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GALLATIN FOSSIL PLANT SURFACE IMPOUNDMENT CLOSURE AND RESTORATION PROJECT ENVIRONMENTAL IMPACT STATEMENT

Sumner County, Tennessee

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COVER SHEET

Gallatin Fossil Plant Surface Impoundment Closure and Restoration Project

Proposed action: The Tennessee Valley Authority (TVA) has prepared this Environmental Impact Statement to assess the effects and address environmental, safety, and socioeconomic concerns associated with the closure of surface impoundments containing Coal Combustion Residuals (CCR) at the Gallatin Fossil Plant (GAF). TVA will decide which of two alternative options will be used for the closure of the surface impoundments and disposition of CCR at the plant.

Type of document: Final Environmental Impact Statement

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Abstract:

TVA must decide how to dispose of CCR removed from the impoundments under the Closure-by-Removal option. In addition to the No Action (Alternative A), TVA considered Alternative B, which includes the closure of the Ash Pond Complex (APC) by removal and the lateral expansion of the existing onsite landfill. Two options for disposal of CCR at GAF are considered under Alternative B. Under Option 1, CCR removed from surface impoundments would be transported via onsite haul roads and placed in either the existing onsite North Rail Loop (NRL) Landfill, an expansion of the existing landfill (South Rail Loop Landfill), or a combination of these landfills. In contrast, under Option 2, CCR removed from surface impoundments at GAF would be transported offsite to a beneficial re-use processing facility, with materials not usable for beneficial re-use to be transported to an offsite landfill or the NRL. This EIS also addresses component actions including those related to transport of borrow material, the construction and operation of a potential beneficial re-use processing facility that would process CCR from GAF, and the removal and relocation of ancillary facilities at GAF. The proposed projects would help support the goal established by the TVA Board of Directors to eliminate wet ash storage at all of its coal plants. Options 1 and 2 would result in minor impacts to the natural environment primarily from the construction of the onsite landfill, but these are not significant and are mitigated, as appropriate. Alternative B with Option 1 is preferred as transportation impacts under Option 2 would be moderate to large due to the transport of CCR to offsite facilities on public roadways. Under Option 1 the air emissions, noise emissions, transportation impacts, safety risks and disruptions to the public that would be associated with the offsite transport of CCR along public roadways are minimized relative to Option 2. Alternative B with Option 1 would meet the purpose and need of the project and is TVA's preferred alternative. However, TVA will continue to explore opportunities for beneficial re-use of CCR at GAF to determine if it could be a viable option in the future.

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Summary

Background

This Environmental Impact Statement (EIS) addresses the the potential environmental effects associated with the closure of the Ash Pond Complex (APC) containing Coal Combustion Residuals (CCR) at the Gallatin Fossil Plant (GAF). GAF is located approximately 12 miles northeast of Nashville in Sumner County, Tennessee. GAF was built between 1953 and 1959 and operates four coal-fired, steam-generating units. Four combustion turbine (CT) units were added to GAF in the 1970s, and another four were added in 2000.

GAF consumes an average of 3.5 million tons of coal per year, which results in the annual production of approximately 255,000 tons of CCR. CCRs are byproducts produced from burning coal and include fly ash, bottom ash, boiler slag, and flue gas desulfurization (FGD) materials. Historically, GAF stored CCR wet in onsite surface impoundments (commonly referred to as ash ponds). All CCR currently produced at GAF is stored in the existing North Rail Loop (NRL) Landfill. The NRL Landfill is a state-of-the-art lined facility located on the GAF reservation.

With a long-standing commitment to safe and reliable operations and to environmental stewardship, TVA began in 2009 its plan to convert from wet to dry management of CCR. On April 17, 2015, the U.S. Environmental Protection Agency (EPA) published the final Disposal of Coal Combustion Residuals from Electric Utilities Rule (CCR Rule) in the Federal Register (80 Federal Register 21302). The CCR Rule establishes national criteria and schedules for the management and closure of CCR facilities.

In June 2016, TVA issued a Final Programmatic Environmental Impact Statement (PEIS) that analyzed methods for closing impoundments that hold CCR materials at all TVA fossil plants and identified specific screening and evaluation factors to help frame the evaluation of closures at these facilities. A Record of Decision (ROD) was released on July 2016 that would allow future site-specific environmental reviews of CCR impoundment closures to tier from the PEIS (TVA 2016). This EIS will tier from the 2016 PEIS document for surface impoundment closures.

TVA has prepared this EIS pursuant to the National Environmental Policy Act (NEPA) to assess the potential environmental impacts associated with several projects to facilitate long-term management of CCR at GAF. Specifically, these projects are listed as follows:

- Surface impoundment closures for the following:
  - Ash Pond A
  - Ash Pond E
  - Middle Pond A
  - Bottom Ash Pond (if not previously closed under a separate project)
  - Stilling ponds
- Permanent disposition of CCR from the surface impoundments, including CCR previously removed from the Bottom Ash Pond that may be temporarily stockpiled in

the existing onsite landfill, as well as *de minimis* amounts of CCR proposed to be removed from the stilling ponds

- Construction of a lateral expansion of the existing onsite landfill
- Location requirements analysis for a beneficial re-use processing facility
- Disposal of CCR materials not usable by a beneficial re-use processing facility in either the onsite landill or an offsite landfill

Ponds subject to the CCR Rule include Ash Pond A, Ash Pond E, Middle Pond A, and the Bottom Ash Pond. In contrast, the stilling ponds are not subject to the CCR Rule. However, for the purposes of this EIS, all of these ponds are collectively referred to as the APC.

Purpose and Need for Action

The purpose of this GAF Surface Impoundment Closure and Restoration EIS is to address the disposition of CCR onsite at GAF, to support the implementation of TVA's goal to eliminate all wet CCR storage at its coal plants by closing CCR surface impoundments across the TVA system, and to assist TVA in complying with EPA's CCR Rule and other applicable federal and state statutes and regulations. The proposed actions would also provide long-term onsite landfill space for operations and/or storage of CCR.

Alternatives and Sites Eliminated from the Scope of this EIS

In April 2019, TVA released a Scoping Report for the GAF Surface Impoundment Closure and Restoration Project EIS which indicated that it would consider three alternatives based on internal review and scoping comments:

- Alternative A – No Action
- Alternative B – Closure of All Surface Impoundments via Closure-by-Removal, the Potential Removal of De Minimis CCR from the Stilling Ponds, and Expansion of the Existing Onsite Landfill
- Alternative C – Closure of All Surface Impoundments via Closure-in-Place, the Potential Removal of De Minimis CCR from the Stilling Ponds, and Expansion of the Existing Onsite Landfill

TVA indicated that under Alternative C it was considering closure of Ash Pond A, Ash Pond E, Middle Pond A, Bottom Ash Pond, and the Non-Registered Site #83-1324 (NRS) at GAF under this EIS.

Since the Scoping Report was published, TVA has reconsidered the Closure-in-Place alternative for Ash Pond A, Ash Pond E, Middle Pond A and Bottom Ash Pond and has eliminated it from further detailed consideration in the EIS for the following reasons:

- The Gallatin site has complex geology and groundwater flows. Although TVA continues to believe that a closure-in-place alternative has merit, TVA believes a conservative approach – moving the CCR to a lined landfill facility, with the possibility of beneficial use – is the better alternative at GAF.
- The Gallatin site can accommodate the construction of an onsite landfill, which is favorable from both an environmental impact perspective and a cost perspective, compared to the use of an offsite landfill. Use of a lined onsite landfill, designed

specifically to avoid impacts associated with karst geologic features of the site, will address concerns for the potential movement of CCR constituents into groundwater.

- TVA entered into an agreement with the State of Tennessee and the Tennessee Department of Environment and Conservation (TDEC) to close the APC by the preferred method of Closure-by-Removal. Consequently, Closure-in-Place is no longer a reasonable alternative for those impoundments.

While Closure-by-Removal is the preferred alternative for several units at Gallatin, according to the EPA, Closure-in-Place remains a safe alternative. TVA will consider the Closure-in-Place alternative where appropriate at our other sites.

The April 2019 Scoping Report also stated that the EIS would study alternatives for closure of the NRS at GAF. Since the Scoping Report was published, TVA entered into an agreement with TDEC that details steps TVA will take to conduct a laboratory treatability test and field demonstration aimed at adjusting pH along the NRS boundary. The evaluation will determine whether adjusting the pH at the site can result in achievement of groundwater protection standards. Following the completion of this investigation, based on a final Environmental Assessment Report (EAR) and data collected in the field demonstration, TVA will submit for TDEC approval a Corrective Action/Risk Assessment (CARA) Plan for closure of the NRS.

TVA will conduct this investigation over the next five years. After adequate information has been collected, TVA will initiate the appropriate NEPA analysis for closure of the NRS before a closure plan is finalized. If appropriate, the NEPA analysis could tier off of this EIS to provide comprehensive coverage of closure activities at the Gallatin site.

Proposed Primary Actions at GAF

Alternatives considered in this EIS consist of both primary actions that directly relate to the project purpose and need, and several component actions that must be undertaken in support of the primary action. Primary actions are those that address the particular options associated with the closure of the surface impoundments and storage of CCR at GAF, whereas component actions are those that may be undertaken by TVA or others and include actions related to disposition of CCR removed from the surface impoundments, the construction and operation of a potential beneficial re-use processing facility that would utilize CCR from GAF, the transport of CCR and borrow material, and several related ancillary facilities and actions. The primary actions that TVA is considering at GAF consist of closure of the surface impoundments that make up the APC and expansion of the existing onsite landfill, as described below.

- **Impoundment Closures.**

  The surface impoundments under consideration for closure at GAF make up the APC. The APC is located north of the fossil plant facilities and includes approximately 435 acres. It began operation in 1970 and was designed, constructed, and operated with the primary intent of treating, storing, and disposing of CCR. Beginning in 1978, pond divider dikes were constructed and subsequently raised over time to divide operational areas of the pond system and to create stilling ponds. The APC is estimated to contain approximately 11.9 million yd^3 of CCR. TVA estimates the duration of Closure-by-Removal of the APC to be approximately 15 years.[1]

Closure of the APC will require stabilization of ponded areas, and removal of CCR material and underlying soil within the impoundment footprint. Specific closure activities would include:

- Dewatering
- Clearing and grubbing
- Karst remediation, if necessary
- Excavation of ash using a tracked excavator and stockpiling CCR material
- Mechanical moisture conditioning the excavated ash by dumping, scooping, and windrowing the ash within the existing footprint of the impoundment until it is sufficiently dried for hauling
- Storm water management
- Over-excavation of soil within the impoundment footprint
- Hauling dry ash and soil to the onsite permitted landfill or beneficial re-use processing facility

Following excavation activities, lower portions of the APC would be converted to storm water management basins with appropriate approvals. The stilling ponds would continue to receive storm water from existing offsite areas north and east of the ponds and could continue to receive storm water runoff from the restored pond area. Upon completion of closure activities, the site would be graded and vegetated to provide appropriate surface water management.

Closure of the surface impoundments may entail the addition of borrow material to achieve proposed finished grades and provide a suitable medium to support restoration of the former impoundment with approved, non-invasive seed mixes designed to quickly establish desirable vegetation. Suitable borrow material would be obtained from the TVA-owned permitted borrow site located 1.5 miles northwest of the fossil plant.

- **Expansion of the Onsite Landfill.**

  The existing onsite landfill at GAF, the 52-acre NRL Landfill, is a Class II disposal facility that went into service in 2016. It is located within the GAF Rail Loop which is an approximately 343-acre area surrounded by inactive railroad tracks. The NRL Landfill contains approximately 6.8 million yd^3 of permitted disposal capacity and is currently utilized for disposal of dry FGD product generated by the GAF plant. The NRL Landfill does not have the capacity for storage of the estimated 11.9 million yd^3 of CCR contained in the APC. Therefore, TVA is proposing to permit and develop an expansion of the NRL Landfill to store the CCR currently contained in the APC. The expansion, referred to as the South Rail Loop (SRL) Landfill, would be of sufficient

[1] The 15-year closure period that is referred to herein begins with the start of CCR removal, after permitting and landfill construction have been completed. By agreement with TDEC, TVA has committed to a 20-year closure period inclusive of the permitting and landfill construction activities.

size to store ash removed from these surface impoundments and would also provide additional storage capacity to supplement the capacity of the NRL Landfill.

The SRL Landfill is a 130-acre lateral expansion of the NRL Landfill, with an approximate landfill volume of 17.2 million yd^3. The estimated capacity provides adequate storage capacity for CCR removed from the surface impoundments at GAF. Construction of the landfill expansion would require the disturbance of 174 acres of primarily undeveloped land and previously developed areas associated with plant operations. Landfill development in this location would also require disturbance of streams, wetlands, and cemeteries. Ancillary facilities and actions affected by landfill development include:

- relocation of a communications tower and ammonia sensor,
- the closure and remediation of a decommissioned firearms range,
- demolition of existing conference center/facilities building, and
- development of an office complex facility.

A paved haul road is also proposed to be constructed from the existing perimeter road located in the western portion of the reservation to the SRL in order to access the site from the southwest. Karst topographic features have been identified within the proposed footprint of the landfill expansion. A karst mitigation plan has been developed to address known and unforeseen subsurface karst features during landfill construction in order to mitigate karst risks and improve the landfill foundation.

Alternatives Evaluated in the EIS

The following alternatives are considered in detail in this EIS:

- Alternative A – No Action Alternative
- Alternative B – Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill

Under the No Action Alternative, TVA assumes it would not close any of the surface impoundments (neither in-place nor by removal), would not construct an expansion of the existing onsite landfill, and would not complete any restorative actions at GAF. Under the No Action Alternative, all plant process wastewaters would be handled through the flow management system, which includes the bottom ash dewatering facility. The stilling ponds would continue to receive storm water. TVA would continue safety inspections of structural elements to maintain stability, and all surface impoundments would be subject to continued care and maintenance activities. Under the No Action Alternative, TVA would also continue its groundwater monitoring program at GAF until groundwater protection standards are reached or as required under TVA's agreement with TDEC (i.e., approved CARA Plan).

Under Alternative B, TVA would remove the CCR from the APC via Closure-by-Removal and construct a lateral expansion of the existing onsite landfill. In addition to CCR located in the impoundments, any CCR that may have been previously removed from the Bottom Ash Pond in conjunction with a previous GAF wastewater project, and that may be temporarily stockpiled in the existing onsite landfill, would also be removed.

Under Alternative B, TVA is considering two options for disposal of CCR removed from the APC.

- **Option 1 – Onsite Landfill**

  Under Option 1, CCR removed from surface impoundments would be transported via onsite haul roads and placed in either the existing onsite NRL Landfill, an expansion of the existing landfill (SRL), or a combination of these landfills.

- **Option 2 – Offsite Beneficial Re-use Processing Facility and Onsite and/or Offsite Landfill**

  Instead of transporting excavated CCR material to an onsite landfill, under Option 2 CCR would be transported to an offsite beneficial re-use processing facility to be processed for use in concrete and other marketable materials. Under Option 2, some of the CCR may be unusable for beneficial re-use and would be disposed of in either the onsite landfill or transported to an existing offsite landfill previously permitted to receive CCR (See Section 2.6 of this EIS). TVA estimates that a minimum of 80% of CCR in the APC, or approximately 800,000 yd^3 per year, could be beneficially re-used, with the remaining CCR, up to 200,000 yd^3 per year, transported to a landfill for disposal.[2]

Supplemental NEPA Analysis

TVA is also investigating two potential onsite locations for a beneficial re-use processing facility within the GAF Reservation. Because these candidate sites do not fully meet the bounding criteria developed for such a facility, TVA has evaluated the maximum potential environmental impacts from a beneficial re-use processing facility at either of these onsite locations in a separate NEPA analysis contained in Appendix E of this EIS.

Summary of Alternative Impacts

This EIS presents a summary of the impacts of each of the alternatives carried forward for detailed analysis. The environmental impacts of Alternatives A and B are summarized in Table S-1.

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[2] TVA's estimate that at least 80% of the CCR in the APC at GAF would be beneficially re-used is based on best available information. If this percentage is substantially revised, TVA will review the potential effects and make a determination of the need for a supplemental environmental review.

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

Resource	Alternative A: No Action	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 1 Disposal in Onsite Landfill	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 2 Disposal in Offsite Beneficial Re-use Processing Facility and Onsite and/or Offsite Landfill
Air Quality	No impact.	Temporary construction impacts associated with emissions from onsite vehicles and equipment as well as generation of fugitive dust. Minor impacts.	Similar to Option 1 with localized onsite emissions from vehicles and equipment as well as generation of fugitive dust during construction activities. Increase in exposure to fugitive dust and exhaust along the haul route from trucks transporting CCR to the beneficial re-use processing facility and offsite landfill. Minor impacts.
Climate Change	No impact.	Minor impacts due to temporary increase in construction-related emissions from internal combustion engines during site preparation and closure activities. Operational GHG emissions are related to trucks transporting CCR to the onsite landfill.	Similar to Option 1 with increase in emissions associated with operation of the beneficial re-use processing facility and the delivery of beneficiated product. Operational GHG emissions are related to trucks transporting CCR to the beneficial re-use processing facility and offsite landfill.
Geology	No impact. TVA would ensure that all impoundment dikes would be stable under static and seismic conditions and meet appropriate safety factors.	Minor impacts due to temporary increase in soil erosion during site preparation activities. Higher risk of altering surface drainage patterns with the potential consequence of triggering subsurface drainage and development through karst features. Potential localized alteration of geologic conditions.	Similar to Option 1. Temporary increase in soil erosion during site preparation activities for beneficial re-use processing facility. Potential localized alteration of geologic conditions. Minor impacts.

Resource	Alternative A: No Action	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 1 Disposal in Onsite Landfill	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 2 Disposal in Offsite Beneficial Re-use Processing Facility and Onsite and/or Offsite Landfill
Groundwater	Risk to groundwater is not reduced. Groundwater protection monitoring will continue in conjunction with the CCR Rule, or as required under TVA's agreement with TDEC (i.e., approved CARA Plan).	Beneficial impacts as it eliminates risk of subsurface discharges and eliminates constituents of concern (COCs) from the former CCR impoundment when the removal project is completed. Long-term moderate benefit after prolonged closure activities. Minor impacts due to temporary increase in soil erosion during site preparation and closure activities. Higher risk of altering surface drainage patterns with the potential consequence of triggering subsurface drainage and development through karst features.	Similar to Option 1.
Surface Water	No change from existing conditions.	Temporary, minor impacts due to potential direct and indirect impacts to the Cumberland River associated with sedimentation from storm water during closure activities. Direct impacts to streams due to landfill expansion requiring mitigation for jurisdictional impacted aquatic features. With proper implementation of treatment/BMPs landfill leachate and run-off would not be expected to impact water quality of receiving streams.	Similar to Option 1. Temporary and minor. Minimized with implementation of appropriate BMPs. Site would be selected that does not include surface water features onsite that would require mitigation. Compliance with all permit requirements and limitations and characterization would be performed of discharge waters to ensure compliance.
Floodplains	No impact.	No impact.	No impact, office complex will be located above elevation 453.0 feet to avoid 100-year floodplain.

Resource	Alternative A: No Action	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 1 Disposal in Onsite Landfill	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 2 Disposal in Offsite Beneficial Re-use Processing Facility and Onsite and/or Offsite Landfill
Land Use	No impact.	Minor impacts as landfill is consistent with surrounding GAF facilities. Conversion of surface impoundments to open space would continue to support industrial land use. Conversion of firearms range, maintained open space, and 174 acres of undeveloped land to industrial and office uses.	Similar to Option 1. Minor impacts due to small scale and location of beneficial re-use processing facility in area zoned for compatible uses.
Prime Farmland	No impact.	Permanent conversion of approximately 10.5 acres of prime farmland soils within the office complex area to industrial use. Minor impacts.	Minor impact due to potential conversion of up to 15 acres of prime farmland to industrial use associated with beneficial re-use facility construction.
Vegetation	No impact.	Minor impacts. Clearance of low quality vegetation from APC and 179 acres of herbaceous, developed low-intensity, and forest in landfill expansion area. Forest communities of composition common within 5-mile vicinity. Revegetate impoundments with native seed mix.	Similar to Option 1.
Wildlife	No impact.	Loss of low-quality habitats associated with CCR impoundments and some forested habitats, displacement of common wildlife species would be minor. Loss of low quality deciduous and evergreen forest, wetland, and riparian habitat in landfill expansion area would be minor. Impacts to active osprey nests would be avoided.	Similar to Option 1. Additional minor impacts due to small scale disturbance and the avoidance of sensitive or rare habitat for development of beneficial re-use processing facility. Potential removal of up to 15 acres of low quality habitat associated with facility construction.

Resource	Alternative A: No Action	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 1 Disposal in Onsite Landfill	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 2 Disposal in Offsite Beneficial Re-use Processing Facility and Onsite and/or Offsite Landfill
Aquatic Ecology	No impact.	Potential for flow and water quality alteration due to APC closure, but impacts are negligible. Potential direct and permanent impacts to unnamed streams, wetlands, and ponds due to landfill construction resulting in long-term permanent impacts; however, impacts would be minor and minimized by erosion BMPs and compensatory mitigation measures per permit requirements.	Similar to Option 1. Minor impacts, as site selected for beneficial re-use processing facility is expected to contain no substantial aquatic resources and disturbances would be minimized or permitted through the appropriate federal and state agencies.
Threatened and Endangered Species	No impact.	For those activities with potential to affect the gray bat, Indiana bat, and northern long-eared bat, TVA committed to implementing specific conservation measures in their programmatic consultation with the USFWS completed in April 2018. The associated conservation measures would be implemented as part of the proposed project. Conservation measures include tree clearing restrictions, which would minimize impacts to tri-colored bat as well. With Conservation measures and BMPs, actions are not expected to significantly impact gray bat, Indiana bat, northern long-eared bat, and tri-colored bat. Restoration of ash ponds would create naturalized areas suitable for foraging habitat.	Impacts from impoundment closure and expansion of the onsite landfill to listed bats, streamside salamander, and other threatened and endangered species are similar to those of Option 1. No impact from construction and operation of the beneficial re-use processing facility due to the avoidance of threatened and endangered species and associated critical habitat for development.

Resource	Alternative A: No Action	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 1 Disposal in Onsite Landfill	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 2 Disposal in Offsite Beneficial Re-use Processing Facility and Onsite and/or Offsite Landfill
		Surveys for presence of streamside salamander were performed by subject matter experts in areas of identified suitable habitat in coordination with TDEC and TWRA. No streamside salamanders or their eggs were identified during field surveys. Therefore, no impacts to this species are expected. No impacts expected to pink mucket or lake sturgeon due to BMPs implemented in accordance with site-specific erosion control plans. Activities would be designed to minimize impacts to Cumberland River and meet the terms and conditions of applicable USACE and TDEC permits. No impact to other threatened and endangered species.	
Wetlands	No impact.	No impact under APC closure due to activities only associated with non-jurisdictional impoundments and previously disturbed laydown areas. Minor impacts mitigated by compensatory mitigation due to removal of vegetation and fill of wetlands within the footprint of the landfill expansion and office complex.	Similar to Option 1. Minor and mitigated by compensatory mitigation coupled with use of BMPs to minimize indirect onsite impacts from development of a beneficial re-use facility.

Resource	Alternative A: No Action	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 1 Disposal in Onsite Landfill	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 2 Disposal in Offsite Beneficial Re-use Processing Facility and Onsite and/or Offsite Landfill
Solid and Hazardous Waste	No impact.	Small volumes of solid and hazardous wastes generated from site preparation and construction activities. Production of construction waste and demolition debris and soil from firearms range remediation due to landfill development. Minor impact as onsite storage of CCR would not impact regional landfill capacity and construction and hazardous wastes would be managed in accordance with all applicable state and federal regulations.	Similar to Option 1. Minor impact from the short-term construction and long-term operation of the proposed facility.
Visual Resources	No impact.	Minor impacts due to temporary visual discord during closure period; closed impoundments would generally merge with the overall industrial components of the facility, becoming visually subordinate to the overall landscape character. Long-term change in visual integrity of the landscape which would result in an impact to the viewshed of some members of the surrounding community. Minimal change to overall scenic value.	Similar to Option 1. Potential minor impact to visual receptors within the foreground of the facility. Potential localized impact to visual receptors along truck hauling routes.

Resource	Alternative A: No Action	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 1 Disposal in Onsite Landfill	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 2 Disposal in Offsite Beneficial Re-use Processing Facility and Onsite and/or Offsite Landfill
Cultural and Historic Resources	No impact.	Adverse effect to NRHP-potentially eligible cemeteries, mitigated in consultation with the State Historic Preservation Officer (SHPO) and tribes by delineation of graves, historical and genealogical research on the persons buried in each cemetery, public notice, efforts to identify and contact any living relatives, relocation of graves to a cemetery identified by TVA, analysis of remains, and installation of interpretive signage or marker.	Similar to Option 1. No effect due to development of beneficial re-use facility. Preferred site would be previously disturbed and avoid any previously identified NRHP listed or eligible sites.
Transportation	No impact.	Overall, the aggregate potential impacts on the regional transportation network are minor. However, localized effects on Steam Plant Road and Odoms Bend Road by increased operations, construction workforce, and borrow transport are moderate. Effects may be reduced by a comprehensive traffic management plan to be undertaken by TVA.	Similar to Option 1. Overall aggregate potential impacts on the regional transportation network are minor if facility is located on a major collector or higher type roadway. Localized effects moderate to large. Effects may be reduced by a comprehensive traffic management plan to be undertaken by TVA.

Resource	Alternative A: No Action	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 1 Disposal in Onsite Landfill	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 2 Disposal in Offsite Beneficial Re-use Processing Facility and Onsite and/or Offsite Landfill
Noise	No impact.	Localized noise at sensitive receptors along Odoms Bend Road during closure activities. Localized, intermittent noise at residences along Newton Lane during construction and operation of office complex. Indirect noise impacts from construction workforce vehicle traffic. Minor impacts as noise attenuates to levels below HUD guidelines for residential areas, limited to normal working hours.	Minor to moderate impacts based on percent increase in total traffic volume, limited to normal working hours.
Natural Areas, Parks and Recreation	No impact.	Minor impacts as construction impacts limited to duration of closure activities. Extensive dispersed recreation opportunities available in vicinity. Temporary increase in noise and fugitive dust for dispersed recreation. Increase in traffic, noise and fugitive dust for Gallatin Steam Plant Boat Ramp and dispersed recreation. Loss of approximately 29 acres of hunting land within WMA.	Minor impacts due to relatively short-term and location on major highway or collector road. Impacts minimized with the use of BMPs including dust control measures. Location on major highway or collector road results in minimal changes in existing traffic conditions.
Socioeconomics and Environmental Justice	No impact.	Minor beneficial impacts due to temporary changes in demographic and employment characteristics and temporary benefits to local economy associated with capital costs, sales tax revenue, and expenditure of construction worker wages.	Similar to Option 1, temporary and long-term changes in demographic and employment characteristics. Minor temporary impact of CCR transport on residential communities and environmental justice populations along the haul route.

Resource	Alternative A: No Action	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 1 Disposal in Onsite Landfill	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 2 Disposal in Offsite Beneficial Re-use Processing Facility and Onsite and/or Offsite Landfill
Public Health and Safety	No impact.	Temporary minor impacts related to construction activities and construction-related traffic and increased risk associated with excavation of CCR impoundments.	Minor impact, though impacts of (Option 2) would be incrementally greater than Alternative B (Option 1) due to additional risks (excavation) associated with the short-term construction of the proposed facility and due to the number of additional trucks on roadways for transport of beneficiated product.
Cumulative Effects	No impact.	Moderate impacts to transportation and noise. Mitigated with implementation of traffic control measures.	Same as Option 1.

Preferred Alternative

TVA's preferred alternative is Alternative B with Option 1 as it would achieve the purpose and need of the project. Option 1 would include the closure of the APC by removal, the lateral expansion of the existing onsite landfill, and transport of CCR removed from surface impoundments via onsite haul roads for placement in either the existing onsite NRL Landfill, an expansion of the existing landfill (SRL Landfill), or a combination of these landfills. Option 1 would result in minor impacts to the natural environment primarily from the construction of the onsite landfill, but these are not significant and are mitigated, as appropriate. Under Option 1 the air emissions, noise emissions, transportation impacts, safety risks and disruptions to the public that would be associated with the offsite transport of CCR along public roadways are minimized relative to Option 2. TVA, however, is committed to evaluating emerging technologies and best practices for beneficial re-use of CCR, as outlined in Option 2, to determine if it could be a viable option in the future.

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Symbols, Acronyms, and Abbreviations

AADT	Annual Average Daily Traffic
ACM	Asbestos Containing Materials
APC	Ash Pond Complex
APE	Area of Potential Effect
ARAP	Aquatic Resource Alteration Permit
bgs	Below Ground Surface
BIP	Balanced Indigenous Population
BMP	Best Management Practices
CAA	Clean Air Act
CARA	Corrective Action/Risk Assessment
CCR	Coal Combustion Residuals
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	Cubic Feet per Second
CGP	Construction General Permit
CO	Carbon Monoxide
CO_2	Carbon Dioxide
COCs	Constituents of Concern
CRAC	Cumberland River Aquatic Center
CRM	Cumberland River Mile
CT	Combustion Turbine
CWA	Clean Water Act
dB	Decibels
dBA	A-weighted decibel
DFDG	Dry Flue Gas Desulfurization
DSWM	Division of Solid Waste Management
EA	Environmental Assessment
EIP	Environmental Investigation Plan
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right to Know Act
EPRI	Electric Power Research Institute
ESA	Endangered Species Act of 1973
FEMA	Federal Emergency Management Agency
FGD	Flue Gas Desulfurization
FHWA	Federal Highway Administration
GAF	Gallatin Fossil Plant
GHG	Greenhouse Gases
GPM	Gallons per Minute
HAP	Hazardous Air Pollutants
HELP	Hydrologic Evaluation of Landfill Performance
HUC	Hydrologic Unit Code
HUD	U.S. Department of Housing and Urban Development
IPaC	Information for Planning and Consultation
JD	Jurisdictional Determination
LCS	Leachate Collection System
Ldn	Day-Night Sound Level
LOS	Level of Service
MCL	Maximum Contaminant Level

MGD	Million Gallons Per Day
Mg/L	Milligrams per Liter
MOA	Memorandum of Agreement
MS4	Municipal Separate Storm Sewer System
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NLCD	National Land Cover Dataset
NMSZ	New Madrid Seismic Zone
NO_2	Nitrogen Dioxide
NO_X	Nitrogen Oxides
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRI	Nationwide Rivers Inventory
NRL	North Rail Loop
NRS	Non-Registered Site
NWI	National Wetland Inventory
OSHA	Occupational Safety and Health Administration
Pb	Lead
PEIS	Programmatic Environmental Impact Statement
PCB	Polychlorinated Biphenyls
PM	Particulate Matter
POTW	Publicly Owned Treatment Works
RBI	Reservoir Benthic Index
RCRA	Resource Conservation and Recovery Act
RFAI	Reservoir Fish Assemblage Index
RM	River Mile
ROD	Record of Decision
SHPO	State Historic Preservation Officer
SO_2	Sulfur Dioxide
SO_X	Sulfur Oxide
SOP	State Operating Permit
SR	State Route
SRL	South Rail Loop
SWPPP	Storm Water Pollution Prevention Plan
SR	State Route
TDEC	Tennessee Department of Environment and Conservation
TDOT	Tennessee Department of Transportation
TDS	Total Dissolved Solids
TMSP	Tennessee Storm Water Multi-Sector General Permit for Industrial Activities
TRO	Total Residual Oxidants
TSC	Tennessee State Code
TSDF	Treatment, Storage and Disposal Facility
TSS	Total Suspended Solids
TVA	Tennessee Valley Authority
TWRA	Tennessee Wildlife Resources Agency
UIC	Underground Injection Control
USACE	U.S. Army Corps of Engineers
USC	United States Code

USCB	United States Census Bureau
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	Volatile Organic Compounds
WMA	Wildlife Management Area
WQC	Water Quality Criteria
WWC	Wet Weather Conveyances
yd^3	Cubic Yard

CHAPTER 1 – PURPOSE AND NEED FOR ACTION

1.1 Introduction and Background

Tennessee Valley Authority's (TVA) Gallatin Fossil Plant (GAF) is located approximately 12 miles northeast of Nashville in Sumner County, Tennessee (Figure 1-1). The plant is on a 1,950-acre reservation along the right descending bank of the Cumberland River which is impounded by the Old Hickory Dam located approximately 27 river miles downstream of GAF. GAF was built between 1953 and 1959 and operates four coal-fired, steam-generating units. Four combustion turbine (CT) units were added to GAF in the 1970s, and another four were added in 2000. CTs primarily use natural gas as a fuel and are operated to meet peak power demands. GAF generates about seven billion kilowatt-hours of electric power in a typical year, which is enough electrical energy to meet the needs of approximately 480,000 homes.

GAF consumes an average of 3.5 million tons of coal per year, which results in the annual production of approximately 255,000 tons of coal combustion residuals (CCR). CCRs are byproducts produced from burning coal and include fly ash, bottom ash, boiler slag, and flue gas desulfurization (FGD) materials. Historically, GAF stored CCR wet in onsite surface impoundments (commonly referred to as ash ponds). All CCR currently produced at GAF is stored in the existing North Rail Loop (NRL) Landfill including bottom ash which is washed from the boiler bottoms and sluiced to a new bottom ash dewatering facility where it is dewatered in tanks before being transported to the landfill. The NRL Landfill is a state-of-the-art lined facility located on the GAF reservation (Figure 1-1).

With a longstanding commitment to safe and reliable operations and to environmental stewardship, in 2009 TVA began its plan to convert from wet to dry management of CCR. On April 17, 2015, the U.S. Environmental Protection Agency (EPA) published the Final Disposal of Coal Combustion Residuals from Electric Utilities Rule (CCR Rule) in the Federal Register (80 Federal Register 21302). The CCR Rule establishes national criteria and schedules for the management and closure of CCR facilities.

Air emission controls that were installed at GAF in 2016, including a scrubber system which produces dry CCR material, allow the CCR to be stored dry in the NRL Landfill. With the completion of the bottom ash dewatering facility in 2020, the plant has completed its transition from wet CCR handling to dry handling of all CCR.

What are CCRs?

CCR are byproducts produced from burning coal and include fly ash, bottom ash, and flue gas desulfurization materials.

Fly Ash: Fly ash is composed mainly of non-combustible inorganic material contained in the coal. Fly ash typically consists of fine particles that are entrained in the combustion exhaust gas.

Bottom Ash: Bottom ash is comprised of the incombustible coarse particles that settle to the bottom of the combustion chamber of a boiler. Bottom ash or boiler slag slurry is produced from washing the boiler bottom with a water jet stream.

Flue Gas Desulfurization Materials: The burning of coal in boilers produces flue gas, which is the combustion exhaust gas that eventually exits via the stack. It is composed mostly of nitrogen, carbon dioxide, water vapor, and oxygen. Flue gas also contains pollutants such as particulate matter (PM), nitrogen oxides, and sulfur oxides. Flue gas desulfurization (FGD) systems or scrubbers remove sulfur oxides from the flue gas using limestone. Gypsum is produced in the chemical reaction between the limestone and the sulfur oxides in the flue gas.

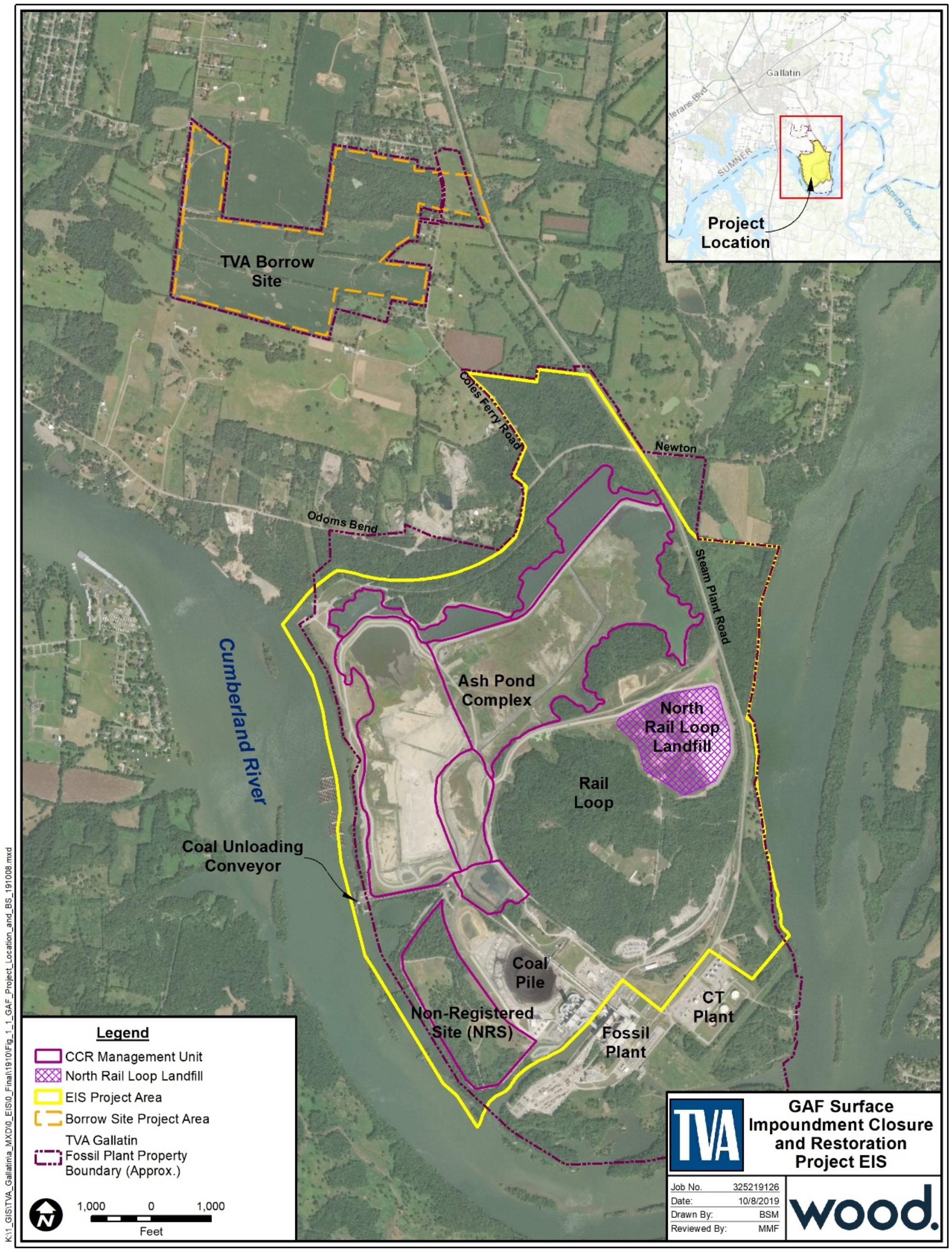


Figure 1-1. GAF Reservation and Project Location

In June 2016, TVA issued a Final Programmatic Environmental Impact Statement (PEIS) that analyzed methods for closing CCR impoundments at TVA fossil plants and identified specific screening and evaluation factors to help frame its evaluation of closures at additional facilities. The purpose of the programmatic National Environmental Policy Act (NEPA) review was to support TVA's goal to eliminate all wet CCR storage at its coal plants by closing CCR surface impoundments across TVA's system and to assist TVA in complying with the EPA's CCR Rule. A Record of Decision (ROD) was released on July 28, 2016 that allowed future environmental reviews of CCR impoundment closures to tier from the PEIS (TVA 2016).

TVA has prepared this Environmental Impact Statement (EIS) pursuant to NEPA to assess the potential environmental impacts associated with several projects to facilitate long-term management of CCR at GAF. Specifically, these projects are listed as follows, and their locations are shown on Figure 1-2.

- Surface impoundment closures for the following:
    - Ash Pond A
    - Ash Pond E
    - Middle Pond A
    - Bottom Ash Pond (if not previously closed under a separate project)
    - Stilling ponds
- Permanent disposition of CCR from the surface impoundments, including CCR previously removed from the Bottom Ash Pond that may be temporarily stockpiled in the existing onsite landfill, as well as *de minimis* amounts of CCR proposed to be removed from the stilling ponds
- Construction of a lateral expansion of the existing onsite landfill
- Location requirements analysis for a beneficial re-use processing facility
- Disposal of CCR materials not usable by a beneficial re-use processing facility in either the onsite landfill or an offsite landfill

Ponds subject to the CCR Rule include Ash Pond A, Ash Pond E, Middle Pond A, and the Bottom Ash Pond. In contrast, the stilling ponds are not subject to the CCR Rule. However, for the purposes of this EIS, all of these ponds are collectively referred to as the Ash Pond Complex (APC).

This EIS will tier from the 2016 PEIS document for surface impoundment closures.

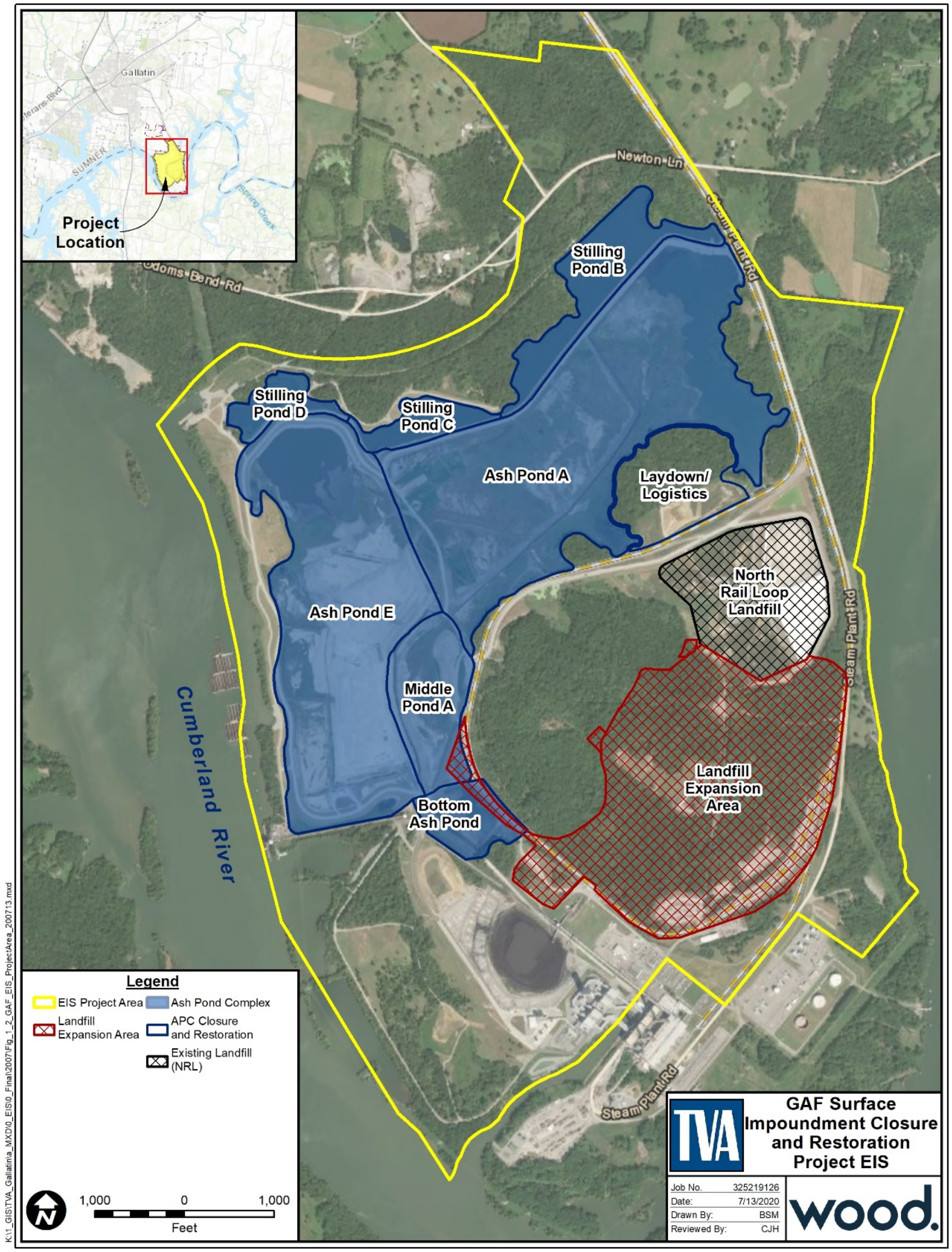


Figure 1-2. GAF EIS Projects

1.2 Purpose and Need

The purpose of this GAF Surface Impoundment Closure and Restoration EIS is to address the disposition of CCR onsite at GAF, to support the implementation of TVA's goal to eliminate all wet CCR storage at its coal plants by closing CCR surface impoundments across the TVA system, and to assist TVA in complying with EPA's CCR Rule and other applicable federal and state statutes and regulations. The proposed actions would also provide long-term onsite landfill space for operations and/or storage of CCR.

1.3 Decision to be Made

This EIS is being prepared to inform TVA decision makers and the public about the environmental consequences of the proposed actions. Specifically, TVA must decide how to dispose of CCR removed from the impoundments under the Closure-by-Removal option. TVA's decision will consider factors such as potential environmental impacts, economic issues, and TVA's long-term goals.

1.4 Related Environmental Reviews

The following environmental reviews have been prepared for actions related to CCR management at GAF:

- *Final Ash Impoundment Closure EIS, Part I Programmatic NEPA Review* (TVA 2016). This Final PEIS was prepared to assess the closure of CCR impoundments at all of TVA's coal-fired power plants.
- *Final Integrated Resource Plan, 2019* (TVA 2019b). This plan provides direction on how TVA can best meet future demands for power.
- *TVA Gallatin Fossil Plant Borrow Site Environmental Assessment (EA)* (TVA 2018a). This EA was prepared to evaluate the development of a borrow site on TVA-owned property located 1.5 miles northwest of GAF.
- *Gallatin Fossil Plant Bottom Ash Process Dewatering Facility EA* (TVA 2017e). TVA conducted this EA to assess wet-to-dry bottom ash conversion at GAF.
- *Gallatin Fossil Plant Bottom Ash Process Dewatering Facility Permanent Flow Management System Supplemental Draft EA* (TVA 2019a). TVA conducted this EA to assess a permanent flow management system to manage process flows without use of the existing surface impoundments.
- *Gallatin Fossil Plant – Installation of Air Pollution Control Equipment and Associated Facilities, Environmental Assessment* (TVA 2013b). TVA prepared this EA to assess proposed additional air emission controls and other actions, including constructing a dry CCR landfill at GAF.

1.5 Scope of the EIS and Summary of the Proposed Action

This EIS evaluates the potential environmental, cultural, and socioeconomic impacts of the proposed impoundment closures and activities associated with the disposition of CCR from the impoundments. A detailed description of the proposed action and alternatives considered are provided in Chapter 2.

TVA prepared this EIS to comply with NEPA and regulations promulgated by the Council on Environmental Quality (CEQ) and TVA's procedures for implementing NEPA. TVA considered the possible environmental effects of the proposed action and determined that potential effects to the environmental resources listed below were relevant to the decision to be made and assessed the potential impacts on these resources in detail in this EIS.

- Air Quality
- Climate Change
- Land Use
- Prime Farmland
- Geology
- Groundwater
- Surface Water
- Floodplains
- Vegetation
- Wildlife
- Aquatic Ecology
- Threatened and Endangered Species
- Wetlands
- Socioeconomics and Environmental Justice
- Recreation and Natural Areas
- Transportation
- Visual Resources
- Cultural and Historic Resources
- Noise
- Solid and Hazardous Waste
- Public Health & Safety

TVA's action would satisfy the requirements of Executive Order (EO) 11988 (Floodplains Management), EO 11990 (Protection of Wetlands), EO 12898 (Environmental Justice), EO 13751 (Invasive Species); and applicable laws including the National Historic Preservation Act (NHPA), Endangered Species Act (ESA), Clean Water Act (CWA), and Clean Air Act (CAA).

1.6 Public and Agency Involvement

1.6.1 Scoping

Public scoping was initiated with the publication of the notice of intent (NOI) to prepare an EIS in the Federal Register on December 7, 2018 (Appendix A). The NOI initiated a 35-day public scoping period, which concluded on January 11, 2019. In addition to the NOI in the Federal Register, TVA sent a media advisory to over 300 newspaper, radio, and television outlets across the TVA service area, as well as trade publications. A public notice advertisement was also placed in the Gallatin News and on the TVA website.

1.6.2 Scoping Feedback

TVA received a variety of comments and opinions regarding the proposed closure of the surface impoundments at GAF and considered this input in developing the Draft EIS. TVA received a total of 13 comment letters and email submissions, of which 11 were from members of the public and two were from public agencies – the EPA and the Tennessee Department of Environment and Conservation (TDEC). Comment submissions were reviewed to identify specific issues of concern by each commenter and were grouped in general categories for identification and review. In total, 25 separate comments were identified. Issues raised by commenters included the following:

1) *Onsite Storage of CCR* – Commenters expressed concern regarding onsite storage of CCR material and requested that it be moved to an offsite location away from the Cumberland River or other bodies of water.

2) *Potential Risks to Water Quality* – Concerns regarding potential risks to both surface water and groundwater quality in conjunction with the disposition of CCR in the existing ash ponds were expressed by four commenters. Comments included issues regarding sensitive geologic characteristics of the region (karst), public water supplies, and protecting water quality.

3) *Recreation and Wildlife* – Two commenters expressed concerns regarding the alternatives under consideration and encouraged TVA to consider potential impacts to recreation, fish and wildlife resources.

4) *Alternatives* – Preferences regarding the stated ash pond closure alternatives were expressed by five commenters. In each case commenters expressed a desire to close ash ponds by removal to reduce potential effects to sensitive resources. TDEC indicated that the evaluation of alternatives should include a consideration of compliance with state regulations and litigation. TDEC also recommended consideration of an alternative that evaluates environmental impacts associated with storage of CCR materials removed from surface impoundments and stilling ponds in the existing onsite landfill or in an expansion of the existing onsite landfill. EPA encouraged TVA to consider alternatives that meet the purpose and need for the project and to consider the No Action alternative.

5) *Preferences Regarding Energy Generation* – Four commenters stated their desire for coal plants to be closed and replaced with natural gas or renewable energy sources.

6) *Beneficial Re-use* – One commenter indicated that more information should be included in the EIS regarding the beneficial re-use process and potential issues related to heavy metals.

7) *Permitting Requirements* – TDEC referenced a need to comply with appropriate permitting in conjunction with project alternatives including National Pollutant Discharge Elimination System (NPDES) permitting requirements, the need for a hydrologic determination study by a certified hydrologic professional to identify all of the aquatic resources within the project limits of disturbance to determine the impact to water resources, and the potential for an Aquatic Resource Alteration Permit (ARAP) in conjunction with the construction of a new onsite landfill.

Additional details regarding comments received during the scoping process are included in the Scoping Report, issued by TVA on April 15, 2019, which is included in Appendix A.

1.6.3 Alternatives Eliminated from Further Consideration

In April 2019, TVA released a Scoping Report for the GAF Surface Impoundment Closure and Restoration Project EIS which indicated that it would consider three alternatives based on internal review and scoping comments:

- Alternative A – No Action
- Alternative B – Closure of All Surface Impoundments via Closure-by-Removal, the Potential Removal of De Minimis CCR from the Stilling Ponds, and Expansion of the Existing Onsite Landfill
- Alternative C – Closure of All Surface Impoundments via Closure-in-Place, the Potential Removal of De Minimis CCR from the Stilling Ponds, and Expansion of the Existing Onsite Landfill

TVA indicated that under Alternative C it was considering closure of Ash Pond A, Ash Pond E, Middle Pond A, Bottom Ash Pond, and the Non-Registered Site #83-1324 (NRS) at GAF under this EIS.

Since the Scoping Report was published, TVA has reconsidered the Closure-in-Place alternative for Ash Pond A, Ash Pond E, Middle Pond A and Bottom Ash Pond and has eliminated it from further detailed consideration in the EIS for the following reasons:

- The Gallatin site has complex geology and groundwater flows. Although TVA continues to believe that a closure-in-place alternative has merit, TVA believes a conservative approach – moving the CCR to a lined landfill facility, with the possibility of beneficial use – is the better alternative at GAF.
- The Gallatin site can accommodate the construction of an onsite landfill, which is favorable from both an environmental impact perspective and a cost perspective to the use of an offsite landfill. Use of a lined onsite landfill, designed specifically to avoid impacts associated with karst geologic features of the site, will address concerns for the potential movement of CCR constituents into groundwater.
- TVA entered into an agreement with the State of Tennessee and TDEC to close the APC by the preferred method of Closure-by-Removal. Consequently, Closure-in-Place is no longer a reasonable alternative for those impoundments.

While Closure-by-Removal is the preferred alternative for several units at Gallatin, according to the EPA, Closure-in-Place remains a safe alternative. TVA will consider the Closure-in-Place alternative where appropriate at our other sites.

1.6.4 Sites Eliminated from the Scope of this EIS

In the April 2019 Scoping Report, TVA stated that the EIS would study alternatives for closure of the NRS at GAF. The NRS location is shown in Figure 1-1. Since the Scoping Report was published, TVA entered into an agreement with TDEC that details steps TVA will take to conduct a laboratory treatability test and field demonstration aimed at adjusting pH along the NRS boundary. The evaluation will determine whether adjusting the pH at the site can result in achievement of groundwater protection standards. Following the completion of this investigation, based on a final Environmental Assessment Report (EAR) and data collected in the field demonstration, TVA will submit for TDEC approval a Corrective Action/Risk Assessment (CARA) Plan for closure of the NRS.

TVA will conduct this investigation over the next five years. After adequate information has been collected, TVA will initiate the appropriate NEPA analysis for closure of the NRS before a closure plan is finalized. If appropriate, the NEPA analysis could tier off of this EIS to provide comprehensive coverage of closure activities at the Gallatin site.

1.6.5 Public and Agency Review of the Draft EIS

TVA's public and agency involvement for the Draft EIS included publication of a public notice and a 45-day public review of the Draft EIS. To solicit public input, the availability of the Draft EIS was announced in regional and local newspapers. A news release was issued to the media and posted to TVA's website. The document was posted on TVA's website and hard copies were made available by request. TVA's agency involvement included sending notices to local, state, and federal agencies and federally recognized tribes to inform them of the availability of the Draft EIS. A list of agencies and tribes notified of the availability of the Draft EIS is provided in Chapter 5.

TVA hosted an open house meeting to solicit public input on January 16, 2020, at the Gallatin Civic Center in Gallatin, Tennessee. TVA chose the open house meeting format to allow the public to attend at their convenience and meet with TVA staff to discuss the project on an informal basis. Members of the public were provided the opportunity to look at displays, discuss the proposed project with subject matter experts, and submit comments.

TVA accepted comments submitted through mail, email, a comment form on TVA's public website, and at the public meeting during the public comment period from December 27, 2019 through February 18, 2020. TVA received 96 comment submissions as follows:

- One submission from a federal agency (EPA)
- One submission from TDEC
- One submission from Sierra Club Tennessee Chapter (included 89 separate comments from the organization's members and 151 additional signatures from members)
- One submission from the Southern Environmental Law Center (collaboration of Tennessee Clean Water Network, Tennessee Scenic Rivers Association, and Sierra Club Tennesee Chapter)
- One submission from a representative of the Tennessee Concrete Association and Tennessee Road Builders Association
- Two submissions from members of the public

TVA carefully reviewed all substantive comments that were received during the public comment period. Most of the comments received were of a general nature, such as the promotion of clean air and water and environmental stewardship. Other comments received were related to public health and safety, groundwater impacts, sufficiency of the bounding analyses, beneficial re-use, cemetery relocation, and consideration of impacts to communities requiring environmental justice considerations.

Comments and TVA's responses are included in Appendix B. TVA will not make final decisions regarding the actions considered in this EIS any earlier than 30 days after the Notice of Availability of the Final EIS is published in the Federal Register.

1.7 Necessary Permits or Licenses

TVA will obtain all necessary permits, licenses, and approvals required for the alternative selected. TVA anticipates the following may be required for implementing the proposed alternatives.

- TDEC Division of Solid Waste Management (DSWM) Class II Solid Waste Permit
- A National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction Activities or an Individual Construction Storm Water permit may be required for the proposed project
- Storm Water Pollution Prevention Plan (SWPPP) would be required to detail sediment and erosion control best management practices (BMPs)

- A TDEC Section 401 Water Quality Certification/ARAP and U.S. Army Corps of Engineers (USACE) 404 permit would be required for disturbance to wetlands and stream features
- Any new outfalls would require a notification or permit modification request to the TDEC
- Air permitting regulations under the CAA require TVA to secure an Air Pollution Control Permit to Construct prior to the commencement of the proposed construction. The project would likely require revisions to TVA's Title V Permit under the CAA for operations.

Any other necessary permits would be evaluated based on site-specific conditions.

CHAPTER 2 – ALTERNATIVES

2.1 Introduction

To support TVA's goal to eliminate all wet ash storage at its coal plants and comply with present and future regulatory requirements related to CCR production and management, as well as applicable state law requirements, TVA is considering closure of CCR surface impoundments at GAF. To achieve this goal and facilitate the long-term management of CCR produced at GAF, TVA proposes closure of existing surface impoundments that make up the APC, disposal and use of CCR from the impoundments, and expansion of the existing onsite landfill. This chapter describes the background and existing condition regarding wet CCR at GAF and the alternatives being considered in this EIS to implement these proposed actions.

Alternatives considered in this EIS consist of both primary actions that directly relate to the project purpose and need, and several component actions that must be undertaken in support of the primary action. As described further in the following sections, primary actions are those that address the particular options associated with the closure of the surface impoundments and storage of CCR at GAF, whereas component actions are those that may be undertaken by TVA or others and include actions related to disposition of CCR removed from the surface impoundments, the construction and operation of a potential beneficial re-use processing facility that would utilize CCR from GAF, the transport of CCR and borrow material, and several related ancillary facilities and actions. Figure 2-1 depicts the relationship between each of the primary actions and their dependent component actions.

2.2 Ash Impoundment Closure Programmatic Environmental Impact Statement

As described in Section 1.1, this EIS is intended to tier from the 2016 PEIS document for surface impoundment closures. TVA issued a Final PEIS that analyzed methods for closing impoundments that contain CCR materials at TVA fossil plants. The PEIS identified specific screening and evaluation factors to help frame the assessment of future closure actions at TVA facilities. TVA determined future environmental reviews of CCR impoundment closures at TVA facilities could tier from the PEIS if the impoundments fit into the framework established in the PEIS. Figure 2-2 provides the conceptual framework used to evaluate ash impoundment closures to determine if the conclusions reached from the PEIS would be applicable to the proposed impoundment closures at GAF.

The PEIS programmatically considered all TVA ash impoundment closures and the environmental effects of two primary ash impoundment closure methods:

1. *Closure-in-Place*. Closure-in-place involves stabilizing the CCR in place and installing an approved cover system.

2. *Closure-by-Removal*. Closure-by-removal involves excavating and relocating the CCR from the ash impoundment in accordance with federal and state requirements to an approved onsite or offsite disposal facility. The CCR may also be beneficially used in products or structural fills.

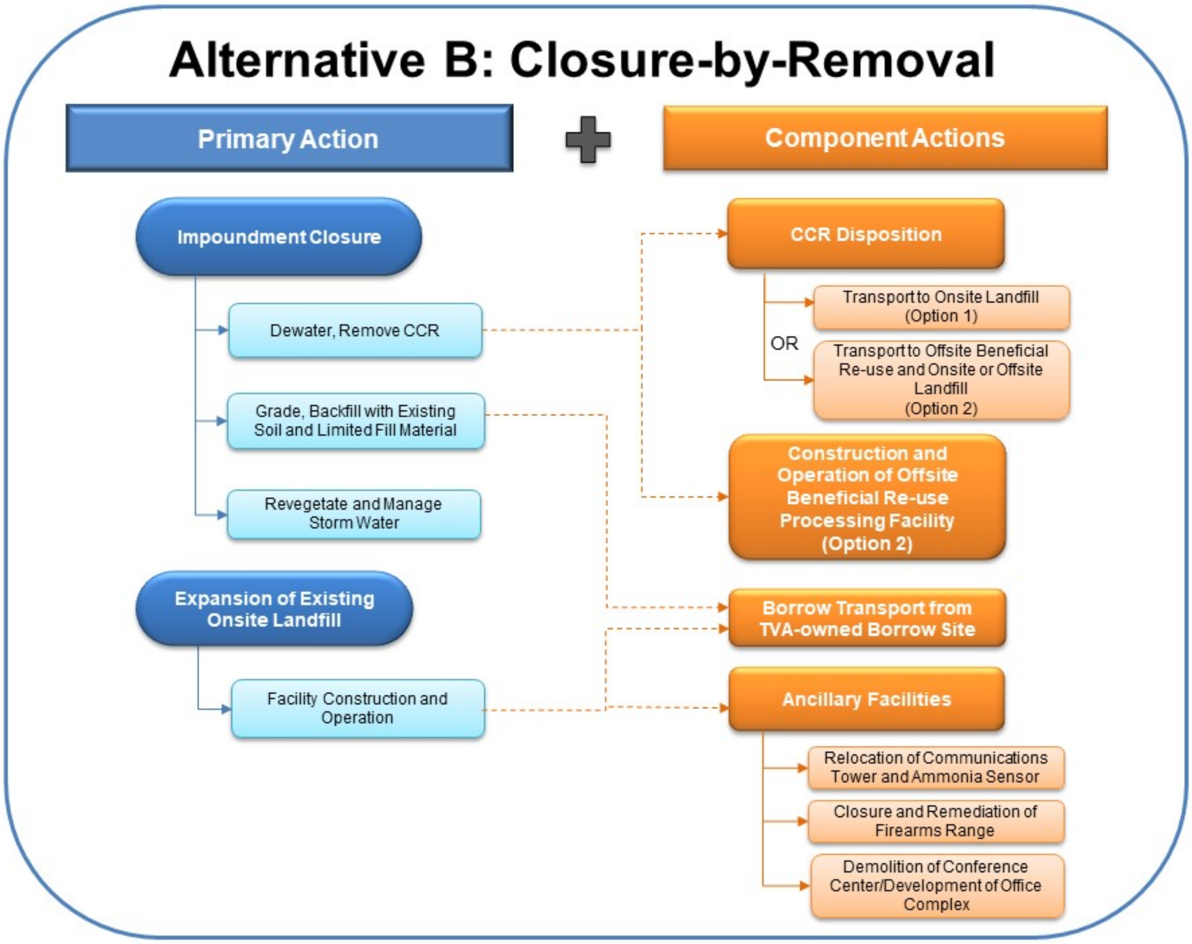


Figure 2-1. Primary and Component Actions Evaluated

At the programmatic level, TVA's analysis confirmed EPA's determination that both closure options can be equally protective of human health and the environment, provided they are implemented properly. In most situations, Closure-in-Place would more likely be environmentally beneficial and less costly than Closure-by-Removal, especially when the amount of CCR material that must be moved from the site exceeds 600,000 cubic yards (yd^3) and the amount of borrow that needs to be delivered to the site exceeds 200,000 yd^3.

For Closure-in-Place, TVA's analyses also confirmed EPA's determination that dewatering and closing impoundments using an approved cover system would reduce groundwater contamination and structural stability risks because the hydraulic head (water pressure) would be reduced. Compared to Closure-by-Removal, this alternative would have significantly less risk to workforce health and safety than those related to offsite transportation of CCR (crashes, derailments, road damage and other transportation-related effects). However, as described in Section 1.6.3, TVA has eliminated Closure-in-Place from further consideration at GAF.

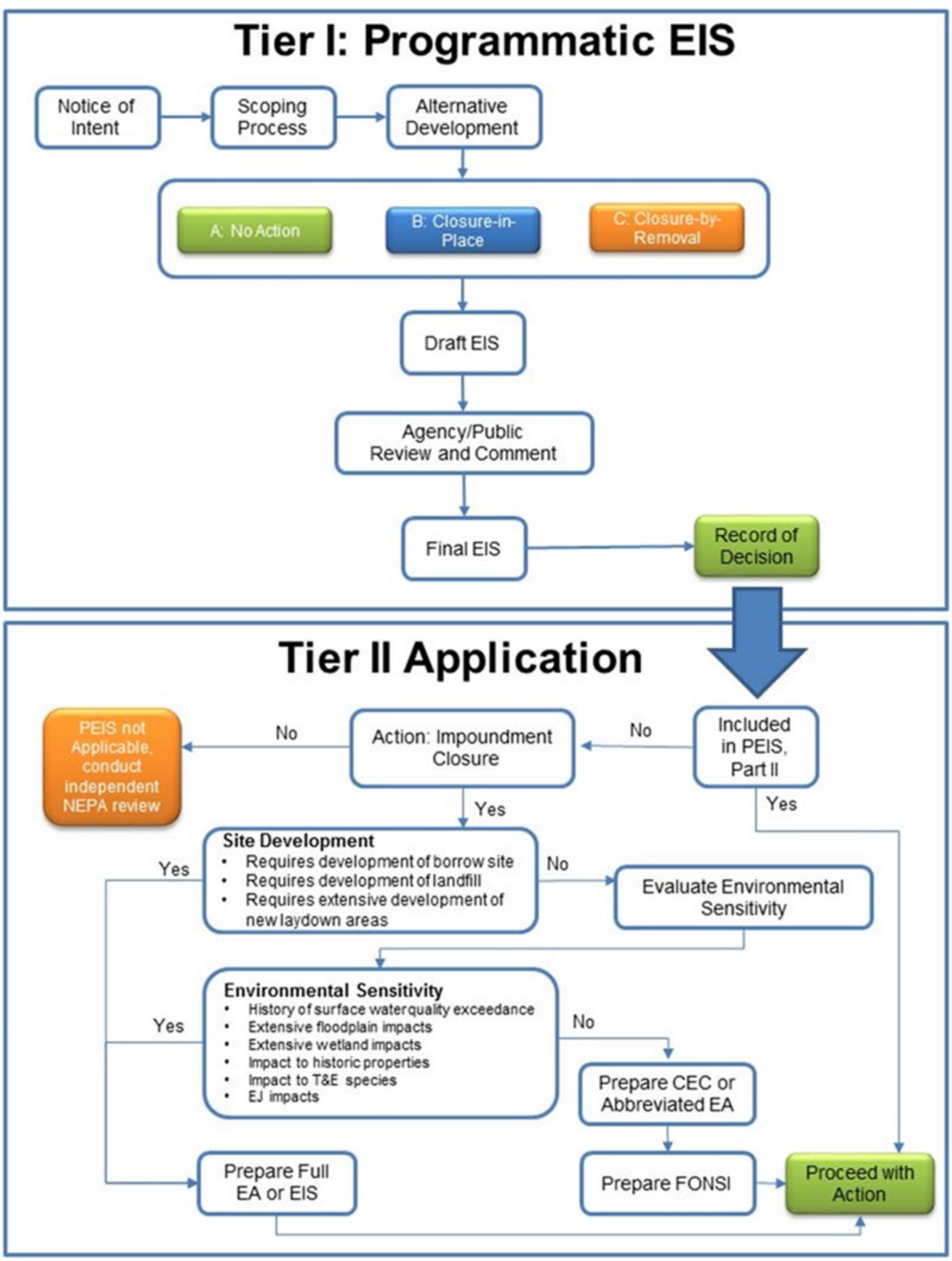


Figure 2-2. Tiered NEPA Process for TVA Ash Impoundment Closure

Closure-by-Removal would reduce groundwater contamination risks more than Closure-in-Place over the long term when CCR intersects with groundwater because CCR material would be excavated and moved to a permitted landfill or beneficially re-used. However, this alternative would potentially result in notably greater impacts associated with other environmental factors (air quality, noise) in conjunction with transport of CCR and would increase the potential for impacts on worker-related and transportation-related health and safety.

2.2.1 Tiering from Ash Impoundment Closure PEIS

This section considers the applicability and appropriateness of the impoundment closures at GAF for second tier NEPA analysis under the PEIS. As such, this analysis considers both the characteristics of the impoundments being considered for closure, and the nature of activities proposed under the closure action. Substantial deviations in either impoundment characteristics or the type and extent of proposed actions to conduct closure may either negate the applicability of tiering or necessitate additional specialized site-specific analyses.

Recognizing the potential pathways for exposure and risk related to existing ash impoundments, TVA developed a series of factors to screen and evaluate project alternatives to determine whether an alternative is a “reasonable” action. Applicability of the impoundment closures under consideration at GAF to the characteristics of impoundment closures considered in the PEIS is demonstrated in Table 2-1.

2.2.2 Deviations from the PEIS

As illustrated in Table 2-1, the volume of CCR in the surface impoundments at GAF exceeds threshold conditions established in the PEIS to determine if it would be reasonable to consider Closure-by-Removal. In the PEIS (TVA 2016), TVA determined that for sites with CCR volumes exceeding 600,000 yd^3, insufficient time would be available within the construction schedule to effectively remove the CCR materials by truck or rail and achieve closure of impoundments within the 5-year period for closure under EPA’s CCR Rule.

In addition, TVA determined that loading operations are highly dependent on the rate at which CCR can be safely excavated, dried, and moved to truck loading facilities. TVA considered these factors and determined programmatically that the rate of truck loading to be 100 truckloads per day, with a capacity of approximately 10 yd^3 of CCR each, for 150 working days per year. Under Alternative B Option 1, CCR removed at GAF would be transported to an onsite landfill. As such transport would not affect offsite properties or land uses. In addition, TVA would be able to use off-road equipment and larger trucks (capacity of 25 yd^3), allowing for an increase of up to 90 truckloads per day. Therefore, the parameter established in the PEIS related to trucking and duration of closure, which assumed fewer, smaller trucks and fewer working days per year, is not applicable to the evaluation of this closure option at GAF. Specifically, at GAF, TVA is able to use a larger number of trucks with a greater capacity and at a higher frequency as well as off-road equipment, resulting in a decreased duration of closure than would be expected using the broader set of conservative assumptions identified in the programmatic analysis.

Table 2-1. Factors Evaluated to Determine Reasonability of Closure Activities in the PEIS and Related Attributes of the Impoundments at GAF

Screening Factor	Programmatic Attribute	GAF Characteristics
Volume of CCR Materials	The size of an ash impoundment and volume of CCR affect closure activities, potential environmental impacts and cost. CCR volume within ash impoundments considered in the PEIS ranged from 10,000 to 25,000,000 yd^3.	Volume of CCR in the APC is approximately 11,945,000 yd^3
Schedule/Duration of Closure Activities	Time necessary to complete closure activities at an ash impoundment affects the reasonability of closure alternatives. The range of closure durations for Closure-by-Removal determined in the PEIS were as follows: Closure-by-Removal: 2.7 years to 170 years	Time to close the APC via Closure-by-Removal is approximately15 years.[3]
Risk to Human Health and Safety Relating to Closure Activities	Closure activities entail a range of construction activities that represent a potential risk to the health and safety of the workforce and the public. As discussed in the PEIS, sites having large volumes of CCR that are considered for Closure-by-Removal would also result in extensive trucking operations that would increase transportation risks.	TVA considered worker safety in the evaluation of closure options for the impoundments at GAF. Closure-by-Removal would require a greater number of truck movements on the site than Closure-in-Place which would increase the risk of injuries and fatalities associated with truck movements.
Surface Water Resources	Consistent with EPA's determination in the CCR Rule and the results of the Electric Power Research Institute (EPRI) model, TVA anticipates that either closure method would have positive effects on surface water, if conducted properly. However, the results of the EPRI model indicated that for the configuration modeled, the Closure-by-Removal alternative would have a greater beneficial impact on surface water.	TVA is conducting an environmental investigation pursuant to an Environmental Investigation Plan (EIP) at GAF which includes an evaluation of the extent of soil, surface water, and groundwater contamination by CCR materials. Initial screening analysis by TVA determined Closure-by-Removal would not cause or contribute to violations of any applicable state water quality standard, violate any applicable toxic effluent standard or prohibition, or jeopardize the continued existence of endangered or threatened species or critical habitats.

[3] For purposes of this EIS, the 15-year closure period that is referred to herein begins with the start of CCR removal, after permitting and landfill construction have been completed. By agreement with TDEC, TVA has committed to a 20-year closure period inclusive of the permitting and landfill construction activities.

Screening Factor	Programmatic Attribute	GAF Characteristics
Groundwater Resources	Closure-by-Removal reduces groundwater contamination by removing the potential source of constituents of concern (COCs) from the site.	In accordance with the EIP, groundwater sampling has been conducted at monitoring wells throughout the GAF site and indicates minimal exceedances of maximum contaminant levels (MCLs) resulting from CCR. In addition to any federal requirements that may apply to the impoundments at GAF after closure is completed, TVA will implement supplemental mitigative measures as agreed upon by TDEC, as well as its approved closure plan, which could include additional monitoring, assessment or corrective action programs. However, as noted in the PEIS, TVA expects any groundwater impacts to be notably reduced following impoundment closure.
Wetlands	Analyses presented in the PEIS determined that for Closure-by-Removal proposed actions would not cause or contribute to significant degradation of wetlands because laydown areas were minimized, and jurisdictional wetlands are generally not present in ash impoundments. Additionally, appropriate measures could be taken to avoid and minimize or compensate for impacts to wetlands and ensure no net loss of wetlands.	Approximately 2.85 acres of wetlands would be impacted due to the expansion of the existing landfill and ancillary actions. No jurisdictional wetlands are within the footprints of the APC at GAF.
Risk to Other Adjacent Environmental Resources	The analyses performed as part of the PEIS determined that risk of potential release and degradation of environmental resources (cultural resources, ecological receptors, and factors related to the human environment) was generally low for Closure-by-Removal. However, potential air and noise emissions were expected to be markedly greater for the Closure-by-Removal alternative due to offsite transport.	Potential areas of disturbance associated with impoundment closure at GAF would be largely confined to previously disturbed lands. Avoidance and minimization efforts to reduce impacts to wildlife species would be implemented as required. Additionally, no adjacent sensitive receptors for air or noise are located proximate to ash impoundments or the proposed landfill expansion at GAF.
Mode and Duration of Transport Activities – Trucking	For those sites with CCR volumes exceeding 600,000 yd^3, TVA determined that insufficient time is available within the construction schedule to effectively remove the CCR materials by truck or rail and achieve closure of impoundments within the 5-year period for closure.	Volume of CCR to be removed from the APC at GAF is approximately 11.9 million yd^3. Based upon the total volume of CCR, Closure-by-Removal of all ash impoundments at GAF would require approximately 15 years.

Primary actions common to all impoundment closures under Closure-in-Place and Closure-by-Removal were identified in the PEIS. However, as described more fully in Section 1.6.3, TVA is only considering Closure-by-Removal of the impoundments at GAF. Table 2-2 summarizes actions under the Closure-by-Removal alternative identified in the PEIS and demonstrates the consistency and applicability of this alternative for the impoundments at GAF within the constraints of the analyses performed as part of the PEIS. Because the characteristics and proposed actions associated with the closure of the surface impoundments at GAF are sufficiently bounded by the conditions and environmental effects described in the PEIS, closure of the GAF impoundments can tier off the analysis in the PEIS. The impacts associated with the increase in number of truckloads, truckload capacity, and annual working days and the impacts of the associated change in duration of the closure activities are evaluated in the analysis of resources in Chapter 3.

Table 2-2. Actions Associated with Closure-by-Removal of GAF Impoundments

Closure Activity	Programmatic Impoundment Closure Activity	Proposed GAF Impoundment Closure Activity
Consider opportunities for beneficial use of ash	Beneficial re-use is considered by TVA as part of all ash management activities. Such re-use may include incorporation of ash from CCR impoundments as part of a low permeability approved cover system.	TVA is considering beneficial re-use of CCR removed from the surface impoundments at GAF under one of the proposed closure alternatives. The main beneficial uses of CCR are in the manufacture of wallboard, roofing, concrete and other products.
Lower ash impoundment water level	Dewatering, which could include decanting and drawdown (which is the removal of free or ponded liquid from an impoundment), must meet current permit limits and could include the removal of pore water from the impoundment. These activities could require additional monitoring or meeting additional limits from state regulators.	Dewatering of surface impoundments at GAF would comply with applicable NPDES permit requirements.
Identify temporary laydown areas and borrow areas	TVA anticipates temporarily using approximately 5 to 10 acres of previously undisturbed lands per site for vehicle and equipment parking, materials storage, and construction administration.	TVA will utilize existing previously disturbed areas for temporary laydown areas during construction activities. Borrow will be obtained from the permitted offsite borrow site owned by TVA and located 1.5 miles northwest of GAF.
Identify facilities for CCR disposal	Identify onsite or offsite permitted management facilities for CCR disposal.	TVA is considering disposal of CCR removed from the impoundments in an expansion of the existing onsite landfill as well as beneficial re-use. CCR that is not usable by a beneficial re-use processing facility will be disposed of in the onsite landfill or a permitted offsite landfill.

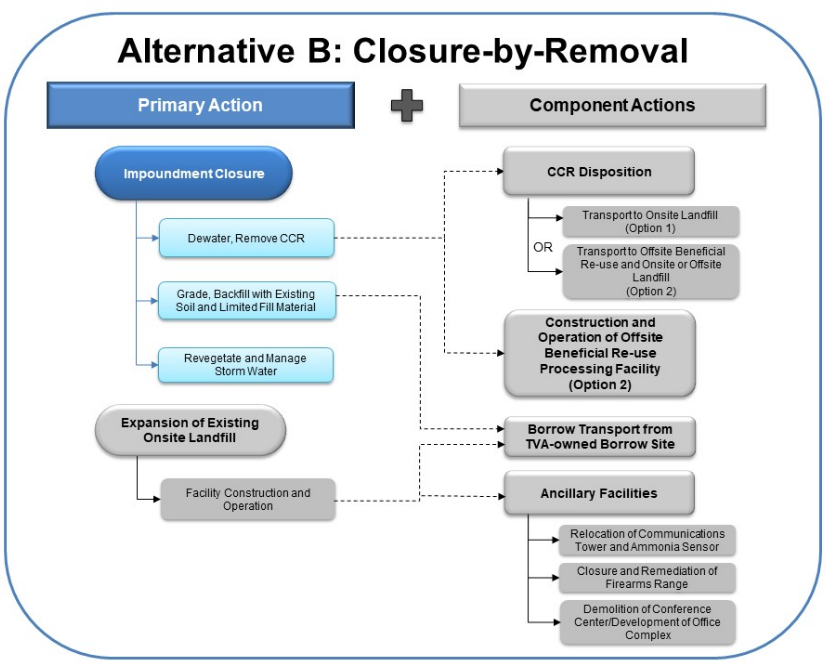
Closure Activity	Programmatic Impoundment Closure Activity	Proposed GAF Impoundment Closure Activity
Install or expand groundwater monitoring system	A groundwater monitoring system will be installed to ensure that an adequately robust system is in place that meets or exceeds federal or state requirements. States may require groundwater monitoring, assessment, and if appropriate, corrective action.	An extensive groundwater monitoring program has been ongoing at GAF in conjunction with TDEC agreements and the EIP. In addition to any federal requirements that may apply to the impoundments at GAF after closure is completed, TVA will implement supplemental mitigative measures as agreed upon with TDEC, as well as its approved closure plan, which could include additional monitoring, assessment or corrective action programs.
Closure documentation	Prepare documentation to demonstrate that appropriate closure activities were successfully implemented.	Closure plans would be finalized upon successful completion of the NEPA review.

2.3 Proposed Primary Actions at GAF

The primary actions that TVA is considering at GAF, as illustrated in Figure 2-1, consist of closure of the surface impoundments that make up the APC and expansion of the existing onsite landfill. These actions are described in detail in the following sections.

2.3.1 Impoundment Closures

The surface impoundments under consideration for closure at GAF make up the APC and are shown in Figure 2-3. The APC is located north of the fossil plant facilities and includes approximately 435 acres. It began operation in 1970 and was designed, constructed, and operated with the primary intent of treating, storing, and disposing of CCR. Beginning in 1978, pond divider dikes were constructed and subsequently raised over time to divide operational areas of the pond system and to create stilling ponds. These efforts resulted in the current ash pond configuration as shown in Figure 2-3.



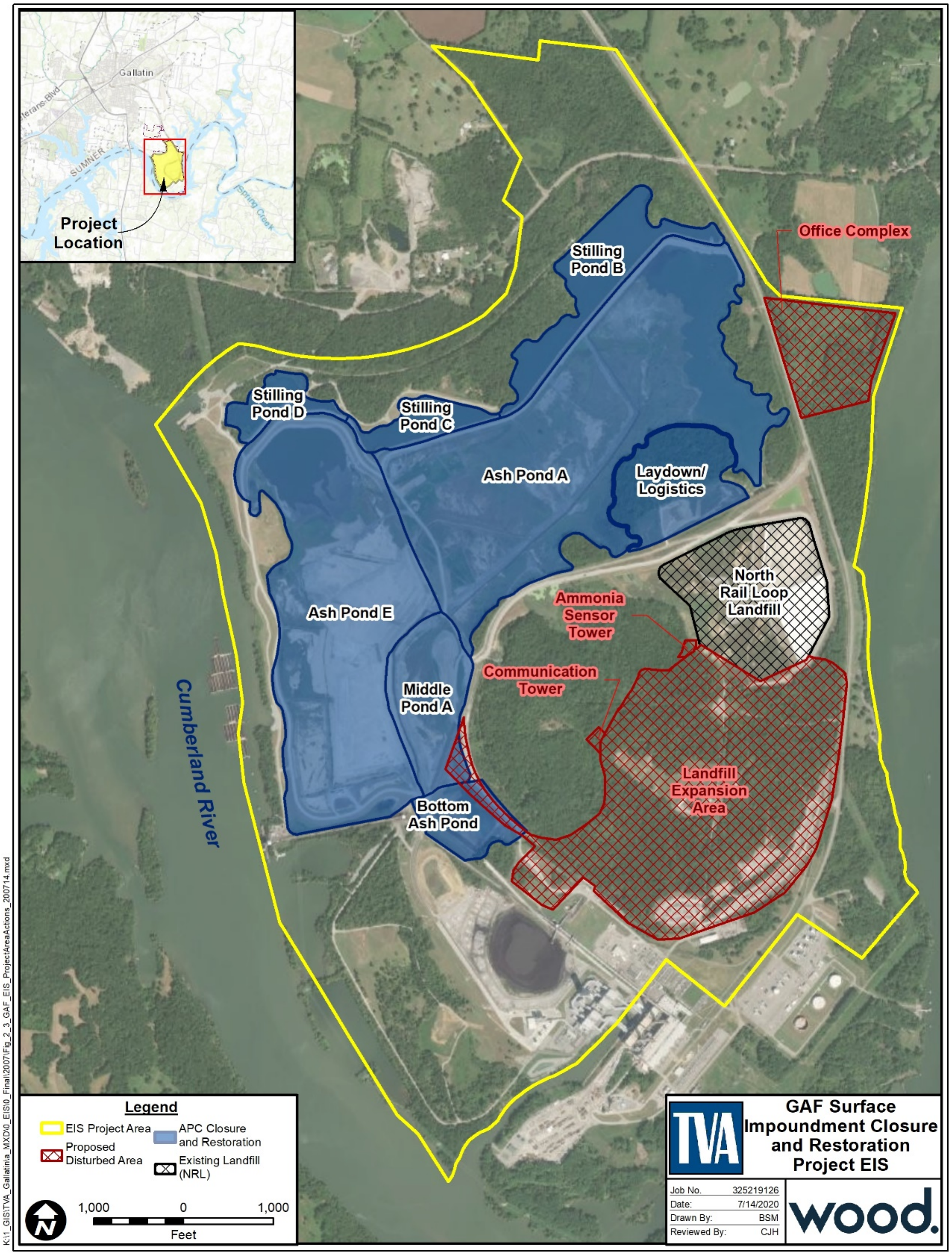


Figure 2-3. GAF APC Closure and Restoration Units, Landfill Expansion, and Ancillary Development Areas

The APC system has functioned to treat plant process wastewaters, coal yard runoff, and bottom ash sluice water. The system allowed for process water to be discharged to the Bottom Ash Pond which was then directed through an open channel into Middle Pond A and Ash Pond A. Process water then discharged from the northeast end of Ash Pond A to a series of connected ponds, Stilling Ponds B, C, and D, which are located along the northern portion of the GAF plant boundary immediately north of Ash Ponds A and E. The stilling ponds cover approximately 52 acres and functioned as wastewater treatment and storm water ponds and are not considered CCR impoundments under the CCR Rule. They provided final polishing of discharged water from Ash Ponds A and E as well as onsite and offsite storm water, before discharging water from Stilling Pond D to the Cumberland River at NPDES permitted Outfall 001. In 2019, TVA completed construction of temporary facilities to convert bottom ash handling facilities from wet to dry and ceased sending waste streams to the APC. As of January 2020, plant process wastewater flows from GAF are routed to a new permanent bottom ash dewatering facility prior to discharge at Outfall 010. CCR produced at GAF is currently disposed of in the NRL landfill.

As shown in Table 2-3, the APC is estimated to contain approximately 11.9 million yd^3 of CCR. CCR material within each impoundment has been estimated based on the best available information from initial investigative studies at GAF. Quantities within this EIS are estimated values and are used for planning and impact analysis purposes. Should further technical analysis indicate substantial change in these quantities that would potentially alter the findings of impacts, supplemental NEPA studies would be conducted. TVA estimates the duration of Closure-by-Removal of the APC to be approximately 15 years.

Table 2-3. Estimated CCR Quantities in the Ash Pond Complex

Impoundment	Area (Acres)	Volume (yd^3)
Ash Pond A	189	5,525,000
Ash Pond E	146	4,950,000
Middle Pond A	32	1,040,000
Bottom Ash Pond	16	400,000
Stilling Pond B	27	3,000
Stilling Pond C Dike	5	18,000
Stilling Pond C	11	4,000
Stilling Pond D	9	5,000
Total CCR	**435**	**11,945,000**

Source: AECOM 2020.

An additional approximately 800,000 yd^3 of impacted soils may be removed from beneath the CCR as part of closure and disposed of in the onsite landfill.

Closure of the APC will require stabilization of ponded areas, and removal of CCR material and underlying soil within the impoundment footprint. Specific closure activities would include:

- Dewatering
- Clearing and grubbing
- Karst remediation, if necessary
- Excavation of ash using a tracked excavator and stockpiling CCR material

- Mechanical moisture conditioning the excavated ash by dumping, scooping, and windrowing the ash within the existing footprint of the impoundment until it is sufficiently dried for hauling
- Storm water management
- Over-excavation of soil within the impoundment footprint
- Hauling dry ash and soil to the onsite permitted landfill or beneficial re-use processing facility

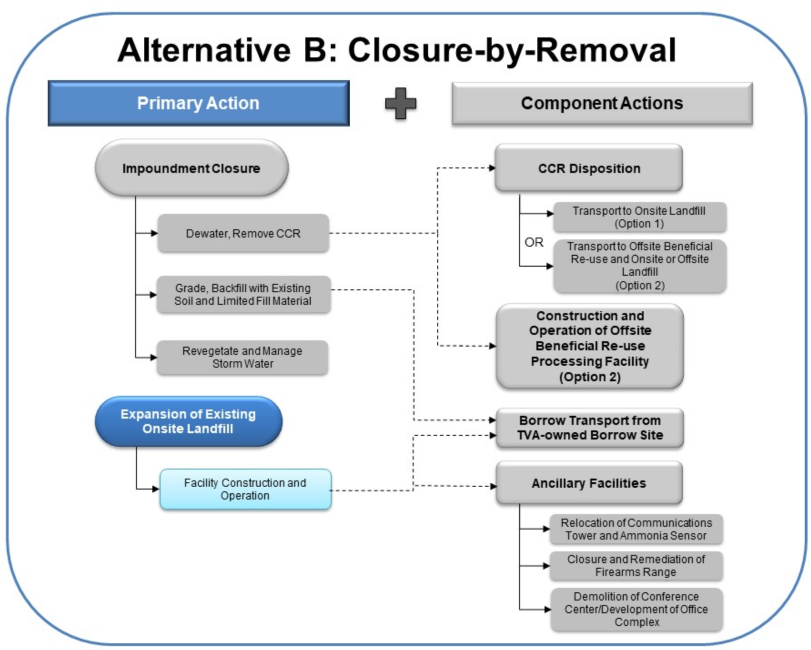
Following excavation activities, lower portions of the APC would be converted to storm water management basins with appropriate approvals. The stilling ponds would continue to receive storm water from existing offsite areas north and east of the ponds and could continue to receive storm water runoff from the restored pond area. Upon completion of closure activities, the site would be graded and vegetated to provide appropriate surface water management.

To facilitate the construction activities associated with closing the surface impoundments, an approximately 31-acre area located between the NRL Landfill and Ash Pond A would be used for laydown, access, and logistical purposes. This laydown/logistical use area would support equipment storage, material stockpiles, construction trailer placement, and would provide direct access for excavation and dewatering equipment to the APC. Approximately 17 acres of the site have been previously cleared, with the remainder to be cleared to accommodate these purposes.

Closure of the surface impoundments may entail the addition of borrow material to achieve proposed finished grades and provide a suitable medium to support restoration of the former impoundment with approved, non-invasive seed mixes designed to quickly establish desirable vegetation. Suitable borrow material would be obtained from the TVA-owned permitted borrow site located 1.5 miles northwest of the fossil plant.

2.3.2 Expansion of the Onsite Landfill

The existing onsite landfill at GAF, the 52-acre NRL Landfill, is a Class II disposal facility that went into service in 2016. It is located within the GAF Rail Loop which is an approximately 343-acre area surrounded by inactive railroad tracks (Figure 1-1). The NRL Landfill contains approximately 6.8 million yd^3 of permitted disposal capacity and is currently utilized for disposal of CCR generated by the GAF plant. The NRL Landfill does not have the capacity for storage of the



estimated 11.9 million yd^3 of CCR contained in the APC. Therefore, TVA is proposing to permit and develop an expansion of the NRL Landfill to store the CCR currently contained in the APC. The expansion would be of sufficient size to store ash removed from these surface impoundments and would also provide additional storage capacity to supplement the capacity of the NRL Landfill.

TVA evaluated feasible landfill alternatives for disposal of the CCR contained in the APC and issued findings and recommendations in the “TVA Gallatin Fossil Plant CCR Disposal Alternatives Study” in March 2018 (AECOM 2018). This study evaluated existing offsite commercial landfills with adequate capacity for disposal of the CCR at GAF, including an evaluation of transportation options via road, rail, and barge. In addition, the study identified potential new landfill opportunities on the GAF Reservation and new offsite options on TVA property in the vicinity of GAF.

The evaluation analyzed preliminary landfill footprints for 15 potential landfills (12 onsite and 3 offsite). Conceptual designs were developed to determine capacity for CCR storage. To provide a comparative assessment between a new or expanded landfill, conceptual designs were evaluated with respect to several criteria including permitting considerations, capacity, site topography, CCR materials transportation, hydrogeology, construction/operations, and cost per cubic yard. Based on TVA’s analysis of existing offsite landfills and evaluation of conceptual designs for a new landfill, TVA selected a southern expansion of the NRL Landfill on the GAF reservation. This expansion area, shown on Figure 2-3, is bordered by the GAF plant to the south, Steam Plant Road to the east, and ash ponds to the north and west. Compared to offsite options using rail or barge transport that were evaluated by TVA, selection and development of the onsite landfill expansion disposal facility is a lower cost option that contributes to TVA’s commitment to provide cost-effective power to users in its service area. In addition, the onsite expansion option avoids potential impacts associated with high frequency offsite truck traffic and its associated emissions.

The selected site, referred to as the South Rail Loop (SRL) Landfill, is a 130-acre lateral expansion of the NRL Landfill with an approximate landfill volume of 17.2 million yd^3. The estimated capacity provides adequate storage capacity for CCR removed from the surface impoundments at GAF. Construction of the landfill expansion would require the disturbance of 174 acres of primarily undeveloped land and previously developed areas associated with plant operations. Landfill development in this location would also require disturbance of streams, wetlands, and cemeteries. As described in Section 2.8, ancillary facilities and actions affected by landfill development include:

- relocation of a communications tower and ammonia sensor,
- the closure and remediation of a decommissioned firearms range,
- demolition of existing conference center/facilities building, and
- development of an office complex facility.

The proposed SRL Landfill will conform to the Class II landfill regulations promulgated by the Division of Solid Waste Management of TDEC. It will include five cells constructed with a composite liner system and a leachate collection and removal system that will direct leachate for onsite treatment prior to discharge to a NPDES outfall. A draft conceptual design drawing of the landfill is included in Appendix C.

Excess soil material excavated during construction of the landfill would be stockpiled in a designated borrow/stockpile area located within the landfill project area or within the NRL Landfill borrow/stockpile areas. In addition, borrow material from the existing permitted borrow site, owned by TVA and located 1.5 miles northwest of GAF, will be used as needed for interim cover and the final cover system. Earthen berms, ditches, and culverts will be used to manage storm water inside the landfill. Surface water runoff will be collected in three sediment basins located outside of the landfill footprint for treatment prior to discharge through an approved NPDES storm water discharge location. Per TDEC and CCR Rule requirements, a groundwater monitoring program will be used to support the protection of groundwater quality from operations at the SRL Landfill. A paved haul road is also proposed to be constructed from the existing perimeter road located in the western portion of the reservation to the SRL in order to access the site from the southwest. The proposed road would be developed adjacent to the rail loop and would utilize a small strip of land on the perimeter of the Bottom Ash Pond and Middle Pond A.

Karst topographic features have been identified within the proposed footprint of the landfill expansion. A risk associated with these karst features would be liner failure resulting from a sinkhole developing beneath the liner system. Due to this risk, a karst mitigation plan has been developed to address known and unforeseen subsurface karst features during landfill construction in order to mitigate karst risks and improve the landfill foundation.

What is Karst Topography?

"Karst" refers to a type of topography that is formed when rocks with a high carbonate content, such as limestone and dolomite, are dissolved by groundwater to form sinkholes, springs, and underground drainage systems.

2.4 Alternatives Evaluated in this EIS

Alternatives developed by TVA to implement impoundment closures at GAF incorporate elements of Closure-by-Removal as described in the PEIS. The following sections present each alternative under consideration and the additional component actions necessary for implementation. TVA is considering the following two alternatives for closure and restoration of surface impoundments at GAF.

- Alternative A – No Action Alternative
- Alternative B – Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill

2.4.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA assumes it would not close any of the surface impoundments (neither in-place nor by removal), would not construct an expansion of the existing onsite landfill, and would not complete any restorative actions at GAF. Under the No Action Alternative, all plant process wastewaters would be handled through the flow management system, which includes the bottom ash dewatering facility. The stilling ponds would continue to receive storm water. TVA would continue safety inspections of structural elements to maintain stability, and all surface impoundments would be subject to continued care and maintenance activities. Under the No Action Alternative, TVA would also continue its groundwater monitoring program at GAF until groundwater protection standards are reached or as required under TVA's agreement with TDEC (i.e., approved CARA Plan).

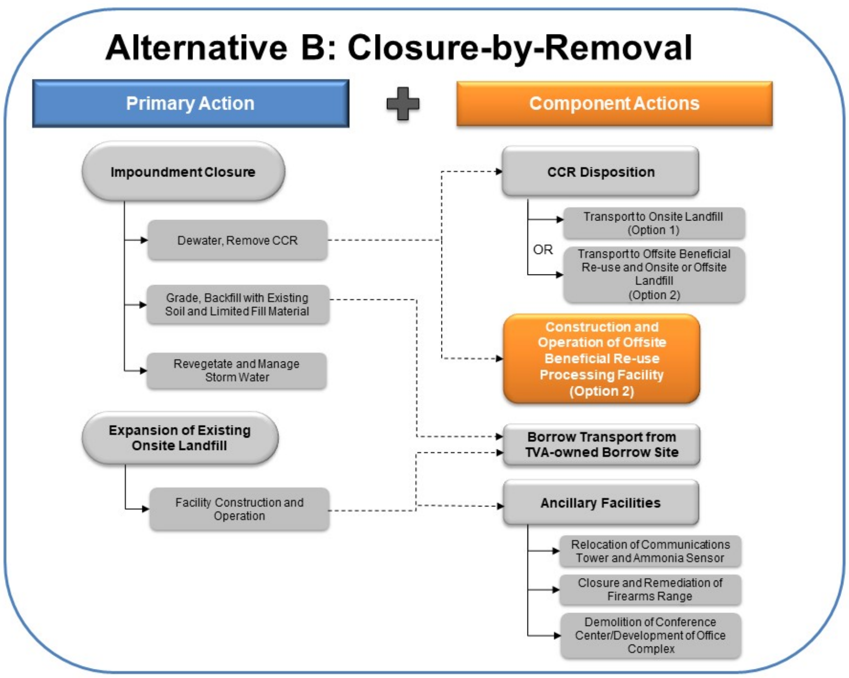
This alternative is included because applicable regulations require consideration of a No Action Alternative in order to provide a baseline for potential changes to environmental resources. However, the No Action Alternative is inconsistent with TVA's plans to convert all of its wet CCR systems to dry systems. It also would be inconsistent with EPA's CCR Rule and TVA's commitments to the State of Tennessee and TDEC. Consequently, this alternative would not satisfy the project purpose and need and, therefore, is not considered viable or reasonable. It does, however, provide a benchmark for comparing the environmental impacts of implementation of Alternative B.

2.4.2 Alternative B – Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill

Under Alternative B, TVA would remove the CCR from the APC via Closure-by-Removal and construct a lateral expansion of the existing onsite landfill. In addition to CCR located in the impoundments, any CCR that may have been previously removed from the Bottom Ash Pond in conjunction with a previous GAF wastewater project, and that may be temporarily stockpiled in the existing onsite landfill, would also be removed.

2.5 Disposal of CCR Removed from Surface Impoundments at GAF

Under Alternative B, TVA is considering two options for disposal of CCR removed from the APC. Each of these options is discussed in the following subsections.



2.5.1 Option 1 – Onsite Landfill

Under Option 1, CCR removed from surface impoundments would be transported via onsite haul roads and placed in either the existing onsite NRL Landfill, an expansion of the existing landfill (SRL), or a combination of these landfills. If CCR from the surface impoundments is placed in the NRL Landfill, it may be necessary to construct separate cells or sub-cells to segregate FGD production material from the excavated ponded ash material due to the variability between these two types of CCR. Comingling of these materials can create significant engineering and operational challenges.

Under this alternative, excavated soil from the landfill area would be stockpiled within the proposed landfill limits or in the NRL Landfill borrow/stockpile areas.

2.5.2 Option 2 – Offsite Beneficial Re-use Processing Facility and Onsite and/or Offsite Landfill

Instead of transporting excavated CCR material to an onsite landfill, under Option 2 CCR would be transported to an offsite beneficial re-use processing facility to be processed for use in concrete and other marketable materials. Under Option 2, some of the CCR may be unusable for beneficial re-use and would be disposed of in either the onsite landfill or transported to an existing offsite landfill previously permitted to receive CCR (See Section 2.6). TVA estimates that a minimum of 80% of CCR in the APC, or approximately 800,000 yd^3 per year, could be beneficially re-used, with the remaining CCR, up to 200,000 yd^3 per year, transported to a landfill for disposal.[4]

Supplemental NEPA Analysis

TVA is also investigating two potential onsite locations for a beneficial re-use processing facility within the GAF Reservation. Because these candidate sites do not fully meet the bounding criteria developed for such a facility (see Section 2.6), TVA has evaluated the maximum potential environmental impacts from a beneficial re-use processing facility at either of these onsite locations in a separate NEPA analysis contained in Appendix E of this EIS.

2.6 Construction and Operation of a Beneficial Re-use Processing Facility

In addition to disposal in an onsite permitted landfill, TVA is also considering the transport of a minimum of 80% of the CCR removed from the APC to a facility where it would be processed for beneficial re-use and distributed to third parties for use in concrete and other construction materials. No specific provider of the beneficiation services or the specific site in which a beneficial re-use processing facility would be constructed has been developed at this time. However, TVA recognizes that such a facility would be constructed and operated because TVA has the necessary raw materials (i.e., CCR) to make such a facility viable. Therefore, regardless of whether TVA owns or operates the facility, TVA recognizes that such a facility is "connected" to the potential Closure-by-Removal of TVA's ash ponds. As described in 40 Code of Federal Regulations (CFR) 1508.25 connected actions are those that "…are closely related and therefore should be discussed in the same impact statement. Actions are connected if they:

> (i) Automatically trigger other actions which may require environmental impact statements.
>
> (ii) Cannot or will not proceed unless other actions are taken previously or simultaneously.
>
> (iii) Are interdependent parts of a larger action and depend on the larger action for their justification."

It is expected that such a facility would be sited and constructed within 10 miles of the nearest interstate system due to the large presence of available CCR at GAF that would need to be transported. However, a specific site for such facility is not yet known. Consequently, this facility, which is a connected action, will be evaluated as a component action in this EIS. TVA has, therefore, developed information to characterize the beneficiation facility and its associated processes to support an analysis of environmental impacts of such a facility in conjunction with Alternative B (Option 2) in Chapter 3. This

[4] TVA's estimate that at least 80% of the CCR in the APC at GAF would be beneficially re-used is based on best available information. If this percentage is substantially revised, TVA will review the potential effects and make a determination of the need for a supplemental environmental review.

alternative, therefore, includes a consideration of the potential effects of a beneficial re-use facility as a means of disposal of CCR from GAF.

Because a specific site for the potential beneficial re-use processing facility has not been identified, impacts of this option for CCR disposal will be based on a bounding analysis of the characteristics of a representative beneficial re-use processing facility. Further information regarding the development of bounding characteristics is provided in Section 2.6.1.3. After completion of this EIS, if a site is identified for use that does not fall within the criteria of the bounding analysis, a supplemental NEPA document will be required. Although a site has currently not been identified, TVA has conducted a supplemental analysis of two potential sites on the GAF Reservation for use by a beneficial re-use processing facility. The environmental consequences of such a development at GAF are presented in a supplemental site-specific analysis presented in Appendix E of this EIS.

Because a beneficial re-use processing facility is expected to be located within 10 miles of the nearest interstate system, trucking is considered to be the only viable mode for transporting CCR to the facility. Based on the estimated volumes of CCR in the APC that could be processed at the beneficial re-use processing facility (a minimum of 80% or 800,000 yd^3 per year) and the use of over the road trucks (capacity of 17 yd^3), 224 truckloads of CCR per day would be needed to transport CCR to the beneficial re-use processing facility. This would result in a traffic count of 448 truck trips per day leaving and returning to GAF for the beneficial re-use processing facility over the approximate 15 years estimated for completion of Closure-by-Removal of the APC.

2.6.1 Overview of the Process to Beneficially Re-use CCR

Technology currently exists at commercially available levels to beneficially use coal ash stored in impoundments in Tennessee. CCR have technical properties that make them valuable resources in certain commercial manufacturing operations. Beneficiation is the treatment of raw material to improve the physical and chemical properties to make them suitable for subsequent use. For example, the Harsco facility at the Allen Fossil Plant in Memphis utilized bottom ash to produce products including roofing granules for shingles and abrasives for sand blasting applications.

EPA (2019b) encourages the beneficial use of CCR in an appropriate and protective manner, because this practice can produce positive environmental, economic, and product benefits such as:

- reduced use of virgin resources,
- lower greenhouse gas emissions,
- reduced cost of coal ash disposal, and
- improved strength and durability of materials.

Encapsulated beneficial uses of CCR are those uses where the CCR is bound in a solid matrix that minimizes mobilization into the surrounding environment. Examples of encapsulated uses include aggregate in concrete or bricks and use as raw material in the manufacture of a product like wallboard. Unencapsulated beneficial uses are those where the material is used in a loose or unbound form and involves the direct placement of the material on land, for example use as structural fills (EPA 2016b).

EPA evaluated the potential environmental impacts associated from fly ash used as a direct substitute for Portland cement in concrete, and from FGD gypsum used as a replacement for mined gypsum in wallboard. EPA's evaluation concluded that the beneficial use of encapsulated CCR in concrete and wallboard is appropriate because environmental releases are comparable to or lower than those from analogous non-CCR products or are at or below relevant regulatory and health-based benchmarks (EPA 2019b).

A common problem limiting the use of fly ash in concrete is high concentrations of residual carbon. Unburned carbon (typically measured as loss on ignition) interferes with air entrainment in the concrete, which is important for freeze-thaw resistance. The ASTM C618 standard for use of fly ash in concrete requires a loss on ignition of no more than 6%. Varying technologies that have been developed to recondition fly ash to make it suitable as a marketable commodity include electrostatic separation, thermal beneficiation and chemical passivation. Two beneficiation technologies considered to have the potential for application at a beneficial re-use processing facility that may be constructed in connection to ash impoundment closure at GAF are the thermal beneficiation and chemical passivation processes.

2.6.1.1 Thermal Beneficiation Process

Thermal beneficiation is a process that uses combustion to reduce the level of carbon in the ash. Thermal beneficiation also eliminates ammonia from fly ash impacted by nitrous oxide controls issues and can improve fineness and uniformity of the resulting product. Successful thermal beneficiation technologies have been commercially deployed for over 15 years and represent more than a million tons of marketable fly ash per year. In general, technologies that utilize thermal beneficiation use atmospheric fluidized bed combustion, which is capable of operating on fuels with low heating values. As a result, in the fluidized bed combustion technology the process is largely "self-fueled" and does not require external fuel inputs (Oberlink et al. 2017).

2.6.1.2 Chemical Passivation

Chemical passivation uses chemicals to reduce the activity of the carbon in the ash. This reduces the need to add large or variable amounts of air entraining agents to the concrete mix. Several passivation methods have been developed and a few are commercially available from large concrete marketers. One approach has been to add low dosages of a "sacrificial chemical" to the ash which reacts with the active sites on the carbon thereby neutralizing them. Another approach uses chemicals to encapsulate the carbon. Both result in the ash having less effect on air entrainment with more predictable results (Oberlink et al. 2017).

2.6.1.3 Bounding Characteristics

In order to assess potential direct and indirect effects associated with the construction and operation of the beneficial re-use processing facility, TVA solicited information from a number of vendors to describe and characterize facility siting requirements, construction characteristics, and operational features. However, because the particular beneficiation technology or location of the beneficial re-use processing facility has not yet been determined, TVA has compiled and summarized bounding attributes to support the analysis of potential environmental impacts. Table 2-4 provides a bounding summary of attributes of a beneficial re-use processing facility and characteristics of activities associated with facility construction and operations. Similarly, Table 2-5 provides a summary of the bounding values associated with various environmental attributes of the facility. Characteristics of the facility and its associated activities as summarized in each of these tables will be used to assess direct and indirect impacts of the beneficial re-use of ash from GAF in each of the resources analyzed in Chapter 3. Tables 2-4 and 2-5 provide lists of bounding attributes and characteristics that a beneficial re-use processing facility should meet in order to fall within the analysis of this EIS. Following completion of this EIS, if a site is identified for a beneficial re-use processing facility that does not meet the listed threshold conditions, a supplemental NEPA document would be required.

Table 2-4. Beneficial Re-use Processing Facility – Table of Facility Attributes

Feature	Characteristic	Specifications
Facility Attributes		
Facility Elements	General Arrangements	Three Primary Facility Areas onsite • Area 1 - Process to Reclaim • Area 2 - Process Island • Area 3 - Storage and Load Out
	Land requirements	Site area up to 15 acres
	Storm water management	Onsite storm water basins or storm sewers
Access	Access to a major highway. Direct access from a collector road	Direct access to site from a collector road or major highway that can support truck traffic without noticeable effects to level of service (LOS)
Electric Use	Electric Requirements	Maximum use of 7.5 MW power needed. Would be obtained from local distribution line
Water Use	Process Water	Up to 150 gallons per minute (GPM) (obtained from local publicly owned treatment works (POTW) or wells) – No surface water intake Can use gray water, if available
	Potable Water	Up to 25 GPM (obtained from local publicly owned source or wells) – No surface water intake
	Cooling System	Closed loop system-heat is re-used to dry ash.
Wastewater Management	Treatment and Discharge	Up to 50 GPM. Processed on site and discharged to POTW or discharge covered under NPDES permit. NPDES permit and limits subject to State requirements.

Feature	Characteristic	Specifications
Capacity	Total operating capacity	400,000-800,000 yd^3 of CCR per year
Material storage	Raw material onsite storage	Approximately 15,000 yd^3 (3 to 4 days) of pre-processed material stored in a covered onsite structure prior to processing.
	Product onsite storage	Processed material stored onsite in silo or dome or equivalent structure that provides protection from elements. Onsite storage (approximately 45,000 yd^3)
Construction Phase Attributes		
Construction	Duration	Up to 14 months
	Construction laydown areas	Laydown areas onsite only. No offsite laydown
Excavation	Process Island Occupied buildings Pipelines	Deep foundations, ~ 40 feet piers depending on geotechnical report No basement or deep foundations for occupied buildings Minor trenching
Borrow	Amount of borrow needed to support construction	None anticipated. If needed would obtain from an existing permitted site within 30 miles of the facility
Operational Characteristics		
Schedule	Hours of Operation	24 hours per day / 7 days per week
Operation	Duration	50 weeks per year 350 operating days per year (2 outages per year)
Fuel	Operational fuel requirement	Natural gas/propane, may be supplied by pipeline. If no pipeline, total quantity stored onsite: up to 200,000 gallons maximum capacity
	Start-up Operations	Natural gas/propane. Total quantity stored onsite would support two (2) cold system start-up per month (4,000 gallons maximum capacity).
Trucking from Fossil Generation Station to Beneficial Re-use Facility (by Utility or Vendor)	Truck type and capacity Distance from Utility	Reclaimed material is transported in either off road heavy haul trucks or covered on-road trucks. Capacity of 25 yd^3 per truck for off-road and 17 yd^3 per truck for on-road trucks. Up to 10 miles to the nearest interstate system

Feature	Characteristic	Specifications
Trucking from Beneficial Re-use Processing Facility (beneficiated product)	Peak truck volume	Beneficiated product is transported in pneumatic trucks, up to 27 tons (25 yd^3 per truck; up to 90 truckloads per day (180 truck trips)
	Average truck volume	50-60 truckloads per day (100 to 120 truck trips)
	Trucking schedule	250 days per year. Monday-Friday during normal operating hours. Occasional weekends.
	Shipping distance	Up to 250 miles

Table 2-5. Beneficial Re-use Processing Facility – Table of Environmental Characteristics and Bounding Values

Resource	Parameter	Bounding Value/ Characteristic
Air Quality	Emissions	SO_2: less than 110 tons per year NO_X and CO: Operational restrictions not to exceed 120 tons per year Particulate matter may exceed 100 tons per year; would obtain a Title V permit Hazardous air pollutants (HAPs): Not a major source. Major source thresholds for HAPs are 10 tons/year for a single HAP or 25 tons/year for any combination of HAPs.
	Area Attainment Status	Prefer areas with attainment status for priority air pollutants
Land Use	Preferred land use	Previously disturbed
Zoning	Preferred zoning	Facility would be located in an area zoned for compatible uses. Prefer industrial zoning or ability to be rezoned.
Water Quality	Potential impacts to receiving streams.	Onsite storm water basins; wastewater process onsite and discharged to POTW; Implement BMPs to minimize soil erosion during construction. Onsite storm water basins; wastewater process onsite and discharged to POTW or via NPDES permit to receiving waterbody. Implement BMPs to minimize soil erosion during construction.
Floodplains		Avoidance of Federal Emergency Management Agency (FEMA) 100-yr floodplain
Vegetation/Land Cover	Forested lands, rare/sensitive vegetation communities and habitats	Avoidance of rare/sensitive vegetation communities Minimization of impacts to forested lands
Species of Concern	Listed species, heronry, osprey, eagles, etc.	Avoidance of impacts to listed species and other species of concern Avoid potential impacts to bats from tree clearing by avoidance and seasonal restrictions on tree clearing Avoidance of impacts to state for federally listed species. Furthermore, actions must not result in the need to consult with USFWS for potential impacts to federally listed species under the ESA. Activities must be in compliance with the National Bald Eagle Management Guidelines.

Resource	Parameter	Bounding Value/ Characteristic
		Avoid potential impacts to bats by avoiding impacts to trees, caves, water bodies, sinkholes, buildings, and bridges
Waters of the U.S.	Jurisdictional waters: streams, wetlands, lakes, etc.	Avoid/minimize stream or wetland impacts (except for potential construction of localized NPDES outfall, impacts would not require a Section 404 and 401 individual permit). Any unavoidable impacts mitigated as per permitting requirements.
Historic Properties	National Register of Historic Places (NRHP) listed properties	Avoidance of previously identified NRHP listed or eligible sites
Hazardous Waste	Avoid hazardous waste impacts	Conduct a Phase I Environmental Survey. Phase II studies conducted if needed. Generation of regulated hazardous substances/wastes not expected. However, any regulated hazardous waste would be managed in accordance with RCRA requirements.
Solid Waste	Management of Solid Waste	Solid wastes from production process expected to be minor. Solid waste generated during outages/maintenance activities varies. Solid wastes to be disposed of in appropriate licensed landfill.
Noise	Noise emissions	Not to exceed 65 decibels at property boundary (commercial properties)
Socioeconomics	Employment	Construction Phase: Up to 150 people Operational Phase: Up to 36 people Workforce Geography: 90 percent from surrounding area, 10 percent from outside local area
Visual/Aesthetics	Maximum height of facility components	140 feet
	Appearance	Industrial facility

2.6.2 Offsite or Onsite Landfill for CCR not Usable in Beneficial Re-use Processing Facility

TVA estimates that up to 20% of CCR removed from the APC may not be suitable for beneficial re-use. This unusable CCR material would be separated and transported by truck to the onsite landfill or to an offsite landfill for disposal. Because a specific disposal site for CCR not useable by the beneficial re-use processing facility has not been identified, impacts of this option for CCR disposal at an offsite landfill is based on a bounding analysis of the characteristics of transport to a representative existing and previously permitted landfill. Given the estimate that a minimum of 80% of CCR would be beneficially re-used under this alternative, disposal of the remaining material in either the onsite landfill or an offsite landfill by trucking would occur over the 15-year period for Closure-by-Removal of the APC. For the purposes of evaluating the maximum extent of impacts from hauling CCR offsite, the EIS analysis assumes that all CCR not beneficially re-used would be transported by truck to a suitable landfill within a 150-mile radius of GAF. Further information regarding the development of bounding characteristics for this component action is provided in Appendix D. After completion of this EIS, if a site is identified for use that does not fall within the criteria of the bounding analysis, a supplemental NEPA document will be required.

Resources having the potential to be impacted by the transport of CCR between GAF and the candidate landfills, and that are considered in this analysis are limited to the following:

- Air Quality – Potential impact from fugitive dust and emissions from loading/unloading equipment and vehicles during transport of CCR to landfill
- Climate Change and Greenhouse Gas (GHG) – Transport operations of CCR contribute to emissions of GHG
- Noise – Potential impact from noise emissions from loading/unloading equipment and vehicles during transport of CCR to landfill
- Transportation – Offsite transport has potential to result in additional impacts to local traffic and increased maintenance needs associated with transportation infrastructure
- Public Health and Safety – Impacts from loading/unloading activities and high-volume transport on roadways result in increased risk of accidents, injuries and deaths
- Natural Areas, Parks, and Recreation – Potential disruptions to the use and enjoyment of natural areas and recreational activities associated with transport of CCR through or adjacent to natural areas, parks or other recreational areas
- Environmental Justice – Potential impacts associated with the transport of and disposal of CCR (transportation-related noise, exposure to fugitive dust, and exhaust emissions) within identified environmental justice communities

The bounding attributes selected for use in impact analyses for transport of CCR to an offsite landfill via truck are summarized in Table 2-6.

Table 2-6. Summary of Bounding Attributes Associated with the Transport of CCR to Offsite Landfill Via Truck

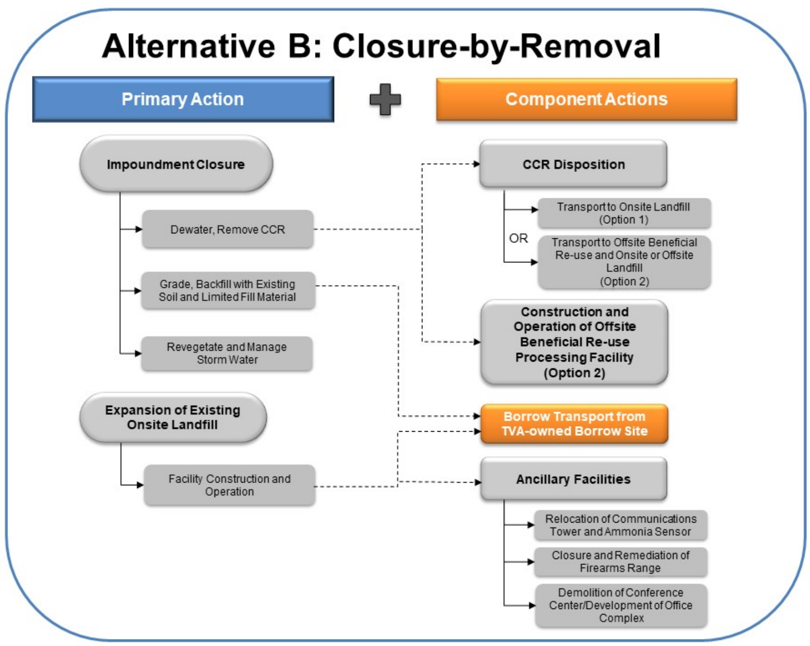
Attribute	Bounding Value
Distance by Road to GAF (miles)	184.3
Estimated Transport-Related Injuries[1]	20.0
Estimated Transport-Related Fatalities[2]	0.8
Length Through Low Income Environmental Justice Population (miles)	52.4
Length Through Minority Environmental Justice Population (miles)	40.4
Is Landfill Located in Low Income Environmental Justice Population?	Yes

Table 2-6. Summary of Bounding Attributes Associated with the Transport of CCR to Offsite Landfill Via Truck

Attribute	Bounding Value
Is Landfill Located in Minority Environmental Justice Population?	No
Length Through USCB Designated Urban Areas (miles)	58.8
Length Through or Adjacent to Natural Areas or Parks (miles)	3.7
Length Through EPA NAAQS Non-Attainment Areas (miles)	24.4
Air Quality Attainment Status of Landfill Location	Non-Attainment for Sulfur Dioxide and 8-hour Ozone

[1]Based on a rate of 32.953 per billion ton-miles for freight transport by truck (FHWA 2016b)
[2]Based on a rate of 1.375 per billion ton-miles for freight transport by truck (FHWA 2016b)

2.7 Borrow Transport

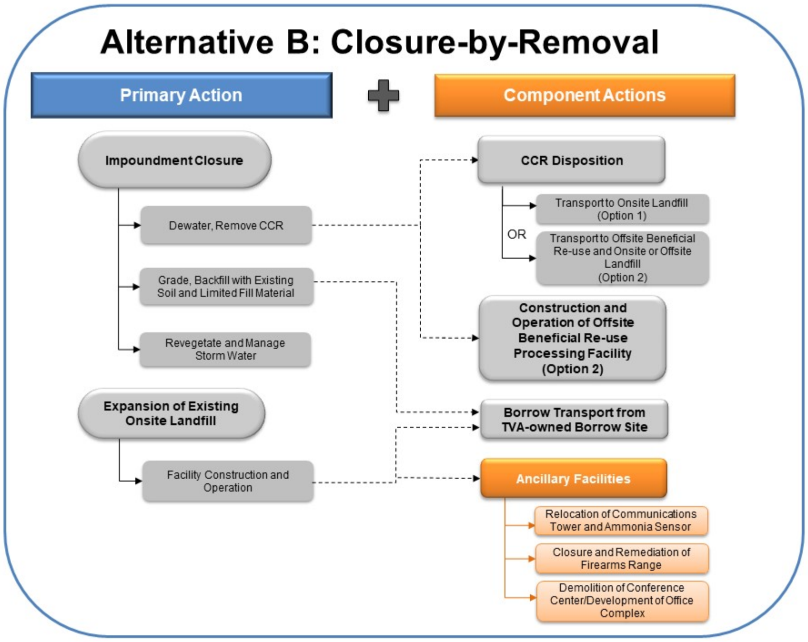


The procurement and transport of borrow for use in backfilling in the onsite landfill and for restoration of the excavated impoundments at GAF is another component action associated with impoundment closure at GAF. Construction, operation, and closure of the landfill is expected to require approximately 1.1 million yd^3 of excavated suitable borrow material. Borrow will also be required for restoration of the impoundments as needed. All borrow material would be obtained from the 198-acre permitted borrow site owned by TVA which is located 1.5 miles northwest of the GAF plant as shown in Figure 1-1. TVA estimates that the site can provide approximately 164,000 yd^3 of topsoil and 987,000 to 1,316,000 yd^3 of clay.

Borrow material from the site would be transported to the landfill expansion site and the excavated impoundment areas at GAF via Steam Plant Road, an approximately 1.5-mile distance from GAF.

2.8 Ancillary Facilities and Actions

Expansion of the existing landfill will require ancillary actions resulting from displacement and relocation of existing facilities as described in the following sections.



2.8.1 Communications Tower and Ammonia Sensor

Currently located within the proposed footprint for the landfill expansion is a 250-foot communications tower which provides microwave/radio communications outside of the plant. This tower is currently located in the north central portion of the landfill expansion footprint. The ammonia sensor structure, located approximately 125 feet southeast of the communications tower, is used to monitor ammonia gas from the plant. The ammonia sensor structure would be relocated to an area adjacent to the landfill near the northwest portion of the site as shown on Figure 2-3. The existing communications tower will be dismantled and recycled. A new self-supporting microwave tower will be erected in the area shown on Figure 2-3 along with a microwave repeater building and backup generator for the building. The communications tower will occupy 0.6 acre and the ammonia sensor tower will occupy 0.5 acre. The new microwave tower and equipment installation will also require telecommunications equipment upgrades at four offsite locations: Hollis Chapel TN Microwave Repeater Station; Wilson TN 500 KV Substation; South Nashville TN 161 KV Switching Station; and the Widows Creek AL Fossil Plant 161 KV Substation. The activities at the offsite locations will be confined to existing structures and equipment at these locations.

2.8.2 Firearms Range Closure and Remediation

Expansion of the existing landfill will require the closure of a firearms range that has operated within the footprint of the proposed SRL. The firearms range was operated by the Gallatin Gun Club as a private range, open only to its members and their guests, from the early 1960s until 2017. The 240-foot pistol/rifle range was periodically used by TVA police and GAF plant security until May 2019 when it closed. Closure of the firearms range will require TVA to characterize the nature, extent, and distribution of lead and other possible COCs located there as a result of this prior use. TVA is entering into the Voluntary Cleanup Program with TDEC Division of Remediation, and remedial measures will be determined in consultation with TDEC and may include onsite treatment coupled with excavation and removal to a suitable offsite landfill.

2.8.3 Office Complex Development

The landfill expansion will require the demolition and removal of the existing GAF conference center located on the southern portion of the rail loop area. This structure will be replaced by an office complex to be developed in the northeast portion of the site, adjacent to the Cumberland River (Figure 2-3). The office complex area will be used to temporarily stage construction trailers, relocation of the existing office complex located near the plant, parking, and construction of a new conference center. The office complex is currently in a conceptual development phase; however, it is expected to be similar in size and appearance of the existing conference center. This site is also being considered for the potential development of a beneficial re-use processing facility by a third party which is evaluated in a supplementary site-specific analysis and presented in Appendix E of this EIS.

2.9 Comparison of Alternatives

The environmental impacts of each of the alternatives under consideration are summarized in Table 2-7. These summaries are derived from the information and analyses provided in the Affected Environment and Environmental Consequences sections of each resource in Chapter 3.

Table 2-7. Summary and Comparison of Alternatives by Resource Area

Resource	Alternative A: No Action	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 1 Disposal in Onsite Landfill	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 2 Disposal in Offsite Beneficial Re-use Processing Facility and Onsite and/or Offsite Landfill
Air Quality	No impact.	Temporary construction impacts associated with emissions from onsite vehicles and equipment as well as generation of fugitive dust. Minor impacts.	Similar to Option 1 with localized onsite emissions from vehicles and equipment as well as generation of fugitive dust during construction activities. Increase in exposure to fugitive dust and exhaust along the haul route from trucks transporting CCR to the beneficial re-use processing facility and offsite landfill. Minor impacts.
Climate Change	No impact.	Minor impacts due to temporary increase in construction-related emissions from internal combustion engines during site preparation and closure activities. Operational GHG emissions are related to trucks transporting CCR to the onsite landfill.	Similar to Option 1 with increase in emissions associated with operation of the beneficial re-use processing facility and the delivery of beneficiated product. Operational GHG emissions are related to trucks transporting CCR to the beneficial re-use processing facility and offsite landfill.
Geology	No impact. TVA would ensure that all impoundment dikes would be stable under static and seismic conditions and meet appropriate safety factors.	Minor impacts due to temporary increase in soil erosion during site preparation activities. Higher risk of altering surface drainage patterns with the potential consequence of triggering subsurface drainage and development through karst features. Potential localized alteration of geologic conditions.	Similar to Option 1. Temporary increase in soil erosion during site preparation activities for beneficial re-use processing facility. Potential localized alteration of geologic conditions. Minor impacts.

Resource	Alternative A: No Action	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 1 Disposal in Onsite Landfill	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 2 Disposal in Offsite Beneficial Re-use Processing Facility and Onsite and/or Offsite Landfill
Groundwater	Risk to groundwater is not reduced. Groundwater protection monitoring will continue in conjunction with the CCR Rule, TDEC agreements, or as required under TVA's agreement with TDEC (i.e., approved CARA Plan).	Beneficial impacts as it eliminates subsurface discharges and eliminates COCs from the former CCR impoundment when the removal project is completed. Long-term moderate benefit after prolonged closure activities. Minor impacts due to temporary increase in soil erosion during site preparation and closure activities. Higher risk of altering surface drainage patterns with the potential consequence of triggering subsurface drainage and development through karst features.	Similar to Option 1.
Surface Water	No change from existing conditions.	Temporary, minor impacts due to potential direct and indirect impacts to the Cumberland River associated with sedimentation from storm water during closure activities. Direct impacts to streams due to landfill expansion requiring mitigation for jurisdictional impacted aquatic features. With proper implementation of treatment/BMPs landfill leachate and run-off would not be expected to impact water quality of receiving streams.	Similar to Option 1. Temporary and minor. Minimized with implementation of appropriate BMPs. Site would be selected that does not include surface water features onsite that would require mitigation. Compliance with all permit requirements and limitations and characterization would be performed of discharge waters to ensure compliance.
Floodplains	No impact.	No impact.	No impact, office complex will be located above elevation 453.0 feet to avoid 100-year floodplain.

