WETLAND STATEMENT OF FINDINGS

NATCHEZ TRACE MULTI-USE TRAIL
PROJECT NATR 055898-3P16
2,000 FEET EAST OF LIVINGSTON ROAD TO HIGHLAND COLONY PARKWAY
(APPROXIMATELY FROM MILEPOST 98.23 TO MILEPOST 101.2)

NATCHEZ TRACE PARKWAY

MADISON COUNTY, MISSISSIPPI

Recommended: _____
Superintendent, Natchez Trace Parkway Date

Concurred: _____
Water Resources Division Date

Approved: _____
Southeast Regional Director Date

INTRODUCTION

The National Park Service, (NPS) in cooperation with the Federal Highway Administration (FHWA) is proposing to design and construct approximately 2.97 miles of multi-use trail, hereafter referred to as the trail, between 2,000 feet east of Livingston Road and Highland Colony Parkway, between approximately mileposts 98.23 and 101.2 within the Natchez Trace Parkway (NATR) boundaries. This project is being funded by Federal Lands Highway Program (FLHP) Category II funding for Congressionally Mandated Parkways.

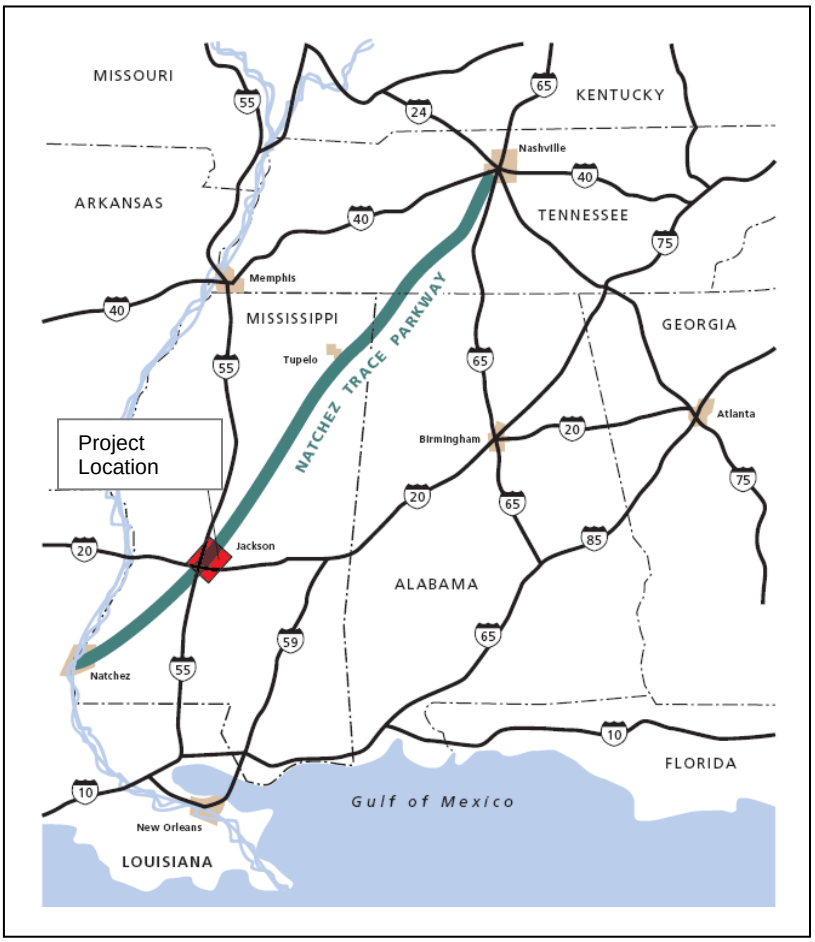


Figure 1. Project location on the Natchez Trace Parkway.

The trail segment will be located in the Jackson, Mississippi metropolitan area, as depicted in Figure 1. The NPS proposes to construct the 2.97-mile long trail segment along the north side of the NATR motor road. See Sheets No. A3-A4 of the FHWA Plans and Profiles at the end of this document. The FHWA Plans and Profiles are 95% complete, subject to changes and have not yet been finalized for construction. The trail will follow the conceptual alignment identified in the September 1995 *Multi-Use Trail Study Environmental Assessment, Natchez Trace Parkway, Jackson, Mississippi*, (EA) (NPS 1995), subject to changes identified during design, and approved by the NPS. In a 1996 Finding of No Significant Impact (FONSI) (NPS 1996) the NPS approved the preferred alternative for building an approximately 21-mile long trail adjacent to the NATR motor road as it passes through the Jackson, Mississippi metropolitan area (Figure 2).

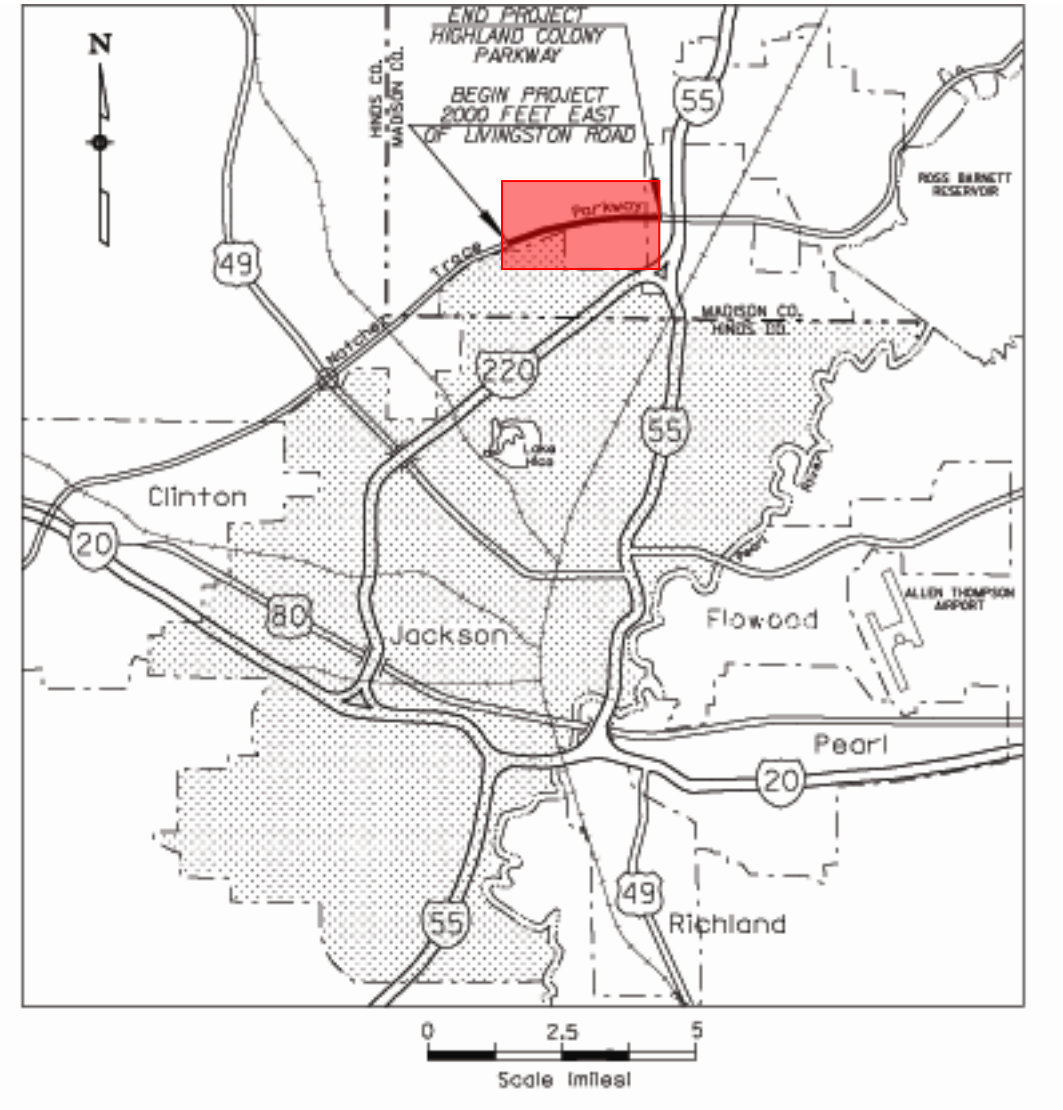


Figure 2. Project location.

The trail profile will closely match the existing ground elevations. See Sheets No. B1-B2 of the FHWA Plans and Profiles at the end of this document for typical trail sections. The limits of disturbance to build the trail will vary, depending on the topography. Based on the 95 percent complete trail design there appears to be a total of 1.89 acres of wetland impacts in this project; 1.75 acres of Palustrine Forested Broad-leaved Deciduous Wetland, 0.06 of an acre of Riverine Lower Perennial Emergent Persistent Wetland, and 0.08 of an acre of Palustrine Emergent Persistent Wetland. For ease of reading the terms Palustrine Forested Broad-leaved Deciduous Wetland, Riverine Lower Perennial Emergent Persistent Wetland, and Palustrine Emergent Persistent Wetland will be shortened to Palustrine Forested Wetland, Riverine Emergent Wetland, and Palustrine Emergent Wetland respectively. These impacts are described in detail further in the document.

The trail will cross a tributary of Hanging Moss Creek, White Oak Creek and three of its tributaries, an unnamed stream, and four drainage ditches. Wetlands along White Oak Creek Tributary #3 intersecting the trail at Station 93+10 to 93+30 and wetlands along the Unnamed

Stream #4 intersecting the trail at Station 118+00 to 125+00 were delineated in 2008 as Riverine Emergent Wetland (Amy S. Green Environmental Consultants [ASGEC] 2008). Station locations, such as Station 93+10 can be located on the Plan and Profile sheets that illustrate the trail route located at the end of the document. Locations are identified by such stations throughout the document. Wetlands along a drainage ditch intersecting the trail from Station 122+70 to 126+15, and wetlands in a roadside ditch along the Greenwood Crossing, intersecting the trail at Station 135+70, were delineated as Palustrine Emergent Wetland. The trail will also traverse 1.75 acres of Palustrine Forested Wetland interspersed along the length of the trail (ASGEC 2008).

Two 18-inch culverts will be installed in the Palustrine Forested Wetlands intersecting the trail from approximately Station 8+00 to Station 12+50. A 12-foot span, 5-foot rise concrete box culvert will also be installed at the Hanging Moss tributary #4 (approximately located at Station 10+00). See Sheet No. D1 of the FHWA Plan and Profile Sheets at the end of this document.

Two 24-inch culverts will be installed along the trail, one at Station 19+60 and one at Station 24+45. An 18-inch culvert will be installed in the Palustrine Forested Wetlands intersecting the trail from Station 26+15 to 26+80, and a 24-inch culvert will be installed at approximately Station 29+25. A Portland Cement Concrete waterway will be installed from Station 35+00 to Station 37+45 to prevent erosion of the slope. Geotextile and class 2 riprap will be placed at the waterway outlet. A 36-inch culvert will be installed in the Palustrine Forested Wetlands located from approximately Station 36+65 to Station 37+60. The trail will be directed north toward North Agency Lane where trail bridges will be built parallel to North Agency Lane to cross White Oak Creek Tributary #1 and White Oak Creek. Due to budget constraints, the trail bridges will not be constructed the same year as the graded trail, but the impacts of constructing those bridges will be analyzed in this statement of findings. See Sheet No. D2 of the FHWA Plan and Profile Sheets at the end of this document.

A 36-inch culvert will be installed in the Palustrine Forested Wetlands intersecting the trail from Station 55+40 to Station 56+40. A 7-foot span, 3-foot rise concrete box culvert will be installed in a small swale located at Station 62+67. An 18-inch culvert will also be installed in the Palustrine Forested Wetlands intersecting the trail at approximately Station 64+00. Another 18-inch culvert will be installed at approximately 70+51. See Sheet No. D3 of the FHWA Plan and Profile Sheets at the end of this document.

A 48-inch culvert will be installed in the Palustrine Forested Wetlands intersecting the trail from Station 74+30 to 75+00. A 6-foot span, 5-foot rise box culvert will be installed at White Oak Creek Tributary #2. An 18-inch culvert will be installed in the Palustrine Forested Wetlands intersecting the trail at Station 90+00 and Station 91+50. A 12-foot span, 5-foot rise box culvert will also be installed at White Oak Tributary #3. See Sheet No. D4 of the FHWA Plan and Profile Sheets at the end of this document.

A drainage pipe will be installed from approximately Station 118+00 to Station 124+00 in the former drainage ditch of the “old trace” to prevent ponding along the trail. This drainage ditch was delineated as Palustrine and Riverine Emergent Wetland. A 30-inch culvert will be installed along the “old trace” from approximately Station 116+42 to 126+50 and will drain west into Unnamed Stream #4. At Station 124+25 a 42-inch culvert will be replaced with an 8-foot span, 2-foot rise box culvert. The Palustrine Forested Wetland located at approximately Station 124+25 contains an existing drainage ditch that silted in. The drainage ditch was not maintained after this segment of the Old Agency Road was restored to “old trace.” In order to maintain

positive drainage between the trail and the NATR motor road, it will be necessary to excavate from 1 to 3 feet along the majority of the length of drainage swale between the trail and the culvert under the NATR motor road. See Sheet No. D5 of the FHWA Plan and Profile Sheets at the end of this document.

Two 18-inch culverts will be installed at the Greenwood Crossing, one on the west side of the Crossing at Station 135+70 and one on the east side of the crossing at Station 136+30. An 18-inch culvert will also be installed at the entrance to the Choctaw Parking Area at Station 139+00. A 24-inch culvert will also be installed at Station 147+60. Another 24-inch culvert will be installed at Station 156+70 where the trail intersects a Palustrine Forested Wetland.

The 1995 EA included analysis of three alternatives for accommodating trail users within the NATR motor road right-of-way in the vicinity of Jackson, Mississippi (NPS 1995). The preferred alternative, part of which is the 2.97-mile trail segment discussed in this statement of findings (SOF), provides a separate and continuous paved trail within the NATR motor road right-of-way, adjacent to the NATR motor road, connecting to local community trails, and potentially linking neighborhoods, parks, and tourist attractions throughout the greater Jackson, Mississippi, metropolitan area. The trail will maintain the visual qualities and character of the NATR motor road and surrounding landscape, accommodate the needs of a variety of trail user groups, and incorporate sustainable design and construction techniques and materials. The trail will be designed to meet American Association of State Highway and Transportation Officials (AASHTO) standards and to Architectural Barriers Act Accessibility Standards (ABAAS), thus maintaining a grade of less than 5 percent and accommodating other necessary accessibility requirements.

The 1995 EA assessed the impacts of the three alternatives. Alternative 1 was a no action alternative; no trail will be constructed. Alternative 2, the preferred alternative and the alternative now being designed, was construction of a separate and continuous paved trail on NATR property from approximately milepost 86.6 to milepost 107.9. The trail will be separate from the NATR motor road. Alternative 3 was construction of three separate paved trail segments. The trail segments would be independent of one another.

Alternative 1, the no-action alternative, will have no impact on wetlands. Alternative 2 and alternative 3 will have adverse impacts on wetlands. The extent and level of impacts were not identified in the 1995 EA.

The 1995 EA indicated that adverse impacts to wetlands will be minimized by the use of temporary erosion control devices during construction, such as silt fences, slope drains, straw bales, inlet protection, plastic lining, loose riprap, sediment traps, diversion berms, and/or diversion channels in areas where there will be a potential to impact wetland areas. Permanent erosion control devices, such as loose riprap, paved waterways, and solid sod will be utilized at locations where the need exists.

Alternative 3 will have the same kinds of impacts as alternative 2 in the 2.97-mile multi-use trail project discussed in this SOF. Mitigation to minimize adverse impacts and to compensate for unavoidable impacts will be the same as for alternative 2.

An additional alternative, paving the roadside shoulders of the NATR motor road through the greater Jackson metropolitan area, was considered but rejected for a number of reasons. Foremost being the safety of non-motorized recreational users being placed immediately adjacent to vehicle traffic, incompatibility with the visual continuity and scenic character of the

NATR experience afforded NATR visitors, and negative impacts on the historic design integrity of the NATR landscape experience.

This SOF has been prepared to comply with NPS Director's Order #77-1, which requires such statement to be prepared to document why an alternative with such impacts was chosen, and to meet the other requirements identified in the procedural manual for protection of wetlands (NPS Procedural Manual #77-1: Wetland Protection 1998).

PURPOSE AND NEED FOR THE ACTION

In 1938 the Natchez Trace Parkway was established as a unit of the NPS by Congress to commemorate the historic Natchez Trace – the principal overland link between the Southwest Territory and the Mississippi River and the United States during the late 18th and 19th centuries. The NATR motor road is designed to follow the alignment of the historic Natchez Trace as closely as possible.

In 1968 the National Trails Systems Act of 1968 (16 USC 1241-51) designated Natchez Trace as one of the initial trails to be studied for potential inclusion in the national trails system which will provide ". . . for the ever-increasing outdoor recreation needs of an expanding population . . . to promote preservation of, public access to, travel within and enjoyment and appreciation of the open-air, outdoor areas and historic resources for the Nation."

In 1983 the Natchez Trace Scenic Trail, established by Congress as a result of the Bureau of Outdoor Recreation (BOR) study and recommendations, and the NPS were directed to designate a route.

The 1987 *Comprehensive Trail Plan, Natchez Trace National Scenic Trail / Alabama-Mississippi-Tennessee* (NPS 1987) developed in conjunction with the Natchez Trace Parkway General Management Plan (NATR-GMP) (NPS 1987), identified the Jackson, Mississippi, metropolitan area as one of three high use areas in which the NPS will build multi-use trails on NATR lands, but off of the NATR motor road. The Trail Plan states that; "Bicycling will continue along the entire developed length of the NATR. Bicycle use will be monitored however, and accommodations will be made to separate bicyclists and vehicular traffic where required in heavy use areas."

By the 1990s increasingly heavy volumes of vehicular traffic on the NATR motor road through the Jackson, Mississippi, metropolitan area presented serious safety concerns for bicyclists traveling on the NATR motor road.

To address that concern, the 1995 EA identified two alternative multi-use trail routes and a no action alternative through the Jackson metropolitan area on NATR lands adjacent to the NATR motor road (NPS 1995). The preferred alternative, alternative 2, is a separate and continuous multi-use trail between approximately mileposts 86.6 and 107.9. The preferred alternative includes the segment of the multi-use trail north of the NATR motor road between from 2,000 feet east of Livingston Road to Highland Colony Parkway (approximately from milepost 98.23 to milepost 101.2) that is the subject of this SOF.

In 1999 a Congressional Directive to the NPS directed the NATR to construct a multi-use trail in conjunction with the construction of the NATR motor road (U.S. Congress 1999). A subsequent Congressionally mandated feasibility study prepared by the Eastern Federal Lands Highway Division of the Federal Highway Administration (EFLHD/FHWA) in conjunction with the NPS, identified the Jackson, Mississippi, metropolitan area as one of three metropolitan areas

transected by the NATR motor road where a multi-use trail should be built within the NATR boundaries, based on existing and projected future average daily traffic volumes (ADT).

Design Alternatives Considered

The multi-use trail analyzed as the preferred alternative in the 1995 EA will have had a paved surface 8 feet wide (NPS 1995). Because the minimum width of a multi-use trail currently recommended by AASHTO is now 10 feet, the trail design was widened to accommodate that new standard. That design change was addressed in a memo to file from the NATR Superintendent, dated March 27, 2007 (NPS 2007a) and is available at the NATR Headquarters.

The separate and continuous multi-use trail between approximately mileposts 86.6 and 107.9 will be constructed in segments at this time due to funding constraints. Design of a 2.2-mile segment of this multi-use trail from the 1995 EA was completed in 2008, and construction is scheduled to be completed in Spring 2010. Wetland impacts of this segment from Old Canton Road to Reservoir Overlook Parking Area (approximately from milepost 103.6 to milepost 105.8) were analyzed in a Wetland SOF approved by the Southeast Regional Director in April 2008 (NPS 2008).

On May 23 through 25, 2007, NPS and EFLHD/FHWA staff, with staff from Parsons Corporation, conducted a Value Analysis and Value Engineering study (VA/VE) of the multi-use trail design for a 2.2-mile segment of proposed multi-use trail through the Jackson, Mississippi, metropolitan area. However, many of the following recommendations from the VA/VE for this segment will also be applicable to the entire 21 miles of multi-use trail. It was confirmed at the VA/VE that the multi-use trail will be located on NATR property, but away from the NATR motor road as much as feasible, and primarily within wooded areas, with intermittent views to and from the NATR motor road. The trail design and construction will be guided by the AASHTO *Guide for the Development of Bicycle Facilities* (AASHTO 1999), and by the Americans with Disabilities Act (ADA), superseded by the ABAAS (General Services Administration [GSA] 2006).

On December 16, 2008, an on-site field review of the 70 percent design plans for the current trail segment from 2,000 feet east of Livingston Road to Highland Colony Parkway was completed by staff from the EFLHD/FHWA, staff from NPS-NATR, and NPS-DSC. Consideration has been given to potential realignment of parts of the trail, to avoid or reduce impacts to wetlands while avoiding impacts to other resources, maintaining the desired NATR trail and NATR motor road character, and complying with other design criteria and the basis of planning and design from the 1995 EA (NPS 1995).

Wetlands in the project area

The project area, the segment of the trail between 2,000 feet east of Livingston Road (approximately milepost 98.23) and Highland Colony Parkway (approximately milepost 101.2) is characterized by Palustrine Forested Wetlands and some Palustrine and Riverine Emergent Wetland fringe areas interspersed with forested uplands. This area contains a number of utility/access pathways. Maintained, grassed turf areas border the NATR's motor road edge of pavement (ASGEC 2007).

The wetlands are heavily impacted by urban development. Many of the wetlands receive urban road and parking lot runoff, some are associated with drainage ditches, though a number of them are associated with intermittent streams and other perennial streams, Hanging Moss Creek Tributary #4, White Oak Creek and its tributaries, and an associated unnamed stream. All of the

wetlands have been impacted by urban development, directly by the construction of roads and housing developments or indirectly through the change in hydrology from water diversion associated with this urban development. This development has also aided in the isolation and fragmentation of these wetlands, further decreasing their function and value.

