

National Park Service  
U.S. Department of the Interior

Prince William Forest Park  
Triangle, Virginia



# Prince William Forest Park

## Environmental Assessment/Assessment of Effect Resurface Public Roads and Parking Lots

June 2009





**Prince William Forest Park  
Environmental Assessment/Assessment of Effect  
Resurface Public Roads and Parking Lots**

**SUMMARY**

Prince William Forest Park of the National Park Service (NPS), in cooperation with Eastern Federal Lands Highway Division (EFLHD) of the Federal Highway Administration (FHWA) is proposing to improve visitor experience and park operations by addressing deficient transportation related facilities within Prince William Forest Park, including access roads and parking facilities. These roads and parking lots provide visitor access to hiking and biking trails, picnic areas, the Visitor Center, and several other Park amenities. These improvements to the Park's transportation facilities are needed because the deterioration of the interior roadways and lack of adequate parking has created public safety concerns and diminished overall visitor enjoyment; and because the existing road signage, guardrails and culverts have been determined to be insufficient.

This Environmental Assessment (EA)/Assessment of Effect (AE) analyzed an action alternative (the preferred alternative) and the no action alternative and their impacts on the environment in accordance with the National Environmental Policy Act (NEPA). The action alternative includes the resurfacing, restoration and rehabilitation of Park roadways and parking lots, replacement of signs, guardrails and culverts, reconditioning of stone and asphalt paved waterways, along with the possible expansion of parking lots D and E and the reconfiguration of the Scenic Drive Intersection at mile marker two.

Impacts of the proposed alternatives were assessed in accordance with NEPA and the NPS's Director's Order 12: *Conservation Planning, Environmental Impact Analysis, and Decision-making*, which requires that impacts to park resources be analyzed in terms of their context, duration, and intensity. Several impact topics have been dismissed from further analysis because the proposed action alternatives would result in negligible to no effects to those resources. No major effects are anticipated as a result of this project.

**Note to Reviewers and Respondents:**

If you wish to comment on the EA, you may mail comments directly via U.S. Post or submit them electronically. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we would be able to do so.

**Mailed comments can be sent to:**

Superintendent, Prince William Forest Park  
Resurface Public Roads and Parking Areas  
18100 Park Headquarters Road  
Triangle, VA 22172

**Comments can also be submitted on-line by following the appropriate links at:**

<http://parkplanning.nps.gov/PRWI>

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## PURPOSE AND NEED

### Project Description

Prince William Forest Park (PRWI, the Park) of the NPS, in cooperation with EFLHD is proposing to rehabilitate Turkey Run Road and Oak Ridge Road, rehabilitate or repave portions of Scenic Drive and Telegraph Road and repave or expand thirteen parking lots along these routes. The project would also include the reconfiguration of the Scenic Drive intersection at mile marker two and the creation of additional parking spaces at parking lots D and E. The location of the Park within the region is shown on Figure 1 on page 4, and the Park roadways and parking lots are shown on Figure 2 on page 5.

This (EA)/(AE) is intended to analyze the preferred alternative, the no action alternative and other reasonable alternatives, as appropriate, and their impacts on the environment. This EA/AE has been prepared in accordance with the NEPA of 1969 and implementing regulations (40 CFR Parts 1500-1508) and the NPS Director's Order #12 and Handbook, *Conservation Planning, Environmental Impact Analysis, and Decision-making*. In accordance with the National Historic Preservation Act of 1966 as amended, and the implementing regulations at 36 CFR Part 800, the process and documentation required for preparation of this EA/AE would also be used to comply with Section 106 of the National Historic Preservation Act.

### Purpose and Need

This project is aimed at addressing deficient transportation related facilities within the Park, including access roads and parking facilities. These roads and parking lots provide visitor access to hiking and biking trails, picnic areas, the Visitor Center, and several other Park amenities.

The NPS Park Road Standards indicate that park roads are intended to enhance visitor experience while providing safe and efficient accommodation of park visitors and to serve essential management access needs (NPS, 1984). Park transportation systems provide a critical role in shaping the experience of visitors and their perceptions on the role of the park (Louter, 2006). On a more local level, in a recent survey conducted for the Park, over half (59%) of the respondents indicated that the maintenance of Park roads was extremely important (Lawson, et. al., 2006), indicating the importance of maintenance of park roadways for a positive visitor experience.

Aesthetically, the parking lots are unsightly due to uneven surfaces, cracks, crumbling asphalt curbs, and deteriorating timber wheel stops. The uneven surfaces also present a safety hazard to bicycles and a tripping hazard to Park visitors and employees who use these parking lots. In addition, the *EFLHD Engineering Study* indicates that most of the existing guardrails and signs associated with these facilities are substandard, and that several existing culverts along these routes are deficient (EFLHD, 2004).

There is also a need to address safety issues at the Y-intersection of Scenic Drive at mile marker two, shown on Figure 2. Currently, large vehicles such as buses transporting visitors from the Turkey Run Education Center have difficulty making the turn into the appropriate southbound travel lane on Scenic Drive, due to the inadequate intersection

radius. In order to make the turn, these longer vehicles swing wide across both directional travel lanes, potentially blocking traffic that is traveling in the opposite direction, creating an accident hazard for individuals utilizing this road. For these larger vehicles to safely perform this turning maneuver, the existing intersection configuration needs to be corrected.

The need for adequate and appropriately located parking facilities was rated as extremely important by 47% of respondents in a recent Park survey (Lawson, et. al., 2006). However, with the exception of the facilities at Turkey Run Education Center, no parking lots with over 30 parking spaces exist within the interior of the Park. The locations of existing parking lots are identified in single, capitalized red letters on Figure 2. Small parking lots and small traditional and pull off lots are available along Scenic Drive and Oak Ridge Road. Park staff report that these small parking lots fill quickly during peak Park use, particularly parking lots D and E. They also report that visitors sometimes park on unpaved areas along Scenic Drive due to the inadequate parking facilities. This requires Park staff to police the area to remind visitors to park only in designated parking lots. Parking lot E provides access to several trail heads, including the popular Quantico Cascades Trail and a picnic area.

Parking lot D provides access to several trail heads where Scenic Drive converts to a one-way road traveling north and west. Many visitors park at lot D to access the beginning of the recreational lane within the one-way portion of Scenic Drive, and to access unpaved bicycle routes such as the Pyrite Mine Road and North Orenda Road. Visitors parking at lot D can easily exit the Park by traveling south on the two-way portion of Scenic Drive. Visitors parking further north along Scenic Drive have more difficulty exiting the Park since they have to travel the additional eight miles around Scenic Drive. To provide adequate and appropriate parking opportunities valued by Park visitors, there is a need to address the existing parking capacity in Lots D and E.

#### **PURPOSE OF THE ACTION**

Based on the discussion above, the purpose of the proposed project is to improve the transportation facilities within Prince William Forest Park in a way that protects the Park's resources and values and that:

- Improves public safety; and
- Enhances visitor enjoyment and interpretation of the Park.

#### **NEED FOR THE ACTION**

Improvements to the Park's transportation facilities are needed because:

- Deterioration of the interior roadways and lack of adequate parking has created public safety concerns and diminished overall visitor enjoyment; and
- Road signage, existing guardrails and culverts have been determined insufficient by EFHLD.

#### **HISTORY AND SIGNIFICANCE OF THE PARK**

Located in the southeast corner of Prince William County, Virginia, the 15,000 acre Prince William Forest Park is 32 miles south of Washington, DC, near the communities of Dumfries and Triangle. The Park is bordered by VA 234 to the north and east, and VA