Resource	Alternative A: No Action	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 1 Disposal in Onsite Landfill	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 2 Disposal in Offsite Beneficial Re-use Processing Facility and Onsite and/or Offsite Landfill
Land Use	No impact.	Minor impacts as landfill is consistent with surrounding GAF facilities. Conversion of surface impoundments to open space would continue to support industrial land use. Conversion of firearms range, maintained open space, and 174 acres of undeveloped land to industrial and office uses.	Similar to Option 1. Minor impacts due to small area of land required and location of beneficial re-use processing facility in area zoned for compatible uses.
Prime Farmland	No impact.	Permanent conversion of approximately 10.5 acres of prime farmland soils within the office complex area to industrial use. Minor impacts.	Minor impact due to potential conversion of up to 15 acres of prime farmland to industrial use associated with beneficial re-use facility construction.
Vegetation	No impact.	Minor impacts. Clearance of low quality vegetation from APC and 179 acres of herbaceous, developed low-intensity, and forest in landfill expansion area. Forest communities of composition common within 5-mile vicinity. Revegetate impoundments with native seed mix.	Similar to Option 1.

Resource	Alternative A: No Action	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 1 Disposal in Onsite Landfill	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 2 Disposal in Offsite Beneficial Re-use Processing Facility and Onsite and/or Offsite Landfill
Wildlife	No impact.	Loss of low-quality habitats associated with CCR impoundments and some forested habitats, displacement of common wildlife species would be minor. Loss of low quality deciduous and evergreen forest, wetland, and riparian habitat in landfill expansion area would be minor. Impacts to active osprey nests would be avoided.	Similar to Option 1. Additional minor impacts due to small scale disturbance and the avoidance of sensitive or rare habitat for development of beneficial re-use processing facility. Potential removal of up to 15 acres of low quality habitat associated with facility construction.
Aquatic Ecology	No impact.	Potential for flow and water quality alteration due to APC closure, but impacts are negligible. Potential direct and permanent impacts to unnamed streams, wetlands, and ponds due to landfill construction resulting in long-term permanent impacts; however, impacts would be minor and minimized by erosion BMPs and compensatory mitigation measures per permit requirements.	Similar to Option 1. Minor impacts, as site selected for beneficial re-use processing facility is expected to contain no substantial aquatic resources and disturbances would be minimized or permitted through the appropriate federal and state agencies.
Threatened and Endangered Species	No impact.	For those activities with potential to affect the gray bat, Indiana bat, and northern long-eared bat, TVA committed to implementing specific conservation measures in their programmatic consultation with the USFWS completed in April 2018. The associated conservation measures would be implemented as part of the	Impacts from impoundment closure and expansion of the onsite landfill to listed bats and other threatened and endangered species are similar to those of Option 1. No impact from construction and operation of the beneficial re-use processing facility due to the avoidance of threatened and

Resource	Alternative A: No Action	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 1 Disposal in Onsite Landfill	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 2 Disposal in Offsite Beneficial Re-use Processing Facility and Onsite and/or Offsite Landfill
		proposed project. Conservation measures include tree clearing restrictions, which would minimize impacts to tri-colored bat as well. With Conservation measures and BMPs, actions are not expected to significantly impact gray bat, Indiana bat, northern long-eared bat, and tri-colored bat. Restoration of ash ponds would create naturalized areas suitable for foraging habitat. Surveys for presence of streamside salamander were performed by subject matter experts in areas of identified suitable habitat in coordination with TDEC and TWRA. No streamside salamanders or their eggs were identified during field surveys. Therefore, no impacts to this species are expected. No impacts expected to pink mucket or lake sturgeon due to BMPs implemented in accordance with site-specific erosion control plans. Activities would be designed to minimize impacts to Cumberland River and meet the terms and conditions of applicable USACE and TDEC permits.	endangered species and associated critical habitat for development.

Resource	Alternative A: No Action	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 1 Disposal in Onsite Landfill	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 2 Disposal in Offsite Beneficial Re-use Processing Facility and Onsite and/or Offsite Landfill
		No impact to other threatened and endangered species.	
Wetlands	No impact.	No impact under APC closure due to activities only associated with non-jurisdictional impoundments and previously disturbed laydown areas. Minor impacts mitigated by compensatory mitigation due to removal of vegetation and fill of wetlands within the footprint of the landfill expansion and office complex.	Similar to Option 1. Minor and mitigated by compensatory mitigation coupled with use of BMPs to minimize indirect onsite impacts from development of a beneficial re-use facility.
Solid and Hazardous Waste	No impact.	Small volumes of solid and hazardous wastes generated from site preparation and construction activities. Production of construction waste and demolition debris and soil from firearms range remediation due to landfill development. Minor impact as onsite storage of CCR would not impact regional landfill capacity and construction and hazardous wastes would be managed in accordance with all applicable state and federal regulations.	Similar to Option 1. Minor impact from the short-term construction and long-term operation of the proposed facility.

Resource	Alternative A: No Action	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 1 Disposal in Onsite Landfill	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 2 Disposal in Offsite Beneficial Re-use Processing Facility and Onsite and/or Offsite Landfill
Visual Resources	No impact.	Minor impacts due to temporary visual discord during closure period; closed impoundments would generally merge with the overall industrial components of the facility, becoming visually subordinate to the overall landscape character. Long-term change in visual integrity of the landscape which would result in an impact to the viewshed of some members of the surrounding community. Minimal change to overall scenic value.	Similar to Option 1. Potential minor impact to visual receptors within the foreground of the facility. Potential localized impact to visual receptors along truck hauling routes.
Cultural and Historic Resources	No impact.	Adverse effect to NRHP-potentially eligible cemeteries, mitigated in consultation with the State Historic Preservation Officer (SHPO) and tribes by delineation of graves, historical and genealogical research on the persons buried in each cemetery, public notice, efforts to identify and contact any living relatives, relocation of graves to a cemetery identified by TVA, analysis of remains, and installation of interpretive signage or marker.	Similar to Option 1. No effect due to development of beneficial re-use facility. Preferred site would be previously disturbed and avoid any previously identified NRHP listed or eligible sites.

Resource	Alternative A: No Action	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 1 Disposal in Onsite Landfill	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 2 Disposal in Offsite Beneficial Re-use Processing Facility and Onsite and/or Offsite Landfill
Transportation	No impact.	Overall, the aggregate potential impacts on the regional transportation network are minor. However, localized effects on Steam Plant Road and Odoms Bend Road by increased operations, construction workforce, and borrow transport are moderate. Effects may be reduced by a comprehensive traffic management plan to be undertaken by TVA.	Similar to Option 1. Overall aggregate potential impacts on the regional transportation network are minor if facility is located on a major collector or higher type roadway. Localized effects moderate to large. Effects may be reduced by a comprehensive traffic management plan to be undertaken by TVA.
Noise	No impact.	Localized noise at sensitive receptors along Odoms Bend Road during closure activities. Localized, intermittent noise at residences along Newton Lane during construction and operation of office complex. Indirect noise impacts from construction workforce vehicle traffic. Minor impacts as noise attenuates to levels below HUD guidelines for residential areas, limited to normal working hours.	Minor to moderate based on percent increase in total traffic volume, limited to normal working hours.

Resource	Alternative A: No Action	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 1 Disposal in Onsite Landfill	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 2 Disposal in Offsite Beneficial Re-use Processing Facility and Onsite and/or Offsite Landfill
Natural Areas, Parks and Recreation	No impact.	Minor impacts as construction impacts limited to duration of closure activities. Extensive dispersed recreation opportunities available in vicinity. Temporary increase in noise and fugitive dust for dispersed recreation. Increase in traffic, noise and fugitive dust for Gallatin Steam Plant Boat Ramp and dispersed recreation. Loss of approximately 29 acres of hunting land within WMA.	Minor impacts due to relatively short-term and location on major highway or collector road. Impacts minimized with the use of BMPs including dust control measures. Location on major highway or collector road results in minimal changes in existing traffic conditions.
Socioeconomics and Environmental Justice	No impact.	Minor beneficial impacts due to temporary changes in demographic and employment characteristics and temporary benefits to local economy associated with capital costs, sales tax revenue, and expenditure of construction worker wages.	Similar to Option 1, temporary and long-term changes in demographic and employment characteristics. Minor temporary impact of CCR transport on residential communities and environmental justice populations along the haul route.

Resource	Alternative A: No Action	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 1 Disposal in Onsite Landfill	Alternative B: Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill – Option 2 Disposal in Offsite Beneficial Re-use Processing Facility and Onsite and/or Offsite Landfill
Public Health and Safety	No impact.	Temporary minor impacts related to construction activities and construction-related traffic and increased risk associated with excavation of CCR impoundments.	Minor impact, though impacts of (Option 2) would be incrementally greater than Alternative B (Option 1) due to additional risks (excavation) associated with the short-term construction of the proposed facility and due to the number of additional trucks on roadways for transport of beneficiated product.
Cumulative Effects	No impact.	Moderate impacts to transportation and noise. Mitigated with implementation of traffic control measures.	Same as Option 1.

2.10 TVA's Preferred Alternative

TVA's preferred alternative is Alternative B with Option 1 as it would achieve the purpose and need of the project. Alternative B would include the closure of the APC by removal and the lateral expansion of the existing onsite landfill. Under Option 1, CCR removed from surface impoundments would be transported via onsite haul roads and placed in either the existing onsite NRL Landfill, an expansion of the existing landfill (SRL Landfill), or a combination of these landfills. Option 1 would result in minor impacts to the natural environment primarily from the construction of the onsite landfill, but these are not significant and are mitigated, as appropriate. Under Option 1 the air emissions, noise emissions, transportation impacts, safety risks and disruptions to the public that would be associated with the offsite transport of CCR along public roadways are minimized relative to Option 2. However, TVA is committed to evaluating emerging technologies and best practices for beneficial re-use of CCR and for handling/transportation of CCR in the future.

2.11 Summary of Environmental Commitments, Mitigation Measures, and BMPs

This section provides a summary of environmental commitments, mitigation measures, and BMPs that TVA would employ to avoid or reduce adverse impacts from the alternatives analyzed. TVA's analysis of potential impacts considers implementation of these measures as required to reduce or avoid adverse effects. Environmental commitments, mitigation measures, and BMPs proposed for the GAF Surface Impoundment Closure and Restoration projects are summarized below and further discussed in Chapter 3:

- **Standard Best Management Practices (BMPs)** – Standard BMPs will be applied during construction activities to minimize environmental effects and would be implemented by construction personnel or included in contract specifications. Such practices or specifications are discussed in Chapter 3 and include measures to ensure public safety, dust abatement, air pollution abatement, noise abatement, water pollution abatement, proper waste material disposal, erosion control, and measures to avoid or reduce impacts to archaeological and historical resources, vegetation, and wildlife.
- **Erosion and Sedimentation** – Erosion and sedimentation control BMPs (e.g., silt fences) described in The Tennessee Erosion and Sediment Control Handbook – 4th Edition (TDEC 2012) and outlined in the project-specific SWPPP will be implemented to minimize erosion, protect surface waters and groundwater, and preserve soils and geologic features during construction and site restoration activities.
- **Storm Water Discharge** – Appropriate BMPs will be implemented, and proposed project activities will be conducted in a manner to ensure that waste materials were contained and the introduction of pollutants to the receiving waters will be minimized. A General Permit for Storm Water Discharges Associated with Construction Activities TNR100000 (TDEC 2016) or an Individual Construction Storm Water Permit will be obtained and would require development of a project-specific SWPPP in accordance with the TDEC General Construction Storm Water permit (CGP) (TDEC 2016) and the Tennessee Erosion and Sediment Control Handbook (TDEC 2012). The SWPPP would identify specific BMPs to address construction-related activities that will be adopted to minimize storm water impacts.
- **Point Source Discharge** – Equipment washing and dust control discharges will be handled in accordance with BMPs described in the CGP's SWPPP or BMP Plan

required by the site's NPDES Permit TN0005428 to minimize construction impacts to surface waters. Onsite hydrostatic testing will have the option to use potable or surface waters and will be covered under the current NPDES Permit TN0005428 or the hydrostatic general permit.

- **Herbicide Application** – During revegetation and maintenance activities, herbicides with groundwater contamination warnings would not be used and the use of fertilizers and herbicides will be considered with caution before application and applied according to the manufacturer's label. BMPs for herbicide and fertilizer application and to control sediment infiltration will be used to protect groundwater.
- **Air Quality** – TVA would comply with fugitive dust emission standards specified in the GAF's Title V Operating Air Permit, the GAF CCR fugitive dust control plan and associated BMPs, and the construction permit from TDEC. Therefore, fugitive dust emissions from site preparation, construction, and transportation will be controlled by wet suppression and other BMPs, as appropriate. In addition, TVA requires all contractors to keep construction equipment properly maintained and use BMPs (such as covered loads and watering unpaved haul roads) to minimize dust, if necessary.

  In order to minimize fugitive dust from operations of the proposed onsite landfill, CCR will be moisture conditioned and will be transported to the working face of the landfill using heavy-duty dump trucks over paved access roads contained within the boundaries of the plant. Once placed within the landfill, the CCR material will be spread and compacted.
- **Noise** – Noise from project activities would typically be limited to weekdays during normal working hours. Additionally, noise emissions will be minimized through implementation of BMPs including proper maintenance of construction equipment and vehicles.
- **Occupation and Public Health and Safety** – Customary industrial safety standards including OSHA requirements for workers will be followed during all project activities. Also, the establishment of appropriate BMPs and job site safety plans would describe how job safety will be maintained during the project. It is TVA policy that all contractors have in place a site-specific health and safety plan prior to operation on TVA properties.
- **Sanitary Wastes** – Sanitary wastes generated during construction activities will be collected by the existing sewage treatment system, onsite septic system(s) or by means of portable toilets (i.e., porta lets). These portable toilets will be located throughout construction areas and will be pumped out regularly, and the sewage will be transported by a vacuum truck to a publicly owned wastewater treatment works that accepts pump out. Additionally, holding tanks will be an option for sanitary wastes, however additional permitting may be required.
- **Solid and Hazardous Wastes** – Solid and hazardous wastes generated by proposed project activities will be managed in accordance with standard procedures for spill prevention and cleanup and waste management protocols in accordance with pertinent federal, state and local requirements.

  TVA is conducting a site investigation to evaluate the presence, extent, and distribution of lead and possible COCs at the decommissioned firearms range located within the proposed landfill expansion footprint. Depending on the nature, concentration, and extent of COCs identified, some remedial action may be necessary to remove lead and other COCs from the topsoil and overburden stockpiles that could be used in landfill construction. TVA is entering into the Voluntary Cleanup Program with TDEC Division of Remediation, and remedial measures will be determined in consultation with TDEC and may include onsite treatment coupled with excavation and removal to a suitable offsite landfill.

- **Revegetation** – Consistent with EO 13112 as amended by EO 13751, disturbed areas will be graded and revegetated with native or non-native, non-invasive plant species to avoid the introduction or spread of invasive species.
- **CCR Removal** – Alternative B would require removal of the CCR material to comply with Closure-by-Removal standards of the CCR Rule. Dewatering of the ponds would occur under existing NPDES authorizations and would comply with all TDEC regulations. The CCR removed from the impoundments will be dried to an acceptable level prior to being loaded for transport. A CCR removal plan will be submitted for TDEC approval prior to removal.
- **Groundwater** – The proposed new SRL landfill expansion would adhere to TDEC Class II permitting and EPA CCR Rule requirements, incorporating a composite liner system that meets RCRA (Resource Conservation and Recovery Act) regulations and performance standards, as well as a storm water management system, leachate migration control standards, a geosynthetic cap system, and a groundwater monitoring program, minimizing and mitigating water flow through the materials that could cause sinkhole formation and/or impacts to groundwater. Additionally, a draft groundwater detection and monitoring plan that conforms to the Class II landfill regulations promulgated by the TDEC DSWM (TDEC 2016c) has also been developed to evaluate potential impacts to groundwater quality from operations at the SRL Landfill (TVA 2019a). This groundwater detection and monitoring plan will be finalized and incorporated into the permit application for the SRL Landfill according to regulatory requirements.
- **Karst Features** – Potential risk and impact to karst features will be investigated and mitigated during construction activities according to a karst mitigation plan that recommends stages and actions to be performed both prior to landfill construction and during landfill construction.
- **Post-Closure Corrective Action/Risk Assessment (CARA) Plan** – State requirements for post-closure care and/or remediation will be implemented as needed and the CARA Plan will be implemented.
- **Storm Water Management** – Upon CCR excavation and removal, lower portions of the APC will be converted to permanent storm water management basins with appropriate approvals. The stilling ponds would continue to receive storm water from offsite areas north and east of the ponds and could also continue to receive runoff from the restored pond area. Storm water drainage will be directed as appropriate to ensure compliance with all applicable regulations and permits. New storm water outfalls will be installed to direct storm water runoff towards the Cumberland River and discharges would either be covered by the site NPDES permit or the Tennessee Storm Water Multi-Sector General Permit for Industrial Activities (TMSP). These closure processes and changes may require the modification/update of the NPDES permit and/or the TMSP general permit coverage.

New ditches and/or outfall structures will be placed as needed to manage runoff from the closed impoundments. Final drainage will be routed to existing or new discharge points and comply with the NPDES permit to ensure that no adverse impacts to surface waters would occur. Mitigation measures will be identified, as needed, to ensure the discharges meet permit limits. This may or may not require a permit modification.

- **Management of Discharge from Proposed Landfill Expansion** – Leachate from the proposed landfill expansion will be collected in either a collection tank or a sump and pumped to the flow management system, where it will be treated prior to discharge from a permitted NPDES outfall. TVA is evaluating options for storm water collection to comply with NPDES permits.
- **Bat Strategy Programmatic Consultation** – The conservation measures required for this project are identified on pages 5-7 of the TVA Bat Strategy Project Screening Form (Appendix F), and they will be implemented as part of the proposed project. Project activities are within the bounds of impacts analyzed in TVA's Bat Strategy Programmatic Section 7 ESA consultation.
- **Pre-Deconstruction Wildlife Surveys** – A survey will be performed between one and three months prior to removal of structures located within the landfill expansion footprint to determine if wildlife or active nests of migratory birds are present. If active migratory bird nests are found within the buildings located within the landfill expansion footprint, the timing of deconstruction actions will be modified to avoid nesting seasons, or TVA would coordinate with the U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services Program to determine the best options for carrying out project activities under existing permits.
- **Osprey Nests** – Should the two osprey nests located on transmission line towers within the proposed project area be active in future years, ash pond closure activities will be minimized within a 660-foot diameter buffer around the nest during the osprey nesting season. Osprey nest removal would not be required as part of the impoundment closures, as the nests are not located within the limits of disturbance for the proposed project.
- **Streamside Salamander Surveys and Mitigation** – Field surveys for the state-listed streamside salamander were performed by subject matter experts from TDEC and TWRA to determine presence of individuals or egg masses of this species within potentially impacted streams. No streamside salamanders or their eggs were identified during field surveys. Therefore, no impacts to this species are expected.
- **Wetlands and Streams** – A Tennessee Stream Quantification Tool will be required per TDEC regulations to assess the quality of streams to be impacted by the proposed projects. Additionally, the USACE will perform a Jurisdictional Determination (JD) to determine wetlands and stream features that would require mitigation within the limits of disturbance of the office complex. A TDEC Section 401 Water Quality Certification/ARAP and USACE 404 permit will be required for disturbance to wetlands and stream features, and the terms and conditions of these permits would include mitigation for unavoidable adverse impacts, such as the purchase of credits in an approved regional mitigation bank, as appropriate.
- **Floodplains** – Non-critical actions proposed within the 100-year floodplain (the area below elevation 453.0) that were reviewed in TVA's 1981 Class Review of Repetitive Actions in the 100-Year Floodplain (Class Review) (TVA 1981) will be

approvable provided floodplain impacts are minimized. Non-critical actions proposed within the 100-year floodplain that were not reviewed in the Class Review (TVA 1981) will be subject to further review under the floodplains No Practicable Alternative analysis. Critical actions would need to be located outside the 500-year floodplain. Specific conditions to minimize adverse impacts for any non-critical actions proposed within the 100-year floodplain will be determined in a subsequent environmental review.

- **Cultural/Historical Resources** – TVA has consulted with the State Historic Preservation Officer (SHPO) and tribes regarding TVA's finding that no NRHP-eligible archaeological sites or historic architectural properties are located in the Area of Potential Effect (APE); TVA's determinations regarding the NRHP eligibility of the cemeteries; and TVA's finding that five cemeteries (Bailey, Franklin, Hudson/Odoms Bend, Unnamed No. 4, and Unnamed No. 10) may be relocated and therefore could be adversely affected by the undertaking. The SHPO did not disagree with these findings, and none of the tribes that TVA consulted with disagreed or identified resources of concern. The SHPO does not agree that sufficient information is available to support a determination that the Bailey, Franklin, Hudson/Odoms Bend, Unnamed No. 4, and Unnamed No. 10 cemeteries are eligible for the NRHP, but it does consider that such information could come to light in the future. Therefore, these five cemeteries should be considered potentially eligible for inclusion in the NRHP. Because the SHPO agrees with TVA's eligibility determinations and agrees that relocating the cemeteries would result in an adverse effect, TVA will carry out additional investigations to more fully determine the cemeteries' NRHP eligibility. TVA will mitigate impacts to cemeteries located within the project area by removing all graves and relocating them to a new burial ground. In order to carry this out, TVA will:
    - fully delineate the boundaries of each cemetery and generate accurate maps depicting the boundaries of each and the locations of all graves within each cemetery;
    - complete historical and genealogical research on the persons buried at each cemetery;
    - consult with the Tennessee SHPO under the National Historic Preservation Act (NHPA) Section 106 on the potential NRHP eligibility of the cemeteries;
    - identify a suitable relocation cemetery in Gallatin or the surrounding area;
    - publish a notice of TVA's intent to relocate the cemeteries in a local newspaper;
    - make efforts to contact any living relatives of persons buried in the cemeteries;
    - obtain permission to terminate the use of the cemeteries as burial grounds and to relocate the cemeteries; and
    - install interpretive signage or a marker honoring those buried in the cemeteries, in a location accessible to members of the general public, such as the relocation cemetery.

  These measures have been stipulated in a Memorandum of Agreement signed by TVA and SHPO. Completion of these steps would complete TVA's obligations for the project under NHPA section 106. After completing these steps, TVA would disinter all the graves and reinter them in the relocation cemetery with the original grave markers.

- **Traffic** – TVA commits to conducting a traffic analysis and traffic management plan to identify and evaluate potential mitigative measures and their effectiveness for reducing traffic related impacts. Such measures may include staging and management of truck ingress/egress, potential alternate routing, intersection improvements, addition of turning lanes, and installation of temporary signals at key intersections.
- **Post-closure Monitoring** – In addition to any federal requirements that may apply to the impoundments at GAF after closure is completed, TVA will implement supplemental mitigative measures as required TDEC, as well as its approved closure plan, which could include additional groundwater monitoring, assessment or corrective action programs.
- **Additional Analyses** – If the proposed action were to change significantly from that described in the EIS because of additional or new information, additional environmental analyses will be undertaken if necessary. Specifically, after completion of this EIS, if a beneficial re-use processing facility site is identified for use that does not fall within the criteria of the bounding analysis in this EIS, a supplemental NEPA document will be required.

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Air Quality

3.1.1 Affected Environment

3.1.1.1 Regulatory Framework for Air Quality

Through passage of the Clean Air Act (CAA), Congress mandated the protection and enhancement of our nation's air quality resources The EPA has established National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment for the following criteria pollutants (EPA 2019e):

- Sulfur dioxide (SO_2)
- Ozone
- Nitrogen dioxide (NO_2)
- Particulate matter (PM) with particle sizes less than or equal to 10 micrometers (PM_{10})
- Particulate matter with particle sizes less than or equal to 2.5 micrometers ($PM_{2.5}$)
- Carbon monoxide (CO)
- Lead (Pb)

The CAA identifies two types of NAAQS. Primary standards provide public health protection. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings (EPA 2019e). The CAA also requires EPA to set standards for emissions of hazardous air pollutants (HAPs).

In accordance with the CAA Amendments of 1990, all counties are designated with respect to compliance, or degree of noncompliance, with the NAAQS. These designations are either attainment, nonattainment, or unclassifiable. An area with air quality better than the NAAQS is designated as "attainment," whereas an area with air quality worse than the NAAQS is designated as "non-attainment." Non-attainment areas are further classified as extreme, severe, serious, moderate, or marginal. An area may be designated as unclassifiable when there is a lack of data to form a basis of attainment status. New or expanded emissions sources located in areas designated as nonattainment for a pollutant are subject to more stringent air permitting requirements (EPA 2018c).

Sumner County and the surrounding counties (Davidson, Macon, Robertson Trousdale and Wilson in Tennessee and Allen and Simpson county in Kentucky) are in attainment with applicable NAAQS (EPA 2019f) and with Tennessee ambient air quality standards referenced in the Tennessee Air Pollution Control Regulations (Chapter 1200-3-3).

3.1.1.2 Other Pollutants and Air Quality Concerns

Nitrogen oxides (NO_X) are a group of highly reactive gases, including NO_2 that contain varying amounts of nitrogen and oxygen. NO_X emissions contribute to ground-level ozone, fine particulate matter, regional haze, acid deposition and nitrogen saturation. Natural sources of NO_X include lightning, forest fires and microbial activity; major sources of human-produced NO_X emissions include motor vehicles, electric utilities, industrial boilers, nitrogen fertilizers and agricultural burning (TVA 2016).

Sulfur oxides (SO_x) are compounds of sulfur and oxygen molecules. Sulphur dioxide (SO_2) is the predominant form found in the atmosphere. Most SO_2 is produced from the burning of fossil fuels (coal and oil), as well as petroleum refining, cement manufacturing and metals processing. In addition, geothermic activity, such as volcanoes and hot springs, can be a significant natural source of SO_2 emissions (World Bank Group 1998).

HAPs, commonly referred to as air toxics, are pollutants that are known or suspected to cause cancer or other serious health effects or adverse environmental effects. The Clean Air Act identifies 187 pollutants as HAPs (EPA 2019a). Most HAPs are emitted by human activity, including mobile sources (motor vehicles), stationary sources (factories, refineries and power plants) and indoor sources (building materials and activities such as dry cleaning). There are two types of stationary sources that generate emissions of air toxics:

- *Major sources:* Sources that emit 10 tons per year or more of any of the listed HAPs, or at least 25 tons per year of a mixture of HAPs.
- *Area Sources:* Sources that emit less than 10 tons per year of a single HAP or less than 25 tons per year of a combination of HAPs. Emissions from individual area sources are relatively small. However, if located in heavily populated areas that contain a number of area sources, emissions can be of concern.

The proposed impoundment closure activities and ancillary facilities and actions would be subject to both federal and state (Tennessee Division of Air Pollution Control) regulations. These regulations impose permitting requirements and specific standards for expected air emissions.

3.1.2 Environmental Consequences

3.1.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, no impoundment closure activities would occur and there would be no additional construction activities or transport of borrow or CCR materials. Therefore, no impacts to air quality are expected.

3.1.2.2 Alternative B – Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill

<u>Surface Impoundment Closures</u>

Potential air quality impacts associated with the proposed Closure-by-Removal of the APC includes dust and emissions from combustion of gasoline and diesel fuels by earth-moving activities (dozing, grading, and fill placement), emissions, transport of CCR for disposal and the onsite transport of borrow to support site restoration. These construction activities would require the use of earthmoving, compacting, and paving equipment as well as trucks for hauling materials. These activities would generate fugitive dust PM during active construction periods. TVA would follow the TVA GAF CCR Fugitive Dust Plan and would comply with fugitive dust emission standards specified in the GAF's Title V Operating Air Permit and the construction permit from TDEC which would further reduce dust emissions. In addition, wet suppression and other BMPs will be utilized as necessary to reduce fugitive dust emissions.

Emissions associated with the combustion of gas and diesel fuels by internal combustion engines (vehicles, construction equipment such as bulldozers, excavators, over-the-road dump trucks, loaders, and telehandlers) would generate local emissions of PM, nitrogen oxides, CO, volatile organic compounds (VOC) and SO_2 during the construction period. All equipment will be used onsite and any air quality impacts would be limited to the immediate site area. However, new emission control technologies and fuel mixtures have markedly reduced vehicle and equipment emissions. Additionally, it is expected that all vehicles would be properly maintained which would also reduce emissions. Therefore, emissions from internal combustion engines would be small and would result in minimal impacts to air quality.

Air quality impacts from construction activities would depend on both man-made factors (intensity of activity, control measures, etc.) and natural factors such as wind speed and direction, soil moisture, etc. However, even under unusually adverse conditions, these emissions would have, at most, a minor localized and short-term impact on offsite air quality and would be well below the applicable ambient air quality standard. Overall, the potential impacts to air quality from construction-related APC closure activities would be minor.

Expansion of Existing Onsite Landfill

Construction Impacts

Under Alternative B, CCR removed from the APC may be placed in either the existing onsite NRL Landfill, an expansion of the existing landfill, or a combination of these landfills. If the existing onsite landfill is expanded, transient air pollutant emissions would occur during the construction of each of the landfill cells, the associated haul route, and ancillary facilities including the office complex, relocated communications tower, and ammonia sensor tower. Construction-related air quality impacts would be primarily related to site preparation and the operation of internal combustion engines, and air emissions would be similar to that described for the proposed Closure-by-Removal of the APC. These emissions would have a minor transient impact on offsite air quality and would be well below the applicable ambient air quality standard.

Excavated soil from the landfill area would be stockpiled within the proposed landfill limits or in the NRL Landfill borrow/stockpile areas. Fugitive dust generated as part of this stockpiling process or the firearms range closure and remediation process would be controlled using wet suppression and other BMPs, as outlined in the fugitive dust control plan as required by GAF's Title V Operating Air Permit. Overall, the potential impacts to air quality from construction-related activities would be minor.

Operation Impacts

Operation of the proposed landfill expansion would comply with Tennessee regulations for fugitive emissions and GAF's air operating permit conditions. CCR handling, transport and placement activities would utilize methods similar to ongoing operations at GAF. In order to minimize fugitive dust from landfill operations, CCR would be moisture conditioned and would be transported to the working face of the landfill using heavy-duty dump trucks over paved access roads contained within the boundaries of the plant.

Once placed within the landfill, the CCR material would be spread and compacted. The compacted surface further limits fugitive dust. As each cell of the landfill reaches its capacity, it would be covered with an approved cover system. Equipment used for placement and compaction of CCR would be similar to what is currently in use at the existing NRL Landfill so there would be no substantive change in emissions as compared to base conditions. Therefore, landfill operation air quality impacts are anticipated to be minor and localized and would not exceed NAAQS.

Construction and Operation of a Beneficial Re-use Processing Facility

In conjunction with TVA actions associated with this alternative, TVA is also assessing the potential impacts associated with a component action consisting of the construction and operation of an offsite beneficial re-use processing facility. Site preparation and vehicular traffic over paved and unpaved roads at the construction site would result in the emission of fugitive dust and combustion of gasoline and diesel fuels by internal combustion engines (vehicles, generators, construction equipment, etc.), which would generate local emissions of particulate matter, NO_X, CO, VOCs, and SO_2 during the site preparation and active construction periods. Proposed construction activities would be subject to both federal and state regulations. These regulations impose permitting requirements and specific standards for expected air emissions. Air quality impacts from construction would be temporary (up to 14 months) and would be minimized through use of BMPs (e.g., dust control measures) as required to reduce offsite emissions. Although the actual site for the beneficial re-use processing facility has not been identified, a site that is located in an area classified as in attainment for priority pollutants is preferred. However, even if the proposed site is constructed in an area designated as non-attainment for any of the priority pollutants, construction-related emissions would have a minor transient impact on offsite air quality and would be well below the applicable ambient air quality standards, as regional construction activities are typically accounted for in the attainment status designation.

Emissions associated with the operation of the beneficial re-use processing facility include NO_X, CO, PM_{10}, and $PM_{2.5}$. Although NO_X and CO from typical beneficial re-use facilities do not exceed 100 tons per year, under the bounding condition (Table 2-5), PM_{10} and $PM_{2.5}$ emissions may exceed 100 tons per year. If so, the facility would obtain a Title V permit and emissions would conform to the terms and conditions of that permit. Therefore, adherence to permit conditions would ensure that the impact to air quality would be minor.

Under the bounding facility condition, CCR raw material would be heated to drive off excess carbon (see Section 2.6.1). As part of this process most metals are retained in the ash matrix and are entombed in the product matrix. For example, as oxidized mercury vapor and fly ash are conveyed by the hot flue gases through the process, the entire mass is cooled to temperatures below the condensation temperature of the oxidized mercury. As such, the vast majority of the mercury is deposited on the fly ash and collected along with the processed fly ash.

Additionally, the operation of the facility would result in emissions from mobile sources that include workforce commuting and delivery of beneficiated product to various markets within the region. Up to 90 truckloads of product are expected to be delivered on a daily basis that would result in additional pollutant emissions (see Table 2-4). However, as described above, such a volume of trucking is expected to result in only minor increases in pollutant emissions on a regional scale and are not expected to adversely affect regional air quality.

Transport of CCR

Under Alternative B (Option 1), CCR removed from surface impoundments would be transported via onsite haul roads and placed in either the existing onsite NRL Landfill, an expansion of the existing landfill, or a combination of these landfills.

TVA estimates that up to 20 vehicles would be onsite at any one time during disposal and hauling activities. Based solely on the estimate of CCR produced daily and the safe capacity of an articulated dump truck, TVA estimates that approximately 190 truckloads of CCR would be transported to the onsite landfill per day which equates to 380 truck trips per day to and from the landfill during the closure period (anticipated to be approximately 15 years). Onsite air emissions of fugitive dust PM and emissions from the combustion of gasoline and diesel fuels associated with excavation and transfer of CCR would be increased during the closure period, but offsite emissions would be minimal as CCR would not be transported to an offsite landfill for disposal. In addition, TVA would implement BMPs as needed to control fugitive dust PM emissions, and it is anticipated that all trucks used to transport CCR would be maintained in good working condition with current emission control technologies to minimize local air quality impacts. Therefore, given the intensity of the transport of CCR and the use of an onsite landfill, impacts to air quality are expected to be moderate and localized, but would not result in exceedances of NAAQS.

Under Alternative B (Option 2), CCR removed from the APC would be transported to an offsite beneficial re-use processing facility. TVA estimates that CCR from the APC could be transported to a beneficial re-use processing facility at a rate of 224 truckloads (448 truck trips) per day using over-the-road trucks (capacity of 17 yd^3). CCR not suitable for beneficial re-use would be transported to either the onsite landfill or a landfill up to approximately 184 miles from GAF at a rate of 56 truckloads per day (112 truck trips). Transport of CCR to the beneficial re-use processing facility and the onsite or offsite landfill would occur over an approximate 15-year timeframe (closure period). This increase in vehicles (estimated to equate to 560 truck trips per day, or 56 trips per hour, based on a 10-hour day represents a moderate increase in traffic especially along roadways which lead to the nearest interstate, and would generate local emissions of PM, NO_2, CO, VOC, and SO_2 throughout the closure period. Although the impact on air quality in these areas as a result of the increase in traffic is expected to be moderate, the regional impact on air quality would be minor as, once on the highway, truck traffic would be dispersed. Therefore, impacts to air quality from Alternative B (Option 2) would be moderate and localized but would be greater than for Alternative B (Option 1) given the additional vehicle miles traveled. However, impacts would not result in exceedances of NAAQS.

<u>Transport of Borrow</u>

Borrow material would be obtained from the previously permitted TVA-owned borrow site located 1.5 miles northwest of GAF. TVA estimates that, when needed, borrow would be transported to GAF at an average rate of 16 truckloads per day (32 truck trips) throughout the closure period. This would result in a potential localized impact to residents living near the borrow site and along the haul route to GAF. Borrow would be transported to GAF on graveled (borrow site access road) and on paved road (Steam Plant Road). Transport of borrow would have a potential localized impact to residents near the haul route due to exposure to fugitive dust and exhaust emissions during transport operations. However, transport of borrow would be intermittent throughout the closure period. In addition, TVA requires all contractors to keep construction equipment properly maintained and use BMPs (such as covered loads and watering unpaved haul roads) to minimize dust, if necessary. Therefore, although there would be a minor localized temporary impact to air quality associated with the transport of borrow material, regional impacts on air quality are not anticipated.

3.1.3 Summary of Impacts to Air Quality

As summarized in Table 3-1, TVA has determined that impacts to air quality related to the primary action and associated component actions for the proposed closure of the APC at GAF are minor and would not have an impact on NAAQS.

Table 3-1. Summary of Impacts to Air Quality

Alternative	Action	Impact	Severity
		Impoundment Closure	
Alternative B	Closure-by-Removal of APC	Temporary construction impacts associated with emissions from onsite vehicles and equipment as well as generation of fugitive dust.	Minor. No exceedance of NAAQS expected.
		Landfill Expansion	
Alternative B	Expansion of Landfill and Ancillary Facilities	Temporary construction impacts associated with emissions from onsite vehicles and equipment as well as generation of fugitive dust.	Minor. No exceedance of NAAQS expected.
		Construction and Operation of Beneficial Re-use Processing Facility	
Alternative B	Construction and Operation of a Beneficial Re-use Processing Facility	Temporary impacts associated with localized onsite emissions from vehicles and equipment as well as generation of fugitive dust during construction activities. Emissions associated with operation of the beneficial re-use processing facility and the delivery of beneficiated product.	Minor. Although state/federal air permitting may be required for operation of the beneficial re-use facility, no exceedance of NAAQS expected with adherence to permit conditions.
		Transport of CCR	
Alternative B (Option 1)	Transport of CCR to Onsite Landfill	Onsite air emissions of fugitive dust PM and emissions from the combustion of gasoline and diesel fuels associated with excavation and transfer of CCR during the closure period.	Moderate localized impact associated with increased intensity of transporting CCR. No exceedance of NAAQS expected.
Alternative B (Option 2)	Transport of CCR to Beneficial Re-use Processing Facility	Temporary increase in exposure to fugitive dust and exhaust along the haul route from trucks transporting CCR to the beneficial re-use facility and offsite landfill.	Moderate localized impact associated yet greater than Alternative B (Option 1) due to greater number of vehicle miles travelled to reach the offsite facilities. No exceedance of NAAQS expected.
Alternative B (Option 2)	Transport of CCR not Suitable for Beneficial Re-use	Temporary increase in exposure to fugitive dust and exhaust along the haul route from trucks transporting CCR to the beneficial re-use facility and offsite or onsite landfill.	Moderate localized impact associated yet greater than Alternative B (Option 1) due to greater number of vehicle miles travelled to reach the offsite facilities. No exceedance of NAAQS expected.

Alternative	Action	Impact	Severity
		Transport of Borrow	
Alternative B	Truck Transport of Borrow to GAF from TVA Owned Borrow Site	Temporary localized increase in exposure to fugitive dust and exhaust emissions along the haul routes from trucks transporting borrow to GAF.	Minor and localized, minimized with the use of BMPs including dust suppression. No exceedances of NAAQS expected.

3.2 Climate Change and Greenhouse Gases

3.2.1 Affected Environment

"Climate change" refers to any substantive change in measures of climate, such as temperature, precipitation, or wind lasting for an extended period (decades or longer) (EPA 2016a). The 2018 National Climate Assessment concluded that the earth's climate is now changing faster than at any point in the history of modern civilization. The amount of warming projected by these studies beyond the next few decades is directly linked to the cumulative global emissions of GHGs (e.g., CO_2, methane). Results from a wide range of climate model simulations suggest that with significant reductions in emissions, global temperature increase could be limited to 3.6°F (2°C) or less. Without significant reductions, our planet's average temperature could rise by 9°F (5°C) by the end of the century (Hayhoe et al. 2018).

Climate change is primarily a function of too much CO_2 in the atmosphere. CO_2 is the primary GHG emitted through human activities. Activities associated with the proposed closure of the APC at GAF that produce CO_2 are mostly related to emissions from fossil-fuel-powered equipment (e.g., bulldozers, loaders, haulers, trucks, generators, etc.) during construction and transport of material (borrow, CCR, and beneficiated product).

Forested areas that absorb and store CO_2 from the atmosphere via a process known as carbon sequestration help to reduce levels of CO_2 in the atmosphere. Approximately 135 acres of evergreen and deciduous forest and woody wetland occur within the proposed landfill expansion and office complex limits of disturbance. There is no forested land within the footprint of the APC.

In 2014, U.S. GHG emissions totaled 6.870 million metric tons (15.1 trillion pounds) of carbon dioxide equivalents. This 2014 total represents a 7 percent increase since 1990 but a 7 percent decrease since 2005 (EPA 2016a). This carbon overload is caused mainly by activities that burn fossil fuels such as coal, oil, and gas or by releasing stored carbon by cutting down forests.

A GHG inventory for Sumner County is not available. However, the Metropolitan Government of Nashville-Davidson County completed a community-wide GHG inventory using a baseline year of 2014 (Livable Nashville 2017). According to the inventory, the Nashville-Davidson County area produced 13,461,292 metric tons of GHG emissions (expressed as carbon dioxide equivalent or CO_2e) in 2014. The largest source of emissions was transportation and mobile sources (4,986.5 metric tons CO_2e per year), followed by commercial energy (3,595,170 metric tons CO_2e per year) and residential energy (2,991,664 metric tons of CO_2e per year). The EPA Greenhouse Gas Reporting Program collects GHG data from large emitting facilities, suppliers of fossil fuels and industrial gases that result in GHG emissions. In 2017, total facility emissions reported from GAF was 5,647,015 metric tons of CO_2e per year (EPA 2019d).

3.2.2 Environmental Consequences

3.2.2.1 Alternative A – No Action Alternative

Under this alternative, no closure activities would occur and there would be no additional emissions related to project construction activities or the transport of CCR materials. Therefore, no change in regional GHG levels or climate change would occur.

3.2.2.2 Alternative B – Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill

Surface Impoundment Closures

As discussed in Section 3.1.2.2, exhaust emissions from equipment used for construction of each landfill cell would contribute CO_2 to the atmosphere. Emissions from construction equipment would be localized and of moderate duration. However, as compared to other regional emissions of CO_2, such emission levels are minor in comparison to the regional and world-wide volumes of CO_2 and would not contribute to climate change. No carbon sequestration would be lost as no forested areas would be affected by closure activities.

Expansion of Existing Onsite Landfill

Construction Impacts

Construction-related CO_2 emitting activities associated with construction of each landfill cell, the associated haul route, and ancillary facilities including the office complex, relocated communications tower, and ammonia sensor tower would be similar to those described for the surface impoundment closures and would be localized and of short duration. However, as compared to other regional emissions of CO_2, such emission levels are *de minimis* in comparison to the regional and world-wide volumes of CO_2 and would not contribute to climate change.

EPA's quantification tool was used to estimate the carbon sequestration that may be lost from the conversion of forested land (EPA 2019c) required for expansion of the existing onsite landfill. Assuming 147.7 acres of forested areas (the land cover with the greatest potential carbon sink) are completely cleared for development of the proposed landfill expansion and office complex, and forest composition and age is typical for the east Tennessee region, TVA estimates that the conversion of these forested lands would result in the loss of approximately 125 metric tons of carbon sequestered in one year. The loss of carbon sequestered or stored is very small relative to the carbon sequestered in local and regional forested areas. Overall, carbon sequestration within forests in the region has increased due to net increases in forest areas (e.g., conversion of farmland to forested areas), improved forest management, as well as higher vegetation growth productivity rates and longer growing seasons. Within the 5-mile radius of GAF, it is estimated that existing forested lands sequester approximately 14,407 metric tons of carbon per year. By comparison, therefore, the loss of 125 metric tons of carbon sequestration due to construction phase clearing of forests at GAF is *de minimis* relative to the regional carbon sequestration and would not adversely affect climate change.

Operation Impacts

Impacts of transport of CCR to the proposed onsite landfill expansion are discussed in Section 3.2.2.2. Equipment that produces CO_2 emissions (e.g., bulldozers) would be used to spread and compact the CCR at the proposed landfill expansion. The equipment used for landfill operations would be similar to what is currently in use at the existing landfill and, therefore, there would be no substantive change in CO_2 emissions as compared to base conditions.

Construction and Operation of a Beneficial Re-use Processing Facility

Onsite construction activities in support of the construction of the beneficial re-use processing facility are expected to result in a temporary minor increase in construction-related emissions from internal combustion engines. Additionally, the operation of the facility would result in emissions from mobile sources that include workforce commuting and daily delivery of up to 90 truckloads of beneficiated product to various markets within the region (see Table 2-4). However, these emissions would be minor in comparison to regional emissions and would not impact climate change.

Transport of CCR

Under Alternative B (Option 1), CCR removed from the ash impoundments would be transported to the onsite landfill via dump trucks over onsite paved access roads within the boundaries of the plant. TVA estimates that up to 190 truckloads of CCR would be transported to the onsite landfill per day which equates to 380 truck trips to and from the landfill during the closure period (anticipated to be approximately 15 years). Impacts to regional GHG emissions from this volume of trucking is minimized given the short transport distance. Therefore, trucking of CCR from the APC to the landfill would produce a minor, localized, moderate-term increase in CO_2 emissions but are not anticipated to increase regional GHG levels or impact climate change.

Under Alternative B (Option 2), CCR would be transported to a beneficial re-use processing facility and to the onsite and/or an offsite landfill. Offsite transport would result in increased emissions of CO_2 relative to Option 1, as GHG emissions are directly related to fuel consumption. TVA estimates that it could transport CCR up to approximately 184 miles (368 miles round trip) and deposit CCR in an existing landfill at a rate of 56 truckloads (112 truck trips) per day. Using estimates of GHG emissions developed by the Environmental Defense Fund (EDF 2014), and the bounding distance to the offsite landfill (Table 2-6), the transport of CCR to an offsite landfill would produce approximately 16,685 metric tons of GHG emissions per year during the closure period. Although the distance to the beneficial re-use processing facility is not known, using the bounding analysis of 10 miles to the nearest interstate and the estimate of trucking CCR to the facility and 448 truck trips per day, truck transport to the beneficial re-use processing facility would produce 3,882 metric tons of CO_2 per year. Additional emissions would occur should distances to the beneficial re-use processing facility be greater. These emissions would be temporary and comprise less than 1 percent of regional GHG emissions and would not impact climate change. However, the impact would be greater than Option 1 due to the greater number of vehicle miles traveled.

Aggregate emissions associated with the transport of CCR to a beneficial re-use processing facility and to an offsite landfill would be *de minimus* (less than 1 percent) of regional emissions and would not impact climate change.

Transport of Borrow

Borrow needed to support construction activities at GAF would be transported using dump trucks, which would result in emissions of CO_2. TVA estimates that an average of 32 truck trips (16 truckloads) per day would be needed support construction activities. However, due to the short transport distance (3 miles round trip) and intermittent nature of borrow transport, this would produce a minor, short-term increase in CO_2 emissions but would not increase regional GHG levels or impact climate change.

3.2.3 Summary of Impacts to Climate Change and Greenhouse Gases

As summarized in Table 3-2, TVA has determined that there would be minor, localized temporary increases in GHG emissions associated with the proposed actions at GAF. However, regional GHG levels and climate change would not be impacted.

Table 3-2. Summary of Impacts to Climate Change and Greenhouse Gases

Alternative	Action	Impact	Severity
		Impoundment Closure	
Alternative B	Closure-by-Removal of APC	Temporary increase in construction-related emissions from internal combustion engines during site preparation and closure activities.	Minor, localized and moderate-term. *De minimis* relative to regional GHG levels. No impact to regional GHG levels or climate change.
		Landfill Expansion	
Alternative B	Expansion of Landfill and Ancillary Facilities	Temporary increase in construction-related emissions from internal combustion engines during site preparation and closure activities. Loss in local forest carbon sequestration.	Minor, localized and short-term. *De minimis* relative to regional GHG levels. No impact to regional GHG levels or climate change.
		Construction and Operation of Beneficial Re-use Processing Facility	
Alternative B	Construction and Operation of a Beneficial Re-use Processing Facility	Temporary increase in construction-related emissions from internal combustion engines during facility construction. Emissions associated with operation of the beneficial re-use processing facility and the delivery of beneficiated product.	*De minimis* relative to regional GHG levels. No impact to regional GHG levels or climate change.
		Transport of CCR	
Alternative B (Option 1)	Transport of CCR to Onsite Landfill	Operational GHG emissions are related to trucks transporting CCR to the onsite landfill.	Minor, localized and moderate-term. No impact to regional GHG levels or climate change.
Alternative B (Option 2)	Transport of CCR to Beneficial Re-use Processing Facility	Operational GHG emissions are related to trucks transporting CCR to the beneficial re-use processing facility.	Minor. Moderate-term effect greater than Alternative B (Option 1). No impact to regional GHG levels or climate change.

Alternative	Action	Impact	Severity
Alternative B (Option 2)	Transport of CCR not Suitable for Beneficial Re-use	Operational GHG emissions are related to trucks transporting CCR to the offsite or onsite landfill.	Minor. Moderate-term effect greater than Alternative B (Option 1). No impact to regional GHG levels or climate change.
		Transport of Borrow	
Alternative B	Truck transport of borrow to GAF from TVA-owned borrow site	Operational GHG emissions are related to trucks transporting borrow.	Minor, moderate-term increase in CO_2 emissions given short transport distance. No impact to regional GHG levels or climate change.

3.3 Geology

3.3.1 Affected Environment

3.3.1.1 Geologic Setting

GAF is located in the outer portion of the Central Basin section of the Interior Lowlands physiographic province, which is a large topographic lowland resulting from the erosion of a geologic structure known as the Nashville Dome.

Bedrock is primarily composed of several layers (stratigraphic units) of limestones of the Nashville Group (Bigby-Cannon Limestone, Hermitage Formation) and the Stones River Group (Carters Limestone that is comprised of upper and lower unit separated by the T-3 Bentonite clay layer, Lebanon Limestone, and the Ridley Limestone). A stratigraphic column of the bedrock units is shown on Figure 3-1. Data on the distribution, thickness, elevation and fractures of the rock was obtained from geophysical logs of bedrock boreholes and boundaries between layers were determined using gamma profiling (TVA 2017c). The different carbonate bedrock units at the site vary in thickness from approximately 20 feet for the Upper Carters and Bigby-Cannon Limestone, approximately 70 to 80 feet thick for the Hermitage Formation, Lower Carters Limestone, and Lebanon Limestone, to the greatest thickness associated with the Ridley Limestone at approximately 200 to 275 feet thick (TVA 2017c).

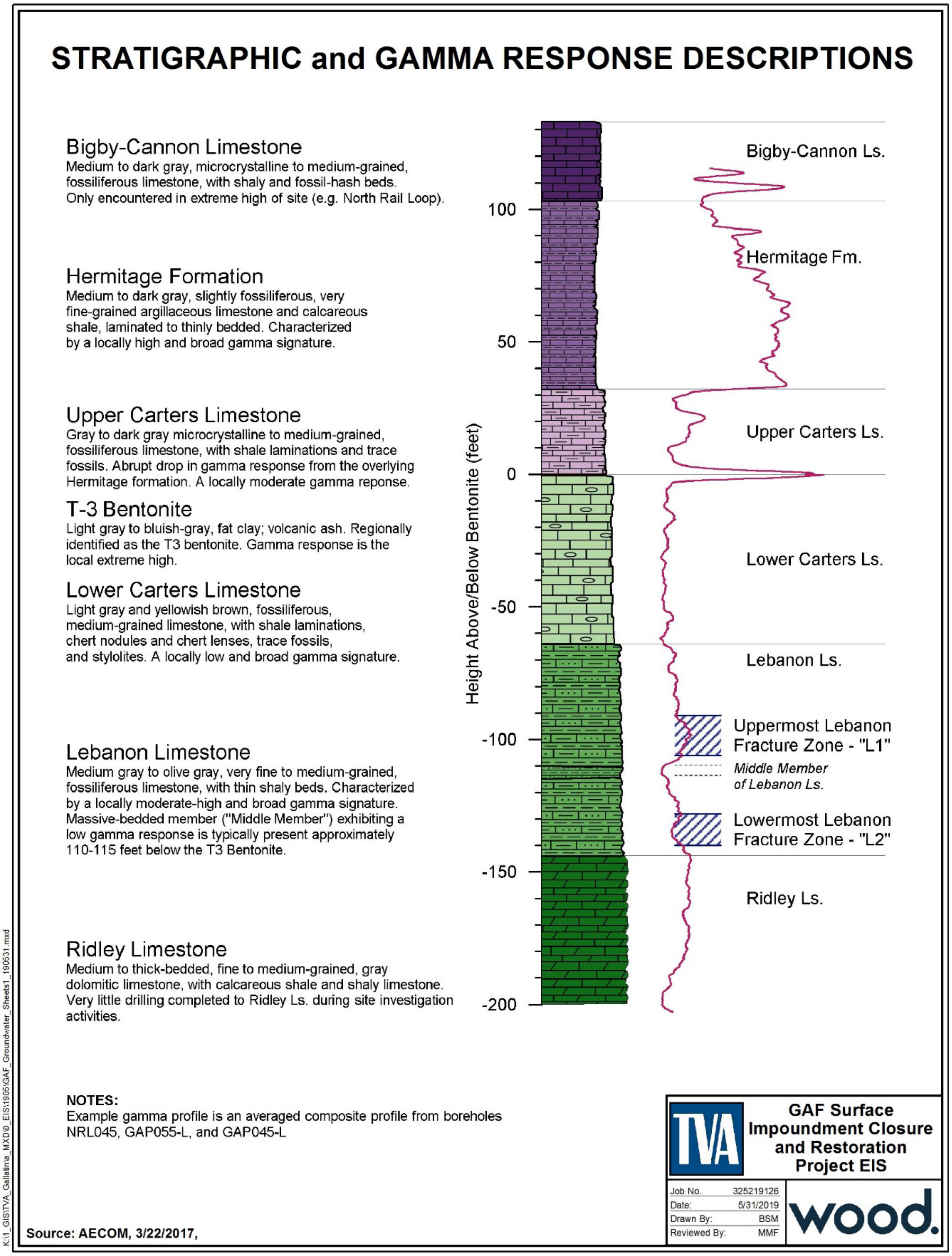


Figure 3-1. Generalized Stratigraphy of Bedrock Units in the Vicinity of GAF

3.3.1.2 Geologic Hazards

Seismicity & Slope Stability

As required by the CCR Rule, TVA evaluated structural and seismic stability of the surface impoundments at GAF. The assessments included field investigations and laboratory testing programs and concluded that the perimeter dikes at the APC and the saddle dikes for Stilling Ponds C and D meet EPA CCR Rule slope stability criteria for both static and seismic conditions (TVA 2018b). The Stilling Ponds stability analyses performed in January and February 2017 and reported by TVA in 2018, were completed at the request of TDEC to fulfill the requirements of the environmental investigation at Gallatin (TVA 2018b).

The calculated safety factors from the analyses performed in 2016 by GeoComp and AECOM for Ash Pond A, Ash Pond E, the Bottom Ash Pond, and Middle Pond A meet the CCR Rule criteria listed under 40 CFR § 257.73(e)(1)(iii)(iv) (TVA 2017d). Additionally, several other non CCR Rule geotechnical investigations, analyses, and remedial repairs at the APC were completed between 2004 and 2014.

Seismic Events

The primary earthquake hazard source to the site is the New Madrid Seismic Zone (NMSZ). The NMSZ is located in the central Mississippi Valley and extends from northeastern Arkansas to northwestern Tennessee and southeastern Missouri. The NMSZ is approximately 200 miles west of the Gallatin facility. Although the majority of the events emanating from this zone are too small to be felt at the surface, the NMSZ has produced several damaging earthquakes, including the sequence of very large earthquakes and aftershocks in 1811-1812. The “Geologic Hazards Map of Tennessee – Environmental Geology Series No. 5” developed and published by the TDEC, Division of Geology and compiled by Robert Miller (1978) classifies the area as Risk Zone 1, low to moderate damage possible.

Faulting

Based on site investigations performed at GAF, no significant faulting has been documented for the area, and major faulting has been noted as being rare for the region (TVA 2014b).

A review of the U.S. Geological Survey (USGS) interactive fault map website, which contains information on faults and associated folds in the United States that are believed to be sources of earthquakes of 6.0 magnitude or above during the Quaternary Period (the past 1,600,000 years), indicates there are no known faults of this age located within the vicinity of GAF (USGS 2019b).

3.3.1.3 Karst Topography

“Karst” refers to a type of topography that is formed when rocks with a high carbonate content, such as limestone and dolomite, are dissolved by groundwater to form sinkholes, caves, springs and underground drainage systems. Karst topography forms in areas where limestone and dolomite are near the surface. Geologic structure, such as synclines and faults can influence sinkhole occurrence (Brezinski 2014; Doctor et al. 2008; TVA 2017c).

Because portions of the GAF site are situated over karst topography, a sinkhole relative risk evaluation was performed to assess stability of the site with regard to karst conditions. While several existing karst features have been identified in the GAF vicinity, including one notable karst feature that occurs at a lower elevation to the north of the APC, most of the site has been characterized as low to medium risk, and no new sinkholes have been reported for the APC by the site for several decades (TVA 2017c). New sinkholes are most likely to form in close proximity to existing sinkholes, and at GAF existing karst features are primarily found within the Carters Limestone and to the north of the APC (TVA 2017c). Additionally, while geologic structure can influence sinkhole occurrence, the rock strata at GAF are nearly flat lying to very gently dipping and structure is not believed to be a significant consideration for the sinkhole risk evaluation at this time (TVA 2017c).

3.3.1.4 Soils

The mapped soils for the site generally consist of well drained silt loams to silty clay loams formed from the weathering of limestone (USDA NRCS 2019). Surficial soils range in thickness from 0 to 80 feet with much of the site having a thickness less than 20 feet (TVA 2017c). The thicker surficial soils are located in the southern and southwestern portion of the site (TVA 2017c). The west and south portions of the project area are mapped as Udorthents, which consist of excavated areas (USDA NRCS 2019). Much of the surficial soils make up the unconsolidated alluvium.

Unconsolidated soils at GAF are comprised of Quaternary alluvium that is primarily clay with sands and gravels, and residual soil deposits from weathering of bedrock limestone that is primarily clay and silty clay and overlie large portions of the GAF site (TVA 2017c). The main hazard associated with the site soils when they are present is the potential for the presence of very soft loose soils that may become unstable under seismic loading.

3.3.2 Environmental Consequences

3.3.2.1 Alternative A – No Action Alternative

Under Alternative A, no excavations or other closure activities would occur, there would be no project-related impacts to geologic resources or soils. TVA would ensure that all impoundment dikes would be stable under static and seismic conditions and would meet appropriate safety factors through continued safety inspections of structural elements to maintain stability, and all surface impoundments would be subject to continued care and maintenance activities. Thus, continued operations at GAF under the No Action Alternative would not be expected to result in reduced safety under either static or seismic conditions.

3.3.2.2 Alternative B – Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill

Surface Impoundment Closures

Under this alternative, impoundments would be dewatered and all CCR would be excavated, and a CCR removal plan would be submitted for TDEC approval prior to removal. No impacts or risks of failure would occur at the CCR removal sites from seismic considerations. However, grading and construction activities have the potential to disturb soil stability, increase erosion, and increase relative risk for karst sinkhole formation. Despite these proposed actions, impacts to soil resources associated with surface disturbances related to the proposed closure activities are expected to be minor, as BMPs described in The Tennessee Erosion and Sediment Control Handbook (TDEC 2012) and outlined in the project-specific SWPPP would be implemented to minimize erosion during clearing and site preparation. Additionally, karst feature development for the underlying limestone bedrock will be mitigated according to a karst mitigation plan (TVA 2017c).

State requirements for post-closure activities in accordance with the approved closure plan would be implemented as needed, and a CARA Plan will be developed for approval by TDEC.

TVA will implement supplemental mitigative measures as required by TDEC, as well as its approved closure plan, which could include additional groundwater monitoring, assessment or corrective action programs.

Based on extensive studies that have documented the karstic potential of the geology underlying the APC, there is the increased relative risk for sinkhole development at the site under this alternative that is not evident for Alternative A. The increase in sinkhole development risk is due to the uncontrolled surface water drainage that would occur during bulk excavation of CCR materials throughout the APC. Because increasing infiltration of water at the ground surface is the most significant triggering mechanism for sinkhole development, the excavation of CCR is expected to alter surface drainage patterns with the potential consequence of triggering subsurface drainage development through karst features (TVA 2017c). The bulk excavation of CCR materials could also penetrate and potentially remove the beneficial clay subgrade that exists across portions of the site and could lead to exposure of karst features as well as disturb repaired karst features. Exposure of these karst features could also provide additional drainage pathways for CCR release during construction (TVA 2017c). These impacts would be minimized through adherence to the procedures established in the karst mitigation plan as identified below.

Expansion of Existing Onsite Landfill

Construction of the proposed landfill expansion, the associated haul route, remediation of a decommissioned firearms range, and ancillary facilities including the office complex, relocated communications tower, and ammonia sensor would involve ground disturbing activities that would include grubbing, grading, and excavation. Removal of vegetation, grading, and construction activities have the potential to disturb soil stability and increase erosion. Despite this, impacts to soil resources associated with surface disturbances related to the proposed construction, excavation, clearing, and grubbing activities are expected to be minor, as BMPs outlined in a SWPPP designed to minimize erosion during land clearing and site preparation would be implemented.

It is anticipated that construction and operation of the proposed landfill site would not have a notable impact to geology as the new landfill expansion would be required to maintain a liner system as well as an engineered cover system to mitigate water flow through the materials that could cause sinkhole formation. The area of expansion is located over the relatively lower risk areas for potential sinkhole development, excavation will be primarily limited to soils, as localized disturbance to surficial rock formations will be limited and blasting will not occur. Based on these factors, in conjunction with the use of BMPs and adherence to TDEC permitting requirements, impacts to geology from the landfill expansion are expected to be minor.

Until the construction of the landfill expansion is completed, construction activities could result in an increased risk of karst sinkhole development compared to Alternative A (TVA 2017c). However, a karst mitigation plan has been drafted to provide a procedure for investigating and mitigating the risk and impact of karst features during construction activities (AECOM 2019a). The draft karst mitigation plan recommends stages and actions to be performed both prior to landfill construction and during landfill construction to mitigate karst risks and improve the landfill foundation and includes the following actions:

- Exploration of existing features
- Over-excavation of surficial soils around existing features
- Site observation after over-excavation

- Repair of exposed karst features
- Soil subgrade assessment and treatment
- Construction of engineered bridge lift
- Ongoing observation

Construction and Operation of a Beneficial Re-use Processing Facility

Construction of the beneficial re-use processing facility would involve ground disturbing activities that would include grubbing, grading, and excavation. As identified in the table of bounding characteristics of the beneficial re-use processing facility (Table 2-5), the site would be constructed on an area that was previously disturbed. Removal of vegetation, grading and construction activities have the potential to disturb soil stability and increase erosion. Despite this, impacts to soil resources associated with surface disturbances related to the proposed construction, excavation, clearing, and grubbing activities are expected to be minor, as BMPs outlined in a SWPPP designed to minimize erosion during land clearing and site preparation would be implemented.

Per the bounding attributes identified in Table 2-4, construction of a portion of the facility may require excavation below the existing ground surface, and deep foundations with up to 40-foot piers. Depending on the site selected, foundations would be designed as required based on local geologic conditions. Operational impacts would be associated with the potential impact of earthquakes on the proposed beneficial re-use processing facility operations. Once selected, the actual conditions at the project site would be investigated during detailed design and, if warranted, seismic considerations may be incorporated into final design of the facility.

As such, although construction and operation of the beneficial re-use processing facility may result in minor potential localized alteration of site soils and geologic conditions, these effects are not expected to result in notable alteration or degradation of these resources. Therefore, impacts to geology and soils resulting from the development and operation of the proposed beneficial re-use processing facility would be minor.

Transport of CCR

Under Alternative B (Option 1), CCR would be transported to an onsite landfill. Transport would utilize off-road trucks using onsite haul roads. As such, no impacts to geology are anticipated in conjunction with the component actions related to transport of CCR to the onsite landfill. In conjunction with Option 2, CCR would be transported to a regional beneficial re-use processing facility. CCR materials unsuitable for use by the beneficial re-use processing facility would be transported to the onsite landfill or a previously permitted offsite landfill. This transport would be undertaken by trucks using the existing roadway network, and as such, would not impact geology or soils.

Transport of Borrow

Because borrow would be obtained from a previously permitted TVA borrow site near GAF, TVA's action under this alternative is limited to the transport of borrow material. Transport of borrow by truck on the existing roadway network would not impact geology or soils for either Option 1 or Option 2 under this alternative.

3.3.3 Summary of Impacts to Geology

Closure-by-Removal of the impoundments and construction and operation of the proposed landfill expansion would incorporate all appropriate designs and TDEC permitting requirements and BMPs such that impacts to geology and soils from the landfill expansion are expected to be minor. Additionally, in consideration of the potential for increased karst development risk during CCR removal operations and landfill construction, karst mitigation measures will be taken to minimize the risk of sinkhole development. Based on the analysis summarized above and as shown in Table 3-3, impacts to geology and soils associated with the proposed projects would be short-term and minor.

Table 3-3. Summary of Impacts to Geology and Soils

Alternative	Action	Impact	Severity
		Impoundment Closure	
Alternative B	Closure-by-Removal of APC	Temporary increase in soil erosion during site preparation and closure activities. Higher risk of altering surface drainage patterns with the potential consequence of triggering subsurface drainage and development through karst features.	Minor impact; minimized with the use of BMPs and adhering to karst mitigation plan.
		Landfill Expansion	
Alternative B	Expansion of Landfill, and Ancillary Facilities	Temporary increase in soil erosion during site preparation activities. Higher risk of altering surface drainage patterns with the potential consequence of triggering subsurface drainage and development through karst features. Potential localized alteration of geologic conditions.	Minor impact mitigated by effective use of BMPs and adherence to TDEC permitting requirements and karst mitigation plan.
		Construction and Operation of Beneficial Re-use Processing Facility	
Alternative B	Construction and Operation of a Beneficial Re-use Processing Facility	Temporary increase in soil erosion during site preparation activities. Potential localized alteration of geologic conditions.	Minor, mitigated by effective use of BMPs included in a SWPPP.
		Transport of CCR	
Alternative B (Option 1)	Transport of CCR to Onsite Landfill	No impact.	No impact.
Alternative B (Option 2)	Transport of CCR to Beneficial Re-use Processing Facility	No impact.	No impact.

Alternative	Action	Impact	Severity
Alternative B (Option 2)	Transport of CCR not Suitable for Beneficial Re-use	No impact.	No impact.
		Transport of Borrow	
Alternative B	Truck transport of borrow to GAF from TVA-owned borrow site	No impact.	No impact.

3.4 Groundwater

3.4.1 Regulatory Framework for Groundwater

The regulatory framework established to protect groundwater is defined in the PEIS. This framework includes the Safe Drinking Water Act of 1974, Wellhead Protection Program, TDEC Solid Waste Disposal and Water Quality Control Acts, and the CCR Rule. As this document tiers off the PEIS, the standards established by these requirements are also applicable to the proposed actions.

3.4.2 Affected Environment

3.4.2.1 Regional Aquifers

GAF is located approximately 40 miles northeast of Nashville, Tennessee on the right descending bank of the Cumberland River on a peninsula known as Odoms Bend. Site-wide geology consists of several types of unconsolidated materials distributed across the site that overlie a sequence of limestone bedrock units that make-up the Nashville Dome. These geologic units reside in what is called the Central Basin in central Tennessee. The limestone bedrock units are nearly flat lying, with broad, gentle anticlines and synclines. The unconsolidated units include fill materials, alluvium, and residual soils. There are three primary water-bearing geologic units associated with GAF and are identified as both unconsolidated overburden soils and carbonate bedrock (TVA 2017c). The unconsolidated overburden water-bearing unit is comprised of alluvium from the Cumberland River and generally consists of a high percentage of fine materials (silts and clays) with some intermixed sands and gravels. Because of its low yield and discontinuous nature, the unconsolidated alluvium is still under investigation as to whether it is an aquifer (TVA 2017c).

In general groundwater flow at the site follows topography from topographic highs to topographic lows and from areas of recharge to areas of discharge. The topographic highs are just north of the main plant and coal pile, and between the rail loop hill and the APC. Recharge occurs primarily from infiltration of precipitation through the soil or bedrock where the bedrock units are exposed or near the ground surface. Recharge readily occurs in the unconsolidated alluvium and CCR materials. The coal pile is also a potential source of recharge as TVA's operations include wetting the coal (TVA 2017c). A notable geologic feature has also been identified that occurs at a lower elevation to the north of the APC and forms a hydraulic trough with low hydraulic head and groundwater elevations similar to the Cumberland River elevation (TVA 2017c). Because the site is situated within the Odoms Bend peninsula, and the Cumberland River and the hydraulic trough are the lowest points hydraulically, groundwater flows radially away from the inland topographic highs toward the Cumberland River to the east, west and south, and to the hydraulic trough to the north where it discharges (TVA 2017c). The Cumberland River is the only major surface water feature in the project area and serves as a point of groundwater discharge. However, there are several small, intermittent streams or drainages that flow in response to storm events or originate as seeps or springs associated with shallow perched groundwater return flow that typically terminate at swallow holes, sinkholes, sinking streams, blind valleys or other surface karst features (TVA 2017c). The hydraulic trough identified north of the APC is also considered to be a groundwater divide, where groundwater north of the trough flows south toward this hydraulic low, and groundwater from the south flows north toward the trough (TVA 2017c). Groundwater that flows to the hydraulic trough is currently considered to discharge to the Cumberland River to the west (TVA 2017c). Because the hydraulic trough covers a relatively large area with a relatively flat gradient at about the river level, it is interpreted as an area of high hydraulic conductivity and connectivity to the Cumberland River (TVA 2017c).

The upper most water-bearing unit is the unconsolidated alluvium. The unconsolidated alluvium is approximately 50 feet thick near the Cumberland River and becomes thinner inland at locations more distant from the river (TVA 2017c). The alluvium is heterogenous and primarily comprised of low permeability materials. Many of the wells completed within the alluvium are low yielding, less than 100 milliliters per minute (TVA 2017c). There are lenses of higher permeability sand and gravel, but these lenses are considered laterally discontinuous (TVA 2017c). Because the alluvium is primarily comprised of low permeability materials with isolated zones of higher permeability sediments, groundwater is found under isolated perched or discontinuous conditions associated with the higher permeability sediments (TVA 2017c).

The carbonate bedrock at the site consists of several stratigraphic units (Figure 3-1, Geology and Soils section). The water-bearing carbonate units at GAF are considered aquifers and include the Lower Carters Limestone and Lebanon Limestone. All of the bedrock units at the site are described as limestone with karst features, including sinkholes, swallow holes, and disappearing streams (TVA 2017c). Groundwater in the limestone bedrock occurs primarily within secondary porosity that is comprised of solution-enhanced, primarily horizontal fractures (TVA 2017).

The upper most bedrock unit is the Bigby-Cannon Limestone (Figure 3-1, Geology and Soils section). The Bigby-Cannon Limestone is a medium- to dark-gray, microcrystalline to medium-grained, fossiliferous limestone with shaly and fossil-hash beds. The formation is up to approximately 20 feet thick at the site but resides entirely above groundwater levels and locally is not a water-bearing formation (TVA 2017c).

The Hermitage Formation is the next sequence of bedrock at the site and is comprised of a medium- to dark-gray, slightly fossiliferous, very fine-grained argillaceous limestone that is laminated to thinly bedded (Figure 3-1, Geology and Soils section). The Hermitage Formation is up to approximately 71 feet thick where present at the site and typically is dry but can contain perched water that is not part of the groundwater flow system (TVA 2017c).

The Carters Limestone resides beneath a large portion of the site and where present overlies the Lebanon Limestone. It is the first consistently water-bearing bedrock unit at the site and consists of two units (designated Upper Carters and Lower Carters) (Figure 3-1, Geology and Soils section). A layer of low permeability volcanic ash (T-3 bentonite) is present within large sections of the Carters Limestone and separates the Upper Carters Limestone from the Lower Carters Limestone and is thought to prevent the vertical migration of infiltrating water (TVA 2017c). The Upper Carters Limestone is a gray to dark-gray, fossiliferous limestone with shale laminations and trace fossils. The unit is approximately 31 feet thick at the site and, although perched water is occasionally encountered within the Upper Carters, the unit is generally above groundwater levels and not water-bearing (TVA 2017c). The Lower Carters Limestone is distinctive from the Upper Carters Limestone by its more massive and thicker beds that contain chert and having clean beds with stylolites near the base of the unit. The Lower Carters Limestone is approximately 64 feet thick at the site, is water-bearing, and groundwater occurs beneath significant portions of the site within this unit (TVA 2017c). However, because of the T-3 bentonite layer, the Carters Limestone exhibits discontinuous zones of groundwater and as such, is not consistently water-bearing (TVA 2017c). Additionally, where the Hermitage Formation overlies the Carters Limestone, it is considered as limiting vertical infiltration of water. Thus, where the T-3 and Hermitage Formation are present, the Carters Limestone is less weathered and the development of solution-enhanced water-bearing zones is limited (TVA 2017c). Groundwater encountered in the Carters Limestone in the areas where the T-3 and Hermitage Formation are present is considered perched, laterally discontinuous, and seasonally ephemeral (TVA 2017c). The water-bearing Lower Carters Limestone underlies most of the APC and all of the stilling ponds. Groundwater flow within the Carters Limestone occurs primarily within fracture zones that have been developed and enhanced by dissolution of the limestone (TVA 2017c). Depth to groundwater within the Lower Carters Limestone ranges from 20 feet below ground surface (bgs) to 93 feet bgs (TVA 2017c). Much of the Lower Carters Limestone is confined by overlying limestone but may be unconfined near karst features such as sinkholes and swallow holes. The groundwater elevations from monitoring wells completed within the active groundwater flow system of the Lower Carters Limestone show that groundwater flow is primarily from south to north, northwest (Figure 3-2). Toward the northern most extent of the water-bearing portion of the Lower Carters limestone, just north of the APC and Stilling Ponds B and C, hydraulic heads are the lowest, similar to river stage, and relatively flat over a very large area. Moving further north, approximately north of Odoms Bend Road, the hydraulic heads begin to increase indicating that there is a groundwater confluence, or hydraulic trough, in the area approximately between Odoms Bend Road and the APC. The combination of a flat groundwater hydraulic gradient with groundwater converging at a hydraulic head similar to that of the river stage, indicates a zone of relatively high permeability and interconnectivity for the Lower Carters Limestone where groundwater is likely in hydraulic communication with the river (TVA 2017c).

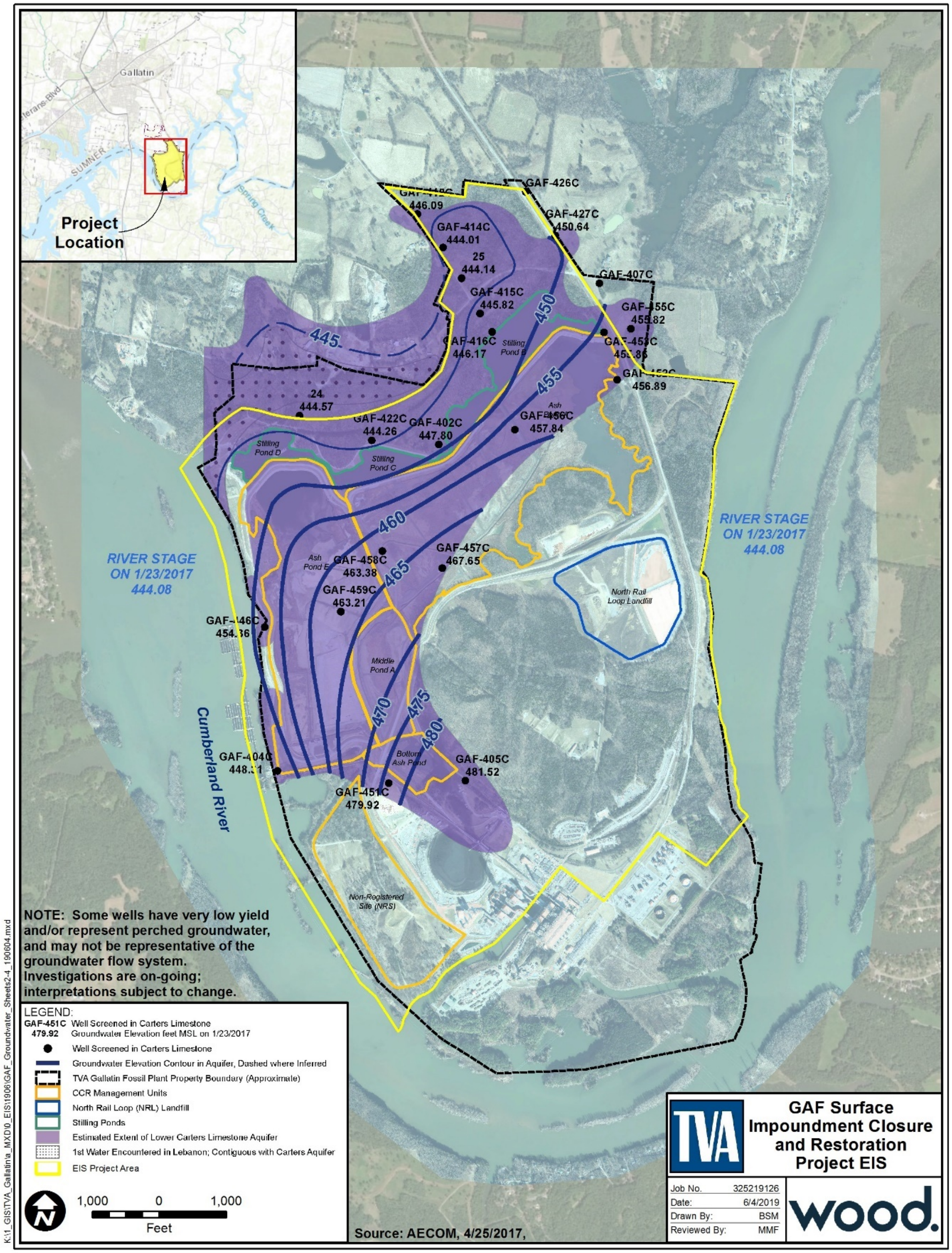


Figure 3-2. Groundwater Elevations within the Carters Formation

The Lebanon Limestone is the next water-bearing bedrock unit in the sequence and is a medium-gray to olive-gray, fossiliferous limestone with thin shaly beds. The Lebanon Limestone is present beneath the entire peninsula and to the north, thus underlying the entire site. Locally, two different water-bearing fracture zones have been identified in the Lebanon Limestone (TVA 2017c). The upper fracture zone is called the L1 and occurs approximately 26 to 42 feet below the top of the Lebanon Limestone, and the lower fracture zone is termed the L2 and occurs approximately 67 to 75 feet below the top of the Lebanon Limestone (TVA 2017c). Other portions of the Lebanon Limestone generally do not contain water-bearing fractures (TVA 2017c). Groundwater within the Lebanon Limestone is primarily confined and found in the L1 and L2 fracture zones, but these zones are not always water-bearing, and groundwater can occasionally be found outside of these zones (TVA 2017c). Groundwater is found at depths of approximately 40 feet bgs at the northwest corner of the plant where the formation is near the ground surface, to 190 feet bgs beneath the NRL Landfill and at other topographic high areas (TVA 2017c). Where the Lebanon Limestone is near the ground surface and the Lower Carters Limestone is eroded or thin, groundwater may be found under unconfined conditions and in hydraulic communication Lower Carters Limestone (TVA 2017c). Groundwater flow occurs in fractures in a somewhat radial pattern out toward the river from a high just northwest of the plant extending to the north under the BAP (Figure 3-3). Hydraulic heads in the Lebanon Limestone are also generally lower in the same area where the groundwater trough within the Lower Carters Limestone is identified. In general, there is a downward vertical gradient from the alluvium to bedrock, but vertical upward hydraulic gradient between the Lebanon Limestone, alluvium where present, and Lower Carters Limestone near the river and the groundwater trough indicating the river is a local discharge point for these formations (TVA 2017c).

The next bedrock unit in the stratigraphic sequence is the Ridley Limestone. The Ridley Limestone is a thick-bedded, fine-grained, brownish-gray limestone, with minor dolomitic limestone, and slightly cherty. This limestone unit is approximately 200 to 275 feet thick and forms the base of the upper water-bearing limestone units.

In general groundwater levels in monitoring wells and piezometers in and around the APC are typically several feet below CCR pond levels, indicating a poor hydraulic connection between the CCR ponds and groundwater (TVA 2017c).

3.4.2.2 Groundwater Use

The carbonate aquifer system, comprised of the Bigby-Cannon Limestone, Hermitage Formation, Carters and Lebanon Limestone, is an important source of drinking water for Central Tennessee, as it supplies most of the rural domestic wells and many public drinking wells in the Central Basin and surrounding region (TVA 2017c). However, a water supply well survey was conducted in 2016, and local groundwater use, other than by TVA, in and around the GAF property and Odoms Bend peninsula is limited to residential water supply wells (TVA 2017c). No residential wells are identified south of the north GAF site boundary (TVA 2017c).

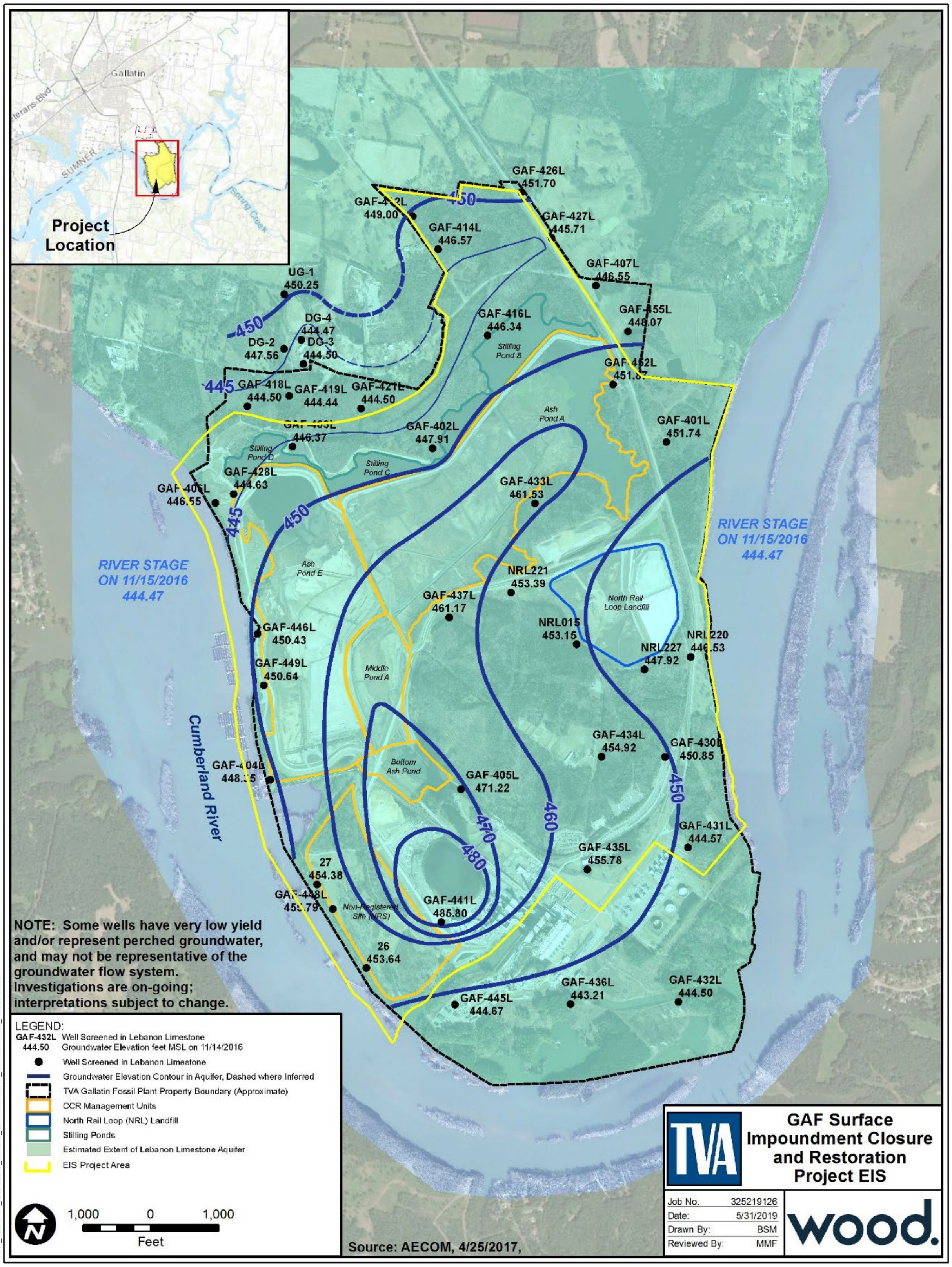


Figure 3-3. Groundwater Elevations within the Lebanon Formation

3.4.2.3 Groundwater Quality

The water quality of the different water-bearing geologic units at GAF is variable and in part is related to the lithology from which samples originate. There is also significant variability within each water-bearing unit.

The major ion water quality of the Carters Limestone is relatively consistent between monitoring wells with a predominantly calcium bicarbonate water type that is typical of limestone aquifers (TVA 2017c). However, based on site investigations, CCR constituents appear to have migrated from the APC into Lower Carters Limestone groundwater (TVA 2017c). Influences from the APC on Lower Carters Limestone groundwater are identified underneath the APC and within a limited distance north, south, and west of the APC perimeter where boron concentrations, and in certain areas sulfate and calcium appear elevated relative to background in some monitoring wells (TVA 2017c). None of these parameters has a maximum contaminant level (MCL) (TVA 2017c).

The major ion water quality within the groundwater of the Lebanon Limestone is relatively more variable with greater proportions of magnesium, sodium and chloride as compared to the alluvial overburden or Carters Limestone groundwater, and variable with respect to proportions of sulfate, chloride, and bicarbonate. However, based on site investigations, CCR constituents from the APC appear to have contributed to the Lebanon Limestone groundwater (TVA 2017c). Impacts from the APC on Lebanon Limestone groundwater have been difficult to quantify due to the greater geochemical variability identified in Lebanon Limestone monitoring well samples. Regardless, boron concentrations are elevated above background in some monitoring wells screened in the Lebanon Limestone (TVA 2017c).

In general, boron concentrations in groundwater indicating the extent of potential CCR-related effects at the APC have been documented for the unconsolidated alluvium, Lower Carters Limestone, and Lebanon Limestone. Some limited MCL exceedances for arsenic have also been reported (TVA 2017c). Monitoring wells near the NRS have shown elevated values for several constituents; however, the origin or cause of the elevated values are not well defined and TVA, in cooperation with TDEC, has agreed to conduct additional investigations to more fully understand site conditions and develop appropriate corrective measures. Specific decisions regarding the outcome and closure of the NRS will be the subject of an independent NEPA analysis.

The water supply wells that were identified during the water supply well survey, and that had access granted by the owners, were sampled for water quality. Sampling results for residential water wells within one mile north of the GAF property boundary and bounded to the east and west by the Cumberland River, show no exceedances of drinking water standards, except for fecal coliform that is not associated with CCR impacts (TVA 2017c). No residential wells are located on the GAF Reservation.

3.4.3 Environmental Consequences

3.4.3.1 Alternative A – No Action Alternative

Under Alternative A, TVA would continue current plant operations and not close any of the current surface impoundments, neither in-place nor by-removal. Additionally, TVA would not seek additional disposal options, would not construct an expansion of the existing onsite landfill, and would not complete any restorative actions at GAF. Instead, the surface impoundments would continue to receive storm water. TVA would continue safety inspections of structural elements to maintain stability and groundwater monitoring in accordance with the CCR Rule, and all surface impoundments would be subject to continued care and maintenance activities.

If no action is taken, it is anticipated that due to the cessation of sluicing activities, there would be some reduction of hydraulic inputs to the subsurface beneath the impoundments. It is anticipated that some reduction of any groundwater mounding would be correspondingly reduced. The reduction of a groundwater mound would conceivably lower the hydraulic head pressures driving a downward gradient of water and associated constituents. Accordingly, this alternative potentially would reduce any movement of constituents, including boron and arsenic identified at the site, to groundwater or surface water.

Therefore, in consideration of the continued operation of CCR impoundments without the continued sluicing of CCR, some reduction of the groundwater mound beneath the ponds is anticipated and impacts of this alternative are likely to be positive and minor.

3.4.3.2 Alternative B – Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill

Surface Impoundment Closures

Alternative B would provide a long-term benefit to groundwater by the removal of the potential future source of CCR constituents from the impoundments to groundwater. It would also eliminate the potential interaction between the CCR and the uppermost aquifer and eliminate new groundwater risk from groundwater COCs potentially migrating offsite.

No federal post-closure care measures are required if the impoundment is closed under the Closure-by-Removal option. State requirements for post-closure certification would be implemented as needed, and the CARA Plan would be implemented. TVA will implement supplemental mitigative measures as required by TDEC, as well as its approved closure plan, which could include additional groundwater monitoring, assessment or corrective action programs.

While monitoring results indicate minimal exceedances of MCLs, the removal of CCR under this alternative would eliminate potential future impacts from CCR materials at the APC. However, based on extensive studies that have documented the karst characteristics of the geology underlying the APC, there is the risk of potential sinkhole development at the site under this alternative (TVA 2017c). The increase in sinkhole development risk is due to the uncontrolled surface water drainage that would occur during bulk excavation of CCR materials throughout the APC (TVA 2017c). Because increasing infiltration of water at the ground surface is the most significant triggering mechanism for sinkhole development, the excavation of CCR is expected to alter surface drainage patterns with the potential consequence of triggering subsurface drainage development through karst features (TVA 2017c). The bulk excavation of CCR materials could also penetrate and potentially remove the beneficial clay subgrade that exists across portions of the site and could lead to exposure of karst features as well as disturb repaired karst features (TVA 2017c). Exposure of these karst features by excavation activities during construction also has the potential to inadvertently result in the development of additional drainage pathways for CCR release (TVA 2017c). However, any risks to groundwater would be minimized in accordance with the implementation of measures identified in the karst mitigation plan (see Section 3.3.2).

The impacts of ash pond closure under this alternative on groundwater are beneficial and considerable, as it eliminates subsurface discharges and eliminates COCs from the former CCR impoundments when the removal project is completed. Furthermore, there are no residential water supply wells onsite and those offsite have demonstrated water quality that is not influenced by CCR. Under this alternative, the presence of karst subsurface geology in the vicinity of the APC represents a notable risk to groundwater quality in the short-term due to the potential for development of additional pathways for transport of COCs as a result of excavation activities (TVA 2017c). Therefore, overall impacts of this alternative to groundwater are potentially beneficial in the long-term and such outcomes for groundwater improvement are supported by the mitigative measures associated with karst geology underlying the APC (TVA 2017).

Expansion of Existing Onsite Landfill

Development of the proposed landfill expansion includes the primary action of landfill development and several related ancillary actions. Ancillary actions encompassed within the landfill footprint include the relocation of the communications tower, ammonia sensor tower, remediation of a decommissioned firearms range, and development of a paved haul road. Development of the landfill expansion would also require removal of the existing GAF conference center located on the southern portion of the rail loop area, and the construction of a new office complex facility. The proposed onsite landfill expansion would be constructed in accordance with an approved Class II landfill permit as approved by TDEC. The proposed landfill expansion design would incorporate a composite liner system that meets TDEC DSWM regulations and Federal Subtitle D RCRA and EPA CCR Rule regulations and performance standards. The landfill design includes a storm water management system, leachate migration control standards, a geosynthetic cap system, and a groundwater monitoring program that are designed to reduce groundwater impacts. BMPs would be used to control sediment infiltration from storm water runoff during all construction phases of the project.

It is anticipated that construction and operation of the proposed landfill site would not have a notable impact to groundwater as the new landfill expansion would be required to maintain a liner system as well as an engineered cover system to mitigate groundwater flow through the materials. Therefore, with the use of BMPs, groundwater monitoring, and adherence to TDEC permitting requirements, impacts to groundwater from the landfill expansion are expected to be minimal. Additionally, a draft groundwater detection and monitoring plan that conforms to the Class II landfill regulations promulgated by the TDEC DSWM (TDEC 2016b) has also been developed to evaluate potential impacts to groundwater quality from operations at the SRL Landfill (TVA 2019c). This groundwater detection and monitoring plan will be finalized and incorporated into the permit application for the SRL Landfill according to regulatory requirements.

A karst mitigation plan has been drafted to provide a procedure for investigating and mitigating the risk and impact of karst features during construction activities (see Section 3.3.2).

Potential impacts to groundwater during development of ancillary facilities including the communications tower and instrumentation structure relocations and office complex could be associated with the transport and deposition of sediments from excavated materials to sinkholes or springs. Transport of contaminants such as herbicides and fertilizers also has the potential to occur in localized areas that are coincident with sinkholes and other karst features. During revegetation and maintenance activities, herbicides with groundwater contamination warnings would not be used and the use of fertilizers and herbicides would be considered with caution before application and applied according to the manufacturer’s label. BMPs as described in the Tennessee Erosion and Sediment Control Handbook (TDEC 2012) will be used to avoid contamination of groundwater in the project area. BMPs for herbicide and fertilizer application and to control sediment infiltration would be used to protect groundwater. With the use of BMPs, impacts to groundwater from ancillary facility development would be minor.

Construction and Operation of a Beneficial Re-use Processing Facility

Because the particular beneficiation technology or location of the beneficial re-use processing facility has not yet been determined, a bounding analysis performed by TVA, described in Section 2.0, was used to support the analysis of potential environmental impacts. The construction and operation of a beneficial re-use processing facility is expected to have minor if any direct impact on local groundwater aquifers. The potential impacts relative to groundwater are related to excavation for foundations, wastewater management, and materials storage. These impacts would be mitigated by effective use of BMPs and adherence to TDEC permitting requirements. As such, although construction and operation of the beneficial re-use processing facility may result in minor potential localized alteration of groundwater, these effects are not expected to result in notable alteration or degradation of groundwater resources. Therefore, impacts to groundwater resulting from the development and operation of the proposed beneficial re-use processing facility would be minor.

Transport of CCR

The CCR removed from the impoundments would be dried to an acceptable level prior to being loaded for transport. Under Option 1, CCR would be transported to an onsite landfill that would be lined and have groundwater monitoring systems as required by TDEC permits to minimize potential impacts to groundwater. Transport would utilize off-road trucks using onsite haul roads. As such, no impacts to groundwater are anticipated in conjunction with the component actions related to transport of CCR to the onsite landfill. In conjunction with Option 2, CCR would be transported to a regional beneficial re-use processing facility. CCR materials unsuitable for use by the beneficial re-use processing facility would be transported to the onsite landfill or a previously permitted offsite landfill. This transport would be undertaken by trucks using the existing roadway network, and as such, would not impact groundwater.

Transport of Borrow

Because borrow would be obtained from a previously permitted TVA borrow site at GAF, TVA's action under this alternative is limited to the transport of borrow material. Transport of borrow by truck on existing roadway network would not impact groundwater for either Option 1 or Option 2 under this alternative.

3.4.4 Summary of Impacts to Groundwater

Construction and operation of the proposed landfill expansion and ancillary facilities would incorporate all appropriate designs and TDEC permitting requirements and BMPs such that impacts to groundwater are expected to be minor. Additionally, in consideration of the successful mitigation of karst development during CCR removal operations, dewatering causing a reduction in the hydraulic head, and removal of the source of future COCs, impacts from ash pond closure under this alternative are expected to be beneficial and considerable in the long-term in improving groundwater quality. Based on the analysis summarized above and as summarized in Table 3-4, impacts to groundwater associated with the proposed projects would be short-term and minor with the potential for long-term beneficial impacts.

Table 3-4. Summary of Impacts to Groundwater

Alternative	Action	Impact	Severity
		Impoundment Closure	
Alternative B	Closure-by-Removal of APC	Reduces risk to groundwater by removing CCR from the impoundment. Higher risk of altering surface drainage patterns with the potential consequence of triggering subsurface drainage development through karst features with potential moderate impacts to groundwater over the short term. Would restore groundwater quality over the long term.	Beneficial impacts as it eliminates subsurface discharges and eliminates COCs from the former CCR impoundment when the removal project is completed. Long-term moderate benefit after prolonged closure activities. No short-term benefit during closure activities.
		Landfill Expansion	
Alternative B	Expansion of Landfill and Ancillary Facilities	No direct impact on local groundwater aquifers.	Minimal impact mitigated by effective use of BMPs and adherence to TDEC permitting requirements.
		Construction and Operation of Beneficial Re-use Processing Facility	
Alternative B	Construction and Operation of a Beneficial Re-use Processing Facility	No direct impact on local groundwater aquifers. Potential effects from dewatering during construction and leachate to groundwater during operation	Minor, mitigated by effective use of BMPs and adherence to TDEC permitting requirements.
		Transport of CCR	
Alternative B (Option 1)	Transport of CCR to Onsite Landfill	No impact.	No impact.
Alternative B (Option 2)	Transport of CCR to Beneficial Re-use Processing Facility	No impact.	No impact.
Alternative B (Option 2)	Transport of CCR not Suitable for Beneficial Re-use	No impact.	No impact.
		Transport of Borrow	
Alternative B	Truck transport of borrow to GAF from TVA-owned borrow site	No impact.	No impact.

3.5 Surface Water

3.5.1 Affected Environment

3.5.1.1 Lower Cumberland River/Old Hickory Lake

GAF is located on the northern side of a bend in the Cumberland River between Cumberland River mile (CRM) 240 and 246. This site is located in Sumner County, Tennessee in the Lower Cumberland - Old Hickory Lake (05130201) 8-digit hydrologic unit code (HUC) sub-basin. The main plant area is drained by permitted storm water outfalls, wet weather conveyances (WWCs), intermittent streams, the condenser cooling water discharge (Outfall 002), and the intake screen backwash (Outfall 004) along with process water discharges from the permanent flow management system (Outfall 010), and storm water driven discharges from the ash pond system (Outfall 001).

This portion of the Cumberland River is impounded by Old Hickory Dam (owned and operated by the USACE) at approximately CRM 216.2. Stream flow varies with rainfall and averages about 21 inches of runoff per year. This equates to approximately 1.5 cubic feet per second (cfs) per square mile of drainage area. Pool elevations (feet above sea level) for CRM 242.5 are:

- Normal Minimum: 442.0
- Normal High: 445.0
- 10 Year Storm: 451.5
- 25 Year Storm: 451.8
- 50 Year Storm: 452.2
- 100 Year Storm: 452.6

Old Hickory Lake is a mainstream storage impoundment which contains 22,500 surface acres at an elevation of 445 feet (above sea level) and extends 97.3 river miles. Water level fluctuations are minimal with minimum pool elevation at 442 feet (USACE 2016). The surface area and volume of the reservoir at normal minimum and high pool elevations are 19,550 and 22,500 acres, respectively, and 357,000 and 420,000 acre-feet, respectively.

For the period 1957 through 2005, the annual mean flow at Old Hickory Dam was 19,110 cfs, the lowest daily mean was 200 cfs (Nov. 3, 1957); the annual 7-day minimum was 1,070 cfs (Oct. 28, 1969), and 90% of the time flow exceeded 5,390 cfs. During 2005, the mean flow was 20,440 cfs and the lowest daily mean flow was 4,270 cfs (USGS 2005).

The USACE maintains water quality monitoring locations above and below GAF at CRMs 245.0 and 241.0, respectively. Parameters monitored are mostly related to eutrophic conditions (dissolved oxygen, temperature, pH, and nutrients), but some data is available for a comprehensive list of parameters including major and minor ions and trace metals. The Cumberland River and its tributaries generally exhibit moderate to high concentrations of calcium and magnesium and a slightly alkaline pH because much of the basin is comprised of limestone and dolomitic bedrock. Total dissolved solids concentrations, a measure of all salts in solution, range from 94 to 173 milligrams per liter (mg/L) in the data retrieved from the USACE monitoring stations between June of 2012 and September of 2015. The metals concentrations at both station locations above and below the GAF facility were evaluated. The metals concentrations were found to display concentrations below the TDEC water quality criteria (WQC), except for thallium, cadmium, and one lead reading (upstream of the facility). The thallium and cadmium exceptions (found at both upstream and downstream locations) are an artifact produced by the method of treating censored data (i.e., values below detection limits set equal to one-half detection limit), and the fact that the thallium and cadmium detection laboratory limits of 0.002 mg/L exceed the TDEC criterion. These results, however, are due to limitations in testing methods and do not represent true impacts to water quality due to thallium and cadmium concentrations. The one lead concentration that was higher than the WQC was upstream in 2012 and was not assumed to be site related. Please note that when WQC were based on dissolved metals concentrations, only the dissolved concentration data set was evaluated (WQC; USACE 2012-2015).

Intake samples of source water for GAF were collected in October of 2018 and again in February of 2019. These samples displayed similar trends as the USACE data discussed above, with all metals being below WQC, expect for thallium, which were all below detection, due to the sensitivity of the analytical method. All of the samples collected were analyzed for total concentrations.

Generally, the mainstream Cumberland River exhibits lower suspended solids concentrations than its tributaries. The lower Cumberland watershed tributaries west of Nashville are characterized by higher suspended solids concentrations ranging from 300 to 2,000 mg/L. The higher values in the lower Cumberland watershed tributaries are caused, in part, by differences in soils and rock formation. The Mississippian materials of the lower watershed are generally more erosion-prone than the Ordovician materials of the upper watershed. Topography and land usage also influence the erodibility of the lower Cumberland tributary valleys (TVA 1995).

The Cumberland River from CRM 216.2 to 309.2 (Confluence with Caney Fork River) is classified by TDEC (TDEC 2013) for the following uses:

- Domestic water supply
- Industrial water supply
- Fish and aquatic life
- Recreation
- Livestock watering and wildlife
- Irrigation livestock watering and wildlife
- Navigation

Water quality standards or criteria are established for each of these uses with the most stringent associated with domestic water supply and fish and aquatic life. TDEC assesses the status of the streams, rivers, and lakes annually. The project area drains to the Cumberland River (at Old Hickory Reservoir) and its tributaries. To provide a baseline for the proposed project’s impacts, both upstream and downstream existing conditions are noted below. Additionally, the federal CWA requires all states to identify all waters where required pollution controls are not sufficient to attain or maintain applicable water quality standards and to establish priorities for the development of limits based on the severity of the pollution and the sensitivity of the established uses of those waters. States are required to submit reports to the USEPA. The term “303(d) list” refers to the list of impaired and threatened streams and water bodies identified by the state. None of the water features in the project area are listed on the TDEC 303(d) list. However, there are streams in the vicinity (both upstream and downstream) of the project that are listed as impaired.

Upstream tributaries of the project site include Bledsoe Creek and its tributaries. All of the offsite streams upstream of the project are classified for fish and aquatic life, recreation, livestock watering, and irrigation. However, portions of Bledsoe Creek in Bledsoe Creek State Park, Old

Hickory Wildlife Management Area (WMA), and Cragfront State Historic Area are also designated by the state as exceptional Tennessee Waters (TDEC 2019a). Brunley Branch is listed as impaired for loss of biological integrity because of siltation and alteration of stream-side or littoral vegetation due to pasture grazing (TDEC 2018b). However, the upstream main stem of the Old Hickory Lake/Cumberland River is considered to be fully supporting its designated uses.

In the downstream vicinity of the project area there are several streams that are listed as impaired including, but not limited to the following streams:

- Rankin Branch of Station Camp Creek is listed for impairments including alteration of stream-side or littoral vegetation, total phosphorus, and *E. coli* due to pasture grazing, channelization, and discharges from a Municipal Separate Storm Sewer System (MS4) area.
- Town Creek is listed for total phosphorus, impairments due to loss of biological integrity due to sedimentation/siltation and other anthropogenic habitat alternations caused by discharges from MS4 area, channel erosion, and hydrologic modification.
- Dry Fork Branch of Spencer Creek is listed for loss of biological integrity due to siltation and alteration of stream-side or littoral vegetation due to pasture grazing.

Additionally, a biological advisory has been listed for the Cumberland River/Cheatham Lake from Mile 185.7 to 190.6 in the Metro Nashville area—far downstream from the current proposed project site. This advisory is primarily due to discharges from MS4 area (TDEC 2019b).

3.5.1.2 Onsite Surface Water Features

The APC is located in previously disturbed areas of the GAF facility. These areas are bordered to the east and west by the Cumberland River. The Cumberland River has a 1Q10 (lowest one day flow with an average recurrence frequency of once in 10 years) of 552 million gallons per day (MGD) based on information provided in the GAF NPDES permit (TDEC 2018a). Intermittent Streams and wetlands were initially delineated within the project areas in 2018 and 2019 by AECOM and Wood (AECOM 2019c; Wood 2019). There is a total of 6,823 linear feet of intermittent streams, 11,784 linear feet of WWCs, and 7 ponds within the project area. These aquatic resources are detailed in Table 3-5 and Figure 3-4. Wetlands are discussed separately in Section 3.13.

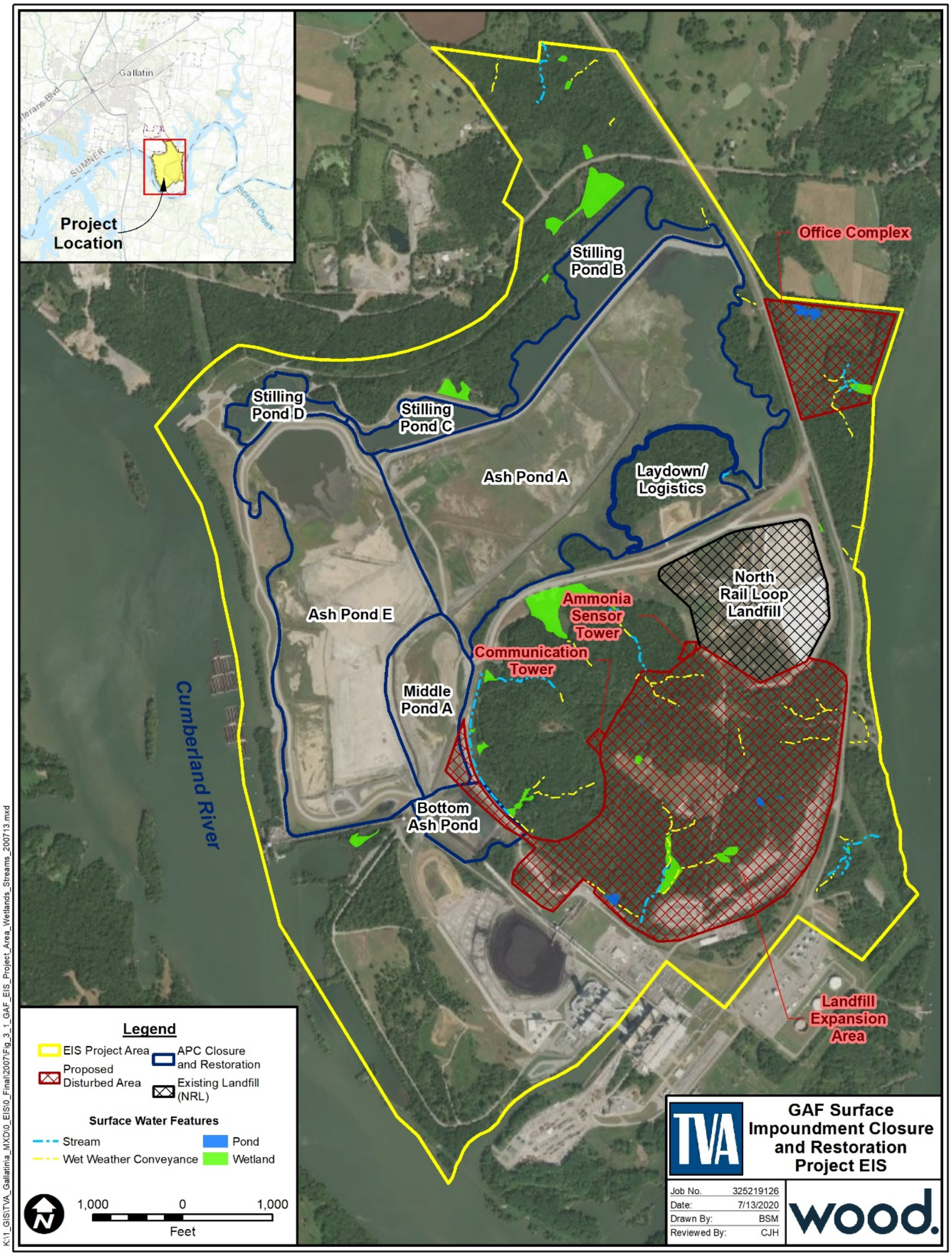


Figure 3-4. Surface Water Features of the GAF Project Areas

Table 3-5. Surface Waters in GAF Project Area

Location	Type	Number	Length (Feet) / Area (Acres)
South Rail Loop Landfill			
	Ponds	6	0.63
	Streams	1	715
	WWCs	11	5,567
Office Complex			
	Ponds	1	0.65
	Streams	2	695
	WWCs	3	594
Remainder of GAF Project Area			
	Ponds	0	0
	Streams	8	5,413
	WWCs	20	5,623
Project Area Total			
	Ponds	7	1.28
	Streams	11	6,823
	WWCs	34	11,784

Source: AECOM 2019c; Wood 2019; USACE 2019

The proposed landfill expansion site is located in the area known as the SRL, which is to the northeast of the main plant area and is primarily wooded but does have some disturbance in the form of a firearms range, some roads, parking lots, drainage conveyances, cemeteries, and various structures. Water exiting the SRL is conveyed either to the east, through culverts beneath Steam Plant Road and into the Cumberland River, or to the southwest where water is carried through culverts by piping under the plant and into the Cumberland River at the discharge canal or north into Ash Pond A (AECOM 2019c). Excluding wetlands, there are approximately 18 aquatic features located in the SRL, including 1 intermittent stream, 6 ponds, and 11 WWC /ephemeral streams. There are approximately 715 linear feet of intermittent stream, 0.63 acres of ponded areas and 5,567 linear feet of WWC/ephemeral streams.

The proposed office complex area is located adjacent to the Cumberland River and is mostly undisturbed with 7 aquatic features in the area including the Cumberland River, 2 intermittent streams, 3 ephemeral streams/WWCs, and a pond.

3.5.1.3 Existing GAF Wastewater Streams

GAF operates a surface water intake structure that withdraws an average of 915.8 MGD from the Cumberland River for use as condenser cooler water and plant process water (i.e., sluice water, fire protection, boiler feed water and miscellaneous wash water). Outfall 002 discharges to CRM 242.5. The plant's permitted discharges into this stream are once-through cooling water, auxiliary cooling water, and storm water runoff. The current NPDES Permit contains limitations on the condenser cooling water discharge for temperature, total residual oxidants (TRO), and toxicity. TRO and toxicity are only monitored when oxidants are added to the waste stream, however the current practice is to not treat cooling water with oxidates. This permit also requires reporting of flow, intake temperature, and time of chlorination. Approximately 98 percent of the water withdrawal is used for cooling, while approximately 2 percent is used for process water. The withdrawn water is returned to the river after appropriate treatment and is in compliance with GAF's NPDES permit.

There are several existing wastewater streams at GAF permitted under NPDES Number TN0005428 (TDEC 2018a). Because the APC discharge (Outfall 001), the new permanent flow management Outfall 010, and storm water discharges are the primary offsite discharge streams potentially affected by the proposed actions, they will be the focus of discussion.

In mid-June 2019 process water discharges began being discharged from the new NPDES Outfall 010. This has reduced the flows from Outfall 001, from approximately 21 MGD to approximately 0 MGD, with now only free water and precipitation driven flows being discharged from the ash pond, based on flow data from July 2019. Outfall 001 discharges to CRM 240.5. The pH of the ash pond discharge generally ranges from 7.05 to 7.71, based on samples from July 2018 through June 2019. The total suspended solids (TSS) of the 001 Outfall discharge ranges from 7.6 mg/L to 23.5, with an average concentration of 12.9 mg/L, based on samples from July 2018 through June 2019. Discharge metals concentrations are expected to decrease from this discharge.

Most process flows are now being routed through the flow management system and discharged from NPDES Outfall 010. This system provides physical and chemical treatment to the process flows prior to discharge from Outfall 010 to ensure they meet NPDES permit limitations and Tennessee Water Quality Criteria. This system utilizes settling time and chemicals to help treat and improve discharge water quality. These chemicals have been evaluated in this discharge to ensure that they will not be detrimental to aquatic organisms and the chemical feeds will not contribute to aquatic toxicity.

Because Outfall 010 has been relatively recently established, there are limited monitoring data for this new outfall. However, based on the available monitoring record the flow fluctuates between 21 and 29 MGD, the pH range so far is 7.99-8.12, and TSS has been seen at or below 5.8 mg/L (Table 3-6).

Table 3-6. In-Stream Mixing Concentrations of Current Operations from Outfall 010

	Conditions	Current Operations		
Element	**Intake Conc.** (mg/L)**	**Flow Management Discharge** (Outfall 010) Conc. (mg/L)**	**Mixing Conc. At Cumberland River 1Q10 (mg/L)**	**Water Quality Criteria * Conc., (mg/L) @ 100 mg/L hardness**
Antimony	<0.002	<0.002	0.00072	0.0056
Arsenic	<0.002	<0.002	0.00100	0.01
Barium	0.0209	0.11	0.00000	2.0
Beryllium	<0.002	<0.002	0.00100	0.004
Cadmium	<0.001	<0.001	0.00050	0.00072
Chromium	<0.002	<0.002	0.00100	0.1
Copper	<0.002	<0.002	0.00100	0.009
Iron	0.258	<0.1	0.18200	

	Conditions	Current Operations		
Element	**Intake Conc.** (mg/L)**	**Flow Management Discharge** (Outfall 010) Conc. (mg/L)**	**Mixing Conc. At Cumberland River 1Q10 (mg/L)**	**Water Quality Criteria * Conc., (mg/L) @ 100 mg/L hardness**
Lead	<0.002	<0.002	0.00100	0.0025
Mercury	0.00000169	0.000000804	0.00000165	0.00005
Nickel	<0.002	<0.002	0.00100	0.052
Selenium	<0.002	<0.002	0.00100	0.005
Silver	<0.002	<0.002	0.00100	0.0032
Thallium	<0.002	<0.002	0.00100	0.00024
Zinc	<0.025	<0.025	0.01250	0.13

Flow Management Discharge 23.0
1Q10 River Flow 552
Flows taken from NPDES flow schematic 2017 for permit No. TN0005428 permit renewal
Mass Discharge and Loadings were calculated using 0.5 the Minimum Detection Limit
*TDEC Criteria, Rule 0400-40-03
**Data was taken from most recent NPDES Permit sampling
Used 1/2 of the RL because of continuous BDL results.

The current NPDES permit contains two tiers of limitations and reporting of constituents for Outfall 001 depending on the circumstances of discharge. Tier I covers conditions during dewatering activities and prior to conversion to treatment in either lined impoundments (i.e., process water basins) or other water treatment options like the flow management system and includes limitations on the ash pond discharge for pH, oil and grease, TSS, and toxicity. Tier I also requires reporting of twenty-six other constituents including aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, iron, lead, selenium, thallium, molybdenum, mercury, nickel, silver, zinc, sulfate, fluoride, lithium, radium 226 + 228, flow, calcium, and total dissolved solids (TDS). Tier II covers the discharges from Outfall 001 after the conversion to lined impoundments (i.e., process water basins) and/or other provided treatment like the flow management system and after ash pond dewatering. During Tier II coverage, the reporting parameters mentioned above are the same; however, the reporting constituents do not include: sulfate, fluoride, boron, molybdenum, calcium, TDS, and radium 226 and 228.

The reporting parameters for Outfall 010 are identical to the Tier II parameters for Outfall 001 mentioned above. This outfall has provided treatment of all discharged process waters through the flow management system.

3.5.1.4 Existing CCR Solid and Wastewater Streams

As described above, an onsite flow management system receives and treats wastewater effluents and consists of a series of treatment tanks and chemicals that provide treatment to settle out fine particles, provide pH control and other treatment, prior to waters being discharged from Outfall 010.

Dry Flue Gas Desulfurization

The dry flue gas desulfurization (DFGD) systems are primarily dry systems, except for the use of injection nozzles that require cleaning out several times daily. This system collects the fly ash and DFGD solid CCR waste streams together in a baghouse. The nozzle wash out could contain ash, hydrated lime, calcium sulfite, and calcium sulfate. Additionally, other miscellaneous wastewater streams would include sumps, drains, and DFGD wash. The volume of water from this process is a relatively low flow stream with approximately 0.0981 MGD which is routed to the coal yard drainage ditch and then to the flow management system for discharge through Outfall 010. Storm water flows from the area are estimated to be 0.0391 MGD.

Bottom Ash

Bottom ash collects in the bottom of the boiler, is washed from the boiler bottoms with jets of water and is then sluiced to the newly constructed bottom ash dewatering facility, where the bottom ash is dewatered from the waste stream. The wastewater stream is then conveyed to the flow management system for additional treatment prior to discharge and the dry bottom ash is removed and disposed of in the onsite landfill. Water is then treated and released from Outfall 010. Bottom ash production currently can range from 38,500 to 48,400 tons per year.

3.5.1.5 Discharge Characterization

To characterize the current conditions and changes in the Outfall 010 discharge, an evaluation of in-stream mixing calculations of chemical characteristics was conducted. This can be useful in predicting potential impacts to water quality that may arise from changes in process water quality. This evaluation was based on a worst case scenario based on a minimum river flow (1Q10 = 678.8 MGD).

Even with the worst-case assumption, the evaluation of the in-stream mixing concentrations show that all the constituents except thallium and cadmium would meet the TDEC lowest criteria (i.e., the limit equal to minimum of the water quality criteria). The exceptions are the result from testing methods that can only detect these constituents in concentrations over the TDEC criterion. These results are due to limitations in testing methods and do not represent true impacts to water quality due to thallium concentrations. The analytical methods utilized to obtain data were compliant with 40 CFR 136.3 analytical methods and TDEC established required reporting levels. Additionally, there are cases in which the in-stream criteria are less than current chemical technological capabilities for analytical detection, which is the case for thallium and cadmium in this case. The mass balance analysis indicates that the overall impact of current operations does not cause impacts to surface water quality.

3.5.1.6 Other Surface Runoff

A large portion of the plant site runoff is regulated under the Tennessee Storm Water Multi-Sector General Permit for Industrial Activities TNR0510000. Other storm water discharges associated with the industrial activity at GAF are covered by the NPDES Permit TNR053186. Existing facilities and BMPs are used to ensure compliance with the permit conditions. Some plant runoff is directed through the APC system Outfall 001 or through the condenser cooling water discharge Outfall 002 discussed above.

3.5.2 Environmental Consequences

3.5.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not close the APC nor construct the landfill expansion and associated structures. Therefore, no construction impacts would occur with pond closure and landfill/facility construction projects. TVA would continue to operate the existing flow management systems for bottom ash and other process flows as described. The existing wastewater streams would continue to be authorized under NPDES Permit TN0005428. Discharges would continue to comply with all applicable permit limits.

Thus, continued operations at GAF under the No Action Alternative would not be expected to cause any additional direct or indirect impacts to local surface water resources and, therefore, would not change existing conditions.

3.5.2.2 Alternative B – Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill

Surface Impoundment Closures

The APC is located in an area within an industrial site covered with impervious structures or ground cover other than the ponds themselves. However, closure of the APC would not increase impervious surface area on the site. Alternative B would require removal of the CCR material to comply with Closure-by-Removal standards of the CCR Rule. Dewatering of the ponds would occur under existing NPDES authorizations and would comply with all TDEC regulations. Any relocation of active utility pipes as part of pond closure would entail their relocation to areas outside of closure limits or their abandonment in place.

Wastewaters generated during pond closure activities may include construction-related storm water runoff, drainage of work areas, non-detergent equipment washings and dust control, hydrostatic test discharges and domestic sewage. Construction activities have the potential to temporarily affect surface water via storm water runoff.

Appropriate BMPs would be implemented, and proposed project activities would be conducted in a manner to ensure that waste materials are contained and the introduction of pollutants to the receiving waters would be minimized. A General Permit for Storm Water Discharges Associated with Construction Activities TNR100000 (TDEC 2016a) or an Individual Construction Storm Water Permit would be required. This permit would require development of a project-specific SWPPP in accordance with the TDEC General Construction Storm Water permit (CGP) (TDEC 2016a) and the Tennessee Erosion and Sediment Control Handbook (TDEC 2012). The SWPPP would identify specific BMPs to address construction-related activities that would be adopted to minimize storm water impacts.

Upon removal of the CCR, the APC would be graded to drain storm water and vegetated with non-invasive vegetation. Storm water drainage would be directed as appropriate to ensure compliance with all applicable regulations and permits. New storm water outfalls would be installed to direct storm water runoff towards the Cumberland River and discharges would either be covered by the site NPDES permit or the Tennessee Storm Water Multi-Sector General Permit for Industrial Activities (TMSP). These closure processes and changes may require the modification/update of the NPDES permit and/or the TMSP general permit coverage.

Currently only precipitation driven flows reach the APC; however, any of these types of flows that have not already been rerouted to the stilling ponds or to a permitted storm water outfall prior to closure would be rerouted. Since process water flows are currently being sent to the flow management system, the operational changes would be minimal.

Existing outfall structures associated with the ash ponds and the stilling ponds, which would act as a storm water basin, would remain in place. New ditches and outfall structures would be placed as needed to manage runoff from the closed impoundments. Future storm water from the closed impoundments should have much lower loadings of suspended solids, metals, and other constituents than current process wastewaters. Final drainage would be routed to existing or new discharge points and comply with the NPDES and/or TMSP permit(s) to ensure that no adverse impacts to surface waters would occur. Mitigation measures would be identified, as needed, to ensure the discharges meet permit limits. This may or may not require a permit modification. Temporary minor impacts to surrounding surface waters would be expected, but they would be mitigated through implementation of BMPs and compliance with NPDES permit limits.

Expansion of Existing Onsite Landfill

Construction Impacts

Wastewaters generated during construction may include construction-related storm water runoff, drainage of work areas, non-detergent equipment washings and dust control, hydrostatic test discharges and domestic sewage. Construction activities have the potential to temporarily affect surface water via storm water runoff.

Appropriate BMPs would be implemented, and proposed project activities would be conducted in a manner to ensure that waste materials were contained and the introduction of pollutants to the receiving waters would be minimized. A General Permit for Storm Water Discharges Associated with Construction Activities TNR100000 (TDEC 2016a) or an Individual Construction Storm Water Permit would be required and would require development of a project-specific SWPPP in accordance with the TDEC General Construction Storm Water permit (CGP) (TDEC 2016a) and the Tennessee Erosion and Sediment Control Handbook (TDEC 2012). The SWPPP would identify specific BMPs to address construction-related activities that would be adopted to minimize storm water impacts.

The proposed areas for the landfill expansion and associated ancillary structures including tower relocations and the office complex are located within partially disturbed areas that still have wooded areas, streams and wetlands, cemeteries, and some structures. Impervious buildings and infrastructure prevent rain from percolating through the soil and result in additional runoff of water and pollutants into storm drains, ditches, and streams. The landfill expansion and office complex would increase impervious surface area onsite. Where construction is proposed, existing structures and infrastructure would be removed from the project site; however, they would be replaced with the other facilities and would alter the current storm water flows. These alterations would increase impervious surface area. However, altered storm water discharge rates would be taken into account in the design of storm water drainage to ensure that storm water flows would not adversely impact surface water quality.

Equipment washing and dust control discharges would be handled in accordance with BMPs described in the CGP’s SWPPP or BMP Plan required by the site’s NPDES Permit TN0005428 to minimize construction impacts to surface waters. Onsite hydrostatic testing will have the option to use potable or surface waters and would be covered under the current NPDES Permit TN0005428 or the hydrostatic general permit.

Sanitary wastes generated during construction activities would be collected by the existing sewage treatment system, onsite septic system(s) or by means of portable toilets (i.e., porta lets). These portable toilets would be located throughout construction areas and would be pumped out regularly, and the sewage would be transported by a vacuum truck to a publicly owned wastewater treatment works that accepts pump out. Additionally, holding tanks would be an option for sanitary wastes, however additional permitting may be required.

Landfill construction activities could include, but are not limited to, the clearing and grading of the project site and grading of new separate storm water and leachate impoundments or collection tanks; the installation of the landfill facility (including liner and leachate collection fields); and the installation of a forced main to pump leachate to the flow management system. Construction activities associated with the office complex could include, but are not limited to, clearing and grading of the project site, the installation of the trailers and other structures, parking areas, development of site drainage and other buildings associated with this project. This project would also include the addition of utilities services to the area including potable water, electricity, and restroom facilities.

The USACE visited the GAF project area in July 2019 and made a preliminary JD of surface water features in the SRL. Subsequently, an Approved JD was issued by the USACE in December 2019 which documented those delineated features within the SRL considered jurisdictional and, therefore, regulated as "waters of the U.S." (WOUS). As a result of this determination, several ponds and upland WWCs in the SRL were determined to be nonjurisdictional and, therefore, not regulated as WOUS. TDEC also made a Hydrologic Determination that identified the features within their jurisdiction and regulated as "waters of the state."

Direct impacts to ponds and streams would occur as a result of the proposed activities. As shown in Table 3-7, direct impacts to jurisdictional surface waters within the landfill expansion limits of disturbance include two ponds, one intermittent stream, and 11 ephemeral streams/WWCs (AECOM 2019c). A Tennessee Stream QuantificationTool (SQT) is required per TDEC regulations to assess the quality of impacted streams in order to calculate mitigation credits. The SQT evaluation was conducted for the stream impacts in the SRL in August 2019, and subsequently, TVA purchased stream credits associated with these impacts from the Cumberland River Compact in February 2020. Additionally, TVA reserved credits for wetland mitigation in October 2019 from the Tennessee Mtigation Fund for wetland impacts within the limits of disturbance of the SRL. Direct impacts within the office complex area include one pond, two intermittent streams and three WWCs as shown in Table 3-7. A JD by the USACE, a state ARAP/401 water quality certification, and federal 404 permits will also be required to address these stream/wetland alterations and the terms and conditions of these permits would likely require mitigation from these proposed activities. Wetland impacts are discussed separately in Section 3.13.