Invasive and/or exotic species, such as the non-native, invasive species, Chinese privet (*Ligustrum sinense*) and native, invasive species, water oak (*Quercus nigra*), are also common in the forested uplands and the wetlands. Chinese privet is listed as one of Mississippi's ten worst invasive weeds by the Mississippi State University Extension Service and is abundant throughout the study area (ASGEC 2008).

Wetlands have been delineated by an NPS contractor, ASGEC, as required by the 1995 EA, which directed that SOFs will be completed prior to trail construction and appended to the EA (NPS 1995). For purposes of compliance with Executive Order 11990, the NPS uses "Classification of Wetlands and Deepwater Habitats of the United States," (U.S. Fish and Wildlife Service [USFWS], Cowardin et al. 1979) as the standard for defining, classifying, and inventorying wetlands. Field delineation of wetlands was performed at the sites in January and February 2008 (ASGEC 2008). Vegetation, soils, and hydrology were examined for evidence of wetland characteristics according to the three-parameter approach methodology outlined in the U.S. Army Corps of Engineers (USACE) Wetlands Delineation Manual (USACE 1987) as required by the USACE for use in the Section 404 of the Clean Water Act permitting process, as well as the Cowardin methodology required by the NPS (ASGEC 2008).

The abovementioned delineation identified wetlands that are classified according to USFWS, Cowardin et al. (1979) as palustrine and riverine systems. Of the 1.89 acres of wetlands being impacted by the construction of the multi-use trail, 1.75 acres of wetlands were classified as Palustrine Forested Broad-leaved Deciduous Wetland (PFO1) and 0.06 acres were classified as Riverine Lower Perennial Emergent Non-persistent Wetland (R2EM2) and 0.08 acres were classified as Palustrine Emergent Persistent Wetland. Sheets No. D1-D7 of the FHWA Plans at the end of the document illustrate the location of the trail relative to the delineated wetlands. According to the delineation report, palustrine wetland areas exhibited ponding and saturated soil to the surface in most instances. Field indicators of long-term hydrology within the wetlands included water-stained leaves, oxidized root channels, water marks on trees, sediment deposits, drainage patterns, inundation, and saturation, as well as morphological features, such as fluted and buttressed trunks (ASGEC 2008). Wetlands were located in NATR roadside ditches, topographical depressions or along open water in a tributary of Hanging Moss Creek, White Oak Creek and two of its tributaries, an unnamed stream, and drainage ditches.

The FHWA Plans and Profiles are 95% complete and are subject to change. They have not yet been finalized for construction.

Functions and values

This section describes the functions and values of typical Palustrine Forested Broad-leaved Deciduous Wetlands, Palustrine Emergent Persistent Wetlands, and Riverine Lower Perennial Emergent Non-Persistent Wetlands.

The vegetation in the project area was described as part of the Wetland Delineation Report (ASGEC 2008). There have not been any fish or wildlife surveys in the project area. The fish and wildlife described below are species that are known to occur along portions of the NATR (Accipiter Biological Consultants [ABC] 2001a; ABC 2001b; NPS 2007b and NPS 2007c) and

potentially occur in the project area based on the natural history of the species and scientific literature.

Palustrine System

The palustrine system (Figure 3) includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 parts per thousand. The palustrine system was developed to group the vegetated wetlands traditionally called by such names as marsh, swamp, bog, fen, and prairie, which are found throughout the United States. It also includes the small, shallow, permanent or intermittent water bodies often called ponds. Palustrine wetlands may be situated shoreward of lakes, river channels, or estuaries; on river floodplains; in isolated catchments; or on slopes. They may also occur as islands in lakes or rivers. The erosive forces of wind and water are of minor importance except during severe flood (USFWS, Cowardin et al. 1979).

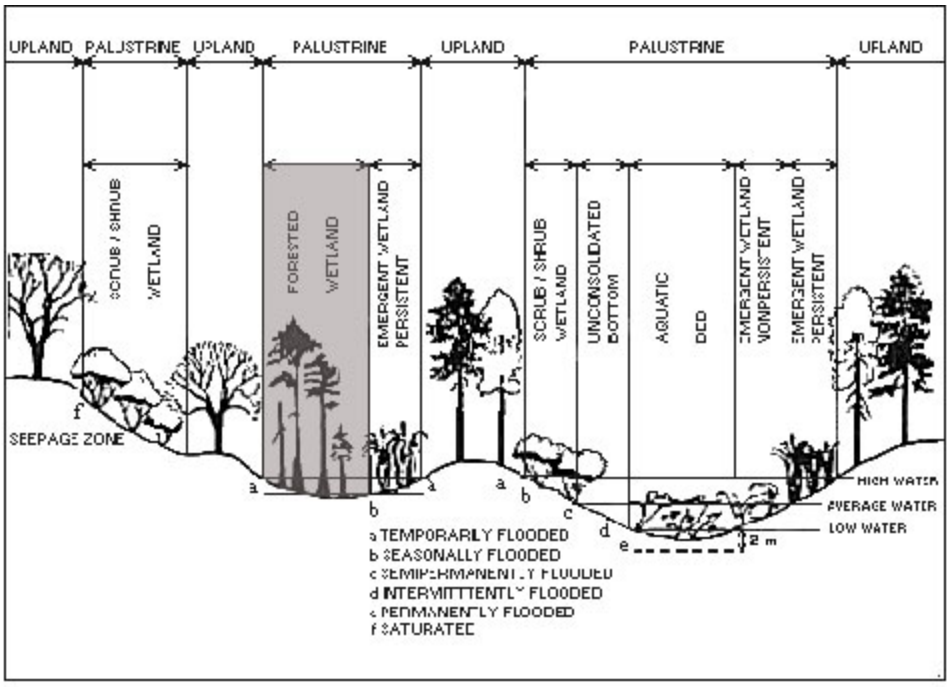


Figure 3. A palustrine forested broad-leaved deciduous wetland (USFWS, Cowardin et al. 1979).

A Palustrine Forested Broad-leaved Deciduous Wetland (Figure 3) may be saturated or temporarily or seasonally flooded. Saturated means that the substrate is saturated to the surface for extended periods during the growing season, but surface water is seldom present. Temporarily flooded means that surface water is present for brief periods during the growing season, but the water table usually lies well below the soil surface for most of the season. Plants that grow both in uplands and wetlands are characteristic of the temporarily flooded regime. Seasonally flooded means that surface water is present for extended periods, especially early in the growing season, but is absent by the end of the season in most years. When surface water is absent, the water table is often near the land surface (USFWS, Cowardin et al. 1979). For ease

of reading the term Palustrine Forested Broad-leaved Deciduous Wetland will be shortened to Palustrine Forested Wetland.

Palustrine Forested Wetlands are characterized by woody vegetation that is 6 m (20 feet) tall or taller. Forested wetlands usually possess an overstory of trees, an understory of young trees or shrubs, and an herbaceous layer. In the project area, the overstory of the forested wetlands is dominated by broad-leaved deciduous trees, such as sweet gum (*Liquidambar styraciflua*), water oak (*Quercus nigra*), American sycamore (*Platanus occidentalis*), sugarberry (*Celtis laevigata*), box elder (*Acer negundo*), and American elm (*Ulmus americana*). Sweet gum, American elm, boxelder, sugarberry, winged elm (*Ulmus alata*), and water oak dominated the woody understory. The shrub layer is dominated by Chinese privet (*Ligustrum sinense*), devil's walking stick (*Aralia spinosa*), and inkberry (*Ilex glabra*). The woody vine layer is dominated by red raspberry (*Rubus strigosus*) and other variations of raspberry species (*Rubus* spp.), Japanese honeysuckle (*Lonicera japonica*), and grape species (*Vitis* spp.). The herbaceous layer is dominated by soft rush (*Juncus effuses*), sensitive fern (*Onoclea sensibilis*), Japanese honeysuckle, river birch seedlings (*Betula nigra*), and water oak seedlings (ASGEC 2008).

Palustrine Forested Broad-leaved Deciduous Wetlands, also known as bottomland hardwood forests, provide wildlife habitat in their overstory, understory, and also on the forest floor where small depressions may form as a result of flood water scouring and sediment deposition. Bottomland hardwood forests provide important breeding habitat for a variety of migratory and resident bird species. High water levels may provide high quality habitat for wintering waterfowl, yet diminish habitat suitability for numerous woodpeckers and other woodland species. During periods of low water levels, bottomland hardwoods may be utilized by several wading birds, including the great blue heron (*Ardea herodias*) and the white ibis (*Eudocimus albus*), and acorn-caching species, such as the redheaded woodpecker (*Melanerpes erythrocephalus*) (USACE 2001).

Monitoring of spring migrants using WSR-88D doppler radar along the Gulf Coast has shown that migrants frequently land in bottomland forests along river systems upon arrival and depart these areas during early morning hours (Gathreaux 1999). Often, migrating birds will fly over coastal areas and land inland along forested river systems. If birds are using river systems as landmarks, then associated forested habitats along rivers may be vital for a successful migration for many species. Examples of species found during migration in bottomland forests include black-throated blue warblers (*Dendroica caerulescens*), American redstarts (*Setophaga ruticalla*), Baltimore orioles (*Icterus balbula*), and black-throated green warblers (*Dendroica virens*) (USACE 2001).

Southern bottomland hardwood forests also support a diverse array of nearctic migrants and year-round resident birds during the winter months (USACE 2001). Nearctic migrants account for about 55 percent of the bird community in southern bottomland hardwood forests. Residents and occasional transient species comprise the rest of the community (Dickson 1978). Typical nearctic species in southern bottomland hardwood forests include the ruby-crowned kinglet (*Regulus satrapa*), yellow-rumped warbler (*Dendroica coronata*), white-throated sparrow (*Zonotrichia albicollis*), brown creeper (*Certhia americana*), and yellow-bellied sapsucker (*Sphyrapicus varius*) (USACE 2001), almost all of which are known to occur on the NATR (ABC 2001a) and potentially occur in the project area. During high water levels, bottomland hardwoods may also support many wintering waterfowl species, including the wood duck (*Aix sponsa*), mallard (*Anas platyrhynchos*), and hooded merganser (*Lophodytes cucullatus*) (USACE 2001).

Southern bottomland hardwood forests also support numerous species of year-round resident birds. Year-round resident species comprise about 35 to 55 percent of seasonal bird communities (Dickson 1978; Zeller and Collazo 1995). Common southern bottomland hardwood forest resident species are the white-breasted nuthatch (*Sitta carolinensis*), the pileated woodpecker (*Dryocopus pileatus*), the downy woodpecker (*Picoides pubescens*), the red-bellied woodpecker (*Melanerpes carolinus*), the tufted titmouse (*Baelophus bicolor*), Carolina wren (*Thryothorus ludovicianus*) and Carolina chickadee (*Poecile carolinensis*) (USACE 2001), all of which are known to occur on the NATR (ABC 2001a) and potentially occur in the project area.

Southern bottomland hardwood forests are renowned for supporting large numbers of breeding bird species. During the breeding season, the number of neotropical migrants breeding in these habitats ranges from 48 to 65 percent of the total breeding bird assemblage (U.S. Forest Service [USFS], Pashley and Barrow 1992). While many resident and wintering species are found in a variety of forested habitats, many breeding species either breed exclusively in bottomland forests or have highest densities and/or reproductive success in these areas. Several species are considered forested wetland specialists, including the prothonotary warbler (*Protonotaria citrea)* and the swallow-tailed kite (*Elanoides forficatus*) (Meyer 1995, Petit 1999). The prothonotary warbler is known to occur on the NATR (ABC 2001a) and potentially occurs in the project area. One of the most common neotropical migrants, the Acadian flycatcher (*Empidonax virescens*), is largely restricted to forested wetland habitats during the breeding season in the Southeast (USACE 2001). A species of warbler known to occur on the NATR (ABC 2001a) and potentially occurring in the project area, showing sharp declines throughout its range during the past few decades is the Cerulean warbler (*Dendroica cerulea*). This warbler achieves highest densities and reproductive success in bottomland forests in the Southeast (USACE 2001). Seasonally flooded areas are often characterized by the presence of five species, the eastern wood-pewee (*Contopus virens*), great-crested flycatcher (*Myiarchus crinitus*), yellow-throated vireo (*Vireo flavifrons*), blue-gray gnatcatcher (*Polioptila californicus*), and prothonotary warbler (USFS, Pashley and Barrow 1992); all of which are known to occur on the NATR (ABC 2001a) and potentially occur in the project area.

The Avifauna Inventory (ABC 2001a) and Reptile and Amphibian Inventory (ABC 2001b) studies included two general habitat types, the bottomland hardwood woodland habitat type and the riparian woodland habitat type, which are considered to be part of the bottomland hardwood designation used above. Sixty-five species of birds were found in the bottomland hardwood general habitat, and 80 species of birds were found in the riparian woodland general habitat as part of the sampling for the Natchez Trace Parkway Avifauna Inventory Project (ABC 2001a). A list of species, including bird species, known to occur on the NATR and potentially occurring in the project area is provided in Table 1.

Shallow depressions in bottomland hardwood forests, sometimes known as vernal ponds, seasonal, or temporary wetlands, can provide important habitat for amphibians. These depressions will often fill with water during the spring or fall and dry up during the remaining seasons. Fish are not able to become established due to the temporary nature of the wetland. This makes depressional habitat especially important as breeding and rearing habitat for not only amphibians, but also crustaceans and insects (USFS, Biebighauser 2003). Approximately one-half of all frogs and one-third of all salamander species rely on seasonal or temporary wetlands for development (USFS, Biebighauser 2003). Three species of amphibians, the spring peeper (*Hyla crucifer*), the northern cricket frog (*Acris crepitans*), and the southern cricket frog (*Acris gryllus*), were found in the bottomland hardwood general habitat and 12 species were found in

the riparian woodland general habitat as part of the sampling for the Natchez Trace Parkway Amphibian and Reptile Inventory Project (ABC 2001b). A list of species, including amphibian species, known to occur on the NATR, (ABC 2001b) and potentially occurring in the project area is provided in Table 1.

A complete list of reptiles known to occur on the NATR (ABC 2001b) and potentially occurring in the project area is provided in Table 1.

Mammals occurring in the southern bottomland hardwood forests of Mississippi and potentially on the NATR include opossum (*Didelphis virginiana*), the swamp rabbit (*Sylvilagus aquaticus*), mink (*Mustela vison*), muskrat (*Ondatra zibethicus*), river otter (*Lutra canadensis*), and bats, such as the southeastern myotis (*Myotis austroriparius*), the little brown myotis (*Myotis lucifugus*), the gray myotis (*Myotis grisescens*), the northern yellow bat (*Lasiurus intermedius*), the Rafinesque's big-eared bat (*Corynorhinus rafinesquii*), the Hoary bat (*Lasiurus cinereus*), the northern myotis (*Myotis septentrionalis*), the Indiana Myotis (*Myotis sodalis*) and the silver-haired bat (*Lasionycteris noctivagans*) (Mississippi Museum of Natural Science [MMNS] 2005; NPS 2007b). Many of the bats are on the State of Mississippi's Species of Greatest Conservation Need list (MMNS 2005). A complete list of mammals potentially occurring on the NATR (NPS 2007c) and the project area is provided in Table 1.

A Palustrine Emergent Persistent Wetland (Figure 4) may be characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants that remain standing at least until the beginning of the next growing season and include most water regimes. In areas with relatively stable climatic conditions, emergent wetlands maintain the same appearance year after year. In other areas, violent climatic fluctuations cause them to revert to an open water phase in some years (Steward and Kantrud 1972). Emergent wetlands are found throughout the United States and occur in all systems except the marine. Water depth in the deepest part of the basin is usually less than 2 meters at low water. Emergent wetlands are known by many names, including marsh, meadow, fen, prairie pothole, and slough. Persistent emergent wetlands are dominated by species that normally remain standing at least until the beginning of the next growing season (USFWS, Cowardin et al. 1979). For ease of reading the term Palustrine Emergent Persistent Wetland will be shortened to Palustrine Emergent Wetland.

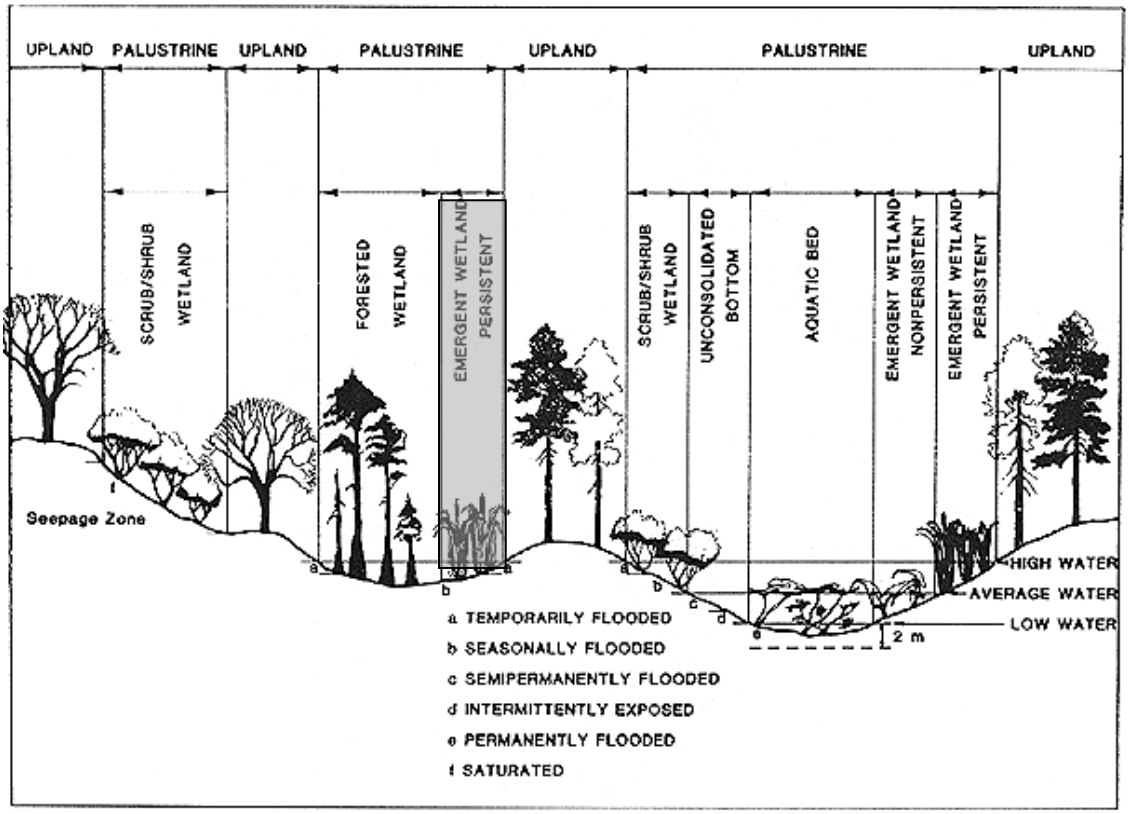


Figure 4. A Palustrine Emergent Persistent Wetland (USFWS, Cowardin et al. 1979).

Palustrine Emergent Wetlands provide habitat for many species of fish and wildlife. Many wading birds, such as herons and egrets are known to occur on the NATR and potentially occur in the Palustrine Emergent Wetlands in the project area. Migratory and resident waterfowl may also use this type of wetland during migration or the breeding season.

A complete list of bird species known to occur on the NATR (ABC 2001a) and potentially occurring in the project area is provided in Table 1.

Thirty-one species of reptiles and amphibians were identified as occurring in Palustrine Emergent Wetlands on the NATR (ABC 2001b). Some of the more common amphibians include the southern leopard frog, the green frog (*Rana clamitans*), bronze frog (*Rana clamitans clamitans*), the northern cricket frog, and the red-spotted newt (*Notophthalmus viridescens viridescens*). Some of the more common reptiles found in this type of wetland include the red-eared slider (*Trachemys scripta elegans*), the chicken turtle (*Deirochelys reticularia*), the common snapping turtle (*Chelydra serpentina*), and the eastern mud turtle (*Kinosternon subrubrum subrubrum*). A complete list of reptile and amphibian species known to occur on the NATR (ABC 2001b) and potentially occurring in the project area is provided in Table 1.

No federally or state listed threatened or endangered species are known to occur in the project area.

Riverine System

The riverine system (Figure 5) includes all wetlands and deepwater habitats contained within a channel, with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, and (2) habitats with water containing ocean-derived salts in excess of 0.5 parts per thousand (USFWS, Cowardin et al. 1979). A channel is "an open conduit either naturally or artificially created which periodically or continuously contains moving water, or which performs a connecting link between two bodies of standing water" (USGS, Langbein and Iseri 1960). Water is usually, but not always, flowing in the riverine system (USFWS, Cowardin et al. 1979).

A Riverine Emergent Perennial Non-persistent Wetland is semipermanently flooded, which means that surface water persists throughout the growing season in most years. When surface water is absent, the water table is usually near the land surface. Herbaceous hydrophytic vegetation is usually present for most of the growing season. Non-persistent wetlands are dominated by plants which fall to the surface of the substrate or below the surface of the water at the end of the growing season so that, at certain seasons of the year, there is no obvious sign of emergent vegetation. The dominant vegetation in the project area Riverine Emergent Wetlands were spring cress (*Nasturtium officinale*), vetch spp. (*Vicia* spp.), sedge spp., soft rush (*Juncus effuses*), and maintained grasses (ASGEC 2008). For ease of reading the term Riverine Emergent Perennial Non-persistent Wetland will be shortened to Riverine Emergent Wetland.

Like Palustrine Emergent Wetlands, Riverine Emergent Wetlands provide habitat for many species of fish and wildlife. Many wading birds, such as herons and egrets are known to occur on the NATR and potentially occur in the Riverine Emergent Wetlands in the project area. Migratory and resident waterfowl may also use this type of wetland during migration or the breeding season.