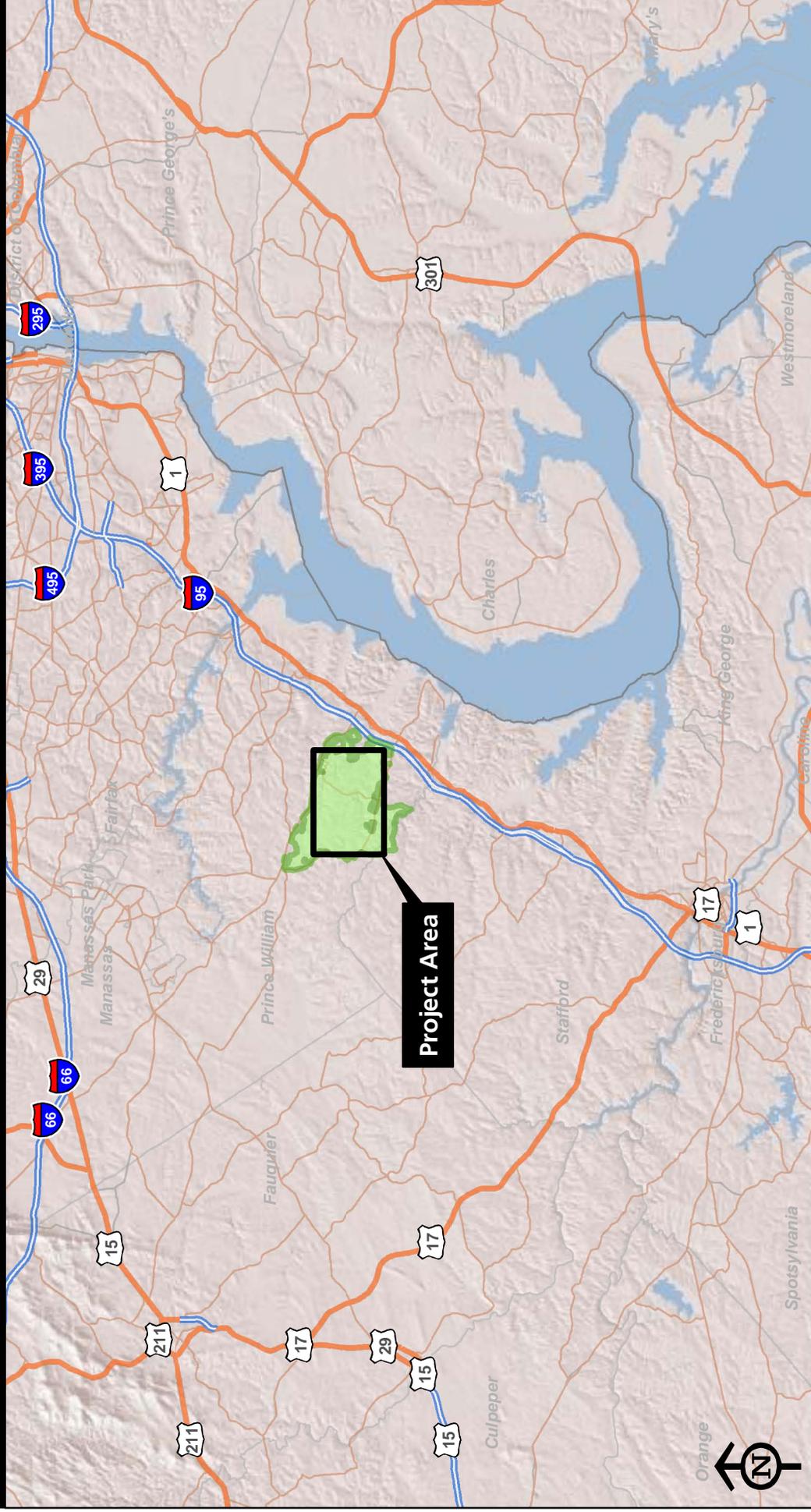
619 to the south and west. The Park is within two physiographic provinces, the Piedmont and the Coastal Plain. These provinces exist in the middle of the northern and southern climates, a transition zone that supports many species in the outer limits of their ranges. The forests and waterways of the Park create a wide diversity of habitat, vegetative communities, and species composition not generally found in any single forest type. Prince William Forest Park represents one of the largest examples of undeveloped land in the region, and is the third largest National Park in the state of Virginia, and the largest Piedmont forest in the National Park System. For these reasons, the Prince William Forest Park is a significant natural resource (NPS, 1999; NPS, 2004).

Within an hour's drive of more than four million people, Prince William Forest Park provides a rare undeveloped landscape of mixed hardwood forest and offers the visitor a variety of opportunities to experience the outdoors. The Park hosts over 200,000 visitors annually (NPS, 2008d), with popular recreational activities that include camping, hiking, picnicking, and biking. The Park offers 37 miles of hiking trails, three wooden bridges, five actively used cabin camps built by the Civilian Conservation Corps (CCC), the Cabin Branch Pyrite Mine, 1800s era homesteads and farms, and more than 25 miles of streams. Four of the CCC cabin camps are listed on the National Register of Historic Places as historic districts (NPS, 1999; NPS, 2004). Day-use facilities at the Park were developed during the Mission 66 era – a program to upgrade the nation's parks in the period following World War II. They include the Telegraph Road Picnic Ground, the Turkey Run and Oak Ridge campgrounds, the Turkey Run Education Center, and the Scenic Drive.

## **ESTABLISHMENT**

The Park land was originally designated as the Chopawamsic Recreation Demonstration Area (RDA) beginning in 1933 (NPS, 1999). During the 1930s, the CCC built roads, cabin camps, and lakes for urban middle and lower income populations (NPS, 1986). With the creation of the U.S. Office of Strategic Services (OSS), nine secret training areas were established within the Park to train spies and radio operators in covert military intelligence operations. The cabin camps were used for group camping, especially by charitable organizations from Washington, D.C., and are still used by the public today for group camping (NPS, 1986). In 1934, strict conservation practices and land acquisitions were initiated.

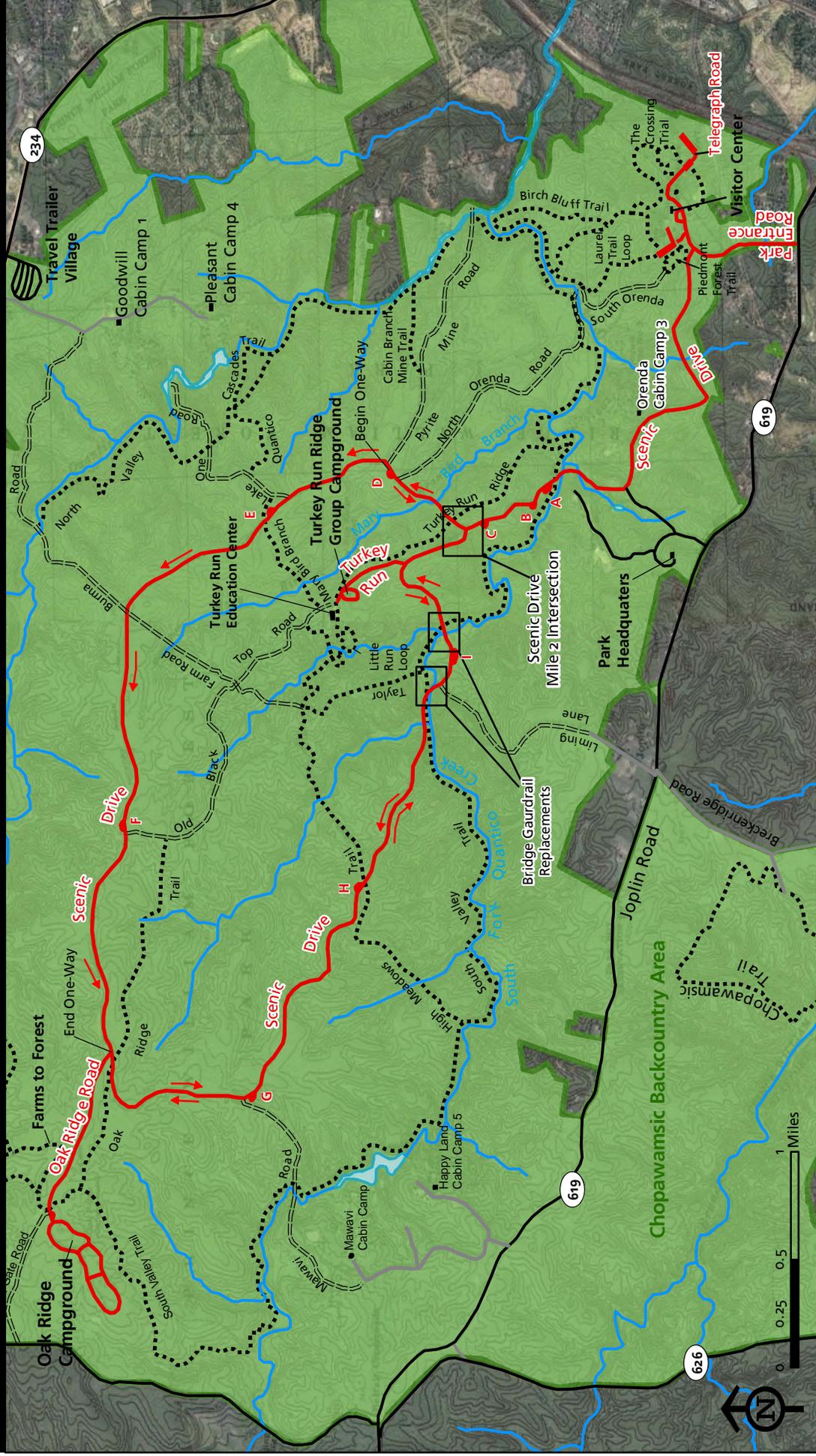
The Chopawamsic RDA was turned over to the NPS in 1936 through an Executive Order signed by President Franklin D. Roosevelt. By this time, most of the recreational developments were in place, and the landscape was exhibiting signs of restoration through natural succession. Congress changed the name of the Park to Prince William Forest Park in 1948. At this time, the conditional transfer of control of 5,000 acres of the adjacent Quantico Marine Corps Base occurred with the understanding that the water quality of the Quantico Creek would continue to be protected. Today, a primary management objective of Prince William Forest Park is the protection of the Quantico Creek watershed through a combination of land acquisition, exchanges and transfers,



**Figure 1: Region,  
DSC/November 2008/ 860/20010**

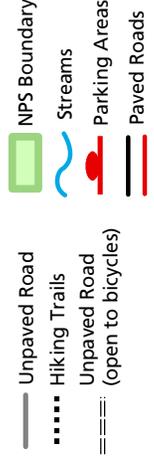
Environmental Assessment  
Roadway Resurfacing





**Figure 2: Project Location,  
DSC/November 2008/ 860/20011**

Environmental Assessment  
Roadway Resurfacing



internal land use practices, and active cooperation with adjacent property owners. As described in the Park's General Management Plan, Prince William Forest Park primarily serves as a "cradle" for local indigenous species and as a natural human retreat from a burgeoning urban area (NPS, 1999).