Table 3-7. Surface Waters Impacted Within Landfill Expansion Limits of Disturbance and Office Complex Area

Stream ID	Stream Type	Area/Length	Waters of the State	WOUS (Federal Status)[3]
Landfill Expansion Area[1]				
Pond 1	pond	0.27	Yes	Yes
Pond 2	pond	0.29	Yes	Yes

Stream ID	Stream Type	Area/Length	Waters of the State	WOUS (Federal Status)[3]
Pond 3	pond	0.01	No	No
Pond 4	pond	0.01	No	No
Pond 5	pond	0.04	No	No
Pond 6	pond	0.01	No	No
Total (acres)		**0.63**	**0.56**	**0.56**
Drainage D-STR1	Intermittent	715	Yes	Yes
Drainage A-WWC1	Ephemeral/WWC	663	No	No
Drainage A-WWC2	Ephemeral/WWC	193	No	No
Drainage B-WWC1	Ephemeral/WWC	578	No	No
Drainage C-WWC1	Ephemeral/WWC	161	No	No
Drainage C-WWC3	Ephemeral/WWC	902	No	No
Drainage D-WWC1	Ephemeral/WWC	428	No	No
Drainage D-WWC2	Ephemeral/WWC	1,000	No	No
Drainage H-WWC1	Ephemeral/WWC	639	No	No
Drainage H-WWC2	Ephemeral/WWC	428	No	No
WWC1 (associated with Pond 2)	WWC	240	No	No
WWC2 (associated with Pond 2)	WWC	335	No	No
Total (feet)		**6,282**	**715**	**6,282**
Office Complex Area[2]				
Pond 1	pond	0.65		
Total (acres)		**0.65**		
Stream 8	Intermittent	248		
Stream 10	Intermittent	447		
Total (feet)		**695**		
WWC-12	WWC	221		
WWC-13	WWC	85		
WWC-17	WWC	288		
Total (feet)		**594**		

[1]Water features within the landfill expansion area (SRL) determined by USACE as jurisdicational Waters of the U.S. or TDEC as Waters of the State.

[2]The jurisdictional status of surface water features within the Office Complex Area has not yet been determined.

[3]Ephermeral streams that were identified in the SRL are no longer considered Waters of the U.S. per “The Navigable Waters Protection Rule” effective June 22, 2020.

Source: AECOM 2019c; Wood 2019; USACE 2019

Impacts to aquatic features within the footprint of the various projects would be expected, but with the implementation of appropriate BMPs only temporary, minor impacts to surface waters surrounding the project area would be expected from construction activities and impoundment closures. TVA has addressed mitigation for direct impacts to streams within the landfill expansion area through the purchase of mitigation credits; however, mitigation requirements for impacts to jurisdictional aquatic features within the office complex area would be confirmed once the JD and SQT evaluations are completed in conjunction with consultation with USACE and TDEC.

Operation Impacts

The CCR by-products that would be placed in the landfill are expected to include CCR material from the ponds and both bottom ash and the dry FGD/fly ash. By-product generation and characterization would be dependent on the coal source.

The wastewater streams which could change substantively under this alternative are:

- The addition of the landfill leachate stream and contaminated storm water runoff.
- Non-containated surface runoff from the proposed landfill drainage area.

The Hydrologic Evaluation of Landfill Performance (HELP) Model was utilized to evaluate the proposed leachate collection system (LCS) disposal facility. For the purposes of this evaluation leachate characterization from the NRL was used to assess impacts. Leachate from the landfill expansion's LCS would be collected into a sump. This sump would discharge to the flow management system for treatment prior to being discharged from Outfall 010. A permit modification may be required to add this flow as an approved discharge from Outfall 010.

Ammonia concentrations in the landfilled materials would be dependent on SCR process and plant specifics. To limit ammonia loads from the dry fly ash stack, the amount of CCR exposed may be restricted to 30 or less acres open face.

Based on the HELP model, the average leachate flow from the proposed landfill was estimated to be approximately 0.066 MGD with a maximum peak flow of 0.454 MGD (AECOM 2019b). Concentrations would be expected to be similar to current leachate concentrations from the NRL landfill. The concentrations are shown in Table 3-8. Leachate would be collected in either a collection tank or a sump and pumped to the flow management system, where it would be treated prior to discharge. Leachate from the NRL currently goes to this system and is treated prior to discharge. It is expected that future discharges from the landfill expansion would be adequately treated prior to discharge from a permitted NPDES outfall; therefore, no impacts would expected from the additional volume of leachate generated from the landfill expansion.

Table 3-8. NRL Landfill Leachate Characterization

Parameters	Units		Results
Chloride	mg/L		117
Fluoride	mg/L		1.52
Sulfate	mg/L		2870
Aluminum	mg/L	<	0.0125
Aluminum (Diss)	mg/L	<	0.0125
Boron	mg/L		1.32
Boron (Diss)	mg/L		1.32
Calcium	mg/L		393
Calcium (Diss)	mg/L		394
Iron	mg/L	<	0.0141
Iron (Diss)	mg/L	<	0.0141
Magnesium	mg/L		75.3
Magnesium (Diss)	mg/L		77.5
Manganese	mg/L		0.00135
Manganese (Diss)	mg/L	<	0.005
Potassium	mg/L		73.9
Potassium (Diss)	mg/L		73.9
Sodium	mg/L		673
Sodium (Diss)	mg/L		704
Antimony	mg/L	<	0.000378
Antimony (Diss)	mg/L	<	0.000378
Arsenic	mg/L		0.000608
Arsenic (Diss)	mg/L		0.000617
Barium	mg/L		0.0149
Barium (Diss)	mg/L		0.0154
Beryllium	mg/L	<	0.000155
Beryllium (Diss)	mg/L	<	0.000155
Cadmium	mg/L	<	0.000125
Cadmium (Diss)	mg/L	<	0.000125
Chromium	mg/L		0.00567
Chromium (Diss)	mg/L		0.00579
Cobalt	mg/L		0.000333
Cobalt (Diss)	mg/L		0.000302
Copper	mg/L		0.000866
Copper (Diss)	mg/L		0.00128
Lithium	mg/L		0.0228
Lithium (Diss)	mg/L		0.0228
Lead	mg/L	<	0.000128
Lead	mg/L	<	0.000128
Mercury	mg/L	<	0.000101
Mercury (Diss)	mg/L	<	0.000101
Molybdenum	mg/L		0.154
Molybdenum (Diss)	mg/L		0.161
Nickel	mg/L		0.00145
Nickel (Diss)	mg/L		0.00172
Selenium	mg/L		0.0135
Selenium (Diss)	mg/L		0.0138
Silver	mg/L	<	0.000121
Silver (Diss)	mg/L	<	0.000121
Strontium	mg/L		6.87
Strontium (Diss)	mg/L		6.97
Thallium	mg/L		0.000288
Thallium (Diss)	mg/L		0.00032

Parameters	Units		Results
Vanadium	mg/L		0.00369
Vanadium (Diss)	mg/L		0.00408
Zinc	mg/L		0.0131
Zinc (Diss)	mg/L		0.0139
Nitrate Nitrite	mg/L		16.2
TKN	mg/L		0.631
Phosphorus	mg/L	<	0.05
Alkalinity	mg/L		102
TDS	mg/L		3820
TSS	mg/L		0.5
Radium 228	pCi/L		0.139
Radium 226	pCi/L		0.0723
Radium 226 and 228	pCi/L		0.211
Silicon	mg/L		1.12
Silicon (Diss)	mg/L		1.13
TOC	mg/L		0.555

Notes: All below detection results represent MDLs;
Groundwater analysis methods were utilized.

Contaminated storm water is storm water runoff from open face of the dry stacks of the landfill areas that do not infiltrate through the CCR to the LCS. Similar to other runoff streams, the settling of solids may require supplemental treatment or use of BMPs. Based on the current level of landfill design, contaminated storm water discharges would depend on the open working face of the landfill. This open face would generally range from 10 to 30 acres. The most conservative flows would be based on a 30-acre working face and would average approximately 0.034 MGD, with a peak flow of 4.04 MGD.

This storm water stream would be characterized to better establish the treatment needs before being discharged from the site. Currently, design is underway for treatment and discharge depending on the treatment needs and regulatory requirements of this runoff stream. Two options would be evaluated as treatment options of this runoff stream.

- **Option 1 – Sediment Basins:** The current design of the landfill expansion includes the installation of three storm water ponds varying in size from 1.6 to 4.1 acres. These ponds would be designed to accommodate storm water runoff from the landfill expansion based on a 25 year, 24-hour storm event. Average discharge flows for these ponds are displayed in Table 3-9. In Option 1, runoff would consist of either a combination of contaminated storm water and non-contaminated storm water or depending on treatment needs one pond could be utilized for the contaminated storm water. Treatment could be provided in these ponds in the form of settling of sediments and other treatment as needed prior to discharge. These ponds would discharge to current or new TMSP outfalls or would be discharged from a current or new NPDES permitted Outfall.
- **Option 2 – Flow Management System:** Option 2 consists of the contact storm water being collected from a sump location within the landfill expansion and pumped and treated by the flow management system (with modifications to increase its capacity). Alternatively, TVA could construct another system similar to the flow management system for treatment of this runoff stream, which could be discharged from a current or new NPDES permitted outfall. In either event, this option would provide physical chemical treatment for this runoff stream, if required. Any

modifications to the flow management system would undergo a separate NEPA review.

With proper settling/treatment of this runoff stream, none of the options are expected to impact the water quality of the Cumberland River. If determined to be necessary, appropriate mitigating measures would be evaluated and implemented to ensure that discharges would meet the appropriate permit requirements.

Table 3-9. Sediment Basin Average Discharge Rates

	Outflow Volume (acre-feet) per 30.4 days (monthly)	Outflow (gal/day)	Outflow (MGD)
Basin 1	3.638	38,995	3.9E10-2
Basin 2	11.22	120,265	1.2E10-1
Basin 3	5.524	59,211	5.9E10-2

TVA would conduct an operational characterization of the altered and new waste streams to confirm that no significant impacts to the Cumberland River would occur from this action. Additionally, no direct negative (toxic) impacts on the Cumberland River are anticipated because Outfalls 010 and 001 would be required to meet NPDES chronic toxicity limits. If the operational characterization showed impacts, then mitigation measures, including altered settling times and chemical treatments, would be undertaken to meet requirements ensuring discharges meet NPDES and chronic toxicity limits and would not cause an exceedance of in-stream TDEC WQC.

Minor impacts from discharges into surface waters would comply with all NPDES permit limits. Thus, continued operations at GAF under Alternative B conditions would not be expected to cause any additional direct or indirect effects to local surface water resources.

Construction and Operation of a Beneficial Re-use Processing Facility

Construction Impacts

Construction activities of the associated project would occur at a location yet to be identified offsite or would be onsite, but the site area would not exceed 15 acres. Construction of the beneficial re-use processing facility has the potential to temporarily affect surface water via storm water runoff. It is expected that the site developer would comply with all appropriate state and federal permit requirements. Appropriate BMPs would be implemented, and all proposed project activities would be conducted in a manner to ensure that waste materials are contained, and the introduction of pollutants to the receiving waters would be minimized. As detailed in Table 2-4, onsite storm water basins would be constructed to aid in onsite storm water treatment. A General Permit for Storm Water Discharges Associated with Construction Activities TNR100000 (TDEC 2016) would be required for this project and this permit would require development of a project-specific SWPPP as per TDEC General Construction Storm Water permit (TDEC 2016) and the Tennessee Erosion and Sediment Control Handbook for BMP guidance and details (TDEC 2012). The SWPPP would identify specific BMPs to address construction-related activities that would be adopted to minimize storm water impacts. If this site was to be located outside of Tennessee, an equivalent state storm water construction permit may be required.

Construction of the facility would avoid and/or minimize stream or wetland impacts. Wastewater (which could include industrial, storm water and/or sanitary wastewaters) would be processed on site and discharged to publicly owned treatment works (POTW) or covered under a NPDES permit. Any unavoidable impacts would be mitigated per the appropriate permit requirements (i.e., a Section 404 permit administered by the USACE and Section 401 Water Quality Certification administered by TDEC through the ARAP permitting program depending on the project impacts and location). It is assumed that these permits may be required for an NPDES outfall; however, the criteria for a future site would limit the impacts to aquatic features and would not be expected to require mitigation from proposed activities.

Portable toilets would be provided for the construction workforce as needed. More permanent restroom facility options are discussed below in the Operation Impacts section.

Construction of the beneficial re-use processing facility would comply with applicable regulations, permits, and BMPs, therefore, potential impacts of this alternative would be minor and would not be expected to adversely impact surface waters.

Operation Impacts

The facility would either use thermal or chemical means to convert the CCR material from its current state to an encapsulated construction material. Both of these processes would require different resources to perform this conversion. Since a vendor has not yet been selected, this evaluation considers the more impactful attributes of the two options. The primary facility areas would include the storage area for the reclaimed CCR material, the area to process and convert the CCR material to construction material, and the storage and load out area for the converted material.

The facility would need to have access to potable or well water. As identified in Table 2-4, water usage for process water could be up to 100 gallons per minute (GPM). Because this facility would expect to operate 24 hours per day, seven days per week, this would be the equivalent to 0.144 MGD. This source water would be obtained from a local public drinking water system, wells or even from a gray water source. Other potable water needs could be up to 25 GPM for on site restrooms and other worker water needs.

The facility has the potential to have process water, contaminated storm water, non-contaminated storm water, and potentially sewage discharges as a result of operation of the facility. For the purposes of this evaluation contaminated storm water refers to storm water that has come in contact with CCR material. The facility could possibly discharge up to 25 GPM or 0.036 MGD of process water, this does not include contaminated storm water. Process water and possibly contaminated storm water discharges would be discharged by means of either an existing POTW via a pre-treatment permit or an onsite NPDES outfall, which would require an individual NPDES permit for industrial activities. If required, a storm water permit would most likely fall under a TMSP for industrial storm water discharges. Sewage discharges would be handled appropriately either by sending them to a POTW; treat and release; or by pump and haul. If this facility is in a MS4 area than any applicable permits may apply to this facility. Permitting details for these restroom facilities are detailed below.

Facility discharges would have to meet all NPDES limitations and State Water Quality Criteria for the receiving stream’s designated uses. If the receiving stream is impaired, more stringent limitations may apply. Because these beneficial re-use processes may utilize chemical additives, the facility would ensure that discharges and the chemicals utilized in the process would not adversely impact water quality of the receiving stream. Chemicals would be evaluated to ensure that they would not contribute to aquatic toxicity.

The operator would conduct a characterization of the new waste streams to confirm that no significant impacts to the receiving stream would occur from this action. Additionally, no direct negative (toxic) impacts on the receiving stream would be anticipated because discharges would be required to meet NPDES toxicity limits or pre-treatment requirements. If the operational characterization showed impacts, then mitigation measures, potentially including water treatment and/or additional BMPs, would be implemented to ensure discharges would meet NPDES or pre-treatment requirements and not cause an exceedance of in-stream State WQC.

The facility would be expected to have restroom facilities to accommodate the staff. If a more permanent system is installed permits may be required depending on the type of system installed. The facility would be required to comply with all federal, state and local permits and regulations.

If the system includes a septic tank with a subsurface sewage disposal field a Septic System Construction Permit, which includes an application for ground water protection services, would be required by the TDEC Division of Water Resources. Depending on the size and capacity of the system an Underground Injection Control (UIC) permit may also be required.

If the facility restrooms are connected to an onsite sewage treatment system, it would require plan submittal and approval by TDEC to obtain a TDEC State Operating Permit (SOP). Depending on the number of people using the facility, an UIC Permit may be required. This system would also require Tennessee water and wastewater operator certification for those operating the system. Discharge would likely be to a local POTW or by land dispersion.

Operation of the beneficial re-use processing facility would comply with applicable regulations, permits, and BMPs; therefore, potential impacts of this alternative would be minor and would not be expected to adversely impact surface waters.

Transport of CCR

All removed CCR material would be hauled to either the onsite landfill/expansion or an offsite beneficial re-use facility and offsite landfill. Prior to transport, CCR removed from the impoundments would be dried to an acceptable moisture content prior to transport. This transport would not directly impact surface water quality; however, fugitive dust emissions can contribute to sediment collection in waterways and also can be a safety concern on public roads. Therefore, dust suppression mitigation BMPs would be implemented during hauling practices to reduce fugitive emissions. CCR would be covered during transportation to reduce the release of dust particulate matter. Consequently, there would be no indirect impacts to surface water associated with the transport of CCR materials over any surface water features along the haul routes.

Transport of Borrow

Borrow would be obtained from a previously permitted TVA borrow site. TVA's action under this alternative would be limited to the transport of borrow material to GAF utilizing Steam Plant Road and onsite haul roads. Borrow materials would be covered during transportation to reduce the release of dust particulate matter. Consequently, there would be no indirect impacts to surface water associated with the transport of borrow over any surface water features along the haul routes.

3.5.3 Summary of Impacts to Surface Water

As summarized in Table 3-10, TVA has determined that all impacts to surface waters related to the primary action and associated component actions for the proposed impoundment closures at GAF would have both direct and indirect impacts to surface water. Temporary and minor impacts would be expected from construction activities with the implementation of proper BMPs, except for the direct impacts to site jurisdictional waters due to permanent impacts. These impacts would be appropriately mitigated. Impacts from operational discharges to receiving waters would be minor when proper treatment and BMPs are implemented prior to discharge from the site.

Table 3-10. Summary of Impacts to Surface Water

Alternative	Action	Impact	Severity
		Impoundment Closure	
Alternative B	Closure-by-Removal of APC	Potential direct and indirect impacts to the Cumberland River associated with sedimentation from storm water during closure activities.	Temporary minor impacts to surrounding surface waters with the implementation of appropriate BMPs. The flow management system would be used to manage onsite process water flows. All discharges would comply with current or future NPDES permit limits and other state and federal regulations. Impacts to surface water features on site would be mitigated as a result of adherence to permit requirements.

Alternative	Action	Impact	Severity
		Landfill Expansion	
Alternative B	Expansion of Landfill and Ancillary Facilities	Direct impacts to streams requiring mitigation for jurisdictional impacted aquatic features.	Construction: Temporary and minor impacts to surrounding surface waters with implementation of appropriate BMPs. Permanent impacts to impacted streams which would require mitigation. Operations: Minor impact to water quality of receiving streams with proper treatment of leachate and runoff.
		Construction and Operation of Beneficial Re-use Processing Facility	
Alternative B	Construction and Operation of a Beneficial Re-use Processing Facility	Potential direct and indirect impacts to surface waters from sedimentation from storm water during construction activities.	Temporary and minor. Minimized with implementation of appropriate BMPs. Site would be selected that does not include surface water features onsite that would require mitigation.
		Potential direct and indirect impacts to surface water from potential continuous discharges and outfall construction activities.	Minor and would not be expected to adversely impact surface waters. Compliance with all permit requirements and limitations and characterization would be performed of discharge waters to ensure compliance.
		Transport of CCR	
Alternative B (Option 1)	Transport of CCR to Onsite Landfill	No impact.	No impact.
Alternative B (Option 2)	Transport of CCR to Beneficial Re-use Processing Facility	No impact.	No impact.
Alternative B (Option 2)	Transport of CCR not Suitable for Beneficial Re-use	No impact.	No impact.

Alternative	Action	Impact	Severity
		Transport of Borrow	
Alternative B	Truck transport of borrow to GAF from TVA-owned borrow site	No impact.	No impact.

3.6 Floodplains

3.6.1 Affected Environment

A floodplain is the relatively level land area along a stream or river that is subjected to periodic flooding. The area subject to a one-percent chance of flooding in any given year is normally called the 100-year floodplain. The area subject to a 0.2-percent chance of flooding in any given year is normally called the 500-year floodplain. It is necessary to evaluate development in the 100-year floodplain to ensure that the project is consistent with the requirements of EO 11988.

The proposed project would be located between Cumberland River miles 240.5 and 245.7, right descending bank, in Sumner County, Tennessee, and shown in Figure 3-5. Flood elevations were interpolated from profiles 21P and 22P in the 2012 Sumner County Flood Insurance Study. Elevations are referenced to NAVD 1988. Sumner County has a Preliminary Flood Insurance Study available. In the 2018 Preliminary study, the flood elevations remained the same as in the 2012 study. The 100- and 500-year flood elevations would vary upstream to downstream on the Cumberland River and are presented in Table 3-11.

Table 3-11. Flood Elevations in Project Area

Flood Event	Flood Elevations at Downstream Boundary, Cumberland River Mile 240.5 (feet)	Flood Elevations at Upstream Boundary, Cumberland River Mile 245.7 (feet)
100-year	451.7	453.0
500-year*	454.8	456.7

*The 500-year flood boundary shown on Figure 3-5 is based on the 457-foot contour, which results in a more conservative floodplain boundary.

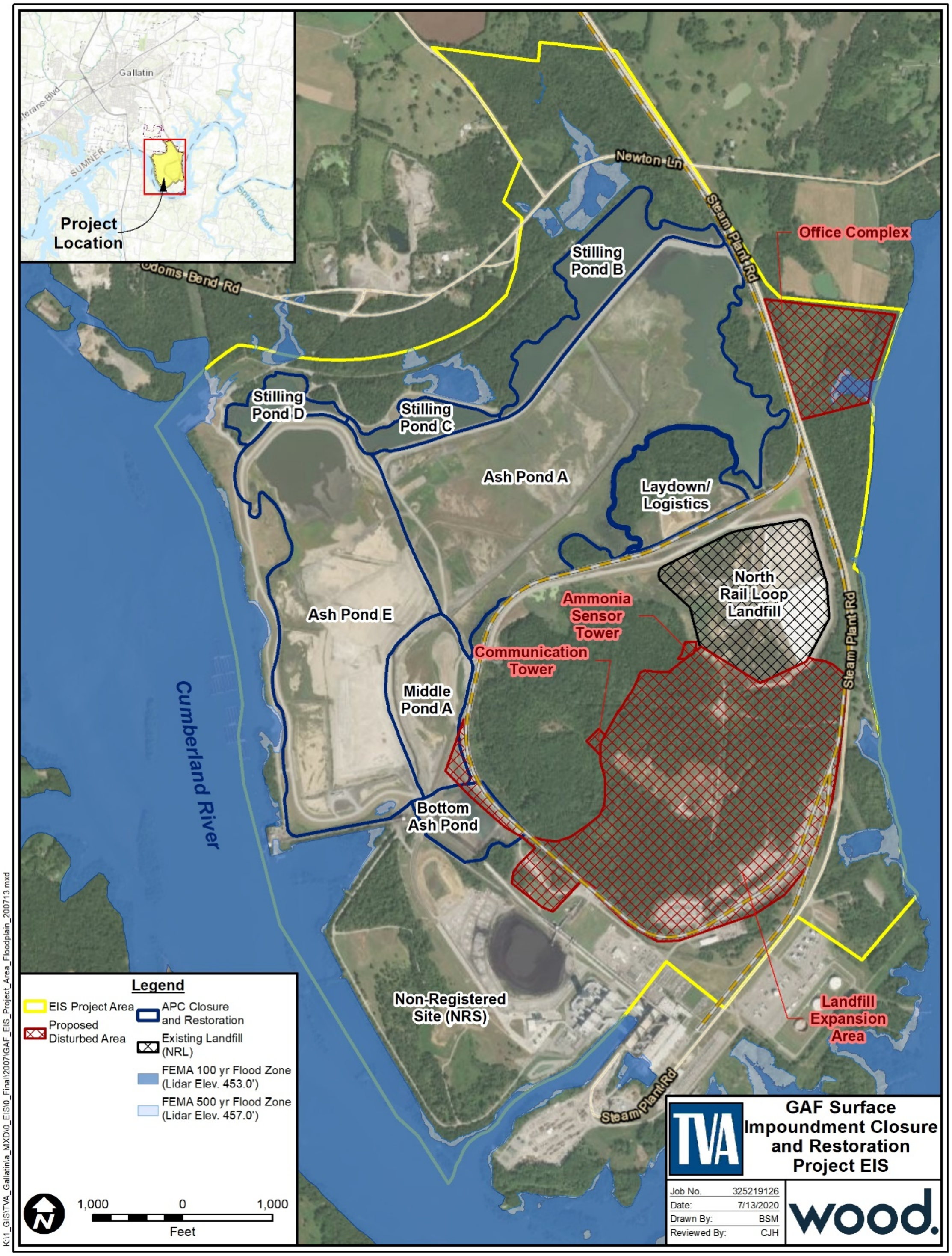


Figure 3-5. Floodplains within the GAF EIS Project Area

3.6.2 Environmental Consequences

As a federal agency, TVA adheres to the requirements of EO 11988, Floodplain Management. The objective of EO 11988 is "…to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative" (EO 11988, Floodplain Management). The EO is not intended to prohibit floodplain development in all cases, but rather to create a consistent government policy against such development under most circumstances (U.S. Water Resources Council 1978). The EO requires that agencies avoid the 100-year floodplain unless there is no practicable alternative. For certain "critical actions," the minimum floodplain of concern is the 500-year floodplain.

The U.S. Water Resources Council defines "critical actions" as "any activity for which even a slight chance of flooding would be too great" (U.S. Water Resources Council 1978). Critical actions can include facilities producing hazardous materials (such as liquefied natural gas terminals), facilities whose occupants may be unable to evacuate quickly (such as schools and nursing homes), and facilities containing or providing essential and irreplaceable records, utilities, and/or emergency services (such as large power-generating facilities, data centers, hospitals, or emergency operations centers). Because, under the proposed actions, there is a potential for CCR material to enter floodplains and streams and alter the flood-carrying capacity of those streams in a disaster, the proposed CCR landfill would be considered a "critical action."

3.6.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not close any of the surface impoundments at GAF, and as such no changes would occur to floodplains and their natural and beneficial values.

3.6.2.2 Alternative B – Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill

Surface Impoundment Closures

Removing CCR from the APC would be consistent with EO 11988 because the ponds are located outside the 100- and 500-year floodplain of the Cumberland River, on either naturally high ground or protected from 100- and 500-year floods by berms. The temporary stockpile in the NRL Landfill is also located outside the 100-year floodplain and above the 500-year flood elevation, which is consistent with EO 11988.

Expansion of Existing Onsite Landfill

Development of the proposed landfill expansion includes the primary action of landfill development and several related ancillary actions. Ancillary actions encompassed within the landfill footprint include the relocation communications tower, ammonia sensor, remediation of a decommissioned firearms range, and development of a paved haul road. Development of the landfill expansion will also require removal of the existing GAF conference center located on the southern portion of the rail loop area and the construction of a new office complex facility.

Constructing a lateral expansion of the existing landfill which will include the ancillary actions related to the communications tower and instrumentation relocation, firearms range closure, and haul road would be consistent with EO 11988 because both the existing onsite landfill and the proposed lateral expansion limits of disturbance are located outside the 100- and 500-year floodplain of the Cumberland River. Additionally, any material removed from the firearms range that would require disposal in an offsite landfill would be outside the 100-year floodplain CCR removed from the APC to the landfill expansion would therefore, have no impact on floodplains.

The proposed office complex would be located in an area near the 100- and 500-year floodplain, and therefore, could potentially be located within the floodplain of the Cumberland River. Although the exact location of the office complex and associated ground disturbance is not yet known, project activities taking place on ground at elevation 456.7 feet or higher would be located above the 500-year flood elevation and actions limited to lands above 453.0 feet would be outside the 100-year floodplain. Such actions would be consistent with EO 11988 for both non-critical and critical actions and no further floodplains review would be required.

Non-critical actions proposed within the 100-year floodplain (the area below elevation 453.0) that were reviewed in TVA's 1981 Class Review of Repetitive Actions in the 100-Year Floodplain (Class Review) (TVA 1981) would be approvable provided floodplain impacts are minimized. Non-critical actions proposed within the 100-year floodplain that were not reviewed in the Class Review (TVA 1981) would be subject to further review under the floodplains No Practicable Alternative analysis. Critical actions would need to be located outside the 500-year floodplain. Specific conditions to minimize adverse impacts for any non-critical actions proposed within the 100-year floodplain would be determined in a subsequent environmental review.

Construction and Operation of a Beneficial Re-use Processing Facility

Under this alternative most CCR would be transported to a beneficial re-use processing facility for commercial use. Although a specific location for the beneficial re-use processing facility has not been determined, as per the bounding parameters identified in Table 2-5, the facility would be constructed in an area outside the FEMA-mapped 100-year floodplain. As such this component action would be consistent with EO 11988 and would result in no impacts to floodplains and their natural and beneficial values.

Transport of CCR

Transport of CCR materials would be along established roads. Consequently, there would be no impact to floodplains associated with this component action.

Transport of Borrow

Transport of borrow material would be along established roads. Consequently, there would be no impact to floodplains associated with this component action.

3.6.3 Summary of Impacts to Floodplains

As summarized in Table 3-12, TVA has determined that Alternative B would have no impact on floodplains and their natural and beneficial values and would be consistent with EO 11988. To avoid and minimize adverse impacts on natural and beneficial floodplain values, the following mitigation measures would be implemented:

- BMPs would be used during construction activities
- TVA would obtain documentation from permitted landfill(s) receiving ash that the ash would be disposed in an area outside the 100-year floodplain. The beneficial re-use processing facility would be constructed at a location outside the FEMA-mapped 100-year floodplain

- Any material removed from the firearms range would be disposed of in an approved landfill outside the 100-year floodplain.

Table 3-12. Summary of Impacts to Floodplains

Alternative	Action	Impact	Severity
		Impoundment Closure	
Alternative B	Closure-by-Removal of APC	No impact.	No impact.
		Landfill Expansion	
Alternative B	Expansion of Landfill and Ancillary Facilities	No impact.	No impact, office complex will be located above elevation 453.0 feet to avoid 100-year floodplain.
		Construction and Operation of Beneficial Re-use Processing Facility	
Alternative B	Construction and Operation of a Beneficial Re-use Processing Facility	No impact.	No impact.
		Transport of CCR	
Alternative B (Option 1)	Transport of CCR to Onsite Landfill	No impact.	No impact.
Alternative B (Option 2)	Transport of CCR to Beneficial Re-use Processing Facility	No impact.	No impact.
Alternative B (Option 2)	Transport of CCR not Suitable for Beneficial Re-use	No impact.	No impact.
		Transport of Borrow	
Alternative B	Truck transport of borrow to GAF from TVA-owned borrow site	No impact.	No impact.

3.7 Land Use

3.7.1 Affected Environment

GAF is located on the right descending bank of the Cumberland River, southeast of the city of Gallatin in Sumner County, Tennessee. The area included within the EIS project boundary consists of approximately 1,441 acres, comprised predominantly of industrial land uses and undeveloped land. Industrial and other developed uses within this area include portions of the fossil plant, the coal pile and coal handling facilities, the 52-acre NRL, the APC and NRS, the existing convention center, a decommissioned firearms range, haul roads, and parking areas.

Undeveloped land at GAF is predominantly open space and forested, some of which has been used previously for hunting as part of the Gallatin Steam Plant WMA.

While GAF is located outside of the Gallatin city limits, it is within the boundaries of the Gallatin Planning Region for which the city maintains planning and zoning authority. According to the Gallatin Zoning Ordinance and current zoning map, the GAF property is zoned agricultural district (A), which permits the growing of crops, animal husbandry, dairying, forestry, very low-density residential development and other similar activities which generally characterize rural areas (City of Gallatin 2017 and 2019b). In addition, this zoning district also permits community facilities, public utilities, and open uses which serve the residents of these districts or which are benefited by an open environment without creating objectionable or undesirable influences which are incompatible with rural and/or residential areas (City of Gallatin 2017). As a federal agency, TVA is not subject to state and local zoning laws; nevertheless, TVA considers applicable zoning regulations for the purpose of analyzing impacts. As a public utility, TVA's current land uses at GAF are permissible under the agricultural zoning designation.

The GAF property is bounded by Old Hickory Lake on the west, south, and east sides. Land use adjacent to the northern property boundary is primarily agricultural land with some low-density commercial and residential development. The nearest residences are located along Odoms Bend Road and Newton Lane, the closest of which is approximately 100 feet from the EIS project boundary and 500 feet from the closest area where project activities would occur (Stilling Pond B in the APC). Additional residential areas are located across the reservoir to the west, south, and east. More urbanized land uses, including higher density residential development and commercial and institutional uses, are located approximately 2 miles north of the GAF reservation within the city limits of Gallatin.

3.7.2 Environmental Consequences

3.7.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, no impoundment closure activities would occur and there would be no additional construction activities or transport of borrow or CCR materials. Therefore, no changes to existing land use would occur.

3.7.2.2 Alternative B – Closure of the APC via Closure-by-Removal, the Potential Removal of De Minimis CCR from the Stilling Ponds, and Expansion of the Existing Onsite Landfill

Surface Impoundment Closures

Following the removal of CCR, surface impoundments at GAF would be graded and vegetated to provide appropriate surface water management. This would convert areas of existing industrial use to open space. However, these areas would still be located within the TVA plant site which is primarily utilized for industrial purposes; therefore, surface impoundment closure would not result in the conversion of any land uses in the foreseeable future.

Due to the utilization of Closure-by-Removal, there would be a broad range of long-term future land use options, as the APC would not be subject to future restrictions under the CCR Rule. While TVA has no future development plans for the closed APC, future development would comply with uses allowed under the current zoning designation.

Expansion of Existing Onsite Landfill

The proposed onsite landfill expansion limits of disturbance (the landfill expansion, relocated communications tower, ammonia sensor, and a paved haul road) and office complex are located on sites that are currently in a predominantly undeveloped state. The landfill expansion area also includes approximately 34 acres of maintained turf and developed space within the firearms range, landfill haul route, existing convention center and communication tower areas. The proposed landfill expansion and office complex development would result in the permanent conversion of this maintained open space, decommissioned recreational firearms range, and approximately 174 acres of undeveloped and predominantly forested land to industrial and office uses.

The areas in which the proposed projects are located are currently zoned for agricultural use. However, like the existing NRL and other industrial facilitates at GAF, the landfill expansion and office complex development would be permissible under the agricultural zoning designation because they are associated with the function of the property as a public utility.

The conversion of this area to industrial use would be consistent with the land use of the surrounding GAF facilities, including the existing NRL. Therefore, impacts to land use from the construction and operation of the proposed onsite landfill expansion and office complex would be minor.

Landfills in the state of Tennessee are regulated by the TDEC Division of Solid Waste Management. A coal ash landfill would be required to obtain a Solid Waste Class II Disposal Permit from TDEC. As such, TVA would obtain the necessary permits required for an expansion of the existing onsite landfill. Construction of the landfill expansion would adhere to the provisions outlined in the TDEC Rule Chapter 0400-11-01-.02, Solid Waste Storage Processing and Disposal Facilities. These requirements include the adherence to the necessary buffer zone standards as identified below:

- 100 feet from all property lines;
- 500 feet from all residences, unless the owner of the residential property agrees to a shorter distance;
- 500 feet from all wells determined to be down gradient and used as a source of drinking water by humans or livestock;
- 200 feet from the normal boundaries of springs, streams, lakes, (except that this standard shall not apply to any wet weather conveyance nor to bodies of water constructed and designed to be part of the facility; and
- A total site buffer with no construction appurtenances within 50 feet of the property line.

Construction and Operation of a Beneficial Re-use Processing Facility

Under Alternative B, the majority of CCR materials removed from the impoundments would be transported to a beneficial re-use processing facility. A specific site for the facility has not been identified. However, according to the proposed facility attributes and bounding characteristics listed in Tables 2-4 and 2-5, the facility would be located in an area zoned for compatible uses, such as industrial zoning. Additionally, it would be preferentially constructed on previously disturbed land and would require an area up to 15 acres. In the event the chosen site is located on land previously developed for industrial use, there would be no change in land use. However, if not, there is the potential for up to 15 acres of previously undeveloped land to be converted to industrial use in association with the construction of the beneficial re-use processing facility. Changes in land use due to the construction and operation of the beneficial re-use processing facility would be long-term, but minor, due to the location of the facility in an area zoned for compatible uses and the small area of land required.

Transport of CCR

Under Alternative B (Option 1), all CCR materials removed from the surface impoundments would be transported to the onsite landfill via truck using an onsite paved haul road. As portions of the onsite haul route are existing and others would be constructed on land that is already utilized for industrial purposes, there would be no changes in land use resulting from the onsite transport of CCR.

Under Alternative B (Option 2), CCR materials removed from the impoundments would be transported to an existing offsite permitted landfill and beneficial re-use processing facility. There would be no changes in land use within the existing landfill boundaries, and land use impacts associated with the development of the beneficial re-use processing facility are discussed in Section 3.7.2.2. Transport to either facility via over-the-road truck would utilize existing roads and no new roads would need to be constructed. Therefore, there would be no impacts to land use associated with offsite transport of CCR.

Transport of Borrow

As borrow material used for site restoration would be obtained from the previously permitted TVA-owned borrow site located 1.5 miles northwest of the fossil plant, TVA's action under this alternative is limited to the transport of borrow material. Transport of borrow would utilize existing roads and no new roads would need to be constructed. Therefore, there would be no impact to land use associated with borrow acquisition and transport.

3.7.3 Summary of Impacts to Land Use

As summarized in Table 3-13, TVA has determined that all impacts to land use related to the primary action and associated component actions for the proposed ash impoundment closures at GAF are minor.

Table 3-13. Summary of Impacts to Land Use

Alternative	Action	Impact	Severity
		Impoundment Closure	
Alternative B	Closure-by-Removal of APC	Conversion of surface impoundments to open space; would continue to support industrial land use.	No impact.
		Landfill Expansion	
Alternative B	Expansion of Landfill and Ancillary Facilities	Conversion of firearms range, maintained open space, and 174 acres of undeveloped land to industrial and office uses.	Minor as landfill is consistent with the surrounding GAF facilities and land uses.

Alternative	Action	Impact	Severity
	Construction and Operation of Beneficial Re-use Processing Facility		
Alternative B	Construction and Operation of a Beneficial Re-use Processing Facility	Potential conversion of up to 15 acres of undeveloped land to industrial use associated with facility construction.	Minor due to small area of land required and location in area zoned for compatible uses.
		Transport of CCR	
Alternative B (Option 1)	Transport of CCR to Onsite Landfill	No impact.	No impact.
Alternative B (Option 2)	Transport of CCR to Beneficial Re-use Processing Facility	No impact.	No impact.
Alternative B (Option 2)	Transport of CCR not Suitable for Beneficial Re-use	No impact.	No impact.
		Transport of Borrow	
Alternative B	Truck transport of borrow to GAF from TVA-owned borrow site	No impact.	No impact.

3.8 Prime Farmland

3.8.1 Affected Environment

The 1981 Farmland Protection Policy Act (7 CFR Part 658) requires all federal agencies to evaluate impacts to prime and unique farmland prior to permanently converting to land use incompatible with agriculture. Prime farmland soils have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. These characteristics allow prime farmland soils to produce the highest yields with minimal expenditure of energy and economic resources. In general, prime farmlands have an adequate and dependable water supply, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. Prime farmland soils are permeable to water and air, not excessively erodible or saturated for extended periods, and are protected from frequent flooding.

The acreage of prime farmland soils within the proposed project area and within a 5-mile radius of GAF are summarized in Table 3-14. Of the approximately 1,441 acres within the EIS project boundary, 11.7 acres (0.8 percent of the total area) are considered prime farmland soils, 10.5 acres of which are located within the proposed office complex area. The remaining 1.2 acres of prime farmland soils are located north of and adjacent to the proposed office complex area and would not be disturbed by proposed project activities. There are no prime farmland soils within the APC or the limits of disturbance of the landfill expansion area. Prime farmland within the project area consists of Harpeth silt loam (USDA NRCS 2019).

Table 3-14. Acres of Prime Farmland Soils Mapped Within a 5-Mile Radius of GAF and the Project Areas

	Prime Farmland Soils (acres)	Non-Prime Farmland Soils (acres)	Total Acreage
5-Mile Radius	13,338.5	36,926.4	50,264.9
Total EIS Project Area	11.7	1,429.4	1,441.1
Disturbance Areas	10.5	631.8	642.3
APC	0	434.5	434.5
Landfill Expansion Limits of Disturbance*	0	178.9	178.9
Office Complex	10.5	18.4	28.9

Source: U.S. Department of Agriculture, Natural Resources Conservation Service 2019

* Includes the landfill expansion, relocated communications tower, ammonia sensor tower, and a paved haul road.

As shown in Table 3-14, prime farmland is not a unique feature in the project vicinity, with approximately 27 percent of soils within a 5-mile radius of GAF being considered prime farmland. Overall, the prime farmland soils in the proposed disturbance areas comprise just 0.08 percent of the total prime farmland soils found within a 5-mile radius of the project area.

3.8.2 Environmental Consequences

3.8.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, no impoundment closure activities would occur and there would be no additional construction activities or offsite transport of borrow or CCR materials. Therefore, there would be no impacts to prime farmland resources under this alternative.

3.8.2.2 Alternative B – Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill

Surface Impoundment Closures

No soils mapped within the APC are considered prime farmland soils. Additionally, these areas have been previously impacted by the construction and use of the surface impoundments and no longer contain native soils. Therefore, closure of the surface impoundments at GAF would have no impact on prime farmland soils.

Expansion of Existing Onsite Landfill

Based on U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) soil mapping, there are no soils considered prime farmland located within the proposed landfill expansion limits of disturbance, the associated haul route, and ancillary facilities including the relocated communications tower and ammonia sensor tower. There are, however, approximately 10.5 acres of prime farmland soils within the office complex area that have the potential to be permanently converted to industrial use. TVA initiated coordination with the NRCS through submittal of the AD 1006 Farmland Conversion Impact Rating Form. After a review of the project information, the NRCS determined that the project, including the conversion of prime farmland soils within the office complex area, would be exempt from the Farmland Protection Policy Act. The AD 1006 Form and correspondence with the NRCS are provided in Appendix G.

Approximately 13,339 acres (27 percent) of the area within 5 miles of the project area have soils classified as prime farmland. The minor loss of onsite soils with prime farmland characteristics due to the proposed actions is not significant when compared to the amount of land designated as prime farmland within the surrounding region. Therefore, impacts to prime farmland soils would be minor under this alternative.

Construction and Operation of a Beneficial Re-use Processing Facility

Under Alternative B, the majority of CCR materials removed from the impoundments would be transported to a beneficial re-use processing facility. Although the specific location of this facility has not been determined, according to the proposed facility attributes and characteristics listed in Tables 2-4 and 2-5, the facility would be preferentially constructed on previously disturbed industrial land and would require an area up to 15 acres. Ideally, the chosen site would not contain soils with the physical characteristics of prime farmland, or soils would be previously disturbed or developed such that the land would no longer be considered prime farmland. However, under the bounding condition, there is the potential for up to 15 acres of prime farmland to be converted to industrial use in association with the construction of the beneficial re-use processing facility. Due to the small scale of the land requirements, the permanent loss of 15 acres of prime farmland would be minor and would not impact regional agriculture or crop production.

Transport of CCR

Under Alternative B (Option 1), all CCR materials removed from the surface impoundments would be transported to the onsite landfill via truck using an onsite paved haul road. As portions of the onsite haul route are existing, and others would be constructed in areas that do not contain prime farmland soils, there would be no impacts to prime farmland resulting from the onsite transport of CCR.

Under Alternative B (Option 2), transport of CCR to an offsite landfill and beneficial re-use facility would utilize existing roads, and no new roads would need to be constructed. Therefore, there would be no impacts to prime farmland associated with offsite transport of CCR.

Transport of Borrow

Borrow material required for site restoration would be obtained from the previously permitted TVA-owned borrow site located 1.5 miles northwest of the fossil plant. Transport of borrow would utilize existing roads and no new roads would need to be constructed. Therefore, there would be no impacts to prime farmland associated with borrow acquisition and transport.

3.8.3 Summary of Impacts to Prime Farmland

As summarized in Table 3-15, TVA has determined that all impacts to prime farmland related to the primary action and associated component actions for the proposed ash impoundment closures at GAF are minor.

Table 3-15. Summary of Impacts to Prime Farmland

Alternative	Action	Impact	Severity
		Impoundment Closure	
Alternative B	Closure-by-Removal of APC	No impact; prime farmland soils not present.	No impact.

Alternative	Action	Impact	Severity
		Landfill Expansion	
Alternative B	Expansion of Landfill and Ancillary Facilities	Permanent conversion of approximately 10.5 acres of prime farmland soils within the office complex area to industrial use.	Minor.
		Construction and Operation of Beneficial Re-use Processing Facility	
Alternative B	Construction and Operation of a Beneficial Re-use Processing Facility	Potential conversion of up to 15 acres of prime farmland to industrial use associated with facility construction.	Minor.
		Transport of CCR	
Alternative B (Option 1)	Transport of CCR to Onsite Landfill	No impact.	No impact.
Alternative B (Option 2)	Transport of CCR to Beneficial Re-use Processing Facility	No impact.	No impact.
Alternative B (Option 2)	Transport of CCR not Suitable for Beneficial Re-use	No impact.	No impact.
		Transport of Borrow	
Alternative B	Truck transport of borrow to GAF from TVA-owned borrow site	No impact.	No impact.

3.9 Vegetation

3.9.1 Affected Environment

GAF is in the Outer Nashville Basin of the Interior Plateau Level IV Ecoregion. This level IV ecoregion is characterized by rolling hills underlain by Ordivician limestone with chert capping the tallest hills and knobs. Deciduous forest, pasture, and cropland are the most abundant cover types (Griffith et al. 1998).

Land cover designations within the project area were developed based upon field observations and land use/land cover information obtained from the National Land Cover Dataset (NLCD) (Homer et al. 2015). The NLCD is based on aerial/satellite observations of large areas using a spatial resolution of 30-meter pixels and is useful for gaining a general understanding of land cover in a region. In addition to the NLCD, field reconnaissance level surveys of plant communities were conducted for the project area in April 2019. Areas of land cover type based on these two sources, within a 5-mile radius of GAF and within the project area at GAF, are shown in Table 3-16 and Figures 3-6 and 3-7.

Herbaceous/grassland is the dominant cover class within the project area (437 acres), followed by deciduous forest (347 acres), developed, low-intensity (335 acres), open water (156 acres), and evergreen forest (151 acres). Analysis of the NLCD indicates that land cover within a 5-mile radius of GAF is composed primarily hay/pasture land (16,958 acres) and deciduous forest (13,154 acres) (Table 3-16; Figure 3-6).

Table 3-16. Land Use/Land Cover within the Project Area and within the Vicinity of GAF

	Project Area and Regional Context		Disturbance Areas (acres)		
Land Cover Type	**Total EIS Project Area (acres)[1]**	**5-mile Radius (acres)[2]**	**APC[3]**	**Landfill Expansion Limits of Disturbance**	**Office Complex**
Barren Land	0	155	0	0	0
Cultivated Crops	0	2,074	0	0	0
Deciduous Forest	347	13,154	8.6	62	11
Developed, High Intensity	0	202	0	0	0
Developed, Low Intensity	335	1,058	149	34	0
Developed, Medium Intensity	0	424	0	0	0
Developed, Open Space	0	3,840	0	0	0
Emergent Herbaceous Wetlands	7	254	0	0	0
Evergreen Forest	151	2,136	6.1	57	3
Hay/Pasture	0	16,958	0	0	0
Herbaceous	437	1,038	206	23	14
Mixed Forest	0	1,395	0	0	0
Open Water	156	6,467	96	1	0.6
Shrub/Scrub	0	845	0	0	0
Woody Wetlands	8	265	0	2	0.5
Total	**1,441**	**50,265**	**466**	**179**	**29**

[1]Derived from Homer et al. 2015 supplemented by field surveys and aerial photography.
[2]Homer et al. 2015
[3]Includes laydown/logistics area.

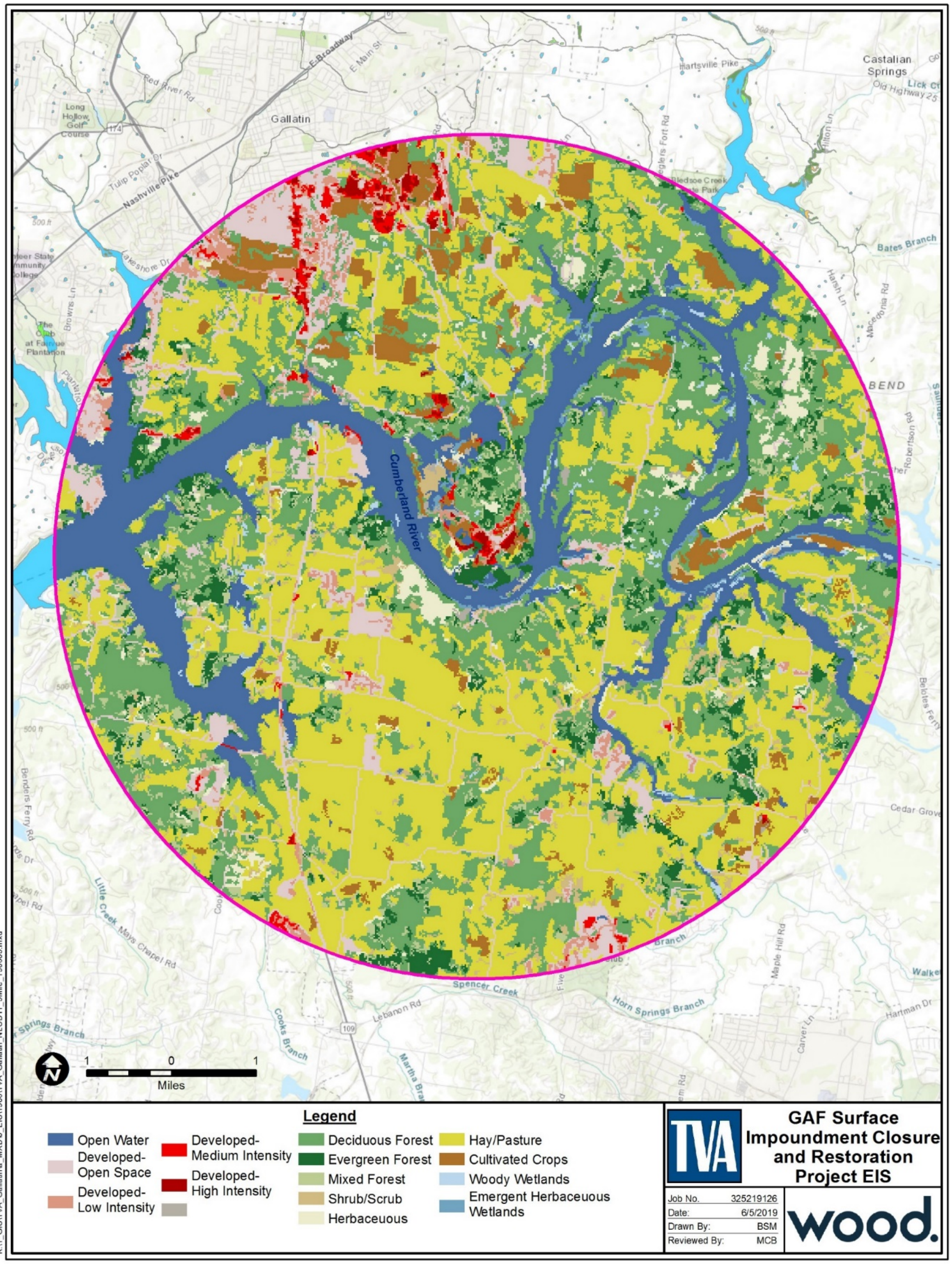


Figure 3-6. Land Use/Land Cover Within a 5-Mile Radius of GAF

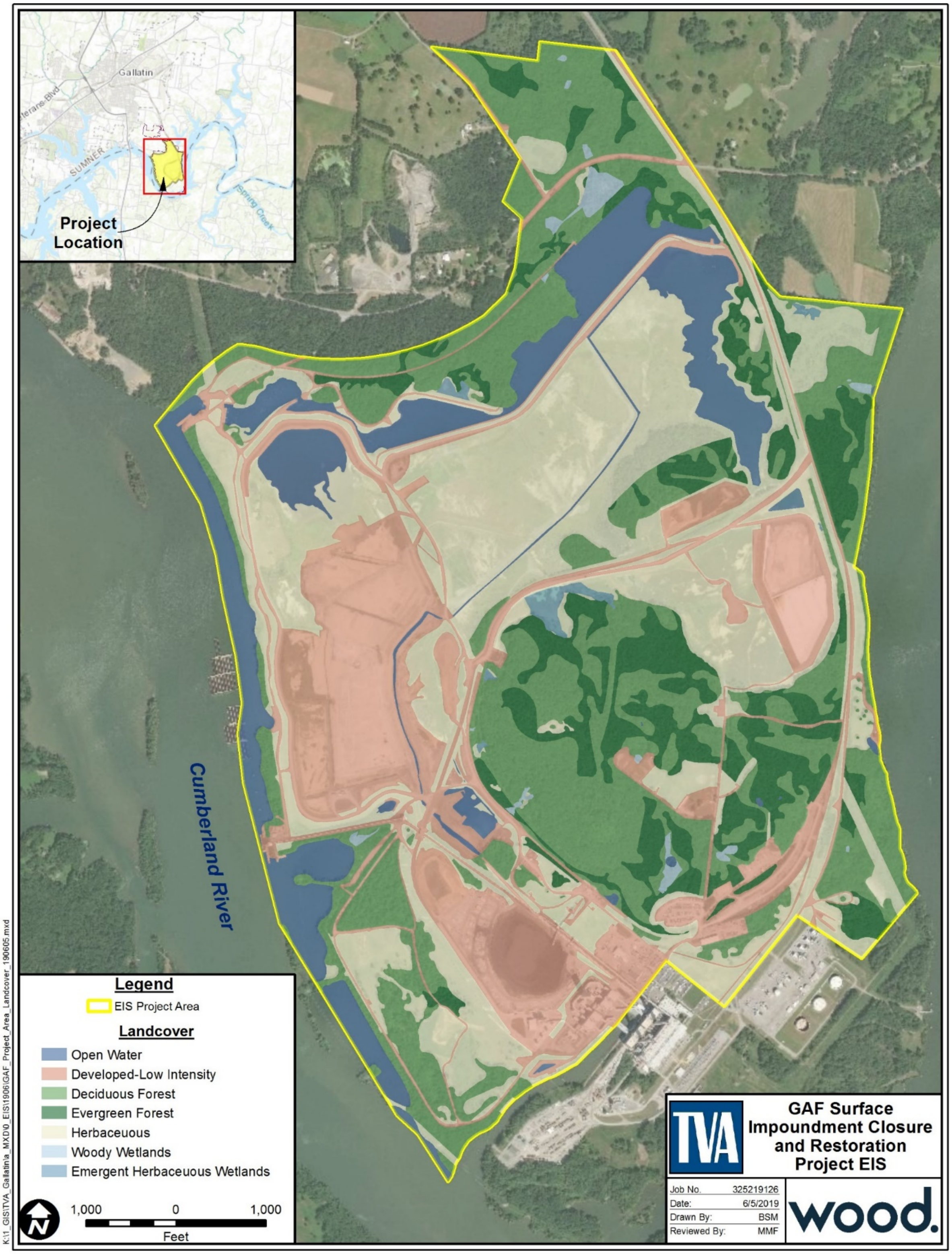


Figure 3-7. Land Use/Land Cover Within the Project Area at GAF

Land cover within the GAF project area consists of a mix of highly disturbed areas that are mapped as developed low-intensity, open water, and herbaceous/grassland and maintained lawn, along with more naturalized communities consisting of a mosaic of disturbed coniferous and deciduous forest. Coniferous forest occupies shallow soils and areas marginal to developed space and is dominated by eastern red cedar, but also frequently includes white ash, sugarberry, slippery elm, and a number of other early successional trees. Typical shrub and herbaceous species include coralberry, Amur honeysuckle, osage orange, white snakeroot, poison ivy, and Japanese stiltgrass. Deciduous forest occupying protected north- and east-facing slopes is dominated by sugar maple, chinquapin oak, and Shumard oak and accompanied by less common species such as slippery elm and northern red oak in the canopy and dogwood and various herbaceous species in the understory. Forested slopes facing south and west are similar but include white oak, shagbark hickory, eastern red cedar and white ash. Lower and topographically flatter forested upland found in the southern part of the Rail Loop is characterized by species such as green ash, sugarberry, upland swamp privet and various sedges. Forested wetlands like those in the middle of the NRS and in the basin north of Stilling Pond B are dominated by hackberry, slippery elm, eastern cottonwood, and poison ivy.

Non-forested areas within and surrounding the various ash and stilling ponds are in a mix of developed-low intensity, scrub, and herbaceous cover classes. Species like common reed, horseweed, broomsedge, black willow, and eastern cottonwood form patchy stands in the drier portions of the unmanaged vegetated interiors of the ponds while emergent stands of cattail and common reed are typical of the wet coves and pond margins. Maintained lawn characterizes the majority of herbaceous cover within GAF, including the slopes of the road berms that surround the ash ponds, areas within NRS, the firearms range, and the communication tower. Upland herbaceous communities in the project area are dominated by tall fescue, Kentucky bluegrass, dwarf plantain, and weedy clover species. An area of wet lawn in the northern part of the NRS includes a number of hydrophytic graminoids (sedges, bulrush, spikerush) in addition to those species found in the upland lawns. Two scrub/herbaceous patches north of Odoms Bend Road, south of Newton Lane, and east of Steam Plant Road are in a mosaic of infrequently mowed grassland and successional shrub thicket. These areas are dominated by invasive brome, corn salad, sawtooth blackberry, and sericea. Infrequently mowed upland herbaceous vegetation found within the east and west powerline corridors and in a small patch north of the stilling ponds are characterized by sericea, crownbeard, invasive brome, clovers, and common vetch.

Certain non-native species are considered invasive and pose a threat to the natural environment. EO 13112-Invasive Species, of February 3, 1999, directed TVA and other federal agencies to prevent the introduction of invasive species (both plants and animals), control their populations, restore invaded ecosystems, and take other related actions. EO 13751-Safeguarding the Nation from the Impacts of Invasive Species, issued on December 8, 2016, amends EO 13112 and directs actions to continue coordinated federal prevention and control efforts related to invasive species. Invasive plants are common in and near the project area. Some of the invasive plant species observed within the project area include Japanese honeysuckle, Amur honeysuckle, Johnsongrass, tall fescue, sericea lespedeza, Chinese privet, common reed, Japanese stiltgrass, and tree of heaven.

3.9.2 Environmental Consequences

3.9.2.1 Alternative A – No Action Alternative

Under Alternative A, no closure activities would take place, the NRL Landfill would not be expanded, and a beneficial re-use processing facility would not be constructed. Consequently, no impacts to vegetation would occur.

3.9.2.2 Alternative B – Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill

Surface Impoundment Closures

Under this alternative, stabilization, clearing/grubbing, and CCR removal activities associated with the closure of surface impoundments would result in the disturbance of all vegetation resources within the ash ponds and laydown/logistics area. Vegetation within impoundments proposed for closure is comprised of a mix of maintained turf, developed low-intensity, and early successional herbaceous and scrub communities (355 total acres). Impacts to these existing low-quality communities are expected to be minor as they are relatively common, of low quality, and represent just 1.4% of the 24,774 total acres of similar habitat within a five-mile radius. Less than one acre of fragmented and disturbed tree cover occurs within the ash impoundments. Vegetation within the laydown/logistics area is comprised of approximately 14 acres deciduous and evergreen forest and 17 acres of undeveloped and herbaceous cover in areas that have been previously cleared. Consequently, impacts to this vegetation from closure activities are expected to be negligible. Similar forested habitat is well represented elsewhere within the GAF project area (498 acres) and within a five-mile radius of the site (15,290 acres) (Table 3-16).

Following excavation and backfilling, disturbed areas within the closed impoundments would be graded and vegetated with a native seed-mix to prevent erosion and limit the invasion of non-native, weedy species. Overall, activities associated with the closure of surface impoundments are expected to impact locally common vegetation with limited conservation value. Therefore, overall impacts to vegetation from closure activities would be minor.

Expansion of Existing Onsite Landfill

As shown in Table 3-16, approximately 119 acres of evergreen and deciduous forest fall within the proposed landfill expansion limits of disturbance which include the landfill expansion, relocated communications tower, ammonia sensor tower, and a paved haul road. This area also includes approximately 34 acres of maintained turf and developed space within the firearms range, landfill haul route, and existing communication tower areas. Complete and permanent removal of vegetation within the proposed landfill expansion and haul route areas is expected, representing a loss of 0.7% of 16,950 total forested acres and a 0.1% loss of 24,179 total herbaceous/developed land within a five-mile radius of GAF. Impacts to the herbaceous vegetation would be minimal due to its low-conservation value, while impacts to the forested majority would be greater due to the more advanced successional age of the stands. “Conservation value” reflects the relative “weediness” of a species or community type, its regional abundance, and the degree to which it prefers growing in a complex, intact ecological system. No uncommon species or associations have been observed within the forested portion of the landfill expansion area, and therefore, the loss of the vegetated communities in this portion of the project area would not have a notable effect on status of any individual species or the regional abundance of forest cover types in the vicinity. Upon closure of the SRL Landfill, a soil cover system will overlay deposited CCR and a pre-approved seed mix will be spread.

Development of the office complex would require the clearing of approximately 28 acres of vegetation. Roughly 14 acres of deciduous and evergreen forest and another 14 acres of herbaceous and scrub vegetation communities would be impacted. These vegetation associations are abundant within and outside of the GAF project area, representing 0.08% of forest within the surrounding 5-mile area and therefore, this impact would be minor. The impacted herbaceous and scrub communities are disturbed, are occupied by a number of invasive or otherwise weedy species, and they represent 0.07% of these vegetative communities within the surrounding 5-mile area. Therefore, impacts to this resource is also minor and is not a conservation concern.

Construction and Operation of a Beneficial Re-use Processing Facility

A specific site for the potential beneficial re-use processing facility has not been identified, however, based on the proposed facility attributes in Table 2-5, the facility would be preferentially constructed on previously disturbed industrial land. Potential site development activities under the bounding condition would result in disturbance up to 15 acres of land with minimal impacts to forested land cover types. Therefore, minor impacts to vegetation associated with the construction and operation of the beneficial re-use facility are expected.

Transport of CCR

Under Alternative B (Option 1) CCR removed from the ash impoundments would be transported to the onsite landfill via truck using an onsite paved haul road. Under Option 2 of this alternative, CCR would be transported to both a beneficial re-use processing facility and to an offsite landfill. Minor indirect effects may occur to vegetation along haul routes associated with the deposition of fugitive dust during the loading and movement of CCR. BMPs such as covered loads would be implemented as appropriate to minimize impacts.

Transport of Borrow

Under Alternative B, borrow material would be transported by truck to the project area from a previously permitted borrow site approximately 1.5 miles north of GAF. Minor indirect effects may occur to vegetation along the haul route associated with the deposition of fugitive dust during the loading and movement of borrow material. BMPs such as covered loads would be implemented as appropriate to minimize impacts.

3.9.3 Summary of Impacts to Vegetation

As summarized in Table 3-17, TVA has determined that impacts to vegetation related to the primary action and associated component actions related to the proposed impoundment closures at GAF are minor.

Table 3-17. Summary of Impacts to Vegetation

Alternative	Action	Impact	Severity
		Impoundment Closure	
Alternative B	Closure-by-Removal of APC	Clear low quality vegetation in the APC. Revegetate impoundments with native seed mix.	Minor because of the low conservation value of affected species/communities and expected return to pre-closure conditions short-term.

Alternative	Action	Impact	Severity
		Landfill Expansion	
Alternative B	Expansion of Landfill and Ancillary Facilities	Clear 179 acres of herbaceous, developed low-intensity, and forest.	Minor impacts due to previously disturbed nature of portions of the affected areas, presence of common vegetation types of herbaceous communities, and abundance of forested areas within 5 miles of GAF.
	Construction and Operation of Beneficial Re-use Processing Facility		
Alternative B	Construction and Operation of a Beneficial Re-use Processing Facility	Loss of vegetation in up to 15-acre parcel for beneficial re-use construction.	Minor due to previously disturbed, non-forested parcel for re-use site.
		Transport of CCR	
Alternative B (Option 1)	Transport of CCR to Onsite Landfill	Potential indirect impacts due to deposition of fugitive dust on vegetation.	Minor impacts minimized with the use of BMPs including covered loads and transport on paved roads.
Alternative B (Option 2)	Transport of CCR to Beneficial Re-use Processing Facility	Potential indirect impacts due to deposition of fugitive dust on vegetation.	Minor impacts minimized with the use of BMPs including covered loads and transport on paved roads.
Alternative B (Option 2)	Transport of CCR not Suitable for Beneficial Re-use	Potential indirect impacts due to deposition of fugitive dust on vegetation.	Minor impacts minimized with the use of BMPs including covered loads and transport on paved roads.
		Transport of Borrow	
Alternative B	Truck transport of borrow to GAF from TVA-owned borrow site	Potential indirect impacts deposition of fugitive dust on vegetation.	Minor impacts minimized with the use of BMPs including covered loads transport on paved roads.

3.10 Wildlife

3.10.1 Affected Environment

The proposed project area is an approximately 1,450-acre site that lies on a bend adjacent to Old Hickory Lake (Cumberland River) and is comprised of approximately 347 acres of deciduous forested habitat, 151 acres of evergreen forested habitat, 437 acres of grassland/herbaceous, 335 acres of developed land, and 156 acres of open water including streams, ponds, and wetland areas (see Table 3-16 and Figure 3-7, Vegetation section). Notably, however, as described in Section 3.9 (Vegetation), most plant communities in the project area, especially within the ash impoundments that are composed of both developed/industrial lands and grassland/herbaceous/shrub scrub habitats, have been disturbed by former construction and operation of GAF; consequently, the wildlife communities associated with these habitats consist of common species that readily adapt to utilizing disturbed habitats.

Field surveys of the site were performed on April 23-25, 2019. A total of 64 wildlife species were documented in the project area via visual observations, songs and calls, and signs (i.e., tracks, scat, remains, and foraging habits) (Table 3-18). Forty-six species of birds were documented, and the dominant species were northern cardinal, turkey vulture, and blue jay. Nine mammalian species were recorded with the dominant species being white-tailed deer and eastern gray squirrel. Five species of reptiles and six species of amphibians were recorded with the respective dominant species being eastern box turtle and gray treefrog (Table 3-18).

The open water and shallow vegetated areas of the APC provide low quality habitat and foraging opportunities for aquatic birds; amphibians and reptiles such as bull frogs, snapping turtles, and painted turtles; and mammals such as muskrats. The APC has historically been used by shorebirds during migration, by waterfowl during the winter, and by wading birds in the summer (TWRA 2019). Least sandpiper, mallard, great blue heron, green heron, and great egret are some species that have been observed (eBird 2019).

The rail loop and the area north of the stilling ponds contain mostly deciduous forest. The rail loop area also contains a firearms shooting range and a radio tower with associated disturbed and developed vegetation. Some wildlife species are known to use man-made structures, such as those associated with the range and radio tower, opportunistically. Common mammals, birds, and reptiles have been observed using parts of buildings or structures abandoned or used infrequently by humans. Several species of bats commonly found in this region may roost in dark or quiet areas of these abandoned structures. Common species of bat in Tennessee known to use human structures include the big brown bat, evening bat, silver-haired bat, and southeastern bat (Bat Conservation International 2019).

Typical bird species that would use deciduous forest habitats in the proposed project area include the black and white warbler, blue-gray gnatcatcher, Carolina chickadee, Carolina wren, eastern wood-pewee, hairy woodpecker, pileated woodpecker, summer tanager, tufted titmouse, wild turkey, white-throated sparrow, wood thrush, and yellow-bellied sapsucker. These areas also provide foraging and roosting habitat for several species of bat, particularly in areas where the forest understory is partially open or includes wetlands or open water areas. Bat species likely found within this habitat include big brown bat, eastern red bat, evening bat, and silver-haired bat. Eastern chipmunk and gray fox are also likely to occur in deciduous forests, and Eastern fence lizard, gray rat snake, and northern ring-necked snake are common reptiles of this habitat type (TWRA 2019; Scott and Redmond 2008). The small stands of coniferous forest scattered within the proposed project area provide habitat for species such as the pine warbler, ovenbird, red crossbill, whip-poor-will, broad-winged hawk, and southern flying squirrel.

Herbaceous vegetation and early successional areas, such as those present within the ash impoundments, provide habitat for Canada goose, eastern meadowlark, European starling, killdeer, field sparrow, song sparrow, indigo bunting, red-winged blackbird, Carolina wren, and mourning dove. White-tailed deer, eastern cottontail, striped skunk, and rodents such as the white-footed mouse are also frequently associated with herbaceous and early successional habitats. Reptiles found in these habitats include southern black racer, gray rat snake, and eastern garter snake (TWRA 2019).

Riparian and wetlands habitats occur in and along streams and wet weather conveyances within the proposed project area, especially in the rail loop area (AECOM 2019c; see Figure 3-10, Wetlands section). Such habitat provides resources for birds, including Acadian flycatcher, great blue heron, northern harrier, northern parula, prothonotary warbler, red-winged blackbird, song sparrow, swamp sparrow, white-throated sparrow, and wood duck (TWRA 2019). North American deermouse and smoky shrew are common mammals of palustrine wetland and aquatic communities (NatureServe 2019). Midwestern worm snake, ringneck snake, and rough green snake are common reptiles likely present within this habitat (Scott and Redmond 2008). Amphibians likely found in forested wetlands in this area include marbled salamander, northern slimy salamander, and spotted salamander, eastern narrowmouth toad, eastern spadefoot toad, Fowler’s toad, gray treefrog, and southern leopard frog (Scott and Redmond 1996).

Review of the TVA Regional Natural Heritage database in April 2019 resulted in records for one cave within 3 miles of the project area (TVA 2019d). This cave, the Gallatin Fossil Plant Cave, occurs approximately 1,300 feet from the southern end of GAF and is located on the opposite side of the Cumberland River (TVA 2013b). In addition, two wading bird colonies have been documented within three miles of the project area. Both are located along the Cumberland River across from GAF; however, neither has been documented as active since 2000. No caves, aggregations of birds or colonial wading bird colonies, or other unique habitats were observed during field investigations. Should caves, wading bird colonies, or other unique terrestrial habitat or features be identified during impoundment closure activities, actions would be taken to preserve these resources. Information regarding threatened and endangered species within and surrounding the project site can be found in Section 3.12.

Review of the USFWS’s Information for Planning and Consultation (IPaC) database (https://ecos.fws.gov/ipac/) resulted in identification of six migratory birds of conservation concern that have the potential to be impacted by the proposed actions: Kentucky warbler, lesser yellow legs, prairie warbler, red-headed woodpecker, semipalmated sandpiper, and wood thrush. Of these species, the project area offers relatively limited upland herbaceous areas for prairie warbler (exclusive of ash pond areas), 365 deciduous forest acres for Kentucky warbler, red-headed woodpecker, and wood thrush, and minimal to no habitat for semi-palmated sandpiper and lesser yellow legs. The wood thrush and prairie warbler also may use the 154 acres of evergreen/mixed forest.

Ospreys, which are also protected under the EO 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds), are known to occur in the vicinity of the project. During the April 2019 field investigations there were three osprey nests observed on transmission line towers in the vicinity of GAF (Figure 3-8, Threatened and Endangered Species section). Two of the osprey nests were located on transmission line towers along the bank of the Cumberland River south of GAF at the confluence with the GAF discharge channel. Nest 1 was occupied by adult ospreys and was downstream of the discharge canal within the southwest corner of the project area. Nest 2 was on a transmission line tower, upstream of the discharge canal and approximately 700 feet outside of the project area boundary. Nest 3 was located on a transmission line tower between the eastern edge of Stilling Pond B and Steam Plant Road on the northeastern edge of the project area boundary.

Table 3-18. Wildlife Observed Within the Proposed Project Areas on TVA Property at the Gallatin Fossil Plant in Sumner County, Tennessee

		Areas Surveyed		
Common Name	**Scientific Name**	**Vicinity of Non-Registered Site**	**Vicinity of Landfill**	**Vicinity of APC**
Birds				
Agelaius phoeniceus	red-winged blackbird	X		
Aix sponsa	wood duck		X	
Ardea alba	great egret [1]			X
Ardea herodias	great blue heron [1]	X	X	
Baeolophus bicolor	tufted titmouse	X	X	X
Branta canadensis	Canada goose [1]			X
Buteo jamaicensis	red-tailed hawk			X
Cardinalis	northern cardinal	X	X	X
Cathartes aura	turkey vulture [1]	X	X	X
Charadrius vociferus	killdeer	X		
Contopus virens	eastern wood-pewee		X	
Corvus brachyrhynchos	American crow		X	X
Cyanocitta cristata	blue jay	X	X	X
Dryocopus pileatus	pileated woodpecker		X	X
Dryobates pubescens	downy woodpecker			X
Dryobates villosus	hairy woodpecker		X	
Geothlypis trichas	common yellowthroat	X		
Hylocichla mustelina	wood thrush		X	
Icteria virens	yellow-breasted chat			X
Megaceryle alcyon	belted kingfisher		X	
Melanerpes carolinus	red-bellied woodpecker		X	X
Meleagris gallopavo	wild turkey			X
Melospiza melodia	song sparrow		X	
Mimus polyglottos	northern mockingbird		X	
Mniotilta varia	black-and-white warbler		X	
Molothrus ater	brown-headed cowbird			X
Pandion haliaetus	osprey [1]	X		X
Phalacrocorax auritus	double-crested cormorant	X		X
Pipilo erythrophthalmus	eastern towhee	X	X	X
Piranga rubra	summer tanager		X	
Poecile carolinensis	Carolina chickadee	X	X	X
Polioptila caerulea	blue-gray gnatcatcher	X	X	X
Setophaga americana	northern parula		X	X
Setophaga discolor	prairie warbler		X	X
Sialia sialis	eastern bluebird		X	X
Sphyrapicus varius	yellow-bellied sapsucker		X	X

		Areas Surveyed		
Common Name	**Scientific Name**	**Vicinity of Non-Registered Site**	**Vicinity of Landfill**	**Vicinity of APC**
Spinus tristis	American goldfinch		X	
Spizella pusilla	field sparrow	X		
Sturnus vulgaris	European starling	X		
Thryothorus ludovicianus	Carolina wren	X	X	X
Turdus migratorius	American robin			X
Tyrannus	eastern kingbird		X	
Vireo griseus	white-eyed vireo	X	X	
Zenaida macroura	mourning dove	X	X	X
Zonotrichia albicollis	white-throated sparrow	X	X	
Zonotrichia leucophrys	white-crowned sparrow			X
Mammals				
Canis latrans	coyote		X	
Castor canadensis	American beaver	X		X
Didelphis virginiana	Virginia opossum			X
Marmota monax	groundhog			X
Odocoileus virginianus	white-tailed deer	X	X	X
Procyon lotor	raccoon	X	X	
Scalopus aquaticus	eastern mole			X
Sciurus carolinensis	eastern gray squirrel		X	X
Sylvilagus floridanus	eastern cottontail rabbit			X
Reptiles				
Pantherophis spiloides	gray ratsnake			X
Plestiodon laticeps	broadheaded skink		X	X
Sceloporus undulatus	eastern fence lizard	X	X	
Terrapene carolina	eastern box turtle	X	X	X
Trachemys scripta elegans	red-eared slider			X
Amphibians				
Eurycea cirrigera	southern two-lined salamander		X	
Hyla versicolor	gray tree frog		X	X
Lithobates catesbeianus	American bullfrog		X	X
Lithobates sphenocephalus	southern leopard frog		X	

[1]Not observed onsite. Observed as a flyover.

3.10.2 Environmental Consequences

3.10.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not close any of the surface impoundments, construct an expansion of the existing landfill, or complete any restorative actions at GAF.

Therefore, no project-related environmental impacts with respect to wildlife would occur under this alternative.

3.10.2.2 Alternative B – Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill

Surface Impoundment Closures

Surface impoundment closure activities under Alternative B would include stabilization, clearing/grubbing, and CCR removal activities that would result in the disturbance of all existing wildlife habitat within the ponds and clearing of the laydown/logistics area. The habitat within the impoundments proposed for closure and the laydown/logistics area is comprised of a mix of open water and shallow vegetated areas, adventive herbaceous vegetation, deciduous and evergreen forest, and early successional herbaceous and scrub communities within a disturbed industrial landscape.

Under this alternative, most wildlife present within the project site would likely disperse to adjacent and/or similar habitat during construction. The closure of the ash impoundments would result in a loss of marginally suitable waterfowl and wading bird habitat. However, there is abundant waterfowl habitat elsewhere in the project vicinity along Old Hickory Lake/Cumberland River, including over 500 acres of emergent and forested wetlands and approximately 6,500 acres of open water (Table 3-16, Vegetation section). Similarly, loss of the scrubby habitat in the APC would remove some habitat for migratory birds of conservation concern identified by USFWS IPaC including the prairie warbler. However, over 18,000 acres of herbaceous, pasture, and shrub scrub habitats exist in the surrounding landscape (Table 3-16, Vegetation section). The proposed laydown/logistics area contains approximately 14 acres of evergreen and deciduous forest habitat. Complete and permanent removal of wildlife habitat within the laydown/logistics area and the associated disturbed areas is expected under Alternative B. Impacts to wildlife using the forested habitat would be greater due to loss of more diverse forage and cover for wildlife associated with this habitat. However, over 15,000 acres of deciduous and evergreen forest habitats exist in the surrounding landscape (Table 3-16, Vegetation section). Additionally, the forested area within the laydown/logistics area has been disturbed and fragmented by former construction and operation of GAF. Consequently, the wildlife communities associated with these habitats consist of species that readily adapt to utilizing disturbed habitats. Given the disturbed nature of the project area and abundance of other similar habitats within the surrounding landscape, any impacts would be minor and would not have measurable impacts to overall populations of any wildlife species, including waterfowl, wading birds, or migratory birds of conservation concern.

There are two osprey nests located on transmission line towers within the proposed project area (Figure 3-8, Endangered Species section). One, which was active during April 2019 field investigations, is located in the southwestern corner of the project area, and the other is located on the northeastern edge of the project area. Should the nests be active in future years, ash pond closure activities would be minimized within a 660-foot buffer around the nests during the osprey nesting season. Osprey nest removal would not be required as part of the impoundment closures, as the nests are not located within the limits of disturbance for the proposed project. These avoidance measures would result in no adverse impacts to these birds. The closest recorded cave in the vicinity is at a distance far enough away (0.83 mi) from the project area that it would not be affected under this alternative, and the recorded wading bird colonies in the vicinity have not recently been active and also would not be affected.

The APC is proposed to be closed by removal and would be restored using approved, non-invasive seed mixes designed to establish desirable vegetation that would support periodic use by wildlife. Lands within the APC would be used in conjunction with overall site storm water control and may be expected to develop both wetland and naturalized upland habitats. Following construction these lands may be expected to be offer moderate quality habitat value for both wetland and upland wildlife species.

While the proposed actions under Alternative B would result in alteration of habitats and displacement of resident wildlife species, these effects are not expected to result in notable alteration or destabilization of populations of any species. In consideration of the highly disturbed habitats present within the project areas, and the availability of higher quality wildlife habitat in proximity, potential direct and indirect impacts to wildlife would be minor. Additionally, restoration of lands within the APC may be expected to provide for marginally improved wildlife habitat in the long-term.

Expansion of Existing Onsite Landfill

As shown in Table 3-16 (Vegetation section), the proposed landfill expansion limits of disturbance, which include the landfill expansion and ancillary facilities such as the relocated communications tower, ammonia sensor tower, and a paved haul road, contain approximately 57 acres of maintained herbaceous lands and developed space and approximately 121 acres of evergreen and deciduous forest habitat with associated riparian habitat along streams, wet weather conveyances, ponds, and forested wetlands. Associated with the landfill expansion is development of an office complex to the east. The proposed office complex development area contains approximately 14 acres of maintained herbaceous lands and developed space and approximately 14.5 acres of evergreen and deciduous forest habitat with associated riparian habitat along streams, wet weather conveyances, and forested wetlands. Complete and permanent removal of wildlife habitat within the landfill expansion and the associated disturbed areas is expected under Alternative B. Impacts to wildlife that use herbaceous habitat would be minimal due to the low conservation value of these types of habitats within the action areas. Conversely, impacts to wildlife using the forested habitat would be greater due to loss of more diverse forage and cover for wildlife associated with this habitat. However, the forested area within the landfill expansion and associated development areas have been disturbed and fragmented by former construction and operation of GAF, including construction and operation of the firearms range and the existing communications tower. Consequently, the wildlife communities associated with these habitats consist of common species that readily adapt to utilizing disturbed habitats.

TVA would use BMPs along all remaining streams and wet weather conveyances within the landfill expansion area to minimize impacts to these aquatic and riparian habitats. In conjunction with any potential impacts to streams TVA would avoid and minimize impacts during design to the extent practicable, implement appropriate BMPs, and compensate for unavoidable adverse effects.

Proposed actions are not likely to affect populations of common wildlife species using structures in the project area, such as those in the firearms range and the communications tower, as use of these structures by wildlife is opportunistic, and similar buildings and structures exist in the surrounding landscape. At present no species of concern are known to use any of the structures that would be affected under this alternative, and no wildlife were observed using these structures during April 2019 field surveys. A survey would be performed between one and three months prior to removal of structures to determine if wildlife or active nests of migratory birds are present. If active migratory bird nests are found within these buildings, the timing of deconstruction actions may need to be modified to avoid nesting seasons, or TVA would coordinate with the U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services Program to determine the best options for carrying out project activities under existing permits.

Habitat for some migratory birds of conservation concern does exist in the forested portion of the landfill expansion, adjacent development, and the office complex areas. Migratory birds of conservation concern were identified near the action area. While habitat for these species could be removed, direct effects are expected to be avoided or minimized for most migratory bird species, as there will be seasonal restrictions for removal of forested habitat when possible. Furthermore, similar deciduous and mixed forest habitat totaling approximately 14,550 acres exist in the surrounding landscape (see Table 3-16).

Osprey nests identified on site are all greater than 660 feet from actions associated with the proposed landfill expansion and would not be impacted. The recorded wading bird colonies in the vicinity of GAF have not recently been active and also would not be affected by proposed actions. The closest recorded cave in the vicinity is at a distance far enough away (0.83 miles) from the project area that it would not be affected under this option. Given the disturbed nature of the project area and timing of tree removal, impacts are expected to be minor and would not have measurable impacts to overall populations of any wildlife species, including migratory birds of conservation concern.

Construction and Operation of a Beneficial Re-use Processing Facility

A specific site for the potential beneficial re-use processing facility that would be constructed and operated under Alternative B has not been identified. However, according to the proposed facility attributes listed in in Table 2-5, previously disturbed industrial land is preferred for construction of the facility, disturbance of rare/sensitive vegetation communities would be avoided, and removal of forested lands would be minimized. Forest surveys would be conducted to determine habitat suitability for summer roosting federally listed bats. Removal of suitable habitat would be avoided or would have seasonal restrictions, which may benefit other common species of bats. As such, although construction and operation of the beneficial re-use processing facility would result in alteration of habitats and displacement of common wildlife species, these effects are not expected to result in notable alteration or destabilization of populations of any species. Therefore, impacts to wildlife resulting from the development and operation of the proposed beneficial re-use facility under Alternative B would be minor.

Transport of CCR

Under Alternative B (Option 1) CCR removed from the impoundments would be transported to the onsite landfill via truck using an onsite paved haul road. Under Option 2 of this alternative, CCR would be transported to both a beneficial re-use processing facility and to an offsite landfill. Because transport of CCR would be undertaken by trucking using either an onsite haul road or existing offsite roadways, CCR transport would not result in additional impacts to offsite wildlife or their associated habitats.

Transport of Borrow

In addition, under this alternative borrow material would be transported by truck to the project areas from a previously permitted borrow site at GAF. This activity would entail the use of existing paved roads and would not result in additional impacts to wildlife and or their associated habitats.

3.10.3 Summary of Impacts to Wildlife

As summarized in Table 3-19, TVA has determined that impacts to wildlife related to the primary action and associated component actions related to the proposed ash impoundment closures at GAF are minor.

Table 3-19. Summary of Impacts to Wildlife

Alternative	Action	Impact	Severity
		Impoundment Closure	
Alternative B	Closure-by-Removal of APC	Loss of low-quality habitats and some forested habitats associated with CCR impoundments, displacement of common wildlife species. Impacts to active osprey nests would be avoided.	Minor due to construction phase losses to existing low quality habitats within impoundments and abundance of other similar habitats in surrounding landscape. Moderately beneficial in long-term due to restored habitats within APC. Other suitable habitat readily available in vicinity for migratory birds of conservation concern.
		Landfill Expansion	
Alternative B	Expansion of Landfill and Ancillary Facilities	Loss of low quality deciduous and evergreen forest, wetland, and riparian habitat. Direct and indirect impacts due to alteration and removal of habitat.	Based on relatively common wildlife communities, abundance of similar habitat in vicinity, and fragmented woodland habitat, impacts are considered minor. TVA would conduct presence/absence surveys prior to removal of buildings and structures to avoid or minimize impacts.
		Construction and Operation of Beneficial Re-use Processing Facility	
Alternative B	Construction and Operation of a Beneficial Re-use Processing Facility	Potential removal of up to 15 acres of low quality habitat associated with facility construction.	Minor due to small scale disturbance and the avoidance of sensitive or rare habitat for development. Removal of forested habitat would be minimized, and removal of suitable summer bat roosting habitat would be avoided or would have seasonal restrictions.
		Transport of CCR	
Alternative B (Option 1)	Transport of CCR to Onsite Landfill	No impact.	No impact.

Alternative	Action	Impact	Severity
Alternative B (Option 2)	Transport of CCR to Beneficial Re-use Processing Facility	No impact.	No impact.
Alternative B (Option 2)	Transport of CCR not Suitable for Beneficial Re-use	No impact.	No impact.
		Transport of Borrow	
Alternative B	Truck transport of borrow to GAF from TVA-owned borrow site	No impact.	No impact.

3.11 Aquatic Ecology

3.11.1 Affected Environment

GAF is located in Sumner County, Tennessee, within a large peninsula on Old Hickory Lake at CRM 240 to 246.0. The Cumberland River was altered from a free-flowing river to a reservoir due to the construction of the Old Hickory Dam in 1954. The dam is located 27 river miles downstream of the GAF facility and the lake extends another 70 river miles upstream to the Cordell Hull Dam. The project area is within an approximately 3-mile-long reach of the reservoir with 1.75 miles along the western boundary and 1.25 miles along the eastern boundary.

TVA has used a Reservoir Ecological Health monitoring program since 1990 to evaluate ecological conditions in major reservoirs in the Tennessee River system. A component of this monitoring program is a multi-metric approach to data evaluation for fish communities known as the Reservoir Fish Assemblage Index (RFAI). Fish communities are used to evaluate ecological conditions because of their importance in the aquatic food web and because fish life cycles are long enough to integrate conditions over time. Benthic (bottom dwelling) macroinvertebrate populations are assessed using the Reservoir Benthic Index (RBI) methodology. Because benthic macroinvertebrates are relatively immobile, negative impacts to aquatic ecosystems can be detected earlier in benthic macroinvertebrate communities than in fish communities. A component of this monitoring program includes sampling the benthic macroinvertebrate community (TVA 2017a).

Beginning in 2001, TVA began a fish community monitoring program downstream (CRM 239 to CRM 240.6) and upstream (CRM 248.4 to CRM 249.9) of the discharge in order to verify that a Balanced Indigenous Population (BIP) of aquatic life was being maintained. Monitoring of the fish community was conducted during most years from 2001 to 2016. A summary of the RFAI scores are provided in Table 3-20 (TVA 2017a). The RFAI is used to assess the BIP by including 12 fish assemblage variables split into four categories: species richness and composition, trophic composition, abundance, and fish health. Over the 12 sampling years, RFAI scores for the condition of the fisheries portion of the BIP were in the fair to good range with identical average RFAI scores upstream and downstream of the discharge. Additionally, over the 12 sampling years the upstream site averaged 30 indigenous species and the downstream site averaged 28 indigenous species, with neither site containing state- or federally protected species. Overall, the Old Hickory Lake portion of the Cumberland River has had a total of 67 fish species recorded (USACE 2016). Based on several studies conducted on the Cumberland River (i.e., impingement, entrainment, electrofishing, gill netting), in the vicinity of GAF, the fish community is comprised of a typical warm water reservoir fish community dominated by gizzard shad, threadfin shad, freshwater drum, bluegill, and Mississippi silverside (TVA 2007; TVA 2017a; TVA 2017b; USEPA 1993).

In conjunction with the fish community monitoring at the GAF facility, in 2010 TVA began a benthic macroinvertebrate monitoring program with two sites upstream and two sites downstream in the Cumberland River. Monitoring of the benthic macroinvertebrate community was conducted from 2010 to 2016 with a summary of the RBI scores in Table 3-21 (TVA 2017a). The RBI is used to assess the condition of the benthic macroinvertebrate community by including seven macroinvertebrate assemblage variables. Over the six sampling years, RBI scores indicate a healthy benthic community with three upstream sites rated fair to excellent and 7 out the 11 ratings good or excellent. The downstream sites over the six years have healthy benthic community scores, as well, with good to excellent ratings for all downstream locations. Similar to the fish community, the benthic community is typical for a warm water reservoir with silt/clay sediment (USEPA 1993). The dominant populations include aquatic worms, midges, burrowing mayflies, Asiatic clams, and mud snails. Over the six sampling years, two native mussel species, the pink heelsplitter and the paper pondshell, were observed at low abundances (TVA 2011a; TVA 2011b; TVA 2013a; TVA 2014a; TVA 2015).

The ash ponds and stilling ponds at GAF are considered treatment systems and not aquatic habitat. Numerous small, isolated ponds also occur within the GAF property. These ponds are man-made features that were constructed for farm use by historical property owners and likely provide some habitat for aquatic species. Aquatic life in ponds within the GAF project area likely vary in abundance and diversity depending on the biologic conditions of a given pond and water quality parameters of the inflow. Generally, since these ponds are small and isolated, habitat quality and species diversity of aquatic life is expected to be low and represented by common aquatic animals.

Numerous intermittent streams and wet-weather conveyances are located within the GAF project area (AECOM 2019c; Wood 2019; see Figure 3-4). Since these aquatic features do not hold water year-round, they are expected to only provide seasonal habitat for aquatic species. Based upon a site survey conducted in April 2019, the macroinvertebrate communities are typical of headwater streams dominated by scuds, sow bugs, common stoneflies, and mayflies. These dominant populations fulfill multiple functional feeding groups such as shredders (scuds and sow bugs), predators (common stoneflies), and collector gatherers (mayflies). There were no fish observed in any of the streams on the GAF project area, however a few southern two-lined salamander larvae and crayfish were observed in one stream.

Table 3-20. GAF Reservoir Fisheries Index Scores

Station	2001	2002	2003	2005	2007	2008	2010	2011	2012	2013	2014	2016	AVG
Upstream of GAF CRM 249	37	33	44	38	46	41	47	42	41	37	41	39	40
Downstream of GAF CRM 240	39	37	41	43	40	40	43	41	39	40	40	40	40

RFAI Score Range: 12-21 (Very Poor), 22-31 (Poor), 32-40 (Fair), 41-50 (Good), or 51-60 (Excellent).
Source: TVA 2017a

Table 3-21. GAF Reservoir Benthic Macroinvertebrate Community Scores

Station	2010	2011	2012	2013	2014	2016
Upstream CRM 250.2*	23	27	23	29	27	25
Upstream CRM 248.7*	NS	27	21	23	27	31
Downstream CRM 242.0	NS	31	29	31	31	31
Downstream CRM 239.3	27	29	27	31	33	31

RBI Score Range: 7-12 (Very Poor), 13-18 (Poor), 19-23 (Fair), 24-29 (Good), 30-35 (Excellent).
NS = no sample
Source: TVA 2017a
*Scoring for 2011 through 2016 based on 10 samples for downstream site and 5 samples for each upstream site, with the exception of 10 samples for the 2010 upstream site.

3.11.2 Environmental Consequences

3.11.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not close any of the surface impoundments, construct an expansion on the existing landfill, or complete any restorative actions at GAF. Through this alternative, all plant process wastewaters would be handled through the flow management system and meet NPDES permit requirements protective of water quality and aquatic life in the reservoir. Consequently, project-related effects on aquatic resources would not change and the aquatic ecology would not be significantly impacted under Alternative A.

3.11.2.2 Alternative B – Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill

Surface Impoundment Closures

During Closure-by-Removal, primary construction activities would be located within the footprint of the existing impoundments. Under this closure alternative, discharges during dewatering would be required to meet existing permit limits, and water quality monitoring would continue to be performed at the approved outfall structure in accordance with the NPDES permit. Since ash ponds and stilling ponds are considered treatment systems and not aquatic habitat, and because laydown areas avoid encroachment or alteration of streams and other water bodies, direct impacts to aquatic ecosystems are limited to potential minor alterations in flow from permitted outfalls and the associated water quality of released effluent.

Following excavation activities, lower portions of the APC would be converted to permanent storm water management basins with appropriate approvals. The stilling ponds would continue to receive storm water from offsite areas north and east of the ponds and could also continue to receive runoff from the restored pond area. Upon completion of closure activities, the site would be graded and vegetated with approved non-invasive seed mixes to provide appropriate surface water management and encourage wildlife habitat.

Activities associated with surface impoundment closure are not expected to have negative indirect impacts on surface water. In the event that minor alterations to surface waters are required, any activities with potential of impacting aquatic resources would be appropriately permitted and would utilize approved BMPs. Effective use of BMPs and the use of the stilling ponds for storm water management, coupled with TVA's adherence to NPDES permit limits, would minimize impacts to aquatic resources within receiving jurisdictional waters such that overall impacts are considered to be negligible. All construction activities would adhere to permit limit requirements and would utilize BMPs based on the Tennessee Erosion and Sediment Control Handbook (TDEC 2012). Where soil disturbance could occur, the area would be stabilized and vegetated with an approved non-invasive seed mix. Following the construction phase, care, and maintenance of the approved closure system and site-wide management of storm water using appropriate BMPs would minimize indirect impacts to the aquatic community in the receiving waters.

Expansion of Existing Onsite Landfill

Under Alternative B, construction of the landfill expansion, the associated haul route, and ancillary facilities including the office complex, relocated communications tower, and ammonia sensor tower would involve ground disturbing activities that include clearing, grading, and excavation. Based on the Approved JD issued by the USACE in December 2019 for the SRL and field delineations in the office complex area, these activities would directly impact 3 intermittent streams, 11 ephemeral /WWCs, 6 wetlands, and 3 ponds. The total linear footage of intermittent streams and ephemeral streams/WWCs within the proposed landfill and office complex project area is 7,571 feet. The total area of wetlands and ponds that would be impacted is 2.46 acres of jurisdictional waters of the U.S. and 2.63 acres of jurisdictional waters of the State, respectively (see Table 3-26, Wetlands section).

The impacted streams and WWCs are within the boundaries of the landfill expansion area and the office complex. The impacted streams and WWCs within the office complex area originate within this area and flow into the Cumberland River. The impacted streams and WWCs in the landfill expansion area originate within the proposed landfill expansion boundary and flow out with the intermittent stream originating just north of the gun range. Potential habitat for the streamside salamander exists in this intermittent stream. The streamside salamander is a species identified by TDEC as a state sensitive species, although it is not a state- or federally listed threatened or endangered species. Suitable habitat for the streamside salamander consists of upland forest area with associated streams containing flowing water, limited number of predatory fish, and limestone beds for eggs that are deposited by salamanders on the underside of submerged rocks (Niemiller et al. 2006). Aquatic habitat of the ephemeral streams and WWCs are not conducive for streamside salamander habitat as they are dry during much of the year. However, the intermittent stream is similar to other intermittent streams surveyed in 2019 (STR-5, STR-7, refer to Figure 3-8, Threatened and Endangered Species section) and would support benthic macroinvertebrates.

Direct and permanent impacts to aquatic species and their habitats would be limited to stream loss and/or culverting within the proposed landfill expansion project area. These activities would be accomplished in compliance with applicable TDEC ARAP and USACE 404 permits obtained for the proposed actions, including any required mitigation. Construction activities would adhere to permit limit requirements and would utilize appropriate BMPs that would minimize potential indirect impacts associated with downstream transport and accumulation of sediments.

The direct impact of stream alteration would be expected to be minor and be mitigated by purchase of appropriate credits in a regional stream mitigation bank. Additionally, some onsite natural habitat restoration may be expected in the long-term as the surface runoff ditch sections would develop flow regimes, substrates, subsequent habitats, and would be recolonized by aquatic species. Watershed level impacts would be minor given the local abundance of similar aquatic resources.

Indirect impacts to downstream reaches of the unnamed streams may be associated with storm water runoff due to construction activities. Construction activities would adhere to permit limit requirements and would utilize BMPs (e.g., silt fencing, wattles) to minimize indirect effects on aquatic resources (e.g., sedimentation) during construction. Additionally, flow alterations to these various unnamed streams would be caused by runoff from the landfill site. These impacts would be mitigated using sediment basins and other BMPs onsite and would have minimal effects on the Cumberland River. Following the construction phase, care, and maintenance associated with site-wide management of storm water would minimize indirect impacts to the aquatic community of the receiving waters.

Construction activities would adhere to permit limit requirements and would utilize BMPs to minimize indirect and direct effects on aquatic resources. Unavoidable direct effects to streams would be mitigated by purchases of stream credits as needed. Following the construction phase, site-wide management of storm water using appropriate BMPs would minimize indirect impacts to the aquatic community of the surrounding waters (Cumberland River). Thus, impacts to aquatic resources resulting from the onsite landfill expansion are expected to be short-term and minor.

Construction and Operation of a Beneficial Re-use Processing Facility

The location for the beneficial re-use processing facility that would be constructed and operated under Alternative B (Option 2) has yet to be determined. Depending on the aquatic resources present at the location, there may be potential impacts on the local aquatic habitats. However, it is expected that the chosen site for a beneficial re-use processing facility would not contain substantial aquatic resources and overall disturbances to aquatic resources will be avoided or minimized. In the event potential impacts to aquatic resources are unavoidable, actions will be taken to minimize effects based on appropriate TDEC and USACE permit requirements.

Although construction and operation of the beneficial re-use processing facility may result in localized and minor alterations to aquatic resources, these effects are not expected to result in notable alterations or destabilization of any aquatic species populations. Therefore, impacts to aquatic ecosystems resulting from the construction and operation of the proposed beneficial re-use processing facility would be minor.

Transport of CCR

The CCR removed from the impoundments would be dried to an acceptable level prior to being loaded for transport. Under Alternative B (Option 1), transport to the proposed landfill expansion would utilize off-road trucks using onsite haul roads. This transport would be undertaken by trucks using the onsite roadway network, and as such would not impact aquatic resources.

Under Option 2, CCR excavated from the surface impoundments at GAF would be transported to a beneficial re-use processing facility. CCR that is not suitable for beneficial re-use would be transported via truck to an existing offsite landfill for disposal. A specific landfill has not been selected; however, the chosen facility will be permitted and in compliance with NPDES and water quality standards. Transport of CCR material to the offsite landfill would not involve direct disturbance to aquatic habitat, as existing interstate highways and arterial facilities would be used as haul routes. Increased fugitive dust could potentially impact streams or water bodies located adjacent to haul routes. Because transport of CCR would be by truck using existing paved roadways and BMPs such as covered loads would be implemented as appropriate, impacts to aquatic resources would be minor.

Transport of Borrow

Because borrow would be obtained from a previously permitted TVA borrow site located 1.5 miles from GAF, TVA's action under this alternative is limited to the transport of borrow material. Transport of borrow material to the offsite landfill would not involve direct disturbance to aquatic habitat, as existing roadways would be used as haul routes. Increased fugitive dust could potentially impact streams or water bodies located adjacent to haul routes. Because transport of borrow would be by truck using existing roadways and BMPs such as covered loads and watering unpaved haul roads would be implemented, as appropriate, impacts to aquatic resources would be minor.

3.11.3 Summary of Impacts to Aquatic Ecology

As summarized in Table 3-22, TVA has determined that impacts to the surrounding aquatic ecology as it relates to the proposed actions for the surface impoundment closures at GAF are minor. In accordance with Section 404 of the CWA, unavoidable direct impacts to aquatic resources would be mitigated as required by both state and federal agencies.

Table 3-22. Summary of Impacts to Aquatic Ecology

Alternative	Action	Impact	Severity
		Impoundment Closure	
Alternative B	Closure-by-Removal of APC	Potential for flow and water quality alteration.	Negligible. Effective use of BMPs and the use of the stilling ponds for storm water management coupled with TVA's adherence to NPDES permit limits would minimize impacts to aquatic resources within receiving jurisdictional waters.
		Landfill Expansion	
Alternative B	Expansion of Landfill and Ancillary Facilities	Potential direct and permanent impacts to unnamed streams, wetlands, and ponds within the proposed project area.	Long-term permanent impact to immobile biota but would be minor and mitigated per permit requirements. Indirect impacts would be minor and minimized by erosion BMPs.

Alternative	Action	Impact	Severity
	Construction and Operation of Beneficial Re-use Processing Facility		
Alternative B	Construction and Operation of a Beneficial Re-use Processing Facility	Potential aquatic resource alteration based on final site determination.	Minor, as site is expected to be selected to contain no substantial aquatic resources and disturbances would be minimized or permitted through the appropriate federal and state agencies.
		Transport of CCR	
Alternative B (Option 1)	Transport of CCR to Onsite Landfill	Potential indirect impacts due to deposition of fugitive dust on aquatic habitat.	Minor impacts minimized with the use of BMPs including covered loads and transport on existing roads.
Alternative B (Option 2)	Transport of CCR to Beneficial Re-use Processing Facility	Potential indirect impacts due to deposition of fugitive dust on aquatic habitat.	Minor impacts minimized with the use of BMPs including covered loads and transport on existing roads.
Alternative B (Option 2)	Transport of CCR not Suitable for Beneficial Re-use	Potential indirect impacts due to deposition of fugitive dust on aquatic habitat.	Minor impacts minimized with the use of BMPs including covered loads and transport on existing roads.
		Transport of Borrow	
Alternative B	Truck transport of borrow to GAF from TVA-owned borrow site	Potential indirect impacts due to deposition of fugitive dust on aquatic habitat.	Minor impacts minimized with the use of BMPs including covered loads and transport on existing roads.

3.12 Threatened and Endangered Species

3.12.1 Affected Environment

The ESA (16 United States Code [USC] §§ 1531-1543) was passed to conserve the ecosystems upon which endangered and threatened species depend, and to conserve and recover those species. An endangered species is defined by the ESA as any species in danger of extinction throughout all or a significant portion of its range. A threatened species is likely to become endangered within the foreseeable future throughout all or a significant part of its range. Critical habitats, essential to the conservation of listed species, also can be designated under the ESA. The ESA establishes programs to conserve and recover endangered and threatened species and makes their conservation a priority for federal agencies. Section 7 of the ESA requires federal agencies to consult with the USFWS when their proposed actions may affect endangered or threatened species and their critical habitats.

The State of Tennessee provides protection for species considered threatened, endangered or deemed in need of management within the state other than those federally listed under the ESA. Plant species are protected in Tennessee through the Rare Plant Protection and Conservation Act of 1985. The listing of species is managed by TDEC which considers listing recommendations from TWRA. Additionally, the TDEC Natural Heritage Program and TVA both maintain databases of species that are considered threatened, endangered, special concern, or are otherwise tracked in Tennessee.

When accessed in April 2019 the TVA Regional Heritage database indicated two records for state-listed species (Allegheny woodrat and streamside salamander), one record of a federally listed species (gray bat), and one record of a federally protected species (bald eagle) within 3 miles of GAF. These species are listed in Table 3-23. The database also indicated records of one federally listed mussel (pink mucket) and five state-listed fishes (bedrock shiner, blackfin sucker, lake sturgeon, orangefin darter, and slenderhead darter) within a 10-mile radius of the proposed project area and one federally listed plant (Spring Creek bladderpod) and one state-listed plant (water stitchwort) within a 5-mile radius (Table 3-23). According to the USFWS IPaC online database (USFWS 2019b), the federally listed Indiana bat and northern long-eared bat also have the potential to occur within the project area, and there are records of these species occurring in Sumner County or in Wilson County, which is directly across the Cumberland River from GAF. No federally designated critical habitat areas are present within the project area. In addition, a review of the TDEC online rare species database resulted in 18 additional state-listed species, including eight plants and ten animals, that are known to occur in Sumner County and/or within the Cumberland River – Bulls Creek 12-digit HUC, HUC watershed 051302010604 (Table 3-23) (TDEC 2019c).

Table 3-23. State and Federally listed Species Documented to Occur in Sumner County, Tennessee and Federally Listed Species with Potential to Occur in Sumner County, Tennessee

Common Name	Scientific Name	Status		Suitable Habitat Present[4]
		Federal[1]	State[2] (Rank[3])	
Birds				
Bald eagle*	*Haliaeetus leucocephalus*	DM	D (S3)	P
Bewick's wren	*Thryomanes bewickii*	--	D (S1)	P
Mammals				
Allegheny woodrat*	*Neotoma magister*	--	D (S3)	N
Gray Bat*	*Myotis grisescens*	LE	E (S2)	P
Indiana bat[5]	*Myotis sodalis*	LE	E (S1)	P
Northern long-eared bat[5]	*Myotis septentrionalis*	LT	T (S1S2)	P
Tri-colored bat	*Perimyotis subflavus*	--	T (S2S3)	P
Reptiles				
Northern pinesnake	*Pituophis melanoleucus*	--	T (S3)	P
Amphibians				
Hellbender	*Cryptobranchus alleganiensis*	--	E (S3)	N
Streamside salamander*	*Ambystoma barbouri*	--	E (S2)	P
Mollusks				
Pink mucket	*Lampsilis abrupta*	LE	E (S2)	P
Crustacean				
Bottle Brush Crayfish	*Barbicambarus cornutus*	--	D (S2)	N
Fish				
Bedrock shiner*	*Notropis rupestris*	--	D (S2)	N
Blackfin sucker*	*Thoburnia atripinnis*	--	D (S2)	N

Common Name	Scientific Name	Status		Suitable Habitat Present[4]
		Federal[1]	State[2] (Rank[3])	
Flame chub	*Hemitremia flammea*	--	D (S3)	N
Frecklebelly darter	*Percina stictogaster*	--	D (S1)	N
Lake sturgeon*	*Acipenser fulvescens*	--	E (S1)	P
Orangefin darter*	*Etheostoma bellum*	--	D (S3)	N
Slenderhead darter*	*Percina phoxocephala*	--	D (S3)	N
Southern cavefish	*Typhlichthys subterraneus*	--	D (S3)	N
Splendid darter	*Etheostoma barrenense*	--	D (S3)	N
Teardrop darter	*Etheostoma barbouri*	--	D (S2)	N
Plants				
American ginseng	*Panax quinquefolius*	--	S-CE (S3S4)	N
Butternut	*Juglans cinerea*	--	T (S3)	N
Giant blue cohosh	*Caulophyllum giganteum*	--	T (S1)	N
Hitchcock's sedge	*Carex hitchcockiana*	--	T (S1)	N
Leafy prairie-clover	*Dalea foliosa*	LE	E (S2S3)	N
Least trillium	*Trillium pusillum*	--	E (S2)	N
Ramps	*Allium tricoccum*	--	S-CE (S1S2)	N
Spring blue-eyed Mary	*Collinsia verna*	--	E (S1)	N
Spring Creek bladderpod*	*Lesquerella perforata*	LE	E (S1)	N
Water Stitchwort*	*Stellaria fontinalis*	--	S (S3)	N

Sources: TVA 2019d, TDEC 2019c, and USFWS IPaC 2019b

[1] Federal Status Codes:
DM = Delisted, Recovered, and Being Monitored LE = Listed Endangered
LT = Listed Threatened; -- = Not Listed by USFWS

[2] State Status Codes:
E = Listed Endangered S = Species of special concern
T = Listed Threatened Rare = Rare, but not state listed
D = Deemed in Need of Management CE = Commercially Exploited

[3] State Rank:
S1 = Critically Imperiled S2 = Imperiled
S3 = Vulnerable S4 = Apparently Secure
S#S# = Denotes a range of ranks because the exact rarity of the element is uncertain (e.g., S1S2)
Migratory Species may have separate ranks for different population segments (e.g. S1B, S2N, S4M);
S#B = rank of breeding population S#N = rank of non-breeding population

[4] Habitat Codes:
Y = Yes, species has been documented in existing habitats within proposed project area, and suitable habitat is present
N = No, no records of species within proposed project area and no suitable habitat is present
P = Potentially suitable habitat is present, but no records of species in proposed project area

[5] Federally listed species whose range includes Sumner County, Tennessee, though no verified records are known from this county.

*Species documented within 3 miles (terrestrial species), 5 miles (plants) or 10 miles (aquatic species) of GAF by the TVA Natural Heritage Database.

3.12.1.1 Wildlife

<u>Birds</u>

The Bewick's wren is state-listed as in need of management (critically imperiled). Bewick's wren utilizes brushy areas, thickets in open country, and open woodlands. This species often builds nests within cavities of trees, as well as on ledges that are within 30 feet of the ground. Common nest sites include rock crevices, brush piles, outbuildings, abandoned woodpecker nest cavities, and abandoned automobiles (The Cornell Lab of Ornithology 2019). No record of Bewick's wren occurs within 3 miles of the project area, and current range maps suggest this species no longer occurs in Sumner County (NatureServe 2019). Should migrants or other individuals be found using the area, their presence would likely be temporary as no breeding pairs have been documented in the TVA database in this location.

Bald eagles are protected under the Bald and Golden Eagle Protection Act (USFWS 2019a) and are listed as in need of management (vulnerable) by the state of Tennessee. This species is associated with larger mature trees capable of supporting its massive nests. These are usually found near larger waterways where the eagles forage (NatureServe 2019). There are a limited number of larger sycamores and cottonwoods along the Cumberland River within the project area. The nearest bald eagle nesting record is approximately 3 miles away from the project area and this nest is no longer intact. The most recent sighting of this nest was in 2012 when it was only partially intact. No bald eagles or their nests were observed in or near the project area during field reviews performed on April 23-25, 2019. Foraging habitat for bald eagle exists over the Cumberland River.

Mammals

Bats

The following provides a description of the state- and federally listed bat species that have the potential to occur within the project area, based on records review. Following the description of each species is a statement regarding the presence of suitable habitat based on field reviews performed on April 23-25, 2019.

The gray bat was federally listed as endangered in 1976, and it is listed as endangered by the state of Tennessee. Its primary range is concentrated in the cave regions of Alabama, Arkansas, Kentucky, Missouri, and Tennessee. Gray bat colonies are residents exclusively of limestone caves or cave-like habitats, and they migrate seasonally between maternity and hibernating caves. Gray bats are highly selective in determining cave suitability; fewer than five percent of available caves offer suitable habitat for this species. The gray bat inhabits caves throughout the year, migrating among different caves across seasons (Brady et al. 1982; Tuttle 1976). During summer, bats disperse from colonies at dusk to forage for insects over streams, rivers and reservoirs (NatureServe 2019). There is one record of gray bat within 3 miles of the project area, and four caves have been recorded within 3 miles of the project area (TVA 2019d). The gray bat has been recorded wintering in the Gallatin Fossil Plant Cave, which occurs across the Cumberland River at the southern end of GAF (TVA 2013b). No caves or other roosting habitat for gray bat were observed in the project area during April 2019 field reviews. Drinking water and foraging habitat for gray bat exists over the Cumberland River and the ponds, streams, and wetlands within the project area.

The Indiana bat is found throughout much of the eastern half of the United States and has been federally listed as an endangered species since March 11, 1967. It is also state-listed in Tennessee as endangered. Per the 2019 Range-Wide Indiana Bat Summer Survey Guidelines, "suitable summer habitat for Indiana bats consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags greater than 5 inches in diameter at breast height that have exfoliating bark, cracks, crevices, and/or hollows" (USFWS 2019d). Other summer habitat may include riparian zones, bottomlands, floodplains, wooded wetlands, and adjacent upland forests (USFWS 2007). Individual trees may be considered suitable roost habitat when they exhibit characteristics of suitable roost trees and are within 1,000 feet of other forested habitat (USFWS 2019d). Tree species that Indiana bats have been known to roost and establish maternity colonies in include hickory (*Carya* spp.), oak (*Quercus* spp.), elm (*Ulmus* spp.), ash (*Fraxinus* spp.), maple (*Acer* spp.), and poplar (*Populus* spp.) trees. Some tree species, primarily hickories and, to a lesser extent, oaks, provide adequate bark characteristics in living trees. Space between exfoliating bark and the trunk of the tree appear to be the primary characteristic needed for bats to use a particular tree (USFWS 2007). Indiana bats are known to change roost trees frequently throughout the season, yet still maintain site fidelity, returning to the same summer roosting areas in subsequent years (Pruitt and TeWinkel 2007; USFWS 2018). Indiana bats typically forage in forested habitats, forest edges, and riparian areas with a relatively open understory adjacent to summer roosting habitat (USFWS 2007). Thus, some forested habitats with a dense understory could be deemed unsuitable as foraging habitat. Indiana bats hibernate in caves during winter and inhabit forest areas around these caves for swarming (mating) in the fall and staging in the spring, prior to migration to summer habitat (USFWS 2007).

Although Sumner County, Tennessee is within the range of this species, no records of this species are known from this county. The closest records of these species are maternity colonies known from Wilson County, approximately 16 miles from the proposed actions. However, Indiana bat calls were isolated from an acoustic survey completed by TVA in 2012 for a habitat assessment at GAF. The location of these two Indiana bat detections was over an ash impoundment, suggesting any bats detected were traveling over the pond, potentially using the pond as foraging habitat (TVA 2017e). Additional foraging habitat occurs within upland and bottomland hardwood forests with open understory space, over and along the Cumberland River, along forested edges of ponds, streams, and wetlands, fields, and pastures, and above tree canopies within a five-mile radius of the project area. Four caves have been documented within a three-mile radius. No new caves or other suitable winter roosting habitat were observed in the project area during field reviews in April 2019.

The northern long-eared bat occurs statewide in Tennessee but is now uncommon in the state after the introduction of the fungus causing the deadly disease known as white-nose syndrome that has caused dramatic declines in populations of this species. This species was federally listed as a threatened species in April 2015, and it is also state-listed as threatened by the state of Tennessee. In summer months, northern long-eared bats roost singly or in colonies within cavities, underneath bark, crevices, or hollows of both live and dead trees that typically have a diameter at breast height greater than or equal to 3 inches. Northern long-eared bats appear to be opportunistic, selecting trees based on the presence of cavities, crevices, or peeling bark. Northern long-eared bats emerge at dusk to forage below the canopy of mature forests on hillsides and roads, and occasionally over forest clearings and along riparian areas (USFWS 2015; USFWS 2018). Non-forested foraging habitats may include adjacent emergent wetlands and edges of agricultural fields, old fields, and pastures. Northern long-eared bats typically occupy their summer habitat from mid-May through mid-August (USFWS 2019d).

Suitable summer habitat for the northern long-eared bat includes a wide variety of forested lands to roost, forage, and travel. This includes forests containing potential roosts such as woodlots, fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Individual trees may be considered suitable habitat when they exhibit characteristics of suitable roost trees and are within 1,000 feet of other forested habitat. In winter, the northern long-eared bat hibernates underground in caves or other manmade structures such as mines. During the fall and spring, they utilize entrances of caves and the surrounding forested areas for swarming and staging (USFWS 2015).

There is no known record of northern long-eared bat within 3 miles of the project area. The closest record of these bats is from a cave approximately 23 miles away from the proposed actions in Sumner County. Four caves have been documented within a 3-mile radius of the project area, and no new caves or other suitable winter roosting habitat were observed in the project area during field reviews on April 23-25, 2019. Within close proximity to suitable bat roost trees, foraging habitat for the northern long-eared bat exists under and along forested canopies within the project area. Drinking water and possible foraging habitat also exists over and in riparian areas of the Cumberland River and the ponds, streams, and wetlands within the project area.

Habitat assessment surveys for Indiana bat and northern long-eared bat were performed on April 23-25, 2019, using the USFWS 2019 Range-wide Indiana bat Summer Survey Guidelines (USFWS 2019d). Throughout the project area, 16 potentially suitable bat habitat areas were identified and delineated, totaling 280.1 acres of forested land. These sites were determined to be potentially suitable for summer bat habitat evidenced by the presence of potentially suitable bat roost trees in proximity to suitable foraging areas. Individual parcels are shown on Figure 3-8.

There were several parcels of potentially suitable summer bat habitat in areas with no proposed tree clearing. These areas include: a 66.4-acre stand of deciduous forest north of Stilling Pond B; two areas in the southwest corner of the project area, including a 3.3-acre woodlot and a 19.4-acre woodlot; a 3.4-acre woodlot and a 4.5 woodlot, both adjacent to the south side of Ash Pond A; a 12.1-acre woodlot just southeast of the landfill expansion area; and 27.7 acres in four separate woodlots located on the north side of Stilling Pond C.

To the west of the proposed landfill expansion area, 47.1 acres of forest containing a high frequency of potentially suitable bat roost trees lay in proximity to several wetlands that create prime bat foraging opportunity. A portion (13.1 acres) of this area falls within the proposed landfill expansion area. Just north of this area is a 56.8-acre woodlot of potentially suitable summer bat habitat with fewer suitable trees, but it is proximate to wetlands and other suitable foraging areas. Approximately 9.3 acres of this potentially suitable habitat area fall within the proposed landfill expansion area and proposed new communication tower and ammonia sensor tower footprints. Just east of the landfill expansion area border, a 6.23-acre plot has one suitable bat roost tree in close proximity to the Cumberland River and is thus classified as suitable summer bat habitat. A small portion (2.5 acres) of this plot falls within the proposed landfill expansion area. Another 6-acre potentially suitable bat roost habitat with one suitable roost tree falls entirely within the proposed landfill expansion area.

Northeast of the existing landfill, a 16-acre stand has four suitable bat roost trees and is also in close proximity to the Cumberland River (to the east). A small portion (0.50 acre) of this habitat area falls within the proposed office complex. Along the Cumberland River, in the northeast section of the project area, 11.1 acres of potentially suitable habitat were identified within a thin stretch of riparian trees. A portion (3.49 acre) of this habitat area also falls within the proposed office complex. The laydown/logistics area contains approximately 14 acres of deciduous and evergreen forest with 4.5 acres of this area identified as potentially suitable summer roost habitat (see Figure 3-8).

Although the project area contains potential foraging habitat for listed bats and a limited number of potentially suitable trees and some snags with potentially suitable cavities for roosting, larger, higher quality foraging and summer roosting habitats are available in surrounding areas that would provide more suitable and adequate habitat for bats (see Table 3-16). No suitable winter roosting or hibernacula sites are present within the project area.

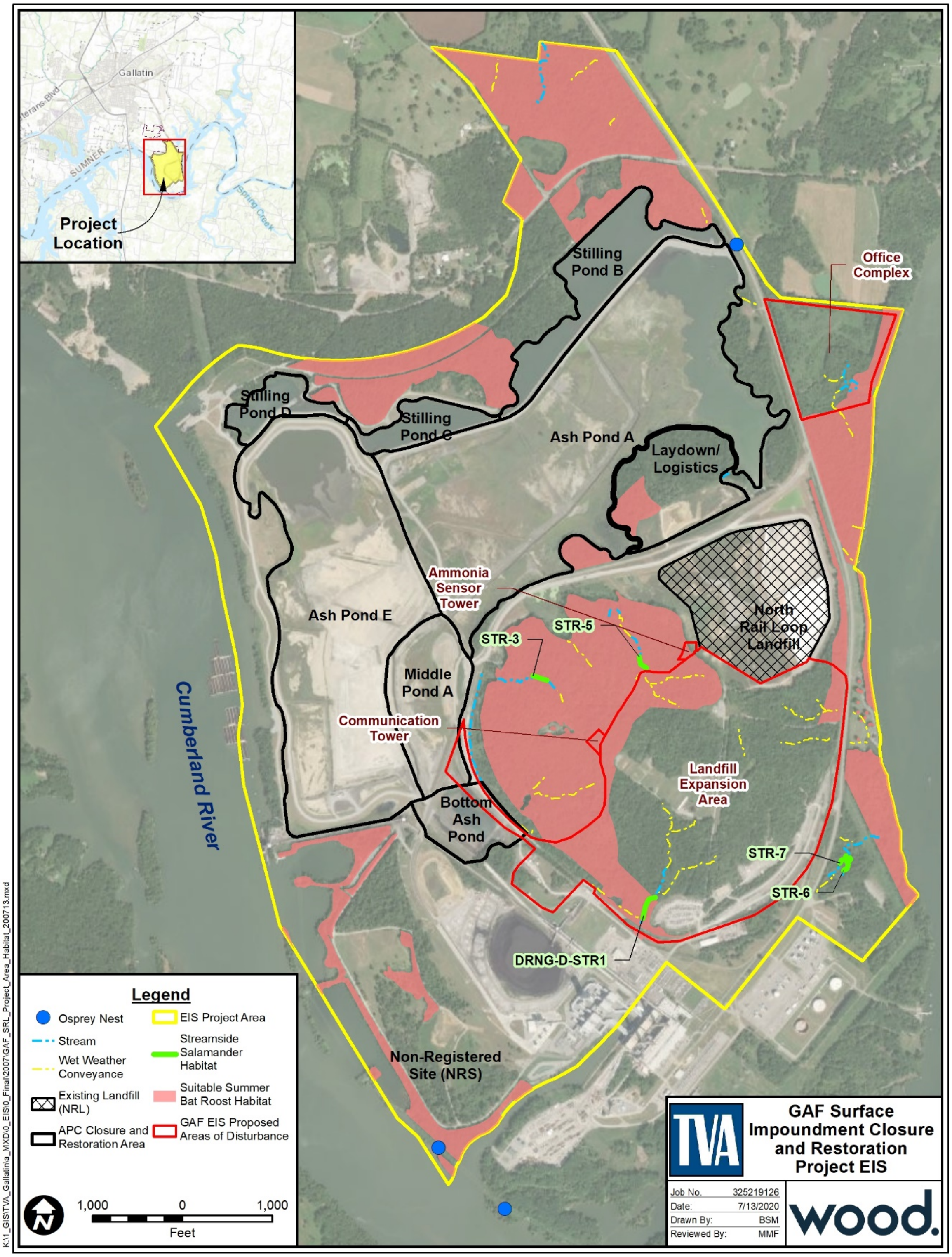


Figure 3-8. Habitat Features for State- and Federally Listed Species and Species of Special Concern at GAF

The tri-colored bat was once one of the more common species of bat in Tennessee, but the species is particularly susceptible to the disease white-nose syndrome, and populations have declined precipitously in eastern North America over the past decade. It is currently state-listed as threatened in the state of Tennessee. Tri-colored bats are associated with forested landscapes, where they forage along waterways in riparian areas and on forest edges. They hibernate in caves, rock crevices and mines, and summer roosts include trees, cliffs, and sometimes buildings, bridges, or other structures. In summer, roosts are often among dead leaves of oaks in mature forest or in clumps of dead needles of live, large pines. Females are faithful to small roost areas both within and between years, and juvenile females have exhibited female natal philopatry (NatureServe 2019; TWRA 2019).

There are no records of tri-colored bats within 3 miles of the project area, though they do occur in Sumner County, and four caves have been recorded within 3 miles of the project area (TVA 2019d). No caves were observed in the project area during field reviews on April 23-25, 2019. Drinking water and foraging habitat for tri-colored bat exists over the Cumberland River and the ponds, streams, and wetlands within the project area. Summer roosting habitat and foraging habitat exists within the project area.

Other Mammals

The Allegheny woodrat is state-listed as in need of management (vulnerable). Allegheny woodrats are associated with rock outcroppings, rocky cliffs, and talus slopes with boulders and crevices. This species is also known from cave habitat, especially when found in a mixed conifer-hardwood forest. Mast producing trees provide an important food source for Allegheny woodrat (TWRA 2019). Their diet also consists of fruits, seeds, grasses, and fungi. The closest record of Allegheny woodrat is approximately 0.8 miles away from the project area. Four caves have been recorded within 3 miles of the project area. No new caves were found during field reviews on April 23-25, 2019. No suitable habitat for Allegheny woodrat exists within the project area.

<u>Reptiles</u>

The northern pinesnake is state-listed as threatened in the state of Tennessee. Northern pinesnakes are egg laying snakes that breed in spring, with hatchlings emerging in late summer. The northern pinesnake's preferred habitat is characterized by xeric, pine or pine-oak dominated woodlands with open understory and sandy soils for burrowing (NatureServe 2019). There are a few small loblolly pine-dominated areas within the project area, although most of the evergreen forest stands within the project area are dominated by cedar and do not have open understory with sandy soils. No records of this species are known within 3 miles of the project area (TVA 2019d) and because the limited possible habitat within the project area is sparse, they are not expected to occur within the project area.

<u>Aquatic Animals</u>

Amphibians

The hellbender is state-listed as endangered in the state of Tennessee. This aquatic salamander has adapted to fill a specific habitat niche and is generally found in areas with large, irregularly shaped, and intermittent rocks and swiftly moving water. They tend to avoid wider, slow-moving waters with muddy banks and/or slab rock bottoms. Males prepare nests and attend eggs beneath large, flat rocks or submerged logs (NatureServe 2019). The hellbender is strictly carnivorous, and crayfish are the preferred food, but they will also consume insects, fish, and worms. The streams within the project area have seasonal flow that would not support the habitat requirements of the hellbender and there is no record of the hellbender occurring within 3 miles of the project area (TVA 2019d).

The streamside salamander is state-listed as endangered in the state of Tennessee. Streamside salamander is found in scattered populations in Middle Tennessee, particularly in limestone habitats. This species is most often found in upland forests close to streams (TWRA 2019). Streamside salamander can be differentiated from small-mouthed salamander by habitat use. Streamside salamanders do not inhabit pools and ditches like small-mouthed salamanders. There are several records of streamside salamander in the Gallatin area but only one within 3 miles of the project area.

The majority of the streams within the project area do not have suitable habitat for the streamside salamander. Most of the streams are small ephemeral streams without exposed limestone beds and larger flat rocks required for streamside salamander habitat. There were four streams in the project area that were identified as potentially suitable habitat during April 2019 field investigations based on the presence of exposed limestone bedrock and large flat rocks (Figure 3-8). One of these streams is within and one is adjacent to the landfill expansion area of disturbance.

The first of the four streams with potential streamside salamander habitat, STR-7, on the east side of Steam Plant Road across from the proposed landfill expansion area, has some riffle habitats with large flat rocks. During the April 2019 field investigation, three southern two-lined salamander larvae were collected from a riffle habitat in this stream, suggesting it has potential to support salamander development. The second and third streams (STR-3, STR-5) with potential streamside salamander habitat originate near the west edge of the proposed landfill expansion area. The upper portions of these streams are ephemeral with silty substrate and are not suitable habitat. The lower reaches of these streams are potentially suitable habitat with large flat rocks, exposed bedrock, and some flowing water. Potential habitat in STR-5 is immediately adjacent to the landfill expansion area (Figure 3-8). The fourth stream (DRNG-D-STR1) with potential streamside salamander habitat originates within the proposed landfill expansion area and flows south into a culvert and then into the discharge canal (Figure 3-8). This stream contains some riffle habitats with large flat rocks, exposed limestone bedrock, and flowing water. No evidence of streamside salamanders was observed during April 2019 field investigations. Furthermore, a streamside salamander survey was performed in December 2019 by TVA, TDEC, and TWRA within the streams identified as potentallly suitable habitat. No streamside salamanders or their eggs were identified during field surveys.