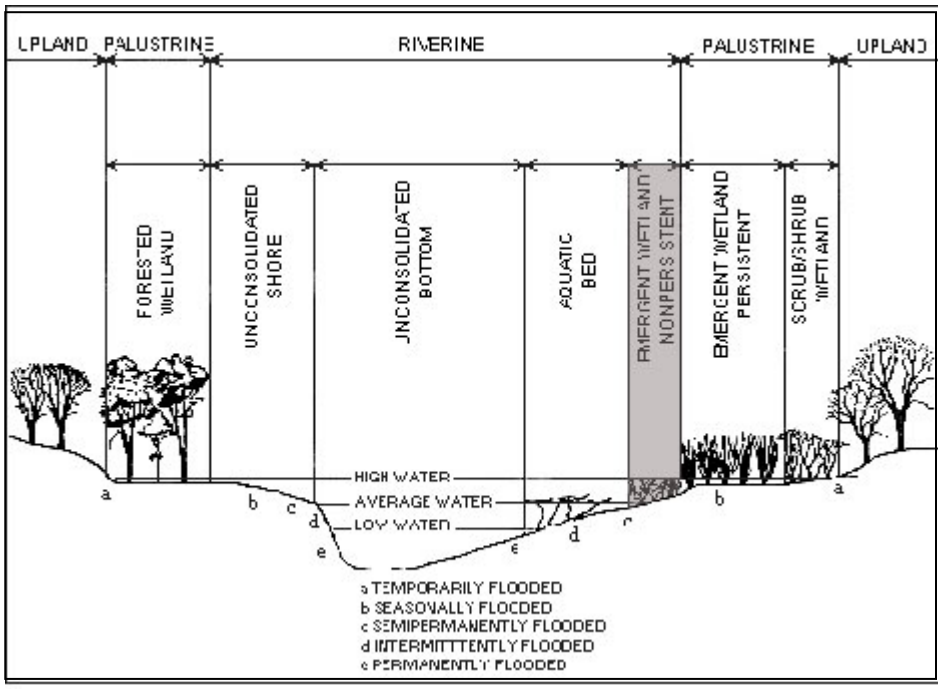


Figure 5. A Riverine Emergent Wetland (USFWS, Cowardin et al. 1979).

A complete list of bird species known to occur on the NATR (ABC 2001a) and potentially occurring in the project area is provided in Table 1.

Thirty-one species of reptiles and amphibians were identified as occurring in Riverine Emergent Wetlands on the NATR (ABC 2001b). Some of the more common amphibians include the southern leopard frog, the green frog (*Rana clamitans*), bronze frog (*Rana clamitans clamitans*), the northern cricket frog, and the red-spotted newt (*Notophthalmus viridescens viridescens*). Some of the more common reptiles found in this type of wetland include the red-eared slider (*Trachemys scripta elegans*), the chicken turtle (*Deirochelys reticularia*), the common snapping turtle (*Chelydra serpentina*), and the eastern mud turtle (*Kinosternon subrubrum subrubrum*). A complete list of reptile and amphibian species known to occur on the NATR (ABC 2001b) and potentially occurring in the project area is provided in Table 1.

Riverine Emergent Wetlands provide fish spawning and nursery habitat for species, such as small-mouth bass (*Micropterus dolomieu*), large-mouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), and the common carp (*Cyprinus carpio*). A complete list of fish species known to occur on the NATR (NPS 2007b) and potentially occurring in the project area is provided in Table 1.

No federally or state listed threatened or endangered species are known to occur in the project area.

The abovementioned wetlands, the Palustrine Forested Wetlands, the Riverine Emergent Wetlands, and the Palustrine Emergent Wetlands, also provide flood storage, reduce flood flows and the velocity of flood waters, reducing erosion and causing flood waters to release sediment. These types of wetlands also aid in nutrient trapping and groundwater recharge/discharge. Wetland vegetation, especially the vegetation in Riverine Emergent and Palustrine Emergent Wetlands, filters out pollutants from the water, while microorganisms utilize nutrients and break down organic matter, improving water quality. Insects living in the substrate and vegetation of the wetlands are the basis of the food chain for the abovementioned wildlife and fish species. Generally, these types of wetlands also serve as recreation areas for hunting, fishing, and wildlife observation and are economically important to local communities as a source of ecotourism and subsistence.

Locally, the wetlands along this relatively narrow (approximately 800 feet wide) urban section of the NATR have been impacted by development and have limited access, so they no longer provide many recreational opportunities. Hunting is not allowed in the park. Constructing the multi-use trail will enable the increased use of these wetlands for wildlife and nature observation. The trail will provide opportunities for recreation primarily in the form of bicycling and walking. No motorized vehicles other than authorized maintenance or emergency vehicles will be allowed on the trail.

The wetlands in the project area are heavily impacted by urban development, directly by the construction of roads and housing developments or indirectly through the change in hydrology from water diversion associated with this urban development. This development has also aided in the isolation and fragmentation of these wetlands. As a result, the abovementioned functions and values of these wetlands have been degraded.

Avoidance and Minimization

The NPS in cooperation with the FHWA is proposing to design and construct approximately 2.97 miles of multi-use trail from 2,000 feet east of Livingston Road to the Highland Colony Parkway, between approximately milepost 98.23 and milepost 101.2 within the NATR motor road right of way. Design emphasis has been to avoid wetlands, which has reduced impacts to wetland resources. Approximately 1.89 acres of wetlands will be impacted by trail construction. The abundance of wetland resources on both sides of the NATR motor road precludes the complete avoidance of impacts to wetlands. Impacts will include the filling in of wetlands, removal and injury to wetland vegetation, and hydrological changes to wetlands. These impacts are described in more detail below.

The trail begins 2,000 feet east of Livingston Road near Jackson, Mississippi (Figure 2). The trail alignment travels east midway between the NATR motor road and the NATR boundary until it travels north to bisect a Palustrine Forested Wetland, impacting 0.780 acres. This wetland is supported by high flows from Hanging Moss Creek Tributary #4, runoff from adjacent uplands, and groundwater seepage (ASGEC 2008). The trail will fill in part of the wetland, impacting vegetation, soils, and hydrology beneath the trail. The trail will also interrupt wetland hydrology by bisecting the wetland. Construction activities will impact the wetland adjacent to the trail, disturbing wetland vegetation and compacting wetland soils. These impacts to wetland vegetation, soils, and hydrology will adversely impact wildlife, permanently because of the loss of wetland habitat beneath the trail as well as temporarily because of construction impacts described above adjacent to the trail and construction noise disturbance. Wildlife potentially occurring in Palustrine Forested Wetlands and potentially adversely impacted by construction activities is described above. To minimize these wetland impacts, effort was made to bisect the wetland in the narrowest part of the wetland between the NATR motor road and the NATR boundary yet also allow a buffer between the trail and the NATR motor road. Two 18-inch culverts will also be installed in the Palustrine Forested Wetland intersecting the trail from approximately Station 8+00 to Station 12+50 to facilitate water flow past the trail and ensure a hydrological connection between wetlands on both sides of the trail. A 12-foot span, 5-foot rise concrete box culvert will be installed at the Hanging Moss tributary #4 (approximately located at Station 10+00). After Station 14+00 the trail will meander southward to avoid Palustrine Emergent Wetlands and will travel midway between the NATR motor road and the NATR boundary until it reaches Station 26+03. See Sheet No. D1 of the FHWA Plan and Profile Sheets at the end of this document.

At Station 26+03 the trail will bisect Palustrine Forested Wetlands at a narrow point, impacting 0.045 acres. This wetland is influenced by a combination of groundwater seepage from the upgradient Palustrine Emergent Wetland and runoff from adjacent upland areas (ASGEC 2008). The trail will fill in part of the wetland, impacting vegetation, soils, and hydrology beneath the trail. The trail will interrupt wetland hydrology by bisecting the wetland. Construction activities will also impact the wetland adjacent to the trail, disturbing wetland vegetation and compacting wetland soils. These impacts to wetland vegetation, soils, and hydrology will adversely impact wildlife, permanently because of the loss of wetland habitat beneath the trail as well as temporarily because of construction impacts described above adjacent to the trail and construction noise disturbance. See Sheet No. D2 of the FHWA Plan and Profile Sheets at the end of this document.

The trail will continue east bisecting a narrow point of the Palustrine Forested Wetland (from approximately Station 37+00 to Station 37+60) impacting 0.050 acres. The wetland is

influenced by runoff from a stormwater outfall beneath North Agency Lane and runoff discharged from a paved ditch along the NATR motor road (ASGEC 2008). The impacts would be the same as those mentioned above for Palustrine Forested Wetlands. To minimize these wetland impacts and ensure drainage past the trail, a 36-inch culvert will be installed in the Palustrine Forested Wetland located at these stations. The trail will continue east and north to eventually travel adjacent to North Agency Lane.

At Station 43+00 trail bridges will be built parallel to North Agency Lane to cross White Oak Creek Tributary #1 and White Oak Creek. All trail bridge abutments will be built on the existing fill of North Agency Lane, but some additional fill will also be necessary to support the trail bridge abutments causing impacts to 0.002 acres of Palustrine Forested Wetlands adjacent to North Agency Lane. These impacts will include the filling in of the Palustrine Forested Wetland along its boundary adjacent to the trail bridge abutments, impacting wetland vegetation and causing soil compaction. These wetlands adjacent to North Agency Lane are supported by high flows from White Oak Tributary #1 (ASGEC 2008). Hydrology would be minimally impacted as a result of this fill along the wetland boundary. Fish and wildlife would also be impacted by this fill because of the permanent loss of wetland habitat beneath the trail as well as temporarily because of the abovementioned construction impacts adjacent to the trail and construction noise disturbance. The trail bridges will be supported by four piers mimicking the piers beneath the bridges of the NATR motor road. None of these piers will impact wetlands. At Station 51+50 the trail will begin again and will run slightly southeast after Station 53+81. See Sheet No. D2 of the FHWA Plan and Profile Sheets at the end of this document.

A 36-inch culvert will be installed in the Palustrine Forested Wetlands intersecting the trail from Station 55+40 to Station 56+40. This wetland receives stormwater runoff from an outfall beneath North Agency Lane. It also receives stormwater runoff from the adjacent uplands (ASGEC 2008). The trail will impact 0.065 acres of Palustrine Forested Wetlands. The abovementioned 36-inch culvert will minimize impacts to hydrology as well as ensure drainage past the trail. The trail will fill in part of the wetland, impacting vegetation, soils, and hydrology beneath the trail. The trail will interrupt wetland hydrology by bisecting the wetland. Construction activities will also impact the wetland adjacent to the trail, disturbing wetland vegetation, wetland hydrology, and compacting wetland soils. These impacts to wetland vegetation, soils, and hydrology will adversely impact wildlife, permanently because of the loss of wetland habitat beneath the trail as well as temporarily because of the abovementioned construction impacts adjacent to the trail and construction noise disturbance. See Sheet No. D3 of the FHWA Plan and Profile Sheets at the end of this document.

The trail will continue east, crossing Patterson Crossing. Shortly after Patterson Crossing, the trail will bisect a Palustrine Forested Wetland from Stations 61+50 to 63+89, impacting 0.345 acres. This wetland receives runoff from a stormwater outfall beneath North Agency Lane and from adjacent upland areas (ASGEC 2008). A 7-foot span, 3-foot rise concrete box culvert will be installed in a small drainage located at Station 62+67. An 18-inch culvert will also be installed in the Palustrine Forested Wetlands intersecting the trail at approximately Station 64+00 to facilitate water flow past the trail and ensure a hydrological connection between wetlands on both sides of the trail. The wetland impacts would be similar to those described above for the Palustrine Forested Wetlands intersecting the trail from Station 55+40 to Station 56+40. See Sheet No. D3 of the FHWA Plan and Profile Sheets at the end of this document.

A 48-inch culvert will be installed in the Palustrine Forested Wetlands intersecting the trail from Station 74+30 to 75+00. This wetland receives runoff from adjacent upland areas (ASGEC

2008). The trail will impact 0.070 acres of Palustrine Forested Wetlands. The wetland impacts will be the same as those described above. To minimize these wetland impacts, effort was made to bisect the wetland in the narrowest part of the wetland between the NATR motor road and the NATR boundary. The trail will continue east and eventually turn southeast to avoid the main body of the Palustrine Forested Wetlands located at approximately Station 83+00. However, 0.015 acres of Palustrine Forested Wetlands adjacent to White Oak Creek Tributary #2 will also be bisected by the trail before it intersects White Oak Creek Tributary #2. The hydrology of these wetlands is supported by high flows from White Oak Tributary #2 (ASGEC 2008). The wetland impacts will be similar to those described above. A 6-foot span, 5-foot rise box culvert will be installed at White Oak Creek Tributary #2. See Sheet No. D4 of the FHWA Plan and Profile Sheets at the end of this document.

The trail will continue east, meandering between the NATR motor road and the NATR boundary until going through Palustrine Forested Wetlands from Station 90+60 to Station 92+80, impacting 0.190 acres. The hydrology of these wetlands is supported by high flows from White Oak Tributary #3 (ASGEC 2008). The wetland impacts will be similar to those described above. To minimize these impacts, an 18-inch culvert will be installed in the Palustrine Forested Wetland intersecting the trail at Station 91+60 to facilitate water flow past the trail and ensure a hydrological connection between wetlands on both sides of the trail. An additional 0.011 acres of Riverine Emergent Wetlands will also be impacted at this point as the trail goes over White Oak Creek Tributary #3. The hydrology of these wetlands is also supported by high flows from White Oak Creek Tributary #3 (ASGEC 2008). The wetland impacts would be similar to those described above; however, the installation of 12-foot span, 5-foot rise box culvert at White Oak Tributary #3 would permanently remove riverine emergent vegetation and compact wetland soils in the construction footprint. Construction activities on the stream bank would temporarily increase sedimentation in the stream and the riverine emergent wetlands downstream of the new box culvert, which would also impact aquatic organisms, such as insects, fish and wildlife, using the stream and streambank. The trail will continue to meander east between the NATR motor road and the NATR boundary. See Sheet No. D4 of the FHWA Plan and Profile Sheets at the end of this document.

The trail will continue east meandering between the NATR motor road and the NATR boundary until Station 113+99 where it will turn south to avoid impacting the Palustrine Forested Wetlands located from approximately 114+50 to 116+00. The trail will then intersect Unnamed Stream #4 before continuing on to a section of the "old trace" from approximately Station 116+42 to Station 126+50. The existing drainage ditch along the northern side of the "old trace" has been delineated as Riverine Emergent Wetland from Station 116+42 to Station 125+00. From Station 122+70 to Station 126+15 it also contains Palustrine Emergent Wetland. A 30-inch culvert will be installed in the existing drainage ditch along the "old trace" from approximately Station 116+42 to Station 126+50, impacting 0.050 acres of Riverine Emergent Wetland and 0.075 acres of Palustrine Emergent Wetland. This area is a former portion of Old Agency Road, which is historically "old trace" and which has now been restored to the "old trace" appearance. This is an historic site. The existing drainage ditch has eroded, causing unstable sideslopes and impacting the integrity of this section of "old trace." The 30-inch culvert will drain west into Unnamed Tributary #4 from approximately Station 116+42 to 126+50. A stormwater outfall, runoff from adjacent uplands and roadways, and Unnamed Stream #4 support this wetland system (ASGEC 2008). The installation of a 30" culvert will fill in the wetland, impacting vegetation, soils, and hydrology beneath the culvert. Construction activities will also impact the wetland between the culvert and the trail, disturbing wetland vegetation, wetland

hydrology and compacting wetland soils. These impacts to wetland vegetation, soils, and hydrology will adversely impact wildlife, permanently because of the loss of wetland habitat beneath the culvert as well as temporarily because of the abovementioned construction impacts adjacent to the trail and construction noise disturbance.

An 8-foot span by 2-foot rise box culvert will be installed at Station 124+25 and will drain into an existing swale, formerly a drainage ditch connecting a culvert beneath Old Agency Road and a culvert beneath the NATR motor road, which flows to the NATR motor road. This existing swale is delineated as a Palustrine Forested Wetland and has silted in. The existing swale was not maintained after this segment of the Old Agency Road was restored to "old trace." A stormwater outfall and runoff from adjacent uplands and roadways support this drainage swale (ASGEC 2008). The topography in this location is very flat. In order to maintain positive drainage between the trail and the NATR motor road, it will be necessary to excavate from 1 to 3 feet along the majority of the length of the drainage swale between the trail and the culvert under the NATR motor road, permanently impacting 0.073 acres of Palustrine Forested Wetland. The construction of the swale will increase the area of the swale to 0.144 acres. The construction activities will impact Palustrine Forested Wetland, disturbing wetland vegetation, wetland hydrology, and compacting wetland soils. These impacts to wetland vegetation, hydrology, and soils will adversely impact wildlife, permanently because of the loss of wetland habitat from the excavation as well as temporarily because of abovementioned construction impacts adjacent to the trail and construction noise disturbance. To minimize these impacts, the side slopes will be graded, so they will be more gradual, and a floodplain bench will be installed. See Sheet No. S27 of the FHWA Plan and Profile Sheets at the end of this document. Palustrine Forested Wetland vegetation, such as sedges and rushes, will be planted along the floodplain bench to prevent erosion, encourage wetland revegetation, prevent invasive plant species establishment, and blend the excavated area with the surrounding forested landscape. See Sheet No. D5 of the FHWA Plan and Profile Sheets at the end of this document.

The trail will continue running east on the section of the "old trace" avoiding as much as possible the Palustrine Forested Wetlands to the south located from approximately Station 125+00 to Station 128+00. The trail will bisect the Palustrine Forested Wetlands from Station 127+14 to Station 128+30, impacting 0.07 acres of Palustrine Forested Wetlands as it meanders to the south to run between the NATR motor road and Old Agency Lane. These wetlands are supported by the drainage ditch located along the south side of the Old Agency Lane. To facilitate water flow past the trail and ensure a hydrological connection between wetlands on both side of the trail, an 18-inch culvert will be installed at Station 128+50. The construction activities will impact Palustrine Forested Wetland, disturbing wetland vegetation and compacting wetland soils. These impacts to wetland vegetation, soils, and hydrology will adversely impact wildlife, permanently because of the loss of wetland habitat beneath the trail as well as temporarily because of the abovementioned construction impacts adjacent to the trail and construction noise disturbance. See Sheet No. D6 of the FHWA Plan and Profile Sheets at the end of this document.

The trail will continue running east until it crosses Greenwood Crossing. 18-inch culverts will be installed at the intersection with Greenwood Crossing impacting 0.002 acres of Palustrine Emergent Wetlands located in the roadside ditch along Greenwood Crossing. This ditch is located along the toe of the slope of Greenwood Crossing (ASGEC 2008). Construction activities will impact these wetlands by disturbing wetland vegetation, wetland hydrology, and compacting wetland soils. These impacts to wetland vegetation, soils, and hydrology will adversely impact wildlife, permanently because of the loss of wetland habitat beneath the culvert

as well as temporarily because of the abovementioned construction impacts adjacent to the trail and construction noise disturbance. An 18-inch culvert will also be installed at the entrance to the Choctaw Parking Area. The trail will travel north of the Choctaw Parking Area and then immediately south to avoid a stand of mature trees. The trail will then continue east, meandering between the NATR motor road and Old Agency Lane. See Sheet No. D6 of the FHWA Plan and Profile Sheets at the end of this document.

The trail will continue to meander until its approach to Highland Colony Parkway where it will bisect a Palustrine Forested Wetland from Station 156+69 to 160+10, impacting 0.045 acres of wetlands. This wetland collects runoff from the surrounding upland areas and adjacent roadways and subsequently drains toward a culvert located along the Highland Colony Parkway (ASGEC 2008). Construction activities will impact these wetlands by disturbing wetland vegetation, wetland hydrology, and compacting wetland soils. These impacts to wetland vegetation, hydrology, and soils will adversely impact wildlife, permanently because of the loss of wetland habitat beneath the trail as well as temporarily because of the abovementioned construction impacts adjacent to the trail and construction noise disturbance. A 24-inch culvert will be installed at Station 156+69 to accommodate potential flow past the trail. See Sheet No. D6 of the FHWA Plan and Profile Sheets at the end of this document.

During the design process different trail approaches to Highland Colony Parkway were considered to avoid these wetlands, none of which were feasible. When the alignment was shifted south it would have run adjacent to the NATR motor road. The slopes of the NATR motor road are very steep in this area to accommodate a NATR motor road overpass over Highland Colony Parkway. The trail would have intersected the Highland Colony Parkway adjacent to the overpass. The overpass would have made it difficult for vehicles to see trail users waiting at the intersection, causing a safety hazard. It would have been impossible to shift the alignment to the north because at the final proposed location, the trail is at the northern limits of the park right of way and cannot be moved further north. At the proposed location, the trail ties directly into an existing portion of the multi-use trail allowing for a smooth transition between trail sections. This segment of the NATR multi-use trail will end at Highland Colony Parkway. See Sheet No. D7 of the FHWA Plan and Profile Sheets at the end of this document.

The trail will closely match the existing ground elevations. The typical section of the trail will have a 10-foot wide paved travel surface with 2-foot wide unpaved shoulders. The trail, including those segments crossing through wetlands along the NATR motor road, will be constructed on compacted fill, including a an aggregate base to existing ground or 24-inch depth minimum and a cement-treated sub-base approximately 6 inches deep, topped with a layer of Superpave Asphaltic Concrete Pavement approximately 3 inches deep. A drawing of a typical section of the trail is included at the end of this document.

Using a more porous fill through the wetland areas to facilitate wetland connectivity was discussed by the interdisciplinary team (IDT) working on this project. It was determined that the porous fill will not be appropriate in this project due to the following reasons:

- The impacted wetlands are primarily underlain by expansive Yazoo clay. The porous rock fill would require a greater height and width of the overall trail footprint than the current trail design and engineering to prevent shrink-swell of the clay from quickly damaging the trail pavement.
- The porosity of the rock fill, even if encased in filter fabric, would be compromised quickly by fallen leaves, silt, and organic matter.