### **CENTENNIAL STRATEGY**

In 2006, President George W. Bush launched the NPS Centennial Initiative as a 10-year effort to prepare national parks for another century of conservation, preservation and enjoyment in time for the NPS's 100th anniversary in 2016. The initiative furthers goals in the areas of stewardship, environmental leadership, recreational experience, education and professional excellence. The First Annual Centennial Strategy for Prince William Forest Park was prepared in 2007. It provided a vision for the Park and outlined stewardship goals. One of the stewardship goals outlined in the strategy was to improve the condition of park resources and assets. An excerpt of the vision statement for the Park is provided below:

"The vision for the park is to build on its history, and by changing its name, to permanently commemorate the CCC as a part of the National Park System. The suggested name would be CCC National Recreation Area, which has been endorsed by the major national CCC alumni groups. Centennial projects related to this vision would include improving the way visitors enter the park to allow access and viewing of a typical cabin camp as identified in the 2006 business plan. We would also provide a parking lot and multi-use trail access on the northern side of the park along Route 234, where most of the population growth has occurred in recent years. Other projects would repair and rehabilitate the five cabin camps, and remove all graffiti from the cabins by 2016, and to create a unique conference room and theater that could be rented by the public. Educational programs would be enhanced, with more emphasis on students from Prince William County and the Bridging the Watershed program for high school students" (NPS, 2007).

### **PROJECT BACKGROUND AND PLANNING**

The EFLHD *Engineering Study* dated June 2004 identified the need to address degraded pavement conditions of five roads and thirteen associated parking lots along these routes in Prince William Forest Park. The roads in need of attention include Park Entrance Road (Route 10, 0.637 mile), Scenic Drive (Route 11, 9.283 miles), Turkey Run Road (Route 12, 0.358 mile), Oak Ridge Road (Route 13, 0.612 mile), and Telegraph Road (Route 15, 0.260 mile). Existing asphalt surfaces of these routes and parking lots exhibit longitudinal and interconnected cracks resulting from repeated vehicle traffic. Park Entrance Road from Route 619 to the Park's visitor center, Scenic Drive, and Telegraph Road were last resurfaced in 1988 and are now showing signs of deterioration. The parking lots and pull offs, all constructed in 1968, have never had a pavement overlay.

### **NPS PLANS, POLICIES, AND ACTIONS**

The Park's General Management Plan indicates a goal to improve visitor experiences and enhance public use of the Park facilities. The approved plan established strategies to improve visitor experience and enhance public use of the Park, while ensuring the long-term protection of the Park's significant resources. The plan acknowledges that roadbeds and drainage would require a higher level of maintenance than in the past (NPS, 1999). The Prince William Forest Park Business Plan identified the resurfacing of public roads and

parking areas project as a high priority future investment (NPS, 2005a).

Director's Order #28: Cultural Resources Management requires the NPS to protect and manage cultural resources in its custody through effective research, planning, and stewardship and in accordance with the policies and principles contained in the NPS Management Policies. It also indicates the NPS would comply with the substantive and procedural requirements described in the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation and the 2008 Programmatic Agreement between the NPS, the Advisory Council on Historic Preservation and the National Conference of State Historic Preservation Officers. The Cultural Resource Management Guideline further implements the NPS Management Policies and contains park management standards and other requirements with which park managers must comply in carrying out their responsibilities. It outlines requirements for research, planning, and stewardship of cultural resources, compliance with Section 106 of the National Historic Preservation Act, as well as the management of archeological resources, cultural landscapes, historic and prehistoric structures, museum objects, and ethnographic resources.

The NPS Park Road Standards document provides guidelines for roadway design elements such as vertical and horizontal alignment, sight distance, intersections, roadside slopes and drainage, guardrails, and curbs, bridges, and tips to maintain the integrity of historic structures (NPS, 1984). While there would be no changes in the current design or function of the Park roadways, parking lots, and related transportation features, the NPS Park Road Standards would provide guidance in maintaining the historically significant elements of the roadways during this project.

## **SCOPING**

Scoping refers to the process used to gather information from the public and interested agencies to define project issues, alternatives, and data needs. Internal scoping typically includes a multidisciplinary team of NPS personnel along with interested federal, state and local agency representatives. External scoping is the process used to gather public input and may include scoping sessions, direct mailings, newsletters, ads, or open houses.

Internal scoping for this project formally began in 2004, when the project was identified in the EFLHD Engineering Study, dated June 2004. Later the next year, the Design Scoping Report was prepared by the EFLHD.

The Environmental Screening Form, which is typically used to identify potential issues and begin the Environmental Assessment process, was initiated in August 2007. The multidisciplinary project team held a meeting on September 30, 2008 to develop alternatives that would meet the purpose and need of this project. During this meeting, potential issues and possible impacts were identified, feasible alternatives were discussed and the existing site conditions were reviewed in the field. NPS held an additional meeting on October 7, 2008 to finalize the alternatives and the project purpose and need.

The NPS initiated formal external scoping for this project. A public notice announcing the project would be issued on the NPS Planning Environment and Public Comment (PEPC) website. In 2006, the Park conducted a series of surveys to collect information about neighborhood residents' and park visitors' visitation patterns, demographic characteristics,

and attitudes and preferences for park management. This series of surveys included an onsite survey of park visitors during June, 2005, a mail survey of residents of communities adjacent to the park during June and July, 2005, and onsite and internet surveys administered to park visitors during October, 2005. The results of the survey indicated that the respondents rated maintenance of Park facilities, roads and trails as extremely important (Lawson, et. al., 2006). It also indicated that adequate and appropriately located parking is important to nearly half of the respondents.

## ISSUES AND IMPACT TOPICS

Issues describe problems or concerns associated with current impacts from environmental conditions or current operations, as well as problems that may arise from the implementation of an alternative. The following issues were identified during the project planning by internal and external scoping, and in the EFLHD Design Scoping Report:

**Balancing the Need for Increased Parking at Lots D and E While Minimizing Impacts to Sensitive Resources.** While there is a demonstrated need for additional parking spaces in this area of PRWI, the Park is concerned with potential impacts to wetlands, a family cemetery, former home sites and existing forest habitat. The issue was how to provide a reasonable increase in parking spaces between the two lots without impacting the identified sensitive resources.

**Improve Safety of Scenic Drive Intersection.** The purpose of the reconfiguration of this intersection is to improve the safety hazard posed by the inadequate intersection radius. The Park would minimize the impacts on natural resources in the area of this intersection while providing the appropriate intersection geometry.

**Correct Poor Pavement Condition.** The poor pavement condition has been a concern of the NPS because aesthetically, the parking lots are unsightly due to uneven surfaces, cracks, crumbling asphalt curbs, and deteriorating timber wheel stops. In addition, uneven surfaces present a safety hazard to bicycles and a tripping hazard to Park visitors and employees. Impacts to visitor use and experience during construction would be minimized as much as possible by not allowing work on weekends, when the Park experiences a higher number of visitors.

**Improve Safety and Operational Efficiency of Existing Roadways.** The Park is concerned about the safety of the existing roadways and the impacts on public and operational safety. The deteriorating roadways and parking lots pose a tripping hazard for Park staff and visitors. The signage, guardrails and deteriorating culverts associated with these facilities are also substandard.

## IMPACT TOPICS RETAINED

The following impact topics are discussed in the Affected Environment chapter and analyzed in the Environmental Consequences chapter. These topics are resources of concern that could be beneficially or adversely affected by the actions proposed under each alternative and are developed to ensure that the alternatives are evaluated and compared based on the most relevant topics. These impact topics were identified based on the following: issues raised during scoping, federal laws, regulations, executive orders, NPS 2006 *Management Policies*, and NPS knowledge of limited or easily impacted resources. A brief

rationale for the selection of each impact topic is given below, as well as the rationale for dismissing specific topics from further consideration.

**Cultural Landscapes** – Most of the park roadways were constructed during the Mission 66 era. Any changes to the layout or design of the roads or features associated with the roads (stone masonry culverts, parking lots), which may occur under the action alternative, could impact the NPS developed landscape within the Park. Based on these potential impacts, this impact topic was carried forward for further analysis in this EA.

**Soil** – According to the Natural Resources Conservation Service soil survey, many of the soil types within the Park are highly erodible. Construction activities and increased visitor use have the potential to increase soil erosion within the Park under the action alternative. Continued deterioration of the Park roadways and parking lots and the insufficient culverts under the no action alternative would also have the potential for increasing soil erosion. Based on these potential impacts, this impact topic was carried forward for further analysis in this EA.

**Vegetation** - Under the action alternative, vegetation removal would occur during the construction activities. The inadvertent establishment of noxious weeds or invasive species would be possible in any disturbed areas. Under the no action alternative, no impacts to native vegetation would occur. Based on these potential impacts, this impact topic was carried forward for further analysis in this EA.

**Water Quality** - Under both alternatives, water resources may be impacted by siltation and erosion. Under the action alternative, water quality impacts would also occur during the replacement or repair of culverts, and the reconditioning or replacement of existing paved waterways. Based on these potential impacts, this impact topic was carried forward for further analysis in this EA.

**Public Health and Safety** – The no action alternative has the potential to impact public health and safety based on the current substandard transportation network. The action alternative is expected to have a positive impact on public health and safety post construction. Based on these potential impacts, this impact topic was carried forward for further analysis in this EA.