Mollusks

The federally and state-listed endangered pink mucket is typically a big river species found in both the Tennessee and Cumberland River systems. The pink mucket prefers shallow riffles with a hard rocky bottom (NatureServe 2019). This species historically occurred in the Cumberland River prior to impoundment and may still survive in the upper reaches of the river. In general, the slow, cold waters now associated with impounded rivers have resulted in the decline of mussel species as their historic range consisted of gravel or rock substrates of free flowing rivers and streams. There is a record from 1993 of the pink mucket occurring within a 10-mile radius of the project area (TVA 2019d), and habitat for this species may occur in the Cumberland River adjacent to the project area.

Fish

Streams observed within the project area during field investigations on April 23-25, 2019 appeared to have only seasonal flow and were not supportive of fish. Therefore, suitable habitat for the state-listed fish species found in Sumner County (TDEC 2019c) and listed in Table 3-23 (bedrock shiner, blackfin sucker, flame chub, frecklebelly darter, orangefin darter, slenderhead darter, splendid darter, and teardrop darter) was not observed within the project area. In addition, the southern cavefish inhabits aquatic cave habitat, and no caves were observed within the project area during field investigations in April 2019.

The state-listed endangered lake sturgeon inhabits the bottoms of large, clean, freshwater rivers and lakes. It prefers firm sand, gravel, or rock substrates, and in rivers, preferred habitat is deep mid-river areas and pools (NatureServe 2019). The lake sturgeon may occur in the Cumberland River adjacent to the project area, and records of the lake sturgeon occur within a 10-mile radius of the project area. However, the lake sturgeon does not occur within any of the waters identified on the GAF project site.

3.12.1.2 Plants

The TVA Regional Natural Heritage database indicated the only plant species of conservation concern known to occur within 5 miles of GAF are the federally-listed endangered Spring Creek bladderpod and state-listed (Species of Special Concern) water stitchwort (TVA 2019d). These species were recorded across the Cumberland River from GAF in Wilson County. No records of federally designated critical habitat occur within 5 miles of GAF.

A total of ten species of plants listed by the TDEC as threatened, endangered, or of special concern in Tennessee are known to occur within Sumner County or within 5 miles of the project area (see Table 3-24). Preferred habitat for each species and the potential for suitable habitat within the project area are addressed in Table 3-24. Herbaceous vegetated communities within the project area are generally low quality and previously disturbed. High-quality native plant communities or species of conservation concern were not observed during field investigations conducted in April 2019.

Table 3-24. Habitat Requirements for State- and Federally listed Plant Species Known to Occur in Sumner County or Within 5 miles of the Project Area

Common Name	Habitat Requirements[1]	Habitat within Project Area*
American ginseng	Slopes of shaded, rich woodlands. Usually over limestone or marble	N
Butternut	Rich mesophytic forests, lower slopes, ravines, and various types of bottomland, including banks and terraces of creeks and streams, and floodplain forests	N
Giant blue cohosh	Mixed deciduous forest, open oak-hickory-dogwood forest, and sugar maple forest	N
Hitchcock's sedge	Rich, moist woods[2]	N
Leafy prairie-clover	Wet calcareous barrens and moist prairies or cedar glades, usually near a stream or where some seepage from limestone provides seasonal moisture	N
Least trillium	Upland woods, mixed mesophytic hardwood forest	N
Ramps	Rich woods[2]	N

Common Name	Habitat Requirements[1]	Habitat within Project Area*
Spring blue-eyed Mary	Rich Wet-Mesic Woods[2]	N
Spring Creek bladderpod**	Bare rock/talus/scree, cropland/hedgerow, Old field. Known only from Wilson County, Tennessee, in the vicinity of Lebanon, where it inhabits the floodplains of Spring Creek and Bartons Creek.	N
Water stitchwort**	Open to partially shaded wet areas with thin limestone soil where natural disturbances keep woody and weedy competition to a minimum. Inhabits stream banks, washouts, moss-covered cliffs overlooking streams, and calcareous seeps in glade woods.	N

Source:
[1] NatureServe 2019
[2] TDEC 2019c
*Habitat Codes:
Y = Yes, species has been documented in existing habitats in proposed project area and suitable habitat is present
N = No, no records of species within proposed project area and no suitable habitat is present
P = Potentially suitable habitat is present, but no records of species in proposed project area or within 5-mile radius
**Species documented in Wilson County within 5 miles of GAF by the TVA Natural Heritage Database.

3.12.2 Environmental Consequences

3.12.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not close any impoundments at GAF, the existing landfill would not be expanded, borrow material would not be required, a beneficial re-use processing facility would not be constructed, and no work would be conducted that would result in loss or disturbance of habitat beyond existing conditions. Therefore, no project-related environmental impacts with respect to threatened or endangered species or species of conservation concern, or any suitable habitat, would occur under this alternative.

3.12.2.2 Alternative B – Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill

<u>Surface Impoundment Closures</u>

Habitat within the APC is comprised of a mix of open water, adventive herbaceous vegetation, early successional herbaceous and scrub, and deciduous and evergreen forest utilized by terrestrial and aquatic communities within a disturbed industrial landscape. There is 14.6 acres of fragmented and disturbed tree cover habitat within the APC.

No bald eagle nests were observed in the APC during April 2019 field surveys. Given the lack of known nesting in these areas and the abundance of both nesting and foraging habitat immediately adjacent to the project area, impoundment closure activities are not expected to impact the bald eagle. Proposed actions are in compliance with the National Bald Eagle Management Guidelines (USFWS 2007).

Impoundment closure activities would result in the clearing of approximately 4.5 acres of potentially suitable summer bat habitat from the logistics/laydown area. This would result in the removal of potential foraging and summer roosting habitat for the federally listed Indiana and northern long-eared bats and state-listed tri-colored bat. TVA would implement conservation measures, such as seasonal tree clearing restrictions, as identified on pages 5-7 of the TVA Bat Strategy Project Screening Form (Appendix F) in areas determined to have suitable

Indiana bat and northern long-eared bat summer roosting habitat. Therefore, direct impacts to roosting individuals of these species is expected to be minimized. By avoiding tree removal during spring and June and July, direct impacts to pregnant mothers and non-volant pups would be avoided. Bats disturbed by tree removal may be able to flush to nearby habitat between August and October. By mid-October it is expected that Indiana bats and northern long-eared bats would be swarming around winter hibernacula, none of which are known to occur within 10 miles of the project area. Tree removal and removal of other vegetation and open water areas could result in indirect impacts to Indiana bat, northern long-eared bat, gray bat, and tri-colored bat through removal of foraging habitat for these listed bat species. However, an abundance of higher quality foraging habitats is available in surrounding areas, and ultimate restoration of the ponds will provide open space, naturalized habitats that may be used for storm water detention, wetland development, and other naturalized habitats. As such, these areas have the potential to provide for suitable foraging habitat for bat species in the future.

Ash impoundment closures were addressed in TVA's programmatic consultation with the USFWS on routine actions and federally listed bats in accordance with ESA Section 7(a)(2) and completed in April 2018. For those activities with potential to affect bats, TVA committed to implementing specific conservation measures. These activities and associated conservation measures are identified on pages 5-7 of the TVA Bat Strategy Project Screening Form (Appendix F) and would be implemented as part of the proposed project. Project activities are within the bounds of impacts analyzed in TVA's Bat Strategy Programmatic Section 7 ESA consultation. With the implementation of identified conservation measures and BMPs and the abundance of available habitat surrounding the project area, proposed actions are not expected to significantly impact gray bat, Indiana bat, northern long-eared bat, and tri-colored bat.

Lake sturgeon (state-listed as endangered) and pink mucket (federally listed as endangered) are the only listed aquatic animal species potentially occurring in the Cumberland River adjacent to the proposed project. TVA would implement standard BMPs and adherence to NPDES permit requirements that avoid or minimize the input of sediment and pollutants into the Cumberland River. Therefore, proposed activities would not have any measurable effects on these species. Suitable habitat for the other listed aquatic species (Table 3-23) does not occur within or near the surface impoundment closure project area; therefore, those species would not be affected by the project.

Expansion of Existing Onsite Landfill

Construction of the landfill expansion, associated haul road, and ancillary facilities including the relocated communications tower and ammonia sensor tower would involve clearing, grading, and excavation of a 179-acre area, including approximately 121 acres of forested habitat and 23 acres of herbaceous habitat. Development of the office complex would require clearing, grading, and excavation of a 29-acre area, including approximately 14.5 acres of forest and 14 acres of herbaceous and scrub habitats.

The closest documented bald eagle nest is approximately 3 miles from the project area. The Cumberland River surrounding GAF provides suitable foraging habitat for bald eagles, and suitable nesting habitat may be available in the project area. No bald eagle nests were observed in any of the proposed action areas during April 2019 field surveys. Given the lack of known nesting in the areas of the proposed action and the abundance of both nesting and foraging habitat immediately adjacent to the project area, impacts to the bald eagle are not expected under Alternative B. Proposed actions are in compliance with the National Bald Eagle Management Guidelines (USFWS 2007).

Potential habitat for the state-listed streamside salamander exists along four intermittent streams within the project area that contain limestone bedrock and large flat rocks. Two of these streams are within or adjacent to the proposed landfill expansion area limits of disturbance. Field surveys for streamside salamander were performed by subject matter experts in December 2019 with TDEC and TWRA to determine presence of individuals or egg masses of this species within the streams identified as potentially suitable habitat. Wet weather conveyances may provide travel corridors but are unlikely to provide suitable breeding grounds for the species due to lack of sufficient water flow for long enough periods of time. No streamside salamanders or their eggs were identified during field surveys.

TDEC and TVA also conducted stream surveys for streamside salamander for a borrow site less than one mile north of GAF in 2018 and did not find presence of the streamside salamander. Based on the results of those surveys, TWRA determined no adverse impacts to state-listed species under TWRA's authority were anticipated for that borrow site. BMPs would be used along all remaining streams and wet weather conveyances onsite to minimize impacts. In conjunction with any potential impacts to streams TVA would avoid and minimize impacts during design to the extent practicable, implement appropriate BMPs, and compensate for unavoidable adverse effects.

Construction of the existing onsite landfill expansion and the office complex would result in the clearing of approximately 30.9 and 4.0 acres of potentially suitable summer bat habitat, respectively. This would result in the removal of potential foraging and summer roosting habitat for the federally listed Indiana and northern long-eared bats and state-listed tri-colored bat. Potential direct impacts to state- and federally listed bat species with landfill expansion would be similar to those listed for APC closure activities under this alternative as it relates to the disturbance of forested habitats. TVA would implement conservation measures, such as seasonal tree clearing restrictions, as identified on pages 5-7 of the TVA Bat Strategy Project Screening Form (Appendix F) in areas determined to have suitable Indiana bat and northern long-eared bat summer roosting habitat. Therefore, direct impacts to roosting individuals of these species is expected to be minimized. By avoiding tree removal during spring and June and July, direct impacts to pregnant mothers and non-volant pups would be avoided. Bats disturbed by tree removal may be able to flush to nearby habitat between August and October. By mid-October it is expected that Indiana bats and northern long-eared bats would be swarming around winter hibernacula, none of which are known to occur within 10 miles of the project area.

Potential indirect impacts to state- and federally listed bat species with landfill expansion would be similar to those listed for APC closure activities under this alternative. Tree removal and removal of other vegetation and open water areas could result in indirect impacts to Indiana bat, northern long-eared bat, gray bat, and tri-colored bat through removal of potentially suitable roost trees, structures, and foraging habitat for listed bat species. While potential roosting and foraging habitats are present within the project area, an abundance of higher quality habitats are available in surrounding areas. In addition, affected wetlands, streams, and wet weather conveyances that provide foraging habitat within the landfill expansion area would be mitigated by purchase of appropriate credits in regional stream or wetland mitigation banks (see Section 3.5). With the implementation of standard BMPs that avoid or minimize the input of sediment and pollutants into surrounding water bodies, such impacts to foraging habitat adjacent to the disturbed areas are not expected to occur.

The structures associated with the firearms range, conference center, and existing communication tower have the potential to provide suitable summer roosting habitat or migration stop-over roosting sites for the gray bat, Indiana bat, and northern long-eared bat. TVA would conduct presence/absence surveys prior to removal of the structures to determine if listed bat species are utilizing these structures. The Gallatin Fossil Plant Cave, which provides roosting habitat for the gray bat, is located across the Cumberland River from the southern end of GAF. Due to the distance away from the proposed actions (0.83 mile) and the location of this cave being across the Cumberland River from the fossil plant, proposed actions are not expected to impact bats roosting in this cave.

A number of proposed activities associated with construction, such as grading, tree clearing, grubbing, vegetation removal, dewatering, demolition, and use of borrow material, were addressed in TVA's programmatic consultation with the USFWS on routine actions and federally listed bats in accordance with ESA Section 7(a)(2) and completed in April 2018. For those activities with potential to affect bats, TVA committed to implementing specific conservation measures. These activities and associated conservation measures are identified on pages 5-7 of the TVA Bat Strategy Project Screening Form (Appendix F) and would be implemented as part of the proposed project. Project activities are within the bounds of impacts analyzed in TVA's Bat Strategy Programmatic Section 7 ESA consultation. With the implementation of identified conservation measures and BMPs and the abundance of available habitat surrounding the project area, proposed actions are not expected to significantly impact gray bat, Indiana bat, northern long-eared bat, and tri-colored bat.

Potential habitat for the Bewick's wren is located in thickets and scrubby field edges within the project area. However, no record of Bewick's wren occurs within three miles of the project area, and current range maps suggest this species no longer occurs in Sumner County (NatureServe 2019). Thus, the Bewick's wren is not anticipated to occur in the project area. Should any rare occurrence be documented, it is more likely to occur in larger blocks of more suitable habitat located adjacent to the project area. Therefore, no impacts to the Bewick's wren are anticipated under this alternative.

Potential low quality habitat for northern pinesnake is located in small loblolly pine-dominated areas. However, this habitat is outside of the limits of disturbance of the proposed actions and generally does not have the open understory and sandy soils desired by these species. In addition, the northern pinesnake has not been documented within three miles of the project area. Larger blocks of more suitable pine barrens habitat in Sumner County would not be impacted and would continue to provide habitat should these species occur in the vicinity. Therefore, no impacts to the northern pinesnake are anticipated under this alternative.

Implementation of Alternative B would result in some additional disturbance on the GAF site, but the project would not affect federally or state-listed plants because field surveys indicated that no suitable habitat occurs for these species within the project area. Furthermore, no plants listed as species of special concern were observed within the project area during field surveys. Since the herbaceous plant species in and around GAF are common and representative of the region, no direct or indirect impacts are expected to occur to rare, threatened, or endangered plant species as a result of adopting this alternative.

Any construction activities would adhere to permit limit requirements and would utilize BMPs as described in the Tennessee Erosion and Sediment Control Handbook (TDEC 2012) to minimize indirect effects on aquatic resources during the construction phase. Previous construction, operation, and maintenance activities on GAF have resulted in significant disturbance and its habitats do not contain intact, high-quality native plant and animal communities or provide suitable habitat for the remaining listed species in Table 3-23; therefore, the project would have no impacts on the remaining listed threatened and endangered species.

Construction and Operation of a Beneficial Re-use Processing Facility

A specific site for the potential offsite beneficial re-use processing facility has not been identified. According to the proposed facility attributes listed in Table 2-5, the facility would be constructed on previously disturbed industrial land and disturbance of rare/sensitive vegetation communities, listed species, and other species of concern would be avoided. Site selection for the potential offsite beneficial re-use processing facility would also avoid designated critical habitats. In addition, there would be no impacts to state- or federally listed bats because tree clearing would be avoided. Therefore, based on the bounding attributes identified in Table 2-5, construction and operation of the proposed beneficial re-use processing facility would not impact threatened or endangered species or their critical habitats.

Transport of CCR

Under Alternative B (Option 1), CCR excavated from the impoundments at GAF would be transported via truck for disposal in the onsite landfill. Transport of the CCR would not result in any additional habitat disturbance on the GAF project area. Under Alternative B (Option 2), approximately 80% of the CCR would be transported to a beneficial re-use processing facility, and the remaining CCR not suitable for beneficial re-use would be transported to an approved offsite landfill. There would be no expected impacts to threatened and endangered species resulting from transport of CCR to a beneficial re-use processing facility or an offsite permitted landfill, as transport would be on existing highways and disposal would occur in an existing permitted landfill. Therefore, there would be no additional impacts to state- or federally listed species and their associated habitats resulting from the transport of CCR.

Transport of Borrow

Because borrow would be obtained from a previously permitted TVA borrow site located 1.5 miles from GAF, TVA’s action under this alternative is limited to the transport of borrow material. Transport would occur on local roads and would not result in an impact to threatened or endangered species or their associated habitats. Therefore, the transport of borrow material would not result in additional impacts to state- or federally listed species and their associated habitats.

3.12.3 Summary of Impacts to Threatened and Endangered Species

Under Alternative B, no impacts to state- or federally listed species are expected to occur to the species that do not have habitat requirements that overlap with the habitat present in the project area. Additionally, for listed species that may have suitable habitat in the project area (northern pinesnake, streamside salamander, pink mucket, lake sturgeon, gray bat, Indiana bat, northern long-eared bat, tri-colored bat, bald eagle, and Bewick’s wren), other than two potential detections of Indiana bat during an acoustic survey in 2012, there are no confirmed records that indicate that these species have historically occurred within the project limits and there were no sightings of these species during contemporary site visits. Streamside salamanders were not encountered as part of a species-specific survey conducted in December 2019 with TDEC and TWRA.

A number of proposed activities associated with construction were addressed in TVA’s programmatic consultation with the USFWS on routine actions and federally listed bats in accordance with ESA Section 7(a)(2) and completed in April 2018. For those activities with potential to affect bats, TVA committed to implementing specific conservation measures. These activities and associated conservation measures are identified on pages 5-7 of the TVA Bat Strategy Project Screening Form (Appendix F) and would be implemented as part of the proposed project. Project activities are within the bounds of impacts analyzed in TVA's Bat Strategy Programmatic Section 7 ESA consultation. With the implementation of identified conservation measures and BMPs and the abundance of available habitat surrounding the project area, proposed actions are not expected to significantly impact gray bat, Indiana bat, northern long-eared bat, and tri-colored bat.

Field surveys for streamside salamander were performed by TDEC and TWRA subject matter experts in December 2019 to determine presence of individuals or egg masses of this species within the streams with potential habitat. No streamside salamanders or their eggs were identified during field surveys.

As summarized in Table 3-25, TVA has determined that impacts to threatened and endangered species and their associated habitats related to the primary action and associated component actions related to the proposed ash impoundment closures at GAF are minor.

Table 3-25. Summary of Impacts to Threatened and Endangered Species

Alternative	Action	Impact	Severity
		Impoundment Closure	
Alternative B	Closure-by-Removal of APC	Loss of potential summer roosting and foraging habitat for Indiana bat, northern long-eared bat, and tri-colored bat and loss of potential summer foraging habitat for gray bat. Potential indirect impacts to pink mucket and lake sturgeon in the Cumberland River could include sedimentation from storm water during closure by removal process. Potential direct and indirect impacts to pink mucket and lake sturgeon in the Cumberland River from dewatering impoundments.	For those activities with potential to affect the gray bat, Indiana bat, and northern long-eared bat, TVA committed to implementing specific conservation measures in their programmatic consultation with the USFWS completed in April 2018. The associated conservation measures would be implemented as part of the proposed project. Conservation measures include tree clearing restrictions, which would minimize impacts to tri-colored bat as well. With conservation measures and BMPs, actions are not expected to significantly impact gray bat, Indiana bat, northern long-eared bat, and tri-colored bat. Restoration of ash ponds would create naturalized areas suitable for foraging habitat. No impacts expected to pink

Alternative	Action	Impact	Severity
			mucket or lake sturgeon due to BMPs implemented in accordance with site-specific erosion control plans. Activities would be designed to minimize impacts to Cumberland River and meet the terms and conditions of applicable USACE, NPDES and TDEC permits. No impact to other threatened and endangered species.
		Landfill Expansion	
Alternative B	Expansion of Landfill and Ancillary Facilities	Loss of potential summer roosting and foraging habitat for Indiana bat, northern long-eared bat, gray bat, and tri-colored bat. Potential streamside salamander habitat could be affected by project activities.	For those activities with potential to affect the gray bat, Indiana bat, and northern long-eared bat, TVA committed to implementing specific conservation measures in their programmatic consultation with the USFWS completed in April 2018. The associated conservation measures would be implemented as part of the proposed project. Conservation measures include tree clearing restrictions, which would minimize impacts to tri-colored bat as well. With conservation measures and BMPs, actions are not expected to significantly impact gray bat, Indiana bat, northern long-eared bat, and tri-colored bat. Surveys for presence of streamside salamander were performed by subject matter experts in areas of identified suitable habitat in coordination with TDEC and TWRA. No streamside salamanders or their eggs were identified during field surveys. Therefore, no impacts to this species are expected.No impact to other

Alternative	Action	Impact	Severity
			threatened and endangered species.
	Construction and Operation of Beneficial Re-use Processing Facility		
Alternative B	Construction and Operation of a Beneficial Re-use Processing Facility	No impact.	No impact due to the avoidance of threatened and endangered species and associated critical habitat for development.
		Transport of CCR	
Alternative B (Option 1)	Transport of CCR to Onsite Landfill	No impact.	No impact.
Alternative B (Option 2)	Transport of CCR to Beneficial Re-use Processing Facility	No impact.	No impact.
Alternative B (Option 2)	Transport of CCR not Suitable for Beneficial Re-use	No impact.	No impact.
		Transport of Borrow	
Alternative B	Truck transport of borrow to GAF from TVA-owned borrow site	No impact.	No impact.

3.13 Wetlands

3.13.1 Affected Environment

The USACE regulates the discharge of dredged or fill material into waters of the United States, including wetlands, under the CWA Section 404 Permit [33 US Code § 1344]. Additionally, Executive Order 11990--Protection of Wetlands requires federal agencies to avoid possible long and short-term impacts to wetlands and minimize their impact in order to preserve and enhance their natural and beneficial values.

As defined in Section 404 of the CWA, wetlands are those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions. Types of wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands and wetland fringe areas can also be found along the edges of many watercourses and impounded waters (both natural and man-made). Wetland habitat provides valuable public benefits including flood storage, erosion control, water quality improvement, wildlife habitat, and recreation opportunities [33 CFR 328.39(b)].

GAF is located on the right descending bank of the Cumberland River on a peninsula known as Odoms Bend. The section of the river surrounding Odoms Bend is commonly referred to as Old Hickory Lake, associated with the Old Hickory Lock and Dam located approximately 27 miles downstream of GAF. The project area is located within the Outer Nashville Basin Level IV

Ecoregion (EPA 2018b). Wetlands encompass approximately 0.6% of the total land cover within this ecoregion (0.45% forested, 0.08% emergent, and 0.04% scrub shrub) and are typically found in low lying areas along streams and rivers (USFWS 2019c).

The majority of the project area has been modified from natural conditions due to a history of industrial and non-industrial land uses and soil disturbances. The National Wetland Inventory (NWI) database identifies several small ponds and forested wetlands within the GAF project area. Wetlands identified on NWI maps include a total of 1.21 acres of emergent wetlands, 4.41 acres of forested wetlands, and 0.68 acre of open water, excluding the APC, which NWI identifies as open water (Table 3-26; Figure 3-9). These NWI features comprise 1% of the project area. The majority of the project area is undeveloped land associated with the impoundments which are not identified as wetlands (Figure 3-9). In the larger 5-mile radius surrounding GAF, emergent and forested wetlands occupy 619 acres (Table 3-16).

Within the project area jurisdictional wetlands and waters of the U.S. were identified in conjunction with two separate wetland delineations undertaken in 2018 and 2019. Wetlands and streams within the proposed landfill expansion area were identified in 2018 and 2019 (AECOM 2019c), whereas a survey for wetlands and streams was conducted on the remainder of the project area in 2019 (Wood 2019). Potential jurisdictional wetlands were evaluated in accordance with the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0) for both surveys.

A total of 19 wetlands and 7 ponds were identified within the project area by both delineations. Because the APC is considered an artificial treatment system, these ponds are considered non-jurisdictional and they are not regulated under either Section 401 or 404 of the CWA. Therefore, they were not included in the wetland delineation survey and are not considered as part of the wetland resources at GAF.

Field visits were conducted by members of the TDEC Natural Resources Division in September 2019 and USACE in July 2019 to confirm delineated features in the landfill expansion area. Based on field confirmations and the Wetland and Surface Water Features Assessment for the SRL Landfill Site (AECOM 2019), a preliminary JD was issued to TVA by USACE on September 4, 2019 and an Approved JD was issued on December 20, 2019. TDEC deferred to the USACE Approved JD for the hydrological determination in March 2020.

Non-forested wetlands identified at the site include fringe wetlands associated with stilling pond overflow areas and storm water detention areas. Forested wetlands occur at the location of former ponds, depressions, and low areas that are subject to periodic inundation. As shown in Table 3-26, based on the Approved JD by the USACE for the landfill expansion areas and field delineations within the office complex area, a total of 14.74 acres of jurisdictional and potentially jurisdictional waters of the U.S. (emergent and forested wetlands) and 14.91 acres of potentially jurisdictional waters of the State are located within the GAF project area. These areas are also shown in Figure 3-10.

Table 3-26. Wetlands and Streams Within the Project Area[3]

NWI Wetlands (acres)				
Feature Type	**Landfill Expansion Area**	**Office Complex**	**Remainder of the GAF Project Area**	**Total NWI Wetlands**
Emergent Wetlands[1]	0	0	1.21	1.21
Forested Wetlands[1]	0	0.20	4.21	4.41
Open Water[2]	0.27	0.01	0.66	0.94
Total	0.27	0.21	6.08	6.56

Delineated Jurisdictional Wetlands (acres)						
Feature Type	**Landfill Expansion Area**		**Office Complex**	**Remainder of the GAF Project Area**	**Total NWI Wetlands**	
	WOUS	Waters of the State			Total WOUS	Total Waters of the State
Emergent Wetlands[1]	0	0	0	6.52	6.52	6.52
Forested Wetlands[1]	2.17	2.34	0.51	5.54	8.22	8.39
Open Water[2]	0.29	0.29	0.65	0	0.94	0.94
Total	2.46	2.63	1.16	12.06	15.68	15.85

Source: USFWS 2019c; AECOM 2019c; Wood 2019; USACE 2019; TDEC 2020

[1] Emergent and forested wetlands are jurisdictional.

[2] Open waters not connected to other jurisdictional streams or wetlands are considered non-jurisdictional. The ash ponds are considered non-jurisdictional and are not included in this total.

[3] An updated assessment report of wetland and surface water features in the proposed landfill expansion site was prepared by AECOM in August 2019 following receipt of the USACE's Preliminary JD. The report identifies only those features the USACE and the State of Tennessee consider jurisdictional for purposes of permitting and mitigation. An Approved JD was issued by USACE on December 20, 2019 for these impacts within the landfill expansion area. TDEC deferred to the Approved JD in issuing the Hydrologic Determination for the landfill expansion area.

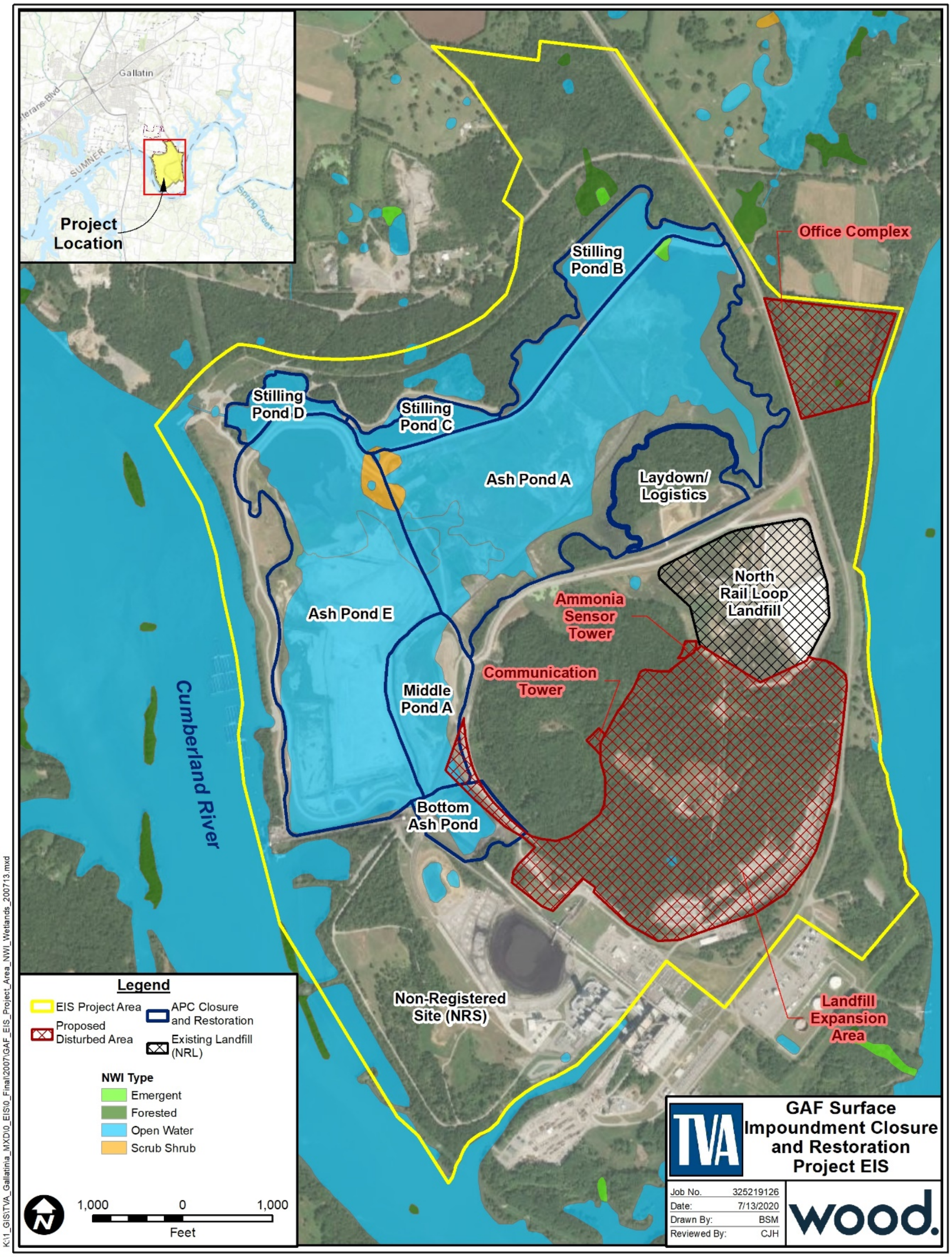


Figure 3-9. NWI Wetlands at GAF

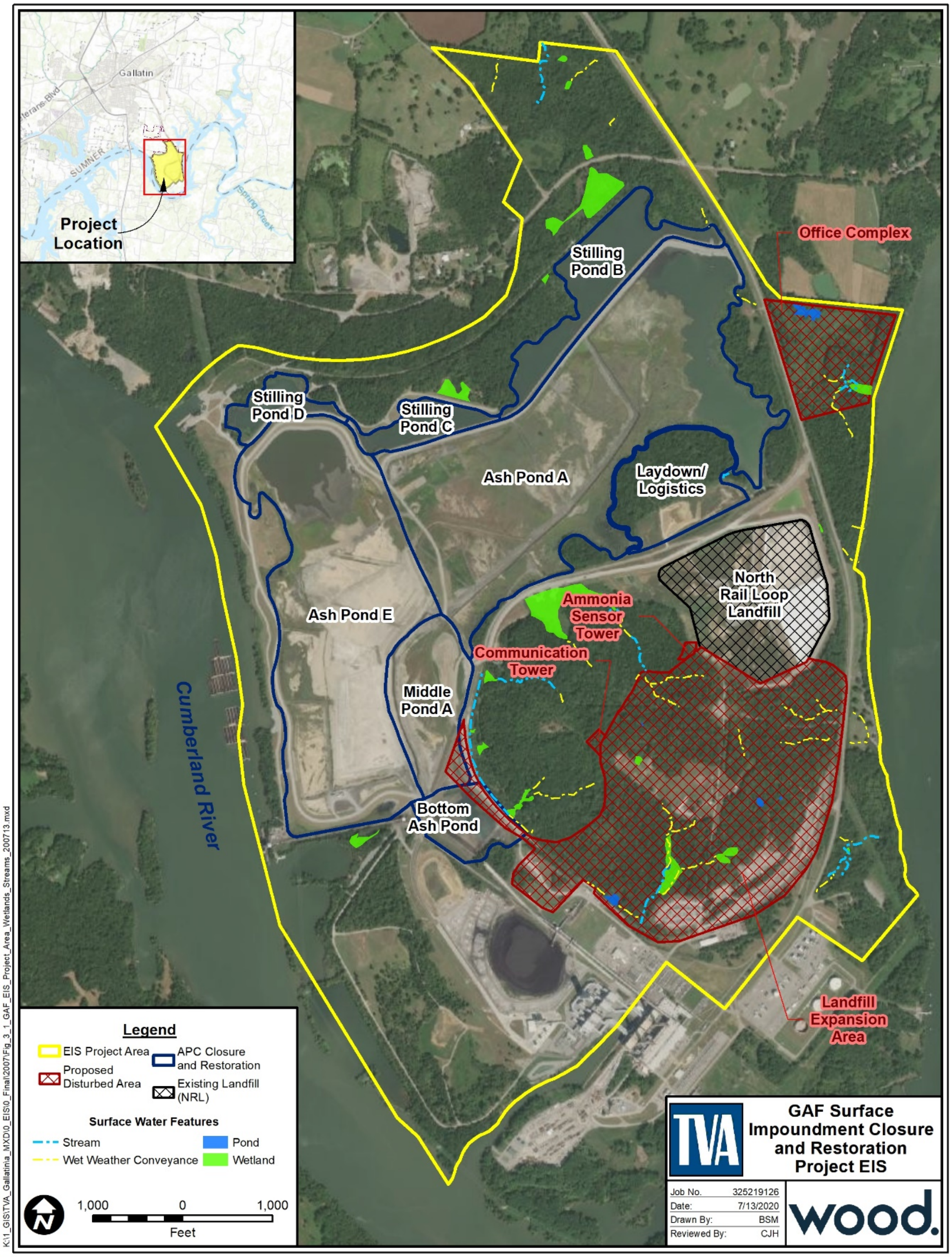


Figure 3-10. Delineated Wetlands within the Project Area

3.13.2 Environmental Consequences

3.13.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, no closure activities would occur and the NRL Landfill would not be expanded. As a result, no new work would be conducted that would potentially fill wetlands or alter wet weather conveyances or streams within the project area. Therefore, there would be no impacts to wetland and open water resources under the No Action Alternative.

3.13.2.2 Alternative B – Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill

Surface Impoundment Closures

Under the primary action considered as part of Alternative B, TVA would close the APC at GAF via Closure-by-Removal, the open water resources within the APC would be drained, and the CCR would be excavated and removed. However, since these impoundments are considered non-jurisdictional, no direct or indirect impacts would occur in conjunction with this action.

Expansion of Existing Onsite Landfill

Under Alternative B, expansion of the existing onsite landfill would include construction of the associated haul route and ancillary facilities including the office complex, relocated communications tower, and ammonia sensor tower. These actions would result in a direct loss of 2.68 acres of forested wetlands identified as waters of the U.S. and 2.85 acres of forested wetlands identified as waters of the State. Impacts would include 2.17 to 2.34 acres of forested wetlands in the landfill expansion footprint and 0.51 acre in the footprint of the office complex. The effects of wetland impact at both of these sites would be minor when viewed in the context of the larger 5-mile region which contains 265.4 acres of forested wetland resources (Table 3-16). Furthermore, unavoidable direct impacts to wetlands within the landfill expansion area will be compensated through the purchase of wetland mitigation credits. Credits for wetland mitigation were reserved by TVA in October 2019 from the Tennessee Mitigation Fund. As required by both state and federal agencies in accordance with the Tennessee Water Quality Control Act and Section 404 of the CWA, additional mitigation credits would be pursued by TVA from an approved regional wetland mitigation bank for the wetland impact within the office complex area.

Potential short-term indirect impacts resulting from the landfill expansion could include erosion and sedimentation from storm water runoff during construction into offsite or nearby jurisdictional and non-jurisdictional wetlands. BMPs in accordance with site-specific erosion control plans would be implemented to minimize this potential. Therefore, development of the proposed landfill would be consistent with EO 11990 and overall impacts would be minor and compensated.

Construction and Operation of a Beneficial Re-use Processing Facility

Under Alternative B, TVA is also assessing the potential impacts associated with the component action of the construction and operation of the beneficial re-use processing facility. The construction and operation of the beneficial re-use processing facility may impact wetland resources depending on the characteristics of the proposed site. However, as noted in Table 2-5, it is expected that the beneficial re-use processing facility developer would preferentially avoid sites containing substantial wetlands and minimize overall disturbances to wetlands. Any potential unavoidable impacts to wetlands are expected to be minimized to the extent that the action would qualify for permitting under the Section 404 Nationwide permitting program and TDEC's ARAP permitting process. As such impacts to wetlands under this component action are considered minor.

Transport of CCR

Under Alternative B (Option 1), CCR excavated from the APC at GAF would be transported via onsite haul roads and placed in either the existing onsite NRL Landfill, an expansion of the existing landfill, or a combination of these landfills. Transport of CCR material to the onsite landfill would not involve direct disturbance to wetland habitat as onsite roads would be used as haul routes. Impacts of construction of the new landfill haul road are discussed under Section 3.13.2.2.2, and there would be no wetlands or Waters of the U.S. affected. Because transport of CCR would be by truck using onsite roadways, no impacts to wetlands would occur with this component action.

Under Alternative B (Option 2), CCR excavated from the surface impoundments at GAF would be transported to a beneficial re-use processing facility. CCR that is not suitable for beneficial re-use would be transported via truck to an existing offsite landfill for disposal. A specific landfill has not been selected; however, the chosen facility will be permitted and in compliance with NPDES and water quality standards. Transport of CCR material to a beneficial re-use facility or the offsite landfill will not involve direct disturbance to wetland habitat as existing interstate highways and arterial facilities will be used as haul routes. Because transport of CCR would be by truck using existing paved roadways, no impacts to wetlands would occur with this component action.

Transport of Borrow

Because borrow would be obtained from a previously permitted TVA borrow site at GAF, TVA's action under this alternative is limited to the transport of borrow material. Transport of borrow by truck on the existing roadway network would not impact wetlands under this component action.

3.13.3 Summary of Impacts to Wetlands

As summarized in Table 3-27, TVA has determined that impacts to wetlands as they relate to the primary action and associated component actions for the proposed impoundment closures at GAF are minor. Any unavoidable direct impacts to wetlands would be mitigated as required by both state and federal agencies in accordance with Section 404 of the CWA.

Table 3-27. Summary of Impacts to Wetlands

Alternative	Action	Impact	Severity
		Impoundment Closure	
Alternative B	Closure-by-Removal of APC	No impact, activities only associated with non-jurisdictional impoundments and previously disturbed laydown areas.	No impact.
		Landfill Expansion	
Alternative B	Expansion of Landfill and Ancillary Facilities	Removal of vegetation and fill of wetlands within the footprint of the landfill expansion and office complex.	Minor and mitigated by compensatory mitigation coupled with use of BMPs to minimize indirect onsite impacts.

Alternative	Action	Impact	Severity
		Construction and Operation of Beneficial Re-use Processing Facility	
Alternative B	Construction and Operation of a Beneficial Re-use Processing Facility	Impacts either avoided or minimal within Nationwide permit limits.	Minor, limited by use of BMPs.
		Transport of CCR	
Alternative B (Option 1)	Transport of CCR to Onsite Landfill	No impact.	No impact.
Alternative B (Option 2)	Transport of CCR to Beneficial Re-use Processing Facility	No impact.	No impact.
Alternative B (Option 2)	Transport of CCR not Suitable for Beneficial Re-use	No impact.	No impact.
		Transport of Borrow	
Alternative B	Truck transport of borrow to GAF from TVA-owned borrow site	No impact.	No impact.

3.14 Solid and Hazardous Waste

3.14.1 Affected Environment

3.14.1.1 Solid Waste

In Tennessee, requirements for management of solid wastes are focused on solid waste processing and disposal under Rule 0400-11-.01. Solid wastes are defined in the rule as garbage, trash, refuse, abandoned material, spent material, byproducts, scrap, ash, sludge and all discarded material including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial and agricultural operations, and from community activities. Solid wastes generated at GAF is managed in accordance with federal and state requirements.

The primary solid wastes that resulted from the operation of GAF are collectively known as CCR. When generating at full capacity, GAF consumes approximately 3.5 million tons of coal a year and produces approximately 255,000 tons of CCR per year. The ash is collected as either fly ash, which is fine enough and light enough to be carried with the flue gas stream exiting the boiler, or as bottom ash, which is coarser and heavier and falls to the bottom of the boiler. Historically, TVA managed storage of CCR materials generated at GAF in surface impoundments and as structural fill. Currently, all fly ash is mixed together with DFGD byproduct and is collected in a baghouse and transported to the NRL for disposal while bottom ash is sluiced to the newly constructed bottom ash dewatering facility, dewatered, and transported to the NRL for disposal. There are approximately 11.9 million yd^3 of CCR in the APC. CCRs are regulated as special wastes that require special waste approval for the wastes to be disposed of at a landfill specifically permitted to receive those types of wastes.

Nonhazardous materials produced at GAF and not disposed onsite are taken to the Sumner County solid waste transfer station and then shipped for disposal by Republic Waste Services to the Middle Point Sanitary Landfill in Murfreesboro, Tennessee. This landfill, a Subtitle D landfill with two clay liners and two synthetic liners, opened in September 1997.

3.14.1.2 Hazardous Waste

Hazardous materials are regulated under a variety of federal laws including Occupational Safety and Health Administration (OSHA) standards, Emergency Planning and Community Right to Know Act (EPCRA), the RCRA, the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, and the Toxic Substances Control Act.

Regulations implementing the requirements of EPCRA are codified in 40 CFR 355, 40 CFR 370 and 40 CFR 372. Under 40 CFR 355, facilities that have any extremely hazardous substances present in quantities above the threshold planning quantity are required to provide reporting information to the State Emergency Response Commission, Local Emergency Planning Committees and local fire departments. Inventory reporting to emergency response parties is required for facilities with greater than the threshold planning quantity of any extremely hazardous substances or greater than 10,000 pounds of any OSHA regulated hazardous material. EPCRA also requires inventory reporting for all releases and discharges of certain toxic chemicals. TVA applies these requirements as a matter of policy.

RCRA regulations define what constitutes a hazardous waste and establishes a “cradle to grave” system for management and disposal of hazardous wastes. Subtitle C of RCRA includes separate, less stringent regulations for certain potentially hazardous wastes. Used oil, for example, is regulated as hazardous waste if it is disposed of, but it is separately regulated if it is recycled. Specific requirements are provided under RCRA for generators, transporters, processors and burners of used oil that are recycled. Universal wastes are a subset of hazardous wastes that are widely generated. Universal wastes include batteries, lamps and high intensity lights and mercury thermostats. Universal wastes may be managed in accordance with the RCRA requirements for hazardous wastes or by special, less stringent provisions.

GAF generates a limited quantity of hazardous waste and is considered a small quantity generator of hazardous waste; generating between 100 to 1,000 kilograms hazardous waste per month. Generated wastes streams are related to maintenance and testing activities and include small quantities of waste paint, paint chips, solvents, mercury waste, absorbents, solvent-contaminated rags, silver containing wastes from x-ray operations, welding, abrasive wastes, and liquid-filled fuses. Used oils including pump lube oils, gear box oils, vacuum pump oils, used engine and transmission oils from vehicles and heavy equipment, hydraulic oils and cutting oils are also generated from maintenance activities. These used oils are generally recycled. Limited amounts of universal wastes (batteries, and lamps) are routinely generated from the plant infrastructure and operations. GAF is considered a small quantity handler of universal wastes.

3.14.2 Environmental Consequences

3.14.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, no closure activities would occur, and there would be no generation of solid or hazardous wastes related to proposed closure activities, offsite transport of CCR materials, or onsite transport of borrow materials. Therefore, no impacts associated with solid and hazardous waste generation are anticipated.

3.14.2.2 Alternative B – Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill

Impoundment Closure

The primary solid and hazardous wastes generated under this alternative would be from closure activities. Table 3-28 identifies representative solid and hazardous wastes that could be generated as a result of closure activities under this alternative.

Table 3-28. Representative Hazardous and Solid Wastes Generated During Construction (Closure Activities)

Waste	Origin	Composition or Characteristic	Disposal Method
Solid Waste			
Scrap wood, steel, glass, plastic, paper	Construction activities	Normal refuse	Recycle and/or dispose of in a Class I landfill[1]
Land clearing wastes	Construction activities	Solids	Dispose of in a Class III[1] or IV[1] landfill
Waste oil filters	Construction equipment and vehicles	Solids	Recycle at a permitted treatment, storage and disposal facility (TSDF)
Oil fuel and solvent rags	Cleanup of small spills, cleaning and degreasing operations	Hydrocarbons	Dispose at a Class I[1] landfill as special wastes
Non-hazardous solvents, paint, adhesives	Construction activities, Equipment cleaning	Solvents paints, adhesives that are not characteristic or listed hazardous waste	Dispose at a Class [1l] landfill as special waste
Sanitary waste	Portable toilet holding tanks	Solids and liquids	Remove by contracted sanitary service or utilize existing sanitary sewer system
Hazardous Waste			
Used and waste lubricating and hydraulic oils	Construction vehicles and equipment	Hydrocarbons	Recycle at a permitted TSDF or used oil recycler
Oily rags, oily sorbent	Cleanup of small spills	Hydrocarbons	Dispose at a permitted TSDF
Fuels, absorbents and soils contaminated by gasoline or diesel	Construction equipment	Ignitable, benzene, other hydrocarbons	Dispose at a permitted TSDF or recycle
Solvents, paint, adhesives	Construction activities, equipment cleaning	Ignitable solvents; solvents paints, adhesives containing constituents identified as characteristic hazardous waste (40 CFR 261 Subpart C); Solvents listed under 40 CFR 261 Subpart D	Recycle or dispose at a permitted TSDF
Solvent and fuel contaminated rags	Construction activities, equipment cleaning	See above	Recycle or dispose at a permitted TSDF
Miscellaneous acids and alkalis	Construction activities	Corrosive hazardous wastes	Dispose at a permitted TSDF

Waste	Origin	Composition or Characteristic	Disposal Method
Spent lead acid batteries	Construction machinery	Lead, sulfuric acid	Manage as universal wastes
Spent lithium and Ni/Cd batteries	Equipment construction machinery	Heavy metals	Manage as universal waste
Fluorescent, mercury vapor and high intensity (sodium vapor) lamps	Lighting equipment	Mercury and other metals	Recycle as universal waste
Contaminated environmental media	Site preparation	Varies	Dispose at permitted TSDF or Class I landfill

Source: TVA 2016

[1]Disposal facilities

- Class I disposal facility - takes non-hazardous municipal solid wastes such as household wastes, approved special wastes, and commercial wastes
- Class II disposal facility - takes non-hazardous industrial wastes, commercial wastes and fill
- Class III disposal facility - takes Class IV wastes plus landscaping, land clearing and farming wastes
- Class IV disposal facility - takes construction/demolition wastes, shredded tires and waste with similar characteristics

As identified in the TVA Ash Impoundment Closure PEIS (TVA 2016), the majority of waste streams resulting from closure activities would be solid nonhazardous waste. However, some nonhazardous liquid waste would also be generated. During construction, the primary solid nonhazardous wastes generated would be refuse from the contractor personnel, a small volume of construction debris (piping removed, rubble, packing materials, etc.) and soils, as briefly summarized below:

- Construction debris consisting primarily of piping removed, miscellaneous construction rubble, wastes from packing materials and empty nonhazardous chemical containers during project construction
- Land clearing wastes would result from grading operations
- Soils would result from land clearing, grading and excavation

In addition to these larger nonhazardous waste streams, limited quantities of nonhazardous solvents, paints and adhesives, spill absorbent, oil and solvent contaminated rags, and empty containers would be generated.

Various hazardous wastes, such as fuels, lubricating oils, solvents, paints, adhesives, compressed gases and other hazardous materials could also be produced during construction. Oily wastes generated during servicing of heavy equipment would generally not be stored on site but would be managed by offsite vendors who service onsite equipment using appropriate self-contained used oil reservoirs. Appropriate spill prevention, containment and disposal requirements for hazardous wastes would be implemented to protect construction and plant workers, the public and the environment.

TVA would manage all solid waste and hazardous wastes generated from closure and construction activities in accordance with standard procedures for spill prevention and cleanup and waste management protocols in accordance with pertinent federal, state and local requirements. OSHA requirements for workers engaged in these activities would be applied.

Under this closure alternative, TVA would excavate and relocate approximately 11.9 million yd^3 of CCR from the APC at GAF to the onsite landfill expansion for disposal or to a beneficial re-use processing facility. Given that the CCR would be disposed of in an onsite properly designed landfill expansion or would not be sent to a landfill in favor of beneficial re-use, disposal of CCR from GAF would not affect the long-term ability to meet disposal needs of the region. Transport of CCR would be managed under the requirements set forth under RCRA Subtitle D and in accordance with pertinent state and local requirements. If upon excavation and testing it is determined that the soils under the CCR in the impoundments contain constituents that could be classified as hazardous, TVA would manage this material in accordance with applicable federal, state and local requirements. As such impacts to solid waste and hazardous waste generation would be minor.

Expansion of Existing Onsite Landfill

Development of the proposed landfill expansion includes the primary action of landfill development and several related ancillary actions. Ancillary actions encompassed within the landfill footprint include the relocation of the communications tower and ammonia sensor tower, remediation of a decommissioned firearms range, and development of a paved haul road. Development of the landfill expansion will also require removal of the existing GAF conference center located on the southern portion of the rail loop area and the construction of a new office complex facility.

Expansion of the onsite landfill would require site preparation including vegetation removal over the approximately 179-acre area of disturbance, excavation, re-compaction of subgrade over the 130-acre landfill footprint, and installation of an approved liner and cover system.

The primary wastes resulting from these activities are:

- Landscaping/vegetative waste
- Construction waste and debris

Landscaping wastes would result from grubbing land clearing and grading necessary to construct the landfill and office complex development areas. These materials may be disposed offsite, chipped and mulched onsite, or disposed onsite through open burning, done in accordance with appropriate local and state regulations.

Construction waste and debris, such as paper, wood, and plastics would be generated during construction. This construction waste would be placed in roll-offs and disposed of at a permitted offsite construction and demolition landfill.

In addition to these nonhazardous waste streams, limited quantities of hazardous solvents, paints and adhesives, spill absorbent, oil and solvent contaminated rags and empty containers would be generated. Additionally, there is the potential for spills or releases of fuels, coolants, oils and hydraulic fluids from construction machinery. These waste streams would be generated in very limited quantities. TVA would manage all solid and hazardous wastes generated from construction activities in accordance with federal, state and local requirements.

Other solid wastes that would be generated from operation of the landfill expansion and the ancillary facilities include paper and plastics from packaging of maintenance-related materials, small quantities of oils and fuels from spills, small quantities of paints, adhesives, etc. from maintenance. Pumps, valves and controls associated with the leachate management system would require replacement during operations.

Various hazardous wastes, such as used oils, hydraulic fluids and engine coolants could be produced during landfill operations. These hazardous wastes would be managed similarly to hazardous wastes generated during operations at the dewatering facilities. Along with TVA BMPs, all materials determined to be waste would be evaluated (e.g., waste determinations) and managed (e.g., inspections, container requirements, permitted transport) in accordance with applicable federal and state rules including TDEC Solid and Hazardous Waste Rules and Regulations as described in TDEC Division of Solid Waste Management Rule 0400 Chapters 11 and 12, respectively. Prior to demolition activities, hazardous waste, materials containing PCBs, asbestos containing materials (ACM), or lead paint, and any universal wastes would require special removal, handling, labeling and disposal by appropriately trained and licensed personnel and contractors. Proper assessment and notification for abatement of ACM or other materials will be conducted in accordance with TDEC requirements. These materials would be disposed of at a facility designed and permitted to receive hazardous materials. Removed materials would be transported to a landfill or other approved disposal facility operated by a company under TVA contract.

At some point in the future, the landfill would implement closure activities following a closure plan approved by TDEC. Construction type wastes would be generated during preparation and installation of the final cover. These solid and hazardous wastes would be similar to those generated during impoundment closure activities. TVA would manage all waste generated during landfill closure in accordance pertinent federal, state and local requirements.

After the landfill is closed, post-closure care would generate vegetative debris and soils from maintenance of drainage swales and storm water basins and sludge from the leachate storage impoundments or tanks. Other small volume solid waste streams could be generated during post-closure care such as lubricating oils and filters from construction equipment and pumps associated with leachate collection system, small quantities of oils and fuels from spills or leaks, and small quantities of paints and other wastes from maintenance. TVA would manage these wastes in accordance with standard procedures for spill prevention and cleanup and waste management protocols. Wastes generated by construction activities would be managed in accordance with standard procedures for spill prevention and cleanup and waste management protocols in accordance with pertinent federal, state and local requirements.

Removal of the decommissioned firearms range located within the proposed landfill footprint is another ancillary action related to landfill expansion. The range allowed the use of small arms munitions that were captured in earthen berms located on the site. TVA is conducting a site investigation to evaluate the presence, extent, and distribution of lead and possible COCs at this site. Depending on the nature, concentration, and extent of COCs identified, some remedial action may be necessary to remove lead and other COCs from the topsoil and overburden stockpiles that could be used in landfill construction. TVA is entering into the Voluntary Cleanup Program with TDEC Division of Remediation and remedial measures will be determined in consultation with TDEC and may include onsite treatment coupled with excavation and removal to a suitable offsite landfill.

In summary, landfill development and its associated ancillary actions would entail the generation of a variety of wastes and long-term storage of CCR in a properly designed and permitted onsite facility. Storage of CCR removed from the APC would be onsite and would not detract from regional commercial landfill capacity. Solid wastes and small quantities of hazardous wastes would be managed in accordance with appropriate federal, state and local requirement and would be disposed of in appropriate and suitable offsite landfill facilities. Therefore, overall impacts associated solid and hazardous waste from landfill expansion are minor.

Construction and Operation of a Beneficial Re-Use Processing Facility

Under Option 2, TVA would excavate and transport by truck up to 80% of CCR from the APC to a beneficial re-use processing facility, with the remaining CCR being transported to an existing offsite landfill. CCR materials removed from the impoundments would be transported to the facility at rates similar to that of transport to an offsite landfill (448 truck trips per day, approximate 15-year period). Though the location of the proposed beneficial re-use processing facility is unknown, solid and hazardous waste impacts associated with the transport of CCR to the facility would be similar to those described for transport of CCR onsite and would be minor.

All solid waste and hazardous wastes generated from construction activities associated with the beneficial re-use processing facility would be managed in accordance with standard procedures for spill prevention and cleanup and waste management protocols in accordance with pertinent federal, state and local requirements.

Solid wastes that would be generated from operation of the proposed facility include paper and plastics from packaging of maintenance-related materials, small quantities of oils and fuels from spills, small quantities of paints, adhesives, etc. from maintenance. Pumps, valves and controls associated with the processing facility would require replacement during operations. Generation of regulated hazardous wastes is not expected (see Table 2-5). However, any regulated hazardous waste would be managed in accordance with RCRA requirements. Solid wastes from production processes at the facility and delivery of beneficiated product are expected to be minor. Solid waste generated during outages/maintenance activities would vary in amounts and would be disposed of in an appropriate licensed landfill (see Table 2-5).

Impacts also would be associated with maintenance of vehicles that deliver beneficiated product to various markets. Average volume of trucking would be 100-120 truck trips per day for up to 250 days per year. Wastes from vehicle maintenance activities would be managed in accordance with standard procedures for spill prevention and cleanup and waste management protocols in accordance with pertinent federal, state and local requirements.

There would also be a long-term beneficial impact associated with solid wastes going to a beneficial re-use facility (Option 2) as compared to being disposed in an onsite landfill (Option 1) as the majority of CCR at GAF would be beneficially re-used for use in concrete and other building materials. This would transform up to 9.1 million yd^3 of CCR wastes into re-usable, beneficiated products. As such, this same quantity of CCR would not be disposed of in the onsite or offsite landfill. In addition, beneficiated CCR could be used as a substitute for other materials which would indirectly limit generation of solid waste associated with obtaining such materials.

Therefore, adverse impacts associated with generation of solid and hazardous wastes during construction and operation of the beneficial re-use processing facility would be minor; however, there would be a long-term moderate beneficial impact associated with solid wastes as the majority of CCR at GAF would be beneficially re-used.

<u>Transport of CCR</u>

The amount of solid and hazardous wastes generated from maintenance of vehicles needed to transport CCR would increase under Alternative B for both Options 1 and 2 over existing conditions. Hazardous wastes generated by vehicle maintenance (EPA 1999) and engine cleaning and maintenance (EPA 2000) include: used lubricating oils, used hydraulic fluids, coolants, oily sorbents and rags, solvents, waste fuel, and batteries. Solid wastes generated from these activities include: packaging, empty containers, bulbs, tires, scraps generated from body work, and other debris. All waste generated from the transport of CCR would be handled in accordance with standard procedures for spill prevention and cleanup and waste management protocols in accordance with pertinent federal, state and local requirements. Impacts from transport of CCR are therefore minor. Vehicle maintenance wastes would be expected to be larger under Option 2 due to a greater number of truck trips associated with hauling CCR to an offsite beneficial re-use processing facility compared to Option 1. Under Option 2, TVA estimates that offsite transport would result in 560 truck trips per day, compared to Option 1 which would result in 380 truck trips per day (Section 3.17 Transportation).

<u>Transport of Borrow</u>

In addition to transport of CCR, this alternative will require transport of borrow material to GAF from the TVA-owned borrow site located approximately 1.5 miles north of GAF. The amount of solid and hazardous wastes generated from maintenance of vehicles needed to transport borrow would increase under Alternative B over existing conditions. Hazardous wastes generated by vehicle maintenance (EPA 1999) and engine cleaning and maintenance (EPA 2000) include: used lubricating oils, used hydraulic fluids, coolants, oily sorbents and rags, solvents, waste fuel, and batteries. Solid wastes generated from these activities include: packaging, empty containers, bulbs, tires, scraps generated from body work, and other debris. All waste generated from the transport of CCR and borrow material would be handled in accordance with standard procedures for spill prevention and cleanup and waste management protocols in accordance with pertinent federal, state and local requirements. Impacts from transport of borrow are therefore minor.

3.14.3 Summary of Impacts to Solid and Hazardous Waste

Hazardous waste streams generated from the proposed actions would be limited and would not change the status of GAF from a small quantity generator. Wastes generated by proposed project activities would be managed in accordance with standard procedures for spill prevention and cleanup and waste management protocols in accordance with pertinent federal, state and local requirements. Therefore, as summarized in Table 3-29, solid and hazardous waste impacts related to the primary action and associated component actions proposed as part of the ash impoundment closures at GAF would be minor.

Table 3-29. Summary of Impacts to Solid and Hazardous Waste

Alternative	Action	Impact	Severity
		Impoundment Closure	
Alternative B	Closure-by-Removal of APC	Small volumes of solid and hazardous wastes generated from site preparation and construction activities.	Minor impact as hazardous wastes would be managed in accordance with all applicable state and federal regulations.

Alternative	Action	Impact	Severity
		Landfill Expansion	
Alternative B	Expansion of Landfill and Ancillary Facilities	Construction waste, demolition debris, firearms range remediation	Minor impact as onsite storage of CCR would not impact regional landfill capacity and construction and hazardous wastes would be managed in accordance with all applicable state and federal regulations. Minor impact due to closure and remediation of decommissioned firearms range as TVA is entering into the Voluntary Cleanup Program with TDEC Division of Remediation to determine remediation measures needed.
		Construction and Operation of Beneficial Re-use Processing Facility	
Alternative B	Construction and Operation of a Beneficial Re-use Processing Facility	Small volumes of solid and hazardous wastes generated from site preparation and construction activities.	Minor impact from the short-term construction and long-term operation of the proposed facility.
		The majority of CCR at GAF would be beneficially re-used.	Long term moderate beneficial impact.
		Transport of CCR	
Alternative B (Option 1)	Transport of CCR to Onsite Landfill	Solid and hazardous wastes generated by maintenance of equipment used to transport CCR to the onsite landfill.	Minor impact as solid and hazardous wastes would be managed in accordance with all applicable state and federal regulations.
Alternative B (Option 2)	Transport of CCR to Beneficial Re-use Processing Facility	Solid and hazardous wastes generated by maintenance of equipment used to transport CCR to the beneficial re-use processing facility and to transport beneficiated product.	Minor impact as solid and hazardous wastes would be managed in accordance with all applicable state and federal regulations. Minor impact from maintenance of trucks that transport beneficiated product.
Alternative B (Option 2)	Transport of CCR not Suitable for Beneficial Re-use	Solid and hazardous wastes generated by maintenance of equipment used to transport CCR to the offsite landfill.	Minor impact as solid and hazardous wastes would be managed in accordance with all applicable state and federal regulations.

Alternative	Action	Impact	Severity
		Transport of Borrow	
Alternative B	Truck transport of borrow to GAF from TVA-owned borrow site	Solid and hazardous wastes generated by maintenance of equipment used to transport borrow to GAF.	Minor impact as solid and hazardous wastes would be managed in accordance with all applicable state and federal regulations.

3.15 Visual Resources

3.15.1 Affected Environment

This assessment provides a review and classification of the visual attributes of existing scenery, along with the anticipated attributes resulting from the proposed action. The classification criteria used in this analysis are adapted from a scenic management system developed by the U.S. Forest Service and integrated with planning methods used by TVA (U.S. Forest Service 1995). Potential visual impacts to cultural and historic resources are not included in this analysis as they are assessed separately in Section 3.16.

The visual landscape of an area is formed by physical, biological, and man-made features that combine to influence both landscape identifiability and uniqueness. Scenic resources within a landscape are evaluated based on a number of factors that include scenic attractiveness, integrity and visibility. Scenic attractiveness is a measure of scenic quality based on human perceptions of intrinsic beauty as expressed in the forms, colors, textures, and visual composition of each landscape. It can be scored into three categories: distinctive, common, or minimal. Scenic integrity is a measure of scenic importance based on the degree of visual unity and wholeness of the natural landscape character. The scenic integrity of a site can be scored as high, moderate, low, or very low. The varied combinations of natural features and human alterations both shape landscape character and help define their scenic importance. The subjective perceptions of a landscape's aesthetic quality and sense of place is dependent on where and how it is viewed.

Visibility of a landscape may be described in terms of three distance contexts: foreground, middleground, and background. In the foreground, an area within 0.5 mile of the observer, individual details of specific objects are important and easily distinguished. In the middleground, from 0.5 to 4 miles from the observer, object characteristics are distinguishable, but their details are weak, and they tend to merge into larger patterns. In the distant part of the landscape, the background, details and colors of objects are not normally discernible unless they are especially large, standing alone, or have a substantial color contrast. In this assessment the background is measured as 4 to 10 miles from the observer. Visual and aesthetic impacts associated with a particular action may occur as a result of the introduction of a feature that is not consistent with the existing viewshed. Consequently, the visual character of an existing site is an important factor in evaluating potential visual impacts.

For this analysis, the affected environment includes the areas within the EIS project boundary that encompass both permanent and temporary impact areas, as well as the physical and natural features of the landscape. GAF is located on a peninsula on the Cumberland River which has been largely developed for industrial uses. However, some areas of the GAF property, including portions of the proposed landfill expansion and the office complex areas, are predominantly undeveloped and wooded. The surrounding area has a gently rolling terrain, with elevations around the plant ranging from 450 to 600 feet above mean sea level. Near the GAF reservation, in the foreground, the viewshed is mostly natural, with trees and the Cumberland River generating a peaceful setting. The land to the north of the property boundary is primarily rural residential, dominated by forested areas, agricultural fields, and single-family homes. Small hills and dense woods act as a visual buffer between plant operations and residences.

The GAF property is bounded by the Cumberland River on the west, south, and east sides. The plant itself dominates views from the river and shorelines as it is highly industrial, providing a sharp visual contrast to the surrounding rural and sparsely developed landscape. Predominant focal points include the two 500-foot steam plant stacks and the newer stack associated with the scrubber facility, which is slightly shorter and wider. All three stacks are visible from the surrounding area and can overpower areas where viewsheds are not screened by trees. Other major visual components of the large-scale industrial site include the powerhouse buildings, the coal pile and coal handling facilities, the APC, emission control buildings, the switchyard and network of high-voltage transmission lines, and the NRL.

Based on the above characteristics, the scenic attractiveness of the affected environment is considered to be minimal to common, whereas the scenic integrity is considered to be low. The rating for scenic attractiveness is based on the ordinary or common visual quality of the landscape. The forms, colors and textures in the affected environment are normally seen through the characteristic landscape; therefore, the landscapes are not considered to have distinctive quality. In the foreground and middleground, the scenic integrity has been lowered by the industrial nature of the GAF reservation. However, in the background these alterations are not substantive enough to dominate the view of the landscape. The scenic class of a landscape is determined by combining the levels of scenic attractiveness, scenic integrity and visibility and can be excellent, good, fair, or poor. Based on the criteria used for this analysis, the overall scenic class for the affected environment is considered to be fair.

3.15.2 Environmental Consequences

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

3.15.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, no closure activities would occur, resulting in no changes to the existing environment. The landscape character and integrity would remain in its current state; therefore, there would be no project-related impacts to aesthetics and visual resources.

3.15.2.2 Alternative B – Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill

Surface Impoundment Closures

Permanent impacts as a result of the impoundment closures would include minor discernible alterations that would be viewed in the foreground of plant operations. In the foreground, the closure of the impoundments and cover with natural vegetation may enhance the landscape character compared to the current condition. In more distant views, the closure of the impoundments would likely merge with the overall industrial components of the facility. Additionally, for the duration of the impoundments closure there would be a slight visual discord from existing conditions due to an increase in personnel and construction equipment in the area and construction-related traffic to the work site.

The viewshed of certain facilities, such as churches, schools, and outdoor recreation sites, can be vulnerable to visual modifications in the surrounding landscape. However, the proposed activities would have minimal public visibility and would primarily be seen by employees and visitors to the GAF facility and recreational boaters on the Cumberland River. Although there are sensitive visual receptors such as residences and a church located along Odoms Bend Road, within 500 to 1,000 feet of the APC, the views from these receptors are obscured by dense forest. Therefore, visual impacts of impoundment closure would be minor, and the closed impoundments would generally be absorbed by existing GAF facility components, becoming visually subordinate to the overall landscape character associated with the plant site.

Expansion of Existing Onsite Landfill

The proposed landfill expansion and ancillary facilities including the ammonia sensor tower and the relocated communications tower would contrast with the color of the landscape during construction and some phases of operation. The current landscape at the proposed site is predominantly green and brown as a result of the existing vegetation on the site. The dominant shapes in the landscape include the vertical lines of trees and existing transmission structures against the horizon. The color and shape contrast of the proposed CCR landfill expansion would be greatest in the foreground and less noticeable in the middleground and background. While the CCR deposited in the landfill would contrast with the natural landscape color, in the long-term, it would be covered with an earthen layer and grassy vegetation. Additionally, the landfill expansion would be bound by trees and other vegetation on the eastern side of Steam Plant Road and on parcels on the eastern side of the Cumberland River, creating a visual barrier and minimizing the visual impact to residents and other members of the public.

Sensitive visual receptors within the foreground of the landfill expansion limits of disturbance are limited to recreational users of the Gallatin Steam Plant Boat Ramp and boaters on the Cumberland River. Residents of houses located to the east of GAF across the Cumberland River, in the middleground, may also have views of the landfill expansion, although most would likely be obstructed by vegetation and terrain. While these receptors may experience minor long-term visual impacts due to the discord created by the landfill expansion, their lines of sight are already dominated by the existing stacks at the plant. The addition of another industrial aspect to an existing industrial area would not create a major change to the existing viewshed.

As the landfill expansion would displace the existing conference center building, a new conference center would be constructed in the proposed office complex, a vegetated area between Steam Plant Road and the Cumberland River in the northeastern portion of the EIS project boundary. The existing conference center is a 30-foot-tall pre-engineered building with steel supports and metal walls, and the new conference center would likely be constructed in a similar fashion. The office complex area would also be for used for parking and to temporarily stage construction trailers. The use and development of this area would contrast with the natural landscape color and shapes present in the immediate vicinity, but due to the relatively low profile and surrounding vegetation, would not be visible past the foreground. Vegetation maintained along the property boundary and shoreline would minimize views of the office complex from recreational boaters and nearby residences along Newton Lane. Motorists travelling on Steam Plant Road would be affected by the minor visual changes, but the only features located at the end of the road are the GAF facilities and the Gallatin Steam Plant Boat Ramp, so the majority of travelers on this road would likely be plant employees.

Construction and Operation of a Beneficial Re-use Processing Facility

Under Alternative B, TVA is also assessing the potential impacts associated with the component action of the construction and operation of a beneficial re-use processing facility. No specific provider of beneficiation services or the specific site on which a beneficial re-use processing facility would be constructed has been identified at this time. However, as noted in bounding characteristics of the facility (Table 2-5), the beneficial re-use processing facility would be developed on a previously disturbed site in an area that is compatible with surrounding land uses. During construction of the beneficial re-use processing facility, there would be a slight visual discord from the existing conditions due to an increase in personnel and equipment in the area. However, this increase would be minor and temporary (up to 14 months). Additionally, as the facility would be constructed in an area with compatible land uses, the facility would blend in with surrounding land uses and visual discord would be minor. The maximum height of the facility components would be 140 feet. At this height, there may be some minor visual impacts to any sensitive receptors in the foreground, however they would not be perceptible in the middleground or background.

The operation of the beneficial re-use processing facility would include the transport of CCR to the site and delivery of beneficiated product to various markets within the region along existing roads. The additional vehicular traffic would not result in a visual discord along these roadways as, according to Table 2-4, the facility would have direct access to a collector road or major highway that can support truck traffic without noticeable effects to the roadway level of service (LOS). Therefore, only minor impacts to visual resources associated with the construction and operation of the beneficial re-use processing facility are anticipated.

Transport of CCR

Under Alternative B (Option 1), transport of CCR materials removed from the surface impoundments to the onsite landfill using an onsite paved haul road would result in a slight visual discord due to increased personnel and vehicle traffic (approximately 381 truck trips per working day) for the duration of the closure period. However, as all transport activity would take place onsite, public visibility would be minimal. Visual impacts would be limited to GAF employees, plant visitors, and recreational boaters on the river, and visual discord would be minor due to the existing industrial nature of the site.

Under Alternative B (Option 2), transport of CCR materials removed from the impoundments to a beneficial re-use processing facility and an existing offsite permitted landfill over the course of the closure period would result in increased trucking on offsite roadways. Visual receptors along the trucking haul routes would potentially be exposed to increased visual discord due to the increase in vehicular traffic (approximately 112 truck trips per working day to the offsite landfill and 448 trips per working day to the beneficial re-use processing facility). Although specific landfill and beneficial re-use processing facility locations have not been selected, impacts to visual resources along most haul routes are expected to be minor as the roads in the vicinity of GAF currently support truck traffic and the remainder of the haul routes would utilize arterial and interstate roadways as much as possible. However, the high frequency of truck traffic on local roadways serving GAF (Odoms Bend and Steam Plant Road), would result in a moderately increased visual discord on these typically low volume roadways. Additionally, any sensitive visual receptors along the roads near the candidate landfills are already subjected to vehicular traffic destined for the landfill. Therefore, visual impacts due to CCR transport would be minor on primary arterial roadways but moderate on local roadways near GAF.

Transport of Borrow

Borrow material used for site restoration would be obtained from the previously permitted TVA-owned borrow site, located 1.5 miles northwest of the fossil plant, at a rate of approximately 32 truck trips per working day. The haul route used to transport borrow to GAF would utilize an existing roadway which currently supports truck traffic. Sensitive visual receptors along the haul route, which include residents of a small number of single-family homes set back at least several hundred feet from the roadway, are already subjected to vehicular traffic destined for GAF. Consequently, the minimal increase in visual discord associated with a relatively small number of additional trucks on the roadway would not alter the overall landscape. Therefore, impacts to visual resources resulting from the transport of borrow to GAF are not anticipated.

3.15.3 Summary of Impacts to Visual Resources

Overall, the project site has low scenic integrity owing to modifications to the landscape from previous development. The proposed closure of the surface impoundments would not be discernible from the existing scenery nor would it contrast with the overall landscape. The proposed developments, including the landfill expansion and office complex, would be visually similar to the surrounding industrial landscape with minor reductions expected to scenic beauty. The landfill expansion would be bound by trees and other vegetation along the side facing the Cumberland River, therefore creating a visual barrier and minimizing the visual impact to residents and other members of the public. There may be some temporary, minor visual discord during landfill construction and closure activities due to an increase in personnel and equipment. In addition, there would be minor changes to the visual setting for visual receptors along the transportation routes that would last through the closure period (approximately 15 years). However, the existing scenic class would be not be reduced by two or more levels, which is the threshold of significance of impact to the visual environment. Therefore, visual impacts associated with the implementation of Alternative B would be minor and would decrease in the long-term once closure activities are complete.

As summarized in Table 3-30, TVA has determined that impacts to visual resources related to the primary action and associated component actions related to the proposed ash impoundment closures at GAF are minor.

Table 3-30. Summary of Impacts to Visual Resources

Alternative	Action	Impact	Severity
		Impoundment Closure	
Alternative B	Closure-by-Removal of APC	Temporary visual discord during closure period; closed impoundments would generally merge with the overall industrial components of the facility, becoming visually subordinate to the overall landscape character.	Minor impact.

Alternative	Action	Impact	Severity
		Landfill Expansion	
Alternative B	Expansion of Landfill and Ancillary Facilities	Long-term change in visual integrity of the landscape which would result in an impact to the viewshed of some members of the surrounding community. Minimal change to overall scenic value.	Minor impact.
		Construction and Operation of Beneficial Re-use Processing Facility	
Alternative B	Construction and Operation of a Beneficial Re-use Processing Facility	Potential impact to visual receptors within the foreground of the facility. Potential localized impact to visual receptors along truck hauling routes.	Minor impact.
		Transport of CCR	
Alternative B (Option 1)	Transport of CCR to Onsite Landfill	Temporary visual discord to visual receptors along the haul route from onsite transport of CCR.	Minor impact.
Alternative B (Option 2)	Transport of CCR to Beneficial Re-use Processing Facility	Temporary visual discord to visual receptors along the haul route from trucks transporting CCR to the beneficial re-use processing facility.	Minor impact on primary arterial roadways, moderate impact on local roadways near GAF.
Alternative B (Option 2)	Transport of CCR not Suitable for Beneficial Re-use	Temporary visual discord to visual receptors along the haul route from trucks transporting CCR to an existing permitted landfill.	Minor impact.
		Transport of Borrow	
Alternative B	Truck transport of borrow to GAF from TVA-owned borrow site	No impact.	No impact.

3.16 Cultural and Historic Resources

3.16.1 Affected Environment

3.16.1.1 Regulatory Framework for Cultural Resources

Cultural resources or historic properties include prehistoric and historic archaeological sites, districts, buildings, structures, and objects as well as locations of important historic events. Cultural resources that are considered eligible for listing, or have been listed on, the National Register of Historic Places (NRHP) maintained by the National Park Service are defined as "historic properties." Federal agencies, including TVA, are required by the NHPA (54 USC

300101 et seq.) and by NEPA to consider the possible effects of their undertakings on historic properties. "Undertaking" means any project, activity, or program, and any of its elements, that has the potential to affect a historic property and is under the direct or indirect jurisdiction of a federal agency or is licensed or assisted by a federal agency. An agency may fulfill its statutory obligations under NEPA by following the process outlined in the regulations implementing Section 106 of NHPA. Additional cultural resource laws that protect historic resources include the Archaeological and Historic Preservation Act (54 USC 300101 et seq.), Archaeological Resources Protection Act (16 USC 470aa-470mm), and the Native American Graves Protection and Repatriation Act (25 USC 3001-3013).

Section 106 of the NHPA requires that federal agencies consider the potential effects of their actions on historic properties and to allow the Advisory Council on Historic Preservation an opportunity to comment on the action early in the project planning process. Section 106 involves four steps: (1) initiate the process, (2) identify historic properties, (3) assess adverse project effects, and (4) resolve adverse effects. This process is carried out in consultation with the SHPO and other interested consulting parties, including federally recognized Indian tribes.

The NRHP eligibility of a resource is based on the Secretary of the Interior's criteria for evaluation (36 CFR 60.4), which state that significant cultural resources possess integrity of location, design, setting, materials, workmanship, feeling, association and:

a. Are associated with events that have made a significant contribution to the broad patterns of our history; or

b. Are associated with the lives of persons significant in our past; or

c. Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic value; or

d. Have yielded, or may yield, information (data) important in prehistory or history.

A project may have effects on a historic property that are not adverse, if those effects do not diminish the qualities of the property that identify it as eligible for listing on the NRHP. However, if the agency determines (in consultation with the SHPO), that the undertaking's effect on a historic property within the area of potential effect (APE) would diminish any of the qualities that make the property eligible for the NRHP, the effect is said to be adverse. Examples of adverse effects would be ground disturbing activity in an archaeological site or erecting structures within the viewshed of a historic building in such a way as to diminish the structure's integrity of feeling or setting.

3.16.1.2 Area of Potential Effects (APE)

The APE is the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist. TVA determined that the APE for historic properties consists of the areas in which ground disturbing activities would be carried out ("footprint") which includes the APC and the adjacent laydown/logistics support area and the expansion of the NRL Landfill including development of an office complex as described in detail in Chapter 2 and shown in Figure 2-3. In addition, the proposed office complex has potential for visual effects on any historic architectural properties that may be located in the viewshed within a half-mile radius and are included or eligible for inclusion in the NRHP; the APE, therefore, includes some areas within a one-half mile radius surrounding the proposed office complex.

The APE will be re-determined in the future once the location of a beneficial re-use processing facility has been selected by its prospective owner. TVA will not own or operate the beneficial re-use processing facility.

3.16.1.3 Archaeological Resources in the APE

TVA previously has performed archaeological surveys of all areas within the footprint portion of the APE that were considered to have potential for intact native soils and sediments that could contain archaeological sites. Past surveys have been performed pursuant to section 106 of the NHPA for a proposed CCR landfill within the Rail Loop and a bottom ash pond (McKee 2010), a proposed stockpile area (Barrett and Holland 2012), proposed on- and offsite soil borrows associated with various projects (Hockersmith et al. 2013), proposed improvements to ash disposal areas (Wampler and Karpynec 2005), and a proposed fish hatchery relocation (Hockersmith and Holland 2013). In 2016, TVA completed an archaeological survey of all areas within the GAF reservation not included in any prior survey and considered to have potential for archaeological sites (Bradley et al. 2016). None of the archaeological sites identified in these surveys are located within the current APE. Some areas at GAF are considered to lack potential for intact native soils and sediments, and to have no potential for NRHP-eligible archaeological sites, due to past activities associated with the construction, operation, and maintenance of GAF impoundments, the coal storage area, and developed areas covered by roads, railroads, parking lots, and plant facilities. These areas were not surveyed.

TVA has completed consultation with the Tennessee SHPO and federally recognized Indian tribes with an interest in this area regarding the findings of the various archaeological surveys. Eight resources located on the GAF reservation—six pre-contact archaeological sites and two historic archaeological sites—have been determined through consultation to be eligible or potentially eligible for inclusion in the NRHP. TVA has avoided all eight of these resources in previous undertakings. None of TVA’s previous actions at GAF have resulted in a finding of adverse effect on historic properties.

3.16.1.4 Historic Architectural Cultural Resources in the APE

TVA conducted a desktop review to determine if any previously-inventoried historic architectural resources are present that could have unobstructed views to the proposed office complex. This desktop review included previous cultural resources surveys, the Tennessee Historical Commission Online Viewer (accessed 9/16/19), NRHP listings, historic and recent USGS topographic quadrangle maps, TVA’s land acquisition maps for GAF, and current satellite imagery. TVA previously conducted a survey of historic architectural cultural resources at GAF in connection with proposed improvements to ash disposal areas (Wampler and Karpynec 2005). The area covered by that survey includes the proposed office complex site. The survey noted two previously inventoried resources (SU-664 and SU-665) within a half-mile radius north of GAF and found that views to both resources from the then-proposed undertaking would be blocked by a thick stand of mature trees north of the stilling ponds and on both sides of the railroad. TVA has not removed the vegetation buffer between the two previously inventoried resources (SU-664 ad SU-665) and the project footprint. The survey did not identify any previously unrecorded historic architectural resources. No additional inventoried properties have appeared on the Tennessee Historical Commission Viewer since that time. There are no NRHP-listed properties within a half-mile of the APE. Therefore, there are no NRHP-listed or NRHP-eligible historic architectural resources within the viewshed of the proposed office complex.

3.16.1.5 Historic Cemeteries in the APE

Records research by TVA has identified eight historic cemeteries located within the EIS project area, listed below in Table 3-31 and shown on Figure 3-11. These cemeteries are shown on TVA's 1952 and 1962 land acquisition maps for GAF, with the McCrary or McCreary Cemetery also appearing on the 1955 edition of the USGS Laguardo 7.5-minute quadrangle topographic map. TVA staff visited these cemeteries in April 2019 and noted that only some of the graves have markers, and of the extant markers, few contain legible inscriptions. Many of the graves are marked solely by a grave shaft depression. The GAF land acquisition maps, which were based on civil surveys that TVA performed as part of land acquisition associated with the GAF project (1952 edition) or later (1962 edition), also provided estimated sizes of each cemetery.

Table 3-31. Historic Cemeteries in the GAF EIS Project Area

Cemetery name	Estimated Number of Graves	Location
McCrary/McCreary	3	Landfill Expansion Area
Franklin	28	Landfill Expansion Area
Unnamed No. 4	17	Landfill Expansion Area
Bailey	1	North of NRL
Unnamed No. 10	4	North of NRL
Hudson/Odoms Bend	98	North of NRL
Carmichael	67	525 feet north of CT Plant
Harper	109	Between Steam Plant Road and Ash Pond A

TVA has completed studies at the McCrary, Franklin, and the "Unknown" cemeteries within the proposed landfill expansion area and at the Hudson/Odoms Bend, Harper, and Carmichael cemeteries (Cunningham and Martin 2019). These studies were conducted to delineate the precise boundaries of each cemetery, evaluate the potential eligibility of each cemetery for inclusion in the NRHP, and to identify any living relatives of the interred persons. The investigation included a remote sensing study, using electrical resistance and ground-truthing with tile probes, in the areas surrounding each cemetery. This study provides more accurate estimates of the number of graves at each cemetery, as shown in Table 3-31. Differences between these figures and those given by the land acquisition maps may be due in part to errors made in the original cemetery records and could also be due to grave relocations that TVA may have conducted in the past. TVA has also completed historical and genealogical research at the McCrary, Franklin, and Unnamed No. 4 cemeteries within the landfill expansion area, as well as the Bailey and Unnamed No. 10 cemeteries. One possible living descendant has been identified.

Under normal circumstances cemeteries do not meet the criteria of eligibility for inclusion in the NRHP at 36 CFR Part 60.4. An exception can be made for any cemetery that meets Criteria Consideration D, "A cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events." An individual grave can be considered eligible for the NRHP if it meets Criteria Consideration C, "A birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building directly associated with his productive life." In addition, a cemetery may be considered eligible for the NRHP under Criterion D (potential to yield important information) if it could contain information that would contribute significantly to a poorly-understood period or area in local, state or national history.

TVA's historical research indicates that the area now occupied by GAF, formerly known as Odoms Bend, was home to a thriving, rural, largely African American community at the time TVA acquired the property. However, the history of this community is very poorly represented in historical documents and literature. A study of the burials themselves could yield information that would be valuable in generating more knowledge of the social, economic, and political history of this community. Therefore, TVA determined that the Franklin, "Unnamed No. 4", Hudson/Odoms Bend, Unnamed No. 10, and Bailey cemeteries are potentially eligible for inclusion in the NRHP under Criterion D and that the McCrary or McCreary Cemetery is ineligible. TVA found that the undertaking could result in an adverse effect on some or all of these cemeteries, and that the Carmichael and Harper cemeteries would be unaffected.

Cemeteries and graves on non-federal land areas are protected by Tennessee state law (Tennessee State Code [TSC] Title 46 Chapters 4 and 8; TSC Title 39 Chapter 17). As a federal agency TVA may not be bound by these laws. However, TVA intends to follow all applicable steps outlined in these laws and to respect the intent of these laws.

3.16.1.6 Consultation

TVA has consulted with the SHPO and federally-recognized Indian tribes regarding TVA's finding that no NRHP-eligible archaeological sites or historic architectural properties are located in the APE; TVA's determinations regarding the NRHP eligibility of the cemeteries; and TVA's finding that five cemeteries (Bailey, Franklin, Hudson/Odom's Bend, Unnamed No. 4, and Unnamed No. 10) may be relocated and therefore could be adversely affected by the undertaking. The SHPO did not disagree with this finding, and none of the TVA consulted tribes disagreed or identified resources of concern. The SHPO responded by letter dated April 22, 2020. The SHPO does not agree that sufficient information is available to support a determination that the Bailey, Franklin, Hudson/Odom's Bend, Unnamed No. 4, and Unnamed No. 10 cemeteries are eligible for the NRHP, but does consider that such information could come to light in future and therefore these five cemeteries should be considered potentially eligible for inclusion in the NRHP. The Cherokee Nation responded by letter dated June 8, 2020, stating in part that the Tribe does not object to the project proceeding as long as three stipulations are observed, which request TVA to consult further with the Tribe if the project is modified, contact the Tribe if items of cultural significance are discovered during the course of the project, and consult with other interested Indian tribes. The Shawnee Tribe responded by email dated May 12, 2020, stating that, "The Shawnee Tribe's Tribal Historic Preservation Department concurs that no known historic properties will be negatively impacted by this project."

TVA consulted further with the SHPO on June 16, 2020 regarding a draft Memorandum of Agreement (MOA) that stipulates that TVA will: consult further to re-determine the APE as project plans are developed and identify which cemeteries would be affected by the undertaking; conduct additional archival research on the affected cemeteries; engage local historians, members of the African American community in Gallatin, and any others with knowledge of the historic Odoms Bend community and provide opportunities for their participation; and identify and design a relocation cemetery in the Gallatin area. The MOA also stipulates that TVA will relocate the affected cemeteries while following steps consistent with Tennessee state law regarding burial grounds and cemeteries; and outlines the process TVA will follow in order to determine the NRHP eligibility of each cemetery and mitigate adverse effects to any cemetery that meets specific criteria of eligibility agreed upon by SHPO and TVA. Mitigation would include analysis of artifacts and skeletal remains disinterred from the cemeteries aimed at identifying individuals and generating a better understanding of their life histories and the history of the community. None of the consulted Indian tribes expressed an interest in participating in the MOA.

SHPO responded to TVA's June 16, 2020 consultation, stating agreement that the proposed measures would adequately mitigate the potential adverse effect, and provided comments on the draft. The MOA was finalized by TVA and executed by SHPO on July 9, 2020 (see Appendix G).

The global Covid-19 pandemic has had an effect on the timing of TVA's Section 106 consultation for the proposed action. In March 2020 the Advisory Council on Historic Preservation (federal agency that promotes the preservation, enhancement, and sustainable use of the nation's diverse historic resources, advises the President and Congress on national historic preservation policy, and published and revises the regulations implementing the NHPA) issued guidance to federal agencies, SHPOs, and Tribal Historic Preservation Officers (THPOs), as follows:

> The Section 106 deadlines for a SHPO or THPO response will be considered tolled while, due to the coronavirus outbreak, an office is closed or work conditions are such that the SHPO or THPO is unable to carry its Section 106 duties (e.g., staff unavailability due to health reasons or restricted access to records or communication capability). SHPOs and THPOs will be responsible for notifying federal agencies and the ACHP about such conditions. The tolling will be lifted once the conditions are no longer in effect. If such circumstances arise and present a serious problem for a federal agency, it should contact the ACHP for assistance.

TVA consulted with the ACHP regarding the possibility of continuing consultation with SHPO despite that several of the tribal offices were closed or not fully functional due to Covid-19 safety measures and may be unable to respond. In their reply (dated June 15, 2020), the ACHP indicated agreement that TVA is carrying out a reasonable and good-faith effort to consult with the SHPO and the tribes. The ACHP requested that TVA continue to consult with the SHPO; indicate to all consulting parties (after determining the eligibility of the cemeteries) how TVA intends to proceed with the Section 106 review for this undertaking; and notify the ACHP of any adverse effect finding. On June 26, 2020, TVA notified the consulted Indian tribes via email of TVA's plans for continuing to comply with Section 106 for this undertaking, including TVA's continued consultation with the ACHP and the SHPO regarding the MOA. TVA provided notification of the potential adverse effect finding to the ACHP on July 2, 2020.

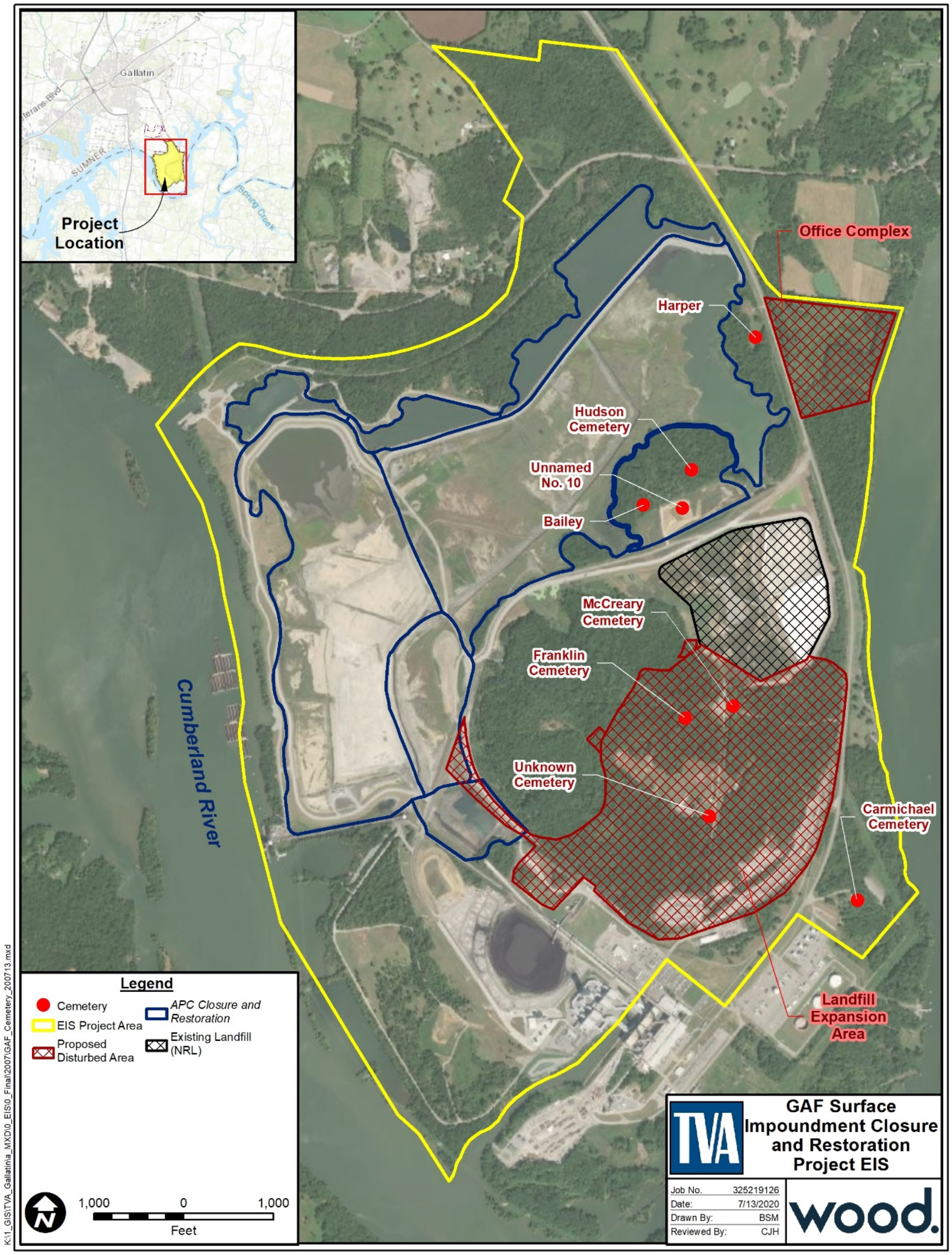


Figure 3-11. Cemeteries within the GAF EIS Project Area

3.16.2 Environmental Consequences

3.16.2.1 Alternative A – No Action Alternative

Implementation of Alternative A would require no new ground disturbance activities or changes to current operations. Therefore, no direct or indirect impacts to cultural resources would occur under Alternative A.

3.16.2.2 Alternative B – Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill

Surface Impoundment Closures and Expansion of Existing Onsite Landfill

Closure of the surface impoundments could impact three cemeteries located within the area located between Ash Pond A and the NRL Landfill if used as a laydown/logistical use area to support equipment storage, material stockpiles, and construction trailer placement and to provide direct access for excavation and dewatering equipment to the APC. These cemeteries include Bailey, Hudson/Odom's Bend, and Unnamed No. 10. If the area is used for purposes of an onsite beneficiation facility (see Appendix E), the three cemeteries could also be impacted.

Expansion of the existing onsite landfill would impact three cemeteries located within the proposed expansion footprint: the McCrary or McCreary Cemetery; the Franklin Cemetery; and a cemetery labelled "Unnamed No. 4." Because of the potential importance of these cemeteries to the surrounding community, and in order to respect state law regarding cemeteries, TVA proposes to remove all graves in these three cemeteries and relocate them to a new burial ground in consultation with the SHPO, federally-recognized Indian tribes, and interested members of the Gallatin community. In order to carry this out TVA would perform the following:

- fully delineate the boundaries of each cemetery and generate accurate maps depicting the boundaries of each and the locations of all graves within each cemetery;
- complete historical and genealogical research on the persons buried at each cemetery;
- consult with the Tennessee SHPO under NHPA Section 106 on the potential NRHP eligibility of the cemeteries;
- identify a relocation cemetery in Gallatin or the surrounding area;
- publish a notice of TVA's intent to relocate the cemeteries in a local newspaper;
- make efforts to contact any living relatives of persons buried in the cemeteries;
- obtain permission to terminate the use of the cemeteries as burial grounds and to relocate the cemeteries;
- conduct analysis of the artifacts and skeletal remains disinterred from each cemetery; and
- install interpretive signage or a marker honoring those buried in the cemeteries, in a location accessible to members of the general public, such as the relocation cemetery.

TVA would propose delineating the cemetery boundaries, generating accurate maps, completing historical and genealogical research, and installing signage or a marker as mitigation measures. These measures are stipulated in the MOA that has been signed by TVA and SHPO. With the signing of the MOA, TVA may proceed with the project under NHPA Section 106 as long as TVA remains in compliance with the obligations set forth in the MOA. After completing these steps, TVA would disinter all the graves and reinter them in the relocation cemetery with the original grave markers.

Under NHPA Section 106, TVA has consulted with the Tennessee SHPO regarding TVA's determination that five of the cemeteries are potentially eligible for the NRHP. Under the MOA, TVA will carry out additional investigations to more fully determine the cemeteries' NRHP eligibility. These investigations will include informant interviews, examinations of additional historical records, and a tabulation of the remains found in disinterred graves. Should the investigations indicate that any of the cemeteries to be relocated would qualify for inclusion in the NRHP, TVA will make a finding of adverse effect, will consult further with the SHPO and other consulting parties, and will perform mitigation steps to resolve the adverse effect.

Should future project activities require the removal and relocation of any remaining cemeteries on the GAF Reservation, TVA will evaluate the potential impacts of these actions in a supplemental NEPA analysis. As there are no archaeological sites located in the landfill expansion area and footprints of the associated ancillary facilities (ammonia sensor tower, relocated communications tower, and the office complex area), and there are no NRHP-eligible historic architectural properties located within the viewshed of the proposed office complex area, the actions would have no impacts to NRHP-eligible archaeological sites or historic architectural properties. As the ash ponds and stilling ponds are constructed landforms from which native soils and sediments were removed, mixed, and compacted during construction, TVA does not consider these impoundments to have potential to contain archaeological sites. No archaeological sites are in the area located between Ash Pond A and the NRL that will be used as a laydown area. However, three historic cemeteries (Bailey, Hudson/Odoms Bend, and Unnamed No. 10) are located in this latter area. TVA will relocate these three cemeteries and will follow the same steps described above for the relocation of the Franklin, McCrary/McCreary, and Unnamed No. 4 cemeteries.

Construction and Operation of a Beneficial Re-use Processing Facility

Under Alternative B, TVA is also assessing the potential impacts associated with the component action of the construction and operation of a beneficial re-use processing facility. A specific site for the potential beneficial re-use processing facility has not been identified; however, based on the proposed facility attributes in Table 2-5, the facility would be preferentially constructed on previously disturbed industrial land and located in an area that is compatible with industrial land uses. The site would not be located in an area that contains previously identified NRHP-listed or -eligible sites. Therefore, development of a beneficial re-use processing facility on such a site would have no effect on historic properties.

However, if the proposed site for the beneficial re-use processing facility is located in an area that does not conform to these bounding characteristics, TVA would perform all necessary due diligence and consultation as required under Section 106 of the NHPA.

Transport of CCR

Under Alternative B (Option 1), transport of CCR from the APC to the onsite landfill via truck would use an existing onsite paved haul road and a new haul road connection on the south side of the landfill expansion. As there are no archaeological sites within the landfill expansion disturbance area, which includes the proposed haul road connection, and no additional ground disturbance would occur, onsite CCR transport would have no impacts to NRHP-eligible resources.

Under Alternative B (Option 2), transport of CCR to both a beneficial re-use processing facility and to an offsite landfill would use existing roadways that have been previously disturbed. Additionally, CCR not usable in a beneficial re-use processing facility would be deposited into an existing permitted landfill. Therefore, there would be no impact to historic resources associated with the transport of CCR offsite.

Transport of Borrow

Borrow material would be transported by truck to the project area from the previously permitted TVA borrow site located 1.5 miles north of GAF. As transport would occur on the existing local road, no additional ground disturbance would occur. Therefore, there would be no impact to historic resources associated with borrow transport.

3.16.3 Summary of Impacts to Cultural and Historic Resources

As summarized in Table 3-32, TVA has determined that impacts to cultural resources resulting from the primary action and associated component actions related to the proposed ash impoundment closures at GAF would be minor.

Table 3-32. Summary of Impacts to Cultural and Historic Resources

Alternative	Action	Impact	Severity
		Impoundment Closure	
Alternative B	Closure-by-Removal of APC	Relocation of 3 historic cemeteries.	Potential adverse effect to NRHP-potentially eligible cemeteries, mitigated in consultation with the SHPO and tribes by delineation of graves, historical and genealogical research on the persons buried in each, public notice, efforts to contact any living relatives, relocation of graves to a cemetery identified by TVA, analysis of remains, and installation of interpretive signage or marker.

Alternative	Action	Impact	Severity
		Landfill Expansion	
Alternative B	Expansion of Landfill and Ancillary Facilities	Relocation of 3 historic cemeteries.	Potential adverse effect to NRHP-potentially eligible cemeteries, mitigated in consultation with the SHPO and tribes by delineation of graves, historical and genealogical research on the persons buried in each, public notice, efforts to contact any living relatives, relocation of graves to a cemetery identified by TVA, analysis of remains, and installation of interpretive signage or marker.
		Construction and Operation of Beneficial Re-use Processing Facility	
Alternative B	Construction and Operation of a Beneficial Re-use Processing Facility	Potential impacts to historic properties based on final site location.	No effect. Preferred site would be previously disturbed and avoid any previously identified NRHP listed or eligible sites.
		Transport of CCR	
Alternative B (Option 1)	Transport of CCR to Onsite Landfill	Onsite transport on existing haul roads.	No effect.
Alternative B (Option 2)	Transport of CCR to Beneficial Re-use Processing Facility	Offsite transport of CCR along existing roadways.	No effect.
Alternative B (Option 2)	Transport of CCR not Suitable for Beneficial Re-use	Offsite transport of CCR along existing roadways.	No effect.
		Transport of Borrow	
Alternative B	Truck transport of borrow to GAF from TVA-owned borrow site	Offsite transport of borrow on existing roadway.	No effect.

3.17 Transportation

3.17.1 Affected Environment

GAF is located within southern Sumner County along the Cumberland River. The facility is currently serviced by waterway (barge) along the Cumberland River and is accessed via roadway by Steam Plant Road. A north-to-south rail line is located parallel to Steam Plant Road and extends south from Gallatin to GAF. GAF has a 3-mile loop track at the plant; however, it has not been operated for several years and would need repair for future use.

Figure 3-12 identifies the primary roadways in the immediate project area that service GAF. The nearest interstate highways are I-65 and I-24 toward the west and I-40 south of GAF. Local roads leading to GAF are U.S. Highway (US) 31E (Nashville Pike), Tennessee State Route (SR) 25 (Hartsville Pike), and SR 109. US 31E is located southeast of Gallatin and generally extends northeast from Nashville, SR 25 extends east to west through Gallatin, and SR 109 extends north to south and intersects with I-40 to the south. SR 109 includes a bypass that goes around the western side of Gallatin. US 31E intersects with the SR 109 Bypass, while SR 109 and SR 25 both connect to Airport Road located north of GAF and south of Gallatin.

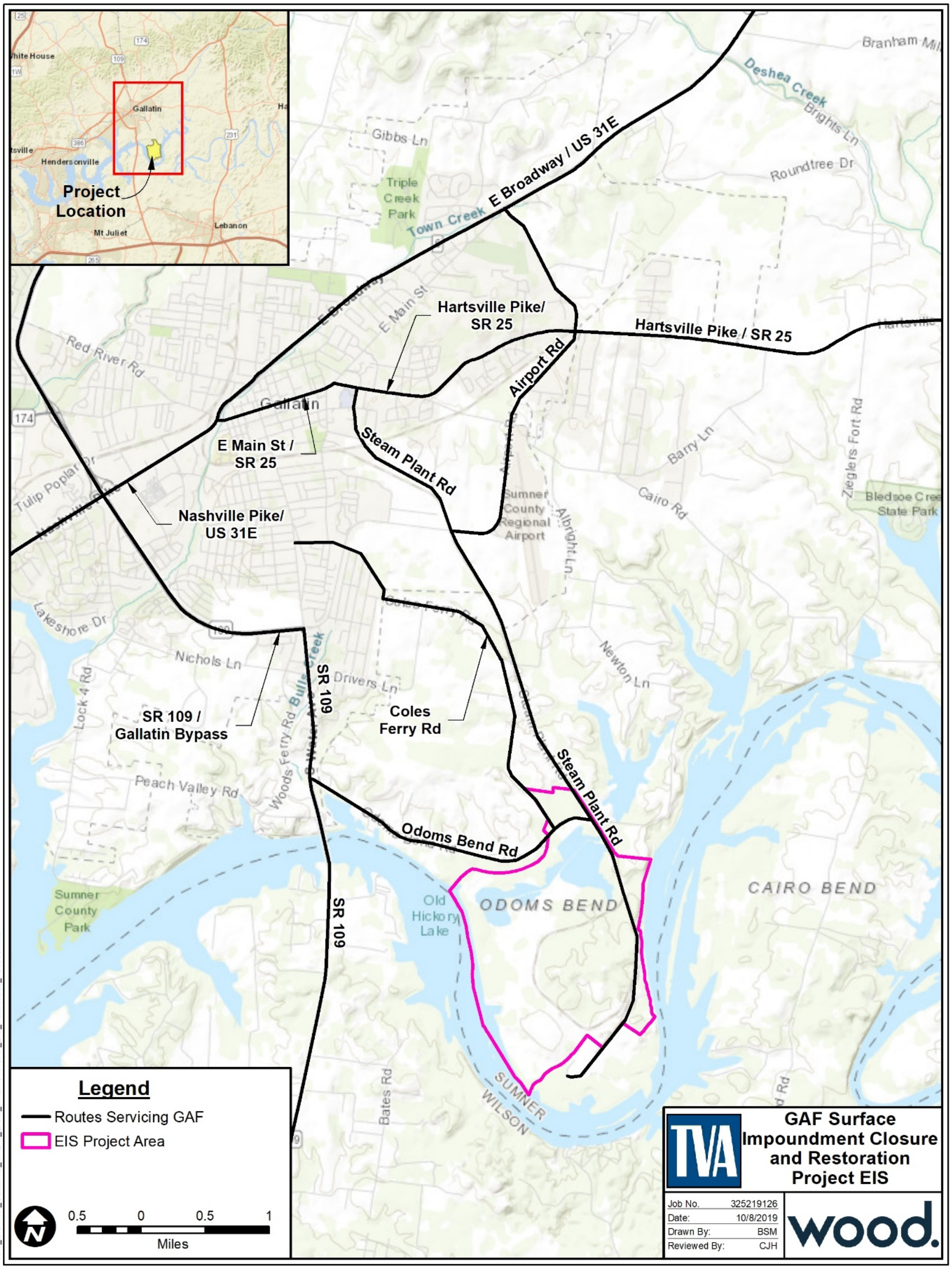


Figure 3-12. Primary Local Road Network Servicing GAF

There are no other major traffic generators in the immediate area of the plant and all roads that link directly to GAF are two-lane roadways. Traffic generated by GAF is generally composed of a mix of cars and light duty trucks, as well as medium duty to heavy duty trucks (semi-tractor trailers). The following provides descriptions of these local roadways:

- Steam Plant Road provides direct truck and automobile access to GAF and is a low volume two-lane roadway with no shoulders which extends north to south from Gallatin and intersects with Odoms Bend Road, Airport Road, and SR 25.
- Odoms Bend Road extends east to west and connects Steam Plant Road to SR 109. This roadway is a low traffic volume, two-lane roadway with no shoulders.
- Airport Road connects Steam Plant Road to Hartsville Pike/SR 25 and East Broadway/US 31E, approximately 2.5 miles from the Odoms Bend/Steam Plant Road intersection.
- Coles Ferry Road extends north to south from GAF and also provides access to Odoms Bend Road from Airport Road.
- Highway 109 connects Odoms Bend Road to SR 109/Gallatin Bypass to the north and south across the Cumberland River to Wilson County and to I-40. Highway 109 has recently been widened to 5 lanes from the Cumberland River to the Gallatin Bypass and is currently being widened to 4 lanes south of the Cumberland River.

Beyond the local road network, GAF connects to several higher capacity roadways that serve Gallatin and the broader Nashville region. These roadways include the following:

- SR 109/Gallatin Bypass which is a four-lane divided highway and connects to the north, south, and west including parts of Gallatin. SR 109 also connects to other routes that connect to I65.
- Hartsville Pike/Main Street/SR 25 west of Steam Plant Road which is a 3-lane urban and congested route with signals and connects to downtown Gallatin.
- Hartsville Pike/SR 25 east of Airport Road which is a two-lane road with shoulders which connects to the east.
- East Broadway/US 31E which is a two-lane road with shoulders and connects to the northwest.

The road network also consists of a number of signalized and unsignalized intersections that provide this connectivity and include:

- Steam Plant Road/Odoms Bend – a low volume intersection with a stop sign on Odoms Bend where it meets Steam Plant Road.
- SR 25/Hartsville Pike/Steam Plant Road – a one-way stop intersection of a low volume two-lane roadway and a moderate volume five-lane roadway.
- SR109/Odoms Bend – a one-way stop intersection of a low volume two-lane road and a moderate volume four-lane road.
- SR 25/Hartsville Pike/Airport Road – a signalized intersection of moderate volume two-lane roadways.

- Steam Plant Road/Airport Road – a two-way stop intersection of a low volume two-lane road and a moderate volume two-lane roadway.
- SR109/Gallatin Bypass/Airport Road/South Water Street – a signalized intersection of moderate volume four-lane roadways.
- US 31E/East Broadway/Airport Road – a signalized intersection of a moderate volume three-lane roadway and a moderate volume two-lane roadway.

Table 3-33 presents the 2017 Average Annual Daily Traffic (AADT) measured in vehicles per day (veh/day) and functional roadway classification for all routes servicing GAF. Roadway functional classification is the process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide and is dependent upon factors related to access and mobility, roadway characteristics (number of lanes, shoulders), and access and setting (rural vs. urban).

Table 3-33. Average Annual Daily Traffic Counts of Affected Roadways

Roadway Segment	Estimate Maximum Travel Distance to GAF (miles)	Setting	FHWA Functional Classification[1]	2017 Average Daily Vehicle Use (veh/day)[2]	Number of Lanes
Steam Plant Road	4.6	Rural	Minor Collector	860	2
Odoms Bend Road	2.5	Rural	Minor Collector	1,618	2
Airport Road	3.2	Rural	Minor Arterial	8,880	2
SR 109	1.2	Urban	Principal Arterial	21,281	5
US 31E/East	More than 10	Urban	Principal Arterial	12,894	2
SR 25/Hartsville Pike/ East	More than 10	Urban	Principal Arterial	12,600	2
SR 25/Main St/West	6.3	Urban	Minor Arterial	16,100	3
SR 109/Gallatin Bypass	More than 10	Urban	Expressway	29,616	4

[1]FHWA 2013.
[2]TDOT 2017. Value shown is average of all available AADT data for impacted roadway segment.

The existing plant workforce at GAF consists of 150 total workers. Assuming vehicle occupancy of one person per vehicle, an average daily traffic volume consists of 300 vehicle trips per day (150 vehicles inbound in the morning and 150 vehicles outbound in the afternoon). It is assumed that workforce traffic would primarily access GAF from Odoms Bend Road via SR 109 and Steam Plant Road via Airport Road. Vehicle movements more distant from GAF would utilize SR 109, Airport Road, US 31E, and SR 25 and would disperse throughout the wider regional transportation network.

3.17.2 Environmental Consequences

As part of the primary actions of impoundment closure and landfill expansion, effects to transportation are associated with workforce travel, construction, and operations.

3.17.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, no impoundment closure or landfill expansion would occur and there would be no additional construction activities or transport of borrow or CCR materials. Therefore, no changes to transportation would occur.

3.17.2.2 Alternative B – Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill

As part of the primary actions of impoundment closure and landfill expansion, effects to transportation are associated with the following activities:

- Existing plant operations workforce travel
- Impoundment closure construction workforce travel
- SRL landfill construction workforce travel
- Truck transport of CCR either onsite to the SRL under Option 1 or offsite to a beneficial re-use processing facility and landfill under Option 2
- Truck transport of borrow material for landfill cover and impoundment restoration

Under Alternative B, the combined workforce of existing plant personnel and construction workers consists of 250 total workers on site. Assuming vehicle occupancy of one person per vehicle, the average daily traffic volume would consist of 500 vehicle trips per day (250 vehicles inbound in the morning and 250 vehicles outbound in the afternoon) during the construction period of approximately 15 years. It is assumed that workforce traffic would follow the existing traffic patterns and primarily access GAF from Odoms Bend Road via Highway 109 and Steam Plant Road via Airport Road. Vehicle movements more distant from GAF would utilize SR 109, Airport Road, US 31E, and SR 25 and would disperse throughout the wider regional transportation network.

Truck transport of CCR from GAF is a component action under Alternative B that would occur either onsite (Option 1) or offsite (Option 2) over the 15-year project duration. Under Option 1, trucks would load CCR from the APC and transport it over onsite haul roads directly to the SRL where it would be dumped and stored. Because these operations would be onsite, larger dump trucks with a 25 yd^3 capacity would be used. Given the approximately 11.9 million yd^3 of CCR in the APC, truck volume available, and closure period, onsite transport of CCR would result in approximately 380 truck trips a day between the APC and the SRL.

Under Option 2, approximately 80% of CCR excavated from the APC would be transported to an offsite beneficial re-use processing facility and the remaining 20% that is unsuitable for beneficiation would be transported to a suitable offsite landfill located within a 150-mile radius of GAF. Given the approximately 11.9 million yd^3 of CCR in the APC, over the road truck volume capacity of 17 yd^3, and closure period, offsite transport of CCR under Option 2 would result in approximately 560 truck trips a day between GAF and the offsite beneficial re-use processing facility and landfill. A specific beneficiation provider or landfill has not been selected at this time. Therefore, under this component action the assessment of potential transportation impacts assumes all related trucking would occur on either Odoms Bend Road or Steam Plant Road.

Borrow material to be used for landfill cover and in the restoration of the APC would be obtained from the TVA-owned borrow site located 1.5 miles north of GAF. The transport of borrow is a component action that would utilize Steam Plant Road. TVA estimates the need for approximately 1.1 million yd^3 of borrow over a 20-year period for impoundment restoration and landfill construction and closure, resulting in approximately 32 truck trips (to and from the borrow site) per day.

Workforce travel and truck transport of CCR and borrow material could have an effect on general traffic flow along local roadways and at intersections. Traffic associated with the impoundment closures and landfill project will use the primary local roadway network which include those roads and intersections in Table 3-33. The higher tier roadways beyond the local roadway network, including US 31E, SR 109, SR 25, and Interstates 40, 65, and 24, are expected to absorb the additional project traffic and distribute it to the wider region beyond Gallatin. Therefore, the focus of transportation impacts is on the local roads which provide access to GAF.

The overall aggregate effects of the additional traffic from workforce traffic, transport of CCR, and transport of borrow material on the roadways in the project vicinity, for onsite transport (Option 1) and offsite transport (Option 2), are summarized in Tables 3-34 and 3-35. These tables illustrate the maximum increase in AADT for each roadway segment analyzed. The analysis assumes all aggregate traffic generated from the project on each individual roadway and does not consider dispersal of traffic localized to GAF.

Traffic increases under Alternative B (Option 1) would primarily be due to the increase in workforce for impoundment closure and landfill expansion. The aggregate effect in traffic would not substantially impact most local roadway segments, and in most cases would represent a 1 to 3 percent increase in annual average daily traffic. However, Steam Plant Road was noted as having a more substantial increase in traffic relative to baseline conditions as traffic is projected to increase 27 percent above the 2017 AADT of 860. The increase in AADT on Odoms Bend Road would result in a somewhat lower percent increase (14 percent) as it would not include the additional traffic associated with borrow transport. This increase on both of these roadways is considered to represent a moderate impact in terms of traffic operations on this roadway. While the increase in traffic on these roadways is not expected to result in delays, it would equate to a traffic count of between 22 and 26 trips per hour (between 8:00 a.m. and 5:00 p.m.) or one truck passing a given point approximately every 2 minutes. This volume of truck traffic could be expected to result in minor deterioration of local traffic operations, and somewhat minor effects on local residents who may depend upon direct access to either Steam Plant or Odoms Bend Road. Following the construction activities associated with landfill expansion, traffic volumes on local roadways will be reduced in proportion to the smaller construction workforce. Over the long term this alternative has the potential to result in some potential minor deterioration of roadways (particularly less improved local roads). Such impacts may include wear and tear of the pavement, pavement rutting, formation of potholes and destruction of soft (grass or loose gravel) shoulders. Other potential adverse effects, such as noise and vibration and visual impacts, may also result from high volumes of haul trucks on public roads. Overall, impacts to traffic and roadways is considered minor for the regional transportation network and moderate for the local roadways serving GAF.

Table 3-34. Traffic Impacts to Roads in the Vicinity of GAF from Workforce and Transport of CCR to the Onsite SRL Landfill (Option 1)

Impacted Roadway Segment	Primary Project Use	2017 AADT[1]	Projected AADT	% Traffic increase	Impact Assessment
Steam Plant Road	Workforce Commute, Transport Borrow	860	1,093	27%	Moderate

Impacted Roadway Segment	Primary Project Use	2017 AADT[1]	Projected AADT	% Traffic increase	Impact Assessment
Odoms Bend Road	Workforce Commute	1,618	1,851	14%	Moderate
Airport Road	Workforce Commute	8,880	9,113	3%	Minor
SR 109	Workforce Commute	21,281	21,514	1%	Minor
US 31E/East	Workforce Commute	12,894	13,127	2%	Minor
SR 25/Hartsville Pike/ East	Workforce Commute	12,600	12,833	2%	Minor
SR 25/Main St/West	Workforce Commute	16,100	16,333	1%	Minor
SR 109/Gallatin Bypass	Workforce Commute	29,616	29,849	1%	Minor

Source: TDOT 2017.
[1]Value shown is average of all available AADT data for impacted roadway segment.

Traffic increases under Alternative B (Option 2), would be due to the increase in workforce for impoundment closure and landfill construction and a substantial increase in truck traffic transporting CCR. The aggregate effect in traffic would not substantially impact most local roadway segments, and in most cases would represent a 2 to 4 percent increase in AADT. However, Steam Plant Road and Odoms Bend Road are noted as having substantial increases in traffic relative to baseline conditions. Under this offsite transport condition, traffic is projected to increase 92% above the 2017 AADT of 860 on Steam Plant Road and 49% above the 2017 AADT of 1,618 on Odoms Bend Road. Both of these increases represent a large impact in terms of traffic operations on these rural collector roadways as they would likely disrupt flow and cause delays in making left turns across oncoming traffic and accessing the roadway, particularly on Odoms Bend Road.

The increase in traffic on these roadways would equate to a traffic count of between 72 and 88 trips per hour (between 8:00 a.m. and 5:00 p.m.) or one to two trucks passing a given point approximately every minute. Particular traffic and access issues may occur along Odoms Bend Road in the area around Flippers Bait and Tackle and Bull Creek Boat Ramp and along segments characterized by a higher frequency of driveways. This volume of truck traffic could be expected to result in deterioration of local traffic operations, and notable effects on local residents who may depend upon direct access to either Steam Plant or Odoms Bend Road. Over the long-term, this alternative has the potential to result in deterioration of roadways (particularly less improved local roads). Such impacts may include wear and tear of the pavement, pavement rutting, formation of potholes and destruction of soft (grass or loose gravel) shoulders. Other potential adverse effects, such as noise and vibration and visual impacts, may also result from high volumes of haul trucks on public roads. Overall, impacts to traffic and roadways is considered minor for the regional transportation network and large for the local roadways serving GAF.

Table 3-35. Traffic Impacts to Roads in the Vicinity of GAF from Workforce and Transport of CCR to an Offsite Beneficial Re-use Processing Facility and Landfill (Option 2)

Impacted Roadway Segment	Primary Project Use	2017 AADT[1]	Projected AADT	% Traffic increase	Impact Assessment
Steam Plant Road	Workforce Commute, Transport Borrow and CCR	860	1,653	92%	Large
Odoms Bend Road	Workforce Commute, Transport CCR	1,618	2,411	49%	Large
Airport Road	Workforce Commute, Transport CCR	8,880	9,276	4%	Minor
SR 109	Workforce Commute, Transport CCR	21,281	21,678	2%	Minor
Hwy 31E/East	Workforce Commute, Transport CCR	12,894	13,291	3%	Minor
SR 25/Hartsville Pike/ East	Workforce Commute, Transport CCR	12,600	12,997	3%	Minor
SR 25/Main St/West	Workforce Commute, Transport CCR	16,100	16,497	2%	Minor
SR 109/Gallatin Bypass	Workforce Commute, Transport CCR	29,616	30,409	3%	Minor

Source: TDOT 2017
[1]Value shown is average of all available AADT data for impacted roadway segment.

Localized traffic impacts may also occur at several intersections in the vicinity of GAF where, under Option 2, there would be substantial increases in traffic and turning movements between roads. Intersections subject to potential degradation in conjunction with projected project related traffic increases include the following:

- Steam Plant Road at Odoms Bend Road
- Steam Plant Road at Airport Road
- Odoms Bend Road at SR 109

TVA commits to conducting a traffic analysis and traffic management plan to identify and evaluate potential mitigative measures and their effectiveness for reducing traffic related impacts. Such measures may include staging and management of truck ingress/egress, alternate routing, intersection improvements, addition of turning lanes, and installation of temporary signals at key intersections.

The transport of both CCR and borrow material over public roadways would result in an increase in the number of vehicle miles traveled on those roadways. This increase in vehicle miles is a factor in injury and fatal traffic crash rates. Therefore, there would be a minor impact related to increased traffic and driver safety due to the greater distance travelled.

Overall, the aggregate potential impacts from vehicle/truck operations on the regional transportation network are considered minor. However, localized effects on roadway segments that are used jointly by trucks transporting CCR and borrow are moderate to large on the local low volume roadways (e.g. Steam Plant Road, and Odoms Bend Road). However, these effects may be potentially reduced in conjunction with the mitigative measures outlined in a comprehensive traffic management plan to be undertaken by TVA as described above.

Construction and Operation of a Beneficial Re-use Processing Facility

In conjunction with TVA actions associated with this alternative, TVA is also assessing the potential impacts associated with a component action consisting of the construction and operation of a beneficial re-use processing facility. Based on the bounding attributes in Table 2-5, the construction phase would employ a workforce of up to 150, and an operational workforce of up to 36. Accordingly, this would generate up to 300 vehicle trips per day and 62 vehicle trips per day, respectively. Additionally, on average up to 60 truckloads per day (120 truck trips) would leave the facility with beneficiated product that is transported to market.

While the site of a prospective beneficial re-use processing facility has not been determined it is expected to be located with direct access to a collector or other higher functioning roadway. In addition to the traffic associated with CCR transport to the beneficial re-use processing facility discussed above, Table 3-36 summarizes the relative effect of the combined traffic of workforce commuting and beneficiated product deliveries associated with typical locations for the beneficial re-use processing facility.

Table 3-36. Projected Traffic Increase Associated with Beneficial Re-use Operations

Impacted Roadway Segment	Primary Project Use	Baseline Average Daily Vehicle Use (veh/day) [1]	Projected Average Daily Vehicle Use (veh/day)	Percent Increase in Traffic
Typical Collector Roadway (High Volume)	Workforce Commute, Product Delivery	6,300	6,492	7.9
Typical Collector Roadway (Low Volume)	Workforce Commute, Product Delivery	2,500	2,692	19.9

[1] FHWA 2013

For a typical high-volume collector roadway, the increase in AADT (7.9 percent) is not expected to adversely affect traffic conditions on the surrounding roadway network. As such the local effects of the operation of a beneficial re-use processing facility on local traffic are considered to be minor. However, for a low volume collector roadway, the combined traffic associated with CCR transport to the facility, workforce commuting, and truck transport beneficiated product are considered to have a potentially moderate impact on local traffic conditions (19.9 percent increase in traffic).

3.17.3 Summary of Impacts to Transportation

As summarized in Table 3-37, TVA has determined that all impacts to transportation related to the primary action and associated component actions for the proposed ash impoundment closures at GAF are minor to large.

Table 3-37. Summary of Impacts to Transportation

Alternative	Action	Impact	Severity
Alternative B (Option 1)	Closure-by-Removal of APC, Expansion of Landfill and Ancillary Facilities – Onsite Transport of CCR, Borrow Transport	Construction impacts related to construction activities and construction-related traffic.	Overall, the aggregate potential impacts on the regional transportation network are minor. However, localized effects on Steam Plant Road and Odoms Bend Road by increased operations, construction workforce, and borrow transport are moderate. Effects may be reduced by a comprehensive traffic management plan to be undertaken by TVA.
Alternative B (Option 2)	Closure-by-Removal of APC, Expansion of Landfill and Ancillary Facilities – Offsite Transport of CCR, Borrow Transport	Localized effects on Steam Plant Road, Odoms Bend Road, and Airport Road by increased operations and construction workforce, substantial increases in trucking due to CCR transport offsite, and borrow transport. Increased traffic and safety risk related to offsite transportation of CCR (crashes, road damage, and other transportation-related effects).	Overall aggregate potential impacts on the regional transportation network are minor. Localized effects moderate to large. Effects may be reduced by a comprehensive traffic management plan to be undertaken by TVA.
Alternative B (Option 2)	Construction and Operation of a Beneficial Re-use Processing Facility	Temporary traffic impacts related to construction activities. Long-term operational effects associated with transport of CCR, workforce commuting and transport of beneficiated product to various markets	Overall aggregate potential impacts on the regional transportation network are minor if facility is located on a major collector or higher type roadway. If located on a minor collector roadway, localized effects moderate.

3.18 Noise

3.18.1 Affected Environment

Noise is unwanted or unwelcome sound usually caused by human activity and added to the natural acoustic setting of a locale. It is further defined as sound that disrupts normal activities or diminishes the quality of the environment. Community response to noise is dependent on the intensity of the sound source, its duration, the proximity of noise-sensitive land uses, and the time of day the noise occurs. For instance, higher sensitivities to noise would be expected during the quieter overnight periods at noise sensitive receptors such as residences. Other sensitive receptors include developed sites where frequent human use occurs, such as churches and schools.

Sound is measured in logarithmic units called decibels (dB). Given that the human ear cannot perceive all pitches or frequencies of sound, noise measurements are typically weighted to correspond to the limits of human hearing. This adjusted unit of measure is known as the A-weighted decibel (dBA) which filters out sound in frequencies above and below human hearing. A noise level change of 3 dBA or less is barely perceptible to average human hearing. However, a 5 dBA change in noise level is clearly noticeable. The noise level associated with a 10 dBA change is perceived as being twice as loud; whereas the noise level associated with a 20 dBA change is considered to be four times as loud and would therefore represent a “dramatic change” in loudness.

To account for sound fluctuations, environmental noise is commonly described in terms of the equivalent sound level. The equivalent sound level is the constant noise level that conveys the same noise energy as the actual varying instantaneous sounds over a given period. Fluctuating levels of continuous, background, and/or intermittent noise heard over a specific period are averaged as if they had been a steady sound. The day-night sound level (L_{dn}), expressed in dBA, is the 24-hour average noise level with a 10-dBA correction penalty for the hours between 10 p.m. and 7 a.m. to account for the increased sensitivity of people to noises that occur at night. Typical background day-night noise levels for rural areas are anticipated to range between an L_{dn} of 35 and 50 dB, whereas higher-density residential and urban areas background noise levels range from 43 dB to 72 dB (EPA 1974). Common indoor and outdoor noise levels are listed in Table 3-38.