- There are no appropriate rock sources located within a reasonable and cost effective distance from the project area. Therefore, importing rock would add significant expense.
- Construction and maintenance of the rock fill would be more difficult and expensive than for a paved trail with adequate culverts.
- Implementing porous fill and culverts as illustrated in Figure 40, page 37 from Managing Roads for Wet Meadow Ecosystem Recovery would be contrary to the desired natural "laid lightly on the land" visual character, the NPS mission and the multi-use trail overall design character.
- Additional oversized culverts have been specified in the current trail design where appropriate to facilitate natural drainage and prevent downstream incision.

The use of boardwalks to facilitate wetland connectivity was also considered. It was determined that boardwalks will not be appropriate for this project due to the following reasons:

- Boardwalks would need to be 14 feet wide based on the 10-foot trail width and would need to be designed to accommodate maintenance and emergency vehicles. This would be very expensive to construct and maintain, since it would essentially be one long bridge. Elevated boardwalks (Director's Order 77-1 – Best Management Practices 2002) [DO-77-1 BMP's] recommend the same height as width – 14 feet high) would result in the construction of a bridge that would be incompatible with NATR aesthetics. This structure would require enormous approach fills, especially to maintain the five percent accessible grade. Supports for an elevated boardwalk/bridge would have to be very deep to withstand shifting and damage from expansive clay soils. Approach fills and deeply driven piles with spread footings would significantly increase construction and maintenance costs and would severely impact existing wetlands during construction.
- Low boardwalks may be more aesthetically pleasing than elevated boardwalks; however, they would experience the same clogging problem as the porous rock fill due to fallen leaves, heavy silt, and woody and other debris. Boardwalk surfaces made of wood or plastic can be slippery when wet increasing the potential for safety problems.
- Maintenance would be more difficult and expensive than for a paved trail with adequate culverts.
- Implementing boardwalks as per the DO-77-1 BMP's (NPS 2002) would be contrary to the desired natural "laid lightly on the land" visual character, the NPS mission and the multi-use trail overall design character and the visual quality of the NATR.
- Additional oversized culverts have been specified in the current trail design where appropriate to facilitate natural drainage and prevent downstream incision.

Adverse impacts to wetlands will be minimized during and after construction by implementing an erosion control plan, which calls for the use of temporary erosion control devices and permanent erosion control devices, such as filter fabric and loose riprap at culvert ends, and check dams with erosion control mats to minimize erosion and facilitate revegetation at needed locations. Following trail construction through wetland areas, disturbed ground between the toe of the slope and the adjacent forest will be re-seeded and/or re-planted with a mixture of native herbaceous, hydrophytic species, such as rushes (*Juncus* sp.) and sedges (*Carex* sp.), in order to help facilitate wetland restoration. Trail shoulders and side slopes will be planted with a park preferred seed mix to control erosion.

The majority of the wetlands appear to have been formed by water overflowing the banks of flat graded, narrow streams and then lying on the flat overbank floodplains for extended periods of time. Hanging Moss Creek Tributary #4 and White Oak Creek and tributaries rise and fall gradually as flood events occur. The trail crosses these streams and other minor tributaries perpendicularly, so that flow rises out of and recedes back into the streams at the same rate on both sides of the trail without the need to cross underneath the trail thru a culvert. However, culverts will be installed where appropriate to facilitate natural drainage and prevent downstream incision.

Some of the wetland areas located further away from the large streams will be crossed by the trail such that the potential exists for water to collect in "pockets" behind one side of the trail as flood waters recede. Flat graded 36-inch to 48-inch diameter culverts will be placed in these areas to allow water levels to recede naturally. For most cases, the headwater depths of ponded water trapped in these pockets, e.g. Station 74+15, do not exceed 2 to 3 feet and outlet velocities will be reduced by stabilizing the culvert outlet with riprap. During large springtime flood events, when streambanks are overtopped and the floodwaters are slowly receding, relatively high tailwater will be acting on these culverts as well, further reducing/controlling the outlet velocities.

NATR staff has noted that channel improvements and downstream urban development outside of the Natchez Trace Parkway boundaries may have substantial impacts on the frequency and extent of overbank flooding on Hanging Moss Creek Tributary #4 and White Oak Creek and tributaries. This narrow section of the NATR bisects two of the most heavily developed and dynamic urban areas of Mississippi. The storm water impacts across this narrow section of the NATR are heavily influenced by the management practices of the surrounding municipalities, the developmental history of the adjacent lands, and the existing footprint of the NATR motor road and trail. Urban development impacts, which are outside the park's control, may have the most substantial impacts on the future health of wetlands within the park.

The FHWA Plans and Profiles are 95% complete and are subject to change. The plans have not yet been finalized for construction.

Mitigation

Design emphasis has been to avoid wetlands to limit impacts to wetland resources. Approximately 1.89 acres of wetlands will be impacted by trail construction – 1.75 acres of which are Palustrine Forested Wetland, 0.06 acres of which are Riverine Emergent Wetland, and 0.08 acres of which are Palustrine Emergent Wetland. The NPS will provide compensation through the restoration of approximately 3.90 acres of wetlands. The restored areas will be Palustrine Forested Wetland and will provide equivalent wetland functions to the Palustrine Forested Wetlands being impacted by the project. These functions are described above. In general, in-kind mitigation is preferable to out-of-kind mitigation because it is most likely to compensate for the functions and services lost at the impact site. However, in the case of the impacted Riverine Emergent Wetlands (0.06 acres) and Palustrine Emergent Wetlands (0.08 acres) where the impacts are much less than those to Palustrine Forested Wetland, it was decided that additional Palustrine Forested Wetland would adequately compensate for the lost functions and services of the 0.14 acres of Riverine and Palustrine Emergent Wetlands.

The Brashear's Stand Wetland Mitigation Area (1.9 acres – Milepost 104.5), the Holly Hill Wetland Mitigation Area (0.2 acres – Milepost 154), and the Kosciusko Wetland Mitigation Area (1.8 acres – Milepost 159.2) are currently being mowed to prevent hydrophytic vegetation

from establishing, resulting in a degraded wetland condition (Figures 5, 6, and 7, respectively). These 3.90 acres will be taken out of the mowing regime. The semi-permanent hydrology has prevented mowing except during periods of extended drought. Vegetation from the adjoining forested wetland will encroach and reestablish within the formerly mowed zone. A variety of native species of trees (Table 2) known to occur in bottomland hardwoods along the NATR motor road will be planted at a density of 400 trees per acre to hasten restoration to a mature bottomland hardwood forest with an interlocking canopy. Native herbaceous species, such as sedges (*Carex* spp.) and rushes (*Juncus* spp.) will also be planted. Given time, the heavily degraded area will mature into a Palustrine Forested Broad-leaved Deciduous wetland that is semi-permanently flooded.

Table 2. Native tree species found in bottomland hardwood forests along the Natchez Trace Parkway.

Scientific Name	Common Name
Acer rubrum	Red maple
Ulmus Americana	American elm
Nyssa sylvatica	Black gum
Quercus falcata	Southern red oak
Quercus pagoda	Cherrybark oak
Liquidambar styraciflua	Sweetgum
Fraxinus pennsylvanica	Green ash
Salix nigra	Black willow

Mitigation Success Criteria

The mitigation will be considered successful if the following conditions are realized at the end of the 5-year monitoring program:

- Mitigation areas contain no more than 20 percent total cover by exotic and nuisance plant species,
- Hydrophytic vegetation has become established, and
- At least a 65 percent survival rate of native trees. To ensure survival of 65 percent, seedlings will be protected with biodegradable mesh tubes. Dead seedlings will also be replaced as needed through the 5-year restoration period.

On-Site Monitoring

Monitoring Methodology

Monitoring will be conducted for the restoration site (Figures 5 and 6), beginning immediately after the restoration (after being taken out of the mowing regime and planting of trees), which will be designated as time-zero or the beginning of the restoration time period. Monitoring surveys will be done by qualified NATR personnel after the first growing season or approximately one year after planting to determine the survival of the plantings. If needed, supplemental planting will be done, and another monitoring survey will be done after the second growing season. By this time, plantings should be at the point where they are sustainable. A final monitoring survey will be done after the fifth growing season. Status/documentation of vegetation, photographs, wildlife, and general weather will be documented at the restoration site. A time-zero post construction and planting (as-built conditions) report will document plant densities and describe the conditions of the restoration area after mowing is stopped. The monitoring reports will document the progress of the restoration efforts and monitor the success of the plantings and natural species recruitment. All reports will be kept on file at NATR headquarters. Any issues that arise or corrective action that needs to be taken will also be included in the monitoring reports. Observations of vegetation will be made along fixed transects in both restoration sites to ensure identical sampling procedures throughout the time-zero and the subsequent reporting cycles.

Wildlife Monitoring

During the monitoring program, observations of wildlife will be made in the restoration areas during monitoring surveys through both visual means and inspection of physical evidence.

Photographic Documentation

Photograph stations will be identified in the restoration areas. These locations will be used to document the physical condition of the restoration area during the five-year monitoring program.

Monitoring Reports

Monitoring reports will be prepared by the NATR. These reports will provide documentation of the success of the mitigation program and the general condition of the enhanced area.

Monitoring reports will consist of the following information:

1. Narrative description of the enhancement activities performed since the last report,
2. Explanation of maintenance work to be conducted over the next year,
3. List of wildlife species observed,

4. Results of vegetative monitoring,
5. Photographs taken at photo station locations,
6. General weather description, and
7. Description of any remedial action recommendations (if necessary).

These reports will be submitted to the NATR Chief of Resources for review and filed at the NATR.

Long Term Maintenance

Annual inspections of the mitigation areas will occur for the five years of the monitoring program. The inspections will be performed by a qualified NATR ecologist. The mitigation site will be inspected and locations of exotic and/or nuisance species identified to be treated and removed. Notations will be made of any potential problems identified during the inspection. The site will be maintained continually to ensure exotics and nuisance species do not become the dominant vegetation in the mitigation areas. If necessary, the park will actively revegetate with native wetland species. The restoration will begin January-February 2010. It is estimated that it may take 15-20 years before a hardwood stand with a good canopy, providing the same functions and values of the impacted wetlands, will be established.

Figure 5. Brashears Stand wetland mitigation area (Total = 1.9 Acres).

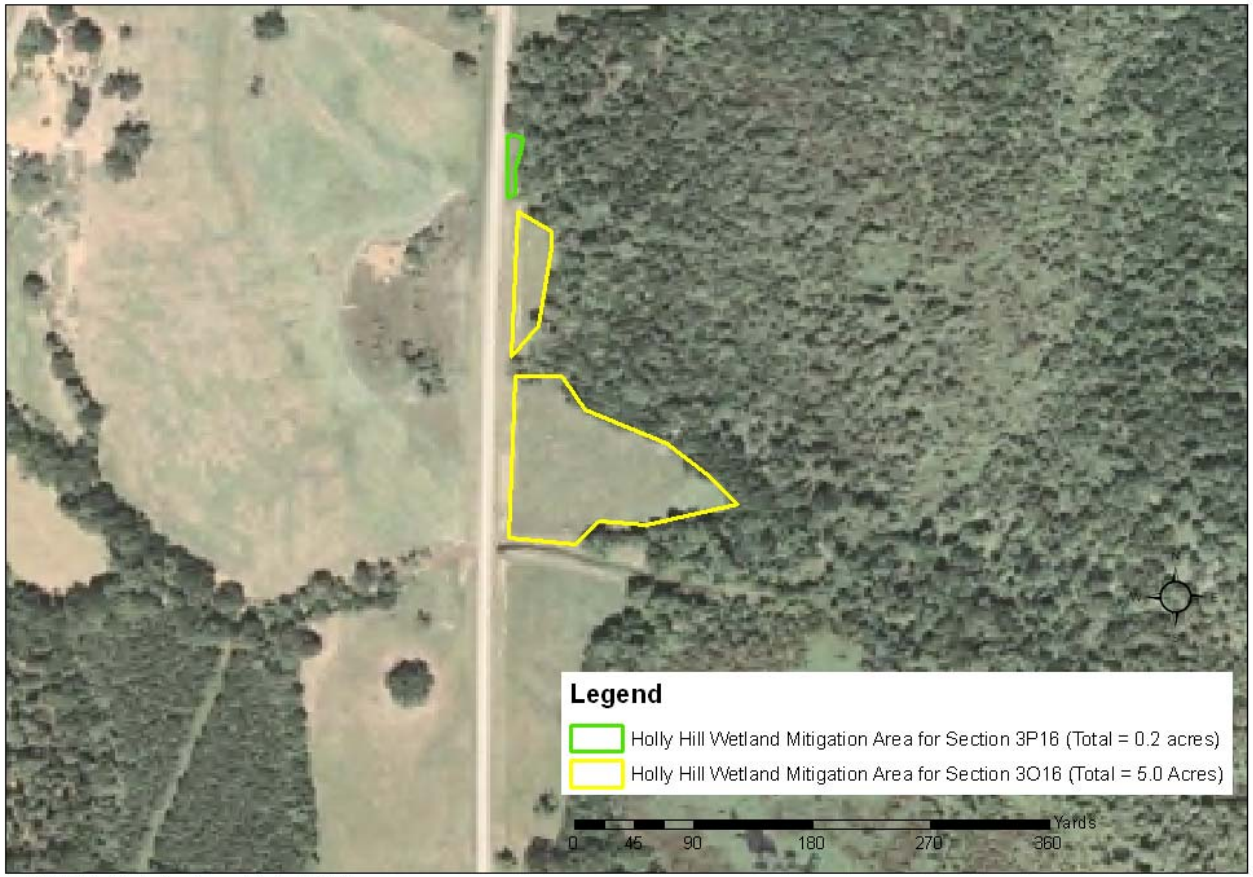
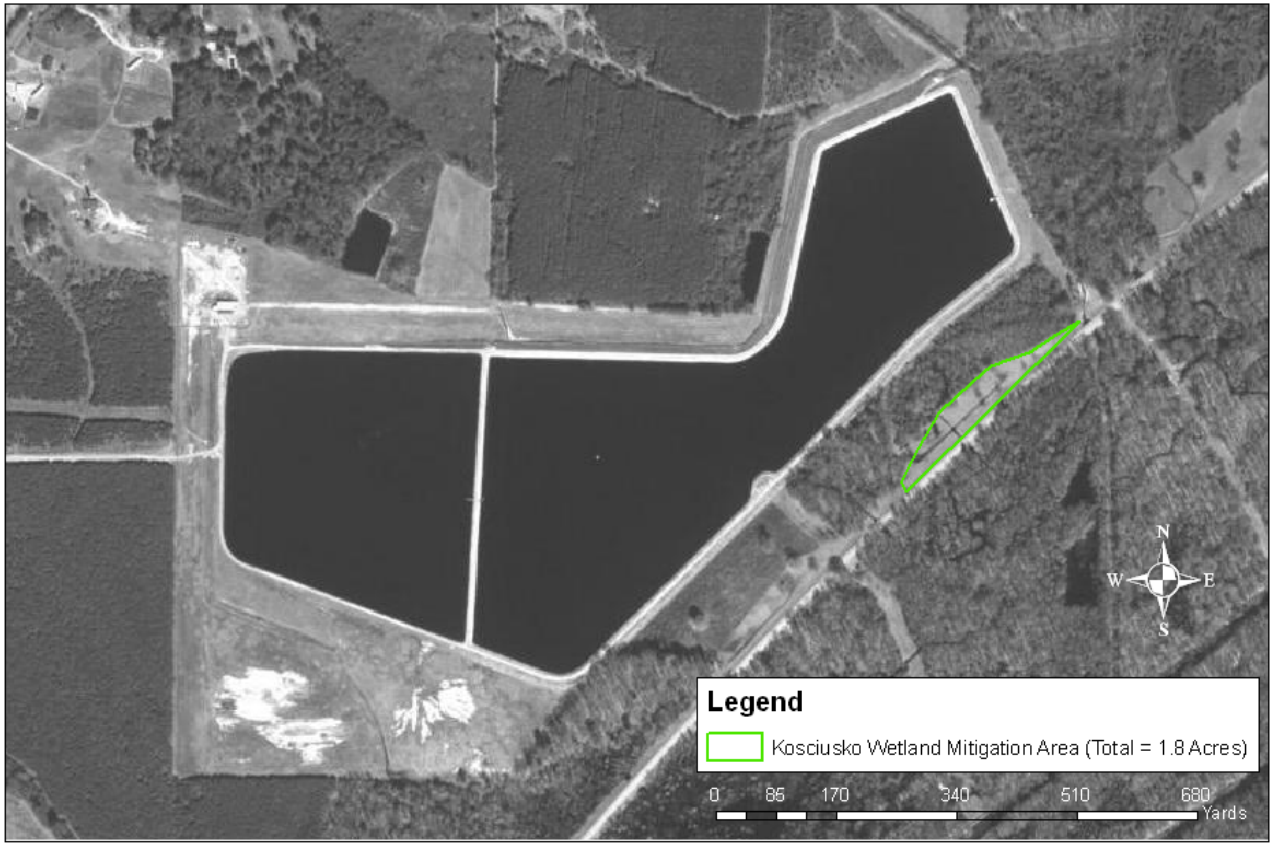


Figure 6. Holly Hill wetland mitigation area (Total = 0.2 Acres).



2006 National Agricutltual Imagery Mosaic by NRCS
Figure developed by Ginger Molitor, NPS-DSC 04/01/20010 File: E:\NATR\3P16 Wetland SOF\kosciusko 2

Figure 7. Kosciusko wetland mitigation area (Total 1.8 Acres).

Work Schedule Plan

The following work schedule, Table 3, outlines activities and dates for monitoring program execution:

Table 3. Work schedule plan.

MITIGATION ACTIVITY	DUE DATE
Restoration starts	January-February 2010
Time-zero monitoring report	April 2010
First monitoring report (after first growing season)	April 2011
Second monitoring report (after second growing season)	April 2012
No monitoring will be done after the third and fourth growing season	2013-2014
Final monitoring report (after fifth growing season)	April 2015

Justification for Use of Wetlands

The NPS proposes to construct a 2.97-mile long trail segment along the north side of the NATR motor road. This proposal is consistent with the 1987 Comprehensive Trail Plan (NPS 1987), Natchez Trace National Scenic Trail/Alabama-Mississippi-Tennessee, developed in conjunction with the NATR-GMP (NPS 1987), the 1995 Natchez Trace Parkway Multi-Use Trail Study Environmental Assessment (NPS 1995), and the 1999 Congressional Directive to the NPS directing the NATR to construct a multi-use trail in conjunction with the construction of the NATR motor road (U.S. Congress 1999). The NPS finds that there are no practicable alternatives to disturbing approximately 1.89 acres of wetlands along the alignment of a trail between approximately mileposts 98.2 and 101.2 of the NATR. Wetlands have been avoided to the maximum practicable extent, and the wetland impacts that could not be avoided will be minimized. Unavoidable impacts to wetlands will be compensated for at a ratio of approximately two to one (2:1), which is consistent with the NPS no-net-loss of wetlands policy.

Compliance

Clean Water Act Section 401 and Section 404, and National Pollution Discharge Elimination System (NPDES)

The proposed actions impact waters of the United States as defined by the Clean Water Act and are therefore subject to review by the USACE. Section 401 of the Clean Water Act is a certification by the state that the project impacts to water quality will not exceed the state's water

quality standards. Section 404 of the Clean Water Act requires a permit for any activity which may result in the discharge of dredged or fill material into navigable waters. Therefore, Section 401 and Section 404, and NPDES permits will be required for this project. Section 401, Section 404, and NPDES permits will complete the requirements for federal and state permitting for this segment of the trail.

National Environmental Policy Act

The 1995 EA and FONSI, the Section 106 compliance review, a Floodplain SOF for Executive Order 11988, Floodplain Management, and this SOF for Executive Order 11990 will complete the requirements for the National Environmental Policy Act for this project.

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Table 1. List of vascular plants and animals known to occur along the NATR.