**Park Operations** – The no action alternative has the potential to impact park operations since continuing repairs to pavement would be necessary. The action alternative is expected to have a positive impact on park operations post construction. Based on these potential impacts, this impact topic was carried forward for further analysis in this EA.

**Visitor Use and Experience** - The no action alternative has the potential to impact visitor experience based on the lack of adequate parking facilities and the current deteriorating aesthetic appearance and functionality of the roadways. Under the action alternative, the project may have a negative impact on visitor use and experience based on accessibility. The action alternative has the potential to have a positive impact on visitor use and experience post construction. Based on these potential impacts, this impact topic was carried forward for further analysis in this EA.

## IMPACT TOPICS ELIMINATED

The following impact topics were eliminated from further analysis in this EA. A brief rationale for dismissal is provided for each topic. With mitigation, potential impacts to these resources would be negligible or less, and localized.

**Geologic Resources** – The Park provides unique geologic resources due its location between the Coastal Plain and Piedmont physiographic provinces. Undulating topography, steep sided valleys and narrow ridge tops characterize the landscape within the Park. In addition to the geological diversity, the Park contains large pyrite deposits. The best example of the mineral deposits is at the confluence of the north and south branches of Quantico Creek, where crystalline formations can be seen. With the exception of two options for parking lot E, the roadway activities and parking lot improvements proposed are completely within the previously disturbed footprints of these transportation facilities. Under two of the options for parking lot E, changes in the landscape would occur to create paved parking in areas that are currently naturalized. No locally rare geological formations are present within the project area. Since the impacts to geologic resources would be negligible under either alternative, this impact topic has been dismissed.

**Land Use** – The PRWI is owned and managed by the NPS. The Park provides a variety of recreational activities, with 21 miles of bicycle trails, 37 miles of hiking trails, five CCC-era cabin camping areas, multiple camping areas, two picnic areas, the Turkey Run Education Center and a visitor center. With the exception of two of the options for parking lot E, no changes in land use would occur since the roadway activities and parking lot improvements proposed are completely within the previously disturbed footprints of these transportation facilities. No changes in land use would occur under the no action alternative. Since any resulting land use changes would result in negligible impacts, this impact topic has been dismissed.

**Prime Farmlands** – According to the U.S. Department of Agriculture (USDA), Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and that is available for these uses. It has the combination of soil properties, growing season, and moisture supply needed to produce sustained high yields of crops in an economic manner if it is treated and managed according to acceptable farming methods. In general, prime farmland has an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, an acceptable level of acidity or alkalinity, an acceptable content of salt or sodium, and few or no rocks. Its soils are permeable to water and air. Prime farmland is not excessively eroded or saturated with water for long periods of time, and it either does not flood frequently during the growing season or is protected from flooding. This designation does not include areas of water or urban or built-up land.

Prime farmland is protected under the Farmland Protection Policy Act of 1981 to minimize the extent to which federal programs contribute to the unnecessary or irreversible conversion of farmland to nonagricultural uses. The U.S. Census Bureau map shows PRWI as part of an urbanized area. Based on this status, the Park does not meet the definition of farmland. Under 7 CFR 658.3, land that does not meet the definition of farmland is exempt from review under the Farmland Protection Policy Act. Therefore, prime farmland was dismissed from further evaluation in this EA.

**Floodplains** – In compliance with Executive Order 11988, it is NPS policy to preserve floodplain values and minimize potentially hazardous conditions associated with flooding (NPS, 2002). A Federal Emergency Management Agency (FEMA) designated 100-year floodplain is present in the project area, where the south leg of Scenic Drive crosses over the South Fork Quantico Creek (see yellow box on Figure 2a below). However, no impacts to natural floodplain values would occur and the project would not be in support of floodplain development that could adversely affect the natural resources and function of the floodplain. Director’s Order 77: Floodplain Management (NPS, 2002) indicates that a Statement of Findings would only be required when locating structures in a floodplain or when impacts to natural floodplain values would occur. Since neither of the identified alternatives support development in the floodplain or impact natural floodplain values, this topic has been dismissed from further evaluation.



## Floodplain

Environmental Assessment

Roadway Resurfacing

Figure 2a: Floodplain Map

- Unpaved Road
- Unpaved Road (open to bicycles)
- Floodplain Boundary
- Hiking Trails
- Streams
- Parking Areas
- Paved Roads
- NPS Boundary

**Wetlands** – In accordance with NPS Director’s Order 77-1 which implements Executive Order 11990, NPS is required to avoid impacting wetlands whenever there is a practical alternative. A vernal pool and surrounding wetland seep were identified by Park staff adjacent to parking lot D. The wetland lacked hydric soil indicators but contained a predominance of hydrophytic vegetation and indications of wetland hydrology.

The NPS utilizes the Fish and Wildlife Service, U.S. Department of the Interior publication *Classification of Wetlands and Deepwater Habitats of the United States*, 1979, to classify wetlands. For identification purposes, wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominately hydrophytes; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year. Therefore, this vernal pool-seep complex is a wetland for purposes of NPS evaluation of potential impacts. A copy of the wetland delineation report prepared by PRWI is provided in Appendix C.

No impacts would occur to wetlands under the no action alternative. Under the preferred alternative, parking lot D would be repaved and reconfigured to provide additional parking spaces, without expanding the existing footprint of the parking area. As the boundaries of the wetland are located outside of the existing footprint of the parking lot, no resulting dredging or fill would occur within the wetland. The parking lot would be designed to direct parking lot runoff away from the wetland. Best management practices to be incorporated into the action alternative include the protection of the identified wetland with construction fencing to prevent accidental equipment access along with appropriate erosion and sediment control measures to prevent siltation. The resulting impacts to wetlands would be adverse, short term and negligible and therefore wetlands have been dismissed as an impact topic.

**Coastal Zones** – The Park is located within the Virginia Coastal Zone Management Area and therefore requires coordination with the Virginia Department of Environmental Quality (DEQ) under the Coastal Zone Management Act. The Park initiated coordination with the Virginia DEQ on April 15, 2009. The vegetated corridors along lakes, streams, rivers, marshes or shoreline are known as riparian buffers, and most are included as Resource Protection Areas (RPAs). The RPAs function to stabilize shorelines and stream banks, filter pollutants, reduce volume of storm water runoff and provide habitat for wildlife. The RPAs within the Park would be protected with the use of sediment and erosion control best management practices (BMPs), as described in the Mitigation Measures Under the Action Alternative section of this EA. Based on the implementation of these BMPs, the action alternative would not be expected to impact the RPAs or coastal zones. Since no impacts to the coastal zone are expected under either alternative, this impact topic has been dismissed from further evaluation.

**Air Quality** – The Clean Air Act (42 USC 85) is the law that defines EPA's responsibilities for protecting and improving the nation's air quality and the stratospheric ozone layer. The last major change in the law, the Clean Air Act Amendments of 1990, was enacted by Congress in 1990. In general, this act requires federal agencies to protect Park air quality and air quality related values (including visibility, plants, animals, soils, water quality, cultural and historic resources and objects, and visitor health) from adverse air pollution impacts. Prince William

Forest Park is a designated Class II area and Prince William County has been designated as a non attainment area for ozone, and a state volatile organic compounds and nitrogen oxides emission area (9VAC5-20-205 and 206).

Should the no action alternative be selected there would be no additional impacts to air quality as this alternative represents the park's current condition. With the action alternative, temporary increases in air pollution would occur during construction, primarily from operation of construction equipment, but also from queuing of visitor's vehicles if stopped temporarily during the construction period. Overall, there would be a slight and temporary degradation of local air quality due to dust generated from road rehabilitation activities and emissions from construction equipment and visitor vehicles. These effects would be localized and negligible to minor, lasting only as long as road rehabilitation activities occurred. Because the Park's Class II air quality would not be affected by the proposal, this impact topic was dismissed from further analysis in this EA.

**Threatened and Endangered Species** – The only federally threatened or endangered species known to occur within the Park is the small whorled pogonia (*Isotria medeoloides*), a federally endangered orchid. Habitat for this species in Virginia consists of deciduous mid-successional forests with fairly sparse ground cover. Intensive grazing by the white tailed deer is reported as the biggest threat to long-term survival within the Park. Surveys for *I. medeoloides* have been conducted in the project area and the known colonies are all outside the potential impact area (Van Alstine and A. Belden Jr., 2007). NPS sent coordination requests to the Virginia Department of Conservation and Recreation (VDCR) on November 18, 2008 and to the U.S. Fish and Wildlife Service (USFWS) on November 11, 2008. On December 17, 2008, VDCR indicated that they have no records of rare, threatened, or endangered plant or animal species, or unique or exemplary natural communities within the project area. They also indicated that consultation regarding state listed Threatened and Endangered Species in Virginia should include the Virginia Department of Agriculture and Consumer Services (VDACS). On May 12, 2009, VDACS indicated that they concurred with NPS and VDNH that the project would not affect any state recognized threatened or endangered species (Tignor, 2009). A copy of the response letter from VDCR is provided in Appendix A. Although no response has been received from USFWS to date, Park staff with expertise on the habitat and occurrence of this species within the Park has indicated that no impacts to *I. medeoloides* would occur as a result of the action alternative (NPS, 2009a).