The City of Gallatin has established standards for noise emissions in residential zoning districts, which includes the agricultural district (A) in which GAF is zoned, in an amendment to the Gallatin Municipal Code adopted in 2015. However, these regulations do not apply to operations at GAF as they are enforced only within one mile of the city’s corporate limits and are also not applicable to any utility company (City of Gallatin 2015). Additionally, the City of Lebanon, located on the opposite side of the reservoir, references OSHA guidelines as suggested noise limits; however, OSHA does not stipulate residential noise limits. There are no other federal, state, or locally established quantitative noise-level regulations specifying environmental noise limits for GAF or the surrounding area. However, the EPA noise guideline recommends outdoor noise levels do not exceed L_{dn} of 55 dBA, which is sufficient to protect the public from the effect of broadband environmental noise in typical outdoor and residential areas. These levels are not regulatory goals but are “intentionally conservative to protect the most sensitive portion of the American population” with “an additional margin of safety” (EPA 1974). The U.S. Department of Housing and Urban Development (HUD) considers an L_{dn} of 65 dBA or less to be compatible with residential areas (HUD 1985).

Table 3-38. Common Indoor and Outdoor Noise Levels

Common Outdoor Noises	Sound Pressure Levels (dB)	Common Indoor Noises
	110	Rock Band at 5 m (16.4 ft)
Jet Flyover at 300 m (984.3 ft)		
	100	
		Inside Subway Train (New York)
Gas Lawn Mower at 1 m (3.3 ft)		
	90	
		Food Blender at 1 m (3.3 ft)
Diesel Truck at 15 m (49.2 ft)		Garbage Disposal at 1 m (3.3 ft)
	80	
		Shouting at 1 m (3.3 ft)

Common Outdoor Noises	Sound Pressure Levels (dB)	Common Indoor Noises
Gas Lawn Mower at 30 m (98.4 ft)	70	Vacuum Cleaner at 3 m (9.8 ft)
Commercial Area		Normal Speech at 1 m (3.3 ft)
	60	
		Large Business Office
	50	Dishwasher Next Room
Quiet Urban Daytime		
	40	Small Theater, Large Conference Room
Quiet Urban Nighttime		Library
Quiet Suburban Nighttime		
	30	
		Bedroom at Night
Quiet Rural Nighttime		Concert Hall (Background)
	20	
		Broadcast and Recording Studio
	10	
		Threshold of Hearing
	0	

Source: Arizona DOT 2008

3.18.1.1 Sources of Noise

There are numerous existing sources of noise at GAF. As a part of the construction of the gas desulfurization plant at GAF, TVA conducted acoustical surveys in response to noise complaints by local residents in March 2016 (TVA 2017e). The significant noise sources identified coming from the Gallatin power plant site were the induced draft fans (through the top of the exhaust stack), and to a much lesser degree, coal handling equipment (bulldozer on the coal pile), vehicle noise, impact noises, and construction activity. The induced draft fans were a consistent noise source when observed, while the other sources tended to be intermittent in nature. Data collected during typical plant operations indicated that noise levels ranged from 35 to 37 dBA at a residence in Gallatin while the noise level at a residence in Lebanon was 50 dBA, both of which are under the EPA suggested recommendations for residential areas.

Noise sources common to activities evaluated in this EIS include noise from construction activities and transportation noise. The level of construction noise is dependent upon the nature and duration of the project. Construction activities for most large-scale projects would be expected to result in increased noise levels adjacent to the construction site due to operation of construction equipment onsite and along roadways used by construction-related vehicles (i.e., worker trips, and material and equipment trips). Construction noise is temporary and intermittent in nature and generally occurs on weekdays during daylight hours which minimizes the impact to receptors.

Transportation noise associated with the proposed actions is primarily comprised of noise associated with the transport of CCR and borrow material via truck. Three primary factors influence highway noise generation: traffic volume, traffic speed, and vehicle type. Generally, heavier traffic volumes, higher speeds, and greater numbers of trucks increase the sound level of highway traffic noise. Other factors that affect the sound level of traffic noise include a change in engine speed and power, such as at traffic lights, hills, and intersecting roads, as well as pavement type. Highway traffic noise is not usually a serious problem for people who live more than 500 feet from heavily traveled freeways or more than 100 to 200 feet from lightly traveled roads (FHWA 2011). Due to the nature of the decibel scale and the attenuating effects of noise with distance, a doubling of traffic volume would result in an approximately 3 dBA increase in noise level, which would not normally be a perceptible noise increase (FHWA 2011).

3.18.1.2 Noise Receptors

Sensitive noise receptors include residences or other developed sites where frequent human use occurs, such as churches, parks, and schools. Sensitive noise receptors in the vicinity of GAF include residences to the north of the property boundary along Odoms Bend Road and Newton Lane, the closest of which are approximately 500 feet from the APC and 555 feet from the proposed office complex, respectively. Additionally, there is a church, Franklin Chapel, located on Odoms Bend Road approximately 650 feet from the APC at its closest point. The nearest noise receptors to the proposed landfill expansion limits of disturbance are residences located across the reservoir, the closest of which is located approximately 3,680 feet to the southeast.

In addition to those sensitive noise receptors located in the vicinity of the project areas at GAF, U.S. Census Bureau (USCB) designated urban areas located along the potential haul routes determined in the bounding analyses for the transport of CCR to offsite candidate landfills were identified (see Section 2.6.2). It is assumed that sensitive noise receptors would occur in greatest numbers within these urban areas. Based upon the bounding or worst-case scenario for CCR transport to an offsite landfill, up to 58.8 miles of the haul route would pass through or adjacent to USCB designated urban areas.

3.18.2 Environmental Consequences

3.18.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, no closure activities would occur and there would be no additional construction activities or offsite transport of borrow or CCR materials. Therefore, there would be no impacts resulting from the proposed action to noise receptors under this alternative. Ambient noise levels would remain similar to current conditions.

3.18.2.2 Alternative B – Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill

<u>Surface Impoundment Closures</u>

Noise from closure activities at the impoundments would be the result of construction equipment, which would typically consist of loaders, dozers, excavators, telescopic handlers, compactors, and dump/haul trucks. Typical noise levels from construction equipment are expected to be 85 dBA or less at a distance of 50 feet from the construction equipment (FHWA 2016a). Based on straight line noise attenuation, it is estimated that noise levels from these sources, when utilized at the northern boundary of the APC, would attenuate to 65 dBA at the closest residence and 62.7 dBA at Franklin Chapel, both located off of Odoms Bend Road. Therefore, noise from surface impoundment closure would attenuate to meet the HUD guideline of 65 dBA. Furthermore, the actual noise level would likely be lower in the field, where vegetation and topography would cause further noise attenuation. Noise levels at these and other nearby sensitive receptors could remain above the EPA guideline of 55 dBA. However, noise from onsite closure activities would be intermittent and typically limited to weekdays during normal working hours. Additionally, noise emissions would be minimized through implementation of BMPs including proper maintenance of construction equipment and vehicles. Therefore, noise impacts from the surface impoundment closure activities would be minor.

Expansion of Existing Onsite Landfill

Under Alternative B, construction activities associated with the expansion of the onsite landfill, associated haul road, and ancillary facilities including the relocated communications tower and ammonia sensor tower would generate noise from compactors, front loaders, backhoes, graders, and dump/haul trucks. Typical noise levels from this construction equipment are expected to be 85 dBA or less at a distance of 50 feet from the construction site (FHWA 2016a). Similarly, during landfill operation, articulated dump trucks would produce noise levels of approximately 84 dBA at a distance of 50 feet (FHWA 2016a). These types of noise levels would diminish with distance from the project area at a rate of approximately 6 dBA per each doubling of distance and therefore would be expected to attenuate to the recommended EPA noise guideline of 55 dBA at 1,500 feet. However, this distance would be shorter in the field as objects and topography would cause further noise attenuation. As the closest sensitive noise receptors are more than 3,000 feet from the landfill expansion limits of disturbance, noise impacts associated with the construction and operation of the onsite landfill expansion would be negligible.

Landfill expansion would displace the existing conference center building; therefore, a new conference center would be constructed in the proposed office complex, a vegetated area between Steam Plant Road and the Cumberland River in the northeastern portion of the EIS project boundary. The office complex area would also be for used for parking and to temporarily stage construction trailers. Construction equipment used in the development of the office complex would be similar to that utilized in the construction of the landfill expansion, with expected noise levels at 85 dBA or less at a distance of 50 feet from the site. Based on straight line noise attenuation, it is estimated that noise levels associated with construction of the office complex would attenuate to 64.1 dBA at the nearest noise receptor, a residence located off Newton Lane. Therefore, noise from the construction of the office complex would attenuate to levels below the HUD guideline of 65 dBA, but would exceed the EPA guideline of 55 dBA. Operational noise associated with the office complex would consist primarily of vehicle noise, as the area would be used for parking and staging of equipment. However, noise impacts from operation would be intermittent and generally less than those associated with construction. As construction noise would be temporary, and all noise impacts would typically only occur during normal working hours, the effects of construction and operation of the office complex on nearby sensitive receptors would be minor.

There is also a potential for indirect noise impacts associated with an increase in traffic related to construction workforce vehicle traffic. TVA estimates that the workforce needed for onsite closure activities, including the onsite landfill expansion, office complex development, and surface impoundment closure, would consist of up to 100 personnel per day over an approximately 15-year period. Assuming one person per commuting vehicle, there would be a daily morning inbound traffic volume of approximately 100 vehicles and a daily outbound traffic volume of approximately 100 vehicles, five days per week. As workforce traffic noise would only occur twice per day as workers are entering and leaving the project site and would result from a relatively small number of personal vehicles dispersed among the surrounding roadways, noise impacts from construction workforce traffic would be minor.

Construction and Operation of a Beneficial Re-use Processing Facility

Under Alternative B, TVA is also assessing the potential impacts associated with the component action of the construction and operation of a beneficial re-use processing facility. While a specific location for the beneficial re-use processing facility has not been chosen, based on the facility attributes and bounding characteristics listed in Tables 2-4 and 2-5, including the location of the facility in an area zoned for compatible uses, the facility would not be sited in immediate proximity to sensitive noise receptors such as residences, schools, or churches. Additionally, according to the bounding characteristics, the noise generated at the facility during operation would attenuate to a maximum of 65 dBA at the property boundaries, consistent with the HUD L_{dn} guidelines and within generally acceptable noise levels for commercial, industrial, and other compatible uses. Noise associated with the construction of the facility may temporarily exceed 65 dBA at the property boundaries; however, construction noise would be limited to a period of 14 months. Additionally, as the facility would have direct access from a collector road or major highway that can support truck traffic without noticeable effects to roadway LOS, increased traffic associated with the construction and operation of the beneficial re-use processing facility, including construction traffic, operational workforce traffic, and trucking of beneficiated product, would not have a notable impact on existing traffic patterns or consequently, traffic noise. Therefore, due to the location of the facility within an area zoned for compatible use, and its direct access from a collector road or major highway, noise impacts associated with the construction and operation of the beneficial re-use processing facility would be minor.

Transport of CCR

Under Alternative B (Option 1), all CCR materials removed from the surface impoundments would be transported to the onsite landfill via truck using an onsite paved haul road. As all transport would take place onsite and residences are located over 1,000 feet from the nearest haul road, noise impacts to sensitive receptors near the plant would not be notably different than those impacts discussed in the previous sections regarding onsite landfill operation and surface impoundment closure.

Under Alternative B (Option 2), the majority of CCR materials removed from the impoundments would be transported to a beneficial re-use processing facility (approximately 224 truckloads, or 448 total trips per day), with the remaining CCR being transported to an existing offsite landfill (approximately 56 truckloads, or 112 total trips per day). CCR removal would occur approximately 210 working days per year over the approximately 15-year closure period.

Per the facility attributes listed in Table 2-4, CCR transported to the beneficial re-use processing facility could be trucked up to 10 miles from the nearest highway or interstate system. Given the location of GAF, the two potential routes to a highway system would be either Steam Plant Road to Odoms Bend Road to TN-109, or Steam Plant Road to Airport Road, which connects to both TN-25 (Hartsville Pike) and US-31 (Gallatin Pike). The receptors along the local and collector roadways in the vicinity of GAF, including Steam Plant Road, Odoms Bend Road, and Airport Road, would experience the greatest noise impacts due to the relatively low baseline traffic volumes on these roads (ranging from approximately 860 to 8,270 vehicles per day). Once on higher-capacity highway or interstate roadways, project-related traffic would fit in with familiar traffic patterns. As the beneficial re-use processing facility would have direct access from a collector road or major highway, the remainder of the haul route would be comprised of high-capacity roadways where additional truck traffic would assimilate into the existing traffic patterns and therefore would result in imperceptible changes in noise level at sensitive receptors located along the haul route.

CCR material not suitable for beneficial re-use would be transported from GAF to an existing offsite landfill for disposal. A specific landfill has not been selected; however, the noise impacts are based upon the bounding or worst-case scenario identified in Table 2-5. In the bounding analysis, TVA determined the distance through USCB designated urban areas for the potential haul routes to the candidate landfills in order to quantify the impacts to areas with the greatest density of sensitive noise receptors. It was determined that up to 58.8 miles of the haul route would pass through or adjacent to urban areas, where receptors would be potentially exposed to increased roadway noise during the closure period. Potential haul routes to the offsite landfills identified in the bounding analysis would primarily use arterial or interstate roadways whenever possible, where the additional truck traffic would assimilate into the existing traffic patterns and have minimal noise impacts. Additionally, receptors along the interstate and other arterial routes are typically set back at a distance from the roadway, minimizing noise impacts. However, per the bounding analysis, shorter portions of the potential haul routes may utilize private, collector, or rural arterial roads which have lower traffic volumes and where receptors are often located closer to the roadway. The portions of the potential haul routes along lower functioning roads are typically either located around GAF, as previously discussed, or near the entrances of candidate landfills. These roadways already support truck traffic destined for GAF or the existing landfill, and the addition of 112 truck trips is not expected to double the traffic volume along any of these lower functioning roads.

Although a specific location has not been decided for either facility, it is possible that the transport of CCR to a beneficial re-use processing facility and to an offsite landfill would utilize the same local and collector roadways in the vicinity of GAF, including Steam Plant Road, Odoms Bend Road, and Airport Road. If the haul routes to both the beneficial re-use processing facility and to the offsite landfill simultaneously utilize any of these roadways, CCR transport would increase traffic volumes by 560 truck trips per day (or approximately 7 to 65 percent). Noise emissions from trucks hauling CCR are expected to be 76 dBA or less at a distance of 50 feet from the roadway (FHWA 2016a). Based on straight line noise attenuation, noise levels at residences along these roads, which range from approximately 60 to 2,350 feet from the roadway, would attenuate to noise levels between 42.6 and 74.4 dBA. Due to the relatively high frequency of trucks passing by and increased noise at intersections and climbing terrain, residents located closest to the local and collector roads in the vicinity of GAF could experience moderate noise impacts associated with CCR transport. Sensitive receptors set back further from these roadways or along higher capacity roads utilized for the remainder of the haul route(s) would be minor. Additionally, CCR transport would be intermittent and would be limited to weekdays during normal working hours.

Transport of Borrow

There is also a potential for indirect noise impacts associated with an increase in traffic related to the transport of borrow material to GAF. Borrow material would be obtained from the TVA-owned and permitted borrow site located 1.5 miles northwest of the fossil plant and would be transported to GAF via Steam Plant Road at rates of approximately 32 truck trips per working day. Noise impacts from the transport of borrow along Steam Plant Road are expected to be negligible as the number of trucks used to transport borrow material would not have a noticeable increase on traffic volume and consequently traffic noise near this roadway. Additionally, there are no residences within 200 feet of the segment of Steam Plant Road between the borrow site and GAF. Given this, the hauling of borrow to GAF is not expected to result in noticeable changes to existing noise levels.

3.18.3 Summary of Impacts to Noise

In summary, direct noise impacts from closure activities at GAF would be limited to minor impacts to sensitive receptors directly north of the GAF property boundary, for the duration of the closure period. At times, noise levels at the closest sensitive receptors may exceed the EPA Ldn guideline recommendation of 55 dBA; however, noise levels would meet or fall below the HUD residential Ldn guideline of 65 dBA. Additionally, noise emissions from onsite construction activities and equipment would be minimized through implementation of BMPs including proper maintenance of construction equipment and vehicles.

Impacts associated with increased transportation noise for individual component actions under this alternative are described above, but as all project-related transportation routes have the potential to utilize roads near the plant, aggregate impacts must also be considered. Under Alternative B (Option 2), if traffic associated with the construction workforce, hauling of borrow material, and offsite transport of CCR utilized the same roadways to access the plant, traffic volumes on these roadways would increase by approximately 793 trips per day. As Steam Plant Road and Odoms Bend Road currently have the lowest traffic volume of the roads that may be utilized, an increase of 793 trips would have the largest impact on these roads, increasing traffic volume by 92 percent and 49 percent, respectively. As a large amount of the increased traffic volume would consist of heavy haul trucks, sensitive receptors located close to these local low-volume roads would experience a notable change in traffic noise level. Therefore, the worst-case aggregate noise impacts along these roads would be moderate. However, project related traffic would be limited to weekdays during daylight hours.

As summarized in Table 3-39, TVA has determined that noise impacts resulting from the primary action and associated component actions related to the proposed ash impoundment closures at GAF are minor.

Table 3-39. Summary of Impacts to Noise

Alternative	Action	Impact	Severity
		Impoundment Closure	
Alternative B	Closure-by-Removal of APC	Localized noise at sensitive receptors along Odoms Bend Road during closure activities.	Minor; attenuates to levels below HUD guidelines for residential areas, limited to normal working hours.
		Landfill Expansion	
Alternative B	Expansion of Landfill and Ancillary Facilities	Localized, intermittent noise at residences along Newton Lane during construction and operation of office complex.	Minor; attenuates to levels below HUD guidelines for residential areas, limited to normal working hours.
		Indirect noise impacts from construction workforce vehicle traffic.	Minor due to small workforce numbers and dispersion on surrounding roadways.

Alternative	Action	Impact	Severity
	Construction and Operation of Beneficial Re-use Processing Facility		
Alternative B	Construction and Operation of a Beneficial Re-use Processing Facility	Localized short-term increase in noise during construction and continuing long-term during operation.	Minor due to location within an area zoned for compatible use and maximum operational noise of 65 dBA at property boundaries.
		Long-term increase in traffic noise for sensitive receptors in the vicinity of the facility due to workforce traffic and delivery of beneficiated product.	Minor. Direct access to major highway or collector road results in notable, but minor changes in existing traffic and associated noise conditions.
		Transport of CCR	
Alternative B (Option 1)	Transport of CCR to Onsite Landfill	Negligible increase in onsite noise from trucks transporting CCR.	No impact due to distance to sensitive receptors.
Alternative B (Option 2)	Transport of CCR to Beneficial Re-use Processing Facility	Increased traffic noise at sensitive receptors along the haul route from trucks transporting CCR.	Minor to moderate based on percent increase in total traffic volume, limited to normal working hours.
Alternative B (Option 2)	Transport of CCR not Suitable for Beneficial Re-use	Increased traffic noise at sensitive receptors along the haul route from trucks transporting CCR.	Minor to moderate based on percent increase in total traffic volume, limited to normal working hours.
		Transport of Borrow	
Alternative B	Truck transport of borrow to GAF from TVA-owned borrow site	Increase in traffic noise for sensitive receptors along Steam Plant Road from trucks transporting borrow.	Minor impact due to small number of truck trips and distance to sensitive receptors.

3.19 Natural Areas, Parks, and Recreation

3.19.1 Affected Environment

Natural areas include ecologically significant sites, national or state forests, wilderness areas, scenic areas, WMAs, greenways, trails, Nationwide Rivers Inventory (NRI) streams, and wild and scenic rivers. Managed areas include lands held in public ownership that are managed by an entity (e.g., TVA, USDA, U.S. Forest Service, State of Tennessee) to protect and maintain certain ecological and/or recreational features. Ecologically significant sites are either tracts of privately-owned land that are recognized by resource biologists as having significant environmental resources or identified tracts on TVA lands that are ecologically significant but not specifically managed by TVA's Natural Areas program. NRI streams are free-flowing segments of rivers recognized by the National Park Service (NPS) as possessing remarkable natural or cultural values. Parks and developed recreation facilities include open areas, boat ramps, community centers, swimming pools, and other public recreation areas.

This section addresses natural areas and parks and recreation facilities that are within a 5-mile radius of GAF. Natural areas and parks and developed recreation areas and their approximate location relative to the proposed project area are listed in Table 3-40 and illustrated on Figure 3-13.

Table 3-40. Parks and Recreation Facilities in 5-mile Study Area

Developed Recreation Area	Distance from the Proposed Project Area (mi)
Gallatin Steam Plant WMA	0.0
Old Hickory State WMA	0.0
Gallatin Steam Plant Boat Ramp	0.0
Old Hickory Lake Reservation	0.0
Gallatin Steam Plant Heronry	0.1
Coles Ferry Boat Ramp	0.5
Cherokee Marina	0.6
Bull Creek Boat Ramp	1.0
Sandy Chapel Boat Ramp	1.0
Martha Gallatin Boat Ramp	1.1
Camp Boxwell Boy Scout Reservation	2.0
Cairo Boat Ramp	2.2
Laguardo Boat Ramp and Recreation Area	2.5
Lock 4 Park (Sumner County Park)	2.5
Bledsoe Creek NRI Segment	2.6
Tyree Boat Ramp	2.9
Davis Corner Boat Ramp	3.0
Bartons Creek Boat Ramp	3.2
Bledsoe Creek State Park	3.2
Gallatin Marina	3.4
Old Hickory Gallatin Boat Ramp	3.5
Riverview Boat Ramp	3.5

Sources: TVA 2019d, City of Gallatin 2019a, and USACE 2016

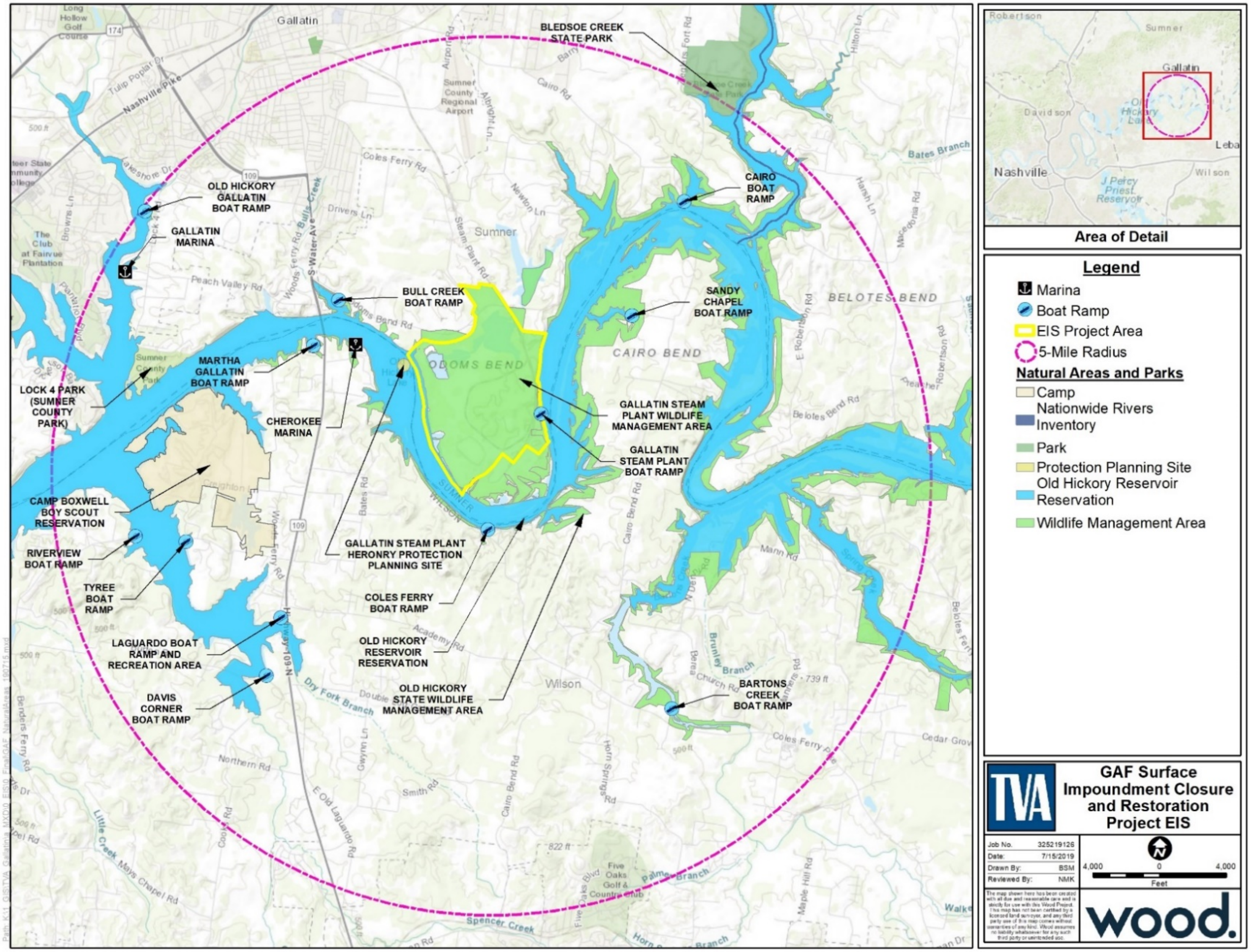


Figure 3-13. Natural Areas, Parks, and Recreation Areas within 5-mile Study Area

The majority of the GAF property is designated as the Gallatin Steam Plant WMA. This WMA is managed by the TWRA for hunting within specified hunting zones. A special permit issued by TWRA is required to hunt on the WMA, and hunting is restricted to deer and turkey, and only with archery equipment. About 229 acres of the GAF property and WMA are open to hunting during designated times. The Cumberland River Aquatic Center, a hatchery facility constructed by TVA and operated by TWRA, is also located within the WMA. In addition, the Old Hickory State WMA is located along the shoreline of the Old Hickory Lake reservoir, with portions located within the GAF property boundary. The Old Hickory State WMA is managed by TWRA for small and large game, including waterfowl. The WMA also includes a publicly accessible boat ramp, the Gallatin Steam Plant Boat Ramp, located on the eastern side of the GAF property off of Steam Plant Road.

GAF is located on Old Hickory Lake Reservation, a reservoir of the Cumberland River created by the Old Hickory Dam located at Cumberland River Mile (RM) 216.2 (USACE 2016), approximately 27 river miles downstream of GAF. Managed by the USACE, the shoreline and waters of the reservoir receive extensive outdoor recreation activity including boating, fishing, camping, picnicking, and swimming. Two commercial marinas and 12 public boat ramps, some of which have additional amenities such as picnic areas, fishing docks, camping, and hiking trails, are located on Old Hickory Lake within a 5-mile radius of GAF.

The Gallatin Steam Plant Heronry is an ecologically significant site located on a small island in the Old Hickory Lake reservoir, approximately 0.1 mile east of the proposed project area. This site has historically been utilized by great blue herons for a nesting colony but is not currently used.

The 1,100-acre Camp Boxwell Boy Scout Reservation is located approximately 2.0 miles west of the proposed project area. Camp Boxwell provides outdoor recreation, such as camping, hiking, swimming, and fishing to boy scout troops (MTCBSA 2019).

Lock 4 Park, also called Sumner County Park, is located approximately 2.5 miles west of the proposed project area, along the shoreline of the Old Hickory Lake reservoir. This park provides boat ramps, biking trails, fishing, and picnic areas (City of Gallatin 2019a).

The Bledsoe Creek NRI stream segment is located approximately 2 miles northeast of GAF in Sumner County. It is designated by the NPS as an NRI stream from RM zero (0) at Old Hickory Lake to RM 14 at Bethpage and is noted for its scenic, recreational, geological, fisheries, wildlife, historical, and cultural values.

Bledsoe Creek State Park is located approximately 3.2 miles northeast of the project area. This approximately 164-acre park, managed by the State of Tennessee Division of State Parks, is located on the Bledsoe Creek embayment of Old Hickory Lake and provides outdoor recreation opportunities like camping, fishing, boating, and hiking (Tennessee State Parks 2019).

Apart from developed recreation facilities, there are also opportunities for dispersed recreation in the vicinity of GAF. Dispersed recreation occurs in an undeveloped setting and includes informal activities such as hiking, nature observation, primitive camping, backpacking, horseback riding, cycling, boating, canoeing, fishing, rock climbing, off-road all-terrain vehicle use, and driving for pleasure. The Old Hickory Lake reservoir provides opportunities for boating and fishing, and as previously noted, the Gallatin Steam Plant

WMA and Old Hickory State WMA are managed for hunting within specified hunting zones. In addition, these areas also provide public opportunities for watching wildlife, especially shorebirds, waterfowl, and wading birds. From at least the 1970s into the 1990s, the Gallatin Steam Plant WMA was regularly utilized for wildlife observation, particularly birdwatching, with public access granted by permission from GAF personnel. The ash ponds, and to a lesser extent the stilling ponds, are used by shorebirds during migration and by waterfowl throughout much of the year, but especially during the winter. However, public access for wildlife observation has been restricted since 2008 due to security and safety concerns (TVA 2013b).

3.19.2 Environmental Consequences

3.19.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, no closure activities would occur and there would be no additional construction activities or offsite transport of borrow or CCR materials. Therefore, there would be no impacts to natural areas, parks, or recreational resources with this alternative.

3.19.2.2 Alternative B – Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill

Surface Impoundment Closures

Under Alternative B, closure of the surface impoundments would entail dewatering, clearing and grubbing, excavation and stockpiling of ash, and onsite restoration activities such as grading and revegetating. There would be no direct impact to natural areas as a result of closure activities under this alternative, as all impoundments are located in previously developed, industrial areas of the WMA. Additionally, as there are no parks, developed recreation facilities or dispersed recreation opportunities within the APC, closure of the impoundments would have no direct effects on parks and recreation.

Additionally, since the Gallatin Steam Plant Boat Ramp and all other developed recreational areas are greater than 0.5 miles from the nearest surface impoundment, there would be no indirect impacts to these facilities due to noise or fugitive dust associated with impoundment closure. There could be impacts such as noise and fugitive dust to dispersed recreation in close proximity to the impoundments. However, as fugitive dust would be minimized through adherence to the TVA GAF CCR Fugitive Dust Plan, impacts would be limited to the duration of closure activities and opportunities for dispersed recreation in close proximity to the impoundments are limited, these impacts would be minor.

Expansion of Existing Onsite Landfill

Although the areas proposed for the onsite landfill expansion and ancillary facilities such as the ammonia sensor tower, and relocated communications tower fall within the boundaries of the Gallatin Steam Plant WMA, these are areas where hunting is prohibited. There are no natural areas, parks, developed recreation facilities, or dispersed recreation opportunities within the proposed landfill expansion area, as there is no public access to this area. Therefore, the expansion of the existing onsite landfill will have no direct impact on natural areas, parks, and recreation. However, the proposed office complex area, an associated ancillary facility, is located in a portion of the Gallatin Steam Plant WMA that currently allows bow hunting during designated hunting seasons. Therefore, the development of the office complex would result in the conversion of approximately 29 acres of land within the WMA that would no longer be usable for recreational hunting. Although this impact would be permanent, the majority of the huntable land within the Gallatin Steam Plant WMA, north of the APC, would not be directly impacted by project activities. For this reason, and because of the abundance of land available for hunting and other outdoor recreational activities in the nearby Old Hickory WMA, impacts to recreation in the Gallatin Steam Plant WMA would be minor.

The Gallatin Steam Plant Boat Ramp is a publicly accessible boat ramp located on GAF property and within the Old Hickory State WMA, approximately 400 feet east of the proposed landfill expansion at its closest point. Although the ramp would not be directly impacted by the proposed project activities, users of the boat ramp may be indirectly impacted during construction and operation of the landfill expansion as a result of increased noise and traffic on Steam Plant Road. However, as construction impacts would be temporary and operational impacts would be similar to those associated with operation of the existing onsite landfill, impacts from the landfill expansion on the boat ramp would be minor and unlikely to interfere with use or enjoyment of this facility. Due to distance, no other natural areas or developed parks and recreation facilities would be impacted by expansion of the onsite landfill.

In addition, while areas directly impacted by the landfill expansion activities are not accessible to the public, dispersed recreation activities occurring in close proximity, such as hunting, fishing, and wildlife observation, may be indirectly affected by increased noise, fugitive dust, and traffic associated with construction and operation of the landfill expansion. These impacts would be similar to those associated with the operation of the existing landfill and would only affect users on or immediately adjacent to the GAF property. As hunting is limited to specific areas of the Gallatin Steam Plant WMA and wildlife observation at GAF has been restricted for safety and security reasons, opportunities for dispersed recreation in the immediate vicinity of the project area are minimal in comparison to those available along other areas of the reservoir and throughout the region. Therefore, impacts of onsite landfill expansion and operation would be minor.

Construction and Operation of a Beneficial Re-use Processing Facility

Under Alternative B, the majority of CCR materials removed from the impoundments would be transported to a beneficial re-use processing facility. Although the specific location of this facility has not been determined, based on the attributes presented in Tables 2-4 and 2-5, existing natural areas, parks, or developed recreation areas would not be considered an acceptable land use for the facility and therefore, would not be directly impacted by construction. In the event that there are natural areas, parks, or recreation areas in the vicinity of the beneficial re-use processing facility, they may experience indirect impacts such as fugitive dust, construction noise, and increased traffic during construction. However, construction impacts would be temporary (up to 14 months) and would be minimized through use of BMPs (e.g., dust control measures) as required to reduce offsite emissions.

In addition, if there are natural areas, parks, or recreation areas in the vicinity, indirect impacts from operation of the beneficial re-use facility may occur. Primary impacts to surrounding recreational areas would be associated with increased traffic and associated noise from workforce commuting and delivery of beneficiated product to various markets within the region. The facility is anticipated to operate up to 350 days per year, with a commuting workforce of up to 36 employees, while trucking of product (up to 90 truckloads or 180 truck trips per day) would occur 250 days per year, primarily on weekdays. However, as facility attributes include direct access to the site from a collector road or major highway that can support truck traffic without noticeable effects to LOS, this increase in traffic would not have a significant impact on existing traffic volume, or consequently, traffic noise. Therefore, impacts associated with the construction and operation of the beneficial re-use processing facility on natural areas, parks, and recreation are anticipated to be minor.

Transport of CCR

Under Alternative B (Option 1), all CCR materials removed from the surface impoundments would be transported to and disposed of in the onsite landfill. All CCR transport activity would take place on GAF property and would not require the utilization of Steam Plant Road. Therefore, there would be no impacts to the Gallatin Steam Plant Boat Ramp or other developed parks and recreational facilities. However, similar to the surface impoundment closures and the landfill expansion, onsite CCR transport has the potential to result in temporary noise and fugitive dust impacts to WMAs and dispersed recreation occurring in close proximity to the project site.

Under Alternative B (Option 2), the majority of CCR materials removed from the impoundments would be transported to a beneficial re-use processing facility via over-the-road trucking at rates of approximately 224 truckloads (448 truck trips) per day, 210 working days per year. All trucks traveling to and from GAF would utilize Steam Plant Road, resulting in increased traffic volume for users of the onsite Gallatin Steam Plant Boat Ramp. Access to this facility could be substantially affected by the increase in trucks transporting CCR offsite and trucks transporting borrow to and from the facility. Furthermore, increased traffic, fugitive dust emissions and noise associated with the transport of CCR could potentially impact natural areas and parks and recreational facilities adjacent to haul routes used to transport CCR. For example, Flippers Bait and Tackle located along Odoms Bend Road provides access to the Bull Creek Boat Ramp that is frequently accessed by recreational users. Transport of CCR using Odoms Bend Road to a potential beneficial re-use processing facility has the potential to notably disrupt access to this popular boat ramp. While a specific location of the beneficial re-use processing facility has not been chosen, transport of CCR from GAF would utilize existing arterial and interstate roadways as much as possible to enhance safety and efficiency of transport. Once on the arterial or interstate roadway, additional truck traffic would assimilate into the existing traffic patterns and therefore would have minimal impacts on any natural areas, parks, or recreation facilities along the haul route. Additionally, BMPs designed to minimize fugitive dust emissions (such as covered loads) would be utilized to minimize the effects of fugitive dust and CCR transport would typically only occur on weekdays during normal working hours, when recreational facilities are less frequently utilized. Therefore, impacts to natural areas, parks, and recreation associated with transport of CCR to the beneficial re-use processing facility would be minor regionally, but they would be moderate for local boat ramps. Impacts to the boat ramps in the vicinity of GAF could be mitigated through the utilization of a traffic management plan to be undertaken by TVA.

Under Alternative B (Option 2), CCR excavated from the surface impoundments that is not suitable for beneficial re-use would be transported via truck to an existing offsite landfill for disposal. A specific landfill has not been selected. Therefore, the impacts to parks and recreation are based upon the bounding or worst-case scenario identified in Section 2.6.1.3. In addition to the developed recreational facilities located within a 5-mile radius of GAF, eighteen additional parks and recreational facilities were identified adjacent to potential CCR haul routes established in the bounding analyses. These facilities are a mix of state and local municipality-owned parks, most of which abut interstate or controlled-access highways utilized by the potential haul routes, although they are not directly accessed by these roadways. In these cases, the park is typically separated from the potential haul route by a frontage road, median, and/or vegetated buffer. A small number of parks, however, are located immediately adjacent to, and are accessed directly by undivided highways or auxiliary roads utilized by the potential haul routes.

Using over-the-road trucks, TVA estimates that CCR would be deposited in an existing landfill, at a rate of 56 truckloads (112 truck trips) of CCR per day, 210 working days per year. Based on the bounding analysis presented in Table 2-6, the maximum length of a trucking haul route through or adjacent to parks or recreational facilities is approximately 3.7 miles. Increased traffic, fugitive dust and noise associated with the transport of CCR could potentially impact users of natural areas, parks, and recreational facilities adjacent to haul routes used to transport CCR. BMPs designed to minimize fugitive dust emissions (such as covered loads and watering unpaved haul roads) would be utilized to minimize the effects of fugitive dust and CCR transport would typically only occur on weekdays during normal working hours, when parks and recreational areas are less frequently utilized. Furthermore, natural areas, parks and recreational areas potentially impacted by CCR transport are primarily located along major roadways and have buffer areas between the roadway and park amenities. As such, impacts from increases in traffic and noise would be minimized and would not impair use or enjoyment of these resources. For these reasons, and because of the moderate duration of the actions, impacts of CCR transport to an existing landfill on natural areas, parks, and recreation would be minor regionally, but moderate for local boat ramps.

<u>Transport of Borrow</u>

Closure-by-Removal under Alternative B would require the transport of borrow material obtained from the TVA-owned permitted borrow site located 1.5 miles northwest of the fossil plant to the impoundment areas for use in restoration and landfill cover. As there are no natural areas or parks or recreational facilities located along the haul route between the borrow site and GAF, there would be no direct impacts associated with the transport of borrow material. As the haul route would utilize Steam Plant Road, users of the Gallatin Steam Plant Boat Ramp may experience indirect effects such as increased traffic. However, as borrow transport impacts would be intermittent and not prevent access to the facility, impacts to the boat ramp would be minor. In addition, similar to other onsite project activities, borrow transport could result in minor impacts, including noise and fugitive dust, to the WMAs and dispersed recreation in close proximity to the project site.

3.19.3 Summary of Impacts to Natural Areas, Parks, and Recreation

As summarized in Table 3-41, TVA has determined that impacts to natural areas, parks, and recreation related to the primary action and associated component actions related to the proposed impoundment closures at GAF are minor. However, the aggregate impact of actions under Alternative B may result in substantial impacts to access of the Gallatin Steam Plant Boat Ramp. Nevertheless, due to the low volume of recreational users and abundance of additional boat ramps in the vicinity, overall impacts to regional parks and recreational facilities are minor.

Table 3-41. Summary of Impacts to Natural Areas, Parks, and Recreation

Alternative	Action	Impact	Severity
		Impoundment Closure	
Alternative B	Closure-by-Removal of APC	Temporary increase in noise and fugitive dust for dispersed recreation.	Minor. Limited to duration of closure activities. Extensive dispersed recreation opportunities available in vicinity.
		Landfill Expansion	
Alternative B	Expansion of Landfill and Ancillary Facilities	Increase in traffic, noise and fugitive dust for Gallatin Steam Plant Boat Ramp and dispersed recreation.	Minor. Loss of approximately 29 acres of hunting land within WMA. Construction impacts limited to duration of closure activities. Extensive dispersed recreation opportunities available in vicinity.
		Construction and Operation of Beneficial Re-use Processing Facility	
Alternative B	Construction and Operation of a Beneficial Re-use Processing Facility	Temporary increase in fugitive dust, noise, and traffic for natural areas and parks in proximity to facility during construction.	Minor. Relatively short-term and minimized with the use of BMPs including dust control measures.
		Long-term increase in traffic and associated noise for any natural areas, parks, or recreational areas near the facility due to increased workforce and delivery of beneficiated product.	Minor. Location on major highway or collector road results in minimal changes in existing traffic conditions.
		Transport of CCR	
Alternative B (Option 1)	Transport of CCR to Onsite Landfill	Temporary increase in noise and fugitive dust for dispersed recreation.	Minor. Limited to duration of closure activities. Extensive dispersed recreation opportunities available in vicinity.
Alternative B (Option 2)	Transport of CCR to Beneficial Re-use Processing Facility	Temporary increase in traffic, noise and fugitive dust for parks along the haul route from trucks transporting CCR.	Moderate impacts to access for Gallatin Steam Plant Boat Ramp and Bull Creek Boat Ramp. Minor for regional recreational facilities. Limited to weekdays during normal working hours and minimized with the use of BMPs including dust control measures.

Alternative	Action	Impact	Severity
Alternative B (Option 2)	Transport of CCR not Suitable for Beneficial Re-use	Temporary increase in traffic, noise and fugitive dust for parks along the haul route from trucks transporting CCR.	Moderate impacts to access for Gallatin Steam Plant Boat Ramp and Bull Creek Boat Ramp. Minor for regional recreational facilities. Limited to weekdays during normal working hours and minimized with the use of BMPs including dust control measures.
		Transport of Borrow	
Alternative B	Truck transport of borrow to GAF from TVA-owned borrow site	Temporary increase in traffic, noise and fugitive dust for boat ramp and dispersed recreation.	Minor. Limited to duration of closure activities. Extensive dispersed recreation opportunities available in vicinity.

3.20 Socioeconomics and Environmental Justice

3.20.1 Affected Environment

For the socioeconomic and environmental justice analysis, the study area was defined as any census block group that falls within a 5-mile radius of GAF. This area includes portions of both Sumner and Wilson counties, and therefore, these counties and the state of Tennessee are included as appropriate secondary geographic areas of reference. Comparisons at multiple spatial scales provide a more detailed picture of populations that may be affected by the proposed actions, including any environmental justice populations (e.g., minority and low-income). Demographic and economic characteristics of populations within the study area were assessed using the 2013-2017 American Community Survey 5-year estimates provided by the USCB (USCB 2019a).

3.20.1.1 Demographics

Demographic characteristics of the study area and of the secondary reference geographies are summarized in Table 3-42. The study area has a resident population of 35,614 and is characterized by low to moderate density residential development. It includes portions of the cities of Gallatin and Lebanon, located northwest and southeast of the plant, respectively, as well as the unincorporated community of Laguardo to the southwest. GAF is located in Sumner County, across the Cumberland River from Wilson County, both of which are included in the Nashville Metropolitan Statistical Area. The populations of Sumner (175,730) and Wilson (128,874) counties account for approximately 2.7 percent and 2.0 percent of the total population of Tennessee (6,597,381), respectively. Since 2010, the population within the study area has increased by 12.1 percent. This is consistent with the population increases experienced in Sumner (9.4 percent) and Wilson (13.1 percent) counties during the same period, and notably higher than the state increase of 4.0 percent.

Table 3-42. Demographic Characteristics of the GAF Study Area and Secondary Reference Geographies

	Study Area (Block Groups within 5-Mile Radius of GAF)	Sumner County	Wilson County	State of TN
Population[1,2]				
Population, 2017 estimate	35,614	175,730	128,874	6,597,381
Population, 2010	31,783	160,645	113,993	6,346,105
Percent Change 2010-2017	12.1%	9.4%	13.1%	4.0%
Persons under 18 years, 2017	22.0%	24.2%	24.2%	22.7%
Persons 65 years and over, 2017	16.2%	14.8%	14.7%	15.4%
Racial Characteristics[1]				
Not Hispanic or Latino				
White alone, 2017 (a)	88.2%	85.2%	86.0%	74.3%
Black or African American, 2017 (a)	4.4%	6.8%	6.8%	16.7%
American Indian and Alaska Native, 2017 (a)	0.2%	0.3%	0.3%	0.2%
Asian, 2017 (a)	0.6%	1.3%	1.5%	1.7%
Native Hawaiian and Other Pacific Islander, 2017 (a)	0.2%	0.1%	0.1%	0.1%
Some Other Race alone, 2017 (a)	0.0%	0.1%	0.1%	0.1%
Two or More Races, 2017	1.6%	1.6%	1.4%	1.9%
Hispanic or Latino, 2017	4.8%	4.5%	3.8%	5.2%
Housing and Income[1]				
Housing units, 2017	14,500	69,146	50,381	2,903,199
Median household income, 2013-2017	$63,618	$61,584	$66,123	$48,708
Persons below poverty level, 2013-2017	8.6%	9.7%	9.2%	16.7%
Persons below low income threshold, 2013-2017 (b)	25.1%	26.7%	23.0%	37.3%

(a) Includes persons reporting only one race.

(b) Low-income threshold is defined as two times the poverty level

Sources: [1]USCB 2019a; [2]USCB 2011

Approximately 88 percent of the study area population is white. Correspondingly, minority populations in the study area are relatively small. Minorities in the study area include: Hispanic or Latino (4.8 percent), Black or African American (4.4 percent), Asian (0.6 percent), American Indian and Alaska Native (0.2 percent), Native Hawaiian and Other Pacific Islander (0.2 percent) and persons who identified as two or more races (1.6 percent). Minority populations in the study area are comparable to those of Sumner and Wilson counties and are considerably lower than the state of Tennessee (Table 3-42).

The average median household income of the block groups that comprise the study area is $63,618, which is consistent with the median household income reported for Sumner and Wilson counties ($61,584 and $66,123, respectively) and notably higher than that of the state of Tennessee ($48,708). Persons falling below the poverty level comprise 8.6 percent of the total population of the study area. In comparison, the percentage of persons below the poverty level is slightly higher in the surrounding counties (9.2 to 9.7 percent) and appreciably higher in the state of Tennessee (16.7 percent).

3.20.1.2 Economic Conditions

Sumner and Wilson counties employ a combined labor force of 150,705 workers (Table 3-43). Business sectors providing the greatest employment in these counties include Education, Health Care and Social Assistance (20.2 percent); Retail Trade (12.3 percent); Manufacturing (11.2 percent); and Professional, Scientific, Management, and Administrative Services (10.7 percent).

Table 3-43. Largest Employers by Sector Within Two-County Project Vicinity

Sector	Number of Employees	Percent
Education, health care and social assistance	30,379	20.2%
Retail trade	18,581	12.3%
Manufacturing	16,849	11.2%
Professional, scientific, management, and administrative services	16,131	10.7%
Arts, entertainment, recreation, accommodation and food services	14,399	9.6%
Finance and insurance, real estate, rental and leasing	10,503	7.0%
Construction	9,400	6.2%
Transportation, warehousing and utilities	9,045	6.0%
Public administration	6,919	4.6%
Wholesale trade	6,399	4.2%
Subtotal	**138,605**	**92.0%**
Total Employed Population	**150,705**	**100%**

Source: USCB 2019a

Employment characteristics of the study area and the secondary reference geographies are summarized in Table 3-44. The total employed civilian population within the block groups that make up the study area is 17,354, with the unemployment rate at 1,020 people, or 5.6 percent of the civilian labor force. This unemployment rate is noted to be slightly higher relative to the unemployment rates of Sumner and Wilson counties (4.5 percent) but slightly lower than the State of Tennessee (6.6 percent) (Table 3-44).

Table 3-44. Employment Characteristics of the Resident Labor Force

	Population			
Employment Status	**Study Area (Block Groups within 5-Mile Radius of GAF)**	**Sumner County**	**Wilson County**	**State of TN**
Population >16 years	28,600	138,282	101,456	5,270,257
Civilian Labor Force	18,374	91,603	66,193	3,207,366
Employed	17,354	87,498	63,207	2,996,610
Unemployed	1,020	4,105	2,986	210,756
Unemployment				
% of Total Population > 16 years	3.6%	3.0%	2.9%	4.0%
% of Civilian Labor Force	5.6%	4.5%	4.5%	6.6%

Source: USCB 2019a

3.20.1.3 Community Facilities and Services

Community facilities and services include public or publicly funded facilities such as police protection and other emergency services (ambulance/fire protection), schools, hospitals and other health care facilities, libraries, day-care centers, churches and community centers. When applicable, the study area for the evaluation of impacts to community services is the service area of various providers; otherwise a secondary study area identified for the purposes of a socioeconomic analysis may be defined. In this case, the study area for community impacts is the same as for the socioeconomic analyses described above, within a 5-mile radius of GAF.

Community facilities and services available within the study area include 16 churches, 4 cemeteries, 4 schools and daycare centers, and an airport (USGS 2019a). There are no police stations, fire stations, or hospitals located within a 5-mile radius of GAF, but all of these facilities can be found just outside the 5-mile radius in the city of Gallatin. The closest community facility to the project site is the Franklin Chapel Baptist Church on Odoms Bend Road, located adjacent to the northern EIS project boundary. There are no other community facilities in the immediate vicinity (within 0.5 mile) of GAF.

3.20.1.4 Environmental Justice

On February 11, 1994, President Clinton signed EO 12898 Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. Under EO 12898 some federal-executive agencies are mandated to consider environmental justice as part of the NEPA process. Environmental justice has been defined as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income (EPA 2018a) and ensures that minority and low-income populations do not bear disproportionately high and adverse human health or environmental effects from federal programs, policies, and activities. Although TVA is not one of the agencies subject to this order, TVA routinely considers environmental justice impacts as part of the project decision-making process.

Guidance for addressing environmental justice is provided by the CEQ's Environmental Justice Guidance under the National Environmental Policy Act (CEQ 1997). The CEQ defines minority as any race and ethnicity, as classified by the USCB, as: Black or African American; American Indian or Alaska Native; Asian; Native Hawaiian and Other Pacific

Islander; some other race (not mentioned above); two or more races; or a race whose ethnicity is Hispanic or Latino (CEQ 1997).

Identification of minority populations requires analysis of individual race and ethnicity classifications as well as comparisons of all minority populations in the region. Minority populations exist if either of the following conditions is met:

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

The nationwide poverty level is determined annually by the USCB and varies by the size of family and number of related children under 18 years of age. The 2018 USCB Poverty Threshold for an individual is an annual income of $13,064, and for a family of four, is an annual household income of $25,900 (USCB 2019b). For the purposes of this assessment, low-income individuals are those whose annual household income is less than two times the poverty level. More encompassing than the base poverty level, this low-income threshold, also used by the EPA in their delineation of low-income populations, is an appropriate measure for environmental justice consideration because current poverty thresholds are often too low to adequately capture the populations adversely affected by low income levels, especially in high-cost areas (EPA 2017). According to EPA, the effects of income on baseline health and other aspects of susceptibility are not limited to those below the poverty thresholds. Populations having an income level from one to two times the poverty level also have worse health overall than those with higher incomes (Centers for Disease Control and Prevention 2011). A low-income environmental justice population exists if either of the following two conditions is met:

- The low-income population exceeds 50 percent of the total number of households.
- The ratio of low-income population significantly exceeds (i.e., greater than or equal to 20 percent) the appropriate geographic area of analysis.

Based on a preliminary review of the EPA's EJSCREEN tool, the majority of communities in the vicinity of GAF do not meet the criteria for consideration as minority and/or low-income populations, and those that do tend to be concentrated around the city of Gallatin. A more detailed evaluation was completed using the 2013-2017 American Community Survey data to identify specific block groups within the study area that exceed environmental justice thresholds. Figure 3-14 identifies the block groups that meet the specified criteria as environmental justice minority populations or low-income populations.

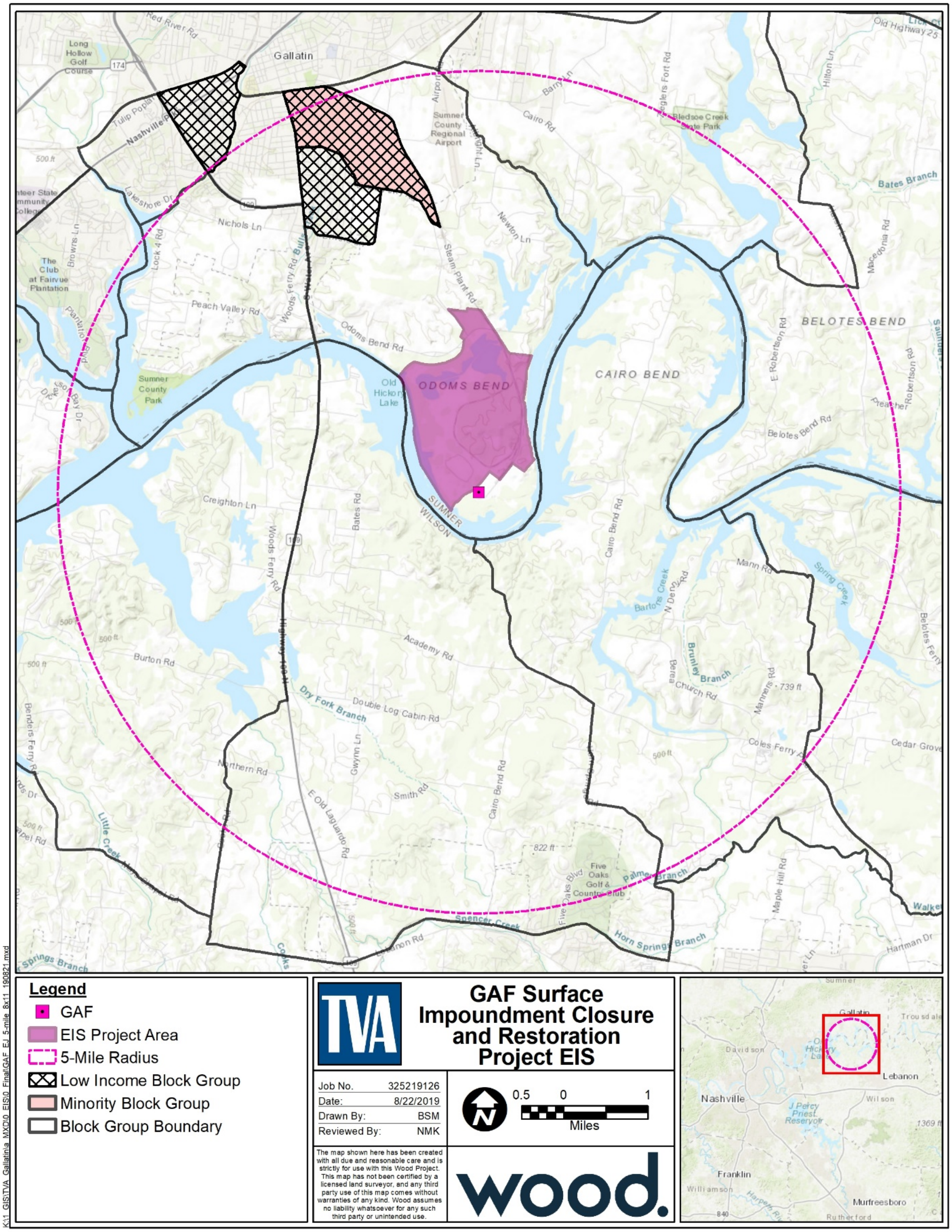


Figure 3-14. Environmental Justice Populations Within the GAF Study Area

Total minority populations (i.e., all non-white and Hispanic or Latino racial groups combined) comprise approximately 15 percent of the population of Sumner County, 14 percent of the population of Wilson County, and 26 percent of the population of Tennessee. Approximately 11.8 percent of people living within the project area are minorities, with percentages for individual block groups ranging from 1.0 to 44.0 percent of the population. Only one of the selected block groups has a minority population that significantly exceeds the minority percentage of one or more of the reference geographies. Figure 3-14 identifies the block group determined to meet the criterion for consideration as a minority population group subject to environmental justice considerations.

The percentage of the population of Tennessee living below the low-income threshold is 37.3 percent. Of the two counties considered, Sumner County has a slightly higher percentage of low-income individuals (26.7 percent) than Wilson County (23.0 percent), though both are notably lower than the state. Approximately 25 percent of people living within the project area are considered low-income, with percentages for individual block groups ranging from 10.3 to 69.8 percent of the population. Three of the selected block groups have low-income populations that either exceed 50 percent of the total population or significantly exceed the low-income percentage of one or more of the reference geographies. Figure 3-14 identifies these block groups determined to meet the criterion for consideration as low-income population groups subject to environmental justice considerations.

In addition to the environmental justice communities located within the 5-mile radius study area, block groups meeting the specified criteria as environmental justice minority or low-income populations along the potential haul routes determined in the bounding analyses for the transport of CCR to candidate landfills were identified (see Section 2.6.2 and Appendix D). Based upon the bounding or worst-case scenario for CCR transport to an offsite landfill, up to 31 percent of the haul route would pass through or is immediately adjacent to block groups with minority environmental justice populations, and up to 30 percent of the haul route would pass through or is immediately adjacent to block groups with low-income environmental justice populations.

3.20.2 Environmental Consequences

3.20.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, no closure activities would occur and there would be no additional construction activities or transport of borrow or CCR materials. Consequently, employment at GAF would remain at existing levels and would not substantially change the local demographics or economy. Additionally, no actions would be undertaken that would have a disproportionate effect on environmental justice populations.

3.20.2.2 Alternative B – Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill

Surface Impoundment Closures

Under Alternative B, impoundment closure activities, including related actions such as the expansion of the existing onsite landfill and construction of ancillary facilities (office complex, ammonia tower, and relocated communications tower) would require a construction workforce of up to 100 personnel for the duration of the approximately 15-year closure period. Workers could be drawn from the labor force that currently resides in the Sumner and Wilson County area and specialty workers and laborers not available within the area would be expected to temporarily relocate or commute to the project area to support impoundment closure activities for the duration of the closure period. Given that the maximum average number of workers needed during closure activities (100) would equate to just 1.4 percent of the unemployed civilian workforce in the two-county project vicinity (7,091), it is likely that most of the workers would be drawn from the existing labor force and that impacts to local demographics, supporting community facilities and services, and employment would be minor.

Onsite closure activities would entail a temporary increase in employment and associated payrolls, as noted above, as well as the purchases of materials and supplies and procurement of additional contract services. Capital costs associated with the proposed actions would, therefore, have direct economic benefits to the local area and surrounding community during the 15-year closure period. Revenue generated by sales tax collected from purchases by construction workers would benefit the local economy. Additionally, temporary beneficial secondary impacts would result from expenditure of the wages earned by the workforce involved in impoundment closure activities. For example, the hospitality and service industries would benefit from the demands brought by the influx of the construction workforce.

Direct impacts to community facilities occur when a community facility is displaced or access to the facility is altered. Indirect impacts occur when a proposed action or project results in a population increase that would generate greater demands for services and/or affect the delivery of such services. As all APC closure activities would occur within the GAF property boundary, they would not result in the displacement of, or impede access to any community facilities. Additionally, as the construction workforce would not have substantial impacts on local demographics, increased demands for services such as schools, churches, and emergency services are not anticipated.

The closest residences to the APC closure limits of disturbance are located approximately 0.7 miles to the southeast, on the opposite side of the reservoir. Due to distance, residents would not experience impacts from APC closure activities, such as increased noise or fugitive dust. Furthermore, as indicated in Figure 3-14, neither the block group containing the GAF property nor the block groups directly across the reservoir meet the criteria for consideration as minority and/or low-income populations under Executive Order 12898. Therefore, there would be no direct impacts to environmental justice populations as a result of onsite APC closure activities. However, it should be noted that employment opportunities may be provided to residents of the study area during the closure period, which could potentially provide positive impacts to area minority and low-income populations.

Expansion of Existing Onsite Landfill

The onsite construction workforce noted in the previous section would also be responsible for landfill expansion activities. Therefore, the demographic, employment, and economic impacts of landfill expansion are included in the discussion above (see Section 3.20.2.2). Additionally, as landfill expansion activities would take place on TVA property, there would be no direct impacts to community services or environmental justice populations.

Construction and Operation of a Beneficial Re-use Processing Facility

Under Alternative B, construction of the beneficial re-use processing facility would require a workforce of up to 150 personnel over the construction period, which would last for up to 14 months (Tables 2-4 and 2-5). Following the construction period, the facility would require a long-term operational workforce of up to 36 personnel. While a specific location for the beneficial re-use processing facility has not been chosen, it is estimated that approximately 90 percent of the workforce would be drawn from the labor force residing in the region where the facility is sited. However, a small number of specialty workers and laborers not available within the region would be expected to relocate to the area, either temporarily to support construction, or long-term to support operational activities. Therefore, demographic characteristics of the region selected for construction of the beneficial re-use processing facility would be expected to experience both temporary and long-term changes in response to the in-migration of construction and operational workforces, respectively. However, given the small number of long-term operational personnel required, and that the majority of the workers would be drawn from the existing labor force in the area, the impact on local demographics and community services and facilities would be minor.

Similar to impoundment closure activities, the construction of a beneficial re-use processing facility would entail a temporary increase in employment and associated construction payrolls, the purchases of materials and supplies, and procurement of additional services. Beneficial economic impacts would result from capital costs associated with the construction, expenditure of wages earned by the workforce, and sales tax revenue from workforce purchases. Following construction, there would be a long-term increase in employment and associated payrolls for the operational workforce, resulting in beneficial economic impacts similar to but less than those associated with the construction period.

While a specific location for the beneficial re-use processing facility has not been chosen, according to the proposed facility attributes and bounding characteristics listed in Tables 2-4 and 2-5, the facility would be located in an area zoned for compatible uses and direct access to the site would be provided by a collector road or major highway that can support truck traffic without noticeable effects to LOS. Based on these bounding characteristics, the construction of the beneficial re-use processing facility would not result in the displacement of any community facilities, nor would nearby community facilities be notably impacted by increased operational traffic. Additionally, as neither the construction workforce or the long-term operational workforce would have substantial impacts on local demographics, increased demands for services such as schools, churches, and emergency services are not anticipated.

Similarly, based on the bounding characteristics, including the location of the facility in an area zoned for compatible uses, the facility would not be constructed in the immediate vicinity of residential properties. Therefore, construction and operation of the facility would not have any direct impacts on environmental justice populations.

However, in the event environmental justice communities are located proximate to routes used to access the facility, these communities could experience transportation-related impacts, first from construction workforce commuting, followed by operational workforce commuting and the delivery of beneficiated product to various markets. During the construction period, lasting up to 14 months, a workforce of up to 150 personnel would be required. Once operational, the facility is anticipated to operate up to 350 days per year, with a commuting workforce of up to 36 employees, while trucking of product (up to 90 truckloads or 180 truck trips per day) would occur 250 days per year, primarily on weekdays. However, because facility attributes include direct access to the site from a collector road or major highway that can support truck traffic without noticeable effects to LOS, this increase in traffic would not have a notable impact on existing traffic patterns or traffic noise. Therefore, impacts associated with the construction and operation of the beneficial re-use processing facility on environmental justice populations are anticipated to be minor.

Additionally, employment opportunities may be provided to residents of the region where the facility is sited during both the construction and operational phases, potentially providing positive impacts to area minority and low-income populations.

Transport of CCR

Under Alternative B (Option 1), all CCR materials removed from the surface impoundments would be transported to the onsite landfill via truck using an onsite paved haul road. Therefore, the onsite transport of CCR would not result in any demographic or economic impacts other than those discussed above and there would be no impact to community facilities or environmental justice populations.

Under Alternative B (Option 2), the majority of CCR materials removed from the impoundments would be transported to a beneficial re-use processing facility (approximately 224 truckloads, or 448 total trips per day), with the remaining CCR being transported to an existing offsite landfill (approximately 56 truckloads, or 112 total trips per day). CCR removal would occur approximately 210 working days per year over the approximately 15-year closure period.

Although a specific location has not been decided for either facility, it is possible that community facilities may be located proximate to the proposed haul routes to the beneficial re-use processing facility and/or offsite landfill. While access to any community facilities would be maintained, there may be some impact to ease of movement to these facilities during closure activities due to increased truck traffic associated with offsite CCR disposal. As noted in Section 3.17 the greatest traffic impacts would occur on the local roads closest to GAF, including Odoms Bend Road and Steam Plant Road (south of Airport Road). However, community services on these road segments are limited to one church, Franklin Chapel, located on Odoms Bend Road. As public use of churches typically occurs on weekends and evenings, outside the normal working hours associated with CCR transport, impacts to this facility are anticipated to be minor. Further from the plant, the project related traffic would disperse on more heavily trafficked major arterial and interstate roadways where the additional traffic would not alter the LOS, and thus, would have only minor impacts to community facilities located along the haul routes.

Transportation activities associated with offsite CCR removal also have the potential to result in indirect impacts to those communities located along the transportation routes, such as increased traffic, transportation related noise, and exposure to fugitive dust and exhaust emissions. Per the facility attributes listed in Table 2-4, CCR transported to the beneficial re-use processing facility could be trucked up to 10 miles to the nearest highway or interstate system. Once on these high-capacity roadways, project-related traffic would fit in with familiar traffic patterns. The two potential routes to a highway system from GAF would be Steam Plant Road to Odoms Bend Road to SR109, or Steam Plant Road to Airport Road, which connects to both SR25 (Hartsville Pike) and US31 (Gallatin Pike). Along these segments, there is just one block group that meets the criteria for consideration as an environmental justice population, located west adjacent to Steam Plant Road approximately 1.5 miles north of GAF. However, the portion of this block group adjacent to the potential haul route is predominantly industrial in nature, with no residences located directly off the road. Additionally, hauling operations would typically be limited to weekdays during normal working hours and BMPs designed to minimize fugitive dust emissions would be utilized. As the beneficial re-use processing facility would have direct access from a collector road or major highway (Table 2-4), the remainder of the haul route to the facility would be comprised of high-capacity roadways where additional truck traffic would assimilate into the existing traffic patterns. Therefore, impacts of CCR transport to the beneficial re-use processing facility on residential communities and environmental justice populations along the haul route would be minor.

CCR material not suitable for beneficial re-use would be transported from GAF to an existing offsite landfill for disposal. A specific landfill has not been selected, but based upon the bounding or worst-case scenario identified in Section 2.6.2, CCR could be transported up to 184.3 miles to an offsite landfill via over-the-road trucks. As indicated in the bounding attributes presented in Table 2-6, the maximum length of a haul route to a candidate landfill through or adjacent to block groups with environmental justice populations is 40.4 miles for minority populations and 52.4 miles for low-income populations. Potential haul routes to the landfills identified in the bounding analysis would primarily use arterial or interstate roadways whenever possible, where the additional truck traffic would assimilate into the existing traffic patterns. Additionally, communities located along the interstate and other arterial routes are typically set back at a distance from the roadway, minimizing impacts from noise and dust emissions. As previously noted, there is one block group containing an environmental justice population along the lower capacity roads near GAF, but impacts to this community would be minimal due to the distance between residences and the haul route. However, depending on the landfill chosen by TVA, it may also be necessary for portions of the haul route to utilize collector roads through residential areas in the vicinity of the destination landfill, some of which have been identified as communities subject to environmental justice considerations. Residences along these lower capacity roads are often located closer to the roadway, and due to lower traffic counts, would be impacted by the increase in truck traffic. However, BMPs designed to minimize fugitive dust emissions (such as covered loads) would be utilized to minimize the effects of fugitive dust. Furthermore, CCR transport would typically only occur on weekdays during normal working hours and would be limited to the duration of closure activities. For these reasons, impacts of CCR transport via truck could have a minor to moderate impact on environmental justice populations that would be limited to the duration of the closure period.

As indicated in Table 2-6, under the bounding or worst-case scenario, the offsite landfill would be located in a low-income environmental justice community. The impacts to the environmental justice communities adjacent to the landfill would consist primarily of the transportation-related impacts described above. As the candidate landfills are all existing, permitted landfills with the capacity to accept the CCR without further expansion, the operations associated with disposal of CCR within the landfill boundaries would be consistent with current, permitted use.

Transport of Borrow

Borrow material used for site restoration would be obtained from the previously permitted TVA-owned borrow site, located 1.5 miles northwest of GAF, at a rate of approximately 32 truck trips per working day. As there are no community facilities or populations subject to environmental justice consideration located along the segment of Steam Plant Road utilized by the borrow haul route, the transport of borrow would have no impact on socioeconomics or environmental justice.

3.20.3 Summary of Impacts to Socioeconomics and Environmental Justice

In summary, impoundment closure and associated activities would have minor but beneficial impacts to the local economy and employment. No direct impacts to community facilities and services or environmental justice communities are anticipated. However, indirect impacts associated with transportation activities under this alternative may affect environmental justice populations located along the haul routes. These impacts would be minor to moderate in nature, limited to the duration of the closure period, and consistent across all communities (i.e., environmental justice and non-environmental justice) along the anticipated transportation routes. In addition, BMPs designed to minimize fugitive dust emissions would be employed, and CCR transport would generally be restricted to weekdays during normal working hours. Therefore, there would be no disproportionately high and adverse impacts to minority or low-income populations under this alternative.

As summarized in Table 3-45, TVA has determined that all impacts to socioeconomics and environmental justice related to the primary action and associated component actions for the proposed ash impoundment closures at GAF are minor to moderate.

Table 3-45. Summary of Impacts to Socioeconomics and Environmental Justice

Alternative	Action	Impact	Severity
		Impoundment Closure	
Alternative B	Closure-by-Removal of APC	Temporary changes in demographic and employment characteristics	Minor beneficial impact.
		Temporary benefits to local economy associated with capital costs, sales tax revenue, and expenditure of construction worker wages.	Minor beneficial impact.
		Landfill Expansion	
Alternative B	Expansion of Landfill and Ancillary Facilities	Temporary changes in demographic and employment	Minor beneficial impact.
		Temporary benefits to local economy associated with capital costs, sales tax revenue, and expenditure of construction worker wages.	Minor beneficial impact.
		Construction and Operation of Beneficial Re-use Processing Facility	
Alternative B	Construction and Operation of a Beneficial Re-use Processing Facility	Temporary and long-term changes in demographic and employment characteristics	Minor beneficial impact.

Alternative	Action	Impact	Severity
		Long-term increase in traffic and associated noise for any environmental justice populations near the facility due to increased workforce and delivery CCR to the site and beneficiated product from the site.	Minor impact. Location on major highway or collector road results in minimal changes in existing traffic conditions.
		Transport of CCR	
Alternative B (Option 1)	Transport of CCR to Onsite Landfill	No impact.	No impact.
Alternative B (Option 2)	Transport of CCR to Beneficial Re-use Processing Facility	Disruption to residential communities and environmental justice populations along the haul route. Temporary increase in fugitive dust, air emissions, noise, and traffic.	Minor and not disproportionate.
Alternative B (Option 2)	Transport of CCR not Suitable for Beneficial Re-use	Disruption to residential communities and environmental justice populations along the haul route. Temporary increase in fugitive dust, air emissions, noise, and traffic.	Minor and not disproportionate.
		Transport of Borrow	
Alternative B	Truck transport of borrow to GAF from TVA-owned borrow site	No impact.	No impact.

3.21 Public Health and Safety

3.21.1 Affected Environment

Workplace health and safety regulations are designed to eliminate personal injuries and illnesses from occurring in the workplace. The OSHA is the main statute protecting the health and safety of workers in the workplaces. TVA has a robust safety conscious culture that is focused on awareness and understanding of workplace hazards, prevention, intervention, and active integration of BMPs to avoid and minimize hazards. Personnel at GAF are conscientious about health and safety having addressed and managed operations to reduce or eliminate occupational hazards through implementation of safety practices, training, and control measures.

General guidelines for work place safety that are communicated to work crews include the following:

- *Pre-Job Brief* – allows the worker to think through a job and use that knowledge to make the job as safe as possible.

- *Two-Minute Rule* (situational awareness) – take time before starting a job to familiarize yourself with the work environment and to identify conditions that were not identified during the pre-job brief.
- *Stop When Unsure* – when confronted with a situation that creates a question and what to do is uncertain, stop and get help.
- *Self-Check* – use of “STAR” acronym to promote self-check awareness: **S**top and focus, **T**hink what will happen with right or wrong action, **A**ct correctly, **R**eview that the results are as expected.
- *Procedure Use and Adherence* – allows for proper application of procedures and work packages based on expected activities.
- *Flagging and Operational Barriers* – key to ensure control of the work zones and avoidance of exposure to work hazards by public.
- *Three-Way Communication* – essential for all job tasks to ensure they are completed safely and productively.

TVA’s Safety Standard Programs and Processes would be strictly adhered to during the proposed actions. The safety programs and processes are designed to identify actions required for the control of hazards in all activities, operations and programs. It also establishes responsibilities for implementing OSHA and state requirements.

The potential offsite consequences and emergency response plan are discussed with local emergency management agencies. These programs are audited by TVA no less than once every three years and by EPA periodically.

Mitigative measures are used to ensure protection of human health which includes the workplace, public and the environment. Applicable regulations and attending administrative codes that prescribe monitoring requirements may include those associated with emergency management, environmental health, drinking water, water and sewage, pollution discharge, air pollution, hazardous waste management and remedial action.

Additionally, wastes generated by operation of the plant can pose a health hazard. Wastes including solid wastes, hazardous waste, liquid wastes, discharges and air emissions are managed in accordance with applicable federal, state and local laws and regulations and all applicable permit requirements. TVA is committed to complying with all applicable regulations, permitting and monitoring requirements. Furthermore, waste reduction practices are employed including recycling and waste minimization.

3.21.2 Environmental Consequences

3.21.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, no closure activities would occur and there would be no additional construction activities or offsite transport of borrow or CCR materials. The operations and maintenance activities at GAF would continue within the safety-conscious culture, and activities currently performed would be in accordance with applicable standards or specific TVA guidance. TVA’s safety conscious efforts would continue such that no changes to current public and health and safety are anticipated under this alternative. Therefore, Alternative A would not have an impact on public health and safety.

3.21.2.2 Alternative B – Closure of the APC via Closure-by-Removal and Expansion of the Existing Onsite Landfill

Impoundment Closures

Closure-by-Removal of the APC would include the excavation of CCR from the impoundments and the transport of the excavated material via onsite haul roads to the existing onsite NRL Landfill, an expansion of the existing landfill, or a combination of these landfills. Closure activities would entail dewatering, clearing and grubbing, excavation and stockpiling of ash, and onsite restoration activities such as grading and revegetating. The equipment required for impoundment closure includes dozers, compactors, dump trucks, scrapers/pans, track hoes and diesel pumps. As identified in the PEIS (TVA 2016) deep excavations of CCR can result in increased risks to workforce health and safety. Customary industrial safety standards including OSHA requirements for workers engaged in excavation activities would help reduce these risks. Also, the establishment of appropriate BMPs and job site safety plans would describe how job safety would be maintained during the project. These BMPs and site safety plans address the implementation of procedures to ensure that equipment guards, housekeeping, and personal protective equipment are in place; the establishment of programs and procedures for lockout, right-to-know, hearing conservation, heavy equipment operations, excavations, and other activities; the performance of employee safety orientations and regular safety inspections; and the development of a plan of action for the correction of any identified hazards. All of these measures would help ensure that job site safety risks are reduced.

TVA may decide to contract with outside vendors for construction and/or transportation services under Alternative B. It is TVA policy that all contractors have in place a site-specific health and safety plan prior to operation on TVA properties. The contractor site-specific health and safety plans must address the hazards and controls as well as contractor coordination for various construction tasks. With the high level of safety awareness and preparation during impoundment closure activities, safety and security plans and safety awareness would reduce potentially large safety risks (deep excavations into the CCR impoundments) down to a minor and temporary impact.

In addition, maintenance of the closed impoundments (e.g., maintaining vegetation, monitoring, and reporting as necessary) would adhere to established health and safety practices. These practices would address and provide management procedures for the reduction or elimination of occupational and public health hazards.

Use of BMPs, safety procedures, and security measures would minimize possible safety effects. Therefore, impacts to public health and safety from surface impoundment closures under Alternative B would be minor.

Expansion of Existing Onsite Landfill

Under Alternative B, during the construction of each of the landfill cells, the associated haul route, and ancillary facilities including the office complex, relocated communications tower, and ammonia sensor tower, earthmoving, compacting, and paving equipment, and trucks for hauling materials would be used. Customary industrial safety standards as well as the establishment of applicable BMPs and job site safety plans would describe how job safety would be maintained. These BMPs and site safety plans address the implementation of procedures to ensure that equipment guards, housekeeping, and personal protective equipment are in place; the establishment of programs and procedures for lockout (to ensure machinery or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance), right-to-know (correct labeling of materials), hearing conservation, equipment operations, excavations, grading, and other activities; the performance of employee safety orientations and regular safety inspections; and the development of a plan of action for the correction of any identified hazard. Construction debris and wastes would be managed in accordance with federal, state, and local requirements. Construction activities in support of the proposed projects would be performed consistent with standards as established by OSHA and TVA requirements. Worker and public health and safety during construction including material transportation would be maintained and impacts to public health and safety would be minor.

Operation of the proposed onsite landfill expansion would require the use of earthmoving and compacting equipment, as well as trucks for hauling materials. The operation of the proposed landfill expansion would comply with TVA guidance and be consistent with standards established by OSHA. Health and safety practices would be developed and implemented to address and manage the reduction or elimination of occupational and public health hazards through worker training and adherence to safety practices and control measures.

All facility wastes would be managed in accordance with applicable federal, state and local laws and regulations and all applicable permit requirements. No hazardous materials that might affect human safety are expected to be utilized. Implementation of operational safety measures would manage and address monitoring and control; maintenance and integrity programs; performance of field surveys and inspections; right-of-way maintenance; and public awareness. Therefore, worker and public health and safety during operation would be maintained and impacts would be minor.

Construction and Operation of a Beneficial Re-use Processing Facility

As shown in Table 2-4, construction of the proposed beneficial re-use processing facility under Alternative B would occur over an approximately 14-month period. Excavation activities may include deep pier foundations (approximately 40 feet deep) for the processing island and minor trenching for establishment of pipelines. No basement or deep foundations would be required for the occupied buildings.

It is expected that construction activities in support of the proposed facility would be performed consistent with standards as established by OSHA and state requirements, and the establishment of applicable BMPs and job site safety plans would describe how job safety would be maintained. Construction debris and wastes would be managed in accordance with federal, state, and local requirements. Worker and public health and safety during construction including material transportation would be maintained and impacts to public health and safety from construction of a beneficial re-use processing facility would be minor.

Activities associated with operation of the beneficial re-use processing facility would adhere to established health and safety practices. These practices would address and provide management procedures for the reduction or elimination of occupational and public health hazards. Operation of the beneficial re-use facility would include transport of CCR to the facility and transport of beneficiated product to various markets, which would be associated with increased risks related to offsite transportation (crashes, road damage and other transportation-related effects). The development and implementation of appropriate safety plans, training and a comprehensive overall safety culture is assumed to be part of any vendor selected by TVA.

With the preparation and execution of safety plans and training, overall impacts to safety with construction and operation of a beneficial re-use processing facility would be minor. However, given the additional risks associated with the short-term construction and long-term operation of the proposed beneficial re-use processing facility, including the number of additional trucks estimated to be on the roadways for transport of beneficiated product, impacts under Alternative B (Option 2) would be minor, yet incrementally greater than Alternative B (Option 1).

Transport of CCR

Under Alternative B (Option 1), all CCR materials removed from the surface impoundments would be transported via onsite haul roads to the existing onsite NRL Landfill, an expansion of the existing landfill, or a combination of these landfills. Therefore, all CCR transport activity would take place on GAF property and would not require the utilization of public roadways. This would reduce the possibility of traffic incidents, road damage, and other transportation-related effects and, as such, would lessen the potential for impacts to public health and safety. Worker safety during material transportation would be maintained through TVA's standard traffic management measures employed at all of TVA plant sites. Therefore, impacts to public health and safety under Alternative B (Option 1) would be minor.

Under Alternative B (Option 2), the majority (approximately 80%) of CCR materials removed from the impoundments would be transported to a beneficial re-use processing facility via over-the-road trucking at rates of approximately 224 truckloads (448 truck trips) per day on public roadways. CCR not suitable for beneficial re-use would be transported to a landfill up to approximately 184 miles from GAF at a rate of 56 truckloads per day (112 truck trips). As identified in the PEIS (TVA 2016) offsite transport of CCR results in a higher risk to workforce health and safety as well as increased risk related to offsite transportation of CCR (crashes, road damage and other transportation-related effects). Closure activities, including materials transport, would last approximately 15 years.

The combined hauling activities in combination with increased construction-related traffic to the work site could cause an increase in truck traffic to and from the facility. Increased truck traffic could lead to a slightly higher risk of accidents in the GAF vicinity during the closure period due to the increase in the number of vehicle miles traveled on those roadways. This increase in vehicle miles is a factor in injury and fatal traffic crash rates. According to the bounding, or worst-case scenario, attributes for transport of CCR not suitable for beneficial re-use to an offsite landfill (shown in Table 2-6), the estimated number of transport-related injuries over the closure period would be 20, and the estimated number of transport-related fatalities would be 0.8 (FHWA 2016b). However, because of the notable increase in truck traffic expected on otherwise low volume local roads surrounding GAF (Odoms Bend Road, Steam Plant Road), the incidence rate of accidents on these roadways is likely to be higher.

TVA may decide to contract with outside vendors for construction and/or transportation services under Alternative B. It is TVA policy that all contractors have in place a site-specific health and safety plan prior to operation on TVA properties.

The establishment of appropriate BMPs and job site safety plans would address transportation in describing how job safety would be maintained during the project. In addition, traffic control measures would be installed in high-risk areas as needed to minimize congestion. With the preparation and execution of safety plans and training, overall impacts to safety with transport of CCR to a beneficial re-use processing facility and to an offsite landfill would be minor. However, given the additional risks associated with the number of additional trucks estimated to be on public roadways, impacts under Alternative B (Option 2) would be minor, yet incrementally greater than Alternative B (Option 1).

Transport of Borrow

Borrow material required for closure of the APC and expansion of the onsite landfill would be obtained from the previously permitted TVA-owned borrow site located 1.5 miles northwest of GAF. TVA estimates that, when needed, borrow would be transported to GAF at an average rate of 16 truckloads per day (32 truck trips) throughout the closure period. Borrow would be transported on graveled (borrow site access road) and on paved road (Steam Plant Road). Transport of borrow material on public roadways to the project area, in combination with increased construction-related traffic to the work site, results in increased risks of crashes, road damage, and other transportation-related incidents in the GAF vicinity. However, impacts related to borrow material transport would be minor because the project area is a short distance from the borrow site, transport of borrow would be intermittent throughout the closure period, and transport would be performed consistent with standards as established by OSHA requirements.

TVA may decide to contract with outside vendors for transportation services under Alternative B. It is TVA policy that all contractors have in place a site-specific health and safety plan prior to operation on TVA properties.

The establishment of appropriate BMPs and job site safety plans would address transportation in describing how job safety would be maintained during the project. In addition, traffic control measures would be installed at any high-risk areas as needed to minimize congestion. Therefore, transportation-related impacts to public health and safety from borrow transport would be temporary and minor.

3.21.3 Summary of Impacts to Public Health and Safety

As summarized in Table 3-46, TVA has determined that impacts to public health and safety resulting from the primary action and associated component actions related to the proposed closure of the APC at GAF are minor.

Table 3-46. Summary of Impacts to Public Health and Safety

Alternative	Action	Impact	Severity
		Impoundment Closure	
Alternative B	Closure-by-Removal of APC	Temporary impacts related to construction activities and construction-related traffic.	Minor impact.
		Increased risk associated with excavation of CCR impoundments.	Minor Impact.

Alternative	Action	Impact	Severity
		Landfill Expansion	
Alternative B	Expansion of Landfill and Ancillary Facilities	Temporary construction impacts related to construction activities and construction-related traffic.	Minor Impact.
		Construction and Operation of Beneficial Re-use Processing Facility	
Alternative B	Construction and Operation of a Beneficial Re-use Processing Facility	Temporary impacts related to construction activities, including excavation, and construction-related traffic.	Minor impact, though impacts of Alternative B (Option 2) would be incrementally greater than Alternative B (Option 1) due to additional risks (excavation) associated with the short-term construction of the proposed facility.
		Long-term transport of beneficiated product to various markets results in increased risk related to offsite transportation (crashes, road damage and other transportation-related effects).	Minor impact, though impacts of Alternative B (Option 2) would be incrementally greater than Alternative B (Option 1) due to the number of additional trucks on roadways for transport of beneficiated product.
		Transport of CCR	
Alternative B (Option 1)	Transport of CCR to Onsite Landfill	Impacts to public health and safety related to truck transport of CCR. Worker safety during material transportation would be maintained through TVA's standard traffic management measures.	Minor impact, minimized by no transport on public roadways. Less risk for injuries and fatalities than Alternative B (Option 2).
Alternative B (Option 2)	Transport of CCR to Beneficial Re-use Processing Facility	Increased risk related to offsite transportation of CCR (crashes, road damage, and other transportation-related effects).	Minor impact, minimized with the installation of traffic control measures as needed to minimize congestion. Greater risk for injuries and fatalities than Alternative B (Option 1).
Alternative B (Option 2)	Transport of CCR not Suitable for Beneficial Re-use	Increased risk related to offsite transportation of CCR (crashes, road damage, and other transportation-related effects).	Minor impact, minimized with the installation of traffic control measures as needed to minimize congestion. Greater risk for injuries and fatalities than Alternative B (Option 1).

Alternative	Action	Impact	Severity
		Transport of Borrow	
Alternative B	Truck transport of borrow to GAF from TVA-owned borrow site	Impacts to public health and safety related to transport of borrow material on public roadways.	Minor impact, minimized by short hauling distance (1.5 miles) and intermittent activity.

3.22 Unavoidable Adverse Impacts

Unavoidable adverse impacts are the effects of the proposed action on natural and human resources that would remain after mitigation measures or BMPs have been applied. Mitigation measures and BMPs are typically implemented to reduce a potential impact to a level that would be below the threshold of significance as defined by the CEQ and the courts. Impacts associated with the proposed primary action and related component actions have the potential to cause unavoidable adverse effects to several natural and human environmental resources.

Under the Alternative B, the closure of surface impoundments at GAF has the potential to cause unavoidable adverse effects to existing open water habitats located within the impoundments. However, this impact is considered minor as these areas are elements of a man-made permitted treatment system which do not provide high quality habitat. In addition, temporary impacts to water quality from runoff at the site could impact nearby receiving water bodies during closure activities. BMPs to minimize runoff would be implemented, and water released by closure activities would meet established TDEC permit limits.

The construction of a landfill expansion and office complex would take place on lands that are predominantly undeveloped and covered with forested or herbaceous vegetation. Clearing and grading of the site would result in long-term impacts to species composition and wildlife habitat. However, the project area is located within the boundaries of an existing industrial use (i.e., GAF) and has been previously disturbed. Adverse impacts would also occur to the intermittent and ephemeral streams, wet weather conveyances, ponds and wetlands within the landfill expansion and office complex areas. These impacts would be mitigated through adherence to applicable permit requirements. In addition, cemeteries located within the APE footprint that are potentially eligible for the NRHP would be adversely impacted; however, these impacts would be mitigated in consultation with the SHPO and tribes through the delineation of graves, conducting historical and genealogical research on the persons buried in each, providing public notice, analysis of remains, contacting living relatives, removing all graves from the cemeteries and relocating them to a new burial ground identified by TVA, and installation of interpretive signage or marker.

Other impacts associated with Alternative B would primarily be related to impacts that occur during onsite closure activities. Activities associated with the use of construction equipment may result in varying amounts of dust, air emissions, and noise that may potentially impact both onsite workers and residents located north of the property along Odoms Bend Road and Newton Lane. Workers would use appropriate protection and adhere to safety standards designed to minimize worker-related injuries. Noise emissions from onsite construction activities and equipment will be minimized through implementation of BMPs including proper maintenance of construction equipment and vehicles.

The commuting of the construction workforce and construction-related equipment (Alternative B, Options 1 and 2), transport of borrow material (Alternative B, Options 1 and 2), and transport of CCR to a beneficial re-use processing facility and offsite landfill (Alternative B, Option 2) would increase traffic on public roads which could compromise public safety. This additional traffic would also increase noise and fugitive dust in areas proximate to these roads, adversely impacting parks and recreational facilities, environmental justice populations, and sensitive noise receptors along the routes. Emissions from construction equipment are minimized through implementation of BMPs including proper maintenance of construction equipment and vehicles and dust suppression measures. Following impoundment closure activities, traffic volumes, noise levels, exhaust emissions and fugitive dust would return to baseline levels.

Under Alternative B (Option 2), the construction of proposed beneficial re-use processing facility could adversely impact natural resources such as vegetation, wildlife, surface waters and wetlands, located where the facility is sited. However, based on the facility attributes and bounding characteristics listed in Tables 2-4 and 2-5, impacts to these environmental features would be minimized to the extent possible. Unavoidable impacts would be permitted through the appropriate federal and state agencies.

With the application of appropriate BMPs and adherence to permit requirements, most unavoidable adverse effects would be minor. However, given the number of additional vehicle trips associated with the offsite transport of CCR, large impacts to the roadway network in close proximity of GAF cannot be avoided under Alternative (Option 2). Impacts to these roadways could, however, be mitigated through utilization of a traffic management plan to be undertaken by TVA and improvements such as added signalization and increased turn-lane storage.

3.23 Relationship of Short-Term Uses to Long-Term Productivity

NEPA requires a discussion of the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity. This EIS focuses on the analyses of environmental impacts associated with the various primary and component actions proposed to support disposal of CCR from the impoundments at GAF. For the purposes of this section, these activities are considered short-term uses of the environment and the long-term is considered to be initiated upon the closure of the impoundments at GAF. This section includes an evaluation of the extent that the short-term uses preclude any options for future long-term use of the project site.

Impoundment closure activities would have a negative effect on a limited amount of short-term uses of the environment such as air, noise, and transportation resources as described above. In addition, construction activities such as site preparation and noise may displace some wildlife during the construction period. Most environmental impacts during construction activities would be relatively short-term and would be addressed by BMPs and mitigation measures. Construction activities would have a limited, yet favorable short-term impact to the local economy through the creation of construction and support jobs and revenue.

Long-term effects of the landfill expansion and office complex development would include the permanent loss of forested land and terrestrial wildlife habitat, and permanent alteration of surface waters and wetlands within the construction areas. However, other high-quality habitat for displaced wildlife is located elsewhere in the vicinity. Because GAF is dedicated to power production, no loss of productivity of other natural resources is anticipated.

Additionally, although there is adequate capacity to store production CCR in the existing onsite landfill, at some point in the future, capacity to store CCR onsite will become a limiting factor for GAF operations. Therefore, the development of the onsite landfill expansion would have a favorable short-term impact on the operations at GAF in that the proposed landfill expansion would meet the need for long-term storage of CCR.

Transport of borrow material to the project site (Alternative B, Options 1 and 2), as well as transport of CCR to a beneficial re-use processing facility and an offsite landfill (Alternative B, Option 2), would have little to no effect on existing natural and physical resources because no new roadways or landfill facilities would be required. Although impacts to roadways along local roads would occur, they would be addressed through development and implementation of a traffic management plan to be undertaken by TVA and the long-term productivity would not be affected. Additionally, as all borrow material would be obtained from the TVA-owned borrow site north of the plant, there would be no impact on the availability of this resource for other uses.

Long-term effects of impoundment closure would include the permanent loss of marginal waterfowl and wading bird habitat as impoundments are dewatered. However, other higher quality waterfowl and wading bird habitat is generally located elsewhere in the vicinity of GAF. In the long-term, as the APC would not be subject to future restrictions under the CCR Rule, there would be a broad range of future land use options available, enhancing long-term productivity of the site.

Overall, limited effects to local resources may affect use of those resources during construction activities associated with impoundment closures. However, the long-term use of these resources would not be affected and resulting redevelopment of the land may result in increased productivity as compared to the No Action Alternative. Additionally, impoundment closure would have a beneficial effect on long-term productivity through the reduction or elimination of potential subsurface discharges to groundwater that would occur as a result of closure of the impoundments.

Additionally, under Alternative B (Option 2), the proposed beneficial re-use processing facility would likely be constructed in an area that has been previously disturbed and supports industrial uses. Any short-term adverse impacts, such as localized increases in noise, fugitive dust, and air emissions, and beneficial economic impacts associated with construction would be similar to those anticipated for construction activities as described above for impoundment closure, but at a much smaller scale. Use of this land for the beneficial re-use processing facility would be consistent with land use in the area and is not expected to affect the region’s long-term productivity.

Landfills that meet the criteria outlined in the bounding analysis and described in Section 2.6.2 and Appendix D would be utilized for disposal of CCR from the GAF surface impoundments that is not suitable for beneficial re-use. Disposal of CCR in one of these landfills would impact capacity and, therefore, may impact users of an individual landfill. However, due to the available capacity for large volumes of solid waste at permitted landfills in the region, there would not be a long-term impact to the overall availability of landfill capacity. No impacts to commercial landfill capacity would occur under Alternative B (Option 1), as all CCR would be disposed of in an onsite landfill.

3.24 Irreversible and Irretrievable Commitments of Resources

The term irreversible commitments of resources describe environmental resources that are potentially changed by the construction or operation of the proposed projects that could not be restored to their prior state by practical means at some later time. Irreversible commitments generally occur to nonrenewable resources such as minerals or cultural resources and to those resources that are renewable only over long timespans, such as soil productivity. A resource commitment is considered irretrievable when the use or consumption is neither renewable nor recoverable for use until reclamation is successfully applied. Irretrievable commitments generally apply to the loss of production, harvest, or other natural resources and are not necessarily irreversible. For example, the construction of a road through a forest would be an irretrievable commitment of the productivity of timber within the road right of way as long as the road remains. Mining of ore is an irreversible commitment of a resource; once the ore is removed and used, it cannot be restored.

The land within the APC is not irreversibly committed because upon completion of impoundment closure activities this land could be returned to other industrial or nonindustrial uses. However, the land used for the proposed landfill expansion is irreversibly committed, as there would be limitations on future use of this land following the cessation of landfill operations, in accordance with a landfill closure/post-closure plan approved by TDEC and the CCR Rule.

Resources required by impoundment closure activities, including labor and fossil fuels, would be irretrievably lost. Nonrenewable fossil fuels would be irretrievably lost through the use of gasoline and diesel-powered equipment during construction and operation of the landfill expansion, removal of CCR, placement of fill, and transport of CCR and borrow material. However, it is unlikely that their limited use in this effort would adversely affect the overall future availability of these resources.

The transfer of borrow material from the borrow site to the landfill expansion and impoundment closure areas for use in restoration could be both an irreversible and irretrievable commitment of resources. The loss of soil (which requires a very long time to generate) would constitute an irreversible and irretrievable resource commitment; however, revegetating the borrow site and impoundment areas would return both sites to productive status. Thus, the loss of vegetation until the areas are successfully revegetated would be an irretrievable commitment, but not irreversible.

For Alternative B (Option 2), the land used for the proposed beneficial re-use processing facility would be irretrievably lost from construction of the structures and associated features. Nonrenewable fossil fuels would be irretrievably lost through the construction and operation of the facility. In addition, the materials used for the construction of the facility would be committed for the life of the facility. While some of these building materials may be irreversibly committed, some metal components and structures could be recycled. The limited use of building materials for use in this project would not adversely affect the future availability of these resources.

The use of an existing landfill for placement of CCR under Alternative B (Option 2) would result in no changes to the committed materials and resources associated with landfill use. However, landfill capacity would be irretrievably lost. This impact would be minor relative to existing landfill capacity within the region.

3.25 Cumulative Effects

The CEQ regulations (40 CFR 1500-1508) implementing the procedural provisions of the NEPA of 1969, as amended (42 USC 4321 et seq.) define cumulative impact as:

> "…the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR § 1508.7)."

TVA evaluated a full range of environmental resource issues for inclusion in the cumulative effects analysis. The proposed actions and their connected actions identified under Alternative B would occur mostly on land that was previously disturbed and is used for industrial purposes. The surrounding landscape is already subject to environmental stressors associated with continuing industrial operations. Consequently, as has been described in prior subsections of this EIS, the existing quality of environmental resources with the potential to be directly or indirectly affected by project activities is generally low. The proposed transportation of CCR from the facility to an onsite landfill, beneficial re-use processing facility, or offsite landfill would utilize existing roadways and this material would be managed on land developed as a landfill or operated as an industrial facility. Additionally, borrow would be obtained from a previously permitted site. As such, impacts associated with these actions are confined to those associated with the transportation of CCR from the APC at GAF for disposal or the transport of borrow to GAF to be used for site restoration and/or landfill construction.

3.25.1 Geographic Area of Analysis

The appropriate geographic area over which past, present, and future actions could reasonably contribute to cumulative effects is variable and dependent on the resource evaluated. The cumulative impact analysis is based on the resources of potential concern and the geographic area in which potential adverse effects from site-specific activities have the potential to alter (degrade) the quality of the regional environmental resources. The appropriate geographic area of analysis for GAF is therefore limited to the immediate project area and vicinity (5-mile radius) surrounding GAF. For air quality, the geographic area is Sumner County and the surrounding counties (Davidson, Macon, Robertson Trousdale and Wilson in Tennessee and Allen and Simpson county in Kentucky).

3.25.2 Identification of "Other Actions"

Past, present, and reasonably foreseeable future actions that are appropriate for consideration in this cumulative analysis are listed in Table 3-47. These actions were identified within the geographic area of analysis as having the potential to, in the aggregate, result in larger and potentially significant adverse impacts to the resources of concern.

Table 3-47. Summary of Other Reasonably Foreseeable Future Actions in the Vicinity of the Proposed Project

Action	Description	Timing and Reasonable Foreseeability
Continuing operations at GAF	GAF generates electrical power for TVA and results in the production of CCR materials	Past, Present, Reasonably Foreseeable Future
Construction and operation of the NRL Landfill	TVA constructed a landfill onsite at GAF to provide storage for dry CCR	Past, Present, Reasonably Foreseeable Future
Construction and operation of the interim flow management system	TVA constructed an interim flow management system to treat process water flows. Modifications to the system are currently being developed and assessed in a Supplemental EA.	Past, Present, Reasonably Foreseeable Future
Installation of emission control equipment and associated facilities at GAF	Equipment was installed at GAF to reduce emissions	Past
Construction of the borrow site	TVA developed a borrow site on TVA-owned property near GAF to support ongoing operations and maintenance activities at GAF	Past, Present, Reasonably Foreseeable Future
Closure of the NRS	After appropriate investigations, TVA will submit for TDEC approval for closure of the NRS	Reasonably Foreseeable Future
Operation of the Cumberland River Aquatic Center (CRAC)	The CRAC is a hatchery facility originally constructed by TVA at GAF and managed by TWRA	Past, Present, Reasonably Foreseeable Future
TDOT State Route (SR) 109 widening project	Widening of SR 109 in Sumner and Wilson Counties	Past, Present, Reasonably Foreseeable Future
Growth and Development Projects in Gallatin	Rapid industrial and residential growth due to Gallatin’s proximity to Nashville	Past, Present, Reasonably Foreseeable Future

Actions that have a timing that is “past” or “present” inherently have environmental impacts that are integrated into the base condition for each of the resources analyzed in this chapter. However, these actions are included in this discussion to provide for a more complete description of their characteristics. Actions that are not reasonably foreseeable are those that are based on mere speculation or conjecture, or those that have only been discussed on a conceptual basis.

3.25.2.1 Continuing Operations at GAF

GAF was built between 1953 and 1959 and has operated, and would continue to operate, four coal-fired, steam-generating units and eight CT units. GAF currently generates about seven billion kilowatt-hours of electric power in a typical year, which is enough electrical energy to meet the needs of approximately 480,000 homes. GAF consumes an average of 3.5 million tons of coal per year, which results in the annual production of approximately 255,000 tons of CCR.

3.25.2.2 Construction and Operation of the NRL Landfill

The NRL Landfill was constructed onsite at GAF to provide storage for dry CCR produced by a dry Flue Gas Desulfurization scrubber system. Construction of Cell 1 was completed in March 2016, and construction of the remaining two cells will be completed over the next seven to 15 years. The landfill is estimated to cover 52 acres and provide capacity to store 6.7 million cubic yards of CCR (TVA 2018a).

3.25.2.3 Installation of Emission Control Equipment and Associated Facilities at GAF

TVA constructed a dry flue gas desulfurization (scrubber) in 2016, selective catalytic reduction, pulse jet fabric filter, and activated carbon injection systems to meet regulatory requirements and agency and advocacy group agreements. The installation of these systems has resulted in a decrease in air pollutants emitted at GAF (TVA 2018a).

3.25.2.4 Borrow Site

TVA has developed a borrow site on TVA-owned property near GAF to support ongoing operations and maintenance activities at GAF. The potential environmental impacts of this borrow area were evaluated in the TVA Gallatin Fossil Plant Borrow Site Final EA (TVA 2018a). Current and future actions that may require borrow material will receive separate NEPA review.

3.25.2.5 Closure of the NRS

TVA entered into an agreement with TDEC that details steps TVA will take to conduct a laboratory treatability test and field demonstration aimed at adjusting pH along the NRS boundary. The evaluation will determine whether adjusting the pH at the site can result in achievement of groundwater protection standards. Following the completion of this investigation, based on a final EAR and data collected in the field demonstration, TVA will submit for TDEC approval a CARA Plan for closure of the NRS.

TVA will conduct this investigation over the next five years. When adequate information has been collected, TVA will initiate the appropriate NEPA analysis for closure of the NRS before a closure plan is finalized. If appropriate, the NEPA analysis could tier off of this EIS to provide comprehensive coverage of closure activities at the Gallatin site.

3.25.2.6 Operation of the Cumberland River Aquatic Center

TWRA receives federal funding for the operation of fish hatcheries, upgrading fishing piers to accommodate handicapped anglers, renovation and construction of boat ramps, acquisition of stream access sites, evaluation of length limits and stocking success on reservoirs, stream habitat improvement projects, statewide construction and maintenance of fish attractors, and habitat protection (which includes investigating pollution problems and fish population surveys on reservoirs, lakes, and streams). As GAF is located along a reservoir that has several water access sites in the near proximity – including one on the reservation, it is likely that some of these activities are taking place on or near GAF. Additionally, the Cumberland River Aquatic Center is located on the GAF reservation. The Cumberland River Aquatic Center is a hatchery facility that TVA constructed on the GAF reservation. It is currently managed by TWRA for the study and preservation of threatened and endangered freshwater aquatic species.

3.25.2.7 TDOT SR 109 Widening Project

The SR 109 widening project is a federally funded Tennessee Department of Transportation (TDOT) project underway in Sumner and Wilson counties. Most of the project activities in the GAF vicinity are complete, including the Gallatin Bypass, the Gallatin Bypass to Portland, the Cumberland Bridge replacement, and the widening of SR 109 from north of I-40 to south of SR 24 (US 70), and the widening of SR 109 from north of Cumberland River Bridge to the Gallatin Bypass. The widening of SR 109 from north of SR 24 (US 70) to south of the Cumberland River Bridge is underway and expected to be complete by 2021 (TDOT 2019). No other federally or state-funded TDOT projects are in the GAF vicinity (TDOT 2019).

3.25.2.8 Growth and Development in the Gallatin Area

The Gallatin area is experiencing rapid growth due to its proximity to Nashville (City of Gallatin 2009). As a result, there are some local and private projects that could result in related localized environmental impacts. The City of Gallatin has developed an industrial park located to the north of the GAF reservation on Airport Road and is currently developing a 206-acre Phase II Industrial Center north of GAF on Gateway Drive (Tennessee Department of Economic and Community Development 2019). In addition, in early 2019 the Gallatin Economic Development Agency announced that two companies are moving to Gallatin and four more are expanding, creating more than 420 additional jobs (Gallatin Economic Development Agency 2019). Multiple residential developments are being constructed in Gallatin and Hendersonville, resulting in over 5,000 new homes planned for the area (Todd 2019).

3.25.3 Analysis of Cumulative Effects

To address cumulative impacts, the existing affected environment surrounding the proposed project area was considered in conjunction with the environmental impacts presented in Chapter 3. These combined impacts are defined by the Council on Environmental Quality as “cumulative” in 40 CFR 1508.7 and may include individually minor but collectively significant actions taking place over a period of time. The potential for cumulative effects to each of the identified environmental resources of concern are analyzed below.

This analysis is limited only to those resource issues potentially adversely affected by preferred alternative project activities or connected actions. Accordingly, climate change, geology, soils, vegetation, wildlife, floodplains, land use, visual resources, cultural and historic resources, managed and natural areas, parks and recreation, socioeconomics, and public health and safety are not included in this analysis as these resources are either not adversely affected, or the effects are considered to be minimal or beneficial.

Primary adverse cumulative effects of the proposed actions as described in the preceding sections of Chapter 3 are related to the potential additive and overlapping effects on air quality, groundwater, surface waters, wetlands, and aquatic ecology, threatened and endangered species, transportation, noise, hazardous materials and solid and hazardous waste, and environmental justice.

3.25.3.1 Air Quality

Air quality within the Nashville region is influenced by emissions from permitted industrial and commercial facilities and routine emissions from mobile sources. As such, Sumner County and the surrounding counties (Davidson, Macon, Robertson Trousdale and Wilson in Tennessee and Allen and Simpson county in Kentucky) was selected as the geographic reference area for this resource.

It is expected that emissions from ongoing operations in the area, including emissions from local vehicles, operation of GAF, on-going construction and operation of the NRL Landfill, the SR 109 widening project, and construction of the bottom ash process dewatering facility would result in individually minor effects to air quality. Ongoing construction and operation of these facilities and the related impacts to air quality are considered part of the existing environmental setting and are not expected to increase in the foreseeable future. Air emissions associated with closure activities under the proposed action and associated component actions would also result in an increase in local emissions and fugitive dust. As described in Section 3.1, emissions from equipment and vehicle use are expected to be minor and short-term. In addition, fugitive dust emissions associated with closure activities would be mitigated through the use of BMPs, such as water suppression for dust control and regular inspections and maintenance of construction vehicles. The cumulative effect of the project activity emissions, when combined with the ongoing emissions from local vehicles and GAF operations, would incrementally increase emissions local to GAF under Alternative B (Option 1). By comparison, the emissions associated with Alternative B (Option 2) would be greater due to the more extensive offsite trucking required under this alternative. However, such increases would not be notable on a regional scale. If the reasonably foreseeable future actions occur at the same time as the proposed project, there would be potential for minor and short-term impacts to air quality. However, exceedances of applicable ambient air quality standards are not expected with either alternative. Therefore, the cumulative effects on air quality of both action alternatives under consideration would not adversely affect regional air quality.

3.25.3.2 Groundwater

As described in Section 3.4, groundwater within the vicinity of GAF is generally of good quality with selected areas of localized exceedances of MCLs. Activities associated with the reasonably foreseeable future actions listed in Table 3-47 have the potential to affect groundwater. However, for many of these potential actions, potential effects would be very localized and implementation of the proper BMPs would minimize the impacts to groundwater. Construction activities associated with impoundment closure and associated component actions at GAF have the potential to release constituents that may impact groundwater. However, in the long-term, all potential environmental contamination sources would be removed from the APC project area. Under Alternative B (Option 1), CCR would be placed in a lined and permitted landfill, thereby reducing any potential exposure to groundwater. By comparison, under Alternative B (Option 2), CCR would be removed from GAF and most would be used as a raw material in a beneficial re-use processing facility, with the remainder placed in a lined and permitted landfill. As such, both alternatives would limit the potential for contamination of groundwater from these sources and would have a positive impact on groundwater quality relative to the No Action Alternative. Therefore, the cumulative effects on groundwater of both action alternatives under consideration would not adversely affect groundwater.

3.25.3.3 Surface Water, Wetlands, and Aquatic Ecology

The potential for cumulative effects to surface waters, wetlands, and the aquatic environment are similar for both Option 1 and Option 2 under Alternative B and are largely driven by the loss of wetlands, ponds, and WWC/ephemeral/intermittent streams within the landfill expansion limits of disturbance. As described in Sections 3.5 and 3.13, impacts to WWCs, streams, and wetlands from the proposed action would be mitigated, as appropriate. Recent development of the TVA-owned borrow site also resulted in loss of WWC/ephemeral/intermittent streams. However, these projects have complied, and will comply in the future, with any applicable TDEC and USACE 404/401 permits obtained for the proposed actions, and unavoidable impacts to resources have been or will be mitigated, as appropriate. Additionally, BMPs have been and would be used for all construction activities to minimize and reduce indirect impacts on receiving streams. Given the local abundance of similar aquatic resources and wetland areas within the region, the relatively low quality of the resources potentially affected, and the implementation of BMPs during construction for all identified projects, cumulative impacts to aquatic and surface water resources at a watershed level are not anticipated.

3.25.3.4 Threatened and Endangered Species

As described in Section 3.12.2.2, summer roosting habitat for the Indiana and northern long-eared bats exists within the landfill expansion project area footprint under Alternative B. In addition, potential habitat for the state-listed streamside salamander exists along two streams within and adjacent to the proposed landfill expansion limits of disturbance.

A number of proposed activities associated with construction were addressed in TVA's programmatic consultation with the USFWS on routine actions and federally listed bats in accordance with ESA Section 7(a)(2) and completed in April 2018. For those activities with potential to affect bats, TVA committed to implementing specific conservation measures. These activities and associated conservation measures are identified on pages 5-7 of the TVA Bat Strategy Project Screening Form (Appendix F) and would be implemented as part of the proposed project. Project activities are within the bounds of impacts analyzed in TVA's Bat Strategy Programmatic Section 7 ESA consultation. With the implementation of identified conservation measures and BMPs and the abundance of available habitat surrounding the project area, proposed actions are not expected to significantly impact gray bat, Indiana bat, northern long-eared bat, and tri-colored bat. Recognizing the potential for cumulative effects in conjunction with the reasonably foreseeable actions associated with construction of the borrow site and other construction projects in the vicinity of GAF, TVA has developed the avoidance and mitigation measures described in Section 3.10 that account for the potential effects of the proposed action and other reasonably foreseeable future actions.

TDEC and TVA conducted stream surveys for streamside salamander for the borrow site less than one mile north of GAF in 2018 and did not find presence of the streamside salamander. Furthermore, a streamside salamander survey was performed within the streams identified as potentallly suitable habitat with TDEC and TWRA within the project area in December 2019. The presence of streamside salamanders or their egg masses was not detected.

In consideration of TVA's commitment to mitigative measures, it is concluded that the cumulative effect of all actions would not significantly affect the Indiana bat, northern long-eared bat, tri-colored bat, streamside salamander, or any other threatened or endangered species.

3.25.3.5 Transportation

The other identified reasonably foreseeable future actions within the geographic area, including ongoing operations at GAF, ongoing operation of the NRL Landfill, and operation of the Cumberland River Aquatic Center, do not have the potential to contribute to additional impacts to transportation. Ongoing operations of these facilities and the traffic they generate are considered part of the existing environmental setting and are not expected to increase in the foreseeable future.

The potential for cumulative effects to transportation from reasonably foreseeable future actions would be related to traffic associated with their construction phases and with additional industrial and residential growth in the surrounding area. Traffic generated by these actions would consist of the construction workforce and the shipments of goods and equipment to and from the construction site. The construction phase traffic would occur in addition to the existing traffic generated by the operation of GAF. However, once construction is completed, maintenance phase traffic associated with the foreseeable future projects would be negligible.

The reasonably foreseeable future projects that are planned to occur on and near GAF such as ongoing construction and operation of the NRL Landfill, the SR 109 widening project, and construction of the bottom ash process dewatering facility, could contribute to cumulative impacts on the local transportation network if these activities overlap with the proposed APC closure project. In addition, industrial and residential construction may occur in the Gallatin area. The number of trucks associated with these construction projects, added to the number of trucks required to remove CCR from impoundments at GAF and transport of borrow material for restoration and landfill construction activities could result in a very large number of trucks entering and exiting the facility on a daily basis. This could lead to congestion along adjacent arterial roadways. TVA would mitigate congestion in the vicinity of GAF with a traffic management plan, as needed. Possibilities include staging of trucks, truck routing, temporary signals, spacing logistics, or timing truck traffic to occur during lighter traffic hours (such as not in the morning or afternoon commute hours). With implementation of these mitigation measures, cumulative impacts to transportation would be moderate. However, once construction is completed traffic associated with the foreseeable future projects would be negligible and would only occur during the construction phases of these activities.

Although industrial and residential construction projects in the Gallatin region may cause minor cumulative negative impacts to transportation, impacts would not be considered significant. The residential and industrial construction projects are not near the GAF reservation and should therefore not result in any significant cumulative impacts as workers and materials would be traveling on different roads.

3.25.3.6 Noise

The other identified actions within the geographic area, including ongoing operations at GAF, ongoing operation of the NRL Landfill, and operation of the Cumberland River Aquatic Center, do not have the potential to contribute to additional impacts to noise. Ongoing operations of these facilities and the related impacts to noise are considered part of the existing environmental setting and are not expected to increase in the foreseeable future.

Implementation of the foreseeable future projects have the potential to contribute to additional noise impacts from with construction activities associated with the NRL Landfill, the SR 109 widening project, construction of the bottom ash process dewatering facility, and industrial and residential growth in the surrounding area. Due to the temporary nature of construction activities and distance to the nearest sensitive noise receptors, noise from construction associated with these activities at GAF would not result in a cumulative impact to noise.

3.25.3.7 Hazardous Materials and Solid and Hazardous Waste

Under Alternative B, CCR would be hauled by truck to an onsite landfill or a beneficial re-use processing facility and an existing, licensed landfill. Due to the temporary nature of the operations and the use of previously permitted disposal facilities, along with trained and experienced contractors and personnel, environmental impacts from CCR handling and disposal are not anticipated. Reasonably foreseeable future construction activities in the immediate vicinity, including the construction of the NRL Landfill, the SR 109 widening project, and construction of the bottom ash process dewatering facility, would also have the potential to contribute waste to permitted disposal facilities in the region. Due to the available capacity for large volumes of solid waste at permitted landfills in the vicinity of GAF, the cumulative impact from these planned activities is anticipated to be negligible.

3.25.3.8 Environmental Justice

There is the potential for communities within the vicinity of GAF that meet the criteria for environmental justice consideration to be indirectly impacted due to an increase in traffic, noise, exposure to fugitive dust, and exhaust emissions from the trucks used to transport CCR and borrow material. It is also likely that some of these communities would be along routes taken during planned construction projects within the vicinity of GAF, such as the SR 109 widening project or industrial and residential development. Because these short-term actions are potentially concurrent, potential cumulative effects may be expected to occur on a local basis. Physical impacts associated with the transport of borrow material or CCR (i.e., noise, fugitive dust, exhaust emissions) would be mitigated through BMPs identified in Section 2.9, and most of the haul routes used would be comprised of high-capacity roadways where additional truck traffic would assimilate into existing traffic patterns. Therefore, cumulative impacts would be minor. Following construction and ash impoundment closure activities, noise levels, exhaust emissions and fugitive dust would return to baseline levels.

CHAPTER 4 – LIST OF PREPARERS

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Experience:	10 years botany, restoration ecology, threatened and endangered plant monitoring/surveys, invasive species control, as well as NEPA and ESA compliance.

Name:	**Elizabeth B. Hamrick**
Education:	M.S., Wildlife and Fisheries Science and B.A. Biology
Project Role:	Terrestrial Ecology (Animals), Terrestrial Threatened and Endangered Species
Experience:	17 years conducting field biology, 12 years technical writing, 8 years compliance with NEPA and ESA.

Name: **Kim Pilarski-Hall**
Education: M.S., Geography, Minor Ecology
Project Role: Wetlands; Natural Areas
Experience: 20 years of expertise in wetland assessment, wetland monitoring, watershed assessment, wetland mitigation and restoration as well as NEPA and Clean Water Act compliance.

Name **Craig Phillips**
Education M.S. and B.S., Wildlife and Fisheries Science
Project Role: Aquatic Ecology and Threatened and Endangered Species
Experience: 7 years sampling and hydrologic determination for streams and wet-weather conveyances; 5 years in environmental reviews.

Name: **A. Chevales Williams**
Education: B.S. Environmental Chemical Engineering
Project Role: Surface Waters
Experience: 16 years of experience in water quality monitoring and compliance; 13 years in NEPA planning and environmental reviews.

Name: **Carrie Williamson, P.E., CFM**
Education: B.S. and M.S., Civil Engineering
Project Role: Floodplains
Experience: 6 years Floodplains, 3 years River Forecasting, 2 years NEPA Specialist, 7 years compliance monitoring.

WOOD

Name: **Matt Basler**
Education: M.S., Fisheries Science/Management and B.S., Wildlife and Fisheries
Project Role: Aquatic Resources; Threatened and Endangered Species and Wildlife Resources Review
Experience: Expertise in fisheries and wildlife science (population studies/surveys, habitat measurements and improvement, stream and wetland delineation, fisheries management, lake renovation, aquatic vegetation sampling and identification).

Name: **Richard Bennett, PE, PTOE**
Education: B.S., Civil Engineering
Project Role: Transportation
Experience: 31 years of experience in transportation and traffic engineering

Name: **Karen Boulware**
Education: M.S., Resource Planning and B.S., Geology
Project Role: Air Quality and Climate Change; Geology review
Experience: 25 years of professional experience in NEPA.

Name:	**Kelley Davis, PE**
Education:	B.S., M.S Civil Engineering
Project Role:	Transportation
Experience:	20 years of experience in engineering and transportation
Name:	**Connie Heitz**
Education:	M.P.A. Environmental and Natural Resource Management, B.S. Public Affairs
Project Role:	Deputy Project Manager; Chapters 1 and 2; Solid and Hazardous Waste; Wetlands; Transportation Review
Experience:	27 years in environmental and land use planning
Name:	**Natalie Kleikamp**
Education:	B.A., Biology
Project Role:	Land Use; Prime Farmland; Natural Areas, Parks and Recreation; Socioeconomics and Environmental Justice; Noise and Vibration; Visual Resources
Experience:	5 years of experience in NEPA analysis and documentation
Name:	**Robin Ledford**
Education:	M.S. Biological Sciences, Wetland Focus; B.S. Biological Sciences, Botany Focus
Project Role:	Wetlands, Surface Waters, and Aquatic Ecology
Experience:	15 years of experience in wetland and stream delineations and permitting; 10 years in ecological NEPA documentation
Name:	**Angela Love**
Education:	M.S. Biological Sciences
Project Role:	Quality Review
Experience:	20 Years NEPA Compliance
Name:	**Chris Mausert-Mooney**
Education:	B.S., Biology (M.S. in progress)
Project Role:	Vegetation
Experience:	9 years of experience in ecological and botanical investigations
Name:	**Rebecca Porath**
Education:	M.S. and B.S., Wildlife and Fisheries Sciences
Project Role:	Threatened and Endangered Species, Wildlife, Public Health and Safety, Cumulative Effects, Technical Review
Experience:	21 years of experience in environmental planning, NEPA analysis and documentation, ecological studies, and preparation of technical documents

Name:	**Konrad Quast**
Education:	B.S. and Ph.D., Hydrology and Water Resources
Project Role:	Groundwater; Geology
Experience:	20 years of experience in hydrogeologic and environmental geochemical data analysis, interpretation, and preparation of technical reports. Assessments and technical reports include basin wide groundwater flow, groundwater surface water interaction, coal combustion residual alternate source demonstrations, and geochemical forensics.

CHAPTER 5 – EIS RECIPIENTS

Following is a list of the agencies, organizations, and persons who have received copies of the EIS or notices of its availability with instructions on how to access the EIS on the project web page.

5.1 Federal Agencies

Environmental Protection Agency
U.S. Department of the Interior
U.S. Fish and Wildlife Service
U.S. Army Corp of Engineers

5.2 Federally Recognized Tribes

Absentee Shawnee Tribe of Oklahoma
Cherokee Nation
The Chickasaw Nation
Eastern Band of Cherokee Indians
Eastern Shawnee Tribe of Oklahoma
Kialegee Tribal Town
Shawnee Tribe
Thlopthlocco Tribal Town
United Keetoowah Band of Cherokee Indians in Oklahoma

5.3 State Agencies

Tennessee Department of Environment and Conservation
Tennessee Department of Transportation
Tennessee Wildlife Resources Agency
Tennessee Department of Agriculture
Tennessee Department of Economic and Community Development

5.4 Individuals and Organizations

Greater Nashville Regional Council
Individuals and organizations who provided comment during Scoping (See Appendix A)

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INDEX

Appendix A – Scoping

Document Type: EIS – Administrative Record
Index Field: Scoping
Project Name: GAF Surface Impoundment Closure & Restoration Project
Project Number: 2018-27

GALLATIN FOSSIL PLANT SURFACE IMPOUNDMENT CLOSURE AND RESTORATION PROJECT EIS SCOPING REPORT

Prepared by:
TENNESSEE VALLEY AUTHORITY
Knoxville, Tennessee

April 2019

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Abbreviations and Acronyms

ARAP	Aquatic Resources Alteration Permit
CCR	Coal Combustion Residuals
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
FR	Federal Register
GAF	Gallatin Fossil Plant
NEPA	National Environmental Policy Act
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRS	Non-Registered Site #83-1324
PEIS	Programmatic Environmental Impact Statement
TDEC	Tennessee Department of Environment & Conservation
TVA	Tennessee Valley Authority

1.0 Introduction

The Tennessee Valley Authority (TVA) intends to prepare an Environmental Impact Statement (EIS) to address the potential environmental effects associated with several projects to facilitate long-term management of Coal Combustion Residuals (CCR) produced at the Gallatin Fossil Plant (GAF) located in Sumner County, Tennessee. Specifically, these projects are listed as follows, and their locations are shown on Figure 1.

- Surface Impoundment Closures for the following:
  - Ash Pond A
  - Ash Pond E
  - Middle Pond A
  - Bottom Ash Pond (if not previously closed under a separate project)
  - Non-Registered Site #83-1324 (NRS)
- Permanent disposition of CCR in the surface impoundments, including CCR previously removed from the Bottom Ash Pond that may be temporarily stockpiled in the existing onsite landfill, as well as de minimis amounts of CCR proposed to be removed from the stilling ponds
- Construction of a lateral expansion of the existing onsite landfill
- Location requirements analysis for beneficial re-use processing facility
- Offsite landfill for CCR materials not usable by beneficial re-use processing facility

This proposal supports TVA's goal to eliminate all wet ash storage at its coal plants and will also help TVA comply with present and future regulatory requirements related to CCR production and management, including those of the U.S. Environmental Protection Agency's (EPA) Final Disposal of Coal Combustion Residuals from Electric Utilities rule (CCR Rule), as well as applicable state law requirements.

This scoping report describes the internal and public scoping for relevant issues relating to these projects and outreach conducted by TVA to notify the public. The scoping report also documents the input submitted to TVA by the public and intergovernmental entities during the public scoping period.

1.1 Background

GAF is located in Sumner County, Tennessee, on 1,950 acres of land on the north bank of the Cumberland River. The plant has four turbo-generating units with a combined summer net generating capacity of 976 megawatts. The plant consumes an average of 3.5 million tons of coal per year, which results in the annual production of approximately 255,000 tons of CCR. CCRs are byproducts produced from burning coal and include fly ash, bottom ash, boiler slag, and flue gas desulfurization materials. Historically, GAF stored CCR wet in onsite surface impoundments (commonly referred to as ash ponds). Bottom ash and boiler slag are the only remaining CCR currently sent to the ponds. All other CCR at GAF is dried and stored in the existing North Rail Loop Landfill.

Newly installed air emission controls at GAF allow the majority of CCR to be stored dry in the North Rail Loop Landfill, a state-of-the-art lined facility. When the construction of a bottom ash dewatering facility is finished in 2020, the plant will have completed its transition from wet CCR handling to dry handling of all CCR.

On July 28, 2016, TVA issued a Record of Decision for a programmatic National Environmental Policy Act (NEPA) review entitled *Ash Impoundment Closure Environmental Impact Statement* (CCR PEIS) (TVA 2016). The purpose of the programmatic environmental impact statement (PEIS) was to support TVA's goal to eliminate all wet CCR storage at its coal plants by closing CCR surface impoundments across TVA's system and to assist TVA in complying with the EPA's CCR Rule issued on April 17, 2015 (80 Federal Register [FR] 21302).

The CCR PEIS programmatically considered TVA surface impoundment closures and the environmental effects of two primary closure methods:

1) Closure-in-Place
2) Closure-by-Removal

A screening analysis to determine the reasonableness of these two closure methods was performed by evaluating a range of key issues and factors related to closure of surface impoundments and the feasibility of undertaking closure activities. Screening factors included:

- Volume of CCR Materials
- Schedule/Duration of Closure Activities
- Stability
- Risk to Human Health and Safety Relating to Closure Activities
- Potential Effects to Water Resources
- Potential Effects to Wetlands
- Risk to Adjacent Environmental Resources
- Mode and Duration of Transport Activities
- Risk to Human Health and Safety Related to Transport of Borrow and CCR
- Cost

This EIS for surface impoundment closures at GAF will tier from TVA's 2016 CCR PEIS, relying upon the over-arching and bounding analyses performed in the PEIS while integrating site-specific details and analyses.

1.2 TVA's Objectives

The 976 megawatts of generating capacity provided by GAF is important in maintaining an adequate and reliable power supply. Accordingly, GAF was identified in TVA's 2015 *Integrated Resource Plan* (TVA 2015) as one of the coal plants that TVA plans to continue operating in the future. The purpose of this *GAF Surface Impoundment Closure and Restoration EIS* is to address the disposition of CCR onsite at GAF, support the implementation of TVA's goal to eliminate all wet CCR storage at its coal plants by closing CCR surface impoundments across the TVA system, and to assist TVA in complying with EPA's CCR Rule and other applicable federal and state statutes and regulations. The proposed actions would also provide long-term onsite landfill space for operations and/or storage of CCR.

TVA needs to decide how best to conduct closure of the existing wet impoundments at GAF as well as how to manage CCR removed from the impoundments under the Closure-by-Removal option. The proposed projects would support the goal established by the TVA Board of Directors to eliminate wet ash storage at all its coal plants and would support the overall CCR management program at GAF. TVA's decision will consider factors such as potential environmental impacts, economic issues, availability of resources, and TVA's long-term goals.