Vascular Plants (ASGEC 2008) known to occur in wetlands between 2,000 feet east of Livingston Road and Highland Colony Parkway (MP 98.23 to MP 101.2)	
Scientific Name	**Common Name**
Acer negundo	Box elder
Baccharis halimifolia	Groundsel tree
Carex spp.	Sedge spp.
Celtis laevigata	Sugarberry
Cornus amomum	Silky dogwood
Fraxinus pennsylvanica	Green ash
Juncus effusus	Soft rush
Ligustrum sinense	Chinese privet*
Liquidambar styraciflua	Sweet gum
Lonicera japonica	Japanese honeysuckle
Mentha spp.	Mint spp.
Nasturtium officinale	Spring cress
Pinus taeda	Loblolly pine
Platanus occidentalis	American sycamore
Quercus nigra	Water oak
Sambucus canadensis	Elderberry
Smilax glauca	Cat greenbrier
Ulmus Americana	American elm
Vicia spp.	Vetch spp.
Avifauna along the NATR (ABC 2001a)	
Scientific Name	**Common Name**
Pelecanus erythrorhycnhos	American white pelican
Phalacrocorax auritus	Double-crested cormorant
Nycticorax violacea	Yellow-crowned night heron
Butorides virescens	Green heron
Egretta caerulea	Little blue heron

Avifauna along the NATR (ABC 2001a)	
Scientific Name	**Common Name**
Bubulcus ibis	Cattle egret
Egretta thula	Snowy egret
Ardea alba	Great egret
Ardea herodias	Great blue heron
Branta canadensis	Canada goose
Dendrocygna bicolor	Fulvous whistling duck
Aix sponsa	Wood duck
Anas platyrhynchos	Mallard
Cathartes aura	Turkey vulture
Coragyps atratus	Black vulture
Ictinia mississippiensis	Mississippi kite
Accipiter striatus	Sharp-shinned hawk
Accipiter cooperii	Cooper's hawk
Buteo platypterus	Broad-winged hawk
Buteo lineatus	Red-shouldered hawk
Buteo jamaicensis	Red-tailed hawk
Falco sparverius	American kestrel
Meleagris gallopavo	Wild turkey
Colinus virginianus	Northern bobwhite
Charadrius vociferous	Killdeer
Scolopax minor	American woodcock
Larus argentatus	Herring gull
Thalasseus maximus	Royal tern
Columba livia	Rock dove
Zenaida macroura	Mourning dove
Coccyzus americanus	Yellow-billed cuckoo
Coccyzus erythopthalmus	Black-billed cuckoo
Bubo virginianus	Great horned owl

Avifauna along the NATR (ABC 2001a)	
Scientific Name	**Common Name**
Strix varia	Barred owl
Otus asio	Eastern screech owl
Chordeiles minor	Common nighthawk
Caprimulgus carolinensis	Chuck-wills-widow
Caprimulgus vociferous	Whip-poor-will
Chaetura pelagica	Chimney swift
Archilachus colubris	Ruby-throated hummingbird
Megaceryle alcyon	Belted kingfisher
Melanerpes erythrocephalus	Red-headed woodpecker
Melanerpes carolinus	Red-bellied woodpecker
Colaptes auratus	Northern flicker
Sphyrapicus varius	Yellow-bellied sapsucker
Picoides pubescens	Downy woodpecker
Picoide villosus	Hairy woodpecker
Dryocopus pileatus	Pileated woodpecker
Contapus virens	Eastern wood pewee
Empidonax virescens	Acadian flycatcher
Sayornis phoebe	Eastern phoebe
Myiarchus crinitus	Great-crested flycatcher
Tyrannus tyrannus	Eastern kingbird
Lanius ludovicianus	Loggerhead shrike
Vireo griseus	White-eyed vireo
Vireo flavifrons	Yellow-throated vireo
Vireo olivaceous	Red-eyed vireo
Vireo gilvus	Warbling vireo
Cyanocitta cristata	Blue jay
Corvus brachyrhynchos	American crow
Corvus ossifragus	Fish crow

Avifauna along the NATR (ABC 2001a)	
Scientific Name	**Common Name**
Progne subis	Purple martin
Petrachelidon pyrrhonota	Cliff swallow
Stelgidopteryx serripennis	Northern rough-winged swallow
Hirundo rustica	Barn swallow
Baeolophus bicolor	Tufted titmouse
Poecile carolinensis	Carolina chickadee
Certhia americana	Brown creeper
Sitta carolinensis	White-breasted nuthatch
Sitta canadensis	Red-breasted nuthatch
Sitta pusilla	Brown-headed nuthatch
Troglodytes aedon	House wren
Troglodytes troglodytes	Winter wren
Thryothorus ludovicianus	Carolina wren
Thryomanes bewickii	Bewick's wren
Regulus satrapa	Golden-crowned kinglet
Regulus calendula	Ruby-crowned kinglet
Polioptila caerulea	Blue-gray gnatcatcher
Sialia sialis	Eastern bluebird
Hylocichla mustelina	Wood thrush
Catharus guttatus	Hermit thrush
Turdus migratorius	American robin
Dumetella carolinensis	Gray catbird
Mimus polyglottos	Northern mockingbird
Toxostoma rufum	Brown thrasher
Sturnus vulgaris	European starling
Bombycilla cedrorum	Cedar waxwing
Protonotaria citrea	Prothonotary warbler
Vermivora pinus	Blue-winged warbler

Avifauna along the NATR (ABC 2001a)	
Scientific Name	**Common Name**
Parula americana	Northern parula
Dendroica coronata	Yellow-rumped warbler
Mniotilta varia	Black and white warbler
Dendroica cerulea	Cerulean warbler
Dendroica dominica	Yellow-throated warbler
Dendroica discolor	Prairie warbler
Dendroica pinus	Pine warbler
Dendroica petechia	Yellow warbler
Oporornis formosus	Kentucky warbler
Wilsonia citrina	Hooded warbler
Helmitheros vermivorus	Worm-eating warbler
Limnothlypis swainsonii	Swainson's warbler
Turdus ludovicianus	Louisiana waterthrush
Geothlypis trichas	Common yellowthroat
Icteria virens	Yellow-breasted chat
Setophaga ruticilla	American redstart
Piranga rubra	Summer tanager
Piranga olivacea	Scarlet tanager
Pipilo erythrophthalmus	Rufous-sided towhee
Aimophila aestivalis	Bachman's sparrow
Spizella pusilla	Field sparrow
Spizella passerina	Chipping sparrow
Ammodranus savannarum	Grasshopper sparrow
Passerculus sandwichensis	Savannah sparrow
Melospiza melodia	Song sparrow
Zonotrichia albicollis	White-throated sparrow
Zonotrichia leucophrys	White-crowned sparrow
Junco hyemalis	Dark-eyed junco

Avifauna along the NATR (ABC 2001a)	
Scientific Name	**Common Name**
Cardinalus cardinalus	Northern cardinal
Spiza americana	Dickcissel
Passerina caerulea	Blue grosbeak
Passerina cyanea	Indigo bunting
Passerina ciris	Painted bunting
Dolichonyx oryzivorus	Bobolink
Sturnella magna	Eastern meadowlark
Agelaius phoeniceus	Red-winged blackbird
Quiscalus quiscula	Common grackle
Euphagus carolinus	Rusty blackbird
Molothrus ater	Brown-headed cowbird
Icterus spurius	Orchard oriole
Icterus galbula	Northern oriole
Carpodacus mexicanus	House finch
Carduelis pinus	Pine siskin
Carduelis tristis	American goldfinch
Passer domesticus	House sparrow
Amphibians and Reptiles along the NATR (ABC 2001b)	
Scientific Name	**Common Name**
Chrysemys scripta elegans	Red-eared slider
Rana utricularia	Southern leopard frog
Acris gryllus	Southern cricket frog
Rana clamitans melanota	Green frog
Rana clamitans clamitans	Bronze frog
Terrapene carolina triunguis	Three-toed box turtle
Scincella lateralis	Ground skink
Coluber constrictor priapus	Southern black racer
Acris crepitans	Northern cricket frog

Amphibians and Reptiles along the NATR (ABC 2001b)	
Scientific Name	**Common Name**
Notophthalmus viridescens	Red-spotted newt
Rana catesbeiana	Bullfrog
Eumeces fasciatus	Five-lined skink
Terrapene carolina carolina	Eastern box turtle
Elaphe guttata guttata	Corn snake
Lampropeltis getulus holbrooki	Speckled kingsnake
Sceloporus undulatus	Eastern fence lizard
Anolis carolinensis	Green anole
Plethodon glutinosus	Slimy salamander
Opheodrys aestivus	Rough green snake
Natrix sipedon pleuralis	Midland water snake
Hyla avivoca	Bird-voiced tree frog
Trionyx muticus	Smooth softshell turtle
Hyla versicolor and Hyla chrysoscelis	Gray tree frog complex
Agkistrodon contortix contortix	Southern copperhead
Natrix rhombifera	Diamond-backed water snake
Kinosternon subrubrum	Eastern mud turtle
Agkistrodon piscivorus leucostoma	Western cottonmouth
Coluber constrictor constrictor	Northern black racer
Eumeces laticeps	Broad-headed skink
Deirochelys reticularia	Chicken turtle
Bufo americanus	American toad
Natrix erythrogaster flavigaster	Yellow-bellied water snake
Hyla crucifer	Spring peeper
Elaphe obsoleta spiloides	Gray rat snake
Lampropeltis getulus niger	Black kingsnake
Chelydra serpentina	Common snapping turtle
Hyla squirella	Squirrel tree frog

Amphibians and Reptiles along the NATR (ABC 2001b)	
Scientific Name	**Common Name**
Chrysemys picta dorsalis	Southern painted turtle
Eumeces inexpectatus	Southeastern five-lines skink
Farancia abacura	Mud snake
Natrix sipedon sipedon	Northern water snake
Thamnophis sirtalis sirtalis	Eastern garter snake
Siren intermedia nettingi	Western lesser siren
Heterodon platyrhinos	Eastern hognose snake
Sternotherus odoratus	Stinkpot
Thamnophis sauritus	Eastern ribbon snake
Gastrophryne carolinensis	Eastern narrow-mouthed toad
Alligator mississippiensis	American alligator
Bufo woodhousei fowleri	Fowler's toad
Carphaphis amoenus	Eastern worm snake
Pseudotriton ruber ruber	Northern red salamander
Farancia erytrogramma	Rainbow snake
Macroclemys temmincki	Alligator snapping turtle
Lampropeltis triangulum triangulum	Eastern milk snake
Chrysemys scripta scripta	Yellow-bellied slider
Hyla cinerea	Green tree frog
Graptemys kohni	Mississippi Map Turtle
Crotalus horridus atricaudatus	Canebrake rattlesnake
Diadophis punctatus	Ringneck snake
Pseudacris triseriata feriarum	Upland chorus frog
Elaphe obsoleta obsoleta	Black rat snake
Lampropeltis calligaster rhombomaculata	Mole kingsnake
Ambystoma talpoideum	Mole salamander
Chrysemys concinna	Slider
Virginia valeriae	Smooth earth snake

Amphibians and Reptiles along the NATR (ABC 2001b)	
Scientific Name	**Common Name**
Sternotherus carinatus	Razor-backed musk turtle
Amphiuma tridactylum	Three-toed amphiuma
Mammals along the NATR (NPS 2007c)	
Scientific Name	**Common Name**
Didelphis virginiana	Opossum
Scalopus aquaticus	Eastern mole
Blarina carolinensis	Southern short-tailed shrew
Sorex longirostris	Southeastern shrew
Cryptotis parva	Least shrew
Myotis grisescens	Gray bat
Myotis lucifugus	Little brown myotis
Myotis septentrionalis	Northern myotis
Myotis sodalis	Social myotis
Myotis austroriparius	Southeastern myotis
Lasionycteris noctivagans	Silver-haired bat
Pipestrellus subflavus	Eastern pipistrelle
Eptesicus fuscus	Big brown bat
Lasiurus borealis	Eastern Red bat
Lasiurus intermedius	Northern yellow bat
Lasiurus seminolus	Seminole bat
Lasiurus cinereus	Hoary bat
Nycticeius humeralis	Evening bat
Plecotus rafinesquii	Rafinesque's big-eared bat
Tadarida braziliensis	Brazilian free-tailed bat
Dasypus novemcinctus	Nine-banded armadillo
Sylvilagus floridanus	Eastern cottontail
Sylvilagus aquaticus	Swamp rabbit
Tamias striatus	Eastern chipmunk

Mammals along the NATR (NPS 2007c)	
Scientific Name	**Common Name**
Marmota monax	Woodchuck
Sciurus carolinensis	Eastern gray squirrel
Sciurus niger	Fox squirrel
Glaucomys volans	Southern flying squirrel
Castor canadensis	Beaver
Oryzomys palustris	Rice rat
Reithrodontomys humulis	Eastern harvest mouse
Reithrodontomys fulvescens	Fulvous harvest mouse
Peromyscus leucopus	White-footed mouse
Peromyscus gossypinus	Cotton mouse
Peromyscus polionotus	Oldfield mouse
Ochrotomys nuttalli	Golden mouse
Sigmodon hispidus	Hispid cotton rat
Neotoma floridana	Eastern woodrat
Microtus ochrogaster	Prairie vole
Microtus pinetorum	Woodland vole
Zapus hudsonius	Meadow jumping mouse
Ondatra zibethicus	Muskrat
Rattus norvegicus	Norway rat
Mus musculus	House mouse
Canis latrans	Coyote
Vulpes vulpes	Red fox
Urocyon cinereoargenteus	Gray fox
Procyon lotor	Raccoon
Mustela frenata	Long-tailed weasel
Mustela vison	Mink
Mephitis mephitis	Striped skunk
Spilogale putorius	Eastern spotted skunk

Mammals along the NATR (NPS 2007c)	
Scientific Name	**Common Name**
Lutra canadensis	River otter
Odocoileus virginianus	White-tailed deer
Lynx rufus	Bobcat
Ursus americanus	Black bear
Felis concolor	Mountain lion
Fish along the NATR (NPS 2007b)	
Scientific Name	**Common Name**
Ameiurus natalis	Yellow bullhead
Amia calva	Bowfin
Aphredoderus sayanus	Pirate perch
Campostoma anomalum	Central stoneroller
Campostoma oligolepis	Largescale stoneroller
Carpiodes carpio	River carpsucker
Carpiodes cyprinus	Quillback, Quillback carpsucker
Carpiodes velifer	Highfin carpsucker
Centrarchus macropterus	Flier, Peacock sunfish, Round sunfish
Clinostomus funduloides	Rosyside dace
Cottus carolinae	Banded sculpin
Cyprinella camura	Bluntface shiner
Cyprinella galactura	Whitetail shiner
Cyprinella lutrensis	Red shiner
Cyprinella spiloptera	Spotfin shiner
Cyprinella venusta	Blacktail shiner
Cyprinella whipplei	Steelcolor shiner
Dorosoma cepedianum	American gizzard shad, Eastern gizzard shad, Gizzard shad, Hickory shad, Mud shad, Skipjack
Dorosoma petenense	Threadfin shad
Erimyzon oblongus	Creek chubsucker

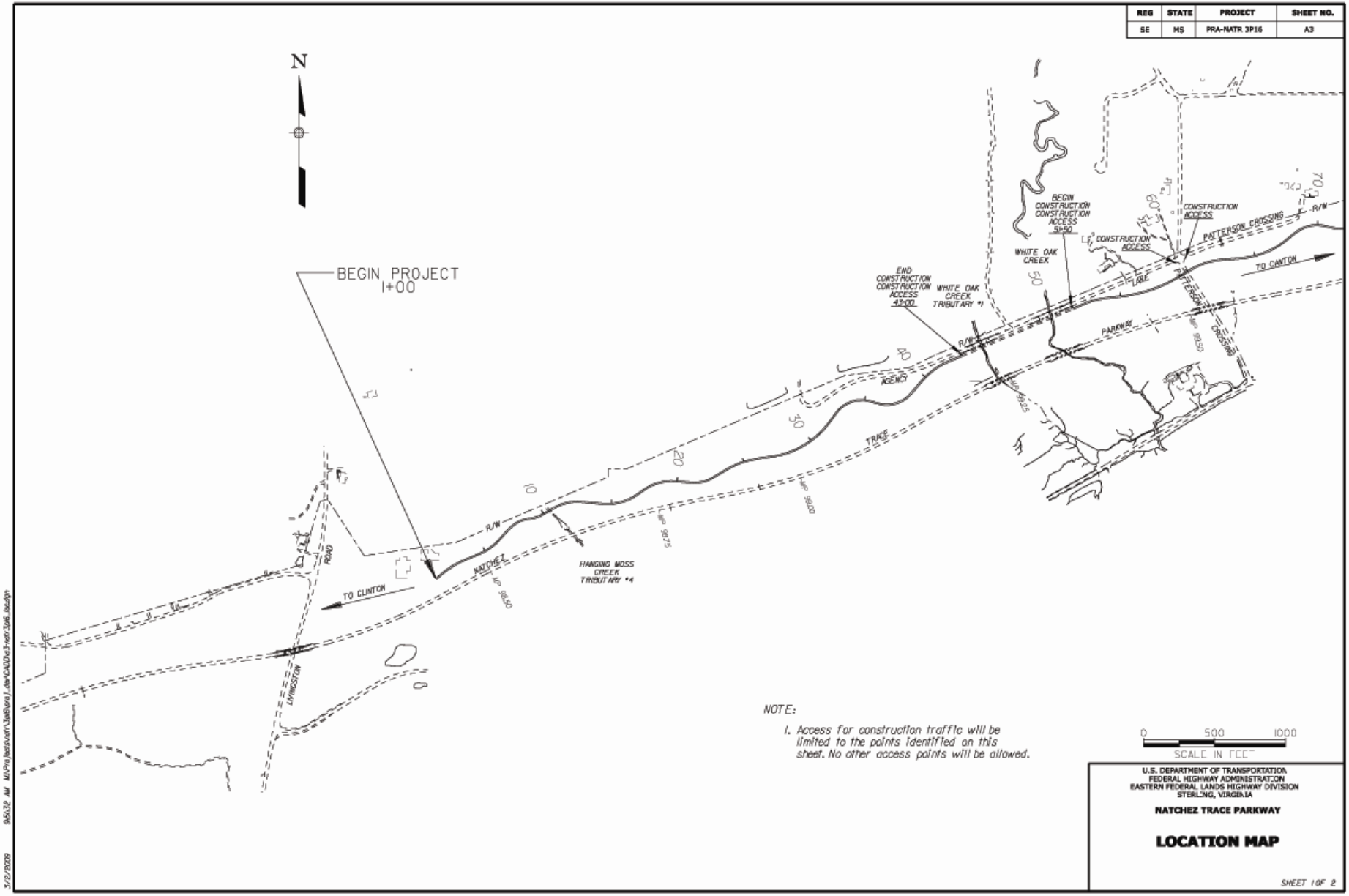
Fish along the NATR (NPS 2007b)	
Scientific Name	**Common Name**
Esox americanus	Grass pickerel, Redfin, Redfin pickerel
Etheostoma blennioides	Greenside darter
Etheostoma blennius	Blenny darter
Etheostoma boschungi	Slackwater darter
Etheostoma caeruleum	Rainbow darter
Etheostoma chlorosomum	Bluntnose darter
Etheostoma corona	Crown darter
Etheostoma crossopterum	Fringed darter
Etheostoma derivativum	
Etheostoma duryi	Black darter, Blackside darter, Blackside snubnose darter
Etheostoma flabellare	Fantail darter
Etheostoma flavum	Saffron darter
Etheostoma histrio	Harlequin darter
Etheostoma kennicotti	Stripetail darter
Etheostoma lachneri	Tombigbee darter
Etheostoma lynceum	Brighteye darter
Etheostoma nigrum	Johnny darter
Etheostoma proeliare	Cypress darter
Etheostoma rufilineatum	Redline darter
Etheostoma simoterum	Snubnose darter, Tennessee snubnose darter
Etheostoma swaini	Gulf darter
Etheostoma whipplei	Redfin darter
Etheostoma zonale	Banded darter
Fundulus catenatus	Northern studfish
Fundulus notatus	Blackstripe topminnow
Fundulus olivaceus	Blackspotted topminnow
Gambusia affinis	Mosquitofish, Western mosquitofish

Fish along the NATR (NPS 2007b)	
Scientific Name	**Common Name**
Hemitremia flammea	Flame chub
Hybognathus nuchalis	Mississippi silvery minnow
Hybopsis amblops	Bigeye chub
Hybopsis winchelli	Clear chub
Hypentelium nigricans	Northern hog sucker
Ictalurus punctatus	Channel catfish, Graceful catfish
Labidesthes sicculus	Brook silverside
Lepisosteus oculatus	Shortnose gar, Spotted gar
Lepisosteus osseus	'Longnose gar
Lepomis cyanellus	Green sunfish
Lepomis gulosus	Warmouth
Lepomis macrochirus	Bluegill
Lepomis megalotis	Longear sunfish
Lepomis microlophus	Redear sunfish
Lepomis miniatus	Redspotted sunfish, Scarlet sunfish
Luxilus chrysocephalus	Striped shiner
Luxilus coccogenis	Warpaint shiner
Luxilus zonistius	Bandfin shiner
Lythrurus ardens	Rosefin shiner
Lythrurus bellus	Pretty shiner
Lythrurus roseipinnis	Cherryfin shiner
Lythrurus umbratilis	Redfin shiner
Micropterus punctulatus	Spotted bass
Micropterus salmoides	Largemouth bass
Minytrema melanops	Spotted sucker
Moxostoma duquesnei	Black redhorse
Moxostoma erythrurum	Golden redhorse
Nocomis leptocephalus	Bluehead chub

Fish along the NATR (NPS 2007b)	
Scientific Name	**Common Name**
Nocomis micropogon	River chub
Notemigonus crysoleucas	Golden shiner
Notropis ammophilus	Orangefin shiner
Notropis atherinoides	Emerald shiner
Notropis baileyi	Rough shiner
Notropis leuciodus	Tennessee shiner
Notropis longirostris	Longnose shiner
Notropis stilbius	Silverstripe shiner
Notropis telescopus	Telescope shiner
Notropis texanus	Weed shiner
Notropis wickliffi	Channel shiner
Noturus funebris	Black madtom
Noturus gyrinus	Tadpole madtom
Noturus miurus	Brindled madtom
Opsopoeodus emiliae	Pugnose minnow
Percina caprodes	Logperch
Percina maculata	Blackside darter
Percina sciera	Dusky darter
Percina vigil	Saddleback darter
Phoxinus erythrogaster	Southern redbelly dace
Pimephales notatus	Bluntnose minnow
Pimephales vigilax	Bullhead minnow
Pomoxis annularis	White crappie
Pomoxis nigromaculatus	Black crappie
Rhinichthys atratulus	Blacknose dace, Eastern blacknose dace
Semotilus atromaculatus	Creek chub

FHWA Plans and Profiles

The FHWA Plans and Profiles are 95% complete and subject to change. They have not yet been finalized for construction.