An important component of the preservation of this species under the Endangered Species Act is the designation of critical habitat for threatened and endangered species. Critical habitat areas are designated geographic locations occupied by a threatened or endangered species which contain those physical or biological features essential to the conservation of the species. It may also include areas outside the geographical area occupied by the species when it has been determined that such areas are essential for the conservation of the species. There is no designated critical habitat within the Park for any federally listed species. Based on the lack of critical habitat present within the Park, the absence of *I. medeoloides* colonies in the vicinity of the project area, the lack of records provided by VDCR and the opinion of PRWI staff and VDACS that no impacts to *I. medeoloides* would occur, no impact to threatened or endangered species would be expected under either alternative and this topic was dismissed from further analysis in this EA.

**Terrestrial and Aquatic Wildlife** - The Virginia Department of Game and Inland Fisheries indicates that over 500 plant and animal species are known or are likely to occur within a three mile radius from PRWI, indicating a diversity of wildlife habitat available in the park and the surrounding areas (Virginia Department of Game and Inland Fisheries, 2008). The Park provides habitat for a diverse group of wildlife including approximately 23 fish species, 24 amphibian species, 27 reptile species, 105 bird species and 38 types of mammals (NPS, 2008a). Aquatic habitat within the Park is available in Quantico Creek and all contributing streams, as well as in the ponds and wetlands. These support a diverse population of benthic macroinvertebrates, aquatic breeding amphibians and fish.

The action alternative would include the repair or replacement of culverts along with the replacement or reconditioning of existing paved Park waterways (adjacent to Park roads). While these waterways likely provide some aquatic habitat value, they flow during and shortly after storm events and provide only temporary refuge for aquatic species. Downstream refuges would be available for mobile aquatic species during any construction activities and no shifts in the diversity of local aquatic communities would be expected. Therefore, the resulting impacts would be short term and negligible. The water quality in the Park streams would be impacted during construction with increased siltation, which has the potential to have a negative impact on aquatic wildlife; these potential impacts are addressed under water quality impacts in this EA. The no action alternative would not involve any in-stream work, so no impacts to aquatic wildlife would occur.

Mammal species thriving in the Park include white-tailed deer (*Odocoileus virginianus*), wild turkey (*Meleagris gallopavo*), fox (*Urocyon cinereoargenteus cinereoargenteus*) and (*Vulpes vulpes fulva*) and beavers (*Castor canadensis*). Also abundant are small mammals, reptiles and amphibians. American black bears (*Ursus americanus*), coyotes (*Canis latrans*) and bobcats (*Lynx rufus rufus*) have been observed in the Park and in the surrounding lands but the population size and distribution within the Park are unknown. These larger predators are relatively sensitive to human disturbances and their numbers are decreasing in other areas of the piedmont (NPS, 2006c). Owls (*Aegolius acadicus*), hawks (*Buteo* spp. and *Accipiter* spp.), pileated woodpeckers (*Dryocopus pileatus*), warblers (*Dendroica* spp.), bluebirds (*Sialia sialis*) and other songbirds are known to inhabit the Park. Bald eagles (*Haliaeetus leucocephalus*) have been observed passing through the area, although they are not known to nest in the Park (NPS, 2008a).

Roadways can impact terrestrial wildlife primarily with habitat disturbance and fragmentation, as well as roadway related mortality. Under the action alternative, roadway resurfacing, restoration, rehabilitation would occur. No additional roadways would be added to the Park. Habitat fragmentation would not occur from the implementation of either alternative. The proposed additional parking spaces in parking lot D would be provided without any expansion beyond the previously disturbed area. While the reconfiguration of the existing grass islands located within parking lots D and E would occur, they provide negligible wildlife habitat value. If the expansion of parking lot E is conducted, impacts to the grassy area to the northeast of the parking lot would occur but no impacts to the trees in the surrounding forested area are expected. Similar to the grass islands, this maintained grassy area would be expected to provide little wildlife habitat value. While traffic may increase slightly due to increased visitor use to the improved facilities, the impacts to terrestrial wildlife are expected to be negligible since these areas have already

been subjected to human activity for some time. The no action alternative would not be expected to impact terrestrial wildlife within the Park. Based on the negligible impacts on terrestrial and aquatic wildlife and wildlife habitat as a result of either alternative, this topic was dismissed from further evaluation.

**Socioeconomic** – While the action alternative would be expected to have a beneficial impact on employment and on the local tax base, these impacts would not likely be noticeable, and would only occur during the construction phase of the project. The no action alternative would be expected to have no socioeconomic impacts. Since no adverse socioeconomic impacts are expected, this impact topic was dismissed.

**Visual and Aesthetic Resources** – Prince William Forest Park is a 15,000-acre Piedmont forest system which provides a rare undeveloped landscape of mixed hardwood forest with diverse, quality visual and aesthetic resources. Both of the proposed alternatives have the potential to impact visual and aesthetic resources. The action alternative would result in short term, negligible localized adverse impacts on the visual quality of the Park due to the presence of construction equipment and materials. The NPS Management Policies require that visual intrusions from construction activities be kept to a minimum. Therefore, to reduce these impacts, the proposed staging area for the action alternative is a materials storage yard that is not generally accessed by the public. The no action alternative would result in the continuation of the negative visual characteristics of the existing roadways and parking lots. Since either alternative would have only a negligible impact on the visual resources within the Park, this impact topic was dismissed.

**Soundscapes** – An important component of the NPS mission is the preservation of natural soundscapes within the National Parks. These natural soundscapes exist in the absence of human sources. No impacts to soundscapes would be expected as a result of the no action alternative. Noise would be generated during the construction activities and would result in short term, localized impacts on the natural soundscapes in PRWI. Considerations of noise impacts on wildlife and visitor experience are addressed under the respective impact topics. An increase in visitor use of the improved facilities may increase the anthropogenic noise sources within the Park after construction. Since these increases are expected to be negligible, no measurable adverse effects on the Park soundscapes would be expected to occur. No impacts would occur under the no action alternative. Therefore, this impact topic was dismissed from further evaluation.

**Lightscape Management** - In accordance with NPS Management Policies (NPS, 2006c), the NPS is to preserve, to the extent possible, the natural lightscapes of Parks, which exist in the absence of human-caused light. Improper outdoor lighting can impede the view and visitor enjoyments of a natural dark night sky and can impact natural resource processes and the evolution of species. No introduction of lighting is proposed as part of either alternative. Since the project would not affect the natural ambient light within the Park, lightscape management was dismissed as an impact topic.

**Traffic and Transportation** – The annual average daily traffic on the Park roadways for 2007 was 160 vehicles per day, or 58,400 per year (EFLHD, 2007a). Under the no action alternative, some minor traffic impacts would occur for the continuing roadway pothole and crack repair and resulting road closures. During the construction of the preferred

alternative, temporary roadway closures and rerouting would occur. Access to certain areas of the Park may also be limited during peak construction periods. To minimize these impacts, construction activities would be limited to weekdays, during which the Park experiences the fewest visitors. Because the resulting negative impacts on traffic and transportation under either alternative would be short term and minor, this impact topic was dismissed from further analysis in this EA. The impacts of traffic and transportation are discussed under the visitor use and experience impact area.

**Indian Trust Resources** – Secretarial Order 3175 requires that any anticipated impacts to Indian trust resources from a proposed project or action by Department of Interior agencies be explicitly addressed in environmental documents. The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry out the mandates of federal law with respect to American Indian and Alaska Native tribes. There are no Indian Trust Lands held by the Secretary of the Interior within PRWI so Indian trust resources have been dismissed as an impact topic in this EA.

### **Cultural Resources**

The 1966 National Historic Preservation Act, as amended, NEPA, the 1916 NPS Organic Act, NPS Management Policies 2006 and other NPS guidelines require consideration of cultural resource impacts. Cultural Resources include cultural landscapes, archeological resources, historic structures and districts, ethnographic resources and museum collections. Cultural landscapes was carried forward and is discussed in the impact analysis section.

Archeological resources, historic structures, ethnographic resources and museum collections have been dismissed from further evaluation in this EA. Further reasoning for the dismissal of each of these cultural resources impact topics are provided below.

**Historic Structures** – The proposed action would directly or indirectly impact the Mission 66 era resources – contributing features of the National Register eligible NPS developed landscape at the Park. Guardrail at South Fork concrete bridges #1 and #2 would be replaced with steel-backed timber guardrail. Mission 66 era wood guardrail would be replaced with steel-backed timber guardrail. Stone masonry headwalls would be repointed or dismantled and reset as necessary, and some new stone masonry culverts and headwalls would be added to improve drainage conditions along the road. Parking lots D and E would be modified to accommodate more parking spaces, and the three-way intersection at mile marker two would be reconfigured to its original Mission 66 era design to improve safety. Because impacts to these structures, as well as potential mitigation, would be addressed under Cultural Landscapes, the separate topic of historic structures was dismissed as an impact topic in this document.

**Archeological Resources** – An archeological survey was conducted in the Park by J. Bedell in 2004 (Bedell 2004). The survey results indicate that no archeological sites are located in the project area. However, because two sites are located near the project area an archeologist would monitor ground disturbing activities. Should previously unknown cultural resources be encountered during construction activities, work would be halted in the discovery area and the park would consult according to 36 CFR 800.13 and, as appropriate, provisions of the Native American Graves Protection and Repatriation Act of 1990. Since there would be no impact to archeological resources from this project, this

impact topic was dismissed from further analysis.