1.3 Related Environmental Reviews

The following environmental reviews have been prepared for actions related to CCR management at GAF:

- *Final Ash Impoundment Closure EIS, Part I—Programmatic NEPA Review* (TVA 2016). This PEIS was prepared to assess the closure of CCR impoundments at all of TVA's coal-fired power plants.
- *Integrated Resource Plan, 2015* (TVA 2015). This plan provides direction for how TVA will meet the long-term energy needs of the Tennessee Valley region.
- *TVA Gallatin Fossil Plant Borrow Site Environmental Assessment (EA*) (TVA 2018). This EA was prepared to evaluate the development of a borrow site on TVA-owned property located 1.5 miles northwest of GAF.
- *Gallatin Fossil Plant Bottom Ash Process Dewatering Facility EA* (TVA 2017). TVA conducted this EA to assess wet-to-dry bottom ash conversion at GAF.
- *Gallatin Fossil Plant – Installation of Air Pollution Control Equipment and Associated Facilities, Environmental Assessment* (TVA 2013). TVA prepared this EA to assess proposed additional air emission controls and other actions, including constructing a dry CCR landfill at GAF.

2.0 Proposed Alternatives

As a result of internal review and scoping comments, TVA has proposed the following alternatives to be evaluated in the EIS.

2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA assumes it would not close any of the surface impoundments (neither in-place nor by removal), would not construct an expansion of the existing onsite landfill, and would not complete any restorative actions at GAF. Under the No Action Alternative, all plant process wastewaters would be handled through the permanent flow management system, which includes the bottom ash dewatering facility. The stilling ponds would continue to receive stormwater from the North Rail Loop Landfill. TVA would continue safety inspections of structural elements to maintain stability, and all surface impoundments would be subject to continued care and maintenance activities.

This alternative is included because applicable regulations require consideration of a No Action Alternative in order to provide a baseline for potential changes to environmental resources. However, the No Action Alternative is inconsistent with TVA's plans to convert all of its wet CCR systems to dry systems. It also would be inconsistent with EPA's CCR Rule. Consequently, this alternative would not satisfy the project purpose and need and, therefore, is not considered viable or reasonable. It does, however, provide a benchmark for comparing the environmental impacts of implementation of Alternatives B and C.

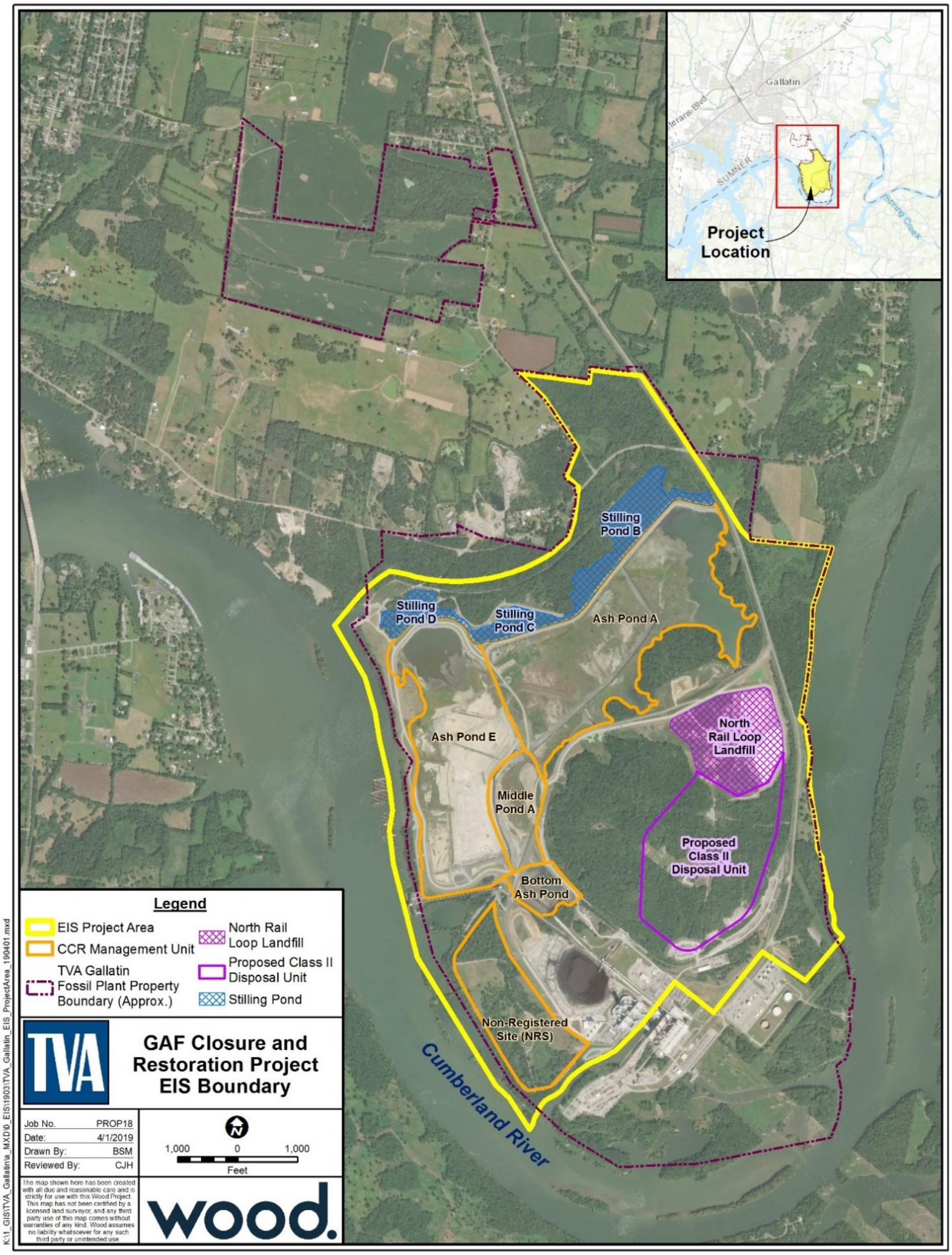

Figure 1. Proposed CCR Management Surface Impoundment Closures and Restoration Projects at GAF

2.2 Alternative B – Closure of All Surface Impoundments via Closure-by-Removal, the Potential Removal of De Minimis CCR from the Stilling Ponds, and Expansion of the Existing Onsite Landfill

Under Alternative B, TVA would remove CCR from the onsite surface impoundments (Ash Pond A, Ash Pond E, Middle Pond A, the Bottom Ash Pond, and the NRS) and construct a lateral expansion of the existing onsite landfill. In addition, any CCR that may have been previously removed from the Bottom Ash Pond and that may be temporarily stockpiled in the existing onsite landfill would also be moved.[1] Based upon site investigations, the CCR in the stilling ponds is considered to be de minimis. Under this alternative, TVA may also remove minor amounts of CCR from the stilling ponds, if deemed necessary. All removed CCR would be stored/used in one of two ways:

1) CCR removed from surface impoundments would be taken to an onsite landfill.

2) Instead of transporting excavated CCR material to an onsite landfill, most CCR would be transported to a beneficial re-use facility to be processed for use in concrete and other marketable materials. The remaining CCR, not suitable for beneficial re-use, either would be transported to an offsite landfill or would be permanently stored in an onsite landfill. Details and characteristics of the beneficial re-use processing facility and process will be provided in the EIS.

   A specific site for the potential beneficial re-use processing facility has not been identified. Therefore, impacts of this option for CCR management will be based on a bounding analysis of the characteristics of a representative beneficial re-use processing facility. If a beneficial re-use location is identified during the course of this EIS that does not fall within the parameters established by the bounding analysis, a separate site specific NEPA evaluation for this location will be included in the EIS. Should a site be identified for use following the completion of this EIS that does not fall within the criteria of the bounding analysis, a supplemental NEPA document will be required.

TVA will evaluate three options for removal of CCR to an onsite landfill including placement of CCR in the existing North Rail Loop Landfill, placement in the expansion to the existing landfill, or a combination of placement options.[2]

The surface impoundments and NRS site would be restored upon completion of the excavation activities. The sites would be graded as needed and restored to natural condition over the excavation areas. Soil utilized for closure and restoration of the sites would be obtained from a borrow site that TVA owns approximately one mile north of the GAF plant property. Following closure activities, the stilling ponds would continue to receive stormwater. TVA may return the

[1] In conjunction with a prior wastewater treatment project implemented at GAF.

[2] The placement of CCR from the surface impoundments alongside dry production ash within the same area of a landfill unit raises serious technical questions and concerns. If CCR from the surface impoundments is placed in the North Rail Loop Landfill or in both the North Rail Loop Landfill and the expansion area, it may be necessary to construct separate cells or sub-cells in which to segregate each type of material.

stilling pond area back to a natural state, in which case stormwater would continue to be directed to the stilling pond area and managed appropriately.

2.3 Alternative C – Closure of All Surface Impoundments via Closure-in-Place, the Potential Removal of De Minimis CCR from the Stilling Ponds, and Expansion of the Existing Onsite Landfill

Under Alternative C, TVA would close the onsite surface impoundments in-place as described in the CCR PEIS (Ash Pond A, Ash Pond E, Middle Pond A, the Bottom Ash Pond, and the NRS).[3] TVA may also remove minor amounts of CCR from the stilling ponds if deemed necessary as described for Alternative B. TVA would expand the existing onsite landfill to accommodate ongoing operations at GAF and future planning. The size of the landfill would be the same size as the landfill that would be constructed for Alternative B or smaller.

Following closure, TVA would conduct post-closure care for the surface impoundments for a period of 30 years (or as otherwise required by applicable state and federal laws) and would undertake any necessary corrective action. TVA would maintain the integrity and effectiveness of the final cover system and make repairs as necessary to correct the effects of settlement, subsidence, erosion, and other events, and prevent run-on and run-off from eroding or otherwise damaging the final cover. The final cover would be maintained by inspection and corrective measures as needed.

3.0 Environmental Review Process

NEPA regulations require an early and open process for deciding what should be discussed in an EIS (i.e., the scope of the document). The NEPA review process is intended to help federal agencies make decisions that are based on an understanding of the action's impacts. NEPA also requires that federal agencies provide opportunities for public involvement in the decision-making process.

As noted, TVA intends to prepare an EIS, the most intensive level of NEPA review, to consider options for management of CCR at GAF. During the development of the EIS, the public, stakeholders, resource and permitting agencies, and other interested parties have two opportunities to provide input on the development of the environmental study. The first opportunity is the initial scoping process that follows the publication of the Notice of Intent (NOI). The second opportunity for public comment is at the publication of the Draft EIS subsequent to the publication of the Notice of Availability.

In addition to agency and public input, the EIS will also address specific requirements associated with a number of federal laws such as National Historic Preservation Act of 1966, Endangered Species Act of 1973, Clean Water Act of 1972, and Clean Air Act, and would satisfy the requirements of Executive Order (EO) 11988 (Floodplains Management), EO 11990 (Protection of Wetlands), EO 12898 (Environmental Justice), and EO 13112 as amended by 13751 (Invasive Species).

After considering input from the public scoping period, TVA will develop and publish a Draft EIS. The Draft EIS will be available to the public for review and comment for 45 days. During the public

[3] A separate NEPA document at GAF is currently underway that could affect the options for closure of the Bottom Ash Pond. This document will be finalized prior to the release of this EIS.

comment period on the Draft EIS, TVA will conduct a public meeting. Once the public stakeholders, resource and permitting agencies, and other interested parties have reviewed the document, TVA will consider all comments, make revisions, if necessary, and publish a final EIS. After a period of at least 30 days, TVA will make a final decision that is summarized in a Record of Decision.

During the initial public scoping period, TVA estimated that the Draft EIS would be published in the fall of 2019, the Final EIS would be published in spring of 2020, and a final decision could be made as early as summer of 2020, subject to relevant state and federal law and ongoing litigation related to the GAF surface impoundments.

3.1 Public Outreach During the Scoping Period

Public scoping was initiated with the publication of the NOI to prepare an EIS in the Federal Register on December 7, 2018 (Appendix A). The NOI initiated a 35-day public scoping period, which concluded on January 11, 2019. In addition to the NOI in the Federal Register, TVA sent a media advisory to over 300 newspaper, radio, and television outlets across the TVA service area, as well as trade publications. A public notice advertisement was also placed in the *Gallatin News* and on the TVA website.

3.2 Summary of Scoping Feedback

TVA received a total of 13 comment letter and email submissions, of which 11 were from members of the public and two were from public agencies – the EPA and the Tennessee Department of Environment and Conservation (TDEC). Comment submissions were reviewed to identify specific issues of concern by each commenter and were grouped in general categories for identification and review. In total, 25 separate comments were identified. Issues raised by commenters included the following:

1) *Onsite Storage of CCR* – Commenters expressed concern regarding onsite storage of CCR material and requested that it be moved to an off-site location far away from the Cumberland River or other bodies of water.

2) *Potential Risks to Water Quality* – Concerns regarding potential risks to both surface water and groundwater quality in conjunction with the disposition of CCR in the existing ash ponds were expressed by four commenters. Comments included issues regarding sensitive geologic characteristics of the region (karst), public water supplies, and protecting water quality.

3) *Recreation and Wildlife* – Two commenters expressed concerns regarding the alternatives under consideration and encouraged TVA to consider potential impacts to recreation, fish and wildlife resources.

4) *Alternatives* – Preferences regarding the stated ash pond closure alternatives were expressed by five commenters. In each case commenters expressed a desire to close ash ponds by removal to reduce potential effects to sensitive resources. TDEC indicated that the evaluation of alternatives should include a consideration of compliance with state regulations and litigation. TDEC also recommended consideration of an alternative that evaluates environmental impacts associated with storage of CCR materials removed from surface impoundments and stilling ponds in the existing onsite landfill, or in an expansion

of the existing onsite landfill. EPA encouraged TVA to consider alternatives that meet the purpose and need for the project and to consider the No Action alternative.

5) *Preferences Regarding Energy Generation* – Four commenters stated their desire for coal plants to be closed and replaced with natural gas or renewable energy sources.

6) *Beneficial Re-use* – One commenter indicated that more information should be included in the EIS regarding the beneficial re-use process and potential issues related to heavy metals.

7) *Permitting Requirements* – TDEC referenced a need to comply with appropriate permitting in conjunction with project alternatives including National Pollutant Discharge Elimination System (NPDES) permitting requirements, the need for a hydrologic determination study by a certified hydrologic professional to identify all of the aquatic resources within the project limits of disturbance to determine the impact to water resources, and the potential for an Aquatic Resources Alteration Permit (ARAP) in conjunction with the construction of a new onsite landfill.

All comment submissions are included in Appendix B.

3.3 Issues to be Addressed

Based on TVA's internal scoping and input gathered from the public scoping process, TVA anticipates the major issues to be addressed in this EIS include:

- *Water Resources* – TVA will characterize surface water and groundwater resources, and will analyze the extent to which each closure alternative would affect water quality directly or indirectly (i.e., through infiltration or runoff).

- *Biological Resources* (vegetation, wildlife and aquatic life) – Community types within the project areas will be described. Significant natural features, including rare species habitat, important wildlife habitat, or locally uncommon natural community types will be identified. TVA will evaluate the effect of each alternative on terrestrial and aquatic ecosystems.

- *Threatened and Endangered Species* – Federally or state-listed as threatened or endangered plants and animals known to exist in the vicinity of GAF or any of the proposed project areas will be identified. The effects of each closure alternative on endangered, threatened, and rare species in need of management will be evaluated.

- *Aquatic Resources, Floodplains and Wetlands* – Aquatic resources, floodplains and wetlands within the proposed project areas will be identified and impacts will be quantified. The effects of each of the alternatives on jurisdictional waters and floodplains will be evaluated.

- *Geology and Soils* – Regional geology and soils at proposed project sites will be identified and any limitations related to construction and operation will be evaluated. Karst conditions will be identified. Impacts to prime farmland soils will be quantified.

- *Land Use* – Land uses within the proposed project sites and within the vicinity (5-mile radius) will be identified. Permanent and temporary direct and indirect impacts to land use associated with each of the alternatives will be evaluated.

- *Transportation* – The existing roadway network in the vicinity of GAF, including physical road characteristics (number of lanes, shoulders, and posted speed limits) and existing traffic characteristics will be identified. The effect of construction and operation of each alternative on the nearby roadway network will be evaluated.

- *Recreational and Managed Areas* – Natural areas, parks, and other managed areas within the vicinity of the alternatives (5-mile radius) will be identified and potential impacts associated with the proposed alternatives will be addressed.

- *Visual Resources* – The aesthetic setting of each project site will be described and an analysis of changes to scenic attractiveness and scenic integrity associated with each of the alternatives will be completed.

- *Cultural Resources* – TVA will characterize archaeological and historic resources within the Area of Potential Effect. TVA also will discuss any known sites listed on the National Register of Historic Places. The potential effects of each alternative on historic and archaeological resources will be evaluated. Results of the analysis will be reviewed by the Tennessee State Historic Preservation Officer.

- *Noise* – Baseline noise conditions will be characterized and noise emissions associated with the construction phase equipment use and truck traffic during operations will be assessed to determine the potential noise impact of each alternative on sensitive receptors.

- *Air Quality and Climate Change* – Air quality considerations including attainment status and regional air quality information will be presented. Impacts to air quality from activities associated with each of the alternatives will be evaluated. The impact of emissions from each of the alternatives on climate change will be addressed.

- *Socioeconomics and Environmental Justice* – Demographic and community characteristics associated with the proposed project and along haul routes to a beneficial re-use processing facility will be evaluated. Special attention will be given to identification of potential low income and minority populations to evaluate the potential for disproportionate adverse impacts in accordance with EO 12898. Economic effects associated with construction and operation of the proposed projects under each alternative will also be evaluated.

- *Solid and Hazardous Waste* – CCR will be characterized based upon existing GAF operations. Current practices regarding hazardous materials/waste management at GAF will also be identified. In addition, TVA will identify any impacts from waste generation during construction and operation of the proposed projects for each alternative. Operational measures (waste management practices) will be incorporated into the assessment of impacts.

- *Public Health and Safety* – Potential effects of each alternative on public health and safety will be evaluated. The evaluation will include potential effects of transportation of CCR along public roadways to a beneficial re-use processing facility.

The potential direct and indirect impacts of each resource will be assessed in the EIS. Mitigative measures designed to minimize impacts, as appropriate, will be identified. In addition, the EIS will include an analysis of the cumulative impacts of the preferred alternative. A cumulative impact analysis considers the potential impact to the environment that may result from the incremental impact of the project when added to other past, present, and reasonably foreseeable future actions (40 Code of Federal Regulations § 1508.7). The methodology for performing such analysis is set forth in Considering Cumulative Effects under NEPA (Council on Environmental Quality 1997).

4.0 References

Council on Environmental Quality. 1997. Environmental Justice Guidance under the National Environmental Policy Act, Executive Office of the President, Washington, DC. Available at: https://www.epa.gov/sites/production/files/2015-02/documents/ej_guidance_nepa_ceq1297.pdf

Tennessee Valley Authority (TVA). 2013. Gallatin Fossil Plant – Installation of Emission Control Equipment and Associated Facilities at Gallatin Fossil Plant, Final Environmental Assessment, March 2013. Chattanooga, TN

_____. 2016. Final Ash Impoundment Closure Environmental Impact Statement, Part I—Programmatic NEPA Review, June 2016. Chattanooga, TN

_____. 2015. Integrated Resource Plan, 2015 Final Report, Knoxville, TN

_____. 2018. TVA Gallatin Fossil Plant Borrow Site Final Environmental Assessment, November 2018. Chattanooga, TN

_____. 2017. Gallatin Fossil Plant Bottom Ash Process Dewatering Facility, Final Environmental Assessment, March 2017. Chattanooga, TN

Appendix A

Federal Register Notice

SURFACE TRANSPORTATION BOARD

[Docket No. FD 36252]

North Carolina & Virginia Railroad Company, L.L.C., Chesapeake & Albemarle Railroad Division—Lease Amendment and Operation Exemption Including Interchange Commitment—Norfolk Southern Railway Company

Chesapeake & Albemarle Railroad (CA), a Class III railroad and division of North Carolina & Virginia Railroad Company, L.L.C. (NCVA), has filed a verified notice of exemption under 49 U.S.C. 10902 to enter into a superseding and replacement lease with Norfolk Southern Railway Company (NSR) and operate lines of railroad between (1) milepost NS 4.00 at Providence Junction, Va., and milepost NS 8.00 at Butts, Va., (2) milepost NS 8.00 at Butts, Va., and milepost NS 73.59 at Edenton, N.C., and (3) milepost WK 0.00 at Elizabeth City, N.C., and milepost WK 7.48 at Weeksville, N.C. (collectively, the Line). The Line totals approximately 77.07 miles.

CA and NSR entered into a lease in 1990, which covered lines between (1) milepost NS 8.00, and milepost NS 74.00, and (2) milepost WK 0.00, and milepost WK 7.48 (Original Lease).[1] A 2003 amendment added a line between milepost NS 4.00, and milepost NS 8.00.[2] In 2004 and 2007, the Board issued abandonment and discontinuance of service exemptions for line included in the Original Lease between (1) milepost NS 73.67 and milepost NS 74.00 at Edenton, N.C.,[3] and (2) milepost NS 73.59 and milepost NS 73.67 at Edenton, N.C.[4] In 2011, CA and NSR added an amendment to extend the term of the Original Lease and strike all provisions relating to the option to purchase.[5] Now, CA explains that the Original Lease has expired, and CA and NSR have reached a new Lease Agreement (New Lease). CA and NSR intend the New Lease to supersede and replace the Original Lease and extend the term for an additional 10 years. CA declares that it currently operates the Line pursuant to the Original Lease and will continue to operate the Line under the New Lease.[6]

According to CA, the New Lease includes an interchange commitment that is similar in structure to the interchange commitment included in the Original Lease. As required under 49 CFR 1150.43(h)(1), CA provided additional information regarding the interchange commitment.

CA does not project that this transaction will result in annual revenues significant enough to establish a Class I or Class II rail carrier. Additionally, CA confirms that its total revenues will not exceed $5 million after the transaction; however, CA states that NCVA, of which CA is a division, will have revenues over $5 million following the transaction. Accordingly, CA is required by Board regulations to send notice of the transaction to the national offices of the labor unions with employees on the affected lines at least 60 days before this exemption is to become effective, to post a copy of the notice at the workplace of the employees on the affected lines, and to certify to the Board that it has done so. 49 CFR 1150.42(e).

CA requests a waiver of the 60-day advance labor notice requirement under 49 CFR 1150.42(e). In that request, CA argues that: (1) No employees of the transferring carrier, NSR, will be affected by the lease and no employees of NSR have worked on any part of the Line since 2003 and therefore, posting notices would be futile because no NSR employees work on the Line and (2) there will be no operational changes and no CA employees will be affected by the lease. CA's waiver request will be addressed in a separate decision.

CA states that it expects to consummate the transaction on the effective date of this exemption. The Board will establish the effective date in its separate decision on the waiver request.

If the notice contains false or misleading information, the exemption is void *ab initio.* Petitions to revoke the exemption under 49 U.S.C. 10502(d) may be filed at any time. The filing of a petition to revoke will not automatically stay the effectiveness of the exemption. Petitions for stay must be filed at least seven days before the exemption becomes effective.

An original and 10 copies of all pleadings, referring to Docket No. FD 36252, must be filed with the Surface Transportation Board, 395 E Street SW, Washington, DC 20423–0001. In addition, a copy of each pleading must be served on Eric M. Hocky, Clark Hill PLC, One Commerce Square, 2005 Market Street, Suite 1000, Philadelphia, PA 19103.

Board decisions and notices are available on our website at *www.stb.gov.*

Decided: December 3, 2018.

By the Board, Scott M. Zimmerman, Acting Director, Office of Proceedings.

Jeffrey Herzig,

Clearance Clerk.

[FR Doc. 2018–26575 Filed 12–6–18; 8:45 am]

BILLING CODE 4915–01–P

[1] *Chesapeake & Albemarle R.R.—Lease, Acquis. & Operation Exemption—S. Ry.,* FD 31617 (ICC served Apr. 17, 1990).

[2] *N.C. & Va. R.R.—Lease & Operation Exemption—Norfolk S. Ry.,* FD 34272 (STB served Jan. 22, 2003).

[3] *Norfolk S. Ry.—Aban. Exemption—in Chowan Cty., N.C.,* AB 290 (Sub-No. 251X) et al. (STB served July 16, 2004). NSR consummated the abandonment between milepost NS 73.67 and milepost NS 74.00.

[4] The verified notices filed by NSR and CA describe the line to be abandoned and discontinued as between milepost NS 73.59 and milepost NS 73.67. Likewise, NSR consummated the abandonment between milepost NS 73.59 and milepost NS 73.67. Therefore, it appears this milepost was erroneously stated as 73.50 in the published notice. *See Norfolk S. Ry.—Aban. Exemption—in Chowan Cty., N.C.,* AB 290 (Sub-No. 295X) et al. (STB served Aug. 9, 2007).

[5] *N.C. & Va. R.R., Chesapeake & Albemarle R.R. Div.—Lease Amendment Exemption—Norfolk S. Ry.,* FD 35564 (Sub-No. 1) (STB served Dec. 16, 2011).

[6] The Original Lease, as amended in 2011, appears to have included line from mileposts NS 73.59 to NS 74.00, which had been abandoned prior to the 2011 lease amendment. CA does not state whether it continued to operate over that abandoned line after the 2011 renewal.

TENNESSEE VALLEY AUTHORITY

Environmental Impact Statement for Gallatin Fossil Plant Surface Impoundment Closure and Restoration Project

AGENCY: Tennessee Valley Authority.

ACTION: Notice of intent.

SUMMARY: The Tennessee Valley Authority (TVA) intends to prepare an Environmental Impact Statement (EIS) to address the potential environmental effects associated with management of coal combustion residual (CCR) material at the Gallatin Fossil Plant (GAF) located near Gallatin in Sumner County, Tennessee. The purpose of the EIS is to address the final disposition of CCR onsite at GAF, support TVA's goal to eliminate wet CCR storage at its plants, and assist TVA in complying with the U.S. Environmental Protection Agency's (EPA's) CCR Rule. The proposed actions would also provide long-term on-site landfill space for operations and/or storage of CCR. TVA will develop and evaluate various alternatives for these actions, including the No Action Alternative. Public comments are invited concerning both the scope of the review and environmental issues that should be addressed.

DATES: Comments on the scope of the EIS must be received on or before January 11, 2019.

ADDRESSES: Comments may be submitted in writing to Ashley Farless, NEPA Specialist, 1101 Market Street, BR4A–C, Chattanooga, TN, 37402. Comments may also be submitted online at: *https://www.tva.gov/nepa* or by email to *CCR@tva.gov.*

FOR FURTHER INFORMATION CONTACT: Other related questions should be sent to Tennessee Valley Authority, Ashley Farless, NEPA Specialist, 1101 Market Street, BR4A–C, Chattanooga, TN, 37402, Phone 423.751.2361 or *arfarless@tva.gov.*

SUPPLEMENTARY INFORMATION: This notice is provided in accordance with the Council on Environmental Quality's regulations (40 CFR parts 1500 to 1508) for implementing the National Environmental Policy Act (NEPA), TVA's procedures for implementing NEPA, and Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations (36 CFR part 800).

TVA Power System and CCR Management

TVA is a corporate agency and instrumentality of the United States created by and existing pursuant to the TVA Act of 1933 that provides electricity for business customers and local power distributors. TVA serves more than 9 million people in parts of seven southeastern states. TVA receives no taxpayer funding, deriving virtually all of its revenues from sales of electricity. In addition to operating and investing its revenues in its electric system, TVA provides flood control, navigation and land management for the Tennessee River system and assists local power companies and state and local governments with economic development and job creation.

The GAF is located in Sumner County, Tennessee, on 1,950 acres of land on the north bank of the Cumberland River. The plant has four turbo-generating units with a combined summer net generating capacity of 976 megawatts. The plant consumes an average of 3.5 million tons of coal per year which results in the annual production of approximately 255,000 tons of CCR. This CCR is the byproduct produced from burning coal and includes fly ash, bottom ash, boiler slag, and flue gas desulfurization materials. Historically, GAF stored CCR wet in onsite surface impoundments (commonly referred to as ash ponds). Bottom ash and boiler slag are the only remaining CCRs currently sent to the ponds. Newly installed air emission controls at GAF allow the majority of CCR to be stored dry in the North Rail Loop Landfill located at GAF, a state-of-the-art lined and state permitted facility. When the construction of a new bottom ash dewatering facility is finished in 2020, the plant will have completed its transition from wet CCR handling to dry handling of all CCR.

Background

In July 2009, the TVA Board of Directors passed a resolution for staff to review TVA practices for storing CCRs at its generating facilities, including GAF, which resulted in a recommendation to convert the wet ash management system at GAF to a dry storage system. On April 17, 2015, the EPA published the final Disposal of CCRs from Electric Utilities rule, also known as the CCR Rule.

In June 2016, TVA issued a Final Programmatic Environmental Impact Statement (PEIS) that analyzed methods for closing CCR impoundments at TVA fossil plants and identified specific screening and evaluation factors to help frame its evaluation of closures at its other facilities. A Record of Decision was released in July 2016 that would allow future environmental reviews of qualifying CCR impoundment closures to tier from the PEIS. This PEIS can be found at *www.tva.com/nepa.*

Alternatives

The EIS will examine closure of the following surface impoundments: Ash Pond A, Ash Pond E, Middle Pond A and a Non-Registered Site. In addition, TVA will examine removal of CCR from on-site Stilling Ponds and permanent disposition of CCR from the Bottom Ash Pond at Gallatin. TVA is performing a separate NEPA review for a project at Gallatin that could result in a temporary stockpile of CCR from the Bottom Ash Pond in the on-site landfill (North Rail Loop Landfill). The Bottom Ash Pond CCR would be temporarily stockpiled to make the most efficient use of property at GAF. Whether the Bottom Ash Pond CCR remains in its current location onsite at GAF or is temporarily stockpiled to allow TVA to make use of real estate available onsite, the final disposition of the Bottom Ash Pond CCR will be addressed in this EIS. Construction of a new on-site landfill will be examined as well as construction of a CCR beneficial re-use facility.

In addition to a No Action Alternative, this EIS will address alternatives that meet the purpose and need for the project. One alternative identified by TVA is closure of all surface impoundments and stilling ponds via closure-by-removal with construction of a new on-site landfill. The CCR material removed in this closure-by-removal alternative would be disposed of in a new on-site landfill and/or a beneficial re-use facility. Another alternative identified by TVA is closure of all surface impoundments and stilling ponds via closure-in-place with construction of a new on-site landfill that would be used to support ongoing long-term plant operations. TVA could also consider a combination closure-in-place and closure-by-removal alternative(s).

No decision has been made about CCR storage at GAF beyond the current operations. TVA is preparing this EIS to inform decision makers, other agencies and the public about the potential for environmental impacts associated with management of CCR at GAF.

Proposed Resources and Issues To Be Considered

This EIS will identify the purpose and need of the project and will contain descriptions of the existing environmental and socioeconomic resources within the area that could be affected by management of CCR at GAF. Evaluation of potential environmental impacts to these resources will include, but not be limited to, water quality, aquatic and terrestrial ecology, threatened and endangered species, wetlands, land use, historic and archaeological resources, solid and hazardous waste, safety, and socioeconomic and environmental justice issues. The final range of issues to be addressed in the environmental review will be determined, in part, from scoping comments received. The preliminary identification of reasonable alternatives and environmental issues in this notice is not meant to be exhaustive or final.

Public Participation

TVA is interested in an open process and wants to hear from the community. The public is invited to submit comments on the scope of this EIS no later than the date identified in the ''Dates'' section of this notice. Federal, state, local agencies and Native American Tribes are invited to provide comments.

After consideration of comments received during the scoping period, TVA will develop and distribute a scoping document that will summarize public and agency comments that were received and identify the schedule for completing the EIS process. Following analysis of the issues, TVA will prepare a draft EIS for public review and comment. In making its final decision, TVA will consider the analyses in this EIS and substantive comments that it receives. A final decision on proceeding with the management and storage of CCRs at GAF will depend on a number of factors. These include results of the EIS, requirements of the CCR Rule, relevant state law requirements, engineering and risk evaluations, financial considerations, as well as the resolution of ongoing litigation concerning Gallatin.

TVA anticipates holding a community meeting near the plant after releasing the Draft EIS. Meeting details will be posted on TVA's website. TVA expects to release the Draft EIS in the Fall 2019.

Authority: 40 CFR 1501.7.

M. Susan Smelley,

Director, Environmental Compliance and Operations.

[FR Doc. 2018–26531 Filed 12–6–18; 8:45 am]

BILLING CODE 8120–08–P

DEPARTMENT OF TRANSPORTATION

Federal Motor Carrier Safety Administration

[Dockets No. FMCSA–2017–0243, FMCSA–2017–0296, FMCSA–2017–0337, FMCSA–2017–0340, FMCSA–2017–0342, FMCSA–2017–0356, FMCSA–2017–0361, FMCSA–2017–0373, FMCSA–2018–0003, FMCSA–2017–0336]

Hours of Service (HOS) of Drivers; Applications for Exemption From the Electronic Logging Device Rule

AGENCY: Federal Motor Carrier Safety Administration (FMCSA), DOT.

ACTION: Notice of final disposition; denial of applications for exemption.

SUMMARY: As required by statute, FMCSA announces denials of 10 applications for exemptions from the hours-of service (HOS) electronic logging device (ELD) rule. The applicants are as follows: Power and Construction Contractors Association; Western Equipment Dealers Association; Association of Energy Service Companies; Cudd Energy Services, Inc.; SikhsPAC and North American Punjabi Trucker Association; Owner- Operator Independent Drivers Association, Inc.; American Disposal Service; Towing and Recovery Association of America; National Electrical Contractors Association; and the Agricultural Retailers Association. The Agency reviewed each application and any comments received and rendered each decision based upon the merits of the application.

DATES: On June 16, 2018, FMCSA denied 9 applications for exemption and on July 26, 2018, the Agency denied the application of the Agricultural Retailers Association.

FOR FURTHER INFORMATION CONTACT: Ms. Pearlie Robinson, FMCSA Driver and Carrier Operations Division; Office of Carrier, Driver and Vehicle Safety Standards; Telephone: 202–366–4325. Email: *MCPSD@dot.gov.*

SUPPLEMENTARY INFORMATION:

Background

FMCSA has authority under 49 U.S.C. 31136(e) and 31315 to grant exemptions from certain parts of the Federal Motor Carrier Safety Regulations. FMCSA must publish a notice of each exemption request in the **Federal Register** (49 CFR 381.315(a)). The Agency must provide the public an opportunity to inspect the information relevant to the application, including any safety analyses that have been conducted. The Agency must provide an opportunity for public comment on the request.

The Agency reviews safety analyses and public comments submitted and determines whether granting the exemption would likely achieve a level of safety equivalent to, or greater than, the level that would be achieved by the current regulation (49 CFR 381.305). The decision of the Agency must be published in the **Federal Register** (49 CFR 381.315(b)) with the reasons for denying or granting the application and, if granted, the name of the person or class of persons receiving the exemption, and the regulatory provision from which the exemption is granted. In the case of denials, 49 U.S.C. 31315 explicitly states that the Agency may meet the requirements by periodically publishing in the **Federal Register** the names of persons denied exemptions and the reasons for the denials.

Applications for Exemption

The current hours-of-service (HOS) regulations in 49 CFR 395.8(a) require motor carriers subject to the regulation to ensure their drivers use ELDs in place of written logs to record their duty status for each 24-hour period. Additionally, Part 395 lists certain ELD exceptions for short-haul operations within a 100 air-mile radius and agricultural operations within a 150 air-mile radius.

The 10 applicants cited below applied for an exemption from the requirement to use an ELD to record HOS for drivers subject to the regulation for various reasons. FMCSA published **Federal Register** notices requesting public comment on each application. Each notice established a docket to provide the public an opportunity to inspect the application and other docketed information, such as comments of others submitted to the docket. Details of the Agency's analysis follows.

Power and Construction Association (PCCA)

The PCCA requested that motor carriers and drivers operating commercial motor vehicles (CMVs) in the power and communication construction industry be allowed to use paper records of duty status (RODS) instead of ELDs. PCCA noted that construction contractors spend considerable time off-road on varying jobsites; a single CMV may have several different drivers over the course of a day, moving the vehicle short distances around the jobsite. Due to the limited time that their drivers spend driving on public roads within a workday, PCCA states that the ELD and RODS requirements for drivers in its industries do not result in a significant safety benefit.

FMCSA reviewed the application and the 259 public comments submitted. On June 16, 2018, FMCSA denied PCCA's application for exemption because the Agency could not ensure that the exemption would provide the requisite level of safety. A copy of the denial letter is available for review in the docket (FMCSA–2017–0243).

Western Equipment Dealers Association (WEDA)

WEDA requested this exemption from ELD use on behalf of several organizations and their members. Effectively, the requested exemption would eliminate the requirement for agricultural equipment dealers to install ELDs on their CMVs. WEDA stated that equipment dealer operations in agriculture present unique circumstances that warrant the requested exemption and that the failure to grant it would pose an undue burden on equipment dealers and their customers without a measurable safety benefit.

FMCSA reviewed the application and the 125 public comments submitted. On June 16, 2018, FMCSA denied WEDA's application for exemption because the Agency could not ensure that the exemption would provide the requisite level of safety. A copy of the denial letter is available for review in the docket (FMCSA–2017–0296).

Association of Energy Service Companies (AESC)

AESC requested this exemption to allow all drivers of well service rigs to complete paper RODS instead of using an ELD whenever the drivers exceeded the requirements of the short-haul exception. According to AESC, complying with the ELD requirement would be overly burdensome for well

Appendix B

Comments Submitted During the Scoping Period

(December 7, 2018 through January 11, 2019)

From:	Gissentanna, Larry
To:	TVA CCR Mailbox; Farless, Ashley Robin
Cc:	Militscher, Chris; Buskey, Traci P.
Subject:	TVA Scoping for Gallatin-Surface-Impoundment-Closure-and-Restoration-Project
Date:	Friday, December 14, 2018 12:16:00 PM

TVA External Message. Please use caution when opening.

Ms. Asley Farless
CCR@tva.gov
NEPA Compliance
Tennessee Valley Authority
1101 Market St., BR4A-C
Chattanooga, TN 37402
Re: Gallatin-Surface-Impoundment-Closure-and-Restoration-Project
Dear Ms. Farless:
The U. S. Environmental Protection Agency has reviewed the referenced document in accordance with Section 309 of the Clean Air Act and Section 102(2)(C) of the National Environmental Policy Act (NEPA). The EPA appreciates the opportunity to review and provide comments.
The EPA understands that TVA's proposed action is to prepare an Environmental Impact Statement (EIS) to address the potential environmental effects associated with management of coal combustion residual (CCR) material at the Gallatin Fossil Plant (GAF) located near Gallatin, Sumner County, Tennessee. The purpose of the EIS is to address the final disposition of CCR onsite at GAF, support TVA's goal to eliminate wet CCR storage at its plants, and assist TVA in complying with the U.S. Environmental Protection Agency (EPA's) CCR Rule. The proposed actions would also provide long-term on-site landfill space for operations and/or storage of CCR.

The EIS should address alternatives that meet the purpose and need for the project. TVA should also consider a "No Action" alternative as well. EPA's preliminary concerns for alternatives at this time can be summarized to include, but not limited to the following areas; e.g., air quality, hazardous waste, solid waste, water, wetlands, noise, energy, socioeconomics resources, aquatic and terrestrial ecology, endangered and threaten species, floodplains, land use, historical and archaeological resources when preparing your NEPA document.

Please continue to keep the community informed throughout the project, and upon completion of your Draft Environmental Impact Statement, please forward 2 hard copies to the NEPA Program Office (address below).

Thank you for the opportunity to provide comments on your proposed project. If you have any questions, feel free to contact me via the information provided below.

Sincerely,

Larry O. Gissentanna
DoD and Federal Facilities, Project Manager

U.S. Environmental Protection Agency/ Region 4
Resource Conservation and Restoration Division
National Environmental Policy Act (NEPA) Program Office
61 Forsyth Street, SW
Atlanta, GA 30303-8960
Office: 404-562-8248
gissentanna.larry@epa.gov

Farless, Ashley Robin

From:	Matthew K. Taylor <Matthew.K.Taylor@tn.gov>
Sent:	Friday, January 11, 2019 6:07 PM
To:	TVA CCR Mailbox
Cc:	Kendra Abkowitz
Subject:	TDEC Comments on TVA Gallatin Fossil Plant CCR Management NOI
Attachments:	2019-1-11--TDEC_Comments_TVA_GAF_Surface_Impoundment_Closure_NOI.PDF

TVA External Message. Please use caution when opening.

Dear Ms. Farless:

The Tennessee Department of Environment and Conservation (TDEC) appreciates the opportunity to provide comments on the Tennessee Valley Authority (TVA) Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) to address the potential environmental effects associated with management of coal combustion residual (CCR) material at the Gallatin Fossil Plant (GAF) located near Gallatin in Sumner County, Tennessee.

Please contact me should you have any questions regarding these comments.

Thanks,

TN Department of Environment & Conservation

Matt Taylor | Senior Policy Analyst
Office of Policy and Sustainable Practices, TDEC
William R. Snodgrass Tennessee Tower
312 Rosa L Parks Ave, 2nd Floor
Nashville, TN 37243
Email: Matthew.K.Taylor@tn.gov
Office: 615-532-1291
Cell: 615-979-2449

Internal Customers: We value your feedback! Please complete our customer satisfaction survey.
External Customers: We value your feedback! Please complete our customer satisfaction survey.

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
NASHVILLE, TENNESSEE 37243-0435

SHARI MEGHREBLIAN, PhD
COMMISSIONER

BILL HASLAM
GOVERNOR

January 11, 2019

<u>Via Electronic Mail to CCR@tva.gov</u>
Attn: Ashley Farless, NEPA Compliance Specialist
Tennessee Valley Authority
1101 Market Street, BR4A-C
Chattanooga, TN 37402

Dear Ms. Farless:

The Tennessee Department of Environment and Conservation (TDEC) appreciates the opportunity to provide comments on the Tennessee Valley Authority (TVA) Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) to address the potential environmental effects associated with management of coal combustion residual (CCR) material at the Gallatin Fossil Plant (GAF) located near Gallatin in Sumner County, Tennessee. TVA intends for the EIS to address the final disposition of CCR on-site at GAF, support TVA's goal to eliminate wet CCR storage at its plants, and assist TVA in complying with the U.S. Environmental Protection Agency's (EPA's) CCR Rule. The proposed actions would also provide long-term on-site landfill space for operations and/or storage of CCR. TVA will develop and evaluate various alternatives for these actions, including the No Action Alternative as part of a forthcoming EIS.

TDEC has reviewed the NOI and has the following comments regarding the forthcoming TVA GAF EIS:

Solid Waste

TDEC notes that the NOI document identifies compliance with the EPA CCR Rule as part of the purpose behind the actions being assessed in the forthcoming EIS document. TDEC recommends that compliance with state rules and litigation also be included in the future scope of the project purpose.

One alternative identified by TVA is closure of all surface impoundments and stilling ponds via closure-by-removal. Under this alternative all removed material would be disposed of in a new on-site landfill and/or a beneficial re-use facility. TDEC recommends that TVA also consider an alternative that evaluates environmental impacts associated with storage of CCR materials removed from surface impoundments and stilling ponds in the existing on-site landfill, or in an expansion of the existing on-site landfill.

Water Resources

TVA GAF has an existing National Pollution Discharge Elimination Systems (NPDES) Stormwater Construction Permit (CGP) and accompanying Storm Water Pollution Prevention Plan that will likely need to be modified as the work for closure associated with potential alternatives begins.

As TVA considers various alternatives, it should consider the following items. Depending on changes in discharges as the ponds are de-watered, the NPDES permit will have to be modified or a new permit issued. Further, it is likely that in all of the alternatives suggested, a new on-site landfill will require a CGP and a hydrologic determination study by a certified hydrologic professional to identify all of the aquatic resources within the project limits of disturbance to determine the impact to water resources. Lastly, an Aquatic Resources Alteration Permit (ARAP) will most likely be necessary should an alternative which includes construction of a new on-site landfill be pursued. TDEC recommends the Draft EIS reflect the potential for these various permitting requirements based on the proposed action and its alternatives.

Additionally, there has been ground water contamination identified at GAF, which will necessitate post-closure groundwater monitoring. TDEC recommends TVA include these considerations in the Draft EIS.

It should be noted that TVA may choose to pursue CCR impoundment closure-in-place at any of its Fossil Plants. However, should TVA begin CCR surface impoundment closures at any of its Tennessee Fossil Plants and TDEC subsequently determines based on soil, surface water, ground water and/or geologic instability that closure in place is not protective of public health and/or the environment, then TDEC shall, in accordance with the Commissioner’s Order, require TVA to commence appropriate corrective action including removal of CCR surface impoundments where TVA has begun or completed closure-in-place. Further, TVA is on notice that Tennessee Code Annotated Section 68-211-106(j) may require a permit or other approval from TDEC for the disposal or use of coal ash.

Please note that more information is necessary to evaluate the beneficial re-use of CCR materials as considered in the forthcoming EIS, and that the heavy metal content of some materials will have to be considered as part of any beneficial re-use application. TDEC appreciates the opportunity to comment on this NOI. Please note that these comments are not indicative of approval or disapproval of the potential action or its alternatives, nor should they be interpreted as an indication regarding future permitting decisions by TDEC. Please contact me should you have any questions regarding these comments.

Sincerely,

Kendra Abkowitz, PhD
Assistant Commissioner, Office of Policy and Sustainable Practices
Tennessee Department of Environment and Conservation
Kendra.Abkowitz@tn.gov
(615) 532-8689

cc: Daniel Brock, TDEC, DOA
Lacey Hardin, TDEC, APC
Chuck Head, TDEC, BOE
Lisa Hughey, TDEC, DSWM
Tom Moss, TDEC, DWR
Joseph Sanders, TDEC, OGC
Robert Wilkinson, TDEC, BOE
Stephanie Williams, TDEC, DNA

Name: Anthony Derrick

Comments: I would like to see all coal ash removed from waterways, moved inland and coal burning plants closed.

close window

From:	April
To:	TVA CCR Mailbox
Cc:	april
Subject:	Public comments for Gallatin Fossil Plant Surface Impoundment Closure and Restoration Project
Date:	Saturday, January 12, 2019 12:36:46 AM

TVA External Message. Please use caution when opening.

My name is April Hungate and I live approximately 15 miles from the Gallatin Fossil Plant. From our hilltop home I can see the smokestacks of the plant. As someone who has asthma, I appreciate the fact that you have invested in cleaner emissions! Thank you! Beside caring about my own health as well as the health of my grandchildren, I am a concerned citizen especially interested in protecting our environment. Having lived other places, I can vouch for the fact that Tennessee has an especially large and diverse population of unique creatures as well as beautiful rivers, streams, and lakes. I feel that it is your responsibility to protect this state as best as you can.

I have been following the news reports of the TVA Kingston Fossil plant ash spill and the horrible situation of the sick and dying clean up workers. Obviously the question of what and how to deal with the coal ash is extremely important. I do not have a deep understanding of the various options you are pursuing but I would like to offer my citizens preference of what to do with the coal ash. Having lived in middle Tennessee for over 40 years, I do know a bit about the topography and geology of the area. Storing dry or wet ash near any moving body of water is not a good idea. Now that we do know that the ash contains poisonous properties, it behooves us to deal with it in a way that not only protects us from airborne particles but also from contaminating water resources. I would like to see the ash moved to lined containment areas far from any river or stream. If there is a way to turn it into something that is inert, that'd be great. I do not think it's a good idea to just move the ash around your property on the river's edge. A lined containment area would be safer for the environment. The area around the Gallatin Fossil plant is a known karst system. This is true for many areas in mid TN. Therefore, it must be moved as far from the river as possible and into a lined containment facility so as to protect our ground water.

I hope that my letter means a tiny something since I am a customer of the utility. I would welcome being informed of future public meetings on this important issue. I'd also like to say that while we appreciate the Gallatin Fossil Plant, please, please, please give us more renewable energy! I'd at least like some options regarding where my money goes. Again, we Tennesseans value our state and want to make it better, not degrade it. So anything you can do to mitigate fouling our environment would be very good.
Thank you,
April Hungate
PO Box 144
Bethpage, TN
37022

From: CHRIS SCHERBA
To: TVA CCR Mailbox
Subject: Coal Ash storage
Date: Thursday, January 03, 2019 4:40:06 PM

TVA External Message. Please use caution when opening.

Dear TVA,

Storing combusted coal ash near the Cumberland waterway is a hazard to our environment and puts all forms of life at risk. Please find an area far away from this precious water source to store the CCR.

Sincerely,

Chris Scherba

164 Cherokee Rd.

Hendersonville TN 37075

Name: Darrin Wall

Comments: I feel that the ash should be excavated and moved to a lined on-site landfill. It's just too risky to leave the ash in place and any poisons leaking into the river is too much. Our, Gallatin's, drinking water is located downstream from the plant and so is my home. It is not comforting to think that a spill could potentially hurt our property value and have a significantly negative impact on the city of Gallatin at any time. Please do the responsible thing and get the ash away from the Cumberland river. The river is not yours to pollute, it is our river too and I look forward to teaching my little girl how to swim and fish in this river without the fear of harming her. I realize it's going to cost another billion plus, but given the billions already spent on the plant adding the scrubber why not finish the job of cleaning up the waste from the plant.

close window

From:	John E
To:	TVA CCR Mailbox
Subject:	Comments for: Gallatin Surface Impoundment Closure and Restoration Project
Date:	Thursday, January 03, 2019 12:02:08 PM

TVA External Message. Please use caution when opening.

To Whom it May Concern:

I recommend closure by off-site removal, which means not using any existing on-site landfills or constructing any new on-site landfills. The off-site removal shall be to a location that is of sufficient distance away from any bodies of water and not located in any areas with any known geologic/seismic faults. The off-site removal location shall be properly lined, capped, stabilized and monitored for leakage and movement. The off-site location shall include 24x7 surveillance involving on-site personnel keeping proper log books recording instrumentation data and other observations.

The GAF project needs to completely mitigate any risk of pollution into the Cumberland River and avoid another Kingston Fossil Plant disaster.

Sincerely,

John Ermer
Gallatin, TN

From:	Jullian Ghita
To:	TVA CCR Mailbox
Subject:	Coal ash ponds
Date:	Tuesday, December 18, 2018 11:32:45 AM

TVA External Message. Please use caution when opening.

I think they should close and remove the ash ponds! There have been too much wildlife habitat damaged around Gallatin steam plant!

Sent from Yahoo Mail on Android

From:	knygard2
To:	TVA CCR Mailbox
Subject:	Ash ponds
Date:	Friday, January 04, 2019 10:00:16 AM

It is folly to store CCR at a level that can be flooded given the increased likelihood of flooding as climate change proceeds due to the burning of fossil fuels. Storage off site in a dry location such as a salt mine in the Southwest seems preferable. The obvious solution is to decommission coal-burning and transition to a combination of solar, wind, and geothermal. Please read the book "Drawdown" . Also please listen to the Sierra Cub. I am one of those concerned about my grandchildren more than immediate profits. The long view always leads to better solutions.

From:	Mark Robbins
To:	TVA CCR Mailbox
Subject:	Future of Coal Ash
Date:	Wednesday, January 02, 2019 11:00:45 AM

TVA External Message. Please use caution when opening.

To Whom it May Concern,

I am responding to your request for public comments regarding on the future of coal ash. Coal ash should be stored a safe distance from rivers, streams, etc. to prevent the environmental issues that occurred in the Kingston Fossil Plant coal fly ash slurry spill in 2008. Also, coal ash should be sealed completely so contaminants do not seep into the ground/ground water and are not spread by wind, etc.

The best solution is to replace all coal powered plants with a cleaner and more cost effective fuel source.

Thank you.

Mark Robbins
Principal
Robbins Properties
One American Center
3100 West End Avenue,
Suite 1070
Nashville, TN 37203
615-301-6571 (o)
615-473-7731 (m)
615-301-6574 (f)
mrobbins@robbins-properties.com
www.robbins-properties.com

From:	Patrick Bradshaw
To:	TVA CCR Mailbox
Subject:	Gallatin fossil plant
Date:	Friday, January 11, 2019 12:19:29 AM

TVA External Message. Please use caution when opening.

NEPA Compliance specialist:

It is beyond belief that after the coal ash spill incident at Kingston and the resultant cleanup travesty, that the State of TN and the TVA would even entertain the idea of continuing to store coal ash or CCR near the Cumberland River.

The devastation to the values of all property in the area of the Lake and river would be catastrophic. Since the river is a major source of water for all of the surrounding areas the impact of another environmental disaster would spread well beyond the Old Hickory dam. The CCR is a hazardous material and should be treated as such.

The TVA needs to consider the cost benefit and risk to the continued burning of fossil fuel in the Gallatin power plant. This plant should have been converted to natural gas some time ago, but it is my belief that politics has played a roll in keeping the coal coming up the river.

It is my suggestion that the barges that bring coal to the plant be loaded up with the CCR and then take the ash back to the mining facility to be stored at that location until such time as the mining ceases and the CCR be placed back in the pits where the coal came from. This could continue until the ash has been removed even after such time as the plant is converted to natural gas. This would please the owners of the barge line I'm sure.

If that plan is unacceptable then maybe we could open a pit at the homes of the TVA and coal mining executives who are so convinced that coal ash is so harmless.

Patrick C Bradshaw
160 Cherokee Rd

Hendersonville, TN. 37075

Sent from my iPad

From: Robert Holecek
To: TVA CCR Mailbox
Subject: CCR
Date: Thursday, January 03, 2019 6:23:13 PM

TVA External Message. Please use caution when opening.

To whom it may concern:

I am extremely concerned about your consideration to store CCR, anywhere near the Cumberland waterway. I would ask that you reconsider, on behalf of myself and the other residence that may be impacted.

Sincerely,

Robert Holecek
203 Cherokee Pt.
Hendersonville, TN 37075
414-758-8522
holecekr@yahoo.com

Sent from my iPhone

Name: veit spero

Comments: My comments regard the ash pond projects at Gallatin, Tennessee.

I live in Bethpage, Sumner County, Tennessee. The supplier of public water for my residence is the Castalian Springs, Bethpage Utility Distric(CSBUD). CSBUD does not treat water for consumption, however it distributes water purchased from the City of Gallatin. One hundred percent of the source of water for the City of Gallatin Water Treatment Facility is the Cumberland River(Old Hickory Reservoir). The water intake for the Gallatin Water Treatment Facility is very near and on the same side of the river as the the Gallatin Fossil plant. In addition there are other water intakes further downstream that supply water to hundreds of thousands of customers in Wilson County, Sumner County, Robertson County and Davidson County.

Old Hickory Reservoir downstream of the Gallatin Fossil plant is swimmable and fishable and is heavily used for these purposes. Many, including myself consume fish from the lake. The lake is a productive fishery. Old Hickory Lake, the Cumberland River and all its uses, including cooling water for the fossil plant are very important to the economy.

In making decisions regarding the ash pond projects, TVA should do what is necessary to eliminate risk to public water supplies, recreation, fish and wildlife.

TVA has demonstrated management failures in the past with the management of ash from its facilities. These include leachate that has been entering Old Hickory Lake from Gallatin Fossil Plant and the Kingston ash pond failure. Additionally I recall a case in which a TVA safety manager was convicted of criminal falsification of safety data.

I would hope the culture that allowed these incidents to occur has been changed and that decision making is improving to ensure the safety of the public and environment.

I appreciate the hard work of TVA employees and their many services to the public. Please make wise decisions and consider all short term and long term results regarding the management of coal ash and all types of waste and emissions at Gallatin.

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Appendix B – Public and Agency Comments on the Draft EIS and TVA's Responses to Comments

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Appendix B
Public Comments and Responses to Comments on the Gallatin Fossil Plant Ash Surface Impoundment Closure and Restoration Project Environmental Impact Statement

TVA released the Draft EIS for public review on December 27, 2019. A Notice of Availability of the Draft EIS was published in the Federal Register on January 4, 2020, initiating a 45-day public comment period which concluded on February 18, 2020.

The availability of the Draft EIS was announced in regional and local newspapers (the Nashville *Tennessean* and the *Gallatin News*) serving the Gallatin area. A news release was issued to the media and posted to TVA's Web site. TVA's agency involvement included sending letters to local, state, and federal agencies and federally recognized tribes to notify them of the availability of the Draft EIS.

TVA hosted an open house meeting to solicit public input on January 16, 2020 at the Gallatin Civic Center in Gallatin, Tennessee. TVA chose the open house meeting format to allow the public to attend at their convenience and meet with TVA staff to discuss the project on an informal basis. Members of the public were provided the opportunity to look at displays, discuss the proposed project with subject matter experts, and submit comments. TVA accepted comments submitted through mail, email, a comment form on the public website, and at the public meetings.

At the end of the public comment period, TVA received 96 comment submissions as follows:

- One submission from a federal agency (EPA)
- One submission from TDEC
- One submission from Sierra Club Tennessee Chapter (included 89 separate comments from the organization's members and 151 additional signatures from members)
- One submission from the Southern Environmental Law Center (collaboration of Tennessee Clean Water Network, Tennessee Scenic Rivers Association, and Sierra Club Tennessee Chapter)
- One submission from a representative of the Tennessee Concrete Association and Tennessee Road Builders Association
- Two submissions from members of the public

TVA carefully reviewed all of the substantive comments that were received. Summarized comments and TVA's responses are included in Table B-1. Original comment submissions will be retained as part of the project's Administrative Record.

Table B-1. GAF Surface Impoundment Closure and Restoration Project EIS Response to Comments

No.	Name	Comment	Response
1	Gkajumba, Ntale (EPA)	The EPA concurs with Alternative B as TVA's preferred alternative because it meets the purpose and need of the project. Option 1 removes CCR from surface impoundments and transports the material to the existing NRL Landfill or the SRL Facility, or a combination of both these landfills. Option 2 removes CCR from surface impoundments and transports CCR offsite to a beneficial re-use processing facility. The DEIS does not identify a preferred option for disposal of CCR at the APC.	Comment noted.
2	Gkajumba, Ntale (EPA)	The DEIS identifies potential impacts to the natural and human environment. Efforts to avoid and minimize many of these effects are discussed in the DEIS. For example, the EPA recognizes that Alternative B Closure-by-Removal will reduce the potential for ground water contamination in the long term. Nevertheless, we recommend that TVA continue its adherence to the Tennessee Department of Environment and Conservation Commissioner's Order OGC15-0177 to ensure ground water monitoring is in place and effective at coal ash storage sites.	Comment noted. As stated in Section 3.4.3.2, state requirements for post-closure certification would be implemented as needed, and the Corrective Action/Risk Assessment (CARA) Plan would be implemented for closure of surface impoundments under Alternative B. Additionally, a groundwater monitoring program would be used to support the protection of groundwater quality from operations at the SRL Landfill, and TVA would also continue its groundwater monitoring program until groundwater protection standards are reached at GAF or as required under the federal CCR Rule and TVA’s agreement with TDEC (i.e., approved CARA Plan). As a point of clarification, the Gallatin site is not subject to TDEC Commissioner’s Order No. OGC15-0177; however, TVA will continue its adherence to that order with respect to other coal ash storage sites in Tennessee.
3	Gkajumba, Ntale (EPA)	In addition, efforts should be made to minimize impacts to communities located along the transportation corridors.	An onsite landfill, if constructed, would be the primary means to minimize transportation impacts to communities. TVA has evaluated potential impacts to communities, both environmental justice and non-environmental justice communities, in Section 3.20 and impacts to transportation in Section 3.17 of the EIS. To minimize impacts to these communities, BMPs designed to minimize fugitive dust emissions during transport (such as covered loads) would be

No.	Name	Comment	Response
			utilized along transportation corridors. Additionally, transport would generally be restricted to weekdays during normal working hours.
4	Gkajumba, Ntale (EPA)	Also, please note that for any additional site-specific actions necessary to implement the proposed Gallatin Fossil Plant Surface Impoundment Closure and Restoration project, additional National Environmental Policy Act analysis or tiering from the June 2016 Final Programmatic Environmental Impact Statement may be required.	Comment noted. TVA will review any site specific action not already included in the scope of this EIS for NEPA applicability and will tier from the Final PEIS as appropriate.
5	Taylor, Matt (TDEC)	TDEC acknowledges that TVA is required by the National Environmental Policy Act to provide corrective action alternatives to address the environmental problems presented by the disposal of CCR material at the TVA GAF. However, TDEC and TVA entered into a Consent Order on July 24, 2019, to resolve the matter of State of Tenn. et al. v. Tenn. Valley Auth., Davidson County Chancery Court No. 15-23-IV, which requires TVA to remove all CCR material from the TVA GAF APC. The Order also allows TVA to conduct a demonstration Project at the TVA Gallatin Non-Registered site to determine if the CCR material at this location can be addressed by treating the disposed CCR material in-place and then capping the disposal area. Tennessee state law requires TVA's compliance with the terms of the final Consent Order and TDEC expects TVA's continued efforts to satisfy its obligations pursuant to those terms.	Comment noted.
6	Taylor, Matt (TDEC)	TDEC encourages TVA to provide additional detail in the Final EIS relating to the long-term soil needs for Alternative B – Option 1 and Alternative B - Option 2 relative to all site and closure needs, including preexisting GAF site needs, borrow site soil availability, APC closure and conversion requirements, and long term landfill operations and management.	As stated in Section 2.7 of the EIS, TVA estimates construction, operation, and closure of the landfill is expected to require approximately 1.1 million yd^3 of excavated suitable borrow material. Borrow will also be required for restoration of the impoundments as needed. Borrow material would be obtained from the 198-acre permitted borrow site owned by TVA which is located 1.5 miles northwest of the GAF plant. TVA estimates that the site can provide approximately 1,480,000 yd^3 borrow material.
7	Taylor, Matt (TDEC)	There is a potential for Alternative B – Option 1, expansion of the onsite landfill, to disturb cultural resources. Potential effects to archaeological resources should be addressed through consultation with the State Historic Preservation Office and the Section 106 compliance process. TDEC encourages TVA to include these considerations in the Final EIS.	Comment noted. TVA has consulted with the Tennessee State Historic Preservation Officer pursuant to Section 106 of the National Historic Preservation Act (NHPA) and has entered into a Memorandum of Agreement. Potential effects to archaeological resources and results of the

No.	Name	Comment	Response
			consultation process are addressed in Section 3.16 of the EIS.
8	Taylor, Matt (TDEC)	TDEC believes the Draft EIS adequately addresses potential impacts to natural resources within the proposed project area.	Comment noted.
9	Taylor, Matt (TDEC)	The planned demolition of buildings is discussed, however no discussion is provided relating to ensuring that any asbestos containing material is identified and managed properly during demolition, and that the appropriate notifications are provided prior to demolition activities commencing. TDEC encourages TVA to include this consideration in the Final EIS.	Along with TVA BMPs, all materials determined to be waste would be evaluated (e.g., waste determinations) and managed (e.g., inspections, container requirements, permitted transport) in accordance with applicable federal and state rules including TDEC Solid and Hazardous Waste Rules and Regulations as described in TDEC Division of Solid Waste Management Rule 0400 Chapters 11 and 12, respectively. Prior to demolition activities, hazardous waste, PCB, ACM, lead paint, and universal waste would require special removal, handling, labeling and disposal by appropriately trained and licensed personnel and contractors. Proper assessment and notification for abatement of ACM or other materials will be conducted in accordance with TDEC requirements. These materials would be disposed of at a facility designed and permitted to receive hazardous materials. Removed materials would be transported to a landfill or other approved disposal facility operated by a company under TVA contract. Section 3.14 has been updated to reflect this additional discussion.
10	Taylor, Matt (TDEC)	TDEC encourages TVA to include descriptions and details in the Final EIS of the measures designed to mitigate fugitive lead dust emissions that could be generated during the remediation of the firing range.	As stated in Section 3.14 of the EIS, TVA is conducting a site investigation to evaluate the presence, extent, and distribution of lead and possible COCs at the former gun range. TVA is entering into the Voluntary Cleanup Program with TDEC Division of Remediation and remedial measures will be determined in consultation with TDEC. Specific BMPs for the management of controlling lead dust are described in the Remedial Action Work Plan.
11	Taylor, Matt (TDEC)	The open burning of landscape waste material is described in the Draft EIS. TDEC encourages TVA to consider other methods of disposal with lesser air resource impacts that may be available and preferred. Should other suitable disposal methods not be available,	Landscape waste at GAF would be disposed of offsite, chipped and mulched, or disposed of via open burning. If the project proceeds with the burning of landscape wastes, TVA would follow federal, state,

No.	Name	Comment	Response
		when open burning, TDEC recommends avoiding burning on days with poor smoke dispersion, not burning on air quality alert days, use of good smoke management practices when planning the open burning and insuring coordination with local and state air pollution control agencies, forestry agencies and local fire agencies prior to conducting any planned burning.	and local air quality regulations related to open burning as stated in Section 3.14.2. This includes necessary best management practices related to smoke management.
12	Taylor, Matt (TDEC)	The amount of material to be processed, if only considering the removal of CCR materials, is likely to be substantial and will require a significant number of dump trucks and related loading vehicles for use onsite. TDEC encourages TVA to include considerations in the Final EIS relating to the use of truck wheel washing stations and wetting, which will likely reduce the possible track-out of CCR materials onto local roads and highways leading to the disposal locations, if Alternative B – Option 2 is considered.	Comment noted. Dust control activities and truck washing activities will be included in the project specific SWPPP. The SWPPP would further detail the use of truck aprons and other fugitive emissions control activities. TVA will also follow the GAF CCR Rule fugitive dust plan. Please see Section 2.11 Summary of Environmental Commitments, Mitigation Measures and Best Management Practices and Section 3.5.2.
13	Taylor, Matt (TDEC)	Additionally, TDEC recommends that TVA discuss anticipated emissions generated by the gasoline and diesel fueled trucks and construction equipment used on- and off-site. TDEC further recommends discussion of how these emissions are expected to be minimized through the use of proper maintenance, new emissions control technologies, and fuels along with the minimization of unnecessary heavy duty vehicle idling, and where possible through using newer trucks for long haul off-site transport to help mitigate off-site emissions during transit to the disposal sites.	Comment noted. Emissions from construction vehicles and equipment are considered in the air quality analysis in Section 3.1 Air Quality of the EIS.
14	Taylor, Matt (TDEC)	TDEC recommends that the Final EIS consider and explicitly reflect that any wastes associated with such activities in Tennessee be managed in accordance with the Solid and Hazardous Waste Rules and Regulation of the State of Tennessee (TDEC DSWM Rule 0400 Chapters 11 and 12, respectively). It is important to note that with respect to hazardous waste management, the state's requirements are most often equivalent with federal Resource Conservation and Recovery Act requirements but may in certain situations be state-specific.	Comment noted. The explicit statement regarding the Solid and Hazardous Waste Rules and Regulation of the State of Tennessee (TDEC DSWM Rule 0400 Chapters 11 and 12) has been added to the Final EIS in Section 3.14.2.2 Solid and Hazardous Waste.
15	Taylor, Matt (TDEC)	The Draft EIS refers to a Draft Karst Mitigation Plan that has been developed for the landfill expansion to address any subsurface karst features that are encountered. TDEC encourages TVA to include additional details from the Karst Mitigation Plan in the Final EIS and offer it as an Appendix to the Final EIS.	A Karst Mitigation Plan will be submitted as part of the landfill expansion permit package that will be reviewed by TDEC. Additionally, a Karst Mitigation Plan will be prepared for the Removal Plan under Consent Order 15-23-IV for implementation during closure of the

No.	Name	Comment	Response
			surface impoundments. This plan will also be reviewed by TDEC.
16	Taylor, Matt (TDEC)	TDEC appreciates the opportunity to comment on this Draft EIS. Please note that these comments are not indicative of approval or disapproval of the potential action or its alternatives, nor should they be interpreted as an indication regarding future permitting decisions by TDEC.	Comment noted.
17	Busey, Trey and Garcia, Amanda (Southern Environmental Law Center)	Conservation Groups care about protecting the Cumberland River and local groundwater for the benefit of the resources, our community, and future generations. We support TVA's decision to remove toxic coal ash from its leaking, unlined pits at the Gallatin Fossil Plant ("Gallatin Coal Plant" or "Coal Plant"). Removing the coal ash at the Gallatin Coal Plant is an essential component of remediating coal ash contamination that currently threatens local groundwater and the Cumberland River. We urge TVA to clean up its coal ash pollution as quickly as is safely possible.	CCR is nonhazardous under 40 CFR 261.4(b)(4) and thus regulated under Subtitle D of RCRA. TVA plans to work as expeditiously as possible to remove CCR from the ash ponds and safely manage the material through storage in a lined landfill and/or through processing for encapsulated beneficial re-use. In addition, as noted in Section 3.11 of the EIS, TVA began a fish community monitoring program on the Cumberland River upstream and downstream of the GAF facility. The over six sampling years of scores indicate a healthy aquatic ecosystem at this location.
18	Busey, Trey and Garcia, Amanda (Southern Environmental Law Center)	At the Gallatin Coal Plant, discharges of coal ash contamination into groundwater are the subject of a consent order TVA entered into with the Tennessee Department of Conservation ("TDEC") and conservation groups Tennessee Clean Water Network ("TCWN") and Tennessee Scenic Rivers Association ("TSRA"). The state court settlement follows years of litigation in federal court, where the district court found that "TVA has discharged and is reasonably likely to continue discharging pollutants from a point source, the Ash Pond Complex, into the Cumberland River." In the settlement of the state case, TVA agreed to remove all coal ash from the Ash Pond Complex by "either exclusively or in some combination, beneficially reusing the excavated material in a recycling process for encapsulated beneficial use, placement of the excavated material into an on-site permitted landfill, or transportation of excavated material off-site for disposal into a permitted landfill." This agreement prohibits the no-action alternative and limits TVA's discretion for the action alternatives. The consent order requires TVA to submit a removal plan to TDEC for review and approval. Thus, to the extent TDEC does not approve of any alternative	As stated in Section 2.4.1 of the EIS, the No Action Alternative is included for review in the document "because applicable regulations require consideration of a No Action Alternative in order to provide a baseline for potential changes to environmental resources. However, the No Action Alternative is inconsistent with TVA's plans to convert all of its wet CCR systems to dry systems. It also would be inconsistent with EPA's CCR Rule and TVA's commitments to the State of Tennessee and TDEC. Consequently, this alternative would not satisfy the project purpose and need and, therefore, is not considered viable or reasonable. It does, however, provide a benchmark for comparing the environmental impacts of implementation of Alternative B." TVA is a corporate agency of the United States, and therefore is required to review proposed actions under NEPA for impacts to the human environment. If changes to the project are encountered that require

No.	Name	Comment	Response
		proposed and selected by TVA in this NEPA process, TVA will be required to reopen the NEPA process to analyze specific alternatives that will address any concerns raised by TDEC in the consent order process.	additional review, TVA would supplement the NEPA review as necessary.
19	Busey, Trey and Garcia, Amanda (Southern Environmental Law Center)	TVA’s history of mismanagement of its coal ash raises concerns regarding the selection of an appropriate disposal and beneficial re-use site with adequate consideration given to disproportionately impacting an environmental justice community. In the aftermath of the Kingston coal ash failure, TVA transported ash to the Arrowhead Landfill in Perry County, Alabama, a landfill in an environmental justice community that had already been subjected to repeated violations of pollution laws. In September 2016, the United States Commission on Civil Rights issued a report finding that the decision to move coal ash to the Arrowhead Landfill was primarily based on technical considerations, including cost, and did not properly take into account environmental justice concerns. This must not happen again. TVA must ensure that any disposal location for its coal ash, including any landfill and beneficial re-use facility, complies with laws designed to protect people from pollution and takes into account disproportionate impacts on communities that are already burdened.	Appendix C of the Draft EIS (Appendix D of the Final EIS) summarizes the results of the landfill screening analysis TVA used to identify existing, permitted landfills within 150 miles of GAF that are suitable for disposal of CCR from GAF via truck transport. Nine Subtitle D landfills met all of the identified screening criteria and were used to inform the bounding analysis of impacts (including impacts to environmental justice communities) associated with disposal of CCR into an existing landfill or to a beneficial re-use processing facility. If an offsite landfill is selected, TVA expects the selected vendor to coordinate with the local community and stakeholders to keep them informed of the progress of the project.
20	Busey, Trey and Garcia, Amanda (Southern Environmental Law Center)	In addition, TVA’s history with the Kingston coal ash remediation raises concerns about the safety of clean-up workers and the communities where the coal ash is recycled or disposed. In November 2018, a jury found that TVA’s contractor for the Kingston clean-up failed to adequately protect workers from exposure to coal ash contamination. Forty-four Kingston disaster workers have died from illnesses they assert in the lawsuit were caused by coal ash exposure, and more than 400 are sick, according to an ongoing tally from court records by Knox News. This, too, must never happen again. In the EIS, TVA must commit to following all laws, regulations, and best practices for worker safety and require its contractors to do the same. TVA must explicitly and specifically address concerns about worker exposure to coal ash pollution to gain the confidence of local communities with respect to either of the available alternatives. This should include a commitment by TVA not to use the same contractor it used in the Kingston coal ash remediation and specific coal ash exposure safety criteria that TVA will apply to its selection of a new contractor. The Draft EIS fails to	Worker safety is addressed in Section 3.21 of the EIS. This section states that it is TVA's policy that contractors have a site-specific health and safety plan in place prior to conducting construction activities at TVA properties. Additionally, the following statement has been added to this section to provide further clarification: “The contractor site-specific health and safety plans must address the hazards and controls as well as contractor coordination for various construction tasks.”

No.	Name	Comment	Response
		address community concerns about worker exposure to coal ash pollution, instead making vague statements about TVA's "robust safety conscious culture."	
21	Busey, Trey and Garcia, Amanda (Southern Environmental Law Center)	The Sierra Club and Tennessee Clean Water Network, together with others, previously commented extensively on the fundamental inadequacy of TVA's programmatic and site-specific analyses in the Ash Impoundment Closure EIS, the final version of which was published in June 2016 ("PEIS"). Comments we provided on the draft and final versions of the PEIS are attached to this letter and are incorporated by reference.	Comment noted. Comments provided on the draft PEIS were appropriately addressed in the final PEIS.
22	Busey, Trey and Garcia, Amanda (Southern Environmental Law Center)	The Draft EIS obscures the differences in impacts among alternative disposal and beneficial re-use sites by improperly employing a "bounding" analysis rather than site-specific analysis. In the Draft EIS, TVA identifies three alternatives: Alternative A, no action; Alternative B (Option 1), closure by removal of the Ash to an on-site landfill; and Alternative B (Option 2), closure by removal of coal ash to a "beneficial re-use facility" and an off-site landfill. The no-action item violates the terms of the Consent Order, which requires closure by removal. Alternative B (Option 1) requires selection of a landfill site, and Alternative B (Option 2) requires selection of both a disposal site and a beneficial re-use facility site. However, instead of identifying specific sites and analyzing the environmental impacts associated with each potential disposal and re-use facility site, TVA employs a "bounding analysis." The "bounding analysis" analyzes the impacts associated with a generic suite of site features. This approach obscures the differences in impacts among alternative disposal and beneficial re-use sites, making it impossible for the public and decision-makers to adequately evaluate the choices.	As stated in Section 2.6 of the EIS, no specific provider of the beneficiation services or the specific site in which a beneficial re-use processing facility would be constructed has been developed at this time. TVA would not own, construct, or operate a beneficial re-use processing facility included in Option 2. As such, TVA cannot dictate or predict the location of such a facility. Because a specific site for a potential beneficial re-use processing facility has not been identified, TVA used a bounding analysis to assess potential direct and indirect effects associated with construction of a beneficial re-use processing facility and transport of CCR to an offsite landfill suitable to receive CCR not used for beneficial re-use. The bounding values contained in Tables 2-5 and 2-6 represent the upper range of facility attributes and potential environmental characteristics of such a facility. Therefore, the bounding attributes and characteristics allow for the assessment of the upper range of potential environmental impacts. However, once details of these component actions are determined, TVA will conduct a review of the potential for substantial differences in facility attributes and in the finding of impact. In such cases, TVA will perform a supplemental NEPA review as appropriate. TVA will review any site-specific action not already included in the scope of this EIS for NEPA applicability and will tier from the Final PEIS as appropriate. Appendix D of the Draft EIS (Appendix E of the Final EIS) also

No.	Name	Comment	Response
			provides TVA's evaluation of the environmental impacts associated with construction of a beneficial re-use processing facility on two potential sites at GAF. See TVA's responses to Comment #18 regarding the No Action Alternative and Comment #19 regarding offsite landfill sites used to inform the bounding analysis.
23	Busey, Trey and Garcia, Amanda (Southern Environmental Law Center)	TVA's approach is particularly concerning because the off-site landfill and haul routes to these landfills are likely to be located in environmental justice communities, each of which undoubtedly bears a unique burden of existing pollution transportation and land uses. TVA nevertheless arbitrarily concludes that the selection of a landfill for its coal ash will not affect environmental justice communities by making a blanket assumption about the characteristics of the hypothetical "bounding" landfill operator. This is a remarkable assumption, given the United States Civil Rights Commission's finding that TVA's and EPA's previous selection of the Arrowhead Landfill did not adequately consider environmental justice.	No decision regarding a particular offsite landfill has been made. However, the EIS identified offsite landfills suitable for disposal of CCR that were identified through a systemic screening process. The identification and analysis of candidate landfills is included in Appendix C of the Draft EIS (Appendix D of the Final EIS). Whether or not a receiving landfill was in an environmental justice community was included in TVA's screening process. However, each of the candidate landfill sites are existing, permitted landfills that meet state and federal criteria for the operation of municipal waste and industrial waste landfills, including design criteria, location restrictions, financial assurance, corrective action (cleanup), and closure requirements. As such, the operation of the landfill will not adversely affect public health or the environment. In addition, each of the candidate sites have the existing infrastructure in place such that construction of additional roads or unloading facilities outside of the existing landfill footprint would not be required. Furthermore, the analysis of the impact of transport of CCR to these facilities by TVA included the identification of the magnitude of impacts that could result from the transport of CCR within sensitive communities requiring environmental justice consideration. As such, TVA evaluated the community and environmental justice characteristics in the vicinity of each candidate landfill site and along each haul route from GAF in Appendix C of the Draft EIS (Appendix D of the Final EIS). Therefore, TVA disagrees that this analysis was arbitrary or incorporated blanket assumptions.

No.	Name	Comment	Response
24	Busey, Trey and Garcia, Amanda (Southern Environmental Law Center)	With up to 88 truck trips per hour for about fifteen years, TVA anticipates a large impact on traffic near Gallatin Coal Plant, but TVA fails to meaningfully consider similar impacts for those trucks' destinations. TVA expects the trucks to represent a nearly 20% increase in local traffic near the beneficial re-use site, but without identifying that site, TVA cannot and does not say how that traffic might burden the community that will receive the coal ash. By considering the transportation, noise, and air quality impacts surrounding Gallatin Coal Plant but not for any other specific facility involved, TVA has done, at best, half the job of analyzing the impacts of its proposal.	As stated in Section 3.17.2.2, under Option 2, approximately 80% of CCR excavated from the APC would be transported to an offsite beneficial re-use processing facility and the remaining 20% that is unsuitable for beneficiation would be transported to a suitable offsite landfill located within a 150-mile radius of GAF. While the site of a prospective beneficial re-use processing facility has not been determined it is expected to be located with direct access to a collector or other higher functioning roadway and the potential increase in traffic would be minor to moderate.
25	Busey, Trey and Garcia, Amanda (Southern Environmental Law Center)	Similarly, the Draft EIS acknowledges the problem of fugitive coal ash dust but broadly states that TVA and its contractors will use best management practices "as appropriate." With toxic coal ash, best management practices are always appropriate and necessary. TVA must prioritize the health and safety of workers and communities by committing to specific, effective practices to minimize fugitive dust during construction and transportation.	TVA would obtain all necessary permits and required approvals before project activities begin. As noted in Section 2.11 of the EIS, TVA would comply with fugitive dust emission standards specified in the GAF's Title V Operating Air Permit, the GAF CCR fugitive dust control plan and associated BMPs, and the construction permit from TDEC. Therefore, fugitive dust emissions from site preparation, construction, and transportation will be controlled by wet suppression and other BMPs, as appropriate. In addition, TVA requires all contractors to keep construction equipment properly maintained and use BMPs (such as covered loads and watering unpaved haul roads) to minimize dust, if necessary. See TVA's response to Comment #20 regarding worker safety.
26	Busey, Trey and Garcia, Amanda (Southern Environmental Law Center)	TVA continually emphasizes that it has not selected a specific site for its landfill. However, TVA's "bounding analysis" identifies specific landfills that satisfy the criteria TVA's consultant selected, and TVA's consultant even ruled out certain landfills by calling them to ascertain their capacity to accept waste. It is therefore unclear why TVA cannot analyze a range of specific landfill sites in this EIS, rather than obscuring the potential impacts by using a so-called "bounding analysis." Indeed, the Landfill Analysis included as Appendix C to the Draft EIS demonstrates that site-specific analysis could be performed for a range of potential landfill sites. TVA cannot rely on unsupported and generic assumptions, where, as here, adequate information is available to perform a site-specific analysis.	As stated in Section 2.6 of the EIS, the purpose of the bounding analysis was to identify a range of potential impacts and to provide a conservative estimate as to the magnitude of impacts that could result from the transport of CCR. TVA believes the bounding analysis presents the scenario with the largest extent of potential impacts. However, if an offsite disposal site is chosen, the transport of CCR may result in less severe impacts. Additional NEPA analysis will be performed if a site for disposal of CCR falls outside of the criteria established for the bounding analysis.

No.	Name	Comment	Response
			Beneficiation providers were contacted by TVA's consultant to provide input in the development of the bounding facility attributes and environmental characteristics as summarized in Tables 2-5 and 2-6 of the EIS. These vendors, rather than TVA's consultant, provided specific parameters on permitting, construction, and operation of beneficial re-use processing facilities that were used to compile the list of bounding attributes used in the analysis. See TVA’s response to Comment #22 regarding selection of a specific beneficial re-use processing facility provider or site. No decision regarding a particular offsite landfill has been made. However, the EIS identified offsite landfills suitable for disposal of CCR that were identified through a systematic screening process. The bounding analysis presents the scenario with the largest extent of potential impacts, but the ultimate haul routes chosen to a particular landfill may result in less severe impacts. For the component actions considered in this EIS (transport of CCR and operation of a beneficial re-use processing facility), the specifics of haul routes and/or location are dependent upon construction contractors or the owner/operator of a beneficial re-use processing facility. These actions are not yet determined and are not therefore “ripe” for full NEPA analysis. Nonetheless, TVA conducted an analysis of reasonable routes and maximum criteria for a beneficial re-use processing facility that serves as the legitimate basis of the bounding condition. The bounding analysis presents the scenario with the largest extent of potential impacts, but the ultimate haul route chosen to a particular landfill may result in less severe impacts. However, once a particular landfill is determined, TVA will conduct a review of the potential for substantial differences in the finding of

No.	Name	Comment	Response
			impact. In such cases, TVA will perform a supplemental NEPA review as appropriate.
27	Busey, Trey and Garcia, Amanda (Southern Environmental Law Center)	TVA must carefully consider the environmental justice, worker safety, traffic, noise, air quality, and other environmental impacts associated with specific sites identified for each alternative. Based on the information disclosed in the Draft EIS and Appendix C, it appears that sufficient information is available to TVA to perform this analysis for the off-site landfill during this EIS process. To the extent that it is possible for TVA to identify specific sites at this stage of its planning, TVA cannot rely on a “bounding analysis” to substitute for site-specific analysis. TVA must commit to developing a supplemental EIS for public comment when it selects a preferred specific disposal and/or beneficial re-use site.	Comment noted. See response to Comment #26.
28	Busey, Trey and Garcia, Amanda (Southern Environmental Law Center)	TVA discusses both encapsulated and unencapsulated beneficial re-use, but TVA must commit to encapsulated beneficial re-use products only. First, TVA is legally bound by a consent order. TVA agreed to remove all coal ash from the Ash Pond Complex by, “either exclusively or in some combination, beneficially reusing the excavated material in a recycling process for encapsulated beneficial use, placement of the excavated material into an on-site permitted landfill, or transportation of excavated material off-site for disposal into a permitted landfill.” Unencapsulated use is not authorized by the terms of the settlement.	In the Draft EIS, TVA uses the term “unencapsulated beneficial use” one time when explaining that there are two general types of beneficial re-uses – encapsulated and unencapsulated. The focus of the EIS is to analyze the impacts of an offsite beneficial re-use processing facility which would process ash for use in concrete and other marketable products, which are encapsulated beneficial re-uses. The Draft EIS does not analyze unencapsulated beneficial uses at GAF.
29	Busey, Trey and Garcia, Amanda (Southern Environmental Law Center)	Second, TVA should not consider unencapsulated beneficial re-use products like structural fill because they present an unnecessary and unacceptable risk to public health and the environment. Unencapsulated products therefore require long-term monitoring and institutional controls to ensure that coal ash will not release or leach contaminants into the environment. To decrease the risk of leaching and eliminate the need for cumbersome and expensive	TVA disagrees with the broad positions and conclusions about unencapsulated beneficial uses of CCR as presented in this comment; however, it is not necessary to respond as the Draft EIS does not evaluate unencapsulated beneficial re-use of CCR at GAF.

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		long-term monitoring, TVA must commit to encapsulated beneficial re-use only.	
30	Busey, Trey and Garcia, Amanda (Southern Environmental Law Center)	TVA should diligently and compassionately protect and share the local history represented by the cemeteries at Gallatin. Expansion of the on-site landfill may impact various historic cemeteries, which occupy an area that "was home to a thriving, rural, African American community at the time TVA acquired the property. However, the history of this community is very poorly represented in historical documents and literature." We support TVA's efforts to contact living descendants of the deceased and to consult with the State Historic Preservation Officer regarding eligibility under the National Registry of Historic Places. But we encourage TVA to do more. Historic preservation efforts have systematically neglected significant African American places. One reason for that neglect is that the criteria established pursuant to the National Historic Preservation Act favor well-preserved, well-researched sites. As TVA has acknowledged, the historical record of these cemeteries and their community is not well documented. TVA should take active measures to better understand, share, and commemorate this history. TVA should seek community input, particularly from descendants, local African American communities, and local historians. It should consider commemorative projects, such as funding local historical research and creating an exhibit to share that history at a local library, school, or park.	Comment noted. TVA is continuing to seek community input and will take all comments into consideration when deciding how best to protect and share the history represented by the cemeteries. In addition, TVA has consulted with the Tennessee SHPO concerning TVA's determinations regarding the NRHP eligibility of 5 cemeteries at GAF and TVA's finding that they could be adversely affected by the undertaking. TVA has signed a Memorandum of Agreement with the SHPO that stipulates that TVA will conduct additional archival research on the affected cemeteries and engage local historians, members of the African American community in Gallatin, and any others with knowledge of the historic Odoms Bend community and provide opportunities for their participation. Mitigation would include analysis of artifacts and skeletal remains disinterred from the cemeteries aimed at identifying individuals and generating a better understanding of their life histories and the history of the community.
31	Garner, David (Sierra Club)	As one of the leading metropolitan areas of the country thanks to Music City, people look us as an example. Nashville is one of the biggest cities in the South and how we conduct ourselves sets a precedent. Nashville has a higher population than Orlando, Miami, or even Atlanta. Not only should we be setting a good example in how we deal with pollution but we need to focus on protecting the health of so many people now and for future generations. Nashville has been one of the fastest growing urban centers in the country. If we want to continue that growth, we need to act responsibly and that means doing due diligence to prevent water contamination and pollution. The plant at Gallatin affects us all. Please protect our water!	Comment noted. TVA has thoroughly evaluated the potential impacts from the proposed project to groundwater and surface water resources in Sections 3.4 and 3.5 of the Draft EIS. Closure of the impoundments by CCR removal results in a long-term beneficial impact to groundwater. Also as noted in the Draft EIS, landfill construction would include a composite liner system and a leachate collection and removal system that will direct leachate for onsite treatment prior to discharge to a NPDES outfall and would not impact the water quality of the receiving streams. Additionally, environmental commitments and mitigation measures to avoid or reduce adverse impacts to water resources from the proposed project are outlined in Section 2.11, Summary of

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			Environmental Commitments, Mitigation Measures, and Best Management Practices. As stated in this section, TVA has developed a draft groundwater detection and monitoring plan that conforms to the Class II landfill regulations promulgated by the TDEC Division of Solid Waste Management to evaluate potential impacts to groundwater quality from operations at the SRL landfill. This groundwater detection and monitoring plan will be finalized and incorporated into the permit application for the SRL Landfill according to regulatory requirements.
32	Crawford, Valerie (Sierra Club)	The danger to our water is unacceptable. Being irresponsible about toxic waste is one of the reasons our planet is in dire danger. Do the responsible thing and clean up the coal ash. There's no such thing as clean coal.	CCR is nonhazardous under 40 CFR 261.4(b)(4) and thus regulated under Subtitle D of RCRA. The projects evaluated in the EIS are designed to facilitate the long-term management of CCR at GAF. These projects include the lateral expansion of the existing landfill and the closure of surface impoundments. CCR from the surface impoundments would be placed in the SRL Landfill, a newly developed state-of-the-art lined landfill, or hauled to a beneficial re-use processing facility for encapsulated use in a product such as concrete. Removal of the CCR from the impoundments results in a long-term beneficial impact to groundwater. TVA is considering these actions to protect environmental resources while supporting the continued operation of GAF.
33	Debord, Jessica (Sierra Club)	Yup. This.	Comment noted.
34	Hill, Sammie (Sierra Club)	Please protect us from further risks.	Please see TVA's responses to Comments #31 and #32 regarding potential impacts to surface and groundwater, and TVA's plan to manage excavated CCR at GAF.
35	Duncan, Donna (Sierra Club)	Please clean up Tennessee, your waste chemicals are destroying all kinds of life including humans!	Please see TVA's response to Comments #31 and #32 regarding potential impacts to surface and groundwater, and TVA's plan to manage CCR at GAF. In addition, as stated in Section 3.14 of the Draft EIS, any solid and hazardous wastes generated by the proposed construction and operation of the proposed

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			landfill or closure of APC would be properly managed in accordance with state and local regulations.
36	Hunter, Sonja (Sierra Club)	I don't want my family drinking water contaminated with heavy metals and who knows what else. Poisons do not belong in drinking water!!!!!!!	As noted in Section 3.4 of the Draft EIS, sampling results for residential water wells within one mile north of the GAF property boundary and bounded to the east and west by the Cumberland River, show no exceedances of drinking water standards, except for fecal coliform that is not associated with CCR impacts. In addition, closure of the impoundments by CCR removal results in a long-term beneficial impact to groundwater. TVA is currently and will continue to monitor groundwater at the impoundments, including during the removal. CCR from the surface impoundments would be placed in the SRL Landfill, a newly developed state-of-the-art properly designed lined landfill, or hauled to a beneficial re-use processing facility for encapsulated use in a product such as concrete. As part of the landfill design, TVA has developed a draft groundwater detection and monitoring plan to evaluate potential impacts to groundwater quality from operations at the SRL landfill.
37	McConkey, Karen (Sierra Club)	We are depending on you to do the right thing.	Please see TVA's responses to Comments #31 and #32 regarding potential impacts to surface and groundwater, and TVA's plan to manage excavated CCR at GAF.
38	Coggins, Nathan (Sierra Club)	There are newer, cleaner, safer, cost effective, less polluting and more efficient ways of producing energy in 2020.	TVA is committed to providing low-cost reliable energy across the Tennessee Valley. TVA's generating assets include a diverse portfolio including fossil plants, nuclear plants, hydroelectric plants, natural gas combustion turbine gas plants, natural gas combined cycle plants, and 14 solar energy sites. Over half of all electricity generated by TVA is from carbon-free resources.
39	Jasud, Lawrence (Sierra Club)	The longer these essential clean up projects are put off the more expensive they will become and far more people will be harmed.	Comment noted.
40	Mccarver, Ruth (Sierra Club)	Please use your public position to protect Tennessee and its citizens!	Comment noted. Please see TVA's responses to Comments #31 and #32 regarding potential impacts to

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			surface and groundwater, and TVA's plan to manage excavated CCR at GAF.
41	Jarvis, Kristina (Sierra Club)	Please think about your children/ grandchildren when making these decisions and what type of planet you want them to inherit.	Please see TVA's responses to Comments #31 and #32 regarding potential impacts to surface and groundwater, and TVA's plan to manage excavated CCR at GAF.
42	Johnson, Bethany & Joshua (Sierra Club)	As a Nashville resident, I urgently need you to protect our water!	Please see TVA's responses to Comment #31 and Comment #36 regarding potential impacts to surface and groundwater.
43	Slentz, Paul (Sierra Club)	As a person of faith, I believe care for the gift of creation is one of our most sacred responsibilities. Please deal with the coal ash in a way that keeps it from harming people and our fellow creatures.	Please see TVA's response to Comment #32 regarding the proposed actions to manage excavated CCR at GAF.
44	Oliver, Lynn (Sierra Club)	I live in Trousdale County. I have had cancer and many people here have had cancer. We live in a rural area. One scientist said it was particles in the air from the Gallatin coal fired plant distributed to us by prevailing wind, soil and water contamination. More filters needed, since the 70's or 80's.	TVA has taken a number of steps to improve air quality at GAF, all of which meet or exceed current EPA requirements. Please refer to the TVA website https://www.tva.gov/Energy/Our-Power-System/Coal/Environmental-Stewardship-at-Gallatin for more information.
45	Boyd, Jo Anne (Sierra Club)	I am a supporter of TVA and have been all my life. I am very concerned about clean H20. You can't afford not to do the right thing for the planet. TN is not a dump.	Please see TVA's responses to Comment #31 and Comment #36 regarding potential impacts to surface and groundwater.
46	Raines Guidry, Anna (Sierra Club)	Please do it for the health of our children!	Comment noted.
47	Strange, Ann (Sierra Club)	This legacy waste must be taken care of properly to avoid future damage to people and the environment.	Please see TVA's response to Comment #32 regarding the proposed actions to manage excavated CCR at GAF.
48	Pafford, Israfel Mark (Sierra Club)	I was born in Gallatin and spent many weekends throughout the year hiking the Hills and Woods in and nearby the Steam Plant Property. It is where my love and stewardship of nature first took root. It breaks my heart to contemplate the possibility of that beautiful spot continuing to be polluted. Please take the appropriate steps to preserve the health of your workers, the surrounding community, and the irreplaceable natural beauty of my childhood adventures watching deer, fishing, and hiking.	Environmental stewardship is an important part of TVA's mission of service. TVA is committed to protecting the Valley's natural resources, as well as its historical and cultural heritage. As noted in the EIS, impacts to the natural environment from the proposed actions evaluated in the EIS are primarily minor and temporary. As noted in Section 2.11, Summary of Environmental Commitments, Mitigation measures, and BMPs, customary industrial safety standards

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			including OSHA requirements for workers will be followed during all project activities. Also, the establishment of appropriate BMPs and job site safety plans would describe how job safety will be maintained during the project. It is TVA policy that all contractors have in place a site-specific health and safety plan prior to operation on TVA properties.
49	McFadden, Nancy (Sierra Club)	Coal ash should be in lined storage and covered. Anything less is not protective of human health.	Please see TVA's response to Comment #32 regarding the proposed actions to manage excavated CCR at GAF.
50	Johnston, Susan (Sierra Club)	This lack of responsibility is a disgrace to our state. Please fix it now!	Comment noted. Please see TVA's response to Comment #48 regarding TVA's commitment to environmental stewardship.
51	Lampa, Christy (Sierra Club)	As Middle TN residents with three children, it's very important to us that the coal ash is disposed of properly.	Please see TVA's response to Comment #32 regarding the proposed actions to manage excavated CCR at GAF.
52	Crawford, Katherine (Sierra Club)	The TVA has done much good in the past. Time to do the good and right thing now.	Comment noted. Please see TVA's response to Comment #48 regarding TVA's commitment to environmental stewardship.
53	Gardner, Jane (Sierra Club)	I live downriver from the Gallatin Plant. Please carefully remove the coal ash, caring for the workers, the residents, the river, the wildlife.	Comment noted. Please see TVA's responses to Comments #32 regarding the proposed actions to manage excavated CCR at GAF and #48 regarding TVA's commitment to environmental stewardship.
54	Davis, Karen (Sierra Club)	Please take care of your people as you would your own family.	Comment noted. Please see TVA's responses to Comments #32 and #48 regarding the proposed actions to manage excavated CCR at GAF and TVA's requirements for worker safety.
55	Samuels, Lauren (Sierra Club)	Please protect my neighbors in Tennessee!	Comment noted. Please see TVA's response to Comments #32 regarding the proposed actions to manage excavated CCR at GAF.
56	Olson, Sarah (Sierra Club)	Please do the right thing by your fellow citizens!	Comment noted. Please see TVA's response to Comments #32 regarding the proposed actions to manage excavated CCR at GAF.
57	Wenger, Clara (Sierra Club)	Please consider all of the lives affected by this coal waste - and think of them when making the decision to dispose of it in a safe and transparent way! We are trusting you to make wise decisions for our community and environment!	Please see TVA's response to Comment #32 regarding the proposed actions to manage excavated CCR at GAF.

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58	Kurowski, Bryan (Sierra Club)	You have a proven track history of mismanagement of these coal ash pits in nearby Kingston at the TVA Steam Plant there. It's time to learn from those mistakes and put sound environmental practices into action on the cleanup and disposal of the coal ash from the unlined, leaking ash pits in Gallatin. Thank you.	As stated in the EIS, TVA's preferred alternative is to close the APC by removing the CCR and transporting it into an onsite lined landfill for disposal or to an offsite beneficial re-use processing facility for re-use. TVA uses state-of-the-art practices and technologies to ensure proper protection of environmental resources.
59	Barrios, Carla (Sierra Club)	Please be transparent and environmentally responsible when removing coal ash and make it possible for the public and decision-makers to adequately evaluate site-specific choices.	Please see TVA's responses to Comments #31 and #32 regarding potential impacts to surface and groundwater, and TVA's plan to manage excavated CCR at GAF. As stated in the EIS, TVA's preferred alternative is to close the APC by removing the CCR and transporting it into an onsite lined landfill for disposal or to an offsite beneficial re-use processing facility for re-use.
60	Canty, Caitlin (Sierra Club)	I value my health, my neighbors health, and our drinking water. Clean up your act	Please see TVA's response to Comment #32 regarding the proposed actions to manage excavated CCR at GAF and Comment #36 regarding potential impacts to surface and groundwater.
61	Leong, Lk (Sierra Club)	Our neighborhoods are so interconnected that it's a matter of time before water contamination find its way to our water/river sources.	Please see TVA's response to Comment #31 regarding the proposed actions beneficial impacts on groundwater.
62	Hunter, Sonja (Sierra Club)	I live downstream from the Gallatin plant. I remember what happened in Kingston, TN. It clearly showed that cleaning up coal ash is hazardous. The coal ash from the Gallatin plant must be safely disposed of in a location and in a manner that protects the workers and the environment (including fresh water sources).	Please see TVA's responses to Comment #32 regarding the proposed actions to manage excavated CCR at GAF, Comment #36 regarding potential impacts to surface and groundwater, and Comment #48 regarding TVA’s requirements for worker safety.
63	Long, Stephanie (Sierra Club)	Let's make sure the toxic ash is removed as safely and cleanly as possible improving guidelines, as well, for future generations. We can do this.	Please see TVA's response to Comment #32 regarding the proposed actions to manage excavated CCR at GAF.
64	Payne, Angela (Sierra Club)	We need to make clean water and natural resources a priority for not only our wellbeing, but those of future generations.	Comment noted. Please see TVA's response to Comment #48 regarding TVA's commitment to environmental stewardship.
65	Kashewa, Violet (Sierra Club)	Do you have children? Do you have lungs, a heart, and other body parts that will suffer because of potential TVA environmental corruptions? Do the right thing!...How about green technology to leverage your partisan special interest lobbying? Thank you. God's child.	Comment noted. Please see TVA’s response to Comment #38 regarding TVA’s commitment to providing low-cost reliable energy across the Tennessee Valley.

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66	Whitt, Cindy (Sierra Club)	Please start leading in environmental issues to save and preserve our land, air and water!	Comment noted. Please see TVA's response to Comment #48 regarding TVA's commitment to environmental stewardship.
67	Graves, Emily (Sierra Club)	Coal ash does not belong in our waterways or groundwater. Once contaminated, this cannot be undone.	Thank you for your comment. Please see TVA's response to Comment #31 regarding the proposed actions' beneficial impacts on groundwater.
68	Keyser, Donald (Sierra Club)	We need clean water and air.	Comment noted. Please see TVA's response to Comment #48 regarding TVA's commitment to environmental stewardship.
69	Oguin, Roxanne (Sierra Club)	I live in Tennessee and want to see it remain beautiful and clean! Please do your part to safely clean up the mess you made. It means so much to future generations! Thanks!	Comment noted. Please see TVA's response to Comment #48 regarding TVA's commitment to environmental stewardship.
70	Miller, Jennifer (Sierra Club)	We will respond positively on media and elsewhere if you do the right thing	Comment noted.
71	Gillaspie, Richard (Sierra Club)	Profits made in production of this waste need be invested in cleaning it up. We need eliminate the concept of waste. Our children will inherit the environment we leave behind, they need not suffer the cost of corporate exploitation.	Comment noted. Please see TVA's response to Comment #48 regarding TVA's commitment to environmental stewardship.
72	Shiflett, Debora (Sierra Club)	As part of our community, you have a responsibility to help keep our water ways and environment clean. Please follow the requests in this petition and help clean up the coal ash in a responsible way. Thank you!	Please see TVA's response to Comments #31 and #32 regarding potential impacts to surface and groundwater and TVA's plan to manage excavated CCR at GAF, and Comment #48 regarding TVA's commitment to environmental stewardship.
73	Cloud, Barbara (Sierra Club)	For heaven's sake TVA, do the right thing!	Comment noted.
74	Cartledge, Ben (Sierra Club)	I believe you hold a public trust to safely confine this by-product. Please protect our futures.	Please see TVA's response to Comment #32 regarding the proposed actions to manage excavated CCR at GAF.
75	Vaught, Kevin (Sierra Club)	Protect our Tennessee air, water and soil. Clean up the coal ash!	Please see TVA's response to Comment #32 regarding the proposed actions to manage excavated CCR at GAF.
76	Vaught, Kevin (Sierra Club)	Keep Tennessee's air, water and soil clean. Clean up the toxic coal ash1	Please see TVA's response to Comment #32 regarding the proposed actions to manage excavated CCR at GAF.
77	Terrell, Jacob (Sierra Club)	Please Make Tennessee Great Again and keep it clean. I'm tired of all of these demoRats dirtying up our back yard with their communist pollution in our water. It's killing our babies. Pro life 4 Eva!	Comment noted.

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78	Stalnaker, Lisa (Sierra Club)	Family members reside in Gallatin, and I want their health and the health of their friends and neighbors to be a priority.	Comment noted. Please see TVA's response to Comment #48 regarding TVA's commitment to environmental stewardship.
79	Helfman, Laura (Sierra Club)	Do the right thing and dispose of the coal ash safely.	Please see TVA's response to Comment #32 regarding the proposed actions to manage excavated CCR at GAF.
80	Kornrich, William (Sierra Club)	This is a big problem. It needs a solution, based on science and safety - both for the communities that suffer from the impact of all this coal ash and any community that might be on the receiving end of this toxic material.	Please see TVA's response to Comment #32 regarding the proposed actions to manage excavated CCR at GAF.
81	Post, Wilfred (Sierra Club)	It's time to stop making any more coal ash. It is now clear that this material is dangerous. The coal ash that TVA has already generated needs to be taken care of responsibly. I live near Bull Run that is slated to be decommissioned in 2023. This site has huge coal ash piles including ones dangerously close to the Clinch River. Please protect communities from the dangers of irresponsibly managed coal ash by finalizing plans that include strong standards for the disposal or recycling of coal ash from this site as well as from John Sevier, Gallatin and others.	Please see TVA's response to Comment #32 regarding the proposed actions to manage excavated CCR at GAF. Disposal of CCR at other TVA facilities is outside of the scope of this EIS.
82	Distel, Michael (Sierra Club)	This request is merely common sense and being considerate to the citizens of Tennessee.	Comment noted. Please see TVA's response to Comment #48 regarding TVA's commitment to environmental stewardship.
83	Belote, Lucinda (Sierra Club)	I grew up a few miles from the Gallatin Steam Plant in the 1950s. This land is precious to me. Please dispose of the coal ash in a safe way. Do not pollute our rivers, streams and land for years to come.	Please see TVA's response to Comment #31 regarding the proposed actions' beneficial impacts on groundwater.
84	Dowell, Carleen (Sierra Club)	I raised my family in the Gallatin area and have extended family still there. I want transparency so I can feel peace about TVA's response.	Comment noted.
85	Kaset, Angela (Sierra Club)	I own property near Gallatin so this is of concern to me. I have family there with children. Their future health could be at risk.	Comment noted.
86	Rodman, Judy (Sierra Club)	What you are planning is truly unacceptable and will harm us all. Do the right thing and it will be remembered.	Comment noted. Please see TVA's response to Comment #32 regarding the proposed actions to manage excavated CCR at GAF.
87	Coombs, Joyce (Sierra Club)	Coal ash is toxic! Protect us, your neighbors, from exposure!!!	Comment noted.
89	Brown, Kathleen M (Sierra Club)	Coal Ash is filthy and dangerous! This is a health hazard for people and all living things and needs to be rectified immediately!	Comment noted. Please see TVA's response to Comment #32 regarding the proposed actions to manage excavated CCR at GAF.

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90	Hoban, Kevin (Sierra Club)	TVA you have a responsibility to the people of TN!	Comment noted. Please see TVA's response to Comment #48 regarding TVA's commitment to environmental stewardship.
91	Corley, Cris (Sierra Club)	I attended the Gallatin F. P. public meeting a couple of weeks ago and met the project manager. I did recommend the possible shipment of coal ash via barge to the old Hartsville Nuclear Plant site and the building of a repurposing plant on that site adjacent to the old cooling tower. The cooling tower could also be used for CCR storage. The site has a deep water barge pier already in place.	TVA has previously looked at the transportation of CCR from GAF by barge. In Part I of the CCR PEIS, TVA considered several modes of transport of CCR materials off-site, including truck, rail, and barge transport. TVA concluded that that while many of TVA's coal-fired plants have barge facilities, these facilities are configured and designed only to off-load coal from barges. TVA concluded that the process to develop new infrastructure to load CCR would likely exceed the closure period considered in the PEIS. Given the infrastructure considerations and the uncertainty related to environmental permitting of these facilities, TVA eliminated barge transport from consideration as feasible. As Impoundment Closure and Restoration project tiers off the PEIS, TVA once again looked at the transportation of CCR via barge and reached the same conclusions regarding the hurdles in constructing the necessary infrastructure. Therefore, an analysis of transport via barge was not included in this EIS.
92	Gipson, Calah (Sierra Club)	Please think about the health and safety of this community.	Comment noted. Please see TVA's response to Comment #48 regarding TVA's commitment to environmental stewardship.
93	Sims, Kellie (Sierra Club)	Please clean up your mess!	Comment noted.
94	McCombs, Genie and Bob (Sierra Club)	There is No doubt - coal ash is toxic and should NOT be dumped in our waterways. Look at the science and the lesson that happened in Kingston, Roane Co. TN. Home of the largest coal ash industrial spill in history. Unacceptable and a tragic disaster!	Comment noted. Please see TVA's response to Comment #32 regarding the proposed actions to manage CCR excavated at GAF.
95	Hill, Sammie (Sierra Club)	Please help to NOT kill us unnecessarily an prematurely!!!	Comment noted.
96	Lorenz, Mariana (Sierra Club)	Please protect not only Gallatin, but ALL of Tennessee. Coal ash has caused enough toxins and subsequent illnesses and deaths.	Comment noted.
97	Armor, Madison (Sierra Club)	Wishing you and everyone in our community a brighter future and hope we solve this problem together.	Comment noted.

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98	Stillman, Allison (Sierra Club)	Please do the right thing, it's your job!	Comment noted.
99	Flynn, Barb (Sierra Club)	As a long time resident here in Nashville what happens in our community needs to be done responsibly. I am trusting you to do just that.	Comment noted. Please see TVA's response to Comment #48 regarding TVA's commitment to environmental stewardship.
100	Tomey, Mary (Sierra Club)	I live at the base of the Cumberland plateau on the Calfkiller River. All of the toxins released above me has a great impact on my quality of life. Keeping our groundwater clean and free of contaminates is very important to me and all citizens. Please clean up your mess!	Thank you for your comment. Please see TVA's response to Comment #31 regarding the proposed actions' beneficial impacts on groundwater.
101	Wilkin, William (Sierra Club)	I come from southern Ohio where there has been pollution filtering into the Ohio River for decades. Don't let that happen in Tennessee.	Comment noted.
102	Boyce, Arline (Sierra Club)	Do this in the name of LOVE	Comment noted.
103	Trotsky, Matthew (Sierra Club)	It is imperative that TVA, as a public agency, act in the interest of its constituents. All coal ash that remains near our water supply must be immediately removed and stored in a sealed, remote location. It is wrong to keep dragging out this process as it poses immediate threats to citizens and our natural resources. TVA must take responsibility for the decisions it has made over the past 70 years.	Please see TVA's response to Comment #32 regarding the proposed actions to manage CCR excavated at GAF.
104	Percy, Sylvia (Sierra Club)	Why are you still using coal? It is the dirtiest, most toxic substance to use for energy production. Invest in wind energy! We have plenty of that.	Comment noted. Please see TVA's responses to Comment #32 regarding the proposed actions to manage excavated CCR at GAF and Comment #38 regarding TVA's diverse portfolio of generating assets.
105	Jones, Edward (Sierra Club)	Coal ash must be cleaned up and cleaner ways to generate electric power must be developed and utilized.	Comment noted. Please see TVA's response to Comment #32 regarding the proposed actions to manage excavated CCR at GAF.
106	Dunson, Debra (Sierra Club)	I am among the research chemists who are speaking out against toxic coal ash storage in Tennessee. Please ensure the safety of Tennesseans by ending this deadly practice!	Comment noted. Please see TVA's response to Comment #32 regarding the proposed actions to manage excavated CCR at GAF.
107	Moore, Genie (Sierra Club)	Coal ash is a dangerous material and needs to be properly disposed of. Our streams and rivers, in particular, need to be carefully protected.	Comment noted. Please see TVA's response to Comment #32 regarding the proposed actions to manage excavated CCR at GAF.
108	Hunt, Laura (Sierra Club)	The children are watching how we do things, and how we demand things get fixed!	Comment noted.
109	C, Lea (Sierra Club)	This stuff is so toxic, it's an outrage that Gallatin has been allowed to get away with this for so long.	Please see TVA's response to Comment #32 regarding the proposed actions to manage excavated CCR at GAF.

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110	Nygard, Kortner (Sierra Club)	Why spend 1 billion renovating the Gallatin Fossil Plant and ash ponds when TVA could have spent the money on pollution free renewable generation such as wind or solar or in-stream hydro?	Please see TVA's responses to Comment #32 regarding the proposed actions to manage excavated CCR at GAF and Comment #38 regarding TVA's diverse portfolio of generating assets.
111	Torrence, Hollie (Sierra Club)	Responsible disposal of the coal ash should be a high priority. Otherwise, you have created a problem as bad as what you were trying to correct. Protection of water and waterways should be of primary importance!!	Please see TVA's responses to Comments #31 and #32 regarding potential impacts to surface and groundwater and TVA's plan to manage excavated CCR at GAF.
112	Nygard, Kortner (Sierra Club)	I live 2 miles from the pits and I am concerned about poisoning of… 1) Ground water 2) River Also,… 3) 350 truck trips per day for 10 years either hauling untreated CCRs or Beneficial Use products 4) A lackluster effort to switch to generation that does NOT produce hazardous waste.	Please see TVA's responses to Comments #31 and #36 regarding the proposed actions' beneficial impacts on groundwater and Comment #38 regarding TVA's diverse portfolio of generating assets. In addition, the impact of the transport of CCR to a beneficial re-use processing facility were assessed in Section 3.17. TVA has committed to conducting a traffic analysis and traffic management plan as appropriate, to identify and evaluate potential mitigative measures and their effectiveness for reducing traffic related impacts.
113	Lowe, Norma (Sierra Club)	Please take this seriously! I have to buy bottled water. Also there is a smell in the air and ultimately in my home.	Comment noted.
114	Knight, Becky (Sierra Club)	This issue matters to me because I want to insure my children, and the children of the Gallatin area, are growing up in a healthy environment!	Comment noted.
115	Hay, Dawn (Sierra Club)	Please do not put our health at risk by polluting our land and ultimate drinking water. Thank you!	Comment noted.
116	Parker, Sandra (Sierra Club)	I am unhappy that I cannot wade , swim or take my boat out on the region without having to clean the black ash residue off my body and boat. Enough is enough.	Comment noted.
117	Burtnett, Sarah (Sierra Club)	I live here..my family is here..we swim in Old Hickory. Please keep us safe. I know its not easy or quick, but keep us informed and keep up your good work . Thank you. Sarah	Comment noted.
118	Elton, Cindy (Sierra Club)	Please don't let this clean up be delayed any longer. Our current president has already changed the regulations on our waterways and streams. We need clean drinking water! Thank you for listening.	Please see TVA's response to Comment #31 regarding the proposed actions' beneficial impacts on groundwater.
119	Levenshus, Jonathan (Sierra Club)	There is no doubt -- coal ash is extremely toxic and needs to be safely transported, stored, and disposed or recycled to prevent the release of dangerous heavy metals and other pollutants into our air	Comment noted. Please see TVA's response to Comment #32 regarding the proposed actions to manage excavated CCR at GAF.

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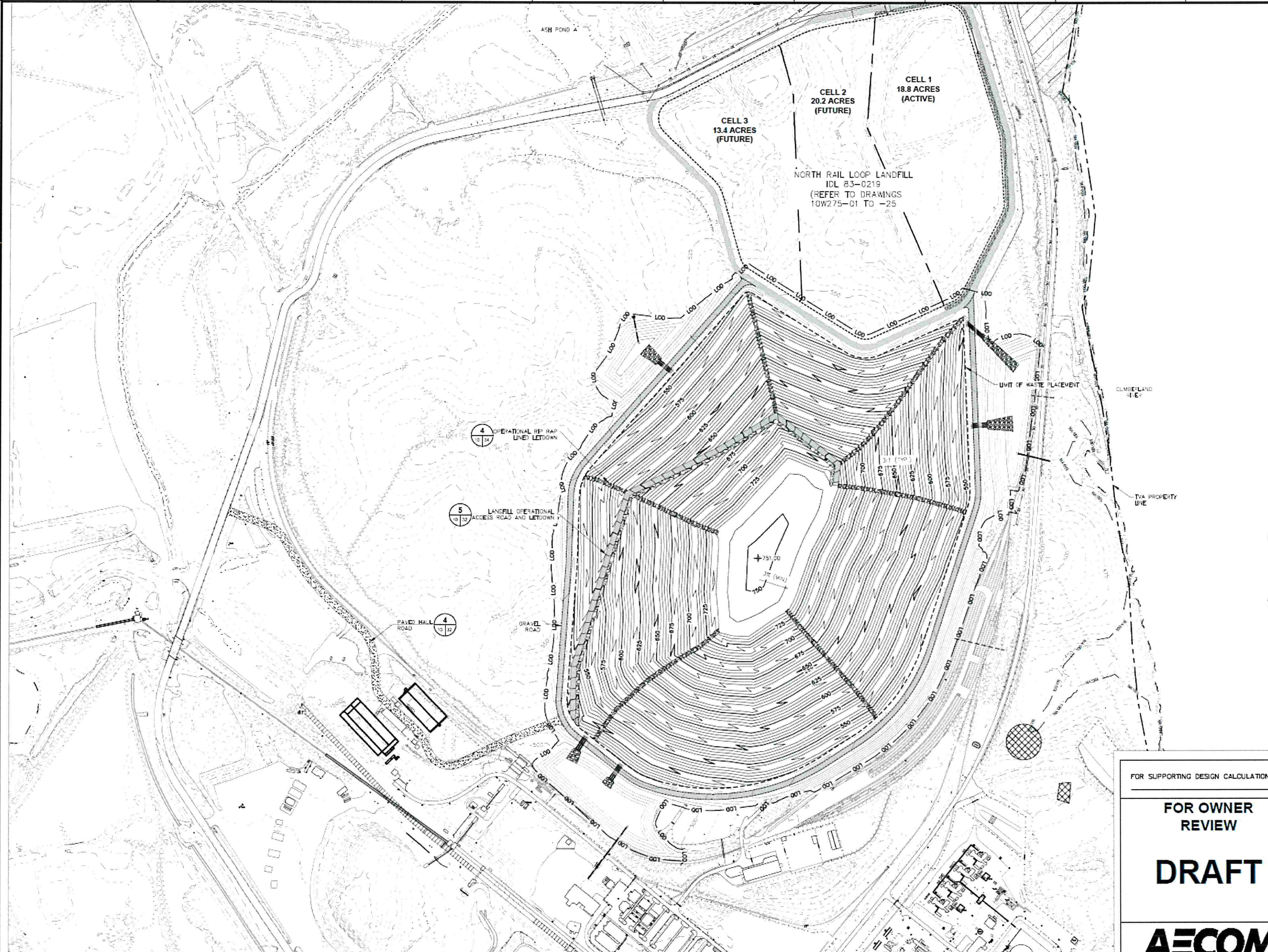
		and water. As more and more electric utilities are rightfully excavating coal ash sites like Gallatin in response to groundwater and surface water contamination, it is imperative that TVA's final Gallatin disposal plan ensures no further contamination and adopts the strongest protections to prevent a new toxic burden from being hoisted on our communities	
120	Levenshus, Jonathan (Sierra Club)	Specifically, the coal ash removed from the leaking, unlined pits at Gallatin must be recycled or disposed of in dry, lined storage out of groundwater and away from rivers and streams.	Please see TVA's response to Comment #32 regarding the proposed actions to manage excavated CCR at GAF.
121	Levenshus, Jonathan (Sierra Club)	TVA must also prioritize worker safety and environmental justice in its final plan for Gallatin. As TVA removes the ash from the leaking ponds, cleanup workers must be protected from exposure to coal ash contamination.	Please see TVA's response to Comment #20 regarding worker safety. Potential impacts to environmental justice communities were evaluated in Section 3.20 of the EIS. The analysis concluded that impacts to environmental justice communities would be associated with the transport of CCR and borrow and would be minor and not disproportionate.
122	Levenshus, Jonathan (Sierra Club)	It is also critical that TVA avoids disproportionate impacts of coal ash on communities that have historically been burdened by pollution when selecting sites or uses for this waste.	See TVA's response to Comment #121 regarding potential impacts to environmental justice communities.
123	Levenshus, Jonathan (Sierra Club)	Finally, TVA must be transparent about all the environmental impacts removal will have on communities near coal ash ponds and landfills. Relying on broad, generic site analyses -- as proposed in TVA's draft plan -- makes it impossible for the public and decision-makers to adequately evaluate site-specific choices.	The EIS provides a thorough and detailed analysis of the environmental impacts associated with the removal of legacy CCR and closure of the surface impoundments at GAF. A summary of impacts by alternative to all resources, including socioeconomic and environmental justice communities, from the proposed actions is provided in Table 2-7. Detailed impact analysis for each resource is provided in Section 3.0 of the EIS. Please also see TVA's response to Comment #22 regarding the location analysis for offsite landfills.
124	Levenshus, Jonathan (Sierra Club)	Please protect communities from the dangers of irresponsibly managed coal ash by finalizing plans that include strong standards for the disposal or recycling of coal ash from the Gallatin site.	Comment noted.
125	Sparkman, Alan (Tennessee Concrete Association and Tennessee Road	Fly Ash Should Be Managed As A Resource Fly Ash is a by-product of burning coal to produce electricity. Fly Ash is also a critical ingredient in the production of high-performance, durable concrete products for residential, commercial and public infrastructure projects. Incorporating Fly Ash into concrete makes it	Thank you for your comment regarding support of Option 2, transport of CCR removed from the ponds to a beneficial re-use processing facility. TVA will consider your comment when finalizing its decision on

No.	Name	Comment	Response
	Builders Association)	stronger, more durable, and more economical to produce, saving both private and taxpayer money across the TVA service area. In addition, using Fly Ash as a component in ready mix concrete is a safe, permanent, and responsible method of mitigating health and environmental risks associated with any other method of managing Fly Ash at coal-fired power plants. Other methods of storing and managing Fly Ash may not provide a permanent solution to the risks associated with such storage, and those methods waste a valuable resource while costing TVA money. This critical resource (Fly Ash) has a proven market value and there are several commercially viable methods of treating fly ash – including fly ash already stored in pits or ponds – to make it a saleable product. Fly Ash used in the production of ready mixed concrete and other similar products no longer has to be stored or managed, and Fly Ash used in this manner is chemically bound into the concrete matrix and rendered safe. In fact, based on US EPA's extensive evaluation of the use of fly ash in concrete, its 2014 conclusion was that "EPA supports the continued beneficial use of coal fly ash in concrete. Focusing on Fly Ash as an important construction resource will permanently reduce the amount of Fly Ash that has to be stored and managed in perpetuity by TVA, at a continuing expense to TVA and a continuing risk to our environment. TVA should choose beneficiation as the first option at all operating coal-fired plants to prevent the need for Fly Ash to be landfilled in the first place, and should begin a focused effort to beneficiate and sell Fly Ash that has already been landfilled in either pits or ponds.	the disposition of CCR removed from the ash ponds at GAF.
126	Underwood, Dennie	I work for a local concrete producer and as part of our production we use fly ash in our concrete. As it is widely known, fly ash has become scarce in recent years due to multiple factors. Reclaiming fly ash that has been land filled is a excellent way to eliminate potential issues with fly ash being stored in the 'ponds'. Also, this reduces the amount of unusable fly ash that would have to be placed in a up to date lined storage thereby reducing cost to TVA. This would also release the fly ash to be used in concrete and any	Thank you for your comment regarding support of Option 2, transport of CCR removed from the ponds to a beneficial re-use processing facility. TVA will consider your comment when finalizing its decision on the disposition of CCR removed from the ash ponds at GAF.

No.	Name	Comment	Response
		other venue that uses the product. By allowing the option to beneficiate, this should also be an acceptable for the environment. I would welcome any response to my comments. Thanks.	
127	Ermer, John	I object to relocating any graves. Their souls should not be disturbed. TVA needs to offer another solution. The Bible states: Numbers 19:16 'Also, anyone who in the open field touches one who has been slain with a sword or who has died naturally, or a human bone or a grave, shall be unclean for seven days. 1 Kings 13:31 After he had buried him, he spoke to his sons, saying, 'When I die, bury me in the grave in which the man of God is buried; lay my bones beside his bones.	Comment noted. If TVA relocates graves, to allow for onsite storage of CCR—helping to avoid transportation impacts to surrounding communities—the relocation will be handled with the utmost respect and with every effort given to maintaining the dignity of those being relocated. As stated in Section 3.17.2, relocation of the graves in the footprint of the expansion would be necessary to allow for the onsite storage of CCR. TVA has consulted with the Tennessee State Historic Preservation Officer and will implement all mitigation measures as required and detailed in a Memorandum of Agreement between the two agencies.

Appendix C – SRL Landfill Design Draft



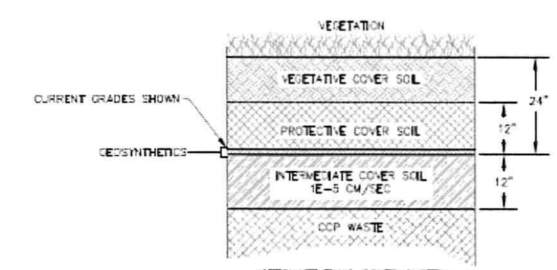
LEGEND

- EXISTING CONTOUR – MAJOR
- EXISTING CONTOUR – MINOR
- PROPOSED CONTOUR – MAJOR
- PROPOSED CONTOUR – MINOR
- NORTH RAIL LOOP LIMIT OF WASTE (52.4 ACRES)
- SOUTH RAIL LOOP EXPANSION LIMIT WASTE (101.0 ACRES)
- OVERHEAD ELECTRIC
- 100-YR FLOOD PLAIN
- WATER
- TVA PROPERTY LINE
- EXISTING TREELINE
- STORM WATER CULVERT
- ACCESS AND PERIMETER ROADS
- PAVED HALL ROAD
- RIP RAP LINED LETDOWN

0 100 200 400 (IN FEET)

NOTES:

1. APPROXIMATELY 1-FT OF COMPACTED SOIL SHALL BE USED AS INTERMEDIATE ON INACTIVE AREAS AND ON ALL AREAS WHERE SURFACE WATER RUNOFF IS TO THE ENTER PERIMETER SURFACE WATER MANAGEMENT SYSTEM. ANY SURFA WATER WHICH COMES IN CONTACT WITH CCP WASTE SHALL BE TREATED AS LEACHATE. THE PLACEMENT OF INTERMEDIATE COVER IS NOT REQUIRED IN AR WHERE FINAL COVER WILL BE CONSTRUCTED WITHIN 180 DAYS.



ALTERNATE FINAL COVER SYSTEM

FOR SUPPORTING DESIGN CALCULATIONS SEE

FOR OWNER REVIEW

DRAFT

AECOM

R C	8/29/19	MDW	MDW	DES	CWL	RBC	MST	JCK	XXXXXX
90% DRAFT PERMIT DRAWINGS									

SCALE: AS SHOWN EXCEPT AS

TOP OF CCP WASTE PLACEMENT

CLASS II DISPOSAL FACILITY
RAIL LOOP SITE PERMIT DRAWINGS
SOUTH RAIL LOOP EXPANSION

DESIGNED BY	DRAWN BY	CHECKED BY	SUPERVISED BY	REVIEWED BY	APPROVED BY
MDW	MDW	DES	CWL	RBC	MST

GALLATIN FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD 2019 | 8/29/19 | 39 | C | 10W327-10

AECOM | C
TASK COMPLETED BY | REV NO.

PLOT FACTOR:XX
W_TVA

C.A.D.
DO NOT A

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Appendix D – Offsite Landfill Analysis

GALLATIN FOSSIL PLANT SURFACE IMPOUNDMENT CLOSURE AND RESTORATION PROJECT EIS LANDFILL SCREENING AND TRANSPORTATION BOUNDING ATTRIBUTE ANALYSIS

Sumner County, Tennessee

Prepared by:
Wood
Ballwin, Missouri

Prepared for:
TENNESSEE VALLEY AUTHORITY
Chattanooga, Tennessee

September 2019

PRE-DECISIONAL AND DELIBERATIVE COMMUNICATION

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List of Acronyms and Abbreviations

CCR	coal combustion residuals
EIS	Environmental Impact Statement
EJ	Environmental Justice
EPA	U.S. Environmental Protection Agency
GAF	Gallatin Fossil Plant
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
PEIS	Programmatic Environmental Impact Statement
RCRA	Resource Conservation and Recovery Act
TDEC	Tennessee Department of Environment and Conservation
TVA	Tennessee Valley Authority
USCB	U.S. Census Bureau
yd^3	cubic yards

1.0 PROJECT BACKGROUND

Tennessee Valley Authority's (TVA) Gallatin Fossil Plant (GAF) is located approximately 12 miles northeast of Nashville in Sumner County, Tennessee. The plant is on a 1,950-acre reservation along the north bank of the Cumberland River which is impounded by the Old Hickory Dam located approximately 27 river miles downstream of GAF. GAF was built between 1953 and 1959 and operates four coal-fired, steam-generating units. Four combustion turbine units were added to GAF in the 1970s, and another four were added in 2000. Combustion turbines primarily use natural gas as a fuel and are operated to meet peak power demands at GAF. GAF generates about seven billion kilowatt-hours of electric power in a typical year, which is enough electrical energy to meet the needs of approximately 480,000 homes.