REG
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SHEET NO.
A3
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BEGIN PROJECT
1+00
BEGIN CONSTRUCTION CONSTRUCTION ACCESS 51+50
CONSTRUCTION ACCESS
CONSTRUCTION ACCESS
PATTERSON CROSSING
WHITE OAK CREEK
END CONSTRUCTION CONSTRUCTION ACCESS 47+00
WHITE OAK CREEK TRIBUTARY #1
TO CANTON
PARKWAY
TRACE
R/W
MP 99.25
MP 99.50
MP 99.75
MP 100.00
HANGING MOSS CREEK TRIBUTARY #4
NATCHEZ
TO CLINTON
LIVINGSTON ROAD
LIVINGSTON
NOTE:
1. Access for construction traffic will be limited to the points identified on this sheet. No other access points will be allowed.
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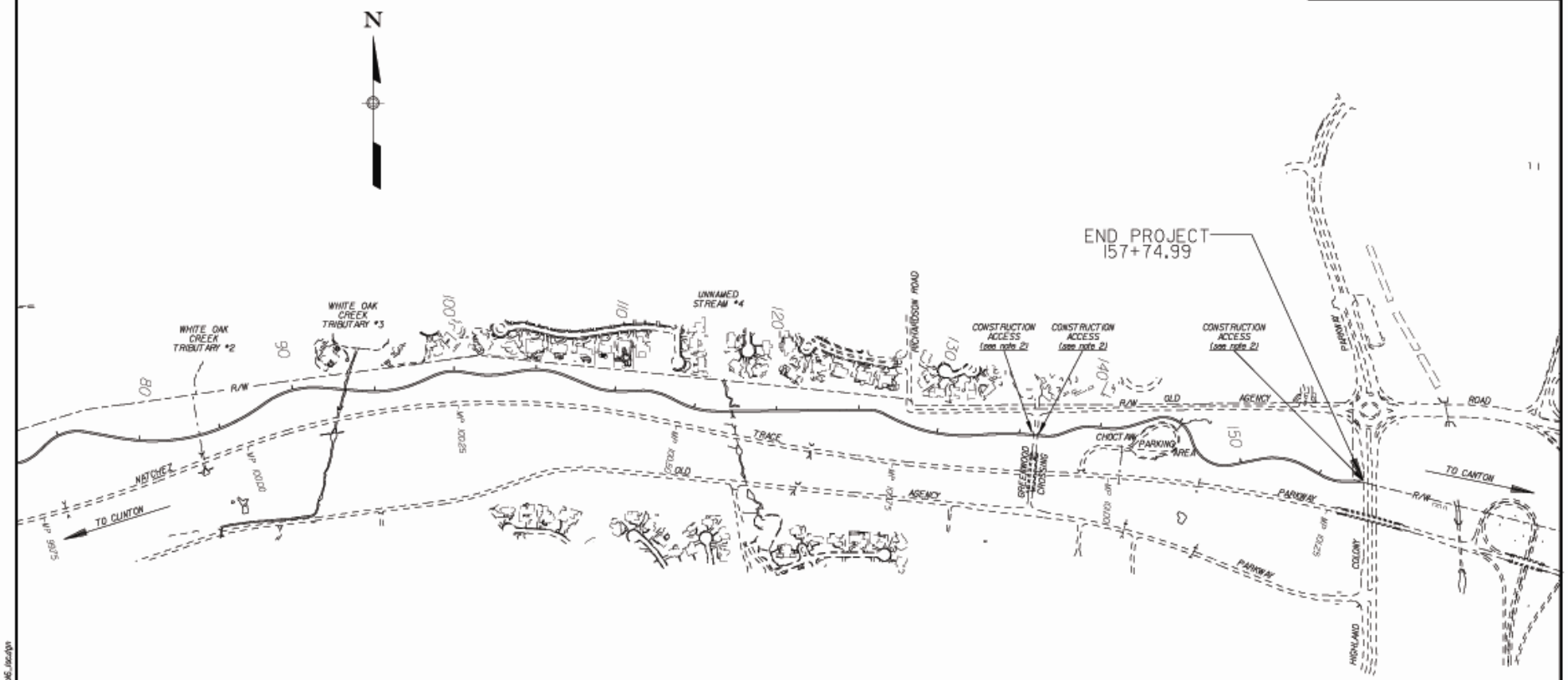
500
1000
SCALE IN FEET
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA
NATCHEZ TRACE PARKWAY
LOCATION MAP
SHEET 1 OF 2

REG	STATE	PROJECT	SHEET NO.
SE	MS	PRA-NATR 3P16	A4



NOTES:

1. Access for construction traffic will be limited to the points identified on this sheet. No other access points will be allowed.
2. No construction truck traffic is permitted on Old Agency Road. Access to the Greenwood Crossing construction accesses shall be from Highland Colony Parkway to Old Agency Road Parkway to Greenwood Crossing.

0 500 1000
SCALE IN FEET

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

NATCHEZ TRACE PARKWAY

LOCATION MAP

SHEET 2 OF 2

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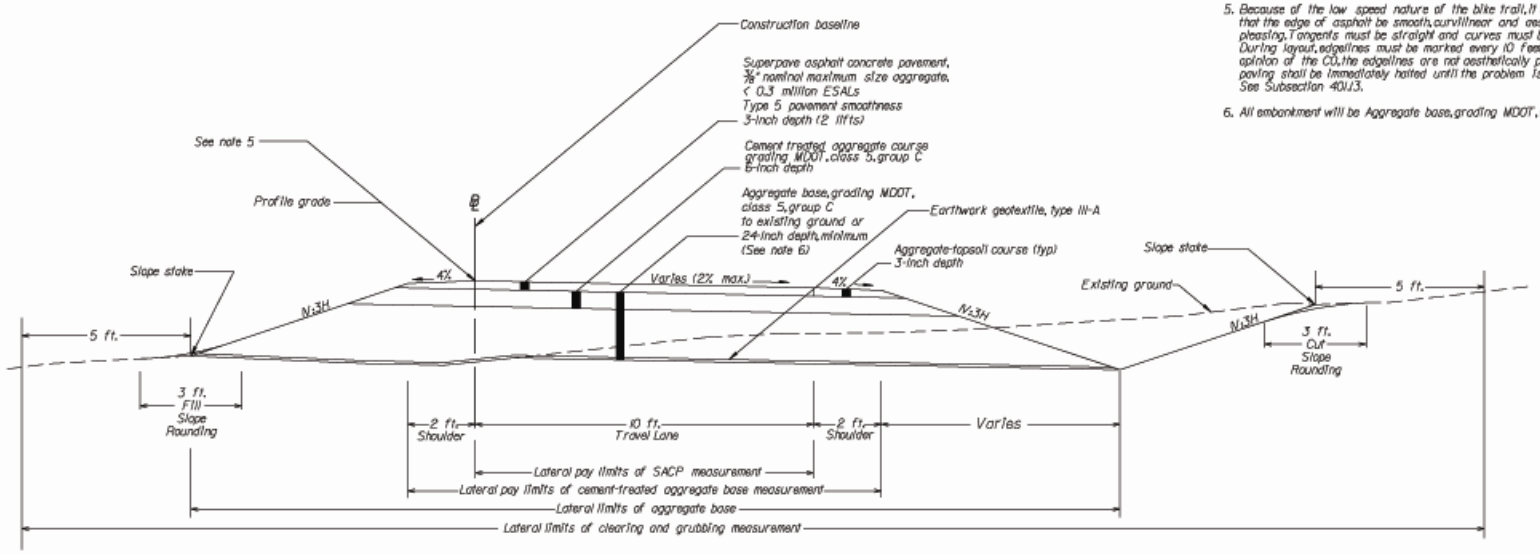
REG	STATE	PROJECT	SHEET NO.
SE	MS	PRA-NATR 3P16	B1

Notes:

1. Cement-treated base shall consist of 6% by weight of ordinary portland cement.
2. Minimum ditch grades are 0.5%. Adjust ditches to provide for proper drainage as directed by the CO.
3. Provide turf establishment on the shoulders. Provide topsoil 4-inch depth, and turf establishment on all other disturbed areas except the paved multi-use trail.
4. No payment will be made for SACP and cement-treated base outside the lateral limits of measurement for each item.
5. Because of the low speed nature of the bike trail, it is critical that the edge of asphalt be smooth, curvilinear and aesthetically pleasing. Tangents must be straight and curves must be uniform. During layout, edgelines must be marked every 10 feet. If, in the opinion of the CO, the edgelines are not aesthetically pleasing, paving shall be immediately halted until the problem is corrected. See Subsection 401.13.
6. All embankment will be Aggregate base, grading MDOT, class 5, group C.



MULTI-USE TRAIL
(1+00 to 140+00)
(145+75 to 158+06.49)

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

NATCHEZ TRACE PARKWAY

TYPICAL SECTION

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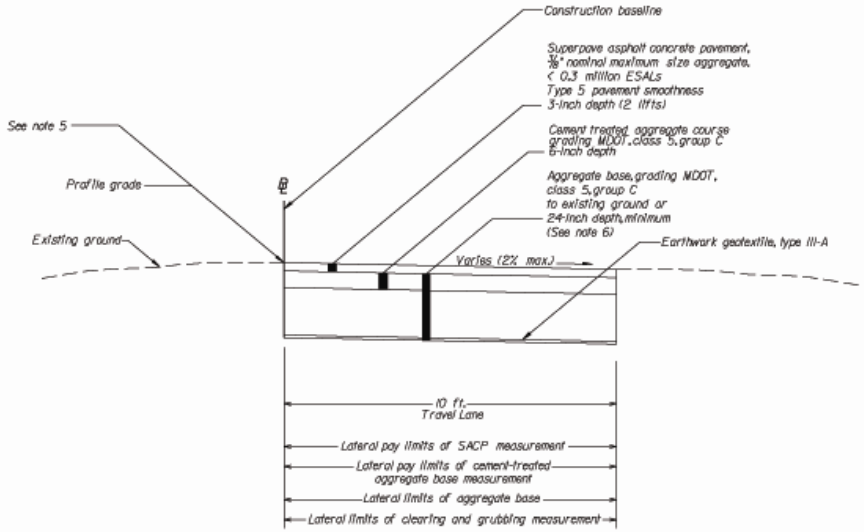
REG	STATE	PROJECT	SHEET NO.
SE	MS	PRA-NATR 3P16	B2



MULTI-USE TRAIL
(140+00 to 145+50)

Notes:

1. Cement-treated base shall consist of 6% by weight of ordinary portland cement.
2. Minimum ditch grades are 0.5%. Adjust ditches to provide for proper drainage as directed by the CO.
3. Provide turf establishment on the shoulders. Provide topsoil 4-inch depth, and turf establishment on all other disturbed areas except the paved multi-use trail.
4. No payment will be made for SACP and cement-treated base outside the lateral limits of measurement for each item.
5. Because of the low speed nature of the bike trail, it is critical that the edge of asphalt be smooth, curvilinear and aesthetically pleasing. Tangents must be straight and curves must be uniform. During layout, edgelines must be marked every 10 feet. If, in the opinion of the CO, the edgelines are not aesthetically pleasing, paving shall be immediately halted until the problem is corrected. See Subsection 401.13.
6. All embankment will be Aggregate base, grading MDOT, class 5, group C.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

NATCHEZ TRACE PARKWAY

TYPICAL SECTION

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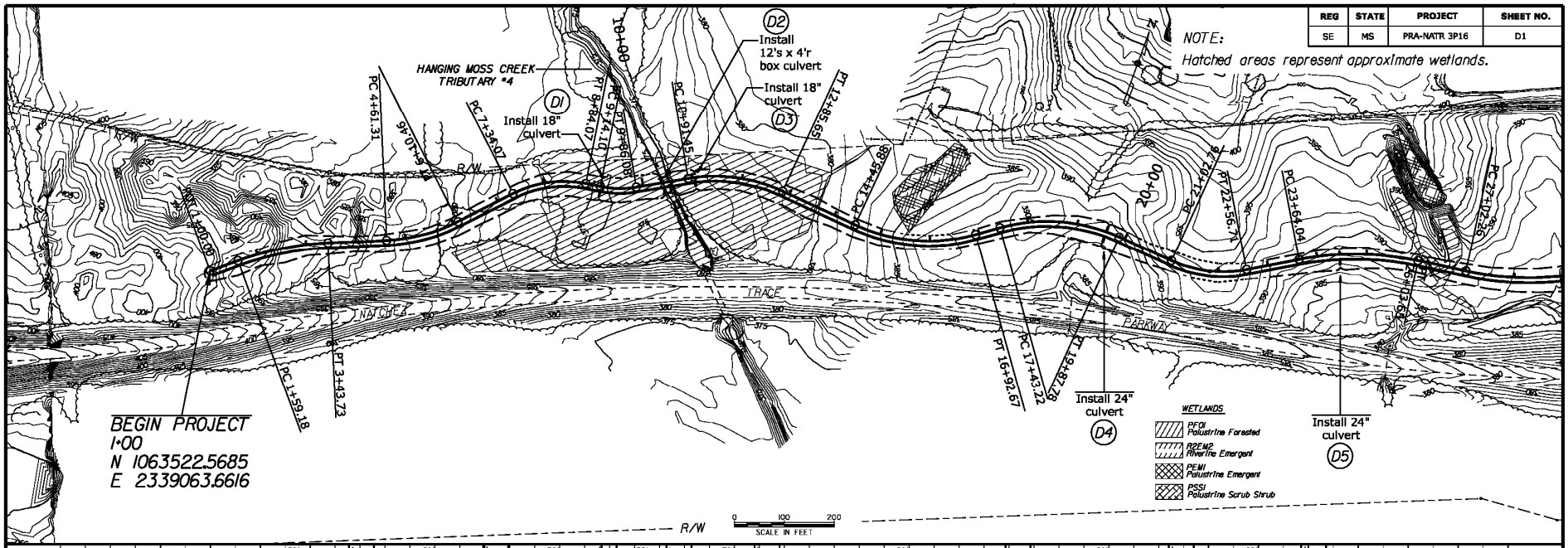
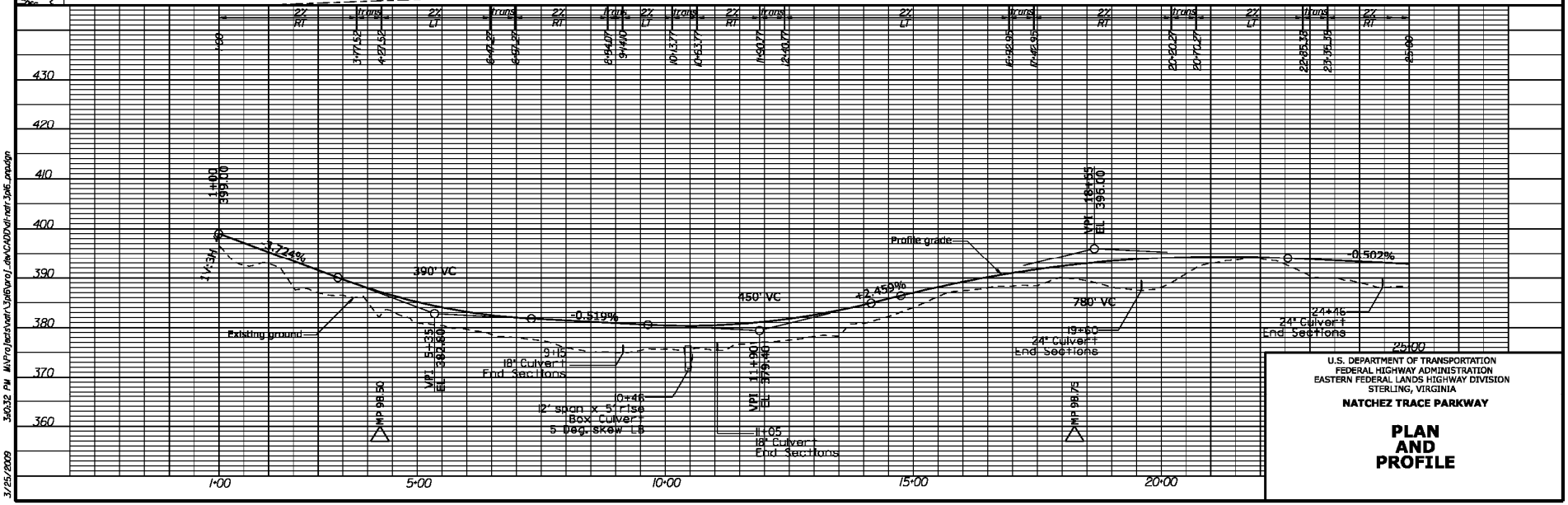
REG	STATE	PROJECT	SHEET NO.
SE	MS	PRA-NATR 3P16	D1

NOTE:
Hatched areas represent approximate wetlands.





U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

NATCHEZ TRACE PARKWAY

PLAN AND PROFILE

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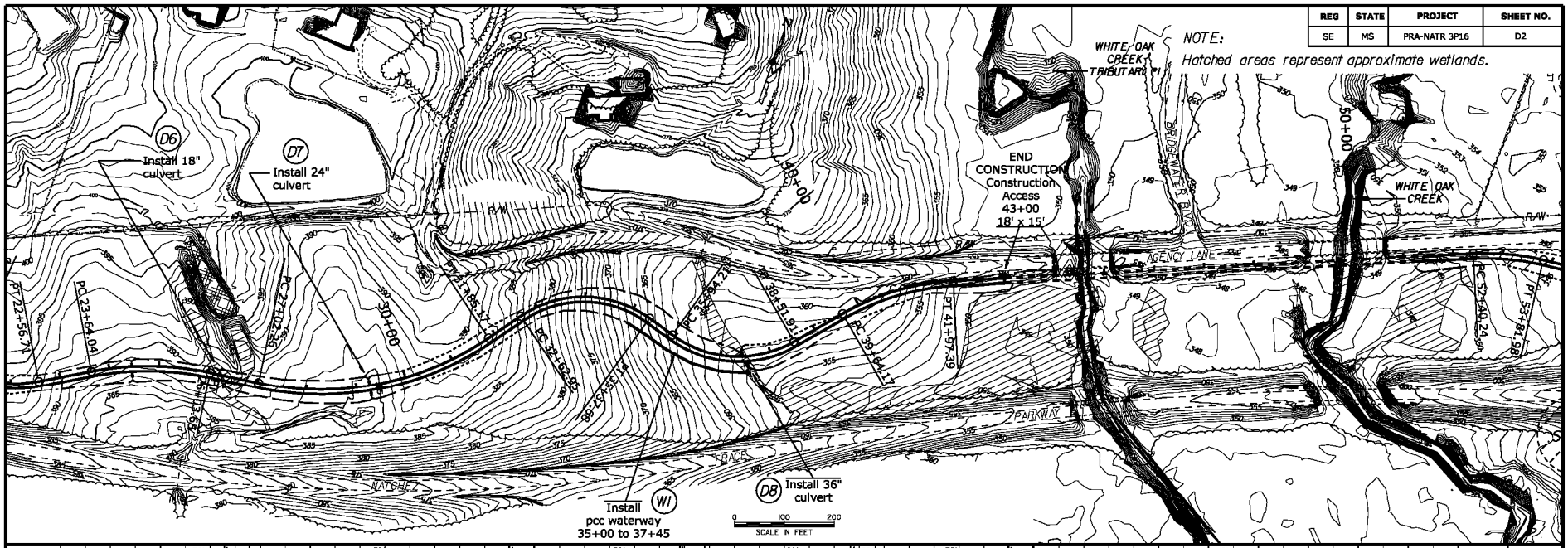
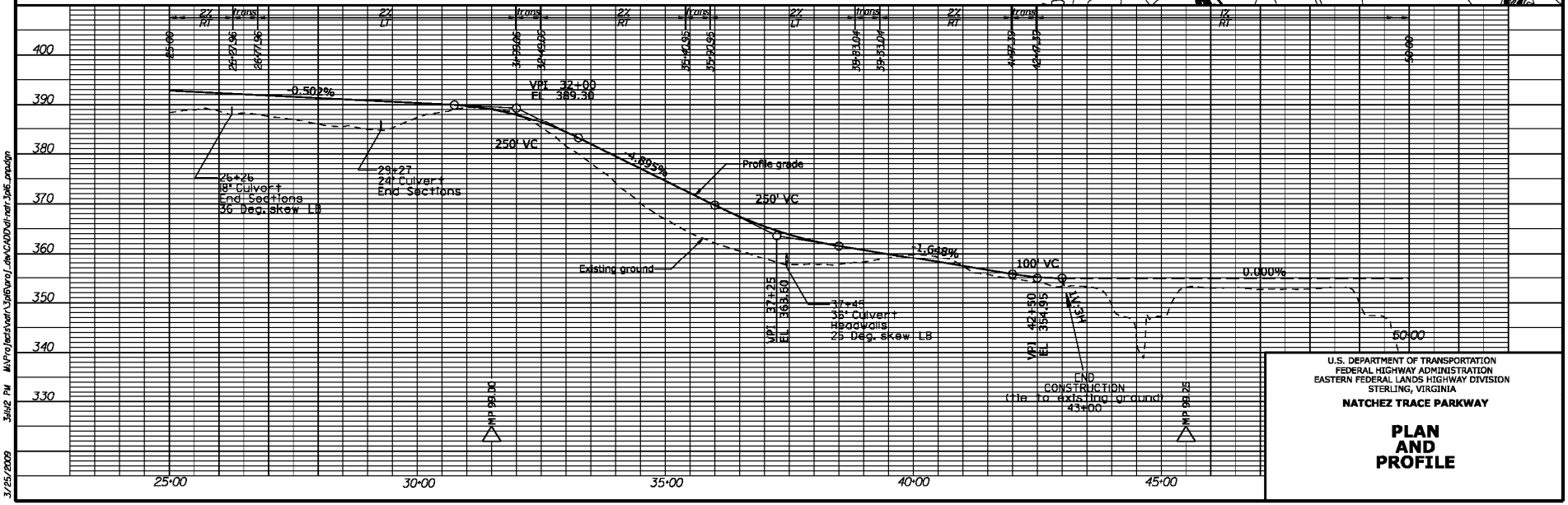
REG	STATE	PROJECT	SHEET NO.
SE	MS	PRA-NATR 3P16	D2

NOTE:
Hatched areas represent approximate wetlands.