***Ethnographic Resources*** - Ethnographic resources are the cultural and natural features of a Park that are of traditional significance to traditionally associated peoples. These peoples have been associated with a Park for two or more generations, and whose interests in the Park's resources began before the Park was established (NPS, 2006). PRWI cultural resource specialists have reviewed the proposed project and have determined that no ethnographic resources are present within the project area (NPS, 2009). Because no known ethnographic resources would be affected by the proposed actions and because mitigations would be in place to protect any human remains, funerary objects, sacred objects, or objects of cultural patrimony inadvertently discovered, ethnographic resources have been dismissed as an impact topic.

***Museum Collections*** – Neither of the alternatives would impact any existing museum collections. Any artifacts recovered during construction would be preserved according to NPS standards as described in the NPS Director's Order #24. Since no impacts to museum collections would occur, this topic was dismissed from further analysis.

## ALTERNATIVES

NEPA requires that federal agencies explore a range of reasonable alternatives. The alternatives under consideration must include the “no action” alternative as prescribed by 40 CFR 1502.14. Project alternatives may originate from the proponent agency, local government officials, members of the public at public meetings, or during the early stages of project development. Alternatives may also be developed in response to comments from coordinating or cooperating agencies. The alternatives analyzed in this document, in accordance with NEPA, are the result of design scoping, internal scoping and public scoping. These alternatives meet the management objectives of the Park while also meeting the purpose and need for the proposed action. Project alternatives that were considered but failed to meet the purpose and need for the project, created unnecessary adverse resource impacts or conflicted with the management of the Park or its resources were dismissed from further analysis.

For this EA, the NPS evaluated the two alternatives described below. The alternatives dismissed from consideration are described in the subsection entitled “Alternatives Considered but Dismissed,” following this discussion.

### **ALTERNATIVE A - THE NO ACTION ALTERNATIVE**

Under the no action alternative, the NPS would continue to operate and manage PRWI under the current conditions. It does not imply or direct discontinuing day-to-day maintenance and repairs or stopping previously approved plans. The maintenance activities to patch cracked pavement and fill potholes would continue. Park staff has indicated that road maintenance is only done periodically and this rarely requires any temporary road closures (NPS, 2009c). Road closures would only occur in the event of an emergency, such as significant snow, fallen trees, etc.

Park staff would also continue to police the areas surrounding parking lots D and E to advise visitors that they cannot park along the adjacent roadways. While this policing is periodically conducted, visitors are rarely asked to vacate parking spaces (NPS, 2009c).

### **ALTERNATIVE B – ROADWAY RESURFACING, RESTORATION, REHABILITATION WITH RECONFIGURATION OF THE THREE LEG SCENIC DRIVE INTERSECTION AND THE EXPANSION OF PARKING LOTS D & E (PREFERRED ALTERNATIVE)**

The preferred alternative includes the resurfacing, restoration, rehabilitation of Park Entrance Road (Route 10, 0.637 mile), Scenic Drive (Route 11, 9.283 miles), Turkey Run Road (Route 12, 0.358 mile), Oak Ridge Road (Route 13, 0.612 mile), Telegraph Road (Route 15, 0.260 mile), and 13 parking areas along those routes. Scenic Drive intersection at mile marker 2 would be reconfigured to its original design (as constructed in 1970 and as depicted in the 1964 PRWI General Development Plan). Most of the existing signs along the Park roads would be replaced. Crosswalks and other roadway and parking area markings would be applied as needed. The current roadway speed limit would be unchanged. Parking lots D and E may be expanded. Further discussions of the options for the Scenic Drive Intersection and the reconfiguration of Parking lots D and E are provided below.

Most of the existing guardrails would be replaced, and some new guardrails would be installed. Existing guardrails would be replaced with steel-backed timber guardrails. The guardrails would be set back further from the roadways than the existing guardrails, requiring some grading and removal of vegetation, including trees.

Some new culverts would be installed and some of the existing culverts would be removed, with new culverts installed in their place. Reconditioning of drainage structures would include cleaning and repairing existing drop inlets, end sections, and culverts. Some existing headwalls, end sections and drop inlets would be replaced. Existing headwalls would be removed and reset as needed. New headwalls, end sections, and drop inlets would be added in some locations.

Stone riprap would be placed where needed at culvert inlets and outlets, including placement of riprap at the box culvert inlet and outlet at Mary Bird Branch. Existing stone and asphalt paved waterways would be reconditioned as needed. Reconditioning of stone and asphalt paved waterways would include cleaning and repair.

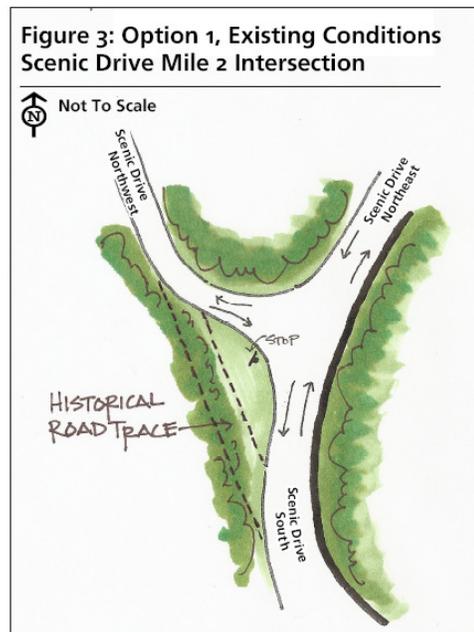
Wood guardrail along roadways would be replaced with steel-backed timber. The bridge railings on two concrete slab bridges over the South Branch of Quantico Creek would be replaced with steel-backed timber bridge railings. The bridges planned for the rail replacements are shown on Figure 2.

### Scenic Drive Intersection

This project would also include the modification of the three-way Scenic Drive intersection at mile marker two. Figure 2 shows the location of this intersection within the Park. Five conceptual options were developed to reconfigure this intersection to provide safer and more efficient access for visitors to the Scenic Drive roadway loop, the Turkey Run Ridge campground and Turkey Run Education Center. Renderings of these options, including the existing conditions, are provided as Figures 3 through 7.

Each of the three legs of this intersection are sections of the road identified within the Park as Scenic Drive which extends northward from Park Entrance Road to the “Y” intersection that is the subject intersection, where the road proceeds both northeast and northwest to form a loop. For the purpose of discussing the conceptual options developed to reconfigure this intersection, each of the three legs have been given an identifier that is a form of “Scenic Drive.” Figure 3 identifies the references to each leg. Scenic Drive Northwest (SDNW) heads toward the Turkey Run Education Center, Scenic Drive Northeast (SDNE) heads traffic toward the one-way section of Scenic Drive, and Scenic Drive South (SDS) goes back out to the Park Entrance Road.

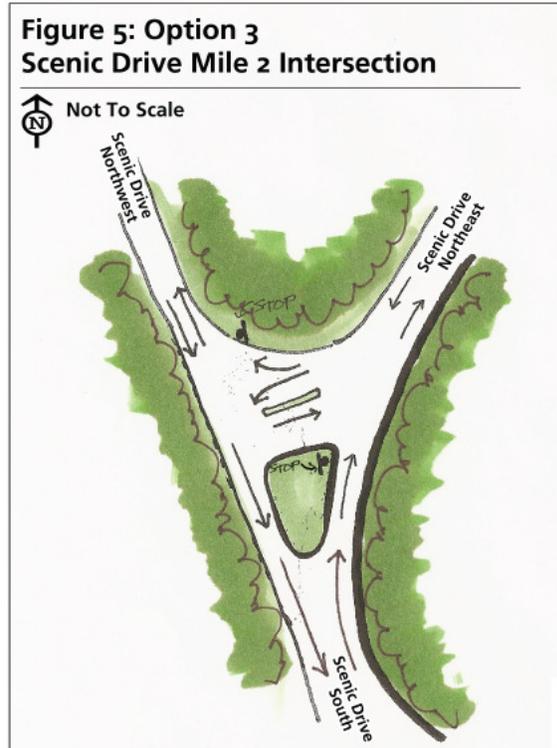
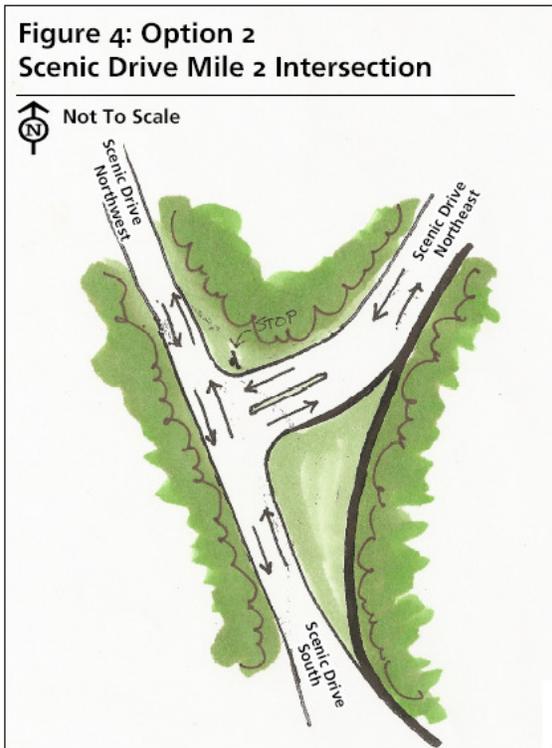
The rendering for Option #1 (Figure 3) shows the existing roadway conditions at this intersection,



which consist of bi-directional travel lanes that provide unrestricted travel between SDS and Scenic SDNE in both directions. Northbound traffic on SDS accessing SDNW must yield to traffic on southbound SDNE. Southbound traffic on SDNW accessing either SDS or SDNE experiences a signed full stop.