GAF consumes an average of 3.5 million tons of coal per year, which results in the annual production of approximately 255,000 tons of coal combustion residuals (CCR). CCR are byproducts produced from burning coal and include fly ash, bottom ash, boiler slag, and flue gas desulfurization materials. Historically, GAF stored CCR wet in onsite surface impoundments (commonly referred to as ash ponds). All CCR currently produced at GAF is stored in the existing North Rail Loop Landfill, including bottom ash which is washed from the boiler bottoms, sluiced to the flow management system and dewatered in tanks before being transported to the landfill.

To support the implementation of TVA's goal to eliminate all wet CCR storage at its coal plants by closing CCR surface impoundments across the TVA system, and to assist TVA in complying with the U.S. Environmental Protection Agency's (EPA) CCR Rule, TVA is evaluating several projects to facilitate long-term management of CCR at GAF. Specifically, these projects are listed as follows:

- Surface impoundment closures for the following:
    - Ash Pond A
    - Ash Pond E
    - Middle Pond A
    - Bottom Ash Pond (if not previously closed under a separate project)
    - Stilling ponds
- Permanent disposition of CCR in the surface impoundments, including CCR previously removed from the Bottom Ash Pond that may be temporarily stockpiled in the existing onsite landfill, as well as de minimis amounts of CCR proposed to be removed from the stilling ponds
- Construction of a lateral expansion of the existing onsite landfill and associated development
- Location requirements analysis for a beneficial re-use processing facility
- Offsite landfill for CCR materials not usable by beneficial re-use processing facility

In accordance with TVA policy and the provisions of the National Environmental Policy Act of 1969 (NEPA), TVA intends to prepare an environmental impact statement (EIS) to address the closure of the surface impoundments at GAF. The purpose of this memo is to identify suitable off-site landfills that TVA could use for the disposal of CCR from GAF that is not useable by a beneficial re-use processing facility (up to 20 percent of the total 11,472,000 cubic yards [yd^3]). Findings from this report are intended to assist TVA with the decision-making process regarding closure of the CCR impoundments at GAF.

On July 28, 2016, TVA issued a Record of Decision for a programmatic NEPA review entitled Ash Impoundment Closure Environmental Impact Statement (CCR Programmatic Environmental Impact Statement [CCR PEIS]) (TVA 2016). The purpose of the programmatic NEPA review was to support TVA's goal to eliminate all wet CCR storage at its coal plants by closing CCR surface impoundments across TVA's system and to assist TVA in complying with the EPA's CCR Rule issued on April 17, 2015 (80 Federal Register 21302). The EIS for surface impoundment closures at GAF will tier from TVA's 2016 CCR PEIS.

In Part I of the CCR PEIS, TVA considered several modes of transport of CCR materials off-site, including truck, rail, and barge transport. TVA concluded that that while many of TVA's coal-fired plants have barge facilities, these facilities are configured and designed only to off-load coal from barges. TVA concluded that the process to develop new infrastructure to load CCR would likely exceed the five-year closure period considered in the PEIS. Given the infrastructure considerations and the uncertainty related to environmental permitting of these facilities, TVA eliminated barge transport from consideration as feasible. Rail was also considered as an option for transport, however, loading infrastructure including rail spurs to impoundment areas would be necessary at most sites, making the rail option infeasible at many facilities.

In addition to the PEIS, TVA conducted a CCR Disposal Alternatives Study to evaluate alternatives for disposal of CCR from GAF (AECOM 2018) at landfills within 100 miles of GAF. This study also eliminated barge transport as a feasible option for transport due to logistical factors including the inability to locate a landfill with barge unloading capacities. The option for transport of CCR by rail was considered in this study, however, identified landfills with rail facilities were located between 485 miles and 691 miles from GAF. Given the distance and the costs to develop on-site infrastructure improvements required for rail, the cost to transport and dispose of CCR via rail was estimated to be almost double the cost of transport by truck.

Considering the analysis and conclusions presented in the CCR PEIS and the CCR Disposal Alternatives Study, TVA determined that transport by truck would be the most feasible method of transporting CCR from GAF not usable by a beneficial re-use facility to an off-site landfill. In addition, TVA has elected to expand the transport study radius to 150 miles from GAF to allow for additional landfill options to consider.

2.0 PURPOSE

TVA has not selected an off-site landfill for disposal of CCR from the surface impoundments at GAF that is not usable by beneficial re-use processing facility. The analysis of potential environmental impacts associated with the disposal of CCR to an off-site, previously permitted landfill would be limited to those associated with the effects of transport of CCR to the facility. Therefore, the purpose of this analysis is to develop a set of bounding attributes related to the transport of CCR from GAF to an offsite landfill. The first step in this analysis is to identify suitable landfills. The most impactful or "bounding" characteristics of CCR transport to these suitable landfills will be incorporated into a set of bounding attributes for transport via truck. The results of the analysis will be used to support the evaluation of impacts developed for the EIS for the closure of the surface impoundments at GAF. Should a receiving landfill be selected following completion of the EIS that does not meet the listed threshold conditions, a supplemental NEPA document would be required.

3.0 IDENTIFICATION OF SUITABLE LANDFILLS

3.1 Review of Previous CCR Disposal Alternatives Study – 100-mile Radius

In considering the use of existing off-site landfills, the CCR Disposal Alternatives Study assumed that all CCR from the GAF Ash Pond Complex and the Non-Registered Site #83-1324 (14.6 million yd^3) would be disposed of in up to three landfills within an approximate 100-mile radius of GAF.

3.1.1 Landfill Selection Criteria used in Previous Study

In the CCR Disposal Alternatives Study, suitable off-site landfills were selected based on the following criteria:

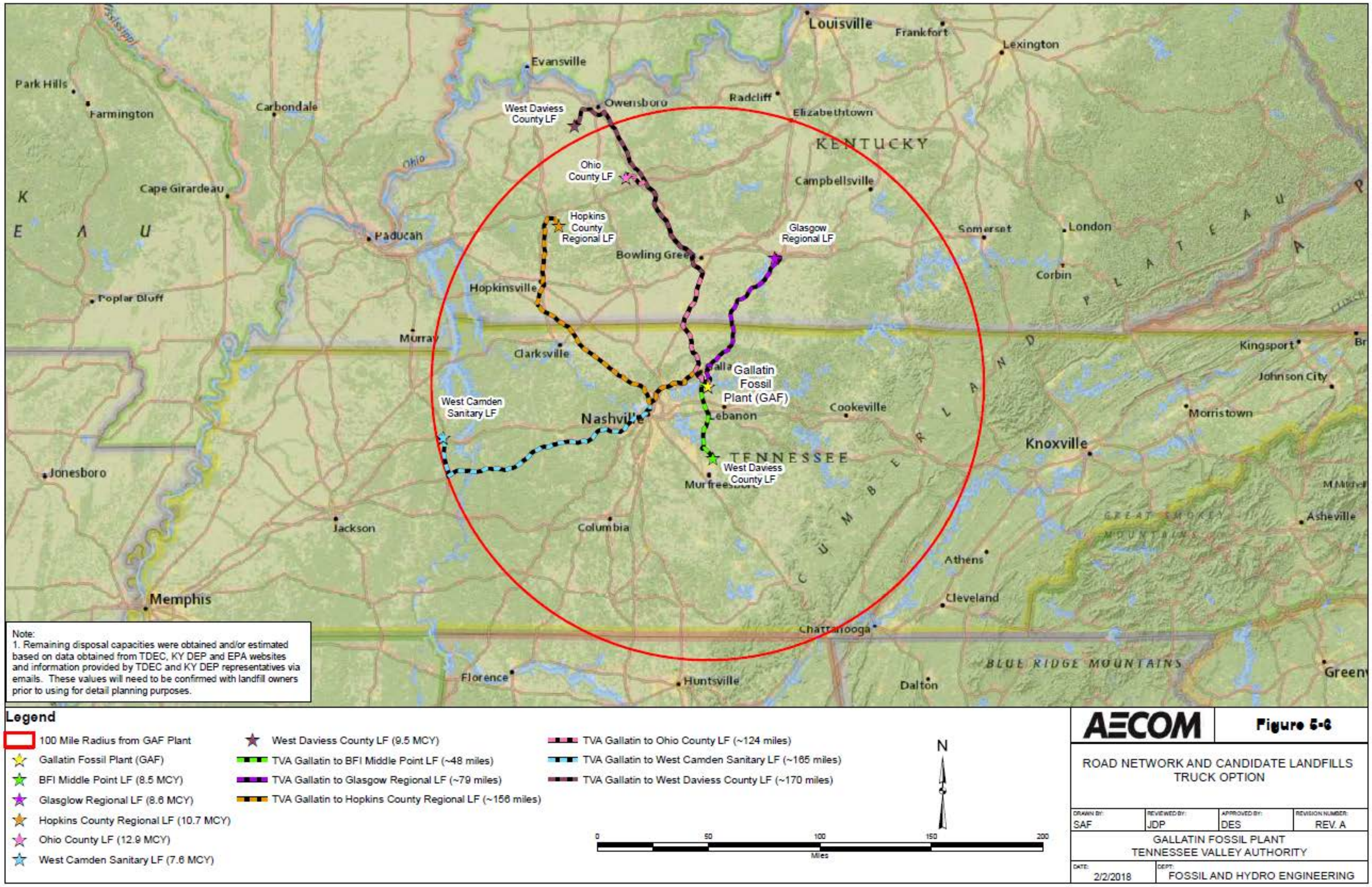
- Location within an approximate 100-mile radius of GAF;
- Permitted to accept CCR (includes Tennessee Department of Environment and Conservation [TDEC] Class I and Class II landfills and Kentucky Contained and Special Waste landfills);
- Available disposal capacity of at least 5 million yd^3 to accommodate CCR (assumes half of reported remaining capacity would be available for CCR disposal; therefore, must have total remaining capacity of 10 million yd^3);
- Minimum of 10 years permitted service life remaining;
- No restrictions on source of waste that exclude GAF; and
- No private landfills serving specific industrial/manufacturing facilities.

3.1.2 Candidate Landfills Identified within 100-mile radius

Based on the screening criteria above, the following off-site landfills were identified as suitable for disposal of CCR from GAF in the CCR Disposal Alternatives Study:

West Camden Sanitary Landfill	Ohio County Landfill
Hopkins County Regional Landfill	West Daviess County Landfill
Glasgow Regional Landfill	Middle Point Landfill

The locations of these six landfills are identified in Figure 3-1.



Source: AECOM 2018

Figure 3-1. Candidate Landfills within Approx. 100 Miles of GAF Identified in CCR Disposal Alternatives Study

3.1.3 Application of Updated Project Parameters

As the project needs have changed since the CCR Disposal Alternatives Study was conducted, the attributes of the candidate landfills identified in the study were reviewed to assess whether they met the revised specifications.

TVA estimates that up to 20 percent of the total CCR removed from GAF would be unsuitable for beneficial re-use and disposed of in a single off-site landfill. However, as the exact proportion of unsuitable reject materials is unknown, an estimate of one-third of the total CCR, or approximately 4 million yd^3, provides a conservative estimate of the required disposal capacity for CCR at a candidate landfill. Under the same assumption utilized in the CCR Disposal Alternatives Study (half of the reported remaining capacity of a landfill would be available for CCR disposal), a candidate landfill would need to have a total remaining capacity of at least 8 million yd^3. Additionally, as impoundment closure activities and CCR removal are anticipated to take approximately 15 years, the landfills would require a minimum of 15 years remaining permitted service life.

As the candidate landfills identified in the CCR Disposal Alternatives Study each had at least 10 million yd^3 remaining capacity, all candidate landfills identified in the previous study were carried through as suitable for this analysis, with the exception of the Middle Point Landfill. Upon review of the most recent TDEC Remaining Life Survey (TDEC 2018), it was determined that this landfill does not meet the remaining life criteria, as it had approximately 8 years and 11 months of life remaining at the time of the survey. This data was supported by the landfill's website, which indicated that "there is capacity for approximately 8 to 9 years of disposal at current disposal rates" at the Middle Point Landfill (Republic Services 2019).

3.2 Suitable Landfills in a 100- to 150-mile Radius

As the CCR Disposal Alternatives Study only identified suitable landfills within a 100-mile radius of GAF, Wood used a similar methodology to identify additional landfills located within an expanded 150-mile radius. The following step-wise process was used to identify landfills that could be considered for disposal of CCR within a 100- to 150-mile radius of GAF.

3.2.1 Initial Landfill Identification

An internet search was conducted to identify all landfills regulated under the Resource Conservation and Recovery Act (RCRA) Subtitle D (solid waste) permitting requirements located between a 100-mile and 150-mile radius of GAF. Landfills that are regulated under RCRA Subtitle D include Municipal Solid Waste Landfills and Non-hazardous Industrial Waste Landfills. These landfills must meet the minimum federal criteria for operation including design criteria, location restrictions, financial assurance, corrective action (cleanup), and closure requirements (EPA 2019). States within the 100- to 150-mile radius of GAF include Alabama, Georgia, Illinois, Indiana, Kentucky, Mississippi, North Carolina, and Tennessee.

Thirty-one Subtitle D landfills were identified within the 100- to 150-mile radius.

3.2.2 Characterization of Landfill Attributes

The 31 potential candidate landfills were screened for specific attributes using readily available information obtained from an internet search of commercial carrier websites, state and county waste management reports, and EPA data. The following screening criteria were utilized, consistent with the methods from the previous CCR Disposal Alternatives Study and current project needs:

- Permitted to accept CCR;
- Available disposal capacity of at least 8 million yd^3;
- Minimum of 15 years permitted service life remaining (calculated from estimated start date of 2021);
- No restrictions on source of waste that exclude GAF; and
- No private landfills serving specific industrial/manufacturing facilities.

Two of the 31 landfills are located in Georgia. The Georgia Environmental Protection Division requires approval of a CCR management plan before a landfill may be permitted to accept CCR. Currently there are seven approved landfills in the state (Georgia Environmental Protection Division 2019); the two landfills in the study radius are not currently approved, and therefore, they were eliminated without further screening.

It should be noted that during the screening, when online information was insufficient, representatives of individual landfills were contacted to obtain information regarding the facility's ability to accept CCR, service area restrictions, and remaining landfill capacity and lifespan.

Out of the 31 landfills, 27 were eliminated from consideration for one or more of the following reasons:

- Not permitted to accept CCR;
- Service area restrictions;
- Insufficient capacity;
- Insufficient remaining life; and/or
- No longer operating.

The four remaining landfills within a 100- to 150-mile radius were:

Blackfoot Landfill	Outer Loop Recycling & Disposal Facility
Laurel Ridge Landfill	Chestnut Ridge Landfill and Recycling Center

3.3 Results

Based on the results of the internet screen, information provided landfill representatives, and the 2018 CCR Disposal Alternatives Study, nine Subtitle D landfills within a 150-mile radius of GAF met all of the identified screening criteria. The names and locations of the candidate landfills are listed in Table 3-1 and depicted in Figure 3-2.

Table 3-1. Landfills Suitable for Accepting CCR from GAF

Facility	Owner	City, State
Blackfoot Landfill	Advanced Disposal	Winslow, Indiana
Chestnut Ridge Landfill and Recycling Center	Waste Management	Heiskell, Tennessee
Glasgow Regional Landfill	City of Glasgow	Glasgow, Kentucky
Hopkins County Regional Landfill	Waste Connections	White Plains, Kentucky
Laurel Ridge Landfill	Waste Connections	Lily, Kentucky
Ohio County landfill	Republic Services	Beaver Dam, Kentucky
Outer Loop Recycling & Disposal Facility	Waste Management	Louisville, Kentucky
West Camden Sanitary Landfill	Waste Management	Camden, Tennessee
West Daviess County Landfill	Daviess County Fiscal Court	Owensboro, Kentucky

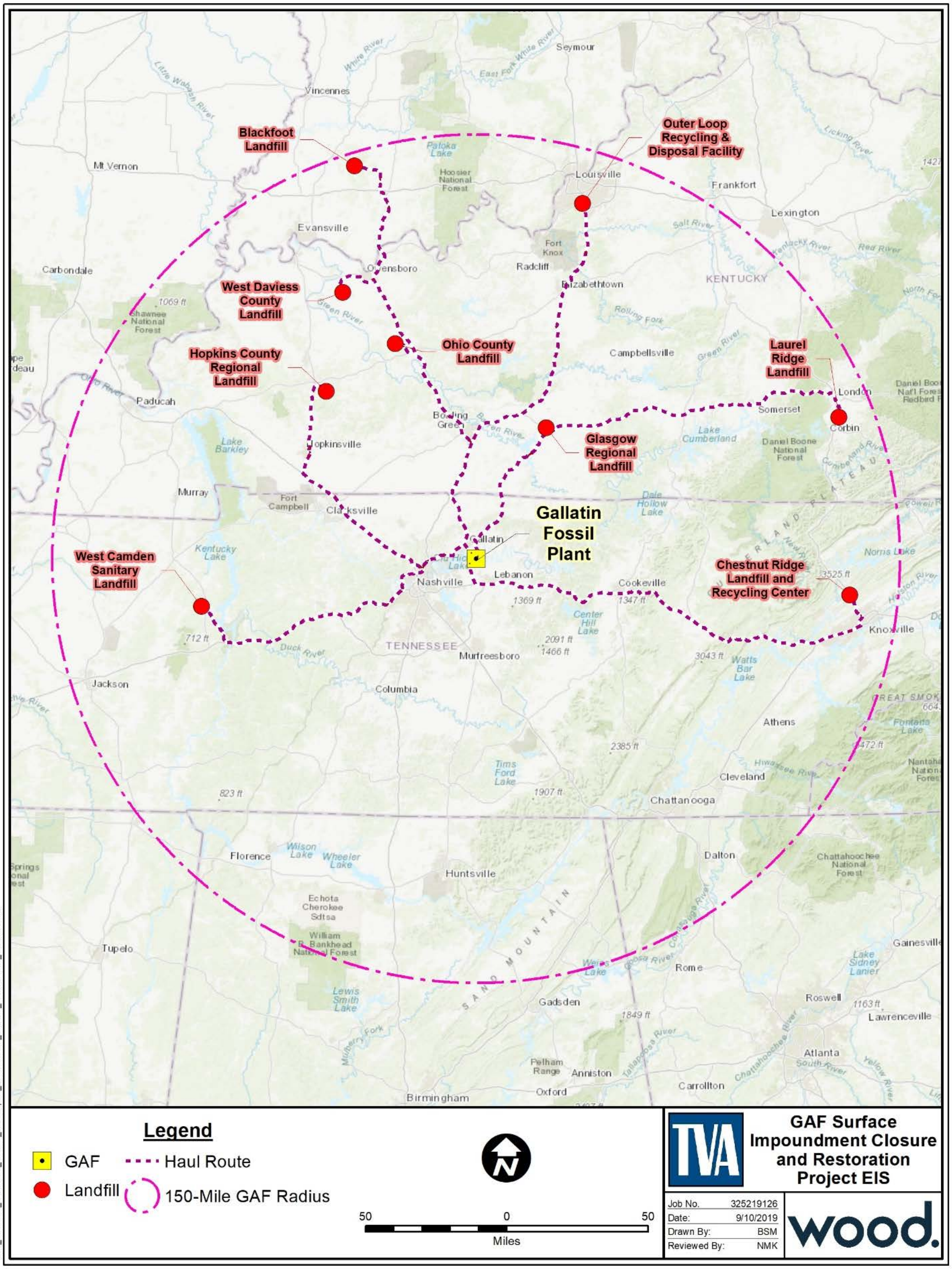


Figure 3-2. Landfills within 150-mile Radius Suitable for Accepting CCR from GAF

4.0 TRANSPORTATION BOUNDING ANALYSIS

Each of the candidate landfill sites are existing permitted landfills with the ability to accept CCR and have the existing infrastructure in place such that construction of additional roads or unloading facilities outside of the existing landfill footprint would not be required. As such, impacts to the natural environment from disposal of CCR at these landfills are not anticipated. The analysis of potential environmental impacts associated with the disposal of CCR to an off-site landfill is limited to those associated with the effects of transport of CCR to the facility and the location of the landfill.

Resources having the potential to be impacted by the transport of CCR between GAF and the candidate landfills, and that are considered in this analysis are limited to the following:

- Air Quality—Potential impact from fugitive dust and emissions from loading/unloading equipment and vehicles during transport of CCR to landfill
- Climate Change and Greenhouse Gas—Transport operations of CCR contribute to emissions of greenhouse gas
- Noise—Potential impact from noise emissions from loading/unloading equipment and vehicles during transport of CCR to landfill
- Transportation—Offsite transport has potential to result in additional impacts to local traffic and increased maintenance needs associated with transportation infrastructure
- Public Health and Safety—Impacts from loading/unloading activities and high-volume transport on roadways result in increased risk of accidents, injuries and deaths
- Natural Areas, Parks, and Recreation—Potential disruptions to the use and enjoyment of natural areas and recreational activities associated with transport of CCR through or adjacent to natural areas, parks or other recreational areas
- Environmental Justice (EJ)— Potential impacts associated with the transport of and disposal of CCR (transportation-related noise, exposure to fugitive dust, and exhaust emissions) within identified EJ communities

TVA examined the proposed transport routes and the environmental attributes of the existing conditions along each route to determine the most potentially impactful or “bounding” characteristics of CCR transport to existing landfills. As part of this analysis, TVA used a number of factors to develop a set of bounding attributes that may be used in conjunction with impact analyses for each potentially affected resource considered by NEPA, as appropriate. These factors included haul route distance and length through or adjacent to established EJ communities, natural areas or parks, and geographic areas with air quality below National Ambient Air Quality Standards (NAAQS) (i.e. designated by the EPA as “non-attainment” areas). Additionally, the length of the haul route through U.S. Census Bureau (USCB) designated urban areas (consisting of Urbanized Areas of 50,000 or more people and Urban Clusters of at least 2,500 but less than 50,000 people [USCB 2018]) was used to quantify potential impacts to sensitive noise and air receptors, which would occur in greatest numbers within these urban areas.

4.1 Bounding Attributes

Bounding attributes selected for use in impact analyses for transport of CCR to a landfill via truck are summarized in Table 4-1.

Table 4-1. Summary of Bounding Attributes Associated with the Transport of CCR to Offsite Landfill Via Truck

Attribute	Bounding Value
Distance by Road to GAF (miles)	184.3
Estimated Transport-Related Injuries[1]	20.0
Estimated Transport-Related Fatalities[2]	0.8
Length Through Low-Income EJ Population (miles)	52.4
Length Through Minority EJ Population (miles)	40.4
Is Landfill Located in Low-Income EJ Population?	Yes
Is Landfill Located in Minority EJ Population?	No
Length Through USCB Designated Urban Areas (miles)	58.8
Length Through or Adjacent to Natural Areas or Parks (miles)	3.7
Length Through EPA NAAQS Non-Attainment Areas (miles)	24.4
Air Quality Attainment Status of Landfill Location	Non-Attainment for Sulfur Dioxide and 8-hour Ozone

[1]Based on a rate of 32.953 per billion ton-miles for freight transport by truck (FHWA 2016)
[2]Based on a rate of 1.375 per billion ton-miles for freight transport by truck (FHWA 2016)

PRE-DECISIONAL AND DELIBERATIVE COMMUNICATION

5.0 REFERENCES

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Appendix E – Supplemental NEPA Analysis

Supplemental Analysis of Potential Development of an Onsite Beneficial Re-use Processing Facility on the Gallatin Fossil Plant Reservation

1.0 Introduction

As described in Chapter 1 of the EIS, the purpose of this GAF Surface Impoundment Closure and Restoration EIS is to address the disposition of CCR onsite at GAF, support the implementation of TVA's goal to eliminate all wet CCR storage at its coal plants by closing CCR surface impoundments across the TVA system, and to assist TVA in complying with EPA's CCR Rule and other applicable federal and state statutes and regulations. The proposed actions would also provide long-term onsite landfill space for operations and/or storage of CCR. Under Alternative B, TVA evaluated the potential effects of disposing CCR at a potential beneficial re-use processing facility at an offsite location. A specific site for the potential beneficial re-use processing facility has not been identified in this EIS, and as such, impacts for this option for CCR management were based on a bounding analysis of the characteristics of a representative beneficial re-use processing facility (see EIS Section 2.6). In other words, a generic facility was analyzed in this EIS that did not have a specific location. However, TVA has identified two possible locations for a beneficial re-use processing facility on GAF plant property. In this supplementary NEPA analysis, TVA is evaluating both locations shown in Figure 1-1 which include the *East Benefication Facility Site*, or East Site, and the *West Benefication Facility Site*, or West Site. If developed at GAF, the facility would be wholy owned and operated by a separate commericial interest and not by TVA.

This supplementary NEPA analysis tiers from the bounding analysis presented in Section 2.6 of this EIS and evaluates the potential development of a beneficial re-use processing facility in both of these locations.

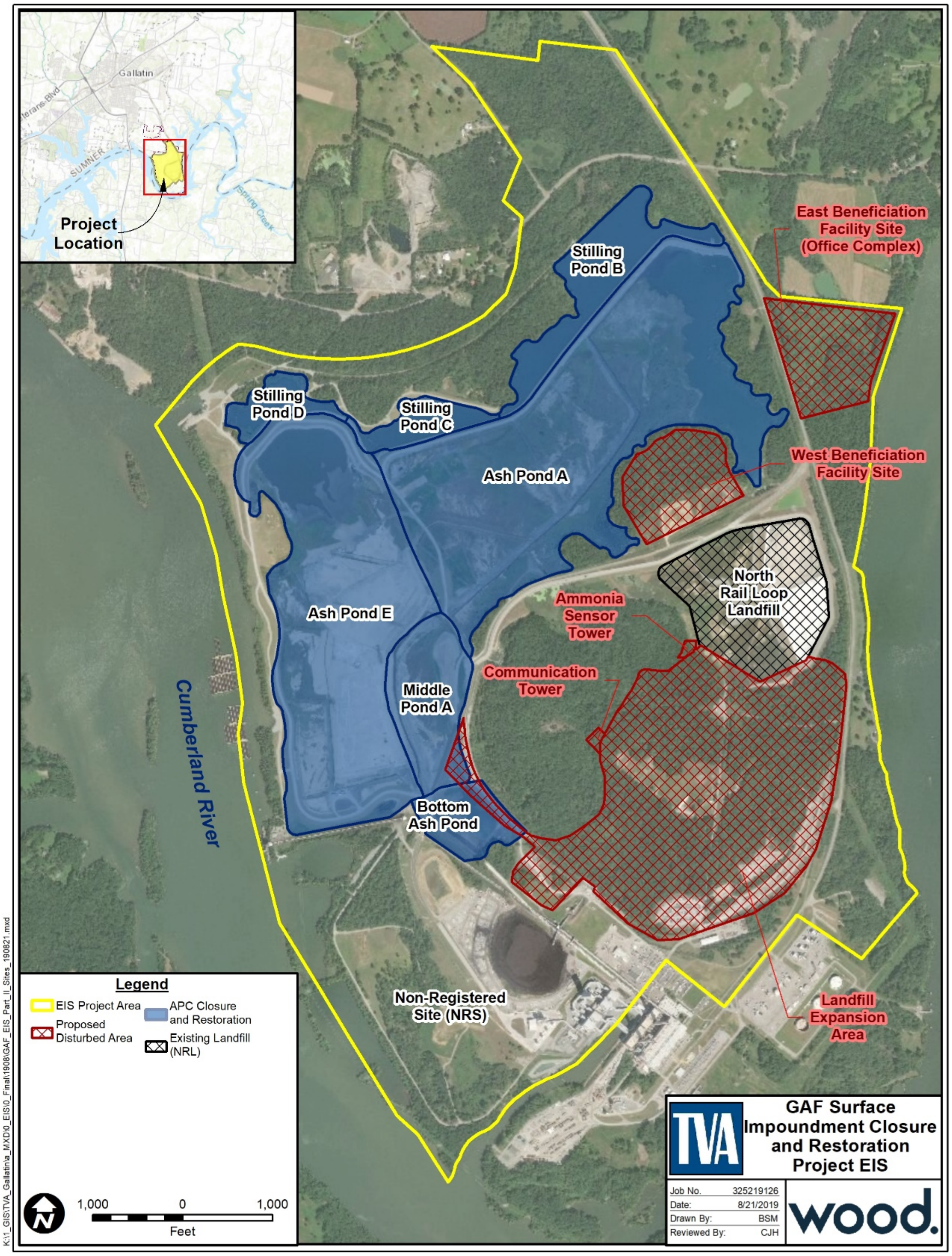

Figure 1-1. Overall Gallatin Fossil Plant EIS Project Study Area and Potential Beneficiation Facility Sites

2.0 Description of Beneficial Re-Use Facility

In order to assess potential direct and indirect effects associated with the construction and operation of the beneficial re-use processing facility, TVA solicited information from a number of vendors to describe and characterize facility siting requirements, construction characteristics, and operational features. However, because the particular beneficiation technology has not yet been determined, TVA has compiled and summarized the bounding attributes presented in EIS Section 2.6 to characterize the facility construction and operation and support analysis of potential environmental impacts. These attributes, presented in Table 2-1, provide the facililty, construction, and operational characteristics of a representative beneficial re-use processing facility potentially to be developed at GAF.

2.1 Development of a Beneficial Re-use Processing Facility on the GAF Reservation

As illustrated on Figure 1-1, two candidate locations are being considerd for development of the beneficial re-use processing facility – the *East Beneficiation Facility Site* (East Site) and the *West Beneficiation Facility Site* (West Site). Because no particular vendor has yet been identified to construct the proposed beneficial re-use processing facility, the bounding attributes described in Table 2-1 are applicable to the GAF facility. However, because of GAF's location, the proposed facility would not meet the condition established for site access as GAF does not offer direct access to the site from a collector road or major highway.

The East Site is a 29-acre area located in the northeastern portion of the GAF reservation. This site is also the location of the proposed office complex that was evaluated for each resource in EIS Section 3.0. Because potential environmental impacts due to the development of the office complex were previously analyzed, this site will be evaluated on the assumption that the site has previously been developed and as such, it is clear of trees, vegetation, or other notable resources. Additionally, it is assumed that any unavoidable impacts associated with the development of this area have previously been mitigated.

The West Site is a 24-acre site located on the north side of the haul road associated with the landfill, directly between Ash Pond A to the north and the North Rail Loop Landfill to the south, as shown on Figure 1-1. This site had been previously partially cleared of vegetation and used for staging operations for the North Rail Loop Landfill. This site is also the location of the 31-acre proposed laydown/logistics area for CCR removal operations at the ash pond complex (APC) as described in EIS Section 2.3.1. TVA proposes to use this site to support equipment storage, material stockpiles, construction trailer placement, and direct access for excavation and dewatering equipment for the APC.

Table 2-1. Beneficial Re-use Processing Facility – Table of Facility Attributes

Feature	Characteristic	Specifications
Facility Attributes		
Facility Elements	General Arrangements	Three Primary Facility Areas onsite a. Area 1 - Process to Reclaim b. Area 2 - Process Island c. Area 3 - Storage and Load Out
	Land Requirements	Site area up to 15 acres
	Storm Water Management	Onsite storm water basins or storm sewers
Access	Facility Access	Direct access to site from a collector road or major highway that can support truck traffic without noticeable effects to level of service (LOS).
Electric Use	Electric Requirements	Maximum use of 7.5 MW power needed. Would be obtained from local distribution line
Water Use	Process Water	Up to 150 gallons per minute (GPM) (obtained from local publicly owned treatment works [POTW] or wells) – no surface water intake Can use gray water, if available
	Potable Water	Up to 25 GPM (obtained from local POTW or wells) – No surface water intake
	Cooling System	Closed loop system – heat is re-used to dry ash
Wastewater Management	Treatment and Discharge	Up to 50 GPM. Processed onsite and discharged to POTW or discharge covered under NPDES permit. NPDES permit and limits subject to state requirements.
Capacity	Total Operating Capacity	400,000-800,000 yd^3 per year
Material storage	Raw Material Onsite Storage	Approximately 15,000 yd^3 (3 to 4 days) of pre-processed material stored in a covered onsite structure prior to processing
	Product Onsite Storage	Processed material stored onsite in silo or dome or equivalent structure that provides protection from elements Onsite storage (up to 45,000 yd^3)
Construction Phase Attributes		
Construction	Duration	Up to 14 months
	Construction Laydown Areas	Laydown areas onsite only. No offsite laydown.

Feature	Characteristic	Specifications
Excavation	Process Island Occupied Buildings Pipelines	Deep foundations, ~ 40 feet piers depending on geotechnical report No basement or deep foundations for occupied buildings Minor trenching may be required
Borrow	Amount of Borrow Needed to Support Construction	None anticipated. If needed would obtain from an existing permitted site within 30 miles of the facility.
Operational Characteristics		
Schedule	Hours of Operation	24 hours per day / 7 days per week
Operation	Duration	50 weeks per year 350 operating days per year (2 outages per year)
Fuel	Operational Fuel Requirement	Natural gas/propane, may be supplied by pipeline. If no pipeline, total quantity stored onsite: up to 200,000 gallons maximum capacity.
	Start-up Operations	Natural gas/propane. Total quantity stored onsite would support two (2) cold system start-up per month (4,000 gallons maximum capacity).
Trucking from Fossil Generation Station to Beneficial Re-use Facility (by Utility or Vendor)	Truck Type and Capacity Distance from Utility	Reclaimed material is transported in either off road heavy haul trucks or covered on-road trucks. Capacity of 25 yd^3 per truck for off-road and 17 yd^3 per truck for on-road trucks. Up to 10 miles from utility to the nearest interstate system
Trucking from Beneficial Re-use Facility (Beneficiated Product)	Peak Truck Volume Average Truck Volume	Beneficiated product is transported in pneumatic trucks, up to 27 tons per truck (25 yd^3); up to 90 truckloads per day (180 truck trips) 50-60 truckloads per day (100 to 120 truck trips)
Trucking from Beneficial Re-use Facility (Beneficiated Product)	Trucking Schedule	250 days per year. Monday-Friday during normal operating hours. Occasional weekends.
	Shipping Distance	Up to 250 miles

3.0 Supplemental Analysis of Site Specific Characteristics and Environmental Consequences

Bounding characteristics and values (see EIS Section 2.6) were used to assess potential direct and indirect effects associated with the construction and operation of an offsite beneficial re-use processing facility. The bounding characteristics and values were developed with input from multiple developers and values represent the maximum extent of impact that would occur to a resource from construction and operation of a typical facility.

Both the East Site and the West Site are considered candidate locations in this analysis. Because no particular site has been selected, TVA has elected to assess the effects of such a facility using a bounding approach that considers attributes of each candidate location. Under this analysis, in order to provide for flexibility in future decision-making, the larger, more bounding attribute of environmental impacts for each resource at each site was used to assess environmental impacts. For example, although a beneficial re-use processing facility could conceivably be developed at the East Site that would be previously disturbed by office complex development, the potential effects on vegetation and wildlife assume that impacts occur at the West Site, resulting in disturbance of up to 15 acres of forested lands.

In evaluating the East and West Sites, environmental characteristics associated with the facility at either location were compared to the bounding values established for the EIS analysis. Under this analysis the base condition for the East Site assumes that TVA has previously disturbed the area in development of the office complex. The West Site is also the location of the laydown/logistics area considered for project development in the EIS. This area was evaluated for potential impacts in the EIS. However, in the event that TVA can avoid and minimize impacts at this site, this supplementary analysis evaluates those resources that may not have been previously impacted by the development of a laydown/logistics area. Therefore, potential environmental impacts associated with a beneficial re-use processing facility at the West Site are evaluated in this supplementary analysis.

Figure 3-1 depicts the process by which resources retained for this supplementary NEPA analysis were identified. The following subsections provide additional site-specific characterization of the affected environment (where needed) and an assessment of environmental consequences for each resource retained for detailed analysis.

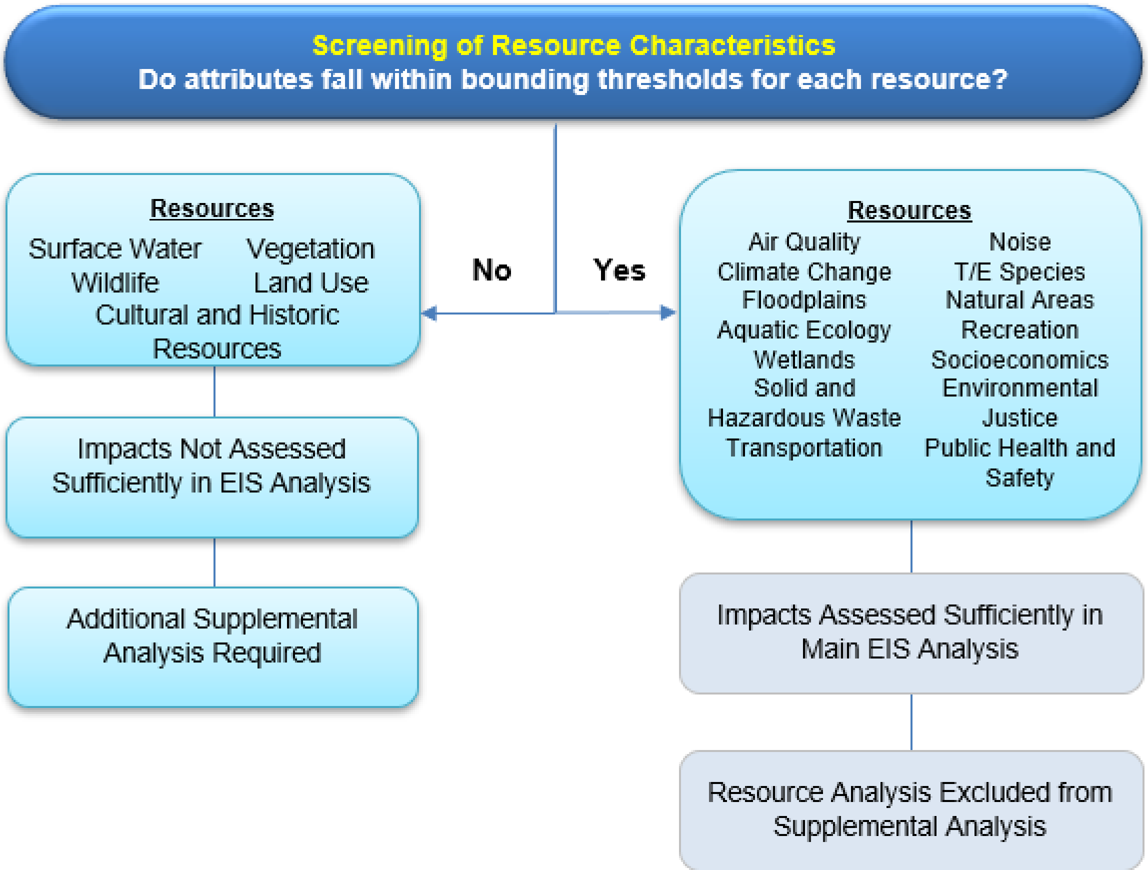

Figure 3-1. Application of Bounding Criteria to Construction and Operation of Beneficial Re-use Facility at GAF

Careful consideration of transportation impacts associated with an offsite beneficial re-use processing facility (Option 2) was given in EIS Section 3.17. In that analysis, transportation impacts from Alternative B including an offsite beneficial re-use processing facility would result in an additional 793 vehicle trips on the local roadway network (Table 3-1). By comparison, the development of an onsite beneficial re-use processing facility would result in a total of 645 vehicle trips. Similarly, the number of vehicle trips on the roadways nearest GAF (Odoms Bend Road and Steam Plant Road) during a typical 9-hour work day would be less for the onsite beneficial re-use processing facility as compared to the offsite facility. Because these values are all less than the related values previously assessed in EIS Section 3.17, the analysis contained in the EIS is considered bounding and applicable to the option for an onsite beneficial re-use processing facility. For that reason, the assessment of transportation and traffic effects of an onsite beneficial re-use processing facility at GAF was eliminated from further analysis in this document.

Table 3-1. Transportation Volumes Associated with Alternative B with Onsite Beneficial Re-use Processing Facility

	Alternative B, Option 2, Offsite Beneficial Re-use Processing Facility	Alternative B, Onsite Beneficial Re-use Processing Facility
Total trips per day on public roads[1]	793	645
Net Increase on Local Roadways		
Steam Plant Road:		
No. of additional vehicles per hour (9 hr workday)	88	72
No. of additional vehicles per minute (9 hr workday)	1.5	1
Odoms Bend Road:		
No. of additional vehicles per hour (9 hr workday)	72	68
No. of additional vehicles per minute (9 hr workday)	1.2	1

[1]Includes CCR transport to facility, workforce commuting, transport of borrow and delivery of beneficiated product to market. Does not include existing GAF plant workforce.

Table 3-2 provides a comparison of each environmental resource and identifies resources where attributes exceed their respective bounding values. Resources for which the bounding analysis were determined to be inadequate to assess potential impacts of development of a beneficial re-use processing facility at GAF include:

- Land use
- Surface Water
- Vegetation
- Wildlife
- Cultural and Historic

Table 3-2. Beneficial Re-use Processing Facility – Table of Environmental Characteristics and Bounding Values and Consistency at GAF

Resource	Parameter	Generic Site Bounding Value/ Characteristic	Maximum Site Specific Value of Either East Site or West Site at GAF	Consistency of GAF Site with Bounding Threshold Values
Air Quality	Emissions	Nitrogen oxides (NO_X) and Carbon monoxide (CO): not to exceed 120 tons per year Particulate matter with particle size less than or equal to 10 micrometers (PM_{10}) and particulate matter with particle size less than or equal to 2.5 micrometers ($PM_{2.5}$): May exceed 100 tons per year - would obtain a Title V permit Hazardous Air Pollutants (HAP)s: None [Metals stay in ash matrix, mercury is condensed in baghouse and leaves site with project (entombed in concrete)] SO_2: less than 110 tons per year NO_X and CO: Operational restrictions not to exceed 120 tons per year PM_{10} and $PM_{2.5}$: May exceed 100 tons per year- would obtain a Title V permit Hazardous air pollutants (HAPs): Not a major source. Major source thresholds for HAPs are 10 tons/year for a single HAP or 25 tons/year for any combination of HAPs	No change	Yes

Resource	Parameter	Generic Site Bounding Value/ Characteristic	Maximum Site Specific Value of Either East Site or West Site at GAF	Consistency of GAF Site with Bounding Threshold Values
	Area Attainment Status	Prefer areas with attainment status for priority air pollutants	No change	Yes
Land Use	Preferred land use	Previously disturbed	Could impact 15 acres of undisturbed area.	No (lands on West Site not previously disturbed)
Zoning	Preferred zoning	Facility would be located in an area zoned for compatible uses. Prefer industrial zoning or ability to be rezoned	GAF is zoned Agricultural	No (Both candidate sites lack required zoning)
Water Quality	Potential impacts to receiving streams.	Onsite storm water basins; wastewater process onsite and discharged to POTW. Implement BMPs to minimize soil erosion during construction. Onsite storm water basins; wastewater process onsite and discharged to POTW or via NPDES permit to receiving waterbody. Implement BMPs to minimize soil erosion during construction.	Stormwater management and erosion control would be provided. No connection to POTW.	No
Floodplains	Floodplain encroachment	Avoidance of Federal Emergency Management Agency 100-year floodplain	No change	Yes
Vegetation/Land Cover	Forested lands, rare/sensitive vegetation communities and habitats	Avoidance of rare/sensitive vegetation communities Minimization of impacts to forested lands	Rare/sensitive vegetation communities would be avoided. Potential for up to 15 acres of forested lands disturbed.	No (lands on West Site are forested)

Resource	Parameter	Generic Site Bounding Value/ Characteristic	Maximum Site Specific Value of Either East Site or West Site at GAF	Consistency of GAF Site with Bounding Threshold Values
Species of Concern	Listed species, heronry, osprey, eagles, etc.	Avoidance of impacts to listed species and other species of concern. Avoidance of impacts to state for federally listed species. Furthermore, actions must not result in the need to consult with USFWS for potential impacts to federally listed species under the ESA. Activities must be in compliance with the National Bald Eagle Management Guidelines. Avoid potential impacts to bats by avoiding impacts to trees, caves, water bodies, sinkholes, buildings, and bridges.	No change. Will require removal of up to 2.8 acres of bat habitat. However, for those activities with potential to affect bats, TVA committed to implementing specific conservation measures, such as adherence to seasonal restrictions on tree clearing activities, under TVA's Bat Strategy Programmatic Section 7 ESA consultation.	Yes
Waters of the US	Jurisdictional waters: streams, wetlands, lakes, etc.	Avoid/minimize stream or wetland impacts except for potential construction of localized NPDES outfall (impacts would not require a Section 404 and 401 individual permit). Any unavoidable impacts mitigated as per permitting requirements.	No change Minor potential effects to intermittent stream, expected not to require a Section 404 and 401 individual permit. Unavoidable impacts mitigated.	Yes
Historic Properties	National Register of HistoricPlaces	Avoidance of previously identified NRHP listed or eligible sites.	Adverse effect. Requires the relocation of up to 3 historic cemeteries located on the site, considered	No

Resource	Parameter	Generic Site Bounding Value/ Characteristic	Maximum Site Specific Value of Either East Site or West Site at GAF	Consistency of GAF Site with Bounding Threshold Values
	(NRHP) listed properties		eligible for the NRHP under Criterion D. TVA will mitigate impacts to cemeteries by delineation of graves, historical and genealogical research on the persons buried in each, public notice, efforts to contact any living relatives, and relocation of graves to a cemetery identified by TVA.	
Hazardous Waste	Avoid hazardous waste impacts	Conduct a Phase I Environmental Survey. Phase II studies conducted if needed. Generation of regulated hazardous substances/wastes not expected. However, any regulated hazardous waste would be managed in accordance with RCRA requirements.	No change	Yes
Solid Waste	Management of Solid Waste	Solid wastes from production process expected to be minor. Solid waste generated during outages/maintenance activities varies. Solid wastes to be disposed of in appropriate licensed landfill.	No change	Yes

Resource	Parameter	Generic Site Bounding Value/ Characteristic	Maximum Site Specific Value of Either East Site or West Site at GAF	Consistency of GAF Site with Bounding Threshold Values
Noise	Noise emissions	Not to exceed 65 decibels (dBA) at property boundary (commercial properties)	No change	Yes
Socioeconomics	Employment	Construction Phase: Up to 150 people Operational Phase: Up to 36 people Workforce Geography: 90 percent from surrounding area, 10 percent from outside local area	No change	Yes
Transportation	Facility Access	Direct access to site from a collector road or major highway that can support truck traffic without noticeable effects to level of service (LOS)	The site has direct access to a minor collector. Minor collector, approximately 4.5 miles to the nearest highway.	Yes
Visual/Aesthetics	Maximum height of facility components	140 feet	No change	Yes
	Appearance	Industrial facility	No change	Yes

4.0 Resources Evaluated

4.1 Land Use and Zoning

4.1.1 Affected Environment

In conjunction with the development of the Office Complex Facility, the East Site is considered to be fully disturbed and developed as described in Section 3.0 of this supplemental analysis. As such, the bounding condition for the assessment of potential environmental impacts of the beneficial re-use processing facility in this supplemental NEPA analysis are represented by the West Site. The approximately 25-acre West Site is undeveloped and consists of both previously cleared and vegetated areas.

4.1.2 Environmental Consequences

Because the maximum site development area is assumed to be 15 acres, the proposed West Site is assumed to require the disturbance of the undeveloped forested land cover on the site, which is approximately 12.3 acres and up to 2.7 acres of grassland/herbaceous vegetation. Complete and permanent removal of vegetation within the West Site is expected if this site were chosen for development of an onsite beneficial re-use facility. Development of this site would result in the permanent conversion of undeveloped area to an industrial use. However, the conversion of this area to industrial use would be consistent with surrounding land uses including the existing NRL which is located adjacent to the site. Therefore, impacts to land use from the construction and operation of a beneficial re-use facility at this site would be minor.

In addition, as TVA would lease this site to a third party vendor for use as a beneficial re-use processing facility and retain ownership, no changes to local zoning would be required as the site would remain a federal facility. However, if TVA were to sell the site to a third party, the site would require rezoning to be in compliance with local regulations.

4.2 Surface Water

4.2.1 Affected Environment

In conjunction with the development of the Office Complex Facility, the East Site is considered to be fully disturbed and developed as described in Section 3.0 of this supplemental analysis. As such, the bounding condition for the assessment of potential environmental impacts of the beneficial re-use processing facility in this supplementary NEPA analysis are represented by the West Site.

The West Site is largely devoid of surface water resources. However, as described further in EIS Section 3.5, one small intermittent stream was identified during site investigation.

4.2.2 Environmental Consequences

Construction of the beneficial re-use processing facility at the West Site has the potential to temporarily affect surface water via storm water runoff. It is expected that the site developer would comply with all appropriate state and federal permit requirements. Appropriate BMPs would be implemented and all proposed project activities would be conducted in a manner to ensure that waste materials are contained and the introduction of pollutants to the receiving waters would be minimized. Onsite storm water basins would be constructed to aid in on-site storm water treatment. A General Permit for Storm Water Discharges Associated with Construction Activities TNR100000 (TDEC 2016) would be required for this project and this permit would require development of a project-specific storm water pollution prevention plan (SWPPP) as per TDEC General Construction Storm Water permit (TDEC 2016) and the Tennessee Erosion and Sediment Control Handbook for BMP guidance and details (TDEC 2012). The SWPPP would identify specific BMPs to address construction-related activities that would be adopted to minimize storm water impacts.

Development of the West Site would potentially impact 103 linear feet of one intermittent stream (Wood, 2019). Wastewater would be processed on site and discharged to a POTW or covered under a current or new NPDES permit. Modification to the current NPDES permit would be required for this facility to be permitted to discharge to the existing outfall. Any unavoidable impacts would be mitigated per the appropriate permit requirements (i.e. a Section 404 permit administered by the USACE and Section 401 Water Quality Certification administered by TDEC through the ARAP permitting program depending on the project impacts and location). It is assumed that these permits may be required for a new NPDES outfall, however the criteria for a future site would limit the impacts to aquatic features and would not be expected to require significant mitigation from proposed activities.

The beneficial re-use processing facility would be expected to have restroom facilities to accommodate the staff of the finished facility. If a more permanent system is installed for this facility, permits may be required depending on the type of system installed. If the system includes a septic tank with a subsurface sewage disposal field, then a Septic System Construction Permit, which includes an application for ground water protection services, would be required by TDECs Division of Water Resources Ground Water Protection Program as per TDEC Regulations over Subsurface Sewage Disposal System 0400-48-01. Depending on the size and capacity of the system an Underground Injection Control Permit (UIC) permit may also be required.

If facility restrooms require a sewage treatment system, this system would require submittal and approval of plans by TDEC to obtain a TDEC State Operating Permit (SOP) and depending on the number of people using the facility, an UIC Permit. This system would also require Tennessee water and wastewater operator certification for those operating the system. This discharge would likely be discharged to a local POTW.

Process discharges would be characterized to confirm that no significant impacts to the Cumberland River would occur from this action. If the operational characterization showed impacts, then mitigation measures, including implementing waste water treatment, would be undertaken to meet requirements ensuring discharges meet NPDES limits and not cause an exceedance of in-stream TDEC WQC.

Any discharges into surface waters would comply with all NPDES permit limits. Thus, development of a beneficial re-use facility under these conditions at the West Site would not be expected to cause any additional direct or indirect effects to local surface water resources.

4.3 Vegetation

4.3.1 Affected Environment

In conjunction with the development of the Office Complex Facility, the East Site is considered to be fully disturbed and developed as described in Section 3.0 of this supplemental analysis.

As such, the bounding condition for the assessment of potential environmental impacts of the beneficial re-use processing facility in this supplementary NEPA analysis are represented by the West Site. The approximately 25-acre West Site consists of both previously cleared and vegetated areas. Within the uncleared areas of the site, mature forest characterized by oak and hickory trees dominante a shrub layer consisting of upland swamp privet and an herb layer of rosy sedge, smallflower baby blue eyes, and spring beaty. A more disturbed, slightly drier forested community dominated by chinquapin oak and cedar occur in conjunction with a shrub layer of roughleaf dogwood and a thick herbaceous carpet of blue periwinkle.

As shown in Table 4-1 and Figure 4-1, land cover includes approximately 12 acres of forest cover and approximately 13 acres of herbaceous/developed area.

Table 4-1 Land Cover in the West Site

Land Cover Type	West Site (acres)*
Deciduous Forest	6.6
Developed, Low Intensity	5.3
Evergreen Forest	5.7
Herbaceous	7.8
Total	**25.4**

*Derived from Homer et al. 2015 supplemented by field surveys and aerial photography.

4.3.2 Environmental Consequences

Under Alternative B, a beneficial re-use processing facility would be developed at GAF at either the East or West Sites. Disturbance and development of the East Site as an office complex is assessed in EIS Section 3.0. Therefore, this section analyzes the development of the West Site as a bounding analysis for the development of a beneficial re-use processing facility at GAF. No impacts to vegetation due to development on the East Site would be anticipated as this site will be previously disturbed due to the development of an office complex which is evaluated in EIS Section 3.0.

Because the maximum site development area is assumed to be 15 acres (see Table 2-1), the proposed West Site is assumed to require the disturbance of all forest habitat on the site, approximately 12.3 acres of evergreen and deciduous forest, and up to 2.7 acres of grassland/herbaceous vegetation. Complete and permanent removal of vegetation within the West Site is expected if this site is chosen for development of an onsite beneficial re-use facility.

Development at this site would represent a minimal loss of less than one percent to total forested and herbaceous/developed land within a five-mile radius of GAF, as demonstrated in EIS Section 3.8. Impacts to the herbaceous vegetation would also be minimal due to its low-conservation value and small area of disturbance, while impacts to the forested majority would be greater due to the more advanced successional age of the stands. No uncommon species or associations have been observed within the West Site. Therefore, the loss of the vegetated communities in this portion of the project area would not have a notable effect on status of any individual species or the regional abundance of forest cover types in the vicinity. Overall, development of a beneficial re-use facility on the West Site is expected to impact locally common vegetation with limited conservation value. Therefore, overall impacts to vegetation would be minor.

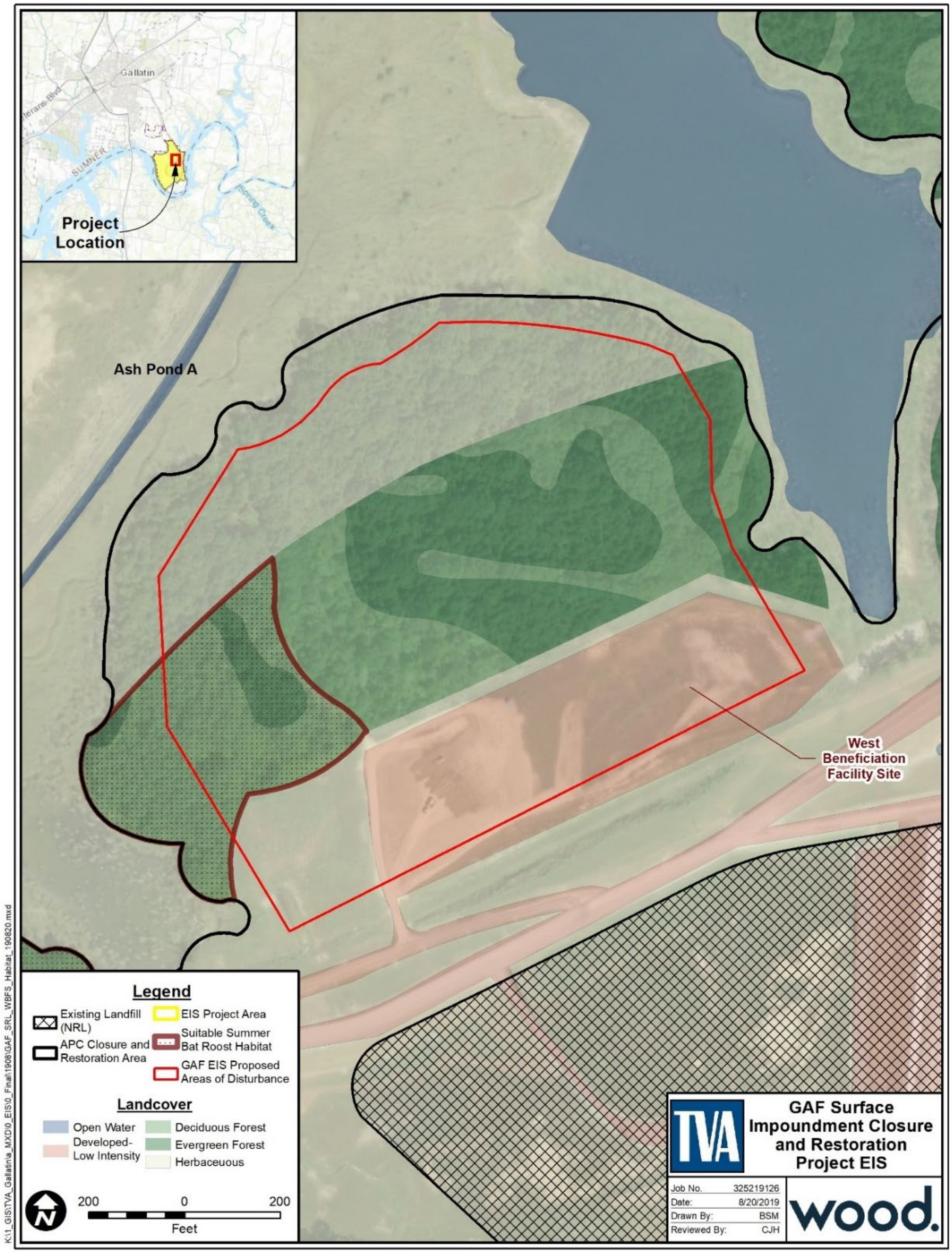

Figure 4-1 Land Cover in the West Beneficiation Facility Site

4.4 Wildlife

4.4.1 Affected Environment

In conjunction with the development of the Office Complex Facility the East Site is considered to be fully disturbed and developed as described in Section 3.0 of this supplemental analysis. As such, the bounding condition for the assessment of potential environmental impacts of the beneficial re-use processing facility in this supplementary NEPA analysis are represented by the West Site.

The proposed project area is an approximately 25-acre site that is comprised of approximately 6.6 acres of deciduous forested habitat, 5.7 acres of evergreen forested habitat, 7.8 acres of grassland/herbaceous vegetation, and 5.3 acres of previously developed/disturbed land (see EIS Section 3.9). The habitats of the West Site have been disturbed by former construction and operation of GAF; consequently, the wildlife communities associated with these habitats consist of common species that readily adapt to utilizing disturbed habitats.

Field surveys of the site were performed on April 23-25, 2019. Dominant species of birds at GAF included northern cardinal, turkey vulture, and blue jay, and dominant species of mammals were white-tailed deer and eastern gray squirrel. Dominant species of reptiles and amphibians were eastern box turtle and gray treefrog, respectively. The approximately 12.3 acres of forest land could provide some foraging and roosting habitat for bats, particularly in areas where the forest understory is partially open. Approximately 2.8 acres was identified during the field surveys as potentially suitable summer roost habitat for Indiana and northern long-eared bats.

Review of the TVA Regional Natural Heritage database in April 2019 resulted in records for one cave within 3 miles of the project area (TVA 2019). This cave, the Gallatin Fossil Plant Cave, occurs approximately 1,300 feet from the southern end of GAF and is located on the opposite side of the Cumberland River (TVA 2013). In addition, two wading bird colonies have been documented within three miles of the project area. Both are located along the Cumberland River across from GAF; however, neither has been documented as active since 2000. No caves, aggregations of birds or colonial wading bird colonies, or other unique habitats were observed in or adjacent to the project area during field investigations. Should caves, wading bird colonies, or other unique terrestrial habitat or features be identified during project activities, actions would be taken to preserve these resources. Information regarding threatened and endangered species within and surrounding the project site can be found in EIS Section 3.12.

Review of the USFWS's Information for Planning and Consultation (IPaC) database (https://ecos.fws.gov/ipac/) resulted in identification of six migratory birds of conservation concern that have the potential to be impacted by the proposed actions: Kentucky warbler, lesser yellow legs, prairie warbler, red-headed woodpecker, semipalmated sandpiper, and wood thrush. Of these species, the project area offers 6.6 deciduous forest acres potentially suitable for Kentucky warbler, red-headed woodpecker, and wood thrush, and minimal to no habitat for semi-palmated sandpiper and lesser yellow legs. The wood thrush also may use the 5.7 acres of evergreen/mixed forest.

Ospreys, which are also protected under the Executive Order 13186 (Responsibilities of Federal Agencies to Protect migratory Birds), are known to occur in the vicinity of the project. During the April 2019 field investigations, there were three osprey nests observed on transmission line towers within and near GAF (see EIS Section 3.12). None of these nests were within 660 feet of the proposed West Site.

4.4.2 Environmental Consequences

Under Alternative B, a beneficial re-use processing facility would be developed at GAF at either the East or West Sites. Disturbance and development of the East Site as an office complex was assessed previously in EIS Chapter 3. Therefore, this section analyzes the development of the West Site as a bounding analysis for the development of a beneficial re-use processing facility at GAF.

Because the maximum site development area is assumed to be 15 acres (see Table 1), the proposed West Site is assumed to require the extent of forest habitat on the site, approximately 12.3 acres of evergreen and deciduous forest, and up to 2.7 acres of grassland/herbaceous vegetation. Complete and permanent removal of wildlife habitat within the West Site is expected. Impacts to wildlife that use herbaceous habitat would be minimal due to the low conservation value of these types of habitats within the action areas. Conversely, impacts to wildlife using the forested habitat would be greater due to loss of more diverse forage and cover for wildlife associated with this habitat. However, the forested area within the West Site has been disturbed and fragmented by former construction and operation of GAF, including construction and operation of the adjacent Ash Pond A. Consequently, the wildlife communities associated with these habitats consist of common species that readily adapt to utilizing disturbed habitats as discussed in EIS Section 3.9.

The West Site contains 2.8 acres of potentially suitable summer roost habitat for Indiana and northern long-eared bats. Suitable summer roost habitat is discussed in EIS Section 3.9.1. For those activities with potential to affect bats, TVA committed to implementing specific conservation measures, such as adherence to seasonal restrictions on tree clearing activities, under TVA's Bat Strategy Programmatic Section 7 ESA consultation. With the use of BMPs, abundance of habitat in surrounding areas, and tree clearing restrictions, actions are not likely to adversely affect gray bat, Indiana bat, northern long-eared bat, and tri-colored bat.

There is an additional 9.5 acres of forest not suitable for summer bat roosting habitat would be removed in the West Site. If possible, there will be seasonal restrictions on the removal of this additional forested area. Tree removal could result in direct and indirect impacts to wildlife through removal of suitable nesting and foraging habitat. TVA would use BMPs along the remaining stream onsite to minimize impacts to this habitat. In conjunction with any potential impacts to the stream TVA would avoid and minimize impacts during design to the extent practicable, implement appropriate BMPs, and compensate for unavoidable adverse effects.

Habitat for some migratory birds of conservation concern does exist in the forested portion of the West Site. Migratory birds of conservation concern or their habitats were identified near the action area. However, similar deciduous and mixed forest habitat totaling approximately 14,550 acres exist in the surrounding landscape (see EIS Section 3.9).

Osprey nests identified on site are all greater than 660 feet from actions proposed under this alternative and would not be impacted. The recorded wading bird colonies in the vicinity of GAF have not recently been active and also would not be affected by proposed actions. The closest recorded cave in the vicinity is at a distance far enough away (0.83 miles) from the project area that it would not be affected under this alternative. Given the disturbed nature of the project area and timing of tree removal, impacts are expected to be minor and would not have measurable impacts to overall populations of any wildlife species, including migratory birds of conservation concern.

Overall, given the relatively common wildlife communities, abundance of similar habitat in vicinity, and fragmented woodland habitat, impacts to wildlife from the development of a beneficial re-use facility on the West Site are considered minor.

4.5 Historic Properties/Cultural Resources

4.5.1 Affected Environment

In conjunction with the development of the office complex facility, the East Site was evaluated for potential effects to cultural resources in the EIS, Section 3.15. Previous surveys and recent desk top analysis confirmed no archaeological sites or NRHP-listed properties are located within the East Site, and no above-ground properties that are included in or eligible for inclusion in the NRHP are located in areas within a one-half mile radius of the East Site . Therefore, the bounding condition for the assessment of potential environmental impacts of the beneficial re-use processing facility in this supplementary analysis are focused only on the West Site.

Three prior archaeological surveys, together, have included the entire area of the West Site. In 2005 TVA conducted a phase I cultural resources survey (Wampler and Karpynec 2005) of 377 acres associated with proposed improvements to the ash disposal area. The survey included some land in the west side of the West Site. This survey identified no archaeological sites and concluded that soils in the project area have been extensively altered through past ash disposal activities. The survey also noted two previously inventoried above-ground properties, SU-664 and SU-664, and established that neither of those would be visible from the then-proposed soil borrow that was to be located within what is currently referred to as the West Site. In 2010 TVA completed a phase I archaeological survey (McKee 2010) of four areas at GAF totaling 285 acres, associated with proposed geophysical investigations in support of plans to construct a new ash storage facility. This survey included a small section of the south side of the West Site. The survey identified four previously unrecorded archaeological sites, none of which are located in the West Site area. In 2012 TVA completed a cultural resources survey (Barrett and Holland 2012) of 43 acres, including most of the West Site, associated with a then-proposed coal ash stockpile. Background research conducted prior to the field survey did not indicate any previously-recorded archaeological sites, above-ground properties, or NRHP –listed properties in the survey area. The survey identified five previously-recorded sites (40SU271, 40SU272, 40SU273, 40SU274, and 40SU275), all located in the West Site. Three of these (40SU272, 40SU273, 40SU274) are historic period farmsteads dating to the 20th century and contain remnant building foundations. The other two sites (40SU271 and 40SU275) are historic period cemeteries (Hudson/Odom Bend and Bailey/"Single Grave", respectively). TVA determined that all five of these archaeological sites are ineligible for inclusion in the NRHP due to a lack of historic significance or data potential. TVA completed consultation with the Tennessee State Historic Preservation Officer (SHPO) for each of these surveys, and SHPO agreed with TVA's findings regarding the resources in the area now known as the West Site.

In addition to the Hudson/Odom Bend (98 graves) and Bailey/"Single Grave" (1 grave) cemeteries, one other cemetery is located on the West site: Unnamed No. 10 (4 graves). These cemeteries are shown on TVA's ca. 1950 land acquisition maps for GAF. TVA staff visited the Hudson/Odom Bend and Bailey/"Single Grave"cemeteries in April 2019 and noted that only some of the graves have markers, and of the extant markers, few contain legible inscriptions. Many of the graves are marked solely by a grave shaft depression. The GAF land acquisition maps, which were based on civil surveys that TVA performed as part of land acquisition associated with the GAF project, also provided estimated sizes of each cemetery. TVA is investigating whether this cemetery was relocated prior to the 2013 archaeological survey.

Under normal circumstances cemeteries do not meet the National Park Service criteria of eligibility for inclusion in the National Register of Historic Places (NRHP) at 36 CFR Part 60.4. An exception can be made for any cemetery that meets Criteria Consideration D, “A cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events.” An individual grave can be considered eligible for the NRHP if it meets Criteria Consideration C, “A birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building directly associated with his productive life.” In addition, a cemetery may be considered eligible for the NRHP under Criterion D (potential to yield important information) if it could contain information that would contribute significantly to a poorly-understood period or area in local, state or national history.

TVA’s historical research indicates that the area now occupied by GAF, formerly known as Odoms Bend, was home to a thriving, rural, African American community at the time TVA acquired the property. However, the history of this community is very poorly represented in historical documents and literature. A study of the burials themselves could yield information that would be valuable in generating more knowledge of the social, economic, and political history of this community. Therefore, TVA has determined that the Hudson/Odoms Bend, Bailey/”Single Grave”, and Unnamed No. 10 cemeteries are eligible for inclusion in in the NRHP under Criterion D. Further, the proposed undertaking would result in a necessity to relocate these cemeteries. TVA found that the undertaking could result in an adverse effect on some or all of these cemeteries.

TVA has consulted with the SHPO and federally-recognized Indian tribes regarding TVA’s finding that no NRHP-eligible archaeological sites or historic architectural properties are located in the APE; TVA’s determinations regarding the NRHP eligibility of the cemeteries; and TVA’s finding that five cemeteries at GAF (Bailey, Franklin, Hudson/Odoms Bend, Unnamed No. 4, and Unnamed No. 10) may be relocated and therefore, could be adversely affected by the undertaking. The SHPO did not disagree with this finding, and none of the TVA consulted tribes disagreed or identified resources of concern. The SHPO responded by letter dated April 22, 2020. The SHPO does not agree that sufficient information is available to support a determination that the Bailey, Franklin, Hudson/Odoms Bend, Unnamed No. 4, and Unnamed No. 10 cemeteries are eligible for the NRHP, but does consider that such information could come to light in future. As such the SHPO indicated that these five cemeteries should be considered potentially eligible for inclusion in the NRHP.

4.5.2 Environmental Consequences

Development of a beneficial re-use processing facility at this location is assumed to require disturbance of 15 acres in this area. As the exact location is not yet known, for the purposes of this analysis, it is assumed that development on this site would require relocation of Hudson/Odoms Bend, Bailey, and the Unknown No. 10 cemeteries.

TVA proposes to mitigate these impacts by removing all graves in each of the cemeteries that would be physically affected by the proposed ash beneficiation facility. and relocating them to a new burial ground in consultation with the SHPO, federally-recognized Indian tribes, and interested members of the Gallatin community. In order to carry this out TVA would perform the following:

- fully delineate the boundaries of each cemetery and generate accurate maps depicting the boundaries of each and the locations of all graves within each cemetery

- complete historical and genealogical research on the persons buried at each cemetery
- consult with the Tennessee SHPO under NHPA Section 106 on the potential NRHP eligibility of the cemeteries
- identify a relocation cemetery in Gallatin or the surrounding area
- publish a notice of TVA's intent to relocate the cemeteries in a local newspaper
- make efforts to contact any living relatives of persons buried in the cemeteries
- obtain permission to terminate the use of the cemeteries as burial grounds and to relocate the cemeteries
- conduct analysis of the artifacts and skeletal remains disinterred from each cemetery; and
- install interpretive signage or a marker honoring those buried in the cemeteries, in a location accessible to members of the general public, such as the relocation cemetery

TVA would propose delineating the cemetery boundaries, generating accurate maps, completing historical and genealogical research, and installing signage or a marker as mitigation measures. These measures are stipulated in a Memorandum of Agreement between TVA and the Tennessee SHPO as described in Section 3.16.2.2 of the EIS.

Based on the required relocation of Hudson/Odoms Bend, Bailey, and the Unknown No. 10 cemeteries and their eligibility for NRHP listing, the impacts of development of the West Site on cultural resources are considered to be moderate. However, because there are no other NRPH-eligible archaeological sites located in the West Site, and because TVA would mitigate the impacts to cemeteries by relocation, overall impacts to cultural resources are considered to be minor.

Appendix F – Bat Strategy Project Assessment

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

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

Project Name: Gallatin Fossil Plant (GAF) Impoundment Closure and Restoration Project EIS **Date:** Oct 1, 2019

Contact(s): Ashley Farless, Env **CEC#:** **Project ID:** 33652

Project Location (City, County, State): Gallatin Fossil Plant, Sumner County, Tennessee

Project Description:

TVA is assessing the environmental impacts of the proposed closure-by-removal of the Ash Pond Complex at GAF, or leaving the plant as is and taking no actions. TVA is investigating expansion of an onsite landfill and disposal of CCR there or at a beneficial re-use facility and an existing offsite landfill. There would be seasonal restrictions on removal of potentially suitable summer bat roosting trees.

SECTION 1: PROJECT INFORMATION - ACTION AND ACTIVITIES

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

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

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

TABLE 1. Activities with no effect to bats. Conservation measures & completion of bat strategy project review form NOT required.		
☐ 1. Loans and/or grant awards	☐ 8. Sale of TVA property	☐ 19. Site-specific enhancements in streams and reservoirs for aquatic animals
☐ 2. Purchase of property	☐ 9. Lease of TVA property	☐ 20. Nesting platforms
☐ 3. Purchase of equipment for industrial facilities	☐ 10. Deed modification associated with TVA rights or TVA property	☐ 41. Minor water-based structures (this does not include boat docks, boat slips or piers)
☐ 4. Environmental education	☐ 11. Abandonment of TVA retained rights	☐ 42. Internal renovation or internal expansion of an existing facility
☐ 5. Transfer of ROW easement and/or ROW equipment	☐ 12. Sufferance agreement	☐ 43. Replacement or removal of TL poles
☐ 6. Property and/or equipment transfer	☒ 13. Engineering or environmental planning or studies	☐ 44. Conductor and overhead ground wire installation and replacement
☐ 7. Easement on TVA property	☐ 14. Harbor limits delineation	☐ 49. Non-navigable houseboats

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

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

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

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

a) Will project involve continuous noise (i.e., ≥ 24 hrs) that is greater than 75 decibels measured on the A scale (e.g., loud machinery)?

(•) **NO** (NV2 does not apply)
( ) **YES** (NV2 applies, subject to records review)

b) Will project involve entry into/survey of cave?

(•) **NO** (HP1/HP2 do not apply)
( ) **YES** (HP1/HP2 applies, subject to review of bat records)

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

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

d) Will the project involve vegetation piling/burning?

( ) **NO** (SSPC4/ SHF7/SHF8 do not apply)
(•) **YES** (SSPC4/SHF7/SHF8 applies, subject to review of bat records)

e) If **tree removal (activity 33 or 34)**, estimated amount: 133 (•) **ac** ( ) **trees** ( ) **N/A**

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

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

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

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

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

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

Info below completed by:

[ ] **Heritage Reviewer**	(name)		Date	
[ ] **OSAR Reviewer**	(name)		Date	
[x] **Terrestrial Zoologist**	(name)	Elizabeth Hamrick	Date	Oct 14, 2019

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

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

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

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

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

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

Amount of SUITABLE habitat to be removed/burned (may differ from STEP 4e): 34.9 ((•) **ac** ( ) **trees)*** ( ) **N/A**

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

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

Actions are across the river from a gray bat summer cave. Based on baseline activities at the plant and distance from the cave, current proposed actions are not likely to impact gray bats in this cave.

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

STEP 7) Project will involve:

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

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

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

STEP 10) Project ◉ **WILL** ○ **WILL NOT** require use of Incidental Take in the amount of 34.9 ◉ **acres or** ○ **trees** proposed to be used during the ▣ **WINTER** ▣ **VOLANT SEASON** ○ **NON-VOLANT SEASON** ○ **N/A**

STEP 11) Available Incidental Take (prior to accounting for this project) as of Oct 14, 2019

TVA Action	Total 20-year	Winter	Volant Season	Non-Volant Season
5 Operate, Maintain, Retire, Expand, Construct Power Plants	1,705.02	1,383.34	249.2	72.48

STEP 12) Amount contributed to TVA's Bat Conservation Fund upon activity completion: $ 17,450 OR ○ **N/A**

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

SECTION 3: REQUIRED CONSERVATION MEASURES

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

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

○ **NO** (Go to Step 14)

◉ **YES** (STOP HERE; Submit for Terrestrial Zoology Review. Click File/Save As, name form as "ProjectLead_BatForm_CEC-or-ProjectIDNo_Date", and submit with project information).

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

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

Manual Override

Name: Elizabeth Hamrick

Check if Applies to Project	Activities Subject To Conservation Measure	Conservation Measure Description
☒	15, 16, 17, 18, 22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 45, 47, 48, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 90, 91, 92, 93, 94, 95, 96	**NV1** - Noise will be short-term, transient, and not significantly different from urban interface or natural events (i.e., thunderstorms) that bats are frequently exposed to when present on the landscape.
☒	16, 25, 26, 37, 47, 52, 62, 63, 64, 65, 70, 71, 73, 78, 80, 82, 83, 86, 91	**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.
☒	17, 23, 34	**SHF2** - Site-specific conditions (e.g., acres burned, transport wind speed, mixing heights) will be considered to ensure smoke is limited and adequately dispersed away from caves so that smoke does not enter cave or cave-like structures.
☒	17, 23, 34	**SHF4** - If burns need to be conducted during April and May, when there is some potential for bats to present on the landscape and more likely to enter torpor due to colder temperatures, burns will only be conducted if the air temperature is 55° or greater, and preferably 60° or greater.
☒	17, 22, 23, 32, 33, 34, 35, 36	**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.
☒	17, 22, 23, 32, 33, 34, 35, 36	**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.
☒	33, 34	**TR1*** - Removal of potentially suitable summer roosting habitat during time of potential occupancy has been quantified and minimized programmatically. TVA will track and document alignment of activities that include tree removal (i.e., hazard trees, mechanical vegetation removal) with the programmatic quantitative cumulative estimate of seasonal removal of potential summer roost trees for Indiana bat and northern long-eared bat. Project will therefore communicate completion of tree removal to appropriate TVA staff.
☒	33, 34	**TR4*** - Removal of suitable summer roosting habitat within potential habitat for Indiana bat or northern long-eared bat will be tracked, documented, and included in annual reporting. Project will therefore communicate completion of tree removal to appropriate TVA staff.
☒	33, 34	**TR9** - If removal of suitable summer roosting habitat occurs when bats are present on the landscape, a funding contribution (based on amount of habitat removed) towards future conservation and recovery efforts for federally listed bats would be carried out. Project can consider seasonal bat presence/absence surveys (mist netting or emergence counts) that allow for positive detections without resulting in increased constraints in cost and project schedule. This will enable TVA to contribute to increased knowledge of bat presence on the landscape while carrying out TVA's broad mission and responsibilities.

■	69, 77, 89, 91	**AR1** - Projects that involve structural modification or demolition of buildings, bridges, and potentially suitable box culverts, will require assessment to determine if structure has characteristics that make it a potentially suitable unconventional bat roost. If so a survey to determine if bats may be present will be conducted. Structural assessment will include: o Visual check that includes an exhaustive internal/external inspection of building to look for evidence of bats (e.g., bat droppings, roost entrance/exit holes); this can be done at any time of year, preferably when bats are active. o Where accessible and health and safety considerations allow, a survey of roof space for evidence of bats (e.g., droppings, scratch marks, staining, sightings), noting relevant characteristics of internal features that provide potential access points and roosting opportunities. Suitable characteristic may include: gaps between tiles and roof lining, access points via eaves, gaps between timbers or around mortise joints, gaps around top and gable end walls, gaps within roof walling or around tops of chimney breasts, and clean ridge beams. o Features with high-medium likelihood of harboring bats but cannot be checked visually include soffits, cavity walls, space between roof covering and roof lining. o Applies to box culverts that are at least 5 feet (1.5 meters) tall and with one or more of the following characteristics. Suitable culverts for bat day roosts have the following characteristics: • Location in relatively warm areas • Between 5-10 feet (1.5-3 meters) tall and 300 ft (100 m) or more long • Openings protected from high winds • Not susceptible to flooding • Inner areas relatively dark with roughened walls or ceilings • Crevices, imperfections, or swallow nests o Bridge survey protocols will be adapted from the Programmatic Biological Opinion for the Federal Highway Administration (Appendix D of USFWS 2016c, which includes a Bridge Structure Assessment Guidance and a Bridge Structure Assessment Form). o Bat surveys usually are NOT needed in the following circumstances: • Domestic garages /sheds with no enclosed roof space (with no ceiling) • Modern flat-roofed buildings • Metal framed and roofed buildings • Buildings where roof space is regularly used (e.g., attic space converted to living space, living space open to rafters) or where all roof space is lit from skylights or windows. Large/tall roof spaces may be dark enough at apex to provide roost space
■	69, 77, 89, 91	**AR2** - Additional bat P/A surveys (e.g., emergence counts) conducted if warranted (i.e., when AR1 indicates that bats may be present).
■	16, 17, 18, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 48, 50, 51, 52, 53, 54, 55, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 70, 71, 73, 76, 77, 78, 80, 81, 82, 83, 86, 87, 88, 89, 90	**SSPC2** - Operations involving chemical/fuel storage or resupply and vehicle servicing will be handled outside of riparian zones (streamside management zones) in a manner to prevent these items from reaching a watercourse. Earthen berms or other effective means are installed to protect stream channel from direct surface runoff. Servicing will be done with care to avoid leakage, spillage, and subsequent stream, wetland, or ground water contamination. Oil waste, filters, other litter will be collected and disposed of properly. Equipment servicing and chemical/fuel storage will be limited to locations greater than 300-ft from sinkholes, fissures, or areas draining into known sinkholes, fissures, or other karst features.

■	16, 17, 18, 21, 22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 48, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 61, 62, 63, 64, 65, 66, 67, 69, 70, 71, 73, 76, 77, 80, 81, 82, 83, 84, 86, 87, 88, 89, 90, 91	**SSPC3** (**Power Plants only**) - Power Plant actions and activities will continue to implement standard environmental practices. These include: o Best Management Practices (BMPs) in accordance with regulations: • Ensure proper disposal of waste, ex: used rags, used oil, empty containers, general trash, dependent on plant policy • Maintain every site with well-equipped spill response kits, included in some heavy equipment • Conduct Quarterly Internal Environmental Field Assessments at each sight • Every project must have an approved work package that contains an environmental checklist that is approved by sight Environmental Health & Safety consultant. • When refueling, vehicle is positioned as close to pump as possible to prevent drips, and overfilling of tank. Hose and nozzle are held in a vertical position to prevent spillage o Construction Site Protection Methods • Sediment basin for runoff - used to trap sediments and temporarily detain runoff on larger construction sites • Storm drain protection device • Check dam to help slow down silt flow • Silt fencing to reduce sediment movement o Storm Water Pollution Prevention (SWPP) Pollution Control Strategies • Minimize storm water contact with disturbed soils at construction site • Protect disturbed soil areas from erosion • Minimize sediment in storm water before discharge • Prevent storm water contact with other pollutants • Construction sites also may be required to have a storm water permit, depending on size of land disturbance (>1ac) o Every site has a Spill Prevention and Control Countermeasures (SPCC) Plan and requires training. Several hundred pieces of equipment often managed at the same time on power generation properties. Goal is to • Minimize fuel and chemical use Ensure proper disposal of waste, ex: used rags, used oil, empty containers, general trash, dependent on plant policy • Maintain every site with well-equipped spill response kits, included in some heavy equipment • Conduct Quarterly Internal Environmental Field Assessments at each sight • Every project must have an approved work package that contains an environmental checklist that is approved by sight Environmental Health & Safety consultant. • When refueling, vehicle is positioned as close to pump as possible to prevent drips, and overfilling of tank. Hose and nozzle are held in a vertical position to prevent spillage o Construction Site Protection Methods • Sediment basin for runoff - used to trap sediments and temporarily detain runoff on larger construction sites • Storm drain protection device • Check dam to help slow down silt flow • Silt fencing to reduce sediment movement o Storm Water Pollution Prevention (SWPP) Pollution Control Strategies • Minimize storm water contact with disturbed soils at construction site • Protect disturbed soil areas from erosion • Minimize sediment in storm water before discharge • Prevent storm water contact with other pollutants • Construction sites also may be required to have a storm water permit, depending on size of land disturbance (>1ac) o Every site has a Spill Prevention and Control Countermeasures (SPCC) Plan and requires training. Several hundred pieces of equipment often managed at the same time on power generation properties. Goal is to minimize fuel and chemical use
■	16, 26, 36, 37, 38, 39, 48, 50, 52, 59, 60, 62, 66, 67, 69, 72, 75, 77, 78, 79, 86	**L1** - Direct temporary lighting away from suitable habitat during the active season.
■	16, 26, 36, 37, 38, 39, 48, 50, 52, 59, 60, 62, 66, 67, 69, 72, 75, 77, 78, 79, 86	**L2** - Evaluate the use of outdoor lighting during the active season and seek to minimize light pollution when installing new or replacing existing permanent lights by angling lights downward or via other light minimization measures (e.g., dimming, directed lighting, motion-sensitive lighting).

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

Hide All Unchecked Conservation Measures

- (•) HIDE
- ( ) UNHIDE

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

- ( ) HIDE
- ( ) UNHIDE

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

Project has committed to clearing suitable bat trees between Aug 1 and March 31. When these trees are cleared, Terrestrial Zoology staff will be notified and appropriate payment will be deducted from project funds and put into to the bat conservation fund at the end of each month. Cost provided below is maximum total payment required if all trees are cleared in Aug 1- Oct 14 window.

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

[ ] (name) is (or will be made) aware of the requirements below.

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

For Use by Terrestrial Zoologist Only

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

☒ For projects that require use of Take and/or contribution to TVA's Bat Conservation Fund, Terrestrial Zoologist acknowledges that Project Lead/Contact has been informed that project will result in use of Incidental Take [34.9] (◉) ac ( ) trees and that use of Take will require $ [17,450] contribution to TVA's Conservation Fund upon completion of activity (amount entered should be $0 if cleared in winter).

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

Appendix G – Coordination

Cultural Resources Correspondence

TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

May 10, 2005

Mr. J. Bennett Graham
Tennessee Valley Authority
400 West Summet Hill Dr.
Knoxville, Tennessee, 37902-1499

RE: TVA, ARCHITECTURAL SURVEY REPORT, ASH DISPOSAL AREAS IMPROVEMENT, GALLATIN, SUMNER COUNTY

Dear Mr. Graham:

In response to your request, received on Wednesday, April 27, 2005, we have reviewed the documents you submitted regarding your proposed 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 applicant 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. You may wish to familiarize yourself with these procedures (Federal Register, December 12, 2000, pages 77698-77739) if you are unsure about the Section 106 process.

Considering the information provided, we find that the area of potential effect contains no architectural resources eligible for listing in the National Register of Historic Places affected by this undertaking. You should notify interested persons and make the documentation associated with this finding available to the public.

This office appreciates your cooperation.

Sincerely,

Herbert L. Harper

Herbert L. Harper
Executive Director and
Deputy State Historic
Preservation Officer

HLH/jyg

TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

April 18, 2011

Mr. A. Eric Howard
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, Tennessee 37902-1499

RE: TVA, ARCHAEOLOGICAL ASSESSMENT, GEOPHYSICAL/FOSSIL PLANT RAIL LOOP, GALLATIN, SUMNER COUNTY, TN

Dear Mr. Howard:

At your request, our office has reviewed the above-referenced archaeological survey report in accordance with regulations codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739). Based on the information provided, we concur that the project area for the geophysical testing sites contains no archaeological resources eligible for listing in the National Register of Historic Places.

On May 28, 2010, we concurred with your office that sites 40SU257, 40SU258, and 40SU259 are potentially eligible for inclusion in the National Register of Historic Places. Without further investigation, we cannot concur that these sites or site 40SU268 are eligible for the National Register. We find that site 40SU268 is potentially eligible and we concur with your agency that sites 40SU263, 40SU264, 40SU265, 40SU266, 40SU267, and 40SU269 are not eligible for the National Register.

If project plans are changed or archaeological remains are discovered during project implementation, 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.

Your cooperation is appreciated.

Sincerely,

E. Patrick McIntyre, Jr.

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

EPM/jmb

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

May 30, 2013

Mr. Clinton Jones
Tennessee Valley Authority
400 West Summit Hill Drive
WT11D
Knoxville, Tennessee 37902-1499

RE: TVA, ARCHAEOLOGICAL ASSESSMENT, DRY SCRUBBER/GALLATIN FOSSIL PLANT, UNINCORPORATED, SUMNER COUNTY, TN

Dear Mr. Jones:

At your request, our office has reviewed the above-referenced archaeological survey report in accordance with regulations codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739). Based on the information provided, we concur that the project area contains no archaeological resources eligible for listing in the National Register of Historic Places.

If project plans are changed or archaeological remains are discovered during 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.

Your cooperation is appreciated.

Sincerely,

E. Patrick McIntyre, Jr.

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

EPM/jmb

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

May 30, 2013

Mr. Clinton Jones
Tennessee Valley Authority
400 West Summit Hill Drive
WT11D
Knoxville, Tennessee 37902-1499

RE: TVA, ARCHAEOLOGICAL ASSESSMENT, POND D SPILLWAY/GALLATIN FOSSIL PT, UNINCORPORATED, SUMNER COUNTY

Dear Mr. Jones:

At your request, our office has reviewed the above-referenced archaeological survey final report in accordance with regulations codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739). We find that the report meets the Tennessee SHPO Standards and Guidelines For Archaeological Resource Management Studies.

If project plans are changed or archaeological remains are discovered during 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.

Your continued cooperation is appreciated.

Sincerely,

E. Patrick McIntyre, Jr.

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

EPM/jmb

TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

July 9, 2012

Mr. Clinton Jones
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, Tennessee 37902-1499

RE: TVA, ARCHAEOLOGICAL ASSESSMENT, NEW DRY SCRUBBER TECH/
S. OF RAIL, GALLATIN, SUMNER COUNTY

Dear Mr. Jones:

At your request, our office has reviewed the above-referenced archaeological survey final report in accordance with regulations codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739). We find that the report meets the Tennessee SHPO Standards and Guidelines For Archaeological Resource Management Studies.

If project plans are changed or archaeological remains are discovered during 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.

Your continued cooperation is appreciated.

Sincerely,

E. Patrick McIntyre, Jr.

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

EPM/jmb

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

September 3, 2013

Mr. Clinton Jones
Tennessee Valley Authority
400 West Summit Hill Drive
WT11D
Knoxville, Tennessee 37902-1499

RE: TVA, ARCHAEOLOGICAL ASSESSMENT, GALLATIN FOSSIL PLANT BORROW AREAS, UNINCORPORATED, SUMNER COUNTY, TN

Dear Mr. Jones:

At your request, our office has reviewed the above-referenced archaeological survey report in accordance with regulations codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739). Based on the information provided, we find that the project area contains no archaeological resources eligible for listing in the National Register of Historic Places.

If project plans are changed or archaeological remains are discovered during 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.

Your cooperation is appreciated.

Sincerely,

E. Patrick McIntyre, Jr.

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

EPM/jmb

TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

June 20, 2012

Mr. Clinton E. Jones
Tennessee Valley Authority
400 W. Summet Hill Dr.
Knoxville, Tennessee, 37902-1499

RE: TVA, GAF/NEW SCRUBBER TECHNOLOGIES, UNINCORPORATED, SUMNER COUNTY

Dear Mr. Jones:

In response to your request, received on Tuesday, June 12, 2012, we have reviewed the documents you submitted regarding your proposed 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 applicant 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. You may wish to familiarize yourself with these procedures (Federal Register, December 12, 2000, pages 77698-77739) if you are unsure about the Section 106 process. You may find additional information concerning the Section 106 process and the Tennessee SHPO's documentation requirements at. http://www.tennessee.gov/environment/hist/federal/sect106.shtml

Considering available information, we find that the project as currently proposed will NOT ADVERSELY AFFECT ANY PROPERTY THAT IS ELIGIBLE FOR LISTING IN THE NATIONAL REGISTER OF HISTORIC PLACES. Therefore, this office has no objection to the implementation of this project. Please direct questions and comments to Joe Garrison (615) 532-1550-103.
We appreciate your cooperation.

Sincerely,

E. Patrick McIntyre, Jr.

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

EPM/jyg

TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

April 17, 2013

Mr. Clinton Jones
Tennessee Valley Authority
400 West Summit Hill Drive
WT11D
Knoxville, Tennessee 37902-1499

RE: TVA, ARCHAEOLOGICAL ASSESSMENT, POND D SPILLWAY IMPS./FOSSIL PLANT,
GALLATIN, SUMNER COUNTY, TN

Dear Mr. Jones:

At your request, our office has reviewed the above-referenced archaeological survey report in accordance with regulations codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739). Based on the information provided, we concur that the project area contains no archaeological resources eligible for listing in the National Register of Historic Places.

If project plans are changed or archaeological remains are discovered during 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.

Your cooperation is appreciated.

Sincerely,

E. Patrick McIntyre, Jr.

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

EPM/jmb

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

October 22, 2013

Mr. Clinton Jones
Tennessee Valley Authority
400 West Summit Hill Drive
WT11D
Knoxville, Tennessee 37902-1499

RE: TVA, ARCHAEOLOGICAL ASSESSMENT, GALLATIN PLANT SOIL BORROW AREAS, GALLATIN, SUMNER COUNTY

Dear Mr. Jones:

At your request, our office has reviewed the above-referenced archaeological survey final report in accordance with regulations codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739). We find that the report meets the Tennessee SHPO Standards and Guidelines For Archaeological Resource Management Studies.

If project plans are changed or archaeological remains are discovered during 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.

Your continued cooperation is appreciated.

Sincerely,

E. Patrick McIntyre, Jr.

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

EPM/jmb

TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

May 17, 2013

Mr. Clinton Jones
Tennessee Valley Authority
400 West Summit Hill Drive
WT11D
Knoxville, Tennessee 37902-1499

RE: TVA, ARCHAEOLOGICAL ASSESSMENT, TWRA HATCHERY FACILITY RELOCATION, GALLATIN, SUMNER COUNTY, TN

Dear Mr. Jones:

At your request, our office has reviewed the above-referenced archaeological survey report in accordance with regulations codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739). Based on the information provided, we concur that the project area contains no archaeological resources eligible for listing in the National Register of Historic Places.

If project plans are changed or archaeological remains are discovered during 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.

Your cooperation is appreciated.

Sincerely,

E. Patrick McIntyre, Jr.

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

EPM/jmb

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON ROAD
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550

Received
9/26/16

September 20, 2016

Mr. Clinton E. Jones
Tennessee Valley Authority
400 W. Summit Hill Dr.
Knoxville, Tennessee, 37902-1499

RE: TVA, FINAL REPORTS, VARIOUS PROJECTS, 2015-2016

Dear Mr. Jones:

At your request, our office has reviewed the above-referenced cultural resources final report. This review is a requirement of Section 106 of the National Historic Preservation Act for compliance by the participating federal agency or applicant for federal assistance. Procedures for implementing Section 106 of the Act are codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

Based on the information provided, we find that the following final reports meet the Tennessee State Historic Preservation Office Reporting Standards and/or the Tennessee SHPO Standards and Guidelines for Archaeological Resource Management Studies:

- Erin Transmission Line Demolition, Stewart County
- Wilson Substation Expansion Project, Wilson County
- Great Falls Hyrdo-Sparta 46-kV Transmission Line, Warren and White Counties
- Three Structure Replacements, Right-of-Way Access, and Delineation of Site 40GY18, Grundy County
- Duck River Elected Membership Corporation Delivery Point Project, Franklin County
- Rickman Delivery Point Project, Overton County
- Highland Solar Advantage Project, Putnam County
- Haywood-Cordova SW Station Transmission Line, Shelby, Fayette, and Haywood Counties
- Gallatin Fossil Plant Proposed Borrow Site, Sumner County
- Dewatering Facility at Kingston Fossil Plant, Roane County

Your continued cooperation is appreciated.

Sincerely,

E. Patrick McIntyre, Jr.

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

EPM/dlc

TENNESSEE HISTORICAL COMMISSION
State Historic Preservation Office
2941 Lebanon Pike
Nashville, Tennessee 37214

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Mr. Clinton E. Jones
Tennessee Valley Authority
400 W. Summit Hill Dr.
Knoxville, Tennessee, 37902-1499

37902$1419 C008

TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

July 13, 2005

Mr. J. Bennett Graham
Tennessee Valley Authority
400 W. Summit Hill Drive
WT 11D - Cultural Resources
Knoxville, Tennessee 37902

RE: TVA, ARCHAEOLOGICAL ASSESSMENT, RAIL SPUR SERVING STEAM PLANT, GALLATIN, SUMNER COUNTY, TN

Dear Mr. Graham:

At your request, our office has reviewed the above-referenced archaeological survey report in accordance with regulations codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739). Based on the information provided, we concur that the project area contains no archaeological resources eligible for listing in the National Register of Historic Places.

If project plans are changed or archaeological remains are discovered during 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.

Your cooperation is appreciated.

Sincerely,

Herbert L. Harper

Herbert L. Harper
Executive Director and
Deputy State Historic
Preservation Officer

HLH/jmb

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

Received
4/15/16

April 11, 2016

Mr. Clinton Jones
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, Tennessee 37902

RE: TVA, CULTURAL RESOURCES ASSESSMENT, GALLATIN FOSSIL PLANT BORROW AREA, UNINCORPORATED, SUMNER COUNTY, TN

Dear Mr. Jones:

At your request, our office has reviewed the above-referenced archaeological survey report in accordance with regulations codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739). Based on the information provided, we concur that the project area contains no historic properties eligible for listing in the National Register of Historic Places.

If project plans are changed or archaeological remains are discovered during 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.

Your cooperation is appreciated.

Sincerely,

E. Patrick McIntyre, Jr.

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

EPM/jmb

TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

May 28, 2010

Mr. A. Eric Howard
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, Tennessee 37902-1499

RE: TVA, PHASE I ARCHAEOLOGICAL ASSESSMENT, GALLATIN PLANT RAIL LOOP/ASH DUMP, UNINCORPORATED, SUMNER COUNTY,

Dear Mr. Howard:

At your request, our office has reviewed the above-referenced archaeological survey report in accordance with regulations codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739). Based on the information provided, we concur that the project area contains archaeological resources potentially eligible for listing in the National Register of Historic Places. Sites 40SU257, 40SU258, and 40SU259 should either be avoided by all ground-disturbing activities or subjected to Phase II archaeological testing.

Upon receipt of the Phase II testing report or avoidance strategy, we will complete our review of this undertaking as expeditiously as possible. Please submit a minimum of two copies of each final report to this office in accordance with the Tennessee Historical Commission Review and Compliance Section Reporting Standards and Guidelines. Complete and/or updated Tennessee Site Survey Forms should be submitted to the Tennessee Division of Archaeology. Until such time as this office has rendered a final comment on this project, your Section 106 obligation under federal law has not been met. Please inform this office if this project is canceled or not funded by the federal agency. Questions and comments may be directed to Jennifer M. Barnett (615) 741-1588, ext. 105.

Your cooperation is appreciated.

Sincerely,

E. Patrick McIntyre, Jr.

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

EPM/jmb

TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

August 5, 2005

Mr. J. Bennett Graham
Tennessee Valley Authority
400 W. Summit Hill Drive
WT 11D - Cultural Resources
Knoxville, Tennessee 37902

RE: TVA, ARCHAEOLOGICAL ASSESSMENT, GALLATIN STEAM PLANT
RAIL SPUR IMP, GALLATIN, SUMNER COUNTY

Dear Mr. Graham:

At your request, our office has reviewed the above-referenced archaeological survey final report in accordance with regulations codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739). We find that the report meets the Tennessee SHPO Standards and Guidelines For Archaeological Resource Management Studies.

If project plans are changed or archaeological remains are discovered during 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.

Your continued cooperation is appreciated.

Sincerely,

Herbert L. Harper

Herbert L. Harper
Executive Director and
Deputy State Historic
Preservation Officer

HLH/jmb

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

February 3, 2017

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

Dear Mr. McIntyre:

TENNESSEE VALLEY AUTHORITY (TVA), GALLATIN FOSSIL PLANT, BOTTOM ASH DEWATERING PROJECT, SUMNER COUNTY, TENNESSEE
36° 19' 44" N, 86° 24' 19" W

TVA proposes to design and erect a new facility that would dewater coal combustion residuals (CCR), specifically ash and pyrite, at Gallatin Fossil Plant (GAF) in Sumner County, Tennessee. The resulting dry ash would be transported to the onsite landfill. This project would support TVA's plan to end wet storage of coal ash and gypsum and convert to dry storage. TVA has determined that this proposed bottom ash dewatering project at GAF constitutes an undertaking (as defined at 36 CFR § 800.16(y)) of the type that has potential to cause effects on historic properties. In this letter, we are initiating consultation with your office regarding this undertaking under Section 106 of the National Historic Preservation Act.

TVA has determined that the area of potential effects (APE) for archaeological sites consists of an approximately 20-acre site within which the dewatering facility would be constructed. The dewatering facility would have an approximately 10-acre footprint, and about 10 additional acres would be used as a temporary equipment laydown area. The facility would be 45 feet in height. TVA has determined that the APE for historic architectural resources consists of areas within a half-mile radius of the proposed facility that would have unobstructed views to the facility. Figures 1.1-1 and 1.1-2 (below), from TVA's draft environmental assessment (*Gallatin Fossil Plant Bottom Ash Process Dewatering Facility, Draft Environmental Assessment, Sumner County, Tennessee*), show the project location. Figure 1.1-3 shows the current project design. Figure 1 shows previously recorded archaeological sites in the GAF property, and a half-mile radius surrounding the center of the proposed facility. Figure 3.3-1, from the draft EA, shows the proposed construction site.

TVA conducted a desktop review of the APE. The APE has not been surveyed by archaeologists and no archaeological sites have been recorded in the APE. The desktop review included a careful examination of historic and current maps, as well as historic records (including TVA, 1967, *The Gallatin Steam Plant: A Report on the Planning, Design, Construction, Costs, and First Power Operations of the Initial Four-Unit Plant. Technical Report No. 36*). This information documents that the archaeological APE is within the site of the former chemical pond. Construction of the chemical pond resulted in the removal or mixing of the original soils and sediments. As a result, there does not appear to be any potential for the presence of intact archaeological sites that could be eligible for inclusion in the NRHP within the APE.

The architectural APE is limited to lands within TVA's GAF reservation and the Cumberland River. Our offices have agreed previously (letters dated June 8, 2012 and June 20, 2012) that GAF is ineligible for the NRHP as an architectural property due to its lack of unique features of architectural style or workmanship, a lack of association with any important historical event or series of events, and losses to its physical and historic integrity resulting from modern alterations. Therefore, TVA finds there are no NRHP-listed or –eligible aboveground properties in the architectural APE.

Based on this review of existing documents, TVA finds that there are no historic properties within the undertaking's APE.

Pursuant to 36 CFR Sections 800.4(d)(1) and 800.5(b), we are seeking your comments on TVA's finding of no effect for the 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.

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

Sincerely,

Clinton E. Jones
Manager
Biological and Cultural Compliance

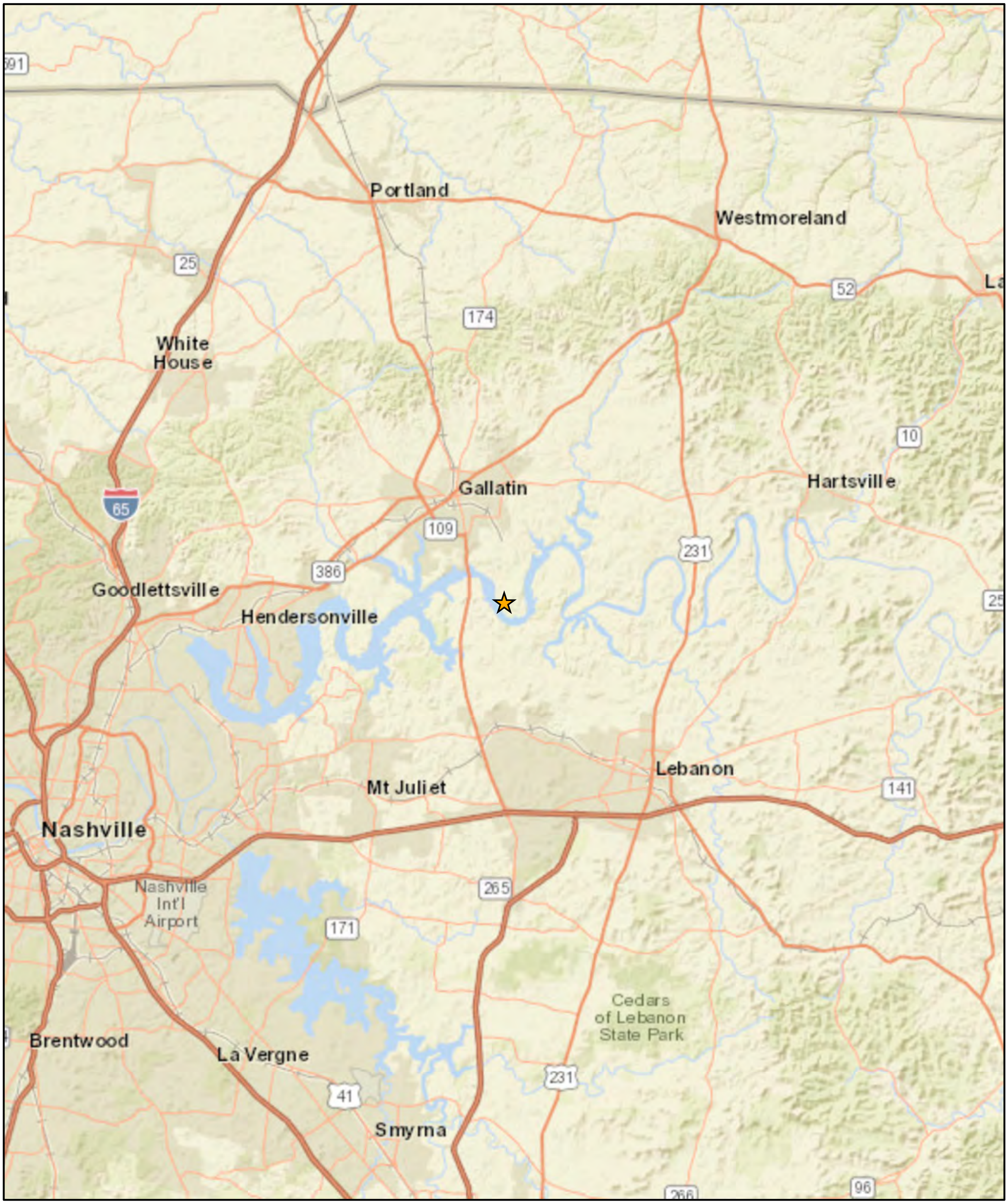
SCC:ABM
Enclosures
cc (Enclosures):

Ms. Jennifer Barnett
Tennessee Division of Archaeology
1216 Foster Avenue, Cole Bldg. #3
Nashville, Tennessee 37210

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

A. Michelle Cagley, KFP 1T-KST
Stephen C. Cole, WT 11D-K
Ashley R. Farless, BR 4A-C
Michaelyn S. Harle, WT 11D-K
Amy B. Henry, WT 11C-K
Susan R. Jacks, WT 11C-K
Bill G. Roddy, LP 5D-C
M. Susan Smelley, BR 4A-C
ECM, WT CA-K

Gallatin Bottom Ash Process Dewatering EA



Legend

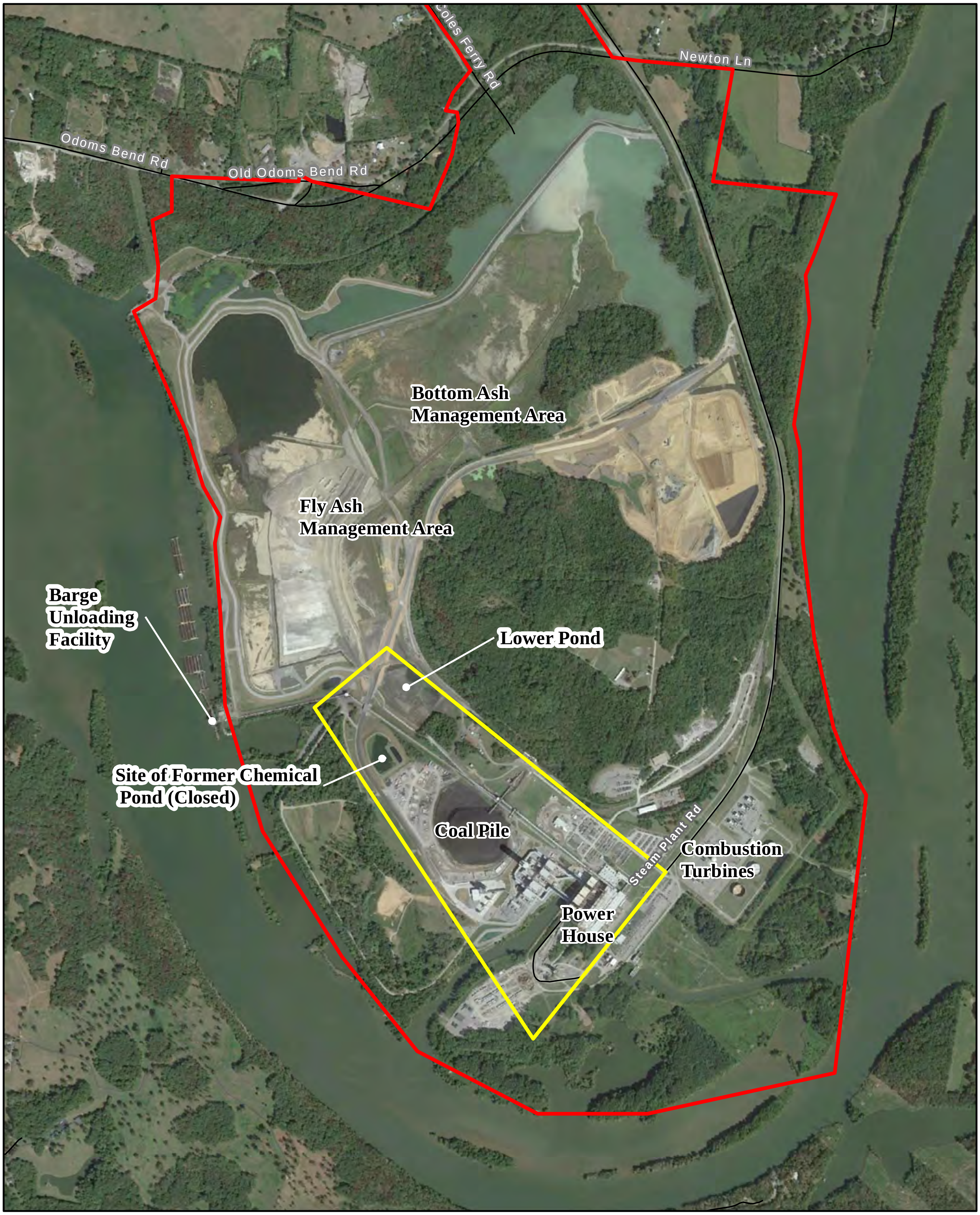
☆ Proposed Dewatering Facility

0 5 10 Miles

Figure 1.1-1. Project Vicinity Map

Date: 12/28/2016

Gallatin Bottom Ash Process Dewatering EA



Legend

GAF Reservation Boundary

GAF Project Boundary

0 0.25 0.5 0.75 1 Miles

Figure 1.1-2. Project Location Map

Date: 12/28/2016

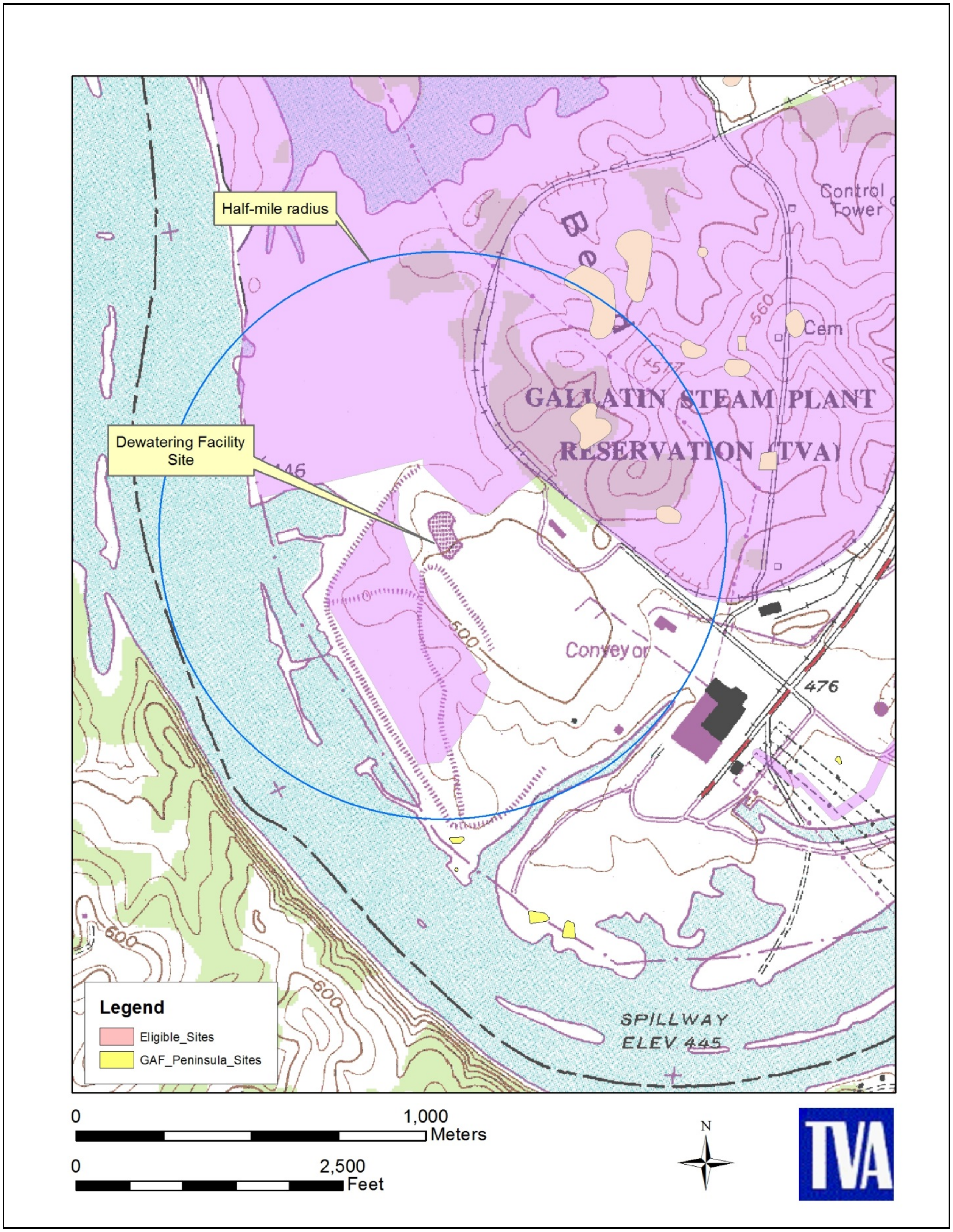
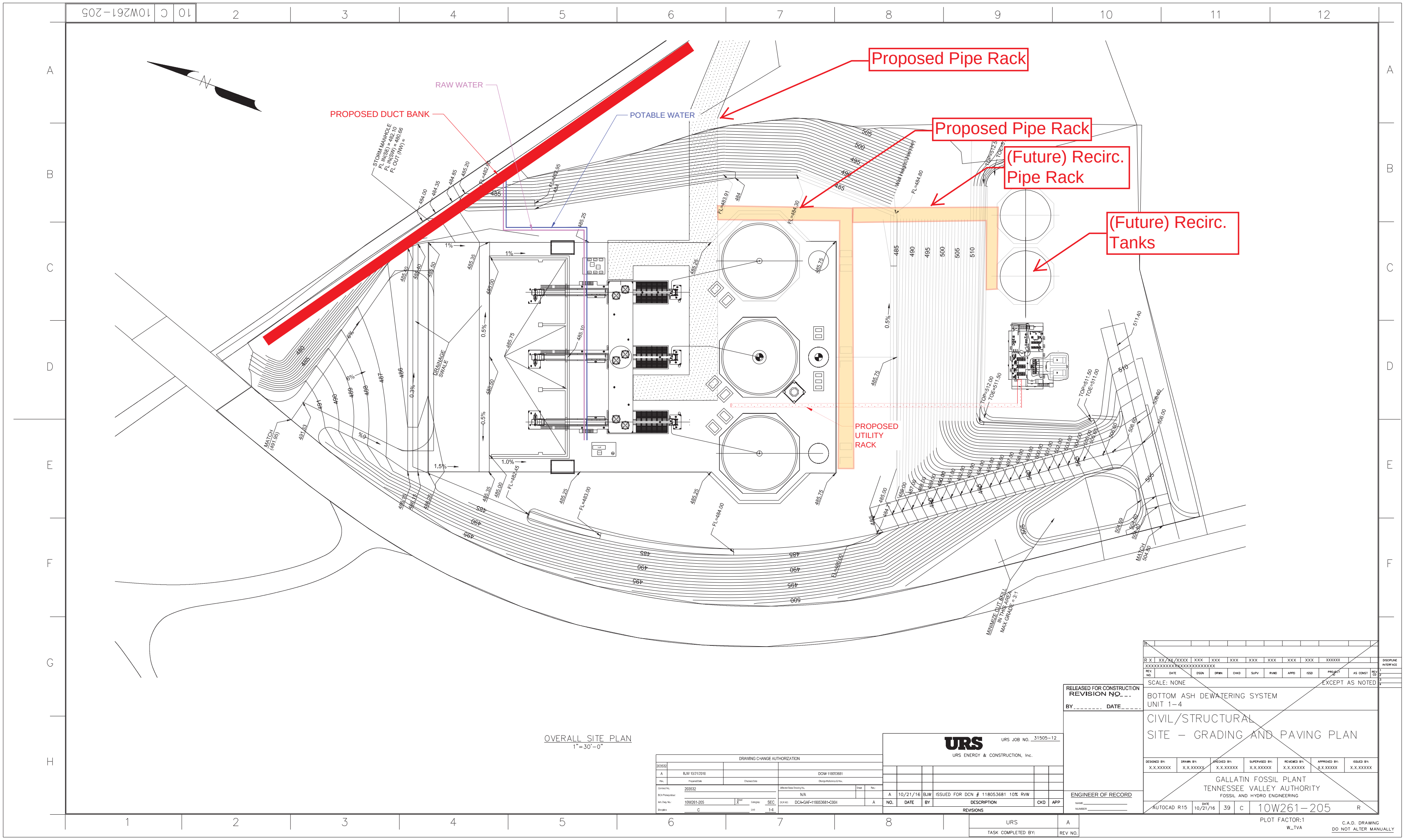


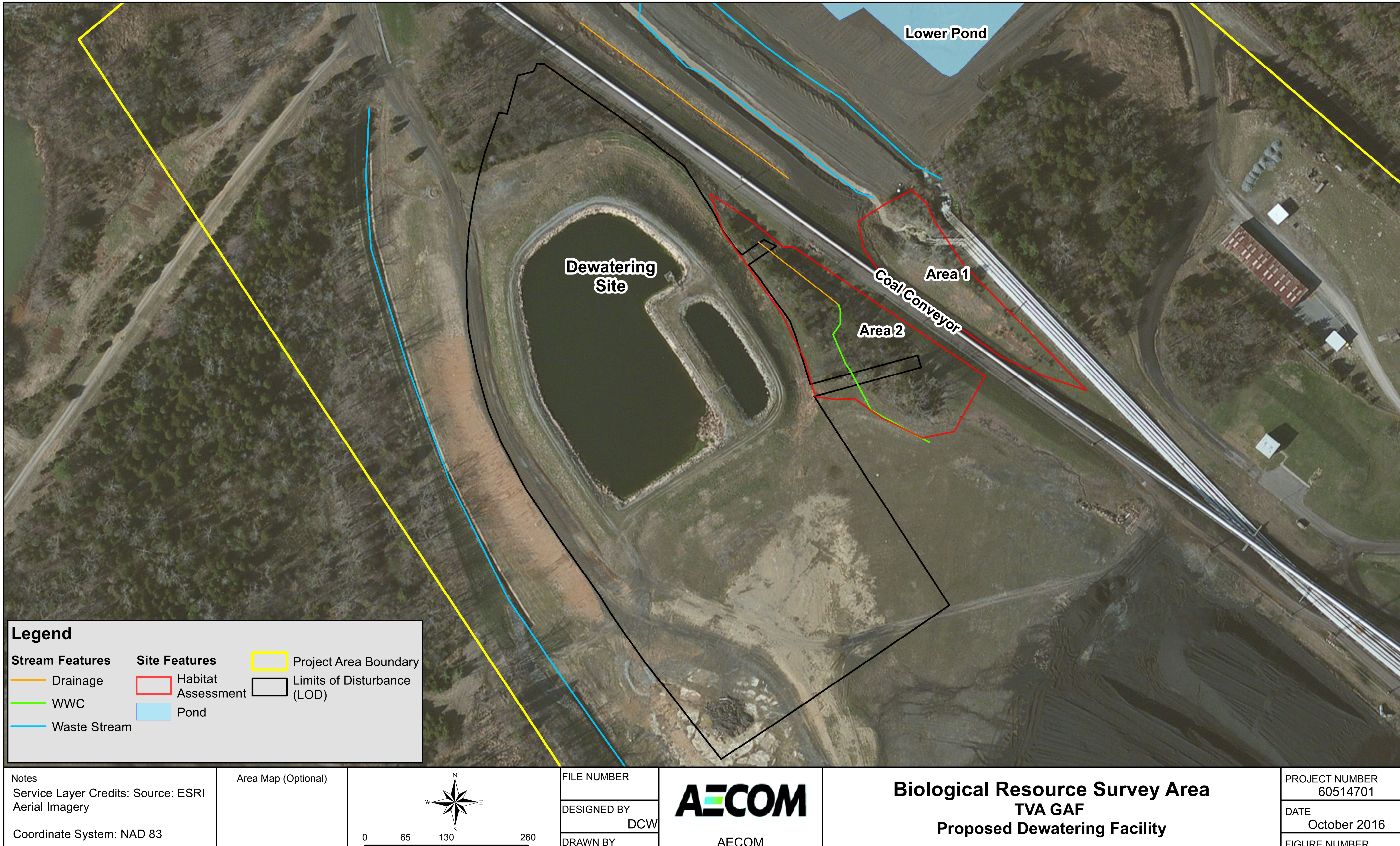
Figure 1. Location of proposed dewatering facility at Gallatin Fossil Plant with previously recorded archaeological sites and half-mile radius; Sumner County, TN.

Gallatin Bottom Ash Process Dewatering EA



Date: 12/29/2016

Figure 1.1-3. Site Layout Map



Notes
Service Layer Credits: Source: ESRI Aerial Imagery

Coordinate System: NAD 83

Area Map (Optional)

FILE NUMBER

DESIGNED BY DCW

DRAWN BY DCW

CHECKED BY JO

AECOM

AECOM
1000 Corporate Centre Dr.
Suite 250
Franklin, TN 37067

Biological Resource Survey Area
TVA GAF
Proposed Dewatering Facility

1499 Steam Plant Road
Gallatin, TN 37066

PROJECT NUMBER 60514701

DATE October 2016

FIGURE NUMBER **3.3-1**

G:\TVA\Gallatin\2016 Dewatering EA\Figure3.3-1_Biological.mxd

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

February 8, 2017

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

RE: TVA / Tennessee Valley Authority, Gallatin Fossil Plant, Bottom Ash Dewatering Project, Sumner County, TN

Dear Mr. Jones:

In response to your request, we have reviewed the documents you submitted regarding your proposed 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 applicant 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).

After considering the documentation submitted, we concur with your agency that there are no National Register of Historic Places listed or eligible properties affected by this undertaking. We have made this determination because either: no National Register listed or eligible Historic Properties exist within the undertaking's area of potential effects, the specific location, size, scope and/or nature of the undertaking and its area of potential effects precluded affects to Historic Properties, the undertaking will not alter any characteristics of an identified eligible or listed Historic Property that qualify the property for listing in the National Register, or it will not alter an eligible Historic Property's location, setting or use. We have no objections to your proceeding with your undertaking.

If your agency proposes any modifications in current project plans or discovers any archaeological remains during the ground disturbance or construction phase, 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. You may direct questions or comments to Jennifer M. Barnett (615) 741-1588, ext. 105. This office appreciates your cooperation.

Sincerely,

E. Patrick McIntyre, Jr.

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

EPM/jmb

June 15, 2020

Susan Jacks
General Manager
Environmental Compliance & Operations
Tennessee Valley Authority
400 West Summit Hill Drive, WT11 C
Knoxville, TN 37902

Ref: *Request for Review and Comment on Gallatin Fossil Plant Surface Impoundments Closure and Landfill Expansion Project - Coronavirus (COVID-19) Outbreak*
Sumner County, Tennessee
ACHP Project Number: 015517

Dear Ms. Jacks:

On May 27, 2020, the Advisory Council on Historic Preservation (ACHP) received the Tennessee Valley Authority's (TVA) notification concerning the referenced undertaking and request to review and comment on the agency's compliance with Section 106 of the National Historic Preservation Act and its implementing regulations, "Protection of Historic Properties" (36 CFR Part 800). This review was requested because the TVA has been unable to obtain responses to its determinations of eligibility and finding of effect for this undertaking from several federally recognized Indian tribes that have previously expressed interest in the area the undertaking is located. We understand from the TVA that the Indian tribes are unable to respond due to changes in their operating status because of the coronavirus (COVID-19) outbreak. While the TVA generally considers the Section 106 review process paused during the period in which consulting parties are unable to respond, it states that the referenced undertaking is a critical project that must move forward despite the extraordinary circumstances.

Consistent with the ACHP's guidance to federal agencies in dealing with coronavirus impacts (found at: https://www.achp.gov/digital-library-section-106-landing/section-106-and-coronavirus-impacts) the TVA has determined that the proposed undertaking requires the agency's decision prior to consulting parties resuming normal operations due to time sensitivity of the clean-up effort. The ACHP will like to reiterate the importance of a federal agency to be flexible with Section 106 deadlines when they have reason to believe the relevant consulting parties may be facing challenges in meeting such deadlines due to the pandemic. Further, the ACHP urges agencies to carefully consider whether schedules for Section 106 reviews can be adjusted to allow additional time for consulting parties to reopen, and to refer to the ACHP only those that cannot accommodate further delay and which are mission critical, time sensitive, and in the public interest. To aid the TVA in complying with Section 106 in this situation, the ACHP is providing this letter under its general commenting authority at 36 C.F.R. § 800.9(a).