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FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

NATCHEZ TRACE PARKWAY

PLAN AND PROFILE

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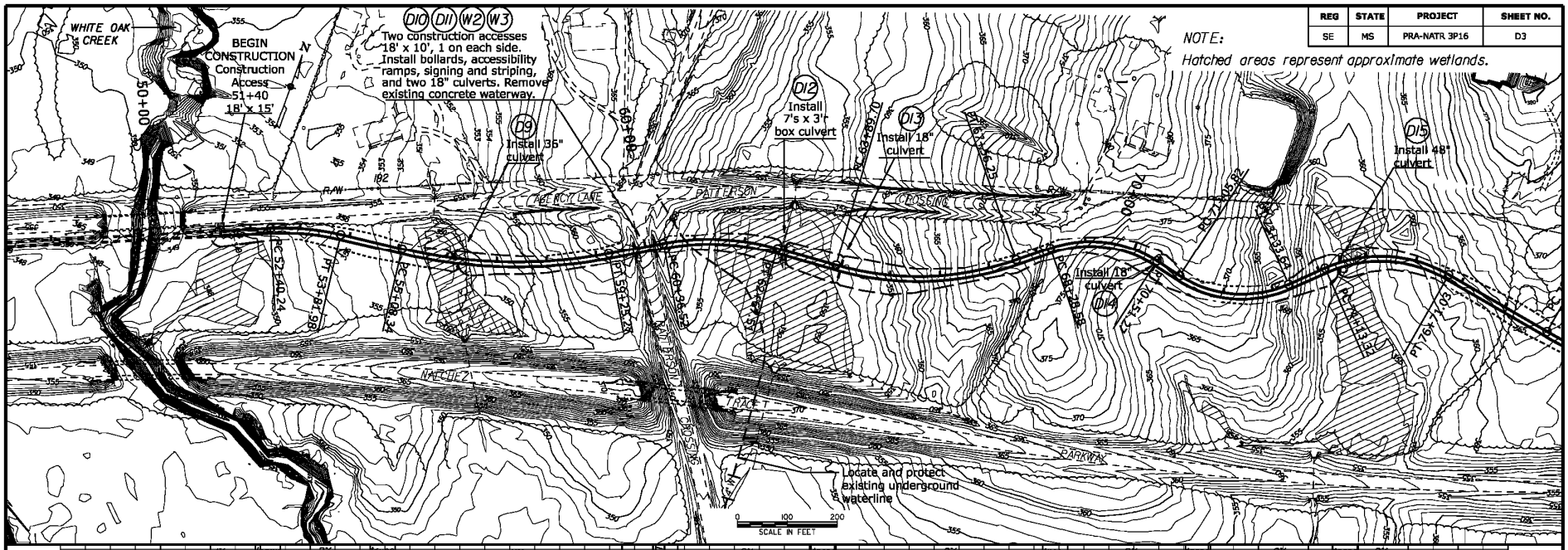
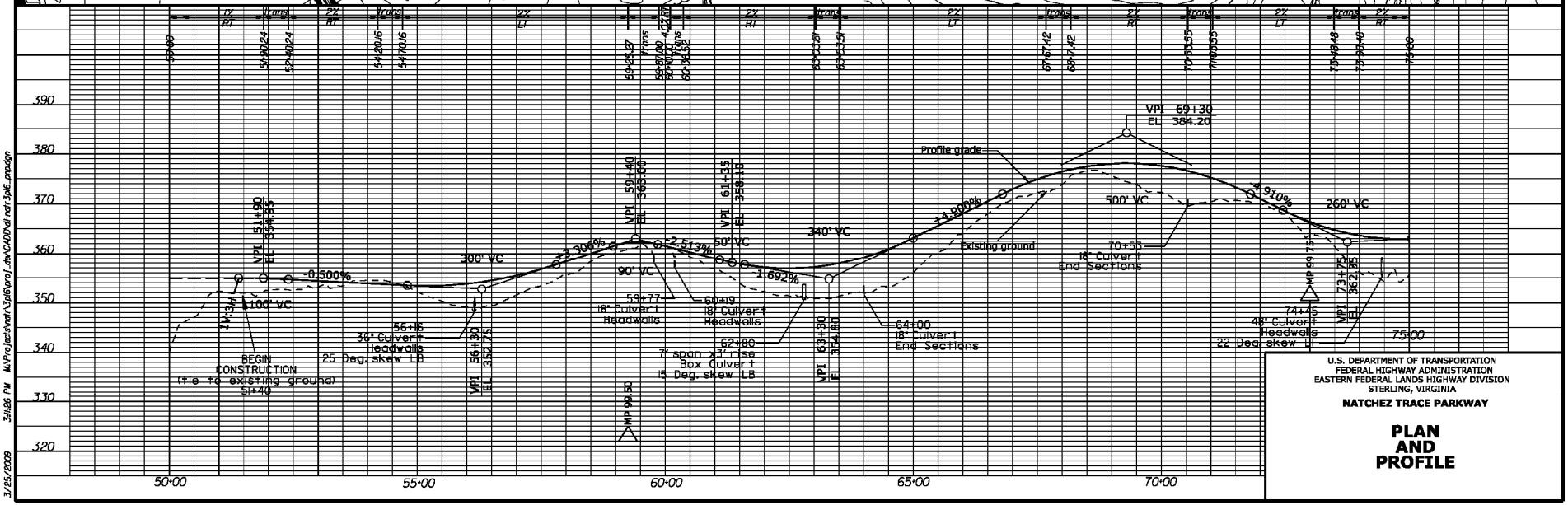
SE	MS	PRA-NATR 3P16	D3





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EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

NATCHEZ TRACE PARKWAY

PLAN AND PROFILE

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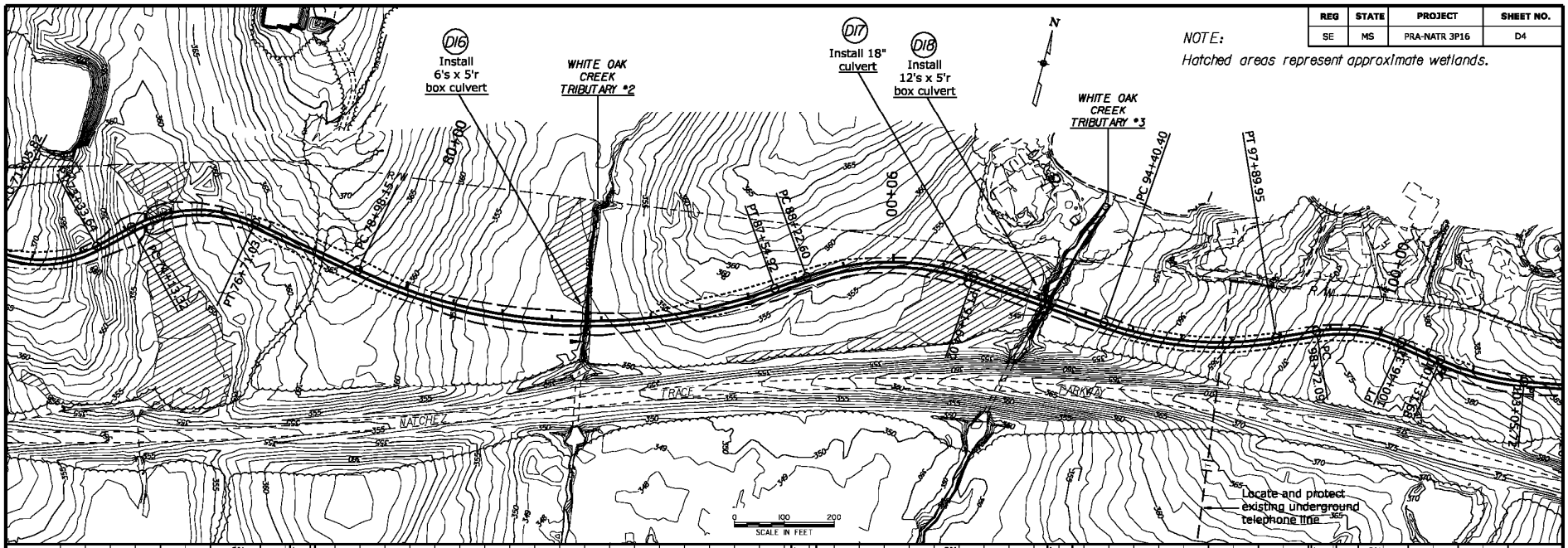
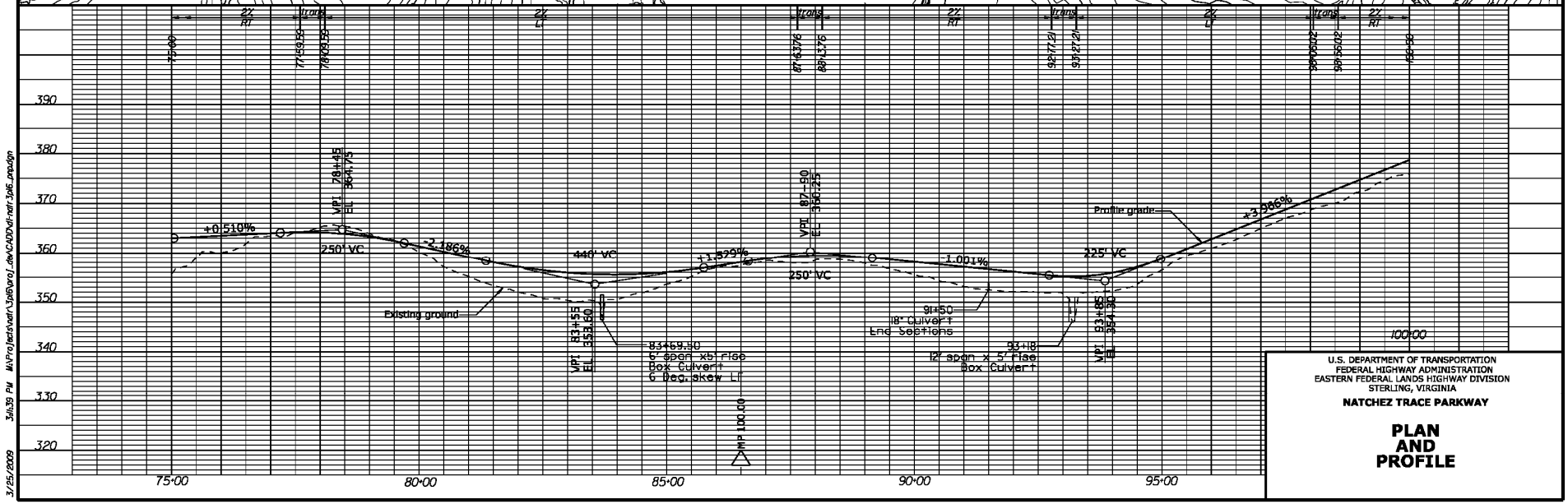
REG	STATE	PROJECT	SHEET NO.
SE	MS	PRA-NATR 3P16	D4

NOTE:
Hatched areas represent approximate wetlands.





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EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

NATCHEZ TRACE PARKWAY

PLAN AND PROFILE

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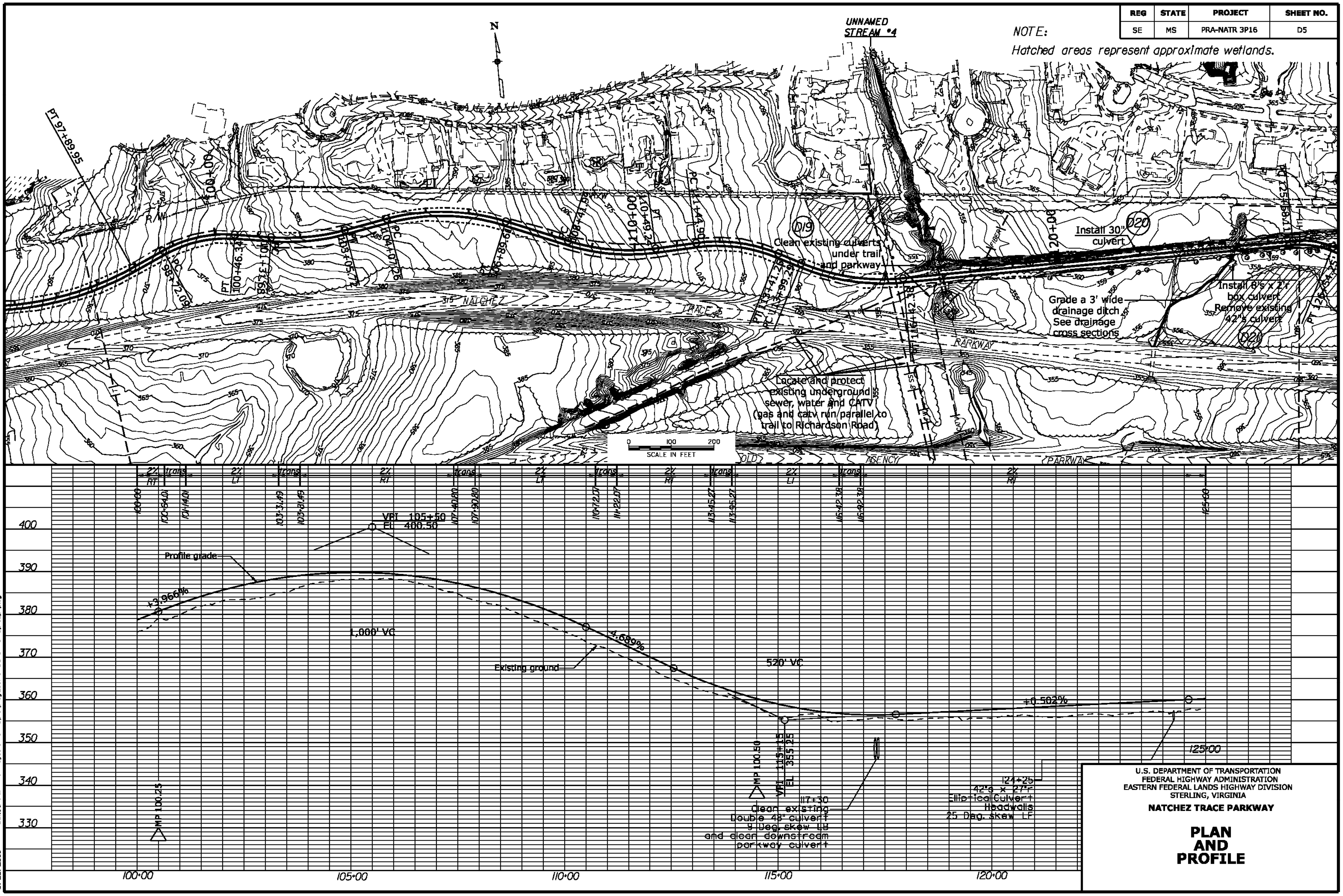
REG	STATE	PROJECT	SHEET NO.
SE	MS	PRA-NATR 3P16	D5

NOTE:
Hatched areas represent approximate wetlands.



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EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

NATCHEZ TRACE PARKWAY

PLAN AND PROFILE

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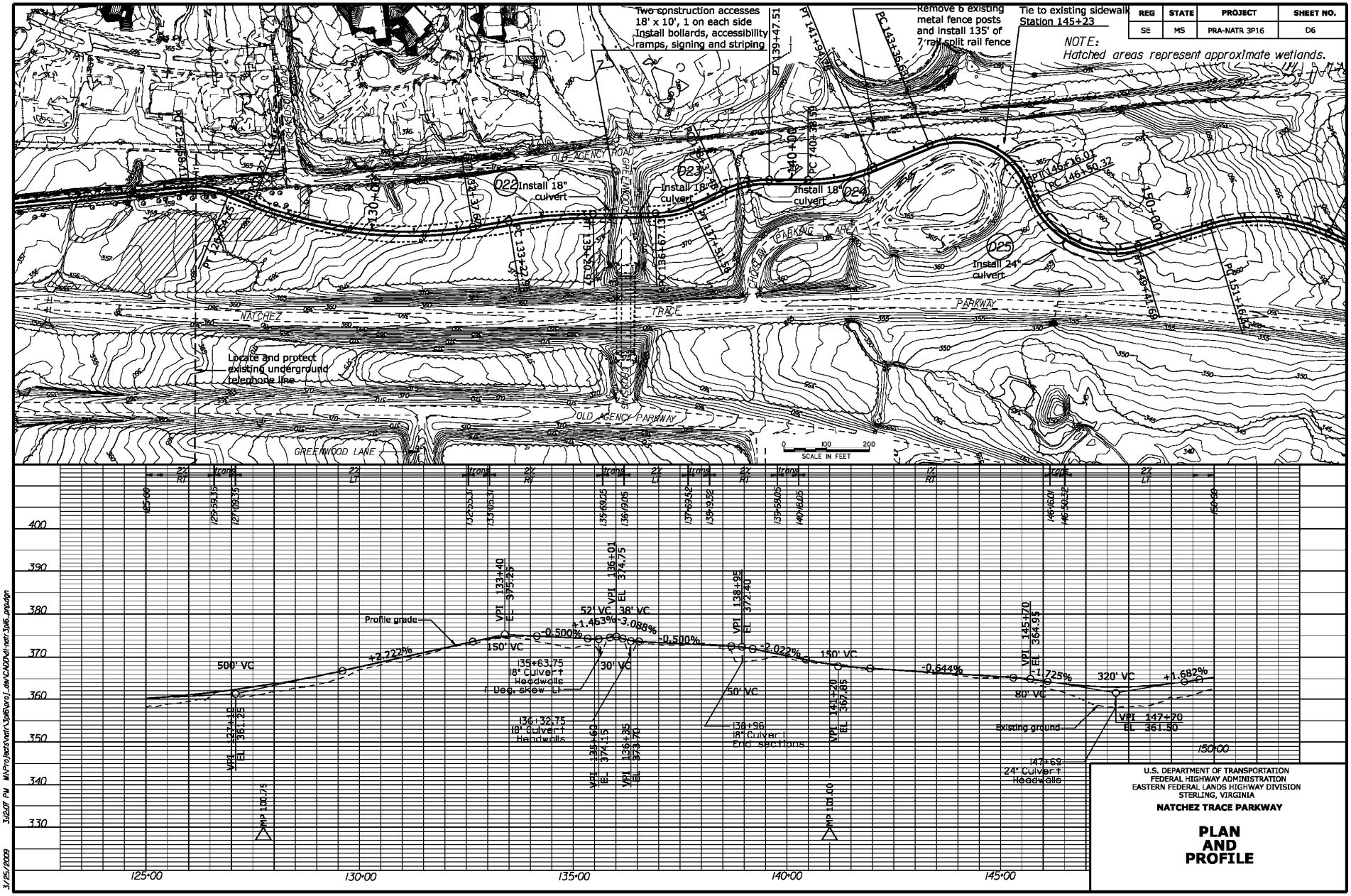

U.S. DEPARTMENT OF TRANSPORTATION
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EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

NATCHEZ TRACE PARKWAY

PLAN AND PROFILE

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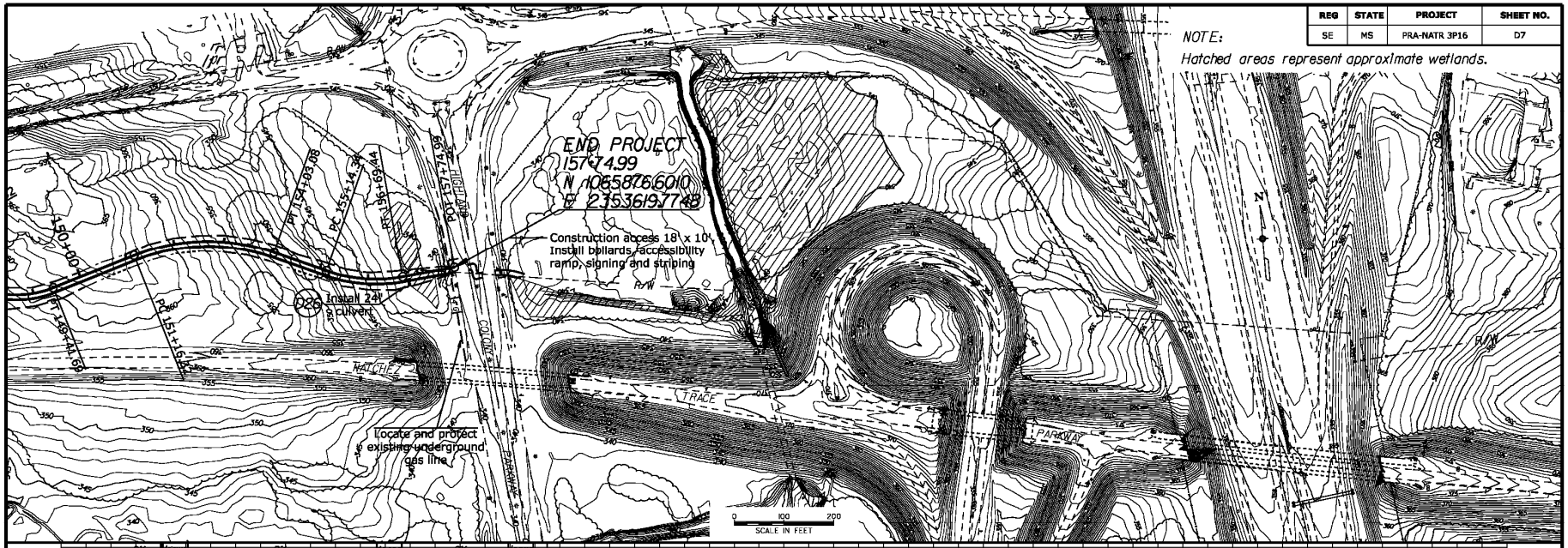
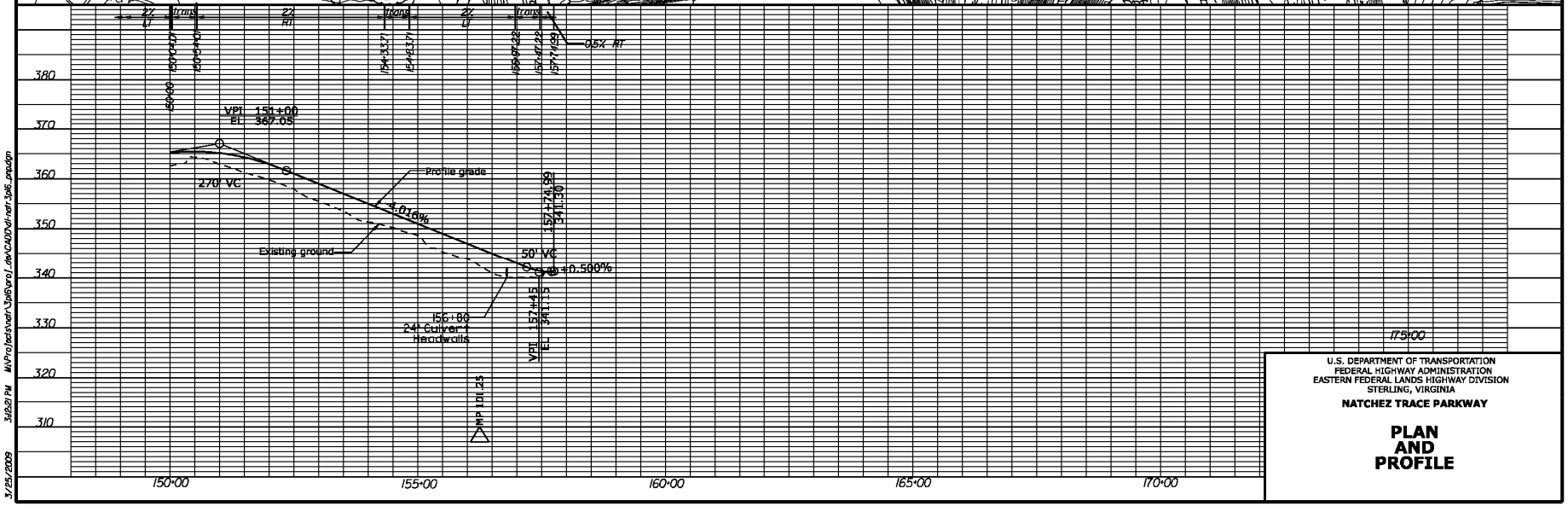
REG	STATE	PROJECT	SHEET NO.
SE	MS	PRA-NATR 3P16	D7

NOTE:
Hatched areas represent approximate wetlands.