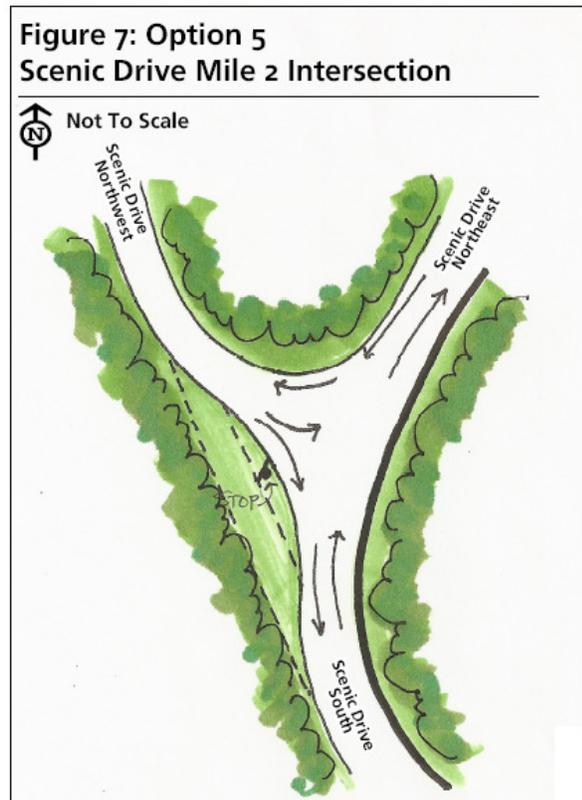
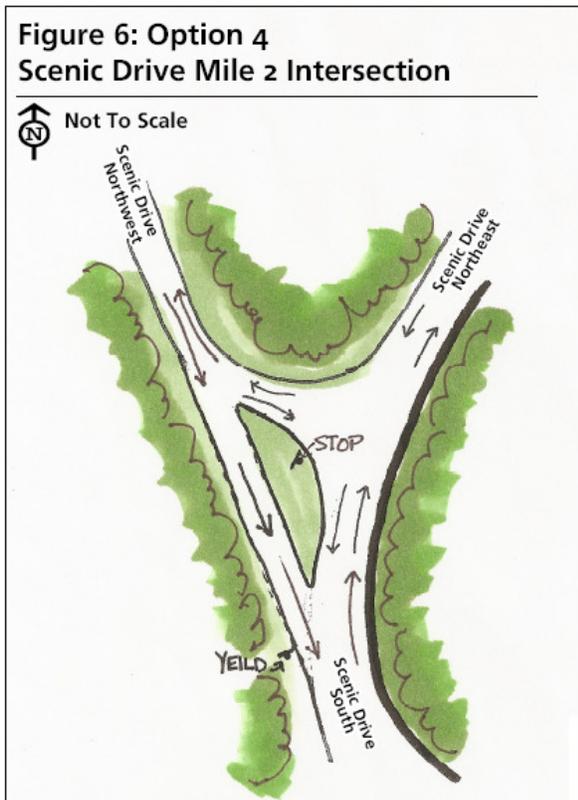
The proposed project desires to provide safer and more efficient access from the Park entrance to Turkey Run Ridge Campground and the Turkey Run Education Center, which are located on SDNW and are major amenity destinations within the Park. Therefore, Options 2 through 4 are focused on reconfiguring this intersection to improve and increase the safety of traffic flow to and from SDS and SDNW. Option #2 (see Figure 4) reconfigures the existing intersection by shifting the existing non-stopped controlled, bi-direction travel between SDS and SDNE over to SDS and SDNW, providing more efficient ingress and egress from the Prince William Forest Park entrance to Turkey Ridge Run Campground and Turkey Run Educational Center. This option would result in a stop sign controlled “T” intersection for the SDNE intersection with SDS, as shown on the referenced rendering.

Option #3 (see Figure 5) depicts a more complicated layout for the interchange reconfiguration, where northbound traffic on SDS has a free-flow movement to SDNE, but must perform a left-turn-to-right-turn movement to travel from SDS to SDNW, in the direction of the Turkey Run facilities. Similarly, traffic on southbound SDNW has a free-flow movement to SDS, which provides efficient egress from the Turkey Run facilities to the Park entrance. But visitors must execute a left-turn-to-left-turn movement to travel from SDNW to continue on the loop to SDNE, and visitors on southbound SDNE must veer right when approaching the intersection and then execute a left turn to continue onto southbound SDS. This configuration requires additional maneuvers for visitors entering the Park with the ingress destination of Turkey Run facilities compared to Option 2, while providing similar unfettered egress from those facilities.



Option #4 (see Figure 6) maintains the bi-directional travel lanes that provide unrestricted travel between SDS and SDNE in both directions. Ingress visitors traveling from northbound SDS to the Turkey Run facilities would be required to turn left across traffic traveling southbound from SDNE, onto the westbound-then-northbound lane of SDNW to reach their destinations. Egress traffic from the Turkey Run facilities traveling to the Park entrance would experience a free flow movement between southbound SDNW and SDS.

Finally, Option #5 (see Figure 7) maintains the bi-directional travel lanes that provide unrestricted travel between SDS and SDNE in both directions. This alternative includes a slight widening of the intersection which reduces the severity of the turn from SDNW onto SDS. Northbound traffic on SDS accessing SDNW must yield to traffic on southbound SDNE. Southbound traffic on SDNW accessing either SDS or SDNE experiences a signed full stop.

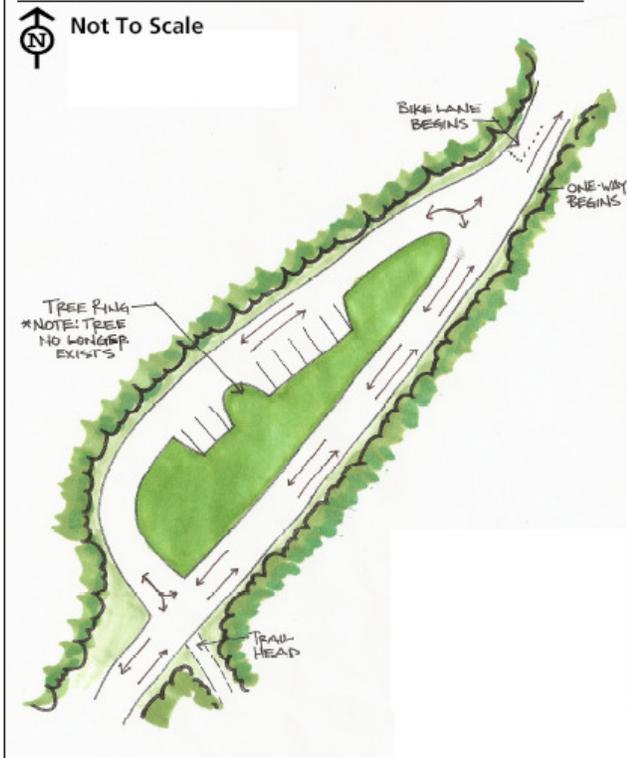


### Parking Lots D and E

Six conceptual options were developed, including the no build, to address insufficient parking in parking lot D. The options are shown in Figures 8 through 13. Each (except Option 1 – Existing Conditions) would modify this lot to provide additional parking compared to the seven spaces present in the existing conditions; however, each option is expected to remain within the existing perimeter of the current parking lot D. The lot would be redesigned to provide either 10 spaces (Option #2), 17 spaces (Option #3), 22 spaces (Option #4), 26 spaces (Option #5), or 23 spaces (Option #6). To varying degrees depending on the option, the existing grass island would be reduced in size to accommodate additional

paved parking spaces. Currently, the one-way section of Scenic Drive and the dedicated bike lane begin at the north end of parking lot D. The one-way section of Scenic Drive has been designed to have the one-way begin at the south end of parking lot D for Options 3 through 6 (see Figures 10 -13). For all options, the bike lane starting point remains on the north end of this lot.