Based on the materials provided and discussions with TVA staff, the ACHP understands that the proposed Gallatin Fossil Plant (GAF), Surface Impoundments Closure and Landfill Expansion Project will consist of various efforts to convert from wet to dry storage of coal combustion residuals in compliance with existing Environmental Protection Agency rules. The undertaking would include the

ADVISORY COUNCIL ON HISTORIC PRESERVATION
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Phone: 202-517-0200 • Fax: 202-517-6381 • achp@achp.gov • www.achp.gov

closure of existing impoundment ponds and the expansion of an existing landfill for disposal. The TVA has conducted identification efforts within the project's area of potential effects APE. Based on those efforts, the TVA has determined that the proposed undertaking would result in an adverse effect on five historic cemeteries that are eligible for inclusion in the NRHP.

On April 15, 2020, the TVA made a finding of "adverse effect" for this undertaking and provided its finding to the Tennessee State Historic Preservation Officer (SHPO), the Absentee Shawnee Tribe of Oklahoma, the Alabama-Coushatta Tribe of Texas, the Cherokee Nation, the Coushatta Tribe of Louisiana, the Eastern Band of Cherokee Indians, the Eastern Shawnee Tribe of Oklahoma, the Kialegee Tribal Town, the Muscogee (Creek) Nation, the Shawnee Tribe, the Thlopthlocco Tribal Town, and the Untied Keetoowah Band of Cherokee Indians in Oklahoma. The TVA received a response from the SHPO disagreeing with its eligibility determination for the five historic cemeteries noting that its identification efforts lacked sufficient information to justify its determination; however, noting that the proposed resolution measures might allow TVA "to fully assess the cemeteries' eligibility and subsequently the potential effects of the undertaking on historic properties", which would appear to indicate the need for phased agreement. The TVA also received responses from one of the eleven Indian tribes contacted (the Shawnee Tribe of Oklahoma) indicating no concerns regarding the proposed undertaking.

Recognizing that other tribal offices may be closed or working under modified conditions, TVA followed up its written letter to each Indian tribe with an email to inquire about their working status and ability to participate in a Section 106 review. TVA also called each tribal office to inquire about its operating status. TVA regularly hosts a monthly tribal consultation phone call to discuss Section 106 reviews submitted during that period. During the March and April 2020 calls, TVA sought input from the Indian tribes on how the COVID-19 outbreak was affecting tribal offices and their ability to participate in reviews. TVA did not receive any indication of concern with this particular undertaking; however, to attempt better coordination with tribal offices that are not able to fully participate in Section 106 reviews, TVA has provided all the Indian tribes it consults with TVA's prioritized projects list, as they requested, and will continue to provide this list to the Indian tribes as it is updated.

Based on our review of this information provided by the TVA, we believe it is carrying out a reasonable and good faith effort to consult with the SHPO and Indian tribes that may attach significance to historic properties located in the APE. Additionally, we have the following comments and recommendations as TVA moves forward:

- The ACHP recommends the TVA continue to consult with the TN SHPO to address their concerns regarding the eligibility of the five cemeteries;

- Following resolution of their eligibility, we recommend that the TVA, in response to this letter, indicate to all consulting parties how it intends to proceed with the Section 106 review for this undertaking, including as appropriate the resolution of adverse effects. As part of these efforts, the TVA should indicate that it will continue to coordinate and follow up with the Indian tribes as they resume normal operating procedures to seek any additional opportunities to consult as appropriate; and

- Further, should the TVA, through consultation with the SHPO, tribes, and other consulting parties, still reach a determination of adverse effect, it must invite the ACHP to participate in consultation at that time, pursuant to our regulations 36CFR800.6(a)(1). Should TVA reach this point we strongly encourage it to use our Electronic Section 106 Documentation Submittal System (e106) for such an invitation. Information on how to do so can be found on our site at: https://www.achp.gov/e106-email-form

If you or your staff have any questions or require further clarification, please contact Mr. Christopher Daniel, Program Analyst, at 202-517-0223 or via e-mail at cdaniel@achp.gov.

Sincerely,

Tom McCulloch PhD, RPA
Assistant Director
Federal Property Management Section
Office of Federal Agency Programs

TENNESSEE HISTORICAL COMMISSION
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
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June 18, 2020

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

RE: TVA / Tennessee Valley Authority, Fossil Plant (GAF) Surface Impoundments Closure and Landfill Expansion, Cemetery Relocations, Gallatin, Sumner County, TN

Dear Mr. Jones:

In response to your request and in accordance with Section 106 of the National Historic Preservation Act, we have reviewed the additional documents submitted regarding your proposed undertaking.

Considering available information, we concur that the project as currently proposed may adversely affect properties that are eligible for listing in the National Register of Historic Places. Implementation of the Memorandum of Agreement (MOA) will provide the data necessary to determine whether the previously identified historic cemeteries within the Area of Potential Effects are eligible for inclusion in the National Register. We have provided our comments on the MOA in the attached document.

We also find that the proposed Cemetery Research and Relocation plan will fulfill the corresponding stipulations included in the MOA. We request that the plan be edited to include reference to the official state archaeological site numbers for the cemeteries to be investigated.

Upon its completion, please submit a final draft MOA to our office for additional review and comment. You may direct questions and comments to Jennifer M. Barnett (615 687-4780, Jennifer.Barnett@tn.gov). We appreciate your cooperation.

Sincerely,

E. Patrick McIntyre, Jr. JB

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

EPM/jmb

Preserving America's Heritage

Advisory Council on Historic Preservation
Electronic Section 106 Documentation Submittal System (*e*106) Form
MS Word format

Send to: *e106@achp.gov*

I. Basic information

1. **Name of federal agency** (If multiple agencies, state them all and indicate whether one is the lead agency):

Tennessee Valley Authority (TVA)

2. **Name of undertaking/project** (Include project/permit/application number if applicable):

Gallatin Fossil Plant Surface Impoundments Closure and Landfill Expansion Project

3. **Location of undertaking** (Indicate city(s), county(s), state(s), land ownership, and whether it would occur on or affect historic properties located on tribal lands):

The project is located at TVA's Gallatin Fossil Plant (GAF), near the city of Gallatin in Sumner County, Tennessee. GAF is owned in fee by TVA. The project would not occur on or affect historic properties on tribal lands.

4. **Name and title of federal agency official and contact person for this undertaking**, including email address and phone number:

Federal agency official: Rebecca C. Tolene, Vice President, Environment and Federal Preservation Officer. rctolene@tva.gov. Desk (865) 632-4433
Contact person: Steve Cole, Archaeologist, Cultural Compliance. Sccole0@tva.gov, Desk: (865) 632-2551; cell (865) 824-8450

5. **Purpose of notification.** Indicate whether this documentation is to:

- notify the ACHP of a finding that an undertaking may adversely affect historic properties, and/or
- invite the ACHP to participate in a Section 106 consultation, and/or
- propose to develop a project Programmatic Agreement (project PA) for complex or multiple undertakings in accordance with 36 C.F.R. 800.14(b)(3).

II. Information on the Undertaking*

6. **Describe the undertaking and nature of federal involvement** (if multiple federal agencies are involved, specify involvement of each):
TVA is proposing a series of actions at Gallatin Fossil Plant (GAF) in Sumner County, Tennessee related to its ongoing effort to convert from wet to dry storage of coal combustion residuals, or CCR (fly ash, bottom ash, boiler slag, and flue gas desulfurization materials). These actions would support TVA's goals to eliminate all wet CCR storage by closing CCR surface impoundments across TVA's system and to comply with the US Environmental Protection Agency's (EPA's) CCR Rule issued on April 17, 2015 (80 Federal Register 21302). The proposed actions include: closure of the following surface impoundments: Ash Pond A, Ash Pond E, Middle Pond A, Bottom Ash Pond, and stilling ponds; construction of a new lateral expansion of the existing onsite landfill (North Rail Loop Landfill); location requirements analysis for a beneficial re-use processing facility; and disposal of CCR materials that cannot be reused/reprocessed in a beneficial re-use processing facility in the onsite landfill or an offsite landfill.

7. **Describe the Area of Potential Effects**:

The area of potential effects (APE) includes several areas where new ground disturbance could occur: the potential landfill expansion area and the footprints of the potential ash beneficiation facility, office complex, new ammonia sensor tower, and relocated communications tower. TVA does not consider closure of the ash ponds and stilling ponds to have potential for effects on archaeological sites. These impoundments are constructed landforms from which native soils and sediments were removed, mixed, and compacted during construction. However, the proposed landfill expansion and construction activities will result in ground disturbance and have potential to affect archaeological sites. The landfill expansion, ash beneficiation facility, office complex, and towers also have potential for visual effects on above-ground historic properties. TVA has determined the APE as the area including the project footprint and areas within a half-mile radius of the footprint from which the completed landfill expansion, beneficial re-use facility, office complex, ammonia sensor tower, and relocated communications tower would be visible.

Based on previous investigations and our knowledge of GAF and the surrounding area, the viewshed of the proposed landfill expansion would be limited to a portion of the GAF reservation, private land along Newton Lane, and the Cumberland River. Mature vegetation along the peripheries of TVA property within the half-mile radius limit potential views to the proposed facilities from areas outside TVA property that could contain extant above-ground properties.

8. Describe steps taken to identify historic properties:

TVA has completed systematic archaeological surveys of all parts of the proposed project footprints in connection with past undertakings, with the exception of developed areas that lack potential for intact pre-modern soils or sediments. The entire proposed ash beneficiation area was included in a previous survey

(Barrett and Holland 2012); two cemeteries were identified there. All of the area within which the office complex would be constructed was included in a 2005 phase I archaeological survey (Wampler and Karpynec 2005). Several previous surveys have covered the areas of the proposed NRL expansion, ammonia sensor tower, and communications tower. The 2010 and 2011 surveys together included nearly 100% of the area within this footprint, with other surveys covering the remainder. TVA does not plan to conduct additional archaeological surveys in connection with the current undertaking.

In 2005 TVA completed a survey of historic architectural properties within the viewshed of a proposed ash disposal site (Wampler and Karpynec 2005). The survey area encompassed much of the current half-mile radius, including a portion that extends outside TVA property, which consists of private residential properties along Newton Lane. (Satellite images show there are no structures along the portions of Odom's Bend Road and Steam Plant Road within the half-mile radius). TVA determined GAF to be ineligible The survey noted two previously-inventoried properties, SU-664 and SU-665, and found that both were outside the viewshed because thick stands of vegetation blocked views to the proposed ash disposal site. The survey did not identify any additional above-ground properties. Property SU-665 is within the current half-mile radius, but the thick stands of vegetation, which are still in place on TVA property, would block views to any of the proposed facilities that are part of the current undertaking. In 2012 TVA consulted with the SHPO regarding the eligibility of GAF as a historic architectural property; TVA and SHPO have agreed that GAF is ineligible due to alterations that have diminished the plant's historic integrity.

TVA recently carried out a desktop review to determine whether any additional properties, not noted in the 2005 survey, could be within the viewshed. The desktop review included historic topographic maps; current satellite imagery; and streetviews viewed in Google. The desktop review indicates there are four unrecorded properties that meet minimum age requirements for NRHP eligibility within the half-mile radius: a farmhouse with several outbuildings located at 943 Newton Lane, which was constructed before 1956; and three adjacent residential properties located at 880, 884, and 888 Newton Lane, which were constructed between 1956 and 1966. Thick stands of vegetation directly south of these properties would block all views of the proposed NRL expansion, ash beneficiation facility, office complex, and towers. TVA considers all four of these properties to be outside the project's viewshed and, therefore, outside of the APE. Based on the previous surveys and consultation and this desktop analysis, TVA finds there are no NRHP-listed or –eligible above-ground properties located in the APE. TVA consulted with the SHPO regarding this finding and SHPO did not object.

9. **Describe the historic property** (or properties) and any National Historic Landmarks within the APE (or attach documentation or provide specific link to this information):

When TVA acquired 1,950 acres of rural property for development of GAF in 1952-54, 11 family cemeteries were located on the land. TVA later relocated three of the cemeteries. The remaining eight cemeteries are extant; six of them have been assigned archaeological site numbers. Based on historical and genealogical research completed this year and ongoing, the 11 cemeteries were used from the first half of the nineteenth century until ca. 1950 by the local community, which was referred to as "Odom's Bend", and which had a mix of white and African American people at various socioeconomic levels but was predominantly African American and rural. TVA has proposed that the following five cemeteries are eligible for inclusion in the National Register under Criterion D due to their potential to add significance information on the poorly-known and poorly documented historic African American community at Odom's Bend: Unknown No. 4/40SU265, Franklin/40SU267, Bailey/40SU271, Hudson or Odoms Bend/40SU275, and Unnamed No. 10/40SU348). All five of these cemeteries are located within the project footprint. In response to TVA's consultation, SHPO stated that they do not agree that sufficient information is available to support a determination that these five cemeteries are eligible for the NRHP, but that they do consider that such information could come to light in the future and therefore the five cemeteries should be considered potentially eligible for inclusion in the NRHP under Criteria A, C, and/or D. TVA is working to provide additional information on the cemeteries from archival sources, which will help address their eligibility under Criterion A. Based on field observations TVA believes we have adequate documentation regarding the cemeteries' eligibility under Criterion C. To fully evaluate their eligibility under Criterion D, information on the content and preservation status of the graves is needed. Such information can only be obtained by exhuming the graves. Thus, TVA will only be able to fully evaluate the cemeteries' eligibility under D once the graves have been disinterred.

10. Describe the undertaking's effects on historic properties:

TVA's plans to expand the NRL landfill are definite and unlikely to change. The Unknown No. 4/40SU265, Franklin/40SU267, and Bailey/40SU271 cemeteries are all located in the footprint of the landfill expansion. As TVA respects Tennessee state law regarding burial grounds and also recognizes the sensitive nature of cemeteries, TVA plans to relocate all three cemeteries. TVA's plans for the ash beneficiation facility are tentative and will be decided at a later date, but if TVA finalizes those plans, the Bailey/40SU271, Hudson or Odoms Bend/40SU275, and Unnamed No. 10/40SU348 cemeteries would likely be within the footprint of construction and TVA would, for the same reasons, relocate those cemeteries prior to initiating the undertaking. TVA would prefer that the burials from all relocated cemeteries be reinterred within a single cemetery in or near GAF or the city of Gallatin.

11. Explain how this undertaking would adversely affect historic properties (include information on any conditions or future actions known to date to avoid, minimize, or mitigate adverse effects):

Should any of the affected cemeteries be determined eligible for the National Register (in consultation), TVA would consider the action of relocating the cemeteries to be an adverse effect because this action would diminish the cemeteries' integrity of setting, feeling, and association and could potentially result in the loss of significant information, unless steps were taken to preserve this information.

12. Provide copies or summaries of the views provided to date by any consulting parties, Indian tribes or Native Hawai'ian organizations, or the public, including any correspondence from the SHPO and/or THPO.

We have attached (or will send in a separate email immediately following this one):

- copies of all correspondence to date between TVA and the Tennessee SHPO and federally-recognized Indian tribes with an interest in this area, regarding TVA's Section 106 obligations for this undertaking.
- copies of emails that TVA received in response to notices that TVA published in local newspapers regarding its intent to relocate cemeteries, along with TVA's responses to those emails
- three comments concerning cultural resources at GAF or the cemeteries that TVA received in response to publication of the Environmental Impact Statement for this undertaking and in response to a public meeting held at Gallatin in January 2020.

* see *Instructions for Completing the ACHP* e*106 Form*

III. Optional Information

13. Please indicate the status of any consultation that has occurred to date. Are there any consulting parties involved other than the SHPO/THPO? Are there any outstanding or unresolved concerns or issues that the ACHP should know about in deciding whether to participate in consultation?

TVA has involved the public in the following ways:

- Publication of the draft EIS, which describes the undertaking, TVA's efforts to identify historic properties in the APE, and TVA's intention to relocate up to six cemeteries. TVA released the draft EIS for public review on December 27, 2019 and published a Notice of Availability for the draft EIS in the Federal Register on January 4, 2020. TVA held a public information session on January 16, 2020 at the Gallatin Civic Center in Gallatin to allow the public the opportunity to learn more about the project. Public comments were accepted between December 27, 2019 and February 18,2020, and at the public information session.

- Publication of notices in local newspapers. TVA published a notice concerning its intent to relocate the cemeteries in connection with the undertaking. The notice appeared in the *Gallatin News* for four weeks and the *Tennessean* for two weeks, starting in mid-January 2020. TVA staff responded to all emails received in response to the notices.

- TVA staff travelled to Gallatin and met with two local residents who had been identified during the historical research as having an interest in the cemeteries, Ms. Velma Brinkley and Mr. James Crutcher (a former resident of Odom's Bend), on December 19, 2020. TVA staff has also called several local residents with connections to the historic Odom's Bend community and spoken with them by telephone, and has also spoken with the Gallatin mayor. All of these conversations were held both to help the community understand the proposed cemetery relocations and to give community members the opportunity to provide information that could be used in TVA's efforts to plan appropriate mitigation.

On April 14 and 15, 2020 TVA initiated consultation with the Tennessee SHPO, Absentee Shawnee Tribe of Oklahoma, Alabama-Coushatta Tribe of Texas, Cherokee Nation, Coushatta Tribe of Louisiana, Eastern Band of Cherokee Indians, Eastern Shawnee Tribe of Oklahoma, Kialegee Tribal Town, Muscogee (Creek) Nation, Shawnee Tribe, Thlopthlocco Tribal Town, and the Untied Keetoowah Band of Cherokee Indians in Oklahoma regarding the undertaking. TVA received response from SHPO, the Cherokee Nation, and the Shawnee Tribe. The SHPO did not object to the undertaking or TVA's identification efforts, but does disagree with the eligibility status of the cemeteries, as mentioned above. Neither tribe that responded objected or identified resources of concern.

TVA consulted with the ACHP regarding the possibility of continuing consultation with SHPO despite that several of the tribal offices were closed or not fully functional due to Covid-19 safety measures and may be unable to respond. In your reply, you indicated agreement that TVA's is carrying out a reasonable and good-faith effort to consult with the SHPO and the tribes. You also requested that TVA continue to consult with the SHPO; indicate to all consulting parties (after determining the eligibility of the cemeteries) how TVA intends to proceed with the Section 106 review for this undertaking; and notify your office of any adverse effect finding.

TVA consulted with SHPO a second time on June 15, regarding a proposed Memorandum of Agreement for the resolution of the adverse project effects on the potentially-eligible historic cemeteries. SHPO responded on June 18, stating agreement with TVA's finding that the undertaking may adversely affect one or more NRHP-eligible cemeteries. SHPO also stated that implementation of the MOA will provide the data necessary to determine eligibility of the cemeteries, and that the proposed cemetery research and relocation plan will fulfil the corresponding stipulations in the MOA. SHPO also provided several comments on the draft MOA.

TVA has responded to SHPO's June 18 letter by making the suggested changes in the MOA and providing a revised MOA for further comment or signature.

14. Does your agency have a website or website link where the interested public can find out about this project and/or provide comments? Please provide relevant links:

https://www.tva.com/environment/environmental-stewardship/environmental-reviews/nepa-detail/Gallatin-Surface-Impoundment-Closure-and-Restoration-Project

15. Is this undertaking considered a "major" or "covered" project listed on the Federal Infrastructure Projects Permitting Dashboard or other federal interagency project tracking system? If so, please provide the link or reference number:

No.

The following are attached to this form (check all that apply):

_X_ Section 106 consultation correspondence

_X_ Maps, photographs, drawings, and/or plans

_X_ Additional historic property information

___ Other: Copy of a report describing the results of historic and genealogical research completed to date; and copy of the revised MOA that TVA recently provided to SHPO for further comment or signature.

TENNESSEE HISTORICAL COMMISSION
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July 10, 2020

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

RE: TVA / Tennessee Valley Authority, Fossil Plant (GAF) Surface Impoundments Closure and Landfill Expansion, Cemetery Relocations, Gallatin Sumner County, TN

Dear Mr. Jones:

At your request, our office has reviewed and signed the memorandum of agreement for the treatment of historic properties that may be adversely affected by the above-referenced undertaking. This review is a requirement of Section 106 of the National Historic Preservation Act for compliance by the participating federal agency or applicant for federal assistance. Procedures for implementing Section 106 of the Act are codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

Your continued cooperation is appreciated.

E. Patrick McIntyre, Jr. JB

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

EPM/jmb

Memorandum of Agreement (MOA)
Between TVA and the Tennessee SHPO

MEMORANDUM OF AGREEMENT
BETWEEN THE TENNESSEE VALLEY AUTHORITY
AND THE
TENNESSEE STATE HISTORIC PRESERVATION OFFICER
REGARDING THE
GALLATIN FOSSIL PLANT, SURFACE IMPOUNDMENTS CLOSURE AND LANDFILL EXPANSION PROJECT, PROPOSED CEMETERY RELOCATIONS, SUMNER COUNTY, TENNESSEE
(DRAFT)

WHEREAS, the Tennessee Valley Authority (TVA) is proposing a series of actions at Gallatin Fossil Plant (GAF) in Sumner County, Tennessee related to its ongoing effort to convert from wet storage to dry storage of coal combustion residuals, or CCR (fly ash, bottom ash, boiler slag, and flue gas desulfurization materials); and

WHEREAS, the proposed actions (jointly referred to as the “GAF Surface Impoundments and Landfill Expansion Project”) include: closure of surface impoundments (Ash Pond A, Ash Pond E, Middle Pond A, Bottom Ash Pond, and stilling ponds); construction of a new lateral expansion of the existing onsite landfill (North Rail Loop) (Figure 1); construction of a beneficial re-use processing facility with an associated office complex; construction of a new ammonia sensor tower; and relocating the existing communications tower; and

WHEREAS, TVA considers the GAF Surface Impoundments and Landfill Expansion Project meets the definition of “undertaking” at 36 CFR § 800.16(y); and,

WHEREAS, TVA, in consultation with the Tennessee State Historic Preservation Officer (TN SHPO), determined the area of potential effects (APE) as including the surface impoundments identified for closure, proposed landfill expansion area and the footprints of the proposed ash beneficiation facility, proposed office complex, relocated communications tower, and new ammonia sensor tower, as well as areas within a half-mile radius of the footprint from which the proposed facilities would be visible; and

WHEREAS, TVA has consulted with the TN SHPO and federally-recognized Indian tribes with an interest in the undertaking, and has reached consensus with these consulting parties that the proposed undertaking would result in no effects on archaeological sites listed in or eligible or potentially eligible for listing in the National Register of Historic Properties (NRHP), and no adverse effects on historic architectural resources listed in or eligible for listing in the NRHP that are located in the viewshed of the undertaking; and

WHEREAS, TVA has identified six historic cemeteries that are located within the undertaking’s footprint, including five (Unknown No. 4/40SU265, McCrary or McCrary/40SU266, Franklin/40SU267, Bailey/40SU271, and Hudson or Odoms Bend/40SU275) that are accessible and one (Unnamed No. 10/40SU348) that is inaccessible due to the presence of a spoils pile (composed of clean dirt) at its historic location; and

WHEREAS, these (and other) cemeteries are located on the land TVA acquired in the early 1950s for the Gallatin Steam Plant project, were used by the local community (a primarily African American community referred to as “Odom’s Bend”) from the middle nineteenth century until the time of TVA’s land acquisition, have not been in use for several decades, and are therefore considered abandoned; and

WHEREAS, TVA has conducted in-person meetings with six local citizens who have connections to or interest in the historic Odom’s Bend community, to inform them of the undertaking and proposed cemetery relocations, and has invited them to consult, and these citizens expressed either no objections to, or support for, TVA’s plans; and

WHEREAS, TVA has posted notifications of its cemetery relocation plans in local newspapers and invited comments from the public, has held a comment period and public meeting, and has received and responded to comments from the public regarding the cemetery relocation plans; and

WHEREAS, TVA has determined that implementation of the undertaking could result in damage to or destruction of three of the cemeteries ((Unknown No. 4/40SU265, McCrary or McCrary/40SU266, Franklin/40SU267) and possibly others of these cemeteries (“affected cemeteries”), unless the graves are relocated to an area outside the APE; and

WHEREAS, TVA intends to relocate all graves in the affected cemeteries to another location outside the APE and in the local area; and

WHEREAS, TVA respects Tennessee State Law, in particular, TCA Title 46, Chapter 4, “Termination of Use of Land as Cemetery” and Chapter 8, “Family Burial Grounds Protection”, and intends to complete the steps set forth in these laws for relocating cemeteries; and,

WHEREAS, TVA has conducted a remote sensing survey at, and archival research on, five of the affected cemeteries, ~~and archival research,~~ and estimates the total number of graves in the affected cemeteries at between 150 and 175; and

WHEREAS, TVA has reached a determination that five of the cemeteries (Unknown No. 4/40SU265, Franklin/40SU267, Bailey/40SU271, Hudson or Odoms Bend/40SU275, and Unnamed No. 10/40SU348) should be considered eligible for inclusion in the NRHP under Criterion D based on their potential to yield information important to the history of the historic African-American community in Gallatin, Sumner County, and the region; and

WHEREAS, TN SHPO does not agree that sufficient information is available to support a determination that these five cemeteries are eligible for the NRHP, but does consider that such information could come to light in the future and therefore the five cemeteries should be considered potentially eligible for inclusion in the NRHP; and,

WHEREAS, TVA and TN SHPO agree that the McCrary or McCreary cemetery (40 SU266) is ineligible for inclusion in the NRHP; and

WHEREAS, TVA and the TN SHPO agree that the undertaking has the potential to result in an adverse effect on the five eligible or potentially-eligible cemeteries (Unknown No. 4/40SU265, Franklin/40SU267, Bailey/40SU271, Hudson or Odoms Bend/40SU275, and Unnamed No. 10/40SU348); and, WHEREAS, TVA and the TN SHPO agree that the process for evaluating site eligibility outlined by the Tennessee Department of Environment and Conservation's *TN SHPO's Standards and Guidelines for Archaeological Resource Management Studies* (Testing/Evaluation) is not appropriate for historic cemeteries; and

WHEREAS, TVA has considered alternatives to avoid or minimize the undertaking's adverse effects on historic cemeteries located in the APE, including alternate project designs, but has been unable to identify reasonable and prudent alternatives that would avoid potential adverse effects on these cemeteries; and,

WHEREAS, pursuant to 36 CFR § 800.6(a)(1),TVA has notified the Advisory Council on Historic Preservation (Council) of the finding of adverse effect; and the Council has chosen [not to participate/ to participate] in the consultation; and,

NOW THEREFORE, TVA and the TN SHPO agree that the undertaking shall be implemented in accordance with the following stipulations to satisfy TVA's responsibilities under Section 106 of the National Historic Preservation Act (NHPA). The TVA Federal Preservation Officer, or the designee thereof, shall act for TVA in all matters concerning the administration of this agreement.

STIPULATIONS

I. Determination of APE and identification of affected cemeteries

As project plans are developed TVA will continue to evaluate the undertaking's APE. TVA will consider the nature, scope, and geographic extent of the undertaking's actions, and if appropriate, will re-determine the APE. The maximal extent of the APE as currently understood is depicted in Appendix A.

A. For each of the cemeteries located at GAF, TVA will make a final determination of whether the cemetery is located in the APE. TVA will consult with TN SHPO regarding a redetermination of the APE when consulting pursuant to Stipulation VII-A of this MOA.

B. Any cemetery that continues to be located in the APE and project footprint will be considered an "affected cemetery".

C. Any cemetery that is no longer within the APE will be considered an unaffected cemetery and will be excluded from consideration as TVA carries out the stipulations of this MOA.

II. Additional Archival Research

A. TVA will conduct additional archival research concerning the history of the Odom's Bend community and genealogies of the families known to be represented in the affected cemeteries. This research will include sources that TVA has not yet explored, such as:

1. obituaries dating to the period 1850-1952 in Sumner and surrounding counties;
2. oral history interviews with surviving members of the historic community; and
3. additional online genealogical and historic databases.

B. The purposes of this archival research shall be two-fold:

1. To identify, to the best of TVA's ability, any and all persons who have any right or easement or other right in, or incident or appurtenant to, any of the affected

cemeteries, including the surviving spouse, or children, or nearest relative or relatives by consanguinity of any one or more deceased persons whose remains are known to have been buried in any of the affected cemeteries ("interested persons"); and

2. To compile information relevant to the potential historic significance of the affected cemeteries. This information shall be used for two purposes:

   a. To prepare a history of the Odom's Bend community, including, to the extent practicable, specific genealogical information on the families represented in the cemeteries; and

   b. To evaluate the significance of the cemeteries under Criterion A (36 CFR Part 60.4 "Criteria for evaluation").

III. Community Engagement

A. TVA will engage local historians, members of the African-American community in Gallatin, and any others with knowledge of the historic Odom's Bend community, and will provide opportunities for their participation. TVA will engage the community in the following ways:

1. Conduct oral history interviews, to be recorded on video or audio;
2. schedule at least one community meeting to communicate TVA's cemetery relocation plans; and
3. arrange a reinterment ceremony at the relocation cemetery.

B. The purposes of the community engagement will be to:

1. Increase public awareness of TVA's plans to relocate the cemeteries and of the cemeteries' potential historic significance, and TVA's proposal to study the remains from NRHP-eligible cemeteries (outlined in Stipulation VIII); and to
2. compile additional information relevant to the history of Odom's Bend and to the potential significance of the cemeteries for the NRHP under Criterion A (36 CFR Part 60.4).

IV. Identification and design of relocation cemetery

A. TVA will consider any reasonable request from an interested person to rebury the remains of their relative who is interred in one of the affected cemeteries to a specific reburial location, when such request is for reburial in an appropriate repository (a private, commercial, or church cemetery) in the Gallatin, Tennessee area, or Sumner County, Tennessee, or one of the Tennessee counties adjoining Sumner County.

B. For graves for which no such requests are received prior to the relocation date, TVA will rebury the remains found within each grave in each of the affected cemeteries in a cemetery ("relocation cemetery") that TVA will identify in the Gallatin, Tennessee area. TVA will ensure that the relocation cemetery is a suitable burial ground and that TVA has all necessary rights, permits, and permissions to rebury the remains in the relocation cemetery.

C. TVA will ensure the relocation cemetery will preserve information about the original cemeteries and is accessible for viewing by members of the public.

V. Grave disinterments at affected cemeteries

A. Permits
TVA will obtain a state burial excavation permit for each of the affected cemeteries prior

to beginning work on grave relocations.

B. Funeral director
TVA will ensure that a state licensed funeral director is present during disinterments.

C. Grave markers

1. TVA will document and record grave markers associated with each grave to be relocated so that each marker is associated correctly with the corresponding grave.
2. Grave markers will be carefully removed, marked non-destructively with identifying information, and transported for storage in a safe location until field excavations are complete.

D. Grave recordation

1. TVA has previously numbered each identified grave in each of the affected cemeteries and has recorded their locations and spatial relations to other graves, through a civil survey and the preparation of plat maps showing each cemetery in detail. TVA has also conducted a remote sensing survey at five of the cemeteries to be relocated, and has identified definite graves, probable grave shafts, and possible grave shafts. TVA will use all of this information to identify graves for excavation. All probable and possible grave shafts identified by the remote sensing survey will be investigated and any that are verified to be grave shafts will be included in the disinterment operation.
2. TVA will ensure that a reliable tracking system is used during grave relocations so that each grave is accounted for, and so that the identification of each grave is maintained throughout the relocation process.

E. Surface treatments
Each grave will be carefully examined for surface treatments and artifacts that may have been left on the ground surface during the cemetery's period of use. Surface treatments will be documented, and grave-associated artifacts on the surface will be collected and transported to an archaeological laboratory.

F. Excavation

1. All excavation will be directed by an archaeologist who meets the Secretary of the Interior's (SOI) Professional Qualification Standards for Archeologist, and who has demonstrated a minimum of five years of experience performing archaeological fieldwork in the Southeastern US in the context of cultural resources management, and at least two years of experience working directly on projects involving the relocation of historic cemeteries.
2. All field technicians assisting in grave disinterments, reinterments, or laboratory processing will have earned a Bachelor's degree in Anthropology or Archaeology and will have demonstrated a minimum of one year of experience performing archaeological fieldwork in the Southeastern US in the context of cultural resources management.
3. After any surface treatments have been documented and artifacts collected, soil will be mechanically excavated using a smooth-bladed bucket, with shovel-skimming as needed, until the top of the grave is identified. Using shovels, the archaeologists will fully expose the entire grave.
4. Archaeologists will carefully disinter each grave by hand using shovels, place the

contents in a labelled container, and transport the remains to an archaeological laboratory, following the grave relocation scope of work that is included in this MOA as Appendix B.

G. Tabulation:
TVA will make an initial tabulation of the remains from each cemetery. This tabulation will include:

1. the number of graves disinterred
2. the quantity and types of artifacts recovered
3. relative abundance of each artifact type
4. general state of bone preservation

VI. Evaluation of eligibility and assessment of adverse effects

A. TVA will evaluate the potential NRHP-eligibility of each cemetery under Criteria A, C, and D, based on all information collected from archival sources, field studies, and the grave excavations (Stipulation V).

B. The Signatories will consider any cemetery that meets both of the following criteria to be eligible for inclusion in the NRHP under Criterion A of §60.4 (Criteria for evaluation):

1. Documentation that the cemetery is directly linked to any broad pattern of the Nation's history.
2. Evidence that specific types of documentation that are an essential part of historical research of communities, were not created for the decedents, or are not extant, or are very incomplete. Such types of documentation could include any of the following, as examples:
   a. Birth and death certificates
   b. Marriage certificates
   c. Property deeds
   d. Census records

C. TVA will evaluate the potential NRHP eligibility of each cemetery under Criterion D §60.4 (Criteria for evaluation) based on the degree to which it possesses the following characteristics.

1. Sufficient bone preservation to identify the age at death, sex, and racial identity of individuals.
2. Presence of an adequate sample of identifiable fabric remains.
3. Presence of an adequate sample of identifiable funerary objects.

D. TVA will also evaluate the potential NRHP eligibility of each cemetery under Criterion C §60.4 (Criteria for evaluation) based on whether the markers or monuments embody "the distinctive characteristics of a type, period, or method of construction, or … represent the work of a master, or … possess high artistic values, or … represent a significant and distinguishable entity whose components may lack individual distinction".

E. TVA will consider the removal of a cemetery that is eligible for inclusion in the NRHP to be an adverse effect on a historic property.

VII. Consultation

A. Upon completion of Stipulation VI, TVA will consult with TN SHPO regarding TVA's re-determination of APE, evaluations of eligibility, assessments of adverse effects, and a proposed resolution of adverse effects. TVA will provide an interim management summary that documents the findings and the removal of all associated graves. TVA will provide the TN SHPO 30 days to comment.

B. Concurrently with this consultation with TN SHPO, TVA will contact members of the local community and interested persons and provide information regarding TVA's evaluations of eligibility, assessments of adverse effects, plans for resolution of adverse effects, and plans for reinterring the graves. TVA will respond to any questions or comments that are provided to TVA within 30 days of TVA's contact regarding these evaluations, assessments, or plans. TVA will make a reasonable and good-faith effort to include such comments in planning for the cemetery relocations.

C. If any affected cemetery fails to meet any of the criteria outlined in Stipulation VI, then TVA will propose that the cemetery is ineligible for the NRHP and will propose prompt reburial of the graves from that cemetery.

D. If any affected cemetery meets the criteria outlined in Stipulation VI, then TVA will propose that the cemetery is eligible for the NRHP and TVA shall make a determination of adverse effect. TVA shall propose further to complete all of the steps in Stipulation VIII for the eligible cemetery.

VIII. Mitigation -- analysis of grave contents

TVA will complete the following steps for all of the affected cemeteries that TVA and TN SHPO agree, in consultation, are eligible for inclusion in the NRHP if eligible under Criterion D. These steps are described in detail in Appendix B. If any of the cemeteries are determined eligible under Criterion A or C, TVA will consult with the TN SHPO about appropriate mitigation.

A. TVA will examine and analyze artifacts, fabric remains, and coffin hardware associated with each grave and record those observations.

1. The analysis will be carried out by one or more persons meeting the Secretary of the Interior's Professional Qualification Standards for Archeology, and who has at least two years of experience in the analysis of historic artifacts in the region, and has demonstrated expertise in the area of African American historic archaeology.
2. The analysis will include detailed tabulations of types and examinations of the chronological, technological, and socio-economic data that can be obtained. The resulting data will be used to address research questions concerning social stratification within the historic Odom's Bend community and the broad patterns of history that qualify the cemetery for inclusion in the NRHP.

B. TVA will conduct osteological analysis of sufficiently preserved skeletal remains.

1. The analysis will be carried out by a person meeting the Secretary of the Interior's Professional Qualification Standards for Archeology, who has a graduate degree in anthropology or archaeology with a specialization in forensic archaeology or human osteology, or a graduate degree in forensic anthropology, and who has at least five years of experience in identifying human skeletal remains.
2. The analysis will include the identification of physical characteristics of the skeletal remains that could be used to elucidate the identity of the deceased.

3. This analysis will also focus on pathologies, injuries, congenital conditions, and tooth wear, for the purpose of addressing research questions relating to the health of the historic Odom's Bend community.

4. TVA will make a reasonable and good-faith effort to carry this analysis out in a manner that minimizes the amount of time for which the remains must be kept in a laboratory before reburial.

C. As soon as practicable after completing the analyses, and prior to drafting a report, TVA will begin reinterring the remains according to Stipulation IX.

D. The results of these analyses will be compiled and presented in a report following the completion of the cemetery relocation project.

IX. Reinterments

A. Upon completion of Stipulations VII and/or VIII (depending on the NRHP eligibility status of the cemetery), TVA will prepare the remains from each cemetery for reburial.

B. TVA will ensure that a licensed funeral director is present during the reinterments.

C. Grave markers will be placed at the same grave as the remains they were associated with in the original grave, and at the same location relative to the grave shaft.

D. TVA will place all remains and associated artifacts recovered from the original grave into each new grave shaft or vault.

E. The grave of any remains that TVA is able to associate with a specific individual based on the archival research and osteological analysis will be marked with a permanent marker indicating the name and (if known) birth and death dates of the deceased.

F. TVA may conduct the reinterments in phases.

X. Report

A. TVA will prepare a report upon completion of Stipulation IX.

B. The report will adhere to the guidelines of the Tennessee Department of Environment and Conservation's, *Tennessee SHPO Standards and Guidelines for Archaeological Resource Management Studies (October 2018)*.

C. The report will include detailed information regarding the research methods, grave relocations methods and techniques, and results of analysis. The report will also include a summary of the history of the Odom's Bend community, lists of individuals identified in each cemetery, graphic representations of the family relationships among individuals (to the extent that could be determined), and maps of each cemetery and the relocation cemetery(-ies). The report will also include an explanation of how each cemetery meets, or does not meet, criteria of eligibility for inclusion in the NRHP.

D. TVA will provide a draft copy of the report to TN SHPO.

E. TVA will provide a draft copy of the report to any member of the local community, and any interested person, upon written request.

F. A final report, which takes into consideration comments received on the draft report, will be provided to TN SHPO after the conclusion of the grave relocation project.

XI. Schedule

A. Additional archival research and oral history interviews

TVA will complete the additional archival research and oral history interviews prior to evaluating the significance of any of the affected cemeteries.

B. Community engagement – meetings and reinterment ceremony
TVA will hold one or more community meetings concurrent with the archival research. TVA will hold the reinterment ceremony within six months of completing the reinterments.

C. Identification and design of relocation cemetery
TVA may identify the relocation cemetery at any time prior to beginning reinterments.

D. Disinterments
TVA may begin disinterring graves at any time after obtaining the State burial removal permits for those graves, and any needed permissions, and completing any required environmental reviews, as appropriate.

E. Evaluation of eligibility and determination of effect
TVA will consult with TN SHPO regarding the eligibility of each cemetery upon completing the tabulation of remains from each cemetery per Stipulation V-G. TVA will take TN SHPO's views into consideration prior to conducting any mitigation steps (Stipulation VIII) or any reinterments (Stipulation IX).

F. TVA will contact members of the local community and interested persons and provide information regarding TVA's evaluations of eligibility, assessments of adverse effects, plans for resolution of adverse effects, and plans for reinterring the graves, per Stipulation VII-B, concurrently with completing consultation with TN SHPO regarding the eligibility of each cemetery for inclusion in the NRHP. TVA will make a reasonable effort to take the views of the community and interested persons into consideration, and will do so prior to conducting any analysis or reinterring any remains.

G. Mitigation of adverse effects
TVA will complete the mitigation steps for any cemetery that the Signatories agree is eligible for the NRHP after completing consultation and prior to beginning reinterments of any graves from that cemetery.

H. Reinterments

   1. TVA will begin reinterments for all cemeteries determined ineligible for inclusion in the NRHP within 30 days after completing Stipulation V-F (Excavation).

   2. TVA will begin reinterments of any cemetery determined eligible for inclusion in the NRHP within 30 days after completing Stipulation VIII (Mitigation -- analysis of grave contents).

I. Report
TVA shall provide the TN SHPO a copy of the draft report within 14 months of completing all reinterments. The TN SHPO shall be afforded 30 days to review and comment on the draft report.

J. Initiation of undertaking
TVA will not initiate physical work related to the GAF Surface Impoundments and Landfill Expansion Project within 30 feet of any of the six affected cemeteries any sooner than the completion of all disinterments of graves in that cemetery.

XII. Duration

This MOA will expire if its terms are not carried out within five (5) years from the date of its execution. Prior to such time, TVA may consult with the TN SHPO to reconsider the terms of the MOA and amend it in accordance with Stipulation XIII below.

XIII. Amendments

This MOA may be amended when such an amendment is agreed to in writing by the TN SHPO. The amendment will be effective on the date a copy signed by both Signatories is filed with the Council.

XIV. Termination

If any signatory to this MOA determines that the terms will not or cannot be carried out, that party shall immediately consult with the other party to attempt to develop an amendment in accordance with Stipulation XIII above. If within thirty (30) days (or another time period agreed to by both Signatories) an amendment cannot be reached, any signatory may terminate the MOA upon written notification to the other signatories.

Once the MOA is terminated, and prior to work continuing on the undertaking, TVA must either (a) execute an MOA pursuant to 36 CFR § 800.6 or (b) request, take into account, and respond to the comments provided by the Council under 36 CFR § 800.7.

If the MOA is terminated prior to TVA's completion of the undertaking and prior to TVA's completion of Stipulations I - IX, TVA shall continue to follow the procedures outlined under Subpart B of 36 CFR part 800 for the resolution of adverse effects on historic properties resulting from the Undertaking.

EXECUTION of this MOA by TVA and the TN SHPO, the submission of documentation and filing of this MOA with the Council, and implementation of its terms evidence that TVA has, in accordance with Section 106 of the National Historic Preservation Act, taken into account the effects of this undertaking on Historic Properties and afforded the Council an opportunity to comment. TVA will submit a copy of the executed MOA, along with the documentation that is specified in 36 CFR § 800.11(f), to the Council.

SIGNATORY

TENNESSEE VALLEY AUTHORITY

By: ____ Date: ___07-07-2020_____
Mr. Clinton E. Jones
Deputy Federal Preservation Officer

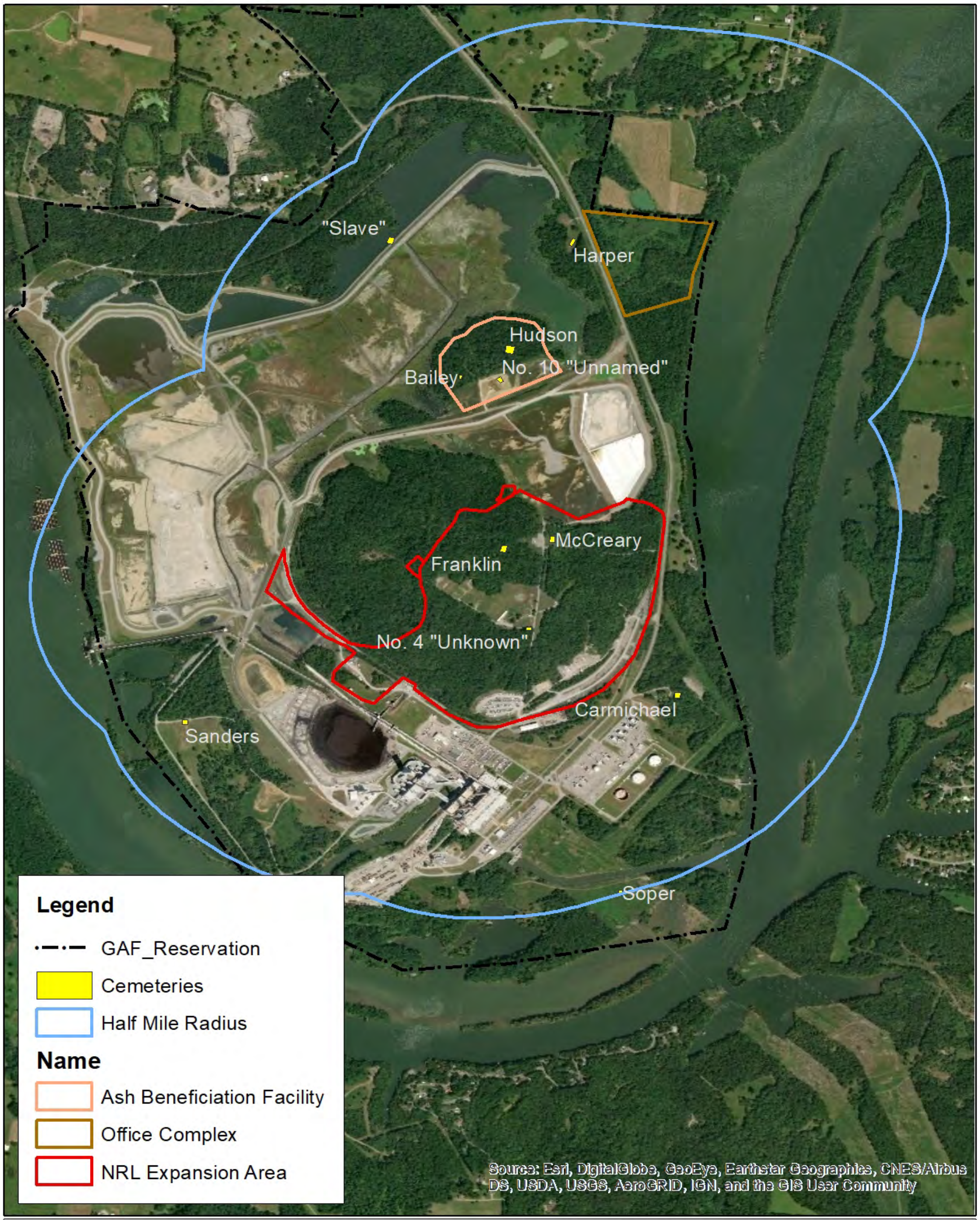
SIGNATORY

THE TENNESSEE STATE HISTORIC PRESERVATION OFFICER

By: E. Patrick McIntyre Jr. Date: July 9, 2020
Mr. E. Patrick McIntyre Jr.
Tennessee State Historic Preservation Officer

APPENDIX A

APE



TVA

Gallatin Fossil Plant

APPENDIX B

SCOPE OF WORK FOR MITIGATION

30 June 2020

Dr. Steve Cole
Archaeologist
Cultural Compliance
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902

Re: Scope of Work Proposal
Tennessee Valley Authority – Gallatin Fossil Plant, Cemetery Research and Relocations

Dear Dr. Cole:

In response to your request for quotes (RFQ) for cultural resource services on February 13, 2020, Wood Environment & Infrastructure Inc. (Wood) is pleased to provide this proposal to the Tennessee Valley Authority (TVA) for the above-referenced professional services. Our proposal is based on an understanding of the RFQ and Scope of Work (SOW) contained therein provided and our knowledge of the project area from extensive previous work. Wood also attended a pre-bid meeting with TVA Project Managers and other bidders regarding this complex project. The meeting provided an opportunity to obtain clarification of a number of issues relating to the project and also to visit each cemetery pertaining to the RFQ. Wood has extensive experience to date on these cemeteries, providing the remote sensing cemetery delineation and genealogical research in previous work for TVA. This proposal reflects a thorough understanding of TVA's project needs, provides a clear and concise approach, and a detailed cost estimate, for this complex and interesting project. We seek to employ an interdisciplinary approach incorporating archival, skeletal biology, and demographics.

Project overview

The TVA is considering several options to close various ash impoundments at the Gallatin Fossil Plant (GAF) in Sumner County, Tennessee as part of their Surface Impoundments Closure and Restoration Project. Eleven historic family cemeteries were recorded at GAF during TVA acquisition of the land in the 1950's, and three of the cemeteries (McCrary, Franklin, and Cemetery No. 4) will be affected by project plans. Three additional cemeteries (Hudson/Odom's Bend, Bailey, and Cemetery No. 10) may also be affected by plans (**Figure 1**).

This proposal details Wood's approach for assisting the TVA in preparation of removing and relocating these six cemeteries. As stated in the RFQ, the proposal is divided into two main Tasks: **Task A-cemetery research and grave relocations**; and **Task B-cemetery design**. Task A

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Lexington, KY 40509
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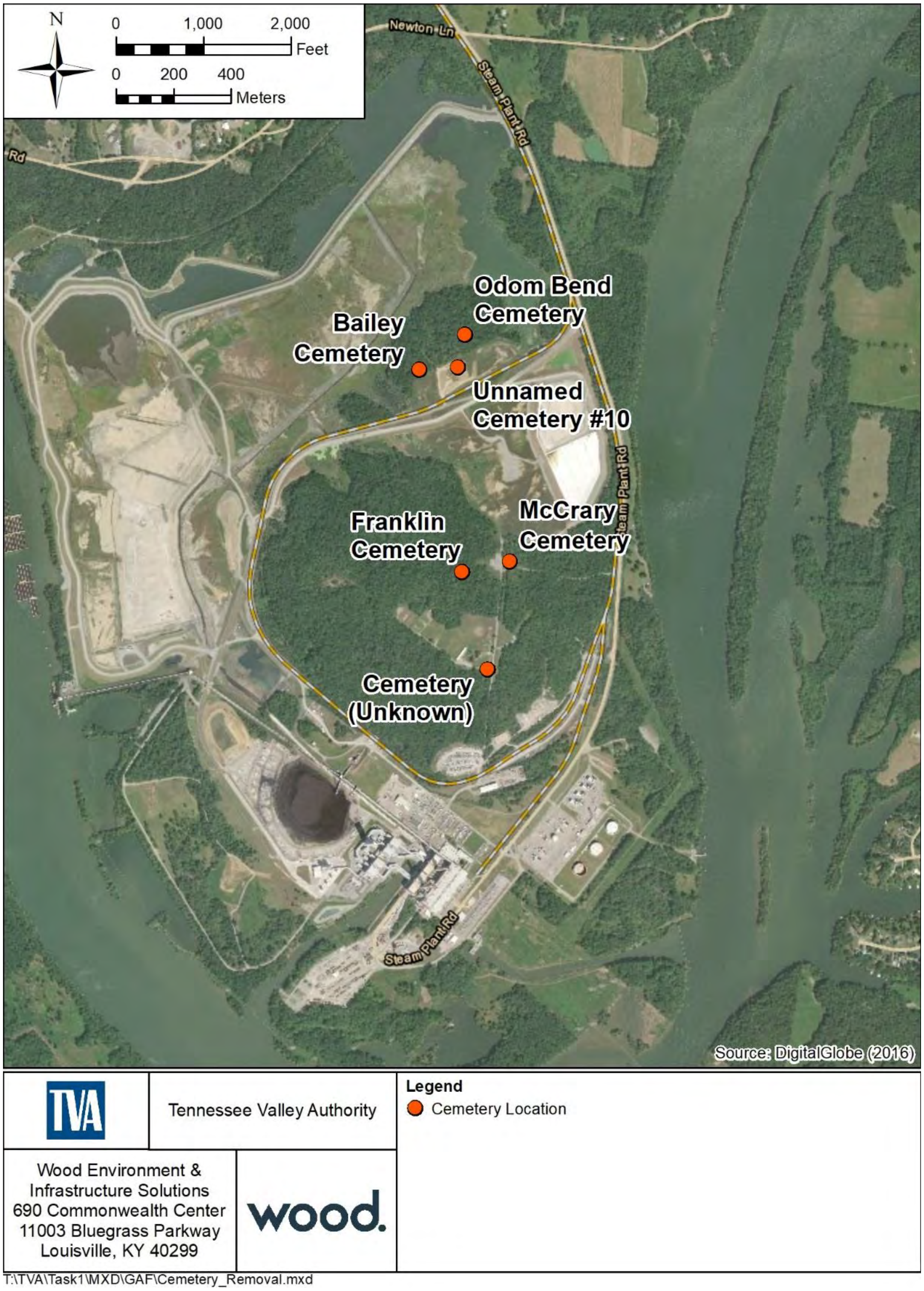

Figure 1. Overview of the six cemeteries slated for proposed removal and relocation at the Gallatin Fossil Plant.

involves the removal and relocation of the McCrary (40SU266), Franklin (40SU267), and Unknown No. 4 (40SU265) cemeteries that contain up to approximately 75 graves; and also the removal and relocation of the Hudson/Odom's Bend (40SU275), Bailey (40SU271), and Unnamed No. 10 (40SU348) cemeteries that contain up to an additional 100 graves. Wood is submitting two separate cost estimates for this proposal: one for Task A and one cost estimate for Task B. Wood has conducted several complex projects of this nature in the past. Therefore, in preparing this proposal we have drawn upon our extensive experience with archaeological grave disinterment and relocation.

In addition, we bring overwhelming expertise in skeletal biological analysis of remains for the purposes of: 1) identification of interred individuals in unmarked graves and 2) valued historical demographic data to provide historical insights into the health of the population and life stresses. We have also sought to apply innovative archaeological techniques that will facilitate accuracy and cost efficiency of the investigations, as well as unique approaches that will help enhance TVA's community engagement for the project greatly. Lastly, Wood has costed additional components of analysis for TVA's consideration that we feel will enhance the results of the project even further.

Previous investigations

Wood has conducted multiple cultural resources investigations at GAF over the past five years and therefore is very familiar with the archaeology at the plant as well as specific safety and logistical protocols. Wood conducted a large Phase I archaeological survey in 2016 for approximately 689 acres, which constituted all remaining acres at GAF that had not undergone such an investigation (Bradley et al. 2016). The project involved a detailed review and synthesis of all other cultural resources investigations that have occurred at the plant in preparation of our survey fieldwork. Thirteen newly identified archaeological sites were recorded and evaluated as a result of the work. These included four undetermined prehistoric lithic artifact open habitation sites, six historic homestead sites, one undetermined historic site, and two possible rock cairn sites. Further work or avoidance was recommended at two of the historic homestead sites and the two rock cairn sites. The work also included full documentation of the Harper Cemetery at GAF.

As stated in the RFQ, TVA has completed civil surveys (**Figure 2**), photography, geophysical (electrical resistivity) delineation surveys (**Figure 3**), and genealogical research for individuals buried at seven of the eleven known cemeteries at GAF. Wood conducted all this work in 2018 and 2019 for TVA (Martin and Wampler 2018; Cunningham and Martin 2020; Cunningham 2020) and therefore have integral knowledge of not only the overall history of the Odom Bend area, but also the history, physical surface manifestations, and burials at each of the six cemeteries that are under consideration for this proposal. Geophysical investigations were initially conducted at the McCrary (40SU266), Bailey (40SU271), and Hudson/Odom Bend (40SU275) cemeteries in 2018 and additional investigations were conducted in 2019. Geophysical investigations at the Franklin Cemetery (40SU267) and Unknown No. 4 (40SU265) were conducted in 2019. As the RFQ states, Unnamed No. 10 (40SU348) has not undergone investigation.

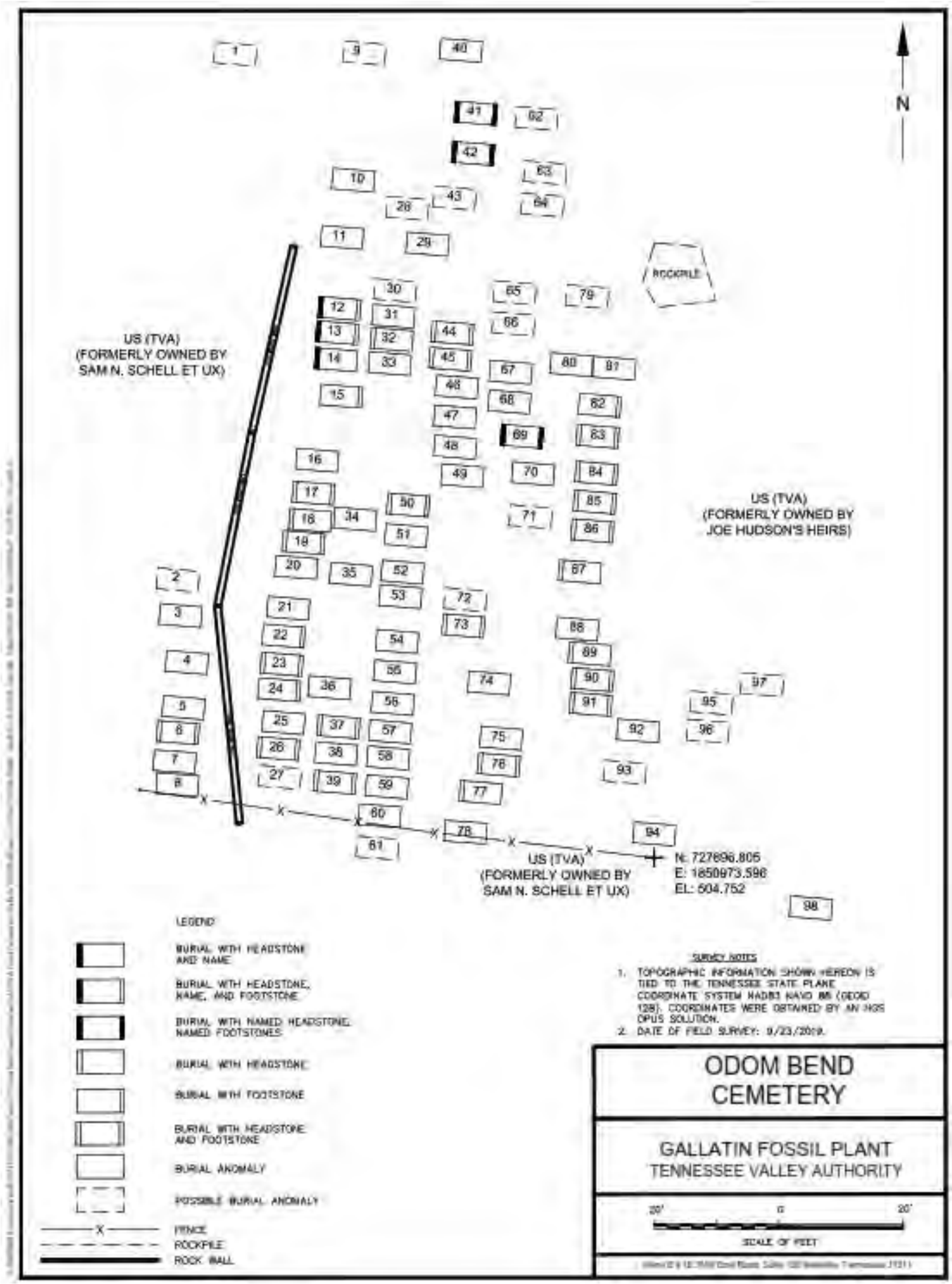

Figure 2. Civil survey map created by Wood for the Hudson/Odom Bend Cemetery (40SU275).

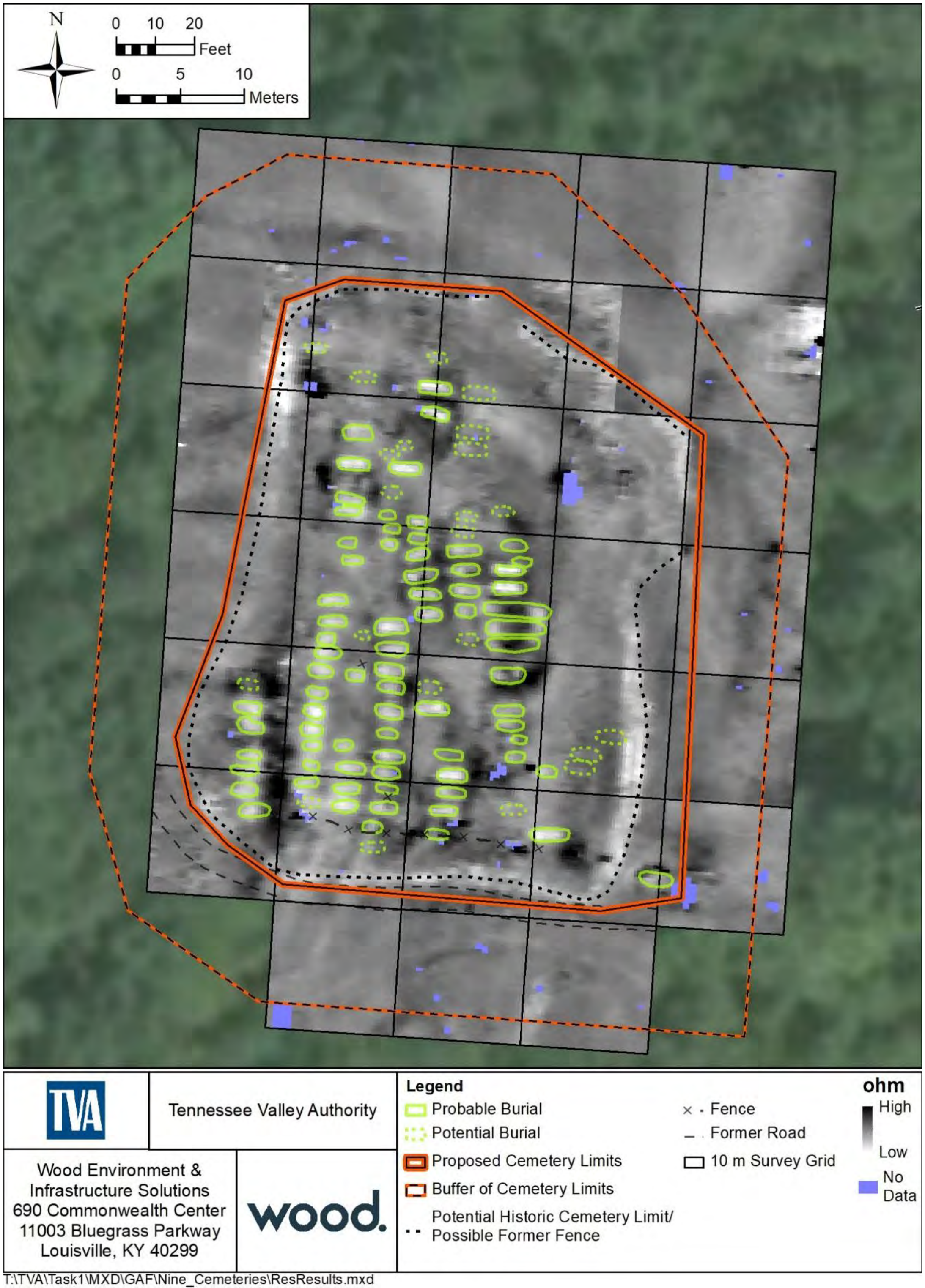

Figure 3. Overview of Wood's geophysical investigations at the Hudson/Odom Bend Cemetery (40SU275).

As a result of Wood's geophysical work for TVA, three potential burials were noted at the McCrary cemetery. Although a wide area was investigated, the data was severely affected by a communications tower located adjacent to the site. The TVA has subsequently found additional records that indicate that over 20 graves may be located at the McCrary cemetery. Wood determined that up to approximately 28 burials are located at the Franklin Cemetery. Geophysical investigations at Cemetery No. 4 showed that 17 potential burials are located there. The Hudson Odom Bend cemetery contains up to approximately 98 burials. Lastly, the Bailey cemetery consists of only one lone burial.

Wood's genealogical and archival research conducted for TVA for the six cemeteries under consideration for this proposal has been extensive, but not exhaustive. The research for the cemeteries and the Odom's Bend area has laid the groundwork for embarkment of several additional avenues to provide a more complete historical overview of the area that incorporates more in depth archival research about the individuals that lived and died there in the late nineteenth and early twentieth centuries. The baseline research has identified additional steps that can be taken to aid in identifying living descendants of those buried in the six cemeteries slated for proposed removal and relocation.

Project components

The RFQ details several project components or sub-tasks that are required to achieve TVA's goals of the project and include six that are essential for Task A:

1. Community engagement and coordination;
2. Genealogical research;
3. Research on potential relocation cemeteries;
4. Grave relocations;
5. Analysis;
6. Reporting; and
7. Weekly communications.

The RFQ states several items associated with each sub-task, which won't be reiterated here, however Wood's approach detailed below will address how these sub-tasks will be achieved in their entirety. In addition, Task B includes aspects regarding the design of the relocation cemetery. The RFQ states an assumption that the majority of graves will be relocated to one large cemetery, and Wood's approach for Task B will address this.

Project approach – Task A: Cemetery research and grave relocations / McCrary (40SU266), Franklin (40SU267), Unknown No. 4 (40SU265), Hudson/Odom's Bend (40SU275), Bailey (40SU271), and Unnamed No. 10 (40SU348)

Sub-task 1: Community engagement and coordination

To satisfy Activity 1 of Task A, the Wood historian will reacquaint himself with past interactions and communications with local historians and prominent community members to set up meetings and in-person oral history interviews. These contacts in the area have knowledge of, and interest in, the history of Odom's Bend and the cemeteries in question. Wood has met with several interested parties within the last year and forged friendly relationships that can be utilized to connect with other individuals. Additionally, Wood has been given contact information for individuals who have yet to be contacted regarding the GAF cemetery efforts. Wood believes these individuals would be interested to discuss the project and willing and able to help with the research. Wood's existing rapport with community contacts and leaders will contribute to beneficial discussions and oral histories, and color the historical context of the communities comprising each of the cemeteries.

Wood historians will use their extensive knowledge of the area, the project, and relevant community members to develop a more in-depth narrative of the Odom's Bend community. Oral histories can be utilized to uncover valuable information about the history of an area, the people who lived there, and everyday activities of the community. Furthermore, such interviews can provide a more personal insight on a community and its members that traditional historic contexts lack. By conducting a proper oral history interview, researchers can uncover individual as well as community memories that can be used to preserve the history, culture, and heritage of an area. Wood's oral history specialist has been extensively trained and has vast experience in conducting oral histories. This training and experience allow for a more comprehensive approach to conducting oral histories that result in a more complete interview.

Wood proposes that, in addition to conducting the oral histories, the interviews will be recorded, either on video or audio alone, to ensure that nothing is lost. Further preservation of the record will also be provided by indexing the interviews. Indexes will be provided in lieu of transcripts because the latter is overly time consuming, often taking four minutes to transcribe every one minute of the interview. Indexes provide a concise, time-stamped summary of the interview, which provides extensive aid to future researchers and takes a fraction of the time of a transcription. Further avenues for preservation and access to the interviews can also be explored such as utilizing the University of Kentucky's Oral History Data Synchronizer (OHMS). OHMS is a web-based system that provides a way to "inexpensively and efficiently enhance access to and discovery of oral history online" (UK Libraries OHMS). "The OHMS system provides users word-level search capability and a time-correlated transcript or index connecting the textual search term to the corresponding moment in the recorded interview online" (UK Libraries OHMS). This system is free to use and is utilized by over 100 archives. OHMS allows for the synced interviews to be incorporated to websites to enhance access to the interviews. Wood's oral history specialist has extensive experience with indexing and with OHMS and has used this technique and this system on several projects. This capability ensures generations can benefit from the oral histories created. Wood proposes to have personnel available for any and all community/public meetings related to the relocation of the cemeteries. Wood will utilize the connections that have already been made with individuals around Gallatin and the new connections to be made in the upcoming project to help coordinate and engage with the public. Many of the individuals who Wood has spoken to over the course of the past projects have shown a willingness to help and an appreciation for the work that is being done. Wood will build on this sentiment when addressing a wider Gallatin community. Lastly, Wood will compile all pertinent information gathered from the oral histories and other sources into a comprehensive, written deliverable. This report will include a more in-depth history of Odom's Bend and provide a detailed description of the oral history data.

Sub-task 2: Genealogical research

To satisfy Activity 2 of Task A, Wood will conduct additional genealogical research for the six cemeteries in question. Wood will use its extensive knowledge of the available resources to streamline the process by focusing on sources that have not yet been explored. Wood historians have conducted several research trips in Gallatin and Sumner County and, as a result, have significant knowledge and understanding of the resources available on site. This in-depth knowledge allows Wood to hit the ground running with the proposed project without repeating the research from previous efforts. Furthermore, Wood has forged valuable connections with Sumner County's two archivists and has maintained a relationship since the last field visit. This relationship will be utilized to maximize the efficiency of the research effort by communicating before mobilization and by focusing on new sources. Some of the sources that Wood identified in previous research efforts include: utilizing new online subscription services and resources to acquire information on potential next of kin, reaching out to sources and local churches to speak to elders familiar with the area, conduct oral history interviews with local contacts both new and old, and scour obituaries for Sumner County, adjacent counties, and any localities where individuals identified in the research might have relocated among others.

Wood proposes to distill all of this information into comprehensive reports outlining a more detailed history of the Odom's Bend community, a thorough genealogical narrative of all of the known individuals associated with the cemeteries in question, and a list of contact information for any potential next of kin of interred individuals. To the extent possible, a detailed family tree will be developed, in forms like those provided in the RFQ, for any individual whose remains are determined to be interred at any of the cemeteries. Given the extensive genealogical research that Wood has already conducted for GAF cemeteries, we have taken the extra step to develop examples of a family tree for Mr. Robert James Odom Sr., an individual known to be buried at the Hudson/Odom's Bend cemetery (40SU275) (**Figures 4 and 5**).

ROBERT JAMES ODOM SR.

MARY (SANDERS) ODOM, wife
WILLIAM ODOM, son
MARY (MAY) ODOM, daughter
    ROBERT H. TERRELL, son-in-law
    ROBERT G. TERRELL, grandson
MAND ODOM, daughter
ROBERT JAMES ODOM JR., son
    FLORIDA MAE (TIPTON) ODOM, daughter-in-law
    JAMES E. ODOM, grandson
        THELMA ODOM, granddaughter-in-law
            ANDRÉ ODOM, grandson
        ALLEN HORTON, grandson
        LISA HORTON, granddaughter-in-law
            TIERRA HORTON, granddaughter
            ANDREW HORTON, grandson
GEORGIA ODOM, daughter

Figure 4. Family Tree – Robert James Odom Sr.

To produce these family trees for Robert James Odom Sr., Wood historians consulted several previously studied and gathered material from earlier archival trips to Sumner County for the preceding GAF cemetery projects, such as the Sumner County African American Death Certificates Collection and a portion of the Sumner County African American Obsequies Collection. In addition to these sources, Wood utilized Ancestry.com, specifically the United States Census collection, as well as various newspapers, namely *The Tennessean* and *The Indianapolis Star*.

In addition to the report and summary of the research, Wood proposes to preserve the recorded interviews so that TVA can utilize them in the future. These research efforts will shine light on a community and a demographic that is often neglected from the historical record. The in-depth oral histories along with the detailed genealogical research will provide valuable insight into a rural southern, mostly African American, community while preserving the cultural memory and heritage of the place. Furthermore, because of America's Great Migration and the subsequent diaspora of many southern African Americans, the potential next of kin who will be identified will likely be informed of a personal family history that was previously unknown to them. This project has the opportunity to bring new life to an almost forgotten community, preserve the memory of a rural population, identify and honor individuals who are interred in the area, and to enlighten individuals on their ancestry, and Wood is suited to properly accomplish these tasks.

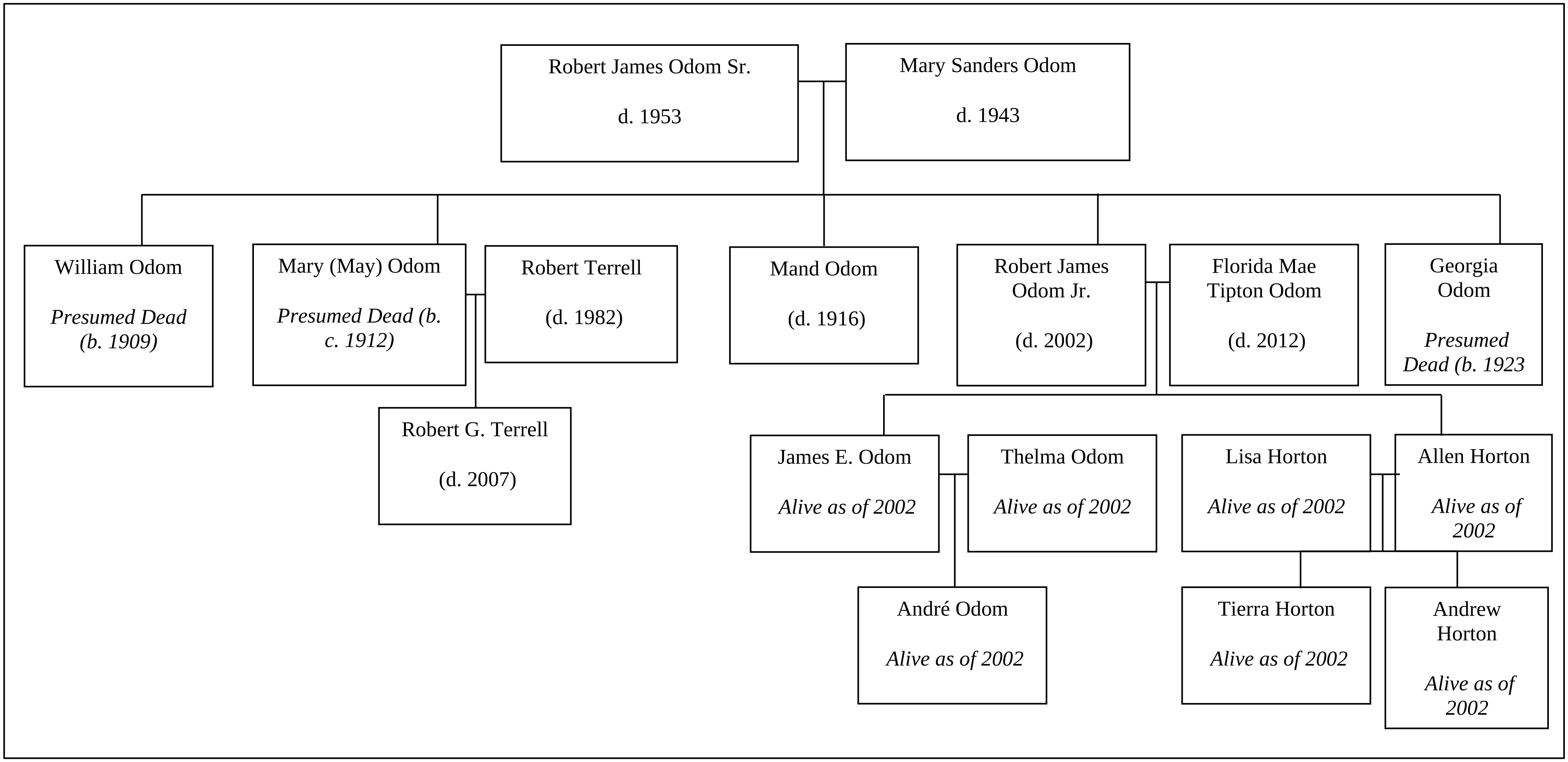

Figure 5. Family Tree – Robert James Odom Sr.

In an effort to demonstrate capabilities and to better understand the required process for the proposed project, Wood historians have completed a full genealogical study of one of the individuals interred at the Hudson/Odom’s Bend Cemetery (40SU275), Mr. Robert James Odom, Sr., in the format that TVA has requested:

Sub-task 3: Research on potential relocation cemeteries

Wood has already completed thorough research on commercial cemeteries in the Gallatin area for TVA (Cunningham 2019). This research identified five cemeteries that were most viable for relocation of those buried at GAF. These included the Gallatin City Cemetery, the LaGuardo Benevolent Cemetery, Sumner Memorial Gardens, Crestview Memorial Gardens, and Hendersonville Memorial Gardens & Funeral Home. As state in the Pre-Bid meeting TVA has already consulted regarding the possibility of relocating graves to the Gallatin City Cemetery and discovered that this is not viable. Wood will re-visit the research already completed for this task and determine if additional research is warranted. For example, given that one of the five cemeteries already identified is not viable we will search for more and provide a brief summary of this additional research. In concert with our extensive discussions with the local community as part of Sub-Task 1 above, we will engage with the community and seek to gain recommendations from the public in regard to specific requests for relocation cemeteries.

Sub-task 4: Grave relocations

For each of the cemeteries, a state burial excavation permit will be obtained by Wood E&I. If county permits are needed, they will be obtained. In addition, permits will be obtained facilitating transport of the human skeletal remains across state lines for osteological analysis in Louisville, Kentucky. A second permit also will be obtained for the transport of Ancient DNA samples to Harvard University in Cambridge, Massachusetts.

The disinterment will be done in a series of meticulous steps. This will first be accomplished utilizing the results of the prior geophysical studies done by Wood E&I showing probative burial features. If the burial feature has a headstone, footstone, or field stones marking the head and foot areas of the grave, each will be photographed, and written documentation of the stone made. Each stone will be measured in relation to the grave feature and will be incorporated into the GPS map of the cemetery. Once that is accomplished, these stones will be carefully removed, marked non-destructively as to previous location at the cemetery, and transported for storage in a safe location until field excavations are complete. Once the area where the remains will be re-interred is properly prepared for re-interment, if practical, these head and footstones will be replaced on the new burial features.

African-Americans, and variably, whites, sometimes performed decorative surface treatments of grave features after interment of the decedent. While headstones and footstones were incorporated into the grave treatments (although these could be made of wood, concrete, stone or simply field stones) additional maintenance and decoration of the grave plot would be maintained as long as friends and family members were in the area and the cemetery was being visited on a fairly regular basis. Grave features were frequently kept swept and bare ground was maintained, while in other cases, the grave was mounded with earth and decorative elements, including shells and sometimes other items, including toys, in the case of white interments. African-Americans sometimes would decorate with shells and bottles, and but also could place objects belonging to the deceased on the grave; examples include lamps, vases, bowls, light bulbs, razors, and mirrors. In many cases these latter items would be deliberately broken (Jordan 1982:13, 21, 22; Little 1998:237-264). Graves could also be outlined with a grave enclosure made of rocks, concrete, and later in time, ornamental concrete blocks or other types of low fencing. The graves would then be kept clean of grass. In other cases, a gravehouse, tomb-table, or a ledger slab would cover the grave feature. Some of the ledgers were stone or poured concrete (Jordan 1982:35-37, 95-97, 106; Little 1998:5, 41, 250-251, 265). If indications of any of these grave treatments are encountered, the sod will be carefully removed, the treatments swept clean of soil and photo documented, and the items will be recovered for re-interment with the decedents.

Since historic cemetery grave shafts vary widely in depths of interment, even within the same cemetery, the ground cover and soil overburden (if no surface grave treatments are initially found and documented) will be stripped down to a depth of 40 cmbs. will be mechanically stripped. This will be accomplished with slow and methodical scraping with a smooth bucket backhoe in conjunction with shovel skimming to identify the grave shaft locations. Once all grave shaft locations are identified, these will be mapped and marked with gutter-spike nails and flagging tape on all four corners. Special markers, to aid in photogrammetry documentation, will also be used in association with the grave features.

Grave Removal and Data Capture

Each grave shaft will be hand excavated carefully and methodically by experienced archaeologists and biological anthropologists with the utmost respect for the decedents. Hand troweling will begin when the outline of the vault (if present) and the coffin/casket outline is visible. Unique cultural mortuary practices in grave treatments will be noted and documented, in the course of excavating the grave features. As unique grave treatments are found, these will also be noted, and documented with regard to the associated decedents ethnicity and religious affiliation where possible.

Photogrammetry techniques will be employed to document the grave feature, the coffin/vault outline and the decedent in the grave at each stage of the feature excavation. This is a fast and efficient way to capture a full three-dimensional (3-D) representation of each burial that traditional photography or drawings are unable to replicate. This technique connects a series of high-resolution overlapping photos taken from multiple angles to create a 3-D model of the burial, associated artifacts, coffin and vault remnants. The 3-D model can then be used to collect metric data from skeletal remains and to identify any disease processes evident in the bone as well as peri or postmortem trauma. Additionally, this model can be used to record, analyze, and compare mortuary practices. The 3D imaging production with be accomplished with Autodesk software, the industry standard for engineering and design. ReCap is Autodesk's latest piece of signature software for handling 3D reality capture photogrammetry from a series of 2D photographs. Wood, as a premier partner with Autodesk, has full licensure to create detailed and fully rendered 3D-scaled digital replication of field observations. Recording the burials using photogrammetry is especially important in instances of poor bone preservation which could prohibit post-excavation osteological measurements or analysis.

The steps required to implement photogrammetry recordation would be comparable to the methods described by Alex Badillo in his article *Bethel Cemetery Project: Procedures and protocols for structure from motion photogrammetry on historic burials* (2018). These steps begin by first positioning a set of specific scale bars around the burial. These scales have a series of targets that later become registered within the photographs and are given real-world coordinates based on data from the total station. Next, a series of approximately 150 photographs are taken along all four sides of the burial at both standing and kneeling heights with additional photos taken for further clarity. The photos are taken so that there is an overlap of the individual images by roughly 70%. Photos will be downloaded immediately onto a field computer to be processed and aligned in-field before burial removal continues. The positioning of multiple scale bars as well as the overlapping photos provides multiple points for the software to stitch together all of the images. During image processing, paperwork is completed that records the field conditions, methods, and any relevant aspects of the photogrammetry process. Upon completion of photo alignment, the 3-D model and paperwork are cross-checked to ensure successful documentation and burial removal can then continue.

Once the remains are located in the feature, excavations using cane or wooden tools may be used to avoid damaging any skeletal material and grave goods found in the features. Traditional photographs, not for public viewing, may be made of the grave feature at excavation to aid in the laboratory analysis of the skeletal material. If the TVA requests, these photographs will be destroyed after the report is finalized and approved by the TVA. In no event will these photos be included in the final report, if they show human remains unless approved by TVA. A detailed grave feature form will be filled out for each interment and included with the skeletal material and coffin hardware/grave goods for use by the laboratory staff. At the discretion of TVA staff, small, specialized wood samples of the vault (if present, and of the level of preservation needed), and the coffin/casket will be taken for speciation identification and to help determine if these elements of the grave feature were harvested and constructed locally or were purchased from commercial vault and coffin/casket manufacturers. A state forestry laboratory in Kentucky or Tennessee will be requested to look at a sample of the better-preserved wood used in the construction of these containers. This will help determine where wood was harvested in the construction of the containers and types of species favored if locally constructed. In addition, the ratio of commercial vs. locally built containers will offer hints about the socio-economic factors surrounding mortuary practices in this area. Approximate dating of interment of unmarked graves will be facilitated using wood type and coffin morphology, along with the coffin hardware. Archaeologists will also record and photograph any treatments found on the coffins and vaults, including evidence of painted burial containers, viewing windows, maker's marks, names of companies or decedents painted on the wood. All of these have been documented in cemeteries when careful excavation techniques have been utilized.

The bones and teeth will be separately packaged by individual decedent in paper sacks labeled with body element part(s), keyed to right and left sides, and placed in cardboard bank file boxes to transport to the lab. Limited *In situ* analysis, will be conducted when necessary to measure long bones and other notable areas on the skeleton. This will be done in order to obtain data that may be lost when remains are excavated and placed in the bags for lab transport. This laboratory analysis provides backup on the photogrammetry data taken in the field. Coffin hardware and preserved grave goods will be packaged separately by grave feature and transported to the Wood E&I laboratories at Louisville, Kentucky where they will be photo documented and analyzed.

Once the burial feature is cleaned and all materials removed, probing with a hollow core soil probe approximately 2.5 cm in diameter will be conducted to verify if this is the only interment in each grave shaft. In some cases, in historic cemeteries, grave shafts were re-opened and utilized again to inter a decedent on top of a prior decedent.

Sub-task 5: Analysis

Osteological Analysis

There are two primary reasons for the conduct of the osteological analysis. The first is that the osteology can be central in determining the identity of an individual in an unmarked grave. This information provides a great public benefit. The second reason to conduct the analysis is to provide scientific information relative to the health of the population. Social factors of health as related to ethnicity, status, work occupations for example are all visible in the metrics and pathologies visible on the skeleton. Incorporating the skeletal biological information into the historic context of the communities provides a clear vision of the life stresses that affected the communities.

Once the skeletal remains are received in the Wood E&I laboratory in Louisville, analysis of the osteological material will be done. Depending on preservation of material and utilization of the photogrammetry data collected in the field, each decedent will have critical data collected in the field reviewed as well as supporting data collected using protocols and laboratory forms for skeletal measurements outlined in Buikstra and Ubelaker (1994) in the lab setting. Standard references will be utilized for elucidating any anomalies, trauma, or pathologies. Age at death, sex and ethnicity will be delineated when possible, as dictated by skeletal preservation. The analysis will be done by an experienced biological anthropologist with the assistance of laboratory staff. The biological anthropologist has years of experience in excavating prehistoric and historic interments. She has analyzed prehistoric, historic and forensic human remains, many from the Southeast, for four decades. In addition, she is an RPA member, cross trained in both human biology and archaeology.

The decedents will be analyzed in a separate room from normal laboratory operations and the public will not be permitted in this room. Standard morphometric measurements will be made, and supporting data collected in photogrammetry, as dictated by preservation. Appropriate regression equations will be utilized at the population level for stature and in some cases for sex and ethnic determination. Examples of these measurements include robusticity measurements of the long bones, and certain bones of the extremities such as the calcaneus, sacrum, pelvic elements, humeral and femoral heads, femoral neck and epicondylar/bicondylar measurements, mandibular and palatal measurements, measurements for determination of certain cranial indices, nasal height and breadth, the basicranial area, including the foramen magnum. At the discretion of the analyst, measurements of other elements may be taken for specific individuals. Additional measurements will be taken for the application of advanced statistical analysis to aid in determination of ethnicity. Dr. Steve Ousley, PhD University of Tennessee in Forensic Anthropology, who has decades of experience performing statistical analysis for ethnic determination using craniometrics, will be consulted for this portion of the analysis.

In cases of poorer preservation, measurements of the dentition will be utilized in an attempt to determine sex, however, sexual dimorphism is very population specific and the data tends to be less precise than utilization of the cranium, pelvic girdle and certain long bone measurements. The teeth are of most value and tend to be first molars and second molars, central incisors and canines. This is a "last resort" analysis and will be conducted only if it is determined the outcome will have reasonable value, and there is adequate preservation of dentition. Data such as these are frequently applied in cases of forensic identification but are sometimes applied in population studies.

Where skeletal material is poorly preserved, the photogrammetric photos taken at excavation will be used to augment skeletal metrics which were captured in the photos at time of excavation. The decedents will be analyzed to determine ethnic background, and to determine age at death. Dental and skeletal attributes and anomalies will be noted. Examination of traits for familial relationships, as expressed phenotypically, will be undertaken. Pathological evidence for stressors including trauma, illness, nutrition, and occupational, will also be noted. An "osteobiography" for each decedent will be generated as a component of the laboratory report. This will detail life events impacting the dental and skeletal remains to give a portrait of the decedent's life experiences, including hints of occupational stressors. Instances of bilateral asymmetry will also be documented. Photographs will be taken of pathologies and anomalies, but these photos will not be utilized in the report, unless the TVA requests these be shown. One option is to present the detailed osteological findings in a dedicated appendix and not released for the public version. For verified biological anthropologists who do osteological analysis, release of the report with the attached osteological appendix could be done. A major initiative for the osteological analysis will be to offer clues to the possible identity of those decedents who were recovered from unmarked graves.

In the body of the report, a summary of the osteological findings will be presented, and discussed in more lay terms. Comparative references for regional and temporal cemetery populations for African-American and white populations will be presented in the discussion section of the main report, comparing and contrasting the findings of these TVA Cemeteries with comparable cemeteries. A few examples of the cemetery reports for the African-American decedents will be: Buchner et al. 1999; Peter et al. 2000; Rose 1985; Shogren et al. 1989; Thompson 2009. The African-American decedents are from Williamson County, Tennessee, Dallas, Texas, Arkansas, and two populations from northern Alabama. The Freedmen's Cemetery (Peter et al. 2000:229) had a total of 1,157 recovered decedents. If the TVA elects to relocate cemeteries with white or predominately white decedents, there are numerous regionally and temporally comparable cemetery reports available which will be utilized for comparative data.

At the conclusion of the laboratory analysis, the decedents' remains will be packaged for re-interment, and transported back to Tennessee. A practice proven popular with cemetery re-interments of this type is to re-inter the decedents in standardized wooden boxes, built to accommodate the length of an adult male femur and high enough to accommodate the skeletal material, including an intact skull, the preserved coffin hardware, and any personal effects which were buried with the decedents. This would include, for example, Prosser, wooden, shell and bone buttons, suspender clasps, watch chains, toys, medicine bottles, coins, jewelry, belt buckles, and hair combs.

Archaeological Analysis
Artifacts recovered in the field will be packaged in the same banker's boxes as the decedents' remains, by burial feature, and transported to the Wood E&I laboratory in Louisville, Kentucky. Artifacts will be analyzed by burial feature, to add to the overall osteobiography of each decedent. A major focus of the archaeological analysis is to characterize social mores and cultural practices of the time periods. In some religious and social groups, use of ornamentation in the form of jewelry, and other personal effects was much frowned upon. Social standards such as these tend to become relaxed over time, and in reconstructing the past culture of the local community, subtle indications of these mores become important. For example, African-Americans joined the Southern Methodist Church in the late eighteenth and well into the nineteenth century, many while still slaves (Lyerly 1995: 104). The church was considerably different than it is today, and adherence to strict tenants were expected, one of which was not wearing "costly apparel," including ruffles, gold jewelry, lace, and "high headdresses" (Lyerly 1995:58, 68.) These practices can sometimes be enumerated in cemetery populations in what is buried with the decedent. Also, a "conservative coffin," may not be so much about what a decedent's family could afford but be related to conservative cultural or religious beliefs. Representative photographs of these personal effects will be presented in the report.

If fabric remnants are recovered, at the discretion of the TVA, a textile specialist may be invited to look at a sample of these items and determine the types of clothing and possibly coffin lining treatments which were present. If textiles are to be examined, a field practice in recovery will be to place the samples on foam-core board and seal in plastic zip-lock bags. These will be refrigerated for later examination by the specialist. In some cases, clues to dates of interment of unmarked graves can be gleaned by preserved textiles. For example, clothing items and personal effects using synthetic materials can be dated in a "no earlier than," context. As noted above in the Field Methods Section, at the discretion of the TVA, wood samples of well-preserved coffins and vaults will be taken and will be shown to forestry specialists for the identification of trees used in the construction of the coffins and vaults. The results of these wood identifications will be utilized to interpret the choices made by local coffin builders or demonstrate the marketing reach of commercial coffin manufacturers in the selection of burial containers for the decedents. Only those wood samples with adequate preservation, showing good grain and ring structure, will be used for this portion of the analysis.

The coffin hardware is the subject of specialized analyses and photography. The hardware gives excellent clues for estimated times of interments and shows the development of the undertaking industry in the area, which can be fairly localized. The advent of train service to communities resulted in a proliferation of hardware options and opened the door to commercially manufactured coffins and caskets. The evolution and development of this more commercial approach to burial practices can be traced through the coffin morphology and the shift from coffins to caskets as favored burial containers. The close proximity of Nashville may have had a greater influence on the local populations, both white and African-American, than what is assumed.

Numerous references at Wood E&I laboratories, including actual period documents, and copies of nineteenth and early twentieth coffin hardware catalogs, and cemetery studies depicting coffin hardware, are available. The coffin hardware recovered will be compared to these sources to ascertain matches. Also, commercial caskets and coffins are illustrated in some of these references, and comparisons can be made for matches for these items, based on photos taken in the field. This will demonstrate the marketing and distribution of these items to local furniture stores, which were the center of the early development of the undertaking industry. In the report, a coffin hardware appendix will be created, which shows which interments had a specific coffin hardware type, at each cemetery, and where each coffin hardware item has been sourced to. The best example of each of the coffin hardware varieties will be photographed and the burial(s) containing that item will be enumerated. It has been found that some types of coffin handles, escutcheons, thumb and coffin screws, and decorative plates have been associated with certain ages and sexes of decedents and are popular in certain time periods and cemeteries. There may be different styles and types of hardware associated with cemeteries which are geographically close to each other, and temporally contemporaneous. These appendices are invaluable comparative resources for cemetery researchers, not only in the region, but across the country.

At the TVA's request, an Excel burial spreadsheet can be included as a CD or thumb drive in the back of the report for each of the cemeteries, which will summarize the features of each interment, including presence or absence of vaults, coffin morphology, presence or absence of grave goods, viewing windows, painted coffins, all of the coffin hardware and where sourced, coffin/vault wood types, and personal effects. Unusual aspects of the interment will be located in a comments section. This will be an augmentation of the burial descriptions and the coffin hardware discussion in the report.

Sub-task 6: Reporting

Wood will prepare a Management Summary at the completion of Sub-Tasks 1 – 5, which will include a summary of the grave removal process and findings, a tabulation of the number of graves relocated from each of the cemeteries, and tabulation and summary of the names and contact information of any living descendants of the deceased identified in Sub-Task 1 and 2. Wood will prepare and submit for TVA review complete Draft and Final Reports that thoroughly details all findings including community engagement, genealogical and documentary research, osteological analysis of the physical remains, archaeological analysis of coffin hardware, and a more complete history of Odom's Bend area.

Sub-task 7: Weekly communications

As requested in the RFQ, Wood will participate in weekly conference calls throughout the duration of the project. Updates of the fieldwork, analysis, and reporting progress will be provided as well as any new project related information that arises will be discussed.

Project approach – Task B: Design of relocation cemetery

This task involves the design of a relocation cemetery on GAF property. Wood will provide a plan for how the cemetery will be laid out for all six cemeteries under consideration as part of this proposal. The grave reinternments will be laid out spatially in a similar fashion as they are currently grouped at each cemetery to the extent possible. Wood will visit GAF and photo document one or more areas under consideration for the relocation for planning purposes. Subsequently, Wood will provide a map that clearly illustrates the proposed grave layout with phot-based renderings to aid in the visualization of the new cemetery.

In every culture, the people have a "mental template" regarding how a cemetery should be laid out and designed. These are carried forward over the generations and are subject to contingencies, economic constraints and introductions to new ideas and products. The group then must decide which of these to embrace and utilize. While the layout of cemeteries in the Colonies and later, in the states, were based on a template from Europe, the presence of large tracts of land began to influence how cemeteries were laid out in North America, because the graves could be laid out in larger, less cramped ways. Still, the idea of organized rows, areas which may be designated for family groups, a marker of some type, and treatment of the grave were all culturally determined, and influenced by ethnic group, religious affiliation, and regional influences. African-Americans, while influenced by the cultural mores of the surrounding white community, often retained some beliefs associated with templates handed down in the generations of their families. Grave surface treatments which may be encountered in some or all of these cemeteries have already been discussed in the excavation methodology above. But, uniquely designed headstones, burial areas which appear to have been family groups, and the overall layout of the cemetery can offer some clues for cultural practices if cemeteries are carefully examined prior to relocation (Jeane 1992: 107-136; Jordan 1982:13-15, Little 1998:248-268). Thus, cemetery layout and design will be discussed in the report, along with comparative data from other southeastern rural cemeteries of the same time period.

As noted in the field methodology section, the headstones and footstones of each cemetery to be relocated will be photographed and measured, with inscriptions recorded. Shifts in use of materials for these headstones, the use of stone cutters, versus family created stones are of primary importance in describing these cemeteries. Headstone/footstone descriptions will also be incorporated into the burial descriptions for each of the decedents. Headstone symbolism is very important in describing indications of the mental templates of the decedents and their families. They also can be used to document the decisions made to create home-made headstones, as opposed to commercially created stones. Both African-American and general Victorian symbolism are variously found on headstones, often in interesting combinations, and this symbolism will be discussed with burial descriptions, in a cemetery layout and description section of the report, as well in the Headstone Appendix.

Optional Items

Oral History Data Synchronizer (OHMS)

Further avenues for preservation and access to the interviews can be explored such as utilizing the University of Kentucky's Oral History Data Synchronizer (OHMS). OHMS is a web-based system that provides a way to "inexpensively and efficiently enhance access to and discovery of oral history online" (UK Libraries OHMS). "The OHMS system provides users word-level search capability and a time-correlated transcript or index connecting the textual search term to the corresponding moment in the recorded interview online" (UK Libraries OHMS). This system is free to use and is utilized by over 100 archives. OHMS allows for the synced interviews to be incorporated to websites to enhance access to the interviews. Wood's oral history specialist has extensive experience with indexing and with OHMS and has used this technique and this system on several projects. This capability ensures generations can benefit from the oral histories created.

Wood Type Identification

At the discretion of TVA staff, small, specialized wood samples of the vault (if present, and of the level of preservation needed), and the coffin/casket will be taken for speciation identification and to help determine if these elements of the grave feature were harvested and constructed locally or were purchased from commercial vault and coffin/casket manufacturers. A state forestry laboratory in Kentucky or Tennessee will be requested to look at a sample of the better-preserved wood used in the construction of these containers. This will help determine where wood was harvested in the construction of the containers and types of species favored if locally constructed. This should offer an aid in historic reconstruction of the local environment of the area at the time the cemetery was in use. In addition, the ratio of commercial vs. locally built containers will offer hints about the socio-economic factors surrounding mortuary practices in this area. Approximate dating of interment of unmarked graves will be facilitated using wood type and coffin morphology, along with the coffin hardware.

Textile Identification

If fabric remnants are recovered, at the discretion of the TVA, a textile specialist may be invited to look at a sample of these items and determine the types of clothing and possibly coffin lining treatments which were present. If textiles are to be examined, a field practice in recovery will be to place the samples on foam-core board and seal in plastic zip-lock bags. These will be refrigerated for later examination by the specialist. In some cases, clues to dates of interment of unmarked graves can be gleaned by preserved textiles. For example, clothing items and personal effects using synthetic materials can be dated in a "no earlier than," context.

DNA Analysis at Harvard University Reich Ancient DNA Laboratory

DNA analysis is also an exceptional mechanism for identifying individuals in unmarked graves and can offer an element of solace to relations of the deceased in a confirmation of the identity. DNA analysis could be conducted after the reinternment. The TVA could consider DNA testing on remains only upon request by family seeking confirmation of the deceased individual's identity.

DNA utilized for the analysis will need to be across the entire spectrum of available DNA including mitochondrial DNA, X-Chromosome DNA, Y-Chromosome DNA and autosomal DNA. The reason for this is random assortment of chromosomes and DNA during meiosis at the point of conception. For example, it is possible, from a genetic standpoint, to have a first cousin who shares no mitochondrial DNA, X-Chromosome or Y-Chromosome DNA with another decedent and still be a biological first cousin. The autosomal DNA could verify the relationship. The Harvard Laboratory has reference African and African-American DNA, some from the point of the beginning of the slave trade in the Colonies, and before, to begin the process of analysis (this is called "the pipeline"). This process begins to establish relationships among the decedents. Using this reference DNA already in place, coupled with any DNA from marked graves in the cemeteries to augment this, biological relationship determination can be made more robust. The reference DNA already present at the lab are from seventeenth and eighteenth century African captives who were forced into the slave trade, and African American slave populations from archaeological sites in the Chesapeake Area in Virginia and Maryland Colonies. One of the populations comes from Jamestown, Virginia. In addition, the lab does research on western and sub-Saharan African populations to establish genetic clades, and has actively published on this topic, as recently as January of 2020. Currently, the lab has a web page enumerating publications of their paleo DNA research dating back to 1998, including Denisovans, Neandertals, mammoths, mastodons, red wolf hybridization, the chimpanzee genome, and numerous ancient modern human populations, including the Myceneans, Micronesians, Neolithic Central European Farmers, African forager populations, and many, many others. See https://reich.hms.harvard.edu/publications

The laboratory personnel will assess the viability of the DNA for each of the samples which were gathered and packaged on site, using the protocols established by the Post Doc's visit to the site to train the excavation crew. Then, any contaminants such as earthworm, soil microbe DNA and other contaminants will be identified. This utilizes what is euphemistically called a "shotgun library" by some labs. This material is "XX ed out" from the sample. Once the decedent DNA is processed for each sample, the "genetic matching" begins. This is called by some labs the "bioinformatics phase." The lab machinery for these samples has also to be prepared for the analysis including filling with mixed reagents, calibrations done, and other functions.

A Post Doc from Harvard University will be present to train excavators in the proper removal and packaging of DNA samples of decedents to avoid destruction or contamination of the bone/tooth samples. Excavators will follow this protocol for the samples.

A report outlining the findings is then generated. Some of the samples may not be able to be utilized, but that is a fact of Paleo DNA Analysis.

Previous Wood Cemetery Removal Experience

Two recent cemetery projects will be described in this section of the proposal as examples of the work which Wood personnel have accomplished. In addition to these projects, Wood personnel have conducted other historic cemetery removals and re-interments, as well as numerous cemetery delineations and documentations. These projects used remote sensing, historical archival research, genealogical research, including interfacing with surviving family members, determination of the evolution of the funeral industry in the region the cemetery is located, monument documentation and removal, excavation of the decedents, laboratory analysis of the decedents' remains, laboratory analysis of grave goods, coffin/vault wood, coffin hardware, re-interment of the remains, and replacement of the headstones/monuments, if practical, with the decedents in the new interment location. When re-interment occurs, a ceremony, with involvement of the community and the press, is held at the new cemetery location. This contributes to a sense of closure for descendants and community members.

The Relocation of the Wright-Whitesell-Gentry Cemetery (1MA944) in Marion County, Indiana (Ross-Stallings, Kinietz 2018). The size and circumstances of the relocation of this cemetery perhaps reflect the types of most cemeteries in the TVA project area. This cemetery was a small family cemetery which was established on the farm of a patriarch and his extended family. Later, the cemetery had limited use as a community cemetery. The interments spanned the time period of 1841 into the first decade of the twentieth century. The total number of interments was 33, with both marked and unmarked graves. Monument documentation and removal was accomplished, and monuments were stored, and stabilized at the Crown Hill Cemetery in Indianapolis, Indiana, where the decedents were re-interred. The majorities of surviving head and footstones were made of white marble, which can become brittle with age. In addition, attempts by descendants and community members over the years to repair the surviving headstones had created some preservation issues with them. Extensive genealogy and archival research helped to establish familial relationships among the decedents, and a branch of the Whitesell Family "found" their other family members they had lost touch with generations back, as a result of this project. Religious beliefs of this white Protestant family, headed by the Southern Methodist patriarch, who had migrated to Indiana from North Carolina in the 1830s, was demonstrated by the burial treatments in the cemetery. The church he founded, now located in suburban Indianapolis, has several hundred members. Osteological analysis showcased the health status of the extended family, reflecting challenges of pioneer life and occupational wear and tear involved in farming in the nineteenth century. Funerary decisions made by the family members showed the generational changes as the influence of strict religious beliefs encountered the burgeoning commercial funerary industry and its effects on the family group. The re-interment was done in the Pioneer Section of the Crown Hill Cemetery in Indianapolis, and the cemetery was recreated to the centimeter, as far as grave layouts and headstone placement.

The Relocation of the Old Berne Mennonite Cemetery (12A461), Berne, Adams County, Indiana (Ross-Stallings et al. 2018). In contrast to the previous cemetery, the Berne Cemetery was established ca. 1851, as a community cemetery at the edge of a village established by refugee Old Order Mennonites who emigrated from the Bern Canton, Switzerland, beginning in the late 1830s. An "apart from the world" culture which had encountered three hundred years of discrimination in Europe at the time this group emigrated, they strove to establish a new settlement, based predominately on an agricultural economy. Strict religious and cultural mores were employed in the community and decisions were made, and enforced, at the Bishop level regarding what innovations the community members would accept and reject. When train service arrived in Berne in the 1870s, along with non-Mennonite citizens, the community was faced with cultural pressures they had never encountered before, not only in decisions regarding burial practices, but other lifeways as well. This resulted in a considerable impact to the Mennonite and Amish Community. The cemetery use continued into circa 1895, when it became too crowded and could not be expanded. A new cemetery was established a few miles away. Over time, exhumations occurred as family members relocated some loved ones, but not nearly all were exhumed. In the second quarter of the twentieth century, the Mennonites themselves pulled up the surviving headstones and turned the cemetery, now in the center of town, into a parking area for the new church across the street, and later it was made into a used car lot and parking for a bus terminal and gas station established to the north. Mennonite and Amish descendants of the settlers still live in large numbers in the community. Genealogical, local archival, and church records were used to augment census records and other traditionally used materials to reconstruct the nineteenth century culture of those interred at the cemetery. Some of the primary records were written in Swiss German dialect, but a Wood staff member was able to successfully translate them. The shift from a local coffin builder who built almost all of the coffins for the community to the development of the commercial undertaking industry in Berne was traced, and analysis of the coffin hardware and coffin morphology told a somewhat different story than was what was considered the "local history" of the funerary and interment decisions made by the Berne citizens over a time period of sixty years. Osteological analysis of the remains demonstrated the pressures of emigration and settlement in a wilderness that was predominately swamp land but turned into some of the most fertile farmland in the United States by the immigrants. Survivorship curves showed female decedents, notably, were under extreme pressure, particularly in the case of interments made in the 1850s into circa 1870s. The cemetery excavations included 129 grave features containing 132 decedents. Grave goods and coffin hardware indicated embracing of commercial funeral industrial offerings as the nineteenth century advanced. Re-interment was done at the Mennonite cemetery established in the 1890s, which is in a rural location near Berne. A local ceremony for the community was held at time of re-interment. The local library, the Mennonite Church and a Mennonite College in northern Indiana were provided copies of the report, but without the Osteology Appendix.

Personnel

Wood has a professional staff that meets and exceeds the qualifications and demands of this complex project. Dr. Hank McKelway, Wood Cultural Resources Program Manager, will serve as Principal Investigator for the project. He received his PhD from the University of Tennessee, Knoxville, has more than 25 years of experience in the archaeology of Tennessee. He has extensive experience in historical archaeology, including African American studies, and is familiar with skeletal biology. Most importantly he understands the value of a holistic approach that integrates the archival record with population health and mortuary customs to understand community lifeways. He oversaw previous work conducted by Wood at Berne and Whitesell cemeteries in Indiana. Marc Wampler, Wood Associate Archaeologist, will serve as the Project Manager and will be the primary point of contact for TVA for the duration of the project. Mr. Wampler will participate in various tasks of the project including general oversight and direction and will ensure project performance with emphasis on meeting the schedule. He has more than 19 years' experience in the archaeology of Tennessee and with TVA. Wood Historians Matt Prybylski, Michael Langmyer, and Wes Cunningham will conduct the community engagement and genealogical tasks for this project. They have all conducted this type of research over the past decade and have already conducted extensive genealogical research for TVA in association with the cemeteries under consideration for this proposal. The Historian team will assisted and mentored by Wood's most senior Historian Susan Andrews. Ms. Andrews has nearly three decades of experience that includes genealogical and archival research associated with historic cemeteries as well as African American studies. Dr. Nancy Ross-Stalling, Wood's inhouse forensic anthropological expert will lead and participate in the grave removal fieldwork, oversee all analysis of physical remains and coffin hardware, and senior author the report of findings. Dr. Ross-Stallings was academically cross-trained as a biological / forensic anthropologist and an archaeologist and has served simultaneously in both capacities for various projects for over 30 years. Dr. Ross-Stallings is trained to analyze bone at the macroscopic and microscopic levels and has completed many projects as an independent researcher as well as within cultural resources management. She serves as a forensic anthropologist for the federal government on the Disaster Mortuary Operations Response Team (DMORT), as an intermittent employee, deployed during mass fatalities, since 1994. Mr. Steve Martin, Wood Staff Archaeologist and Geophysical lead and Bridget Mohr, Wood Staff Archaeologist and Laboratory Director, will aid Dr. Ross-Stallings with directing and implementing the grave removal fieldwork. Both Mr. Martin and Ms. Mohr have extensive experience with the archaeological grave removal process for several similar projects with Wood. Ms. Mohr will also aid in conducting the analysis of coffin hardware. Resumes of key individuals conducting field and laboratory analysis are provided as a separate attachment to this proposal. Wood's field crew will be made up of inhouse technicians that have extensive experience in grave excavation and removal.

Assumptions

Wood's ability to adequately provide the services outlined above is contingent on the following critical assumptions:

- **The effects of the Covid-19 virus situation will not affect travel to and from GAF to perform necessary fieldwork to include genealogical research, informant interviews, and all fieldwork associated with burial removal and relocation;**
- Wood will obtain the necessary state permits for grave removal and relocation and for transport of human remains across state lines to our Louisville, KY laboratory;
- Wood personnel will have unrestricted access to the project area, to conduct the grave removals and reinternments specified in this proposal;
- Weather will permit completion of the field investigation in the allotted time frame.
- Wood will construct a safety fence surrounding each cemetery during the grave removal process;
- No more than 175 graves will require removal and reinternment;
- Wood will provide excavation equipment and operator for the grave removal process;
- It is assumed that the majority of graves will be relocated to a single large cemetery at GAF, however our cost estimates assumes that a smaller number of graves may be relocated to up to three additional local smaller cemeteries;
- Previously conducted genealogical research will not be duplicated;
- Anticipated archival resources will be available and sufficient information will be obtainable given that specific resources may simply not exist;
- No more that 60 individuals will be researched for development of family trees;
- Individuals will be available for interview and willing to be recorded;

- It is assumed that one burial takes 20 person hours to fully expose, document, and remove;
- No more than 2,500 coffin artifacts will require analysis for 75 graves (Scenario 1);
- No more than 6,000 coffin artifacts will require analysis for 175 graves (Scenario 2);
- One skeleton takes 8 hours to examine for all analysis detailed in this proposal;
- Wood will develop a safety plan for TVA review and approval prior to initiation of fieldwork;
- Wood will develop a work plan for TVA review and approval prior to initiation of fieldwork, which will be tiered from this written proposal;
- TVA will pay for the cost of a funeral director and the state permitting;
- It is assumed that some TVA safety training will be required, but this will only be less than two hours in duration;
- Required PPE will be worn at all times throughout the duration of fieldwork including hard hats, safety vests, safety goggles, and steel-toe boots;
- All soils are Class C and all soils at the cemeteries do not contain coal ash or other by-products of GAF operations; all the cemeteries are outside the plant operations areas;
- Backdirt can be left on site during the grave removal process and Wood will be responsible for backfilling each cemetery upon completion of grave removal fieldwork;
- Wood assumes that burial reinternment will occur at an on-site cemetery and that Wood is responsible for opening and closing each grave shaft and markers will be placed in the ground for all graves that originally had grave markers;
- The on-site reinternment cemetery will be designed by Wood and approved by TVA in accordance with Task B of this proposal;
- Our cost estimate assumes that all individuals disinterred will be reinterred at the on-site GAF cemetery no later than September 2021. All skeletal and archaeological analysis will be completed within 10 months of completion of field work or August 30, 2020. If there is a significant delay arrangements will need to be made regarding long term storage of the skeletal material.
    - If based on the commercial cemetery research conducted in accordance with Subtask B TVA decides to reinter burials at an off-site cemetery then Wood only deliver the burial and all associated material including grave markers to the chosen off-site cemetery. Therefore, cost would not incur associated with Wood performing the reburial process.
- TVA will be responsible for removal of fill sitting atop Cemetery No. 10. Wood will be responsible for excavation equipment and operator for removal of graves at that cemetery.

Schedule and deliverables

Deliverables will include those that were stipulated in the RFQ in addition to the safety and work plans that were stipulated in the Pre-Bid meeting and are as follows:

- Safety Plan;
- Work Plan;
- Draft Report – Genealogical research and reinternment cemetery location to include:
    - Detailed summary of Community Engagement and Coordination
    - Detailed summary of Genealogical Research
    - Copies of notes from informant interviews;
- Management Summary to include:
    - Genealogical Research
    - Community Engagement
    - Disinternments
    - Preliminary summary of osteological and archaeological analysis to include:
        - Detailed summary of extent of analysis required to complete
    - Reinternment
- Draft Report – which will include the following:
    - Background section summarizing history and cultural context as well as a summary of geological research including family trees;
    - Methods employed;
    - Results;
    - Summary history of Odom’s Bend;
    - Results of osteological and coffin hardware analysis;
    - Report will meet applicable Tennessee Division of Archaeology and Tennessee Historical Commission Guidelines
- Final Report
- Draft and Final versions of internal TVA Completion Report

Our schedule for the project is summarized in **Table 1 and** is contingent on all the above assumptions being met.

Table 1. Summary of Project Deliverables and Schedule.

Deliverable	Description, Quantity and format	Schedule
Sub-Tasks 1 through 3	Community engagement (1), Genealogy (2), and Reinternment cemetery location evaluation	Begin immediately upon notice to proceed (NTP) – assumed to be March 30, 2020 and complete within 3 months of NTP or no later June 30, 2020 (**see detailed schedule below**)
Draft Report / Sub-Tasks 1 through 3 / Copies of notes from informant interviews	1 electronic PDF copy	Within 4 months of NTP or no later that July 30, 2020 (**see detailed schedule below**)
Safety and Work Plans	1 electronic PDF copy	Emailed one month before initiation (NTP) of fieldwork – NTP assumed to be September 1, 2020 for start of grave removal.
Fieldwork	Grave removal	Begin immediately from NTP (September 1, 2020) and complete within 10 weeks of NTP
Management Summary	1 electronic PDF copy	Within 2 months from completion of Task A fieldwork
Re-burial	Reinternment of graves	No later than September 30, 2021
Draft Report	1 electronic PDF copy and necessary amount of hard copies	Within 18 months of completion of Task A fieldwork or 8 months from completion of reburial.
Cemetery Design	1 electronic copy	Within two months of completion of Task A fieldwork
Final Report	1 electronic PDF copy and necessary amount of hard copies	Within two months of receipt of TVA comments

Detailed schedule / Sub-Tasks 1 through 3 / Community Involvement-Genealogical research

The Wood team has more than ample capacity and experience to complete this segment of research. As stated above, Matt Prybylski, Michael Langmyer, and Wes Cunningham will lead this effort. This team approach will expedite the research and reporting and to meet the July 30, 2020 deadline. The historian team will also be assisted by Susan Andrews, Wood's most senior Historian. Ms. Andrews has over three decades of experience that includes archival and genealogical research associated with historic cemeteries. Her experience with African American studies, archival and archaeological, will support interpretations of lifeways within the communities. Matt Prybylski is experienced with African American archival research, leads our historic personnel and will provide general oversight. Additional Wood historians to aid in the effort will be Allyson Ayers. The multi-personnel approach will enable Wood to complete the research and reporting in a staged approach where many tasks can be conducted simultaneously. Two of Wood's qualified historians will be making most of the trips to the area, which will allow one person to conduct interviews while the other person combs through archival records. This further increases the task intersections and expedites fieldwork. Moreover, report writing, interview indexing, and the creation of family trees will also likely overlap as multiple Wood historians can tackle the tasks simultaneously. The days and weeks included in the bulleted outline below were used for costing and not intended to be added for total time required to complete the deliverables because, as stated, with multiple historians working in tandem, there will be overlap and work will be completed quicker. As stated above in **Table 1** Wood will complete all necessary community engagement and genealogical research by June 30, 2020 and the full report to include a summary of potential commercial cemetery relocations no later than July 30, 2020 as long as all assumptions included above are met.

Community Engagement and Coordination

- 3 weeks of preliminary setup to maximize fieldwork efficiency. This will include re-visiting previous research, reaching out to the public, conducting phone interviews if in-person are not available, setting up a schedule to meet with people in person, devising questions to focus on during the interviews, which may be catered for particular individuals.
- 4-6 mobilizations for this task to meet with individuals, conduct the oral history interviews, attend any public/community meetings, meeting with church elders etc. Individual schedules will dictate how many people can be interviewed for each trip, thus causing the necessity for multiple trips. One preliminary trip may be implemented to meet with groups to explain the project in the hopes that we can reach a greater number of people. The anticipated number of trips may decrease and is subject to change as one trip can serve multiple purposes and completing corresponding research in as few trips as possible is

ideal. Furthermore, at least two historians will be on each trip in the field to double the amount of research and work to be accomplished per field effort.

- 2 weeks to index the oral history interviews. Additional time will need to be added if TVA would like to utilize OHMS (outlined in the proposal). This could be useful if TVA desires to do any public outreach or public exhibit.

Genealogical Research

- 2 weeks to compile a list of all known individuals interred at the cemeteries and begin desktop work to prepare for archival research to complete family trees. This will increase efficiency for ensuing fieldwork and will overlap with the preparation work associated with the above community engagement task.
- 2 days to do preliminary research of relevant sources, communicate with local repositories and individuals to make sure the time spent in the field conducting research is as efficient as possible.
- 2 weeks to do preliminary research for next of kin for people suspected to be buried in the cemeteries (especially useful for the cemeteries where we have no definite name to burial associations). This will Wood to contact them prior to commencing fieldwork in the hopes that they could shine light on if the people buried there are their relatives. This will also open doors for potential interviews.
- 3-4 week-long trips to Gallatin and surrounding area to conduct archival research. The level of in-depth research required for the family trees is extensive. This research will include obituary records in surrounding counties, looking at newspaper archives etc. As previously stated, these tasks will likely overlap with other field efforts, in part because of allowable time in the field and because multiple historians will be working together to tackle the different responsibilities.
- 1 week to compile all of the collected data into a digestible and workable format again to maximize efficency. This includes both the archival data Wood was able to gather as well as the information obtained from the oral history interviews.
- Wood anticipates 8-12 hours to create detailed family trees for individuals. Forty-one known burials exist at the Hudson/Odom's Bend cemetery based on Wood's prior research. We also know of two definite at McCrary, and one at Bailey. We anticipate that up to 16 additional individuals will be definitively identified as buried at the six cemeteries upon completion of our research. Therefore, Wood anticipates that family trees will be created for up to 60 individuals.
- 2 weeks for full next of kin research to try and identify names and contact information for potential next of kin. Contact info will be included in the report but reaching out to the individuals will not be included.

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NRCS Prime Farmland Correspondence and AD 1006 Farmland Conversion Impact Rating Form

From:	McMillen, David - NRCS, Nashville, TN
To:	Kleikamp, Natalie
Subject:	RE: Gallatin Fossil Plant - Form AD-1006
Date:	Wednesday, October 2, 2019 10:29:46 AM
Attachments:	image001.png

Natalie,

So sorry for the delay. After reviewing the information this morning, this project will be exempt from FPPA.

Again, sorry for the delay,

Dave

From: Kleikamp, Natalie <natalie.kleikamp@woodplc.com>
Sent: Monday, September 23, 2019 11:54 AM
To: McMillen, David - NRCS, Nashville, TN <david.mcmillen@usda.gov>
Subject: RE: Gallatin Fossil Plant - Form AD-1006

Hi Dave,

I wanted to check in on the status of the Form AD-1006 review for proposed development at the Gallatin Fossil Plant. If you need any additional information, please let me know.

Thanks,

Natalie Kleikamp
Environmental Technical Professional
Environment & Infrastructure Solutions
Direct: (636) 200-5117
www.woodplc.com

From: Kleikamp, Natalie
Sent: Wednesday, August 21, 2019 8:27 AM
To: david.mcmillen@tn.usda.gov
Subject: RE: Gallatin Fossil Plant - Form AD-1006

Good morning Dave,

I just wanted to check in on this request. I did get your voicemail from a week or so ago, so I know you were planning to see if we may be able to exempt this. If you need any additional info to assist in your review, please let me know.

Thanks so much!

Natalie Kleikamp
Environmental Technical Professional
Environment & Infrastructure Solutions
Direct: (636) 200-5117
www.woodplc.com

wood.

From: Kleikamp, Natalie
Sent: Wednesday, August 7, 2019 11:41 AM
To: david.mcmillen@tn.usda.gov
Subject: Gallatin Fossil Plant - Form AD-1006

Hi Dave,

Please find attached the Form AD-1006 for proposed development at the Gallatin Fossil Plant for your review and completion. A kmz detailing the project areas and a soil map have been attached to assist in your review.

I left a voicemail on your office phone – if you need any additional information or have any requests pertaining to this submission, please let me know.

Thank you!

Natalie Kleikamp
Environmental Technical Professional
Environment & Infrastructure Solutions
Direct: (636) 200-5117
www.woodplc.com

wood.

STEPS IN THE PROCESSING THE FARMLAND AND CONVERSION IMPACT RATING FORM

Step 1 - Federal agencies (or Federally funded projects) involved in proposed projects that may convert farmland, as defined in the Farmland Protection Policy Act (FPPA) to nonagricultural uses, will initially complete Parts I and III of the form. For Corridor type projects, the Federal agency shall use form NRCS-CPA-106 in place of form AD-1006. The Land Evaluation and Site Assessment (LESA) process may also be accessed by visiting the FPPA website, http://fppa.nrcs.usda.gov/lesa/.

Step 2 - Originator (Federal Agency) will send one original copy of the form together with appropriate scaled maps indicating location(s)of project site(s), to the Natural Resources Conservation Service (NRCS) local Field Office or USDA Service Center and retain a copy for their files. (NRCS has offices in most counties in the U.S. The USDA Office Information Locator may be found at http://offices.usda.gov/scripts/ndISAPI.dll/oip_public/USA_map**,** or the offices can usually be found in the Phone Book under U.S. Government, Department of Agriculture. A list of field offices is available from the NRCS State Conservationist and State Office in each State.)

Step 3 - NRCS will, within 10 working days after receipt of the completed form, make a determination as to whether the site(s) of the proposed project contains prime, unique, statewide or local important farmland. (When a site visit or land evaluation system design is needed, NRCS will respond within 30 working days.

Step 4 - For sites where farmland covered by the FPPA will be converted by the proposed project, NRCS will complete Parts II, IV and V of the form.

Step 5 - NRCS will return the original copy of the form to the Federal agency involved in the project, and retain a file copy for NRCS records.

Step 6 - The Federal agency involved in the proposed project will complete Parts VI and VII of the form and return the form with the final selected site to the servicing NRCS office.

Step 7 - The Federal agency providing financial or technical assistance to the proposed project will make a determination as to whether the proposed conversion is consistent with the FPPA.

INSTRUCTIONS FOR COMPLETING THE FARMLAND CONVERSION IMPACT RATING FORM

(For Federal Agency)

Part I: When completing the "County and State" questions, list all the local governments that are responsible for local land use controls where site(s) are to be evaluated.

Part III: When completing item B (Total Acres To Be Converted Indirectly), include the following:

1. Acres not being directly converted but that would no longer be capable of being farmed after the conversion, because the conversion would restrict access to them or other major change in the ability to use the land for agriculture.
2. Acres planned to receive services from an infrastructure project as indicated in the project justification (e.g. highways, utilities planned build out capacity) that will cause a direct conversion.

Part VI: Do not complete Part VI using the standard format if a State or Local site assessment is used. With local and NRCS assistance, use the local Land Evaluation and Site Assessment (LESA).

1. Assign the maximum points for each site assessment criterion as shown in § 658.5(b) of CFR. In cases of corridor-type project such as transportation, power line and flood control, criteria #5 and #6 will not apply and will, be weighted zero, however, criterion #8 will be weighed a maximum of 25 points and criterion #11 a maximum of 25 points.

2. Federal agencies may assign relative weights among the 12 site assessment criteria other than those shown on the FPPA rule after submitting individual agency FPPA policy for review and comment to NRCS. In all cases where other weights are assigned, relative adjustments must be made to maintain the maximum total points at 160. For project sites where the total points equal or exceed 160, consider alternative actions, as appropriate, that could reduce adverse impacts (e.g. Alternative Sites, Modifications or Mitigation).

Part VII: In computing the "Total Site Assessment Points" where a State or local site assessment is used and the total maximum number of points is other than 160, convert the site assessment points to a base of 160.
Example: if the Site Assessment maximum is 200 points, and the alternative Site "A" is rated 180 points:

$$\frac{\text{Total points assigned Site A}}{\text{Maximum points possible}} = \frac{180}{200} \times 160 = 144 \text{ points for Site A}$$

For assistance in completing this form or FPPA process, contact the local NRCS Field Office or USDA Service Center.

NRCS employees, consult the FPPA Manual and/or policy for additional instructions to complete the AD-1006 form.

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request August 7, 2019
Name of Project GAF Impoundment Closure EIS	Federal Agency Involved TVA
Proposed Land Use Office Complex and Beneficial Reuse	County and State Gallatin, Sumner County, TN
PART II *(To be completed by NRCS)*	Date Request Received By NRCS / Person Completing Form:

Does the site contain Prime, Unique, Statewide or Local Important Farmland? *(If no, the FPPA does not apply - do not complete additional parts of this form)*	YES ☐ NO ☐	Acres Irrigated	Average Farm Size
Major Crop(s)	Farmable Land In Govt. Jurisdiction Acres: %	Amount of Farmland As Defined in FPPA Acres: %	
Name of Land Evaluation System Used	Name of State or Local Site Assessment System	Date Land Evaluation Returned by NRCS	

PART III *(To be completed by Federal Agency)*		Alternative Site Rating			
		Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly		642.3			
B. Total Acres To Be Converted Indirectly					
C. Total Acres In Site		642.3			
PART IV *(To be completed by NRCS)* Land Evaluation Information					
A. Total Acres Prime And Unique Farmland					
B. Total Acres Statewide Important or Local Important Farmland					
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted					
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value					
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value of Farmland To Be Converted (Scale of 0 to 100 Points)					
PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(Criteria are explained in 7 CFR 658.5 b. For Corridor project use form NRCS-CPA-106)*	**Maximum Points**	Site A	Site B	Site C	Site D
1. Area In Non-urban Use	(15)				
2. Perimeter In Non-urban Use	(10)				
3. Percent Of Site Being Farmed	(20)				
4. Protection Provided By State and Local Government	(20)				
5. Distance From Urban Built-up Area	(15)				
6. Distance To Urban Support Services	(15)				
7. Size Of Present Farm Unit Compared To Average	(10)				
8. Creation Of Non-farmable Farmland	(10)				
9. Availability Of Farm Support Services	(5)				
10. On-Farm Investments	(20)				
11. Effects Of Conversion On Farm Support Services	(10)				
12. Compatibility With Existing Agricultural Use	(10)				
TOTAL SITE ASSESSMENT POINTS	160	0	0	0	0
PART VII ***(To be completed by Federal Agency)***					
Relative Value Of Farmland *(From Part V)*	100	0	0	0	0
Total Site Assessment *(From Part VI above or local site assessment)*	160	0	0	0	0
TOTAL POINTS ***(Total of above 2 lines)***	260	0	0	0	0

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? YES ☐ NO ☐

Reason For Selection:

Name of Federal agency representative completing this form:	Date:

(See Instructions on reverse side) **Form AD-1006 (03-02)**