U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

NATCHEZ TRACE PARKWAY

PLAN AND PROFILE

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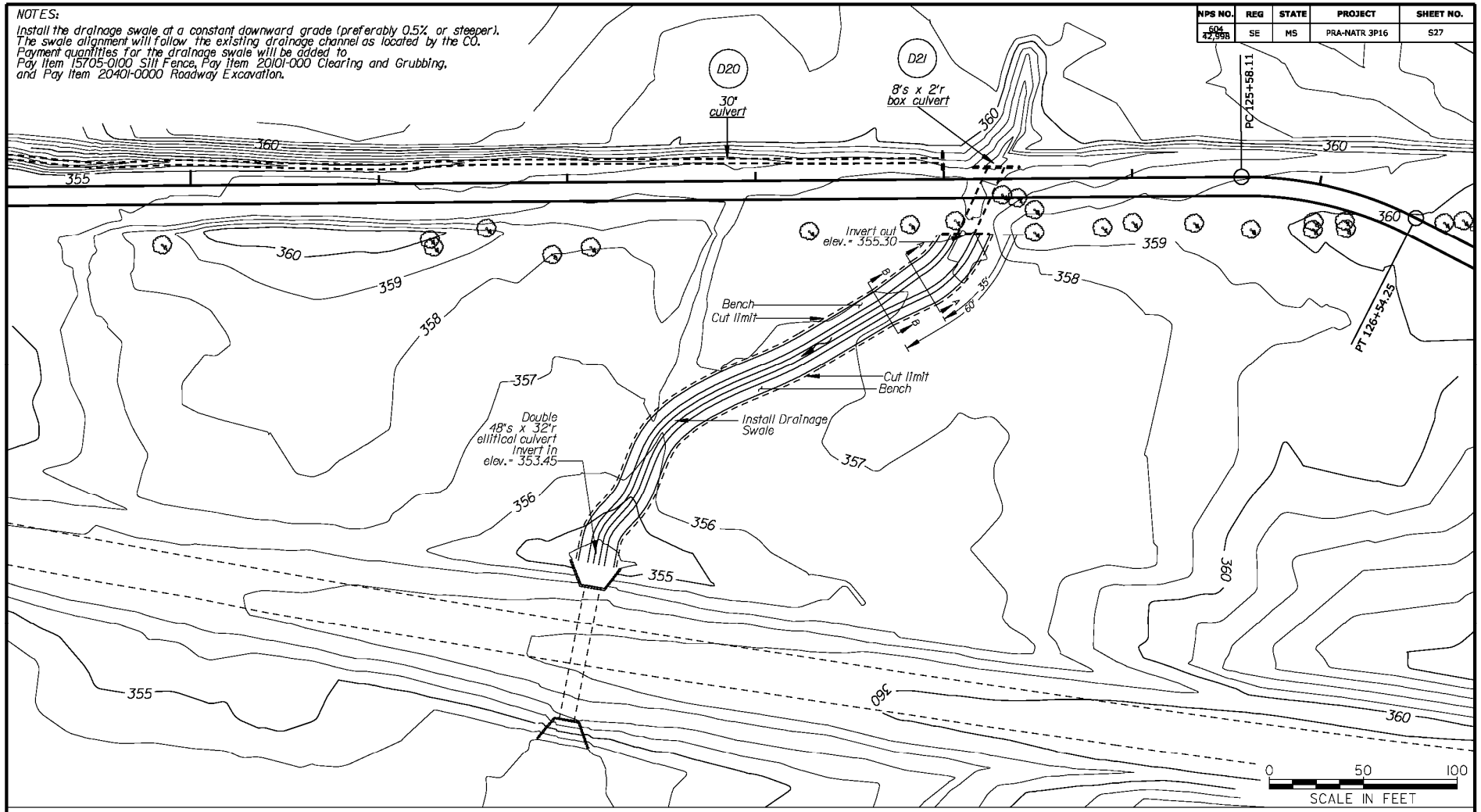
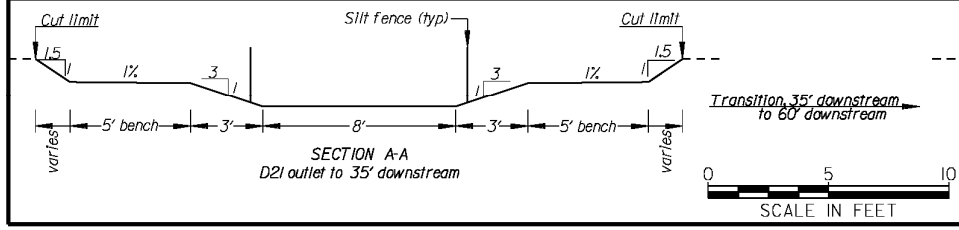
NOTES:

Install the drainage swale at a constant downward grade (preferably 0.5% or steeper). The swale alignment will follow the existing drainage channel as located by the CO. Payment quantities for the drainage swale will be added to Pay Item 15705-0100 Silt Fence, Pay Item 20101-000 Clearing and Grubbing, and Pay Item 20401-0000 Roadway Excavation.

NPS NO.	REG	STATE	PROJECT	SHEET NO.
604 42,998	SE	MS	PRA-NATR 3P16	S27





Transition 35' downstream to 60' downstream

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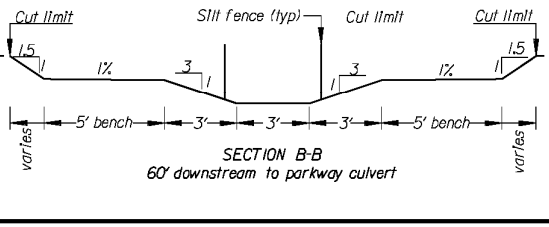
SCALE IN FEET



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

SPECIAL DETAIL

DRAINAGE SWALE

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Wetland Delineator Qualifications

Amy S. Greene Environmental Consultants, Inc.

Resumes from

Jeffrey Gray

And

Jennifer Czar

AMY S. GREENE ENVIRONMENTAL CONSULTANTS INC.

JEFFREY P. GRAY

Wetland Scientist

YEARS OF EXPERIENCE: 4

EDUCATION: B.A. with a concentration in Environmental Studies, 2003, Oberlin College, Oberlin, Ohio

PROFESSIONAL CERTIFICATIONS AND TRAINING

Grasses, Sedges & Rushes, August, 2007; Stabilization and Restoration of Difficult Sites, Rutgers School of Continuing Professional Education (RSCPE), May 2007; Endangered and Threatened Species of Southern New Jersey, RSCPE, May 2006; Freshwater Wetlands Permitting & New Stormwater Management Rules Seminar, November 2005; Southern New Jersey Wetlands Plant Identification, RSCPE, June 2005; Wetlands Delineator Certificate Series, RSCPE, May 2005; Lake Management, RSCPE, February 2004; "Restore Our Streams" Streambank Restoration Workshop, North Jersey RC&D, November 2003; Wilderness First Responder Certification; NJ Transit Safety Training and Roadway Worker Safety Training, 2008.

PROFESSIONAL EXPERIENCE

Mr. Gray has experience in performing environmental and ecological investigations. He has performed wetland delineations and prepared environmental applications for approval by state and federal agencies. He has prepared applications for letters of interpretation and permits for activities in wetlands for submission to the NJDEP Division of Land Use Regulation in accordance with the *NJ Freshwater Wetlands Protection Act*, CAFRA, Waterfront Development Act and *NJ Flood Hazard Area Control Act Rules*. He has requested Jurisdictional Determinations from the U.S. Army Corps of Engineers, New York District to confirm wetland mapping. He has performed federal and state listed endangered and threatened species habitat evaluations and targeted surveys. He has completed Categorical Exclusion Documentation in accordance with FHWA National Environmental Policy Act (NEPA) requirements and Environmental Impact Statements in accordance with NJ Executive Order 215. Mr. Gray has assisted on Phase II and III bog turtle surveys and conducted field surveys for federally endangered plants. Mr. Gray has performed comprehensive searches for and has identified suitable wetland mitigation project sites; has participated in wetland mitigation plan design; and has overseen wetland construction and restoration projects. Mr. Gray has reviewed wetland monitoring reports and wetland mitigation proposals associated with Freshwater Wetlands and CAFRA Individual Permits as an employee of the NJDEP Land Use Regulation Program, Wetlands Mitigation Unit. He also conducted on-site inspections of streambank restorations and tidal/freshwater wetlands construction and restoration projects

RELEVANT EXPERIENCE

US National Park Service, Natchez Trace Parkway PMIS 55898 Multi-Use Trail, City of Jackson, MP 103.5 to 105.8, MP 88.1 to 90.2 and MP 86.6, Hinds and Madison Counties, Mississippi. Wetland Scientist responsible for the delineation of onsite wetlands along six miles of National Park lands as part of the planning for a new multipurpose trail and parking facility. Prepared detailed wetland delineation report, including wetland functional assessments of every wetland.

Lakehurst Naval Air Engineering Station, **Jackson and Manchester Townships, Ocean County, New Jersey.** NJ Army National Guard/Jacobs Engineering Group, Inc. Wetland Scientist responsible for conducting a wetland delineation in accordance with the *New Jersey Pinelands Commission Manual for Identifying and Delineating Pinelands Area Wetlands.*

Rehabilitation of Bispham Street Bridge, Mount Laurel Township, Burlington County, New Jersey. LLP/Delaware Valley Regional Planning Commission/Stantec Consulting Services, Inc. Environmental Scientist responsible for delineating wetlands and State open waters and the preparation of a Categorical Exclusion Document in accordance with NEPA FHWA requirements.

ATIS Equipment Installation, Hutchinson River Parkway, Cross County Parkway, Saw Mill River Parkway and Sprainbrook Parkway, Westchester County, New York. New York State DOT/Dunn Engineering Associates, P.C./Parsons Brinckerhoff Quade & Douglas, Inc. Wetland Scientist responsible for the performance of the wetland delineation for the 113 Km (70 mile) project alignment, based on the presence of hydrophytic vegetation, wetland hydrology, and hydric soils, as outlined in the *1987 Corps of Engineers Wetlands Delineation Manual* and NYSDEC Wetland Delineation Manual.

Stony Brook Regional Bicycle and Pedestrian Pathway, Princeton Township, Mercer County, New Jersey. New Jersey Department of Transportation/Princeton Township/French and Parrello Associates. Wetland Scientist responsible for assisting with performance of a wetland delineation and preparation of a Wetland Delineation Report. This project also includes the preparation of Categorical Exclusion Documentation in accordance with NEPA requirements since the project is partially federally funded. Mr. Gray attended a pre-application conference with the NJDEP and provided guidance to F&P during the preparation of the NJDEP General Permit #17 for Multi-Use Trails and the NJDEP Minor Stream Encroachment Permit.

Edgeboro Landfill Expansion, East Brunswick Township, Middlesex County, New Jersey. Middlesex County Utilities Authority/Kurtz Engineering. Wetland Scientist responsible for wetland delineation and preparation of an application for a NJDEP Letter of Interpretation for an 80-acre parcel in the vicinity of the tidal portion of the Raritan River. The project also includes assistance to the MUA and its project engineer in developing a Conceptual Plan for solid waste facility expansion that complies with applicable NJDEP Land Use, including freshwater wetlands and Waterfront Development, and USACE Section 404 wetlands permit requirements.

Route 23 Wayne Bus and Rail Park and Ride for NJ Transit, Wayne Township, Passaic County, New Jersey. NJ TRANSIT/Christopher P. Statile Associates, Inc. This project included an Environmental Screening, freshwater wetland delineation, Letter of Interpretation, NJDEP Individual Freshwater Wetlands Permit, Environmental Impact Statement in accordance with NJ E.O. 215, Reforestation Plan, NJDEP Individual Freshwater Wetlands Permit Modification, and wetlands mitigation. Mr. Gray submitted and received approval for a Proposal for a Monetary Contribution to the Freshwater Wetlands Mitigation Council to satisfy wetland mitigation requirements of the Freshwater Wetlands Individual Permit.

County Route 571 Realignment, Jackson Township, Monmouth County, New Jersey. Monmouth County/Stantec Consulting Services, Inc. The project includes replacement/reconstruction of County Route 571 over the Toms River. ASGECI performed a wetland and State open waters delineation for the project areas and prepared the Ecology & Permits, Environmental Permits/Coordination Needed, Socio Economic Impacts, Environmental Justice, and Section 4(f) Involvement – Recreational Land sections of the CED. Environmental Scientist responsible for preparation of the CED in accordance with NEPA FHWA requirements and performance of the wetland and State open water delineation and swamp pink habitat survey.

I-287/I-78 and U.S. Routes 202/206 Interchange Improvement Project, Bridgewater and Bedminster Townships, Somerset County, New Jersey. NJDOT/PB Americas, Inc. Environmental Scientist responsible for performing the wetland delineation, and the preparation of an Environmental Screening Document and NJDEP LOI application. The project area included approximately 2 miles north and south of the I-287/I-78 intersection, approximately .75 mile to the east and west.

Route 22 ITS Closed Loop System, Green Brook Township, North Plainfield, and Watchung Borough, Somerset County, New Jersey. NJDOT/Greenman-Pedersen, Inc. Wetland Scientist responsible for performance of a wetland and State open water delineation for 13 intersections along Route 22 in Somerset County. Mr. Gray attended pre-application meetings with the NJDOT to minimize project impacts and identify the required NJDEP permits for the proposed activities.

Kearny Rail Yard Proposed Parking Lot Expansion, Town of Kearny, Hudson, County, New Jersey. NJ TRANSIT. Wetland Scientist responsible for the performance of a detailed on-site wetland delineation through field analysis of flora, hydrology, and soils. Mr. Gray wrote a permitting feasibility document indicating the multi-jurisdictional location of the property, and the required approvals for the project.

AMY S. GREENE ENVIRONMENTAL CONSULTANTS, INC.

JENNIFER CZAR

Wetland Scientist

YEARS OF EXPERIENCE: 5

EDUCATION: B.S. Animal Biotechnology and Conservation, Delaware Valley College, Doylestown, PA, May 2005.

PROFESSIONAL CERTIFICATIONS AND TRAINING

USEPA Hazardous Materials Incident Response Operations Training Course, 40 hours, July 2005; Confined Space Entry, 8 hours, November 2005; OSHA Site Safety Officer, 8 hours, March 2006; OSHA 8 Hour HAZWOPER refresher, August 2006, April, 2007, March 2008; Cook College Continuing Education, Rutgers University: Introduction to Wetland Identification, October 2005; Groundwater in Fractured Bedrock, Cook College Continuing Professional Education, March 2006; Endangered & Threatened Species of Northern New Jersey, March 2007; NJ Transit Safety Training and Roadway Worker Safety, December 2006; AMTRAK Contractor Safety Training, May 2007; Vegetation Identification for Wetland Delineation – North, July 2007; Methodologies for Delineating Wetlands, October 2007; Certified Wetland Delineator, October 2007, Rutgers State University, Cook College; Coastal Project Review, April 2008; NJ Wetlands Manual Training Workshop, August 2008, Rutgers – New Jersey Agricultural Experiment Station, Office of Continuing Professional Education.

PROFESSIONAL EXPERIENCE

Ms. Czar has experience in performing environmental and ecological investigations and preparing environmental documentation and permit applications. She has performed wetland delineations; prepared applications for wetlands and other environmental permits; conducted surveys for endangered and threatened species; provided oversight of wetland mitigation plantings; and conducted post construction monitoring of wetland mitigation sites. She has prepared environmental screening reports and NEPA Categorical Exclusion Documentation for State and Federally funded projects. She has inventoried environmentally sensitive resources to identify potential receptors of contamination as part of Baseline Ecological Evaluations. She has performed commercial/industrial Phase I environmental site assessment reports, including initial site inspection and review of historical information; preparation and implementation and oversight of investigatory and remedial soil and groundwater cleanup projects; preparation of NJDEP technical reports including Site Investigation, Preliminary Assessment, Remedial Action and Remedial Investigation Reports. Ms. Czar has performed the duties of Site Safety Officer of contaminated construction sites, including preparation, instruction and enforcement of a Health and Safety Plan. She has performed underground storage tank investigation, decommissioning and compliance, and designed, assisted and performed oversight of soil boring and test pitting studies. She is trained multiple areas of GPS/GIS, First Aid and CPR.

Ms. Czar received an award (April 2008) for contributing over 500 hours of volunteer service to Great Swamp National Wildlife Refuge in Basking Ridge, New Jersey.

RELEVANT EXPERIENCE

Route 202/206, Route 78, Route 287 Interchange, Bedminster and Bridgewater Township, Somerset County, New Jersey. NJDOT/Parsons Brinckerhoff Quade & Douglas, Inc. Wetland Scientist - Performed wetlands delineation through field analysis of flora, hydrology, and soils in red parent soil materials according to the Field Indicators of Hydric Soils (NRCS). Wetlands areas were identified in numerous locations along this linear project site. Approximately three thousand wetland flags were placed in the field to delineate the wetlands. Services were performed in accordance with the NJDOT Procedures Manual and Capital Projects Delivery Process.

G.R.O.W.S. Landfill, Fairless Expansion Study Area, Falls Township, Bucks County, Pennsylvania. Golder Associates/Waste Management Disposal Services of Pennsylvania. Wetland Scientist - Performed wetland delineation of a 250-acre site in accordance with the US Army Corps of Engineers Wetland Delineation Manual (1987).

Trans-Hudson Expressway (THE) Tunnel, Hudson County, New Jersey. NJ TRANSIT/THE Tunnel Partnership. Wetland Scientist - Performed wetlands and State open water delineation within multiple townships of Hudson County for the THE Tunnel NJ Alignment and Rail Yard project.

Route 181 John Street Drainage Project, Jefferson Township, Morris County, New Jersey. NJDOT/Arora and Associates, P.C. Environmental Scientist assisting with wetlands delineation and the preparation of an application for NJDEP General Wetlands Permits #1 and #11 for maintenance and for stormwater outfall construction, respectively.

Davenport Street Extension Scoping Phase, Somerville Borough, Somerset County, New Jersey. Somerset County Engineering Department/Keller & Kirkpatrick. Environmental Scientist – Performed wetlands delineation and preparation of a Wetland Delineation Report and Categorical Exclusion Documentation in accordance with FHWA NEPA requirements.

NY 27 Operational Performance Study, Township of Brookhaven, Suffolk County, Long Island, New York. New York State Department of Transportation/PB Americas, Inc. Senior Environmental Scientist responsible for conducting environmental resource screening of an approximate 11.5-mile long by an approximate 5-mile wide study area for improvements to the Sunrise Highway (NY 27). Resources include wetlands, floodplains, forests, parklands, streams and waterbodies, and other cultural resources. Environmental Scientist responsible for the preparation of an Inventory of Natural Resources Report.

Rolling Hills Development, Wantage Township, Sussex County, New Jersey. Wetland Scientist responsible for wetlands delineation of approximately 73-acre site.

Else Tract, Hopewell Township, Mercer County, New Jersey. Township of Hopewell. Wetland Scientist – Performed wetlands delineation and documentation of an approximate 67-acre agricultural property and responsible for the preparation of an NJDEP Letter of Interpretation.

Zaraphath, Franklin Township, Somerset County, New Jersey. Pillar of Fire, International/Millstone Mitigation Partners, LLC. Wetland Scientist - Performed with wetland delineation of an approximate 120-acre agricultural site.

Cornine Field at Streeter Pool Site, Morris Township, Morris County, New Jersey. Township of Morris Department of Parks & Recreation. Wetland Scientist - Performed wetland delineation of an approximate 27-acre parcel adjacent to the Whippany River. Also responsible for the preparation of an NJDEP pre-application request for the construction of an artificial turf football field.

South Region, Group 2, Bridge Scour Countermeasure, Various Townships, Various Counties, New Jersey. NJDOT/PB Americas, Inc. Wetland Scientist - Performed delineation of wetlands for two bridges within Jefferson Township, Morris County that will be undergoing repairs to counter scour damage.

BG William C. Doyle Veterans Memorial Cemetery, Arneytown, Burlington County, New Jersey. NJ Department of Military and Veterans Affairs/L. Robert Kimball & Associates**.** Environmental Scientist responsible for the preparation of a Letter of Interpretation/Regulatory Line Verification Extension application for submission to NJDEP. Application was prepared in accordance with *NJ Freshwater Wetlands Protection Act* requirements.