**Figure 8: Option 1, Existing Conditions  
Parking Lot D**



**Figure 9: Option 2  
Parking Lot D**

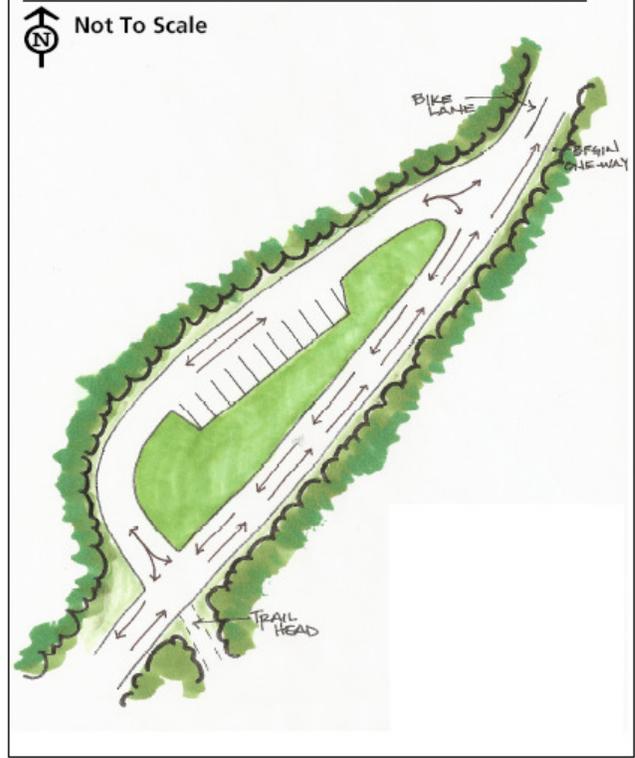


Figure 10: Option 3  
Parking Lot D



Figure 11: Option 4  
Parking Lot D

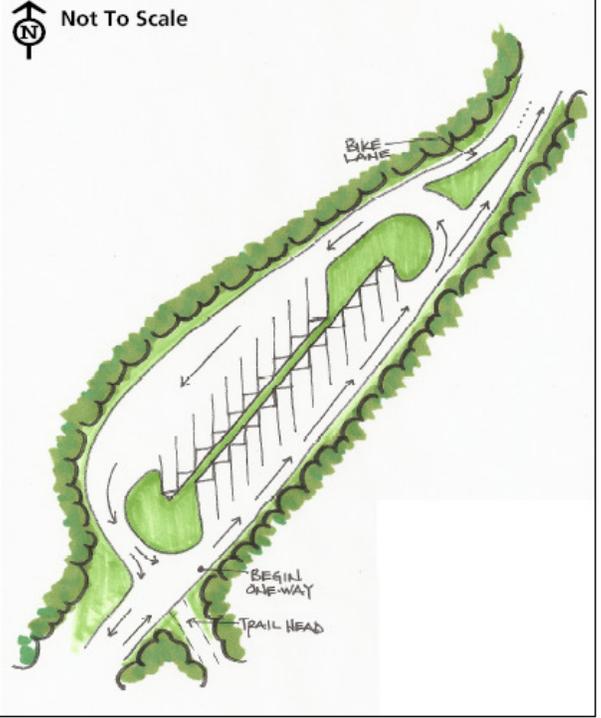


Figure 12: Option 5  
Parking Lot D

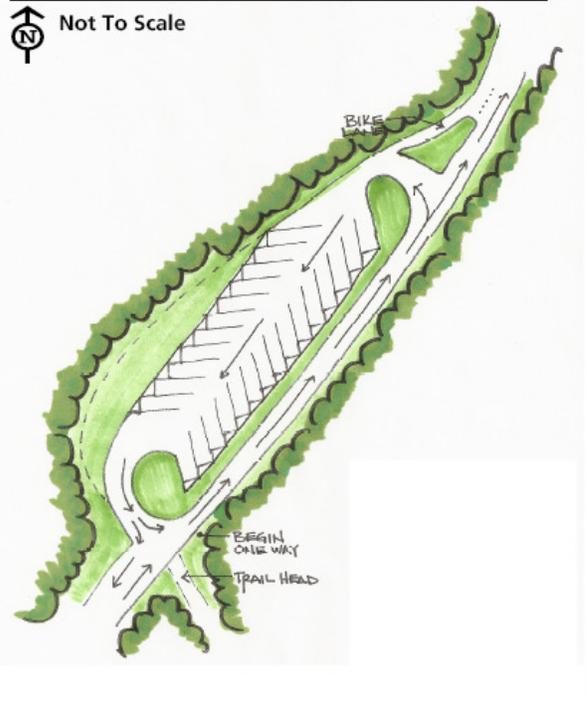
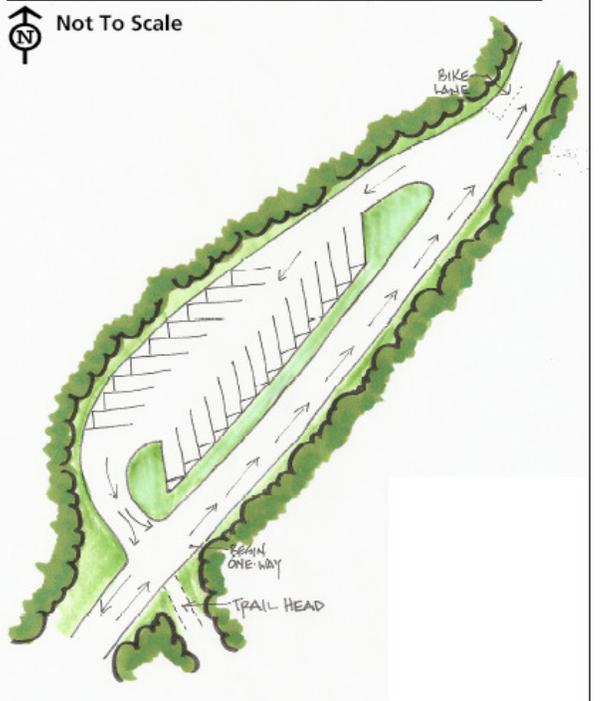
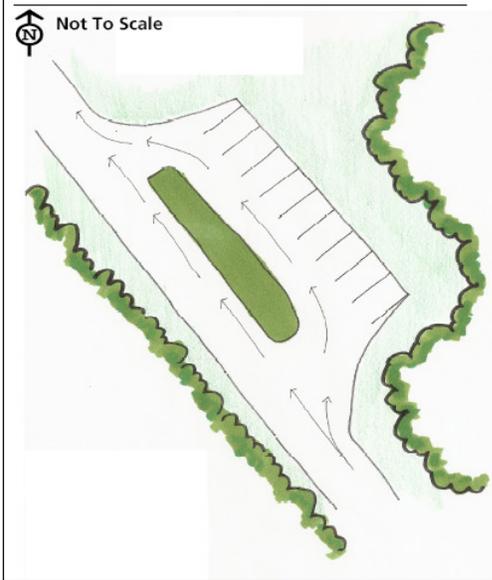


Figure 13: Option 6  
Parking Lot D

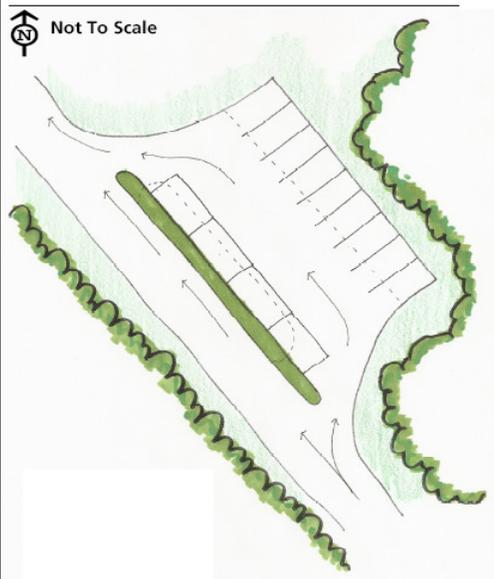


For Lot E, three conceptual options were developed (including the no build) to address the insufficient parking issue at this location. The options are shown in Figures 14 through 16. Each option except Option 1 – Existing Conditions would modify this lot to provide additional parking compared to the nine spaces present in the existing conditions, and would impact the grassy area to the northeast of the existing parking lot to provide the additional parking. This lot would be redesigned to provide either 13 spaces (Option #2) or 15 spaces (Option #3). To varying degrees depending on the option, the existing grass island would be either reduced in size or reconfigured to accommodate additional paved parking spaces. The existing paved surface is indicated in the renderings by a dashed line.

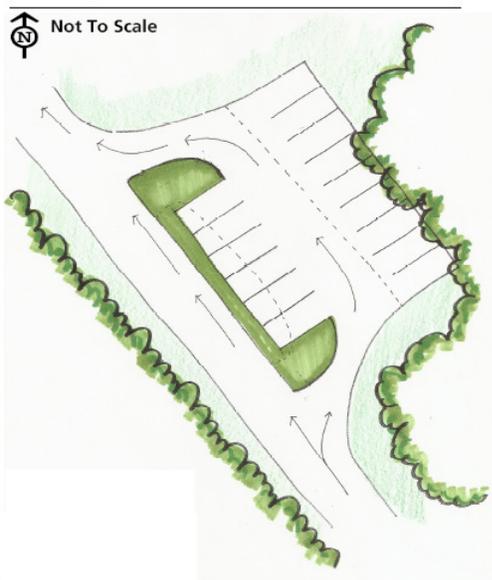
**Figure 14: Option 1, Existing Conditions  
Parking Lot E**



**Figure 15: Option 2  
Parking Lot E**



**Figure 16: Option 3  
Parking Lot E**



## Staging Area

The staging area for this project would be located at an existing material storage area near Orenda Cabin Camp 3, located east of Scenic Drive. This area would provide easy access for construction vehicles to the project area. The location of this Cabin Camp is shown on Figure 2.

## MITIGATION MEASURES OF THE ACTION ALTERNATIVE

The NPS places a strong emphasis on avoiding, minimizing, and mitigating potentially adverse environmental impacts. To help ensure the protection of natural and cultural resources and the quality of the visitor experience, the following protective measures would be implemented as part of the action alternative. The NPS would implement an appropriate level of monitoring throughout the construction process to help ensure that the protective measures are being properly implemented and are achieving their intended results.

### General Mitigation Measures:

- The NPS project manager would ensure that the project remains confined within the parameters established in the compliance documents and that the mitigation measures are properly implemented.
- The majority of the construction activities would occur during non-peak traffic.
- The majority of the road closures would not be implemented during periods of higher use (i.e., weekends).
- Appropriate signage and interpretive wayside exhibits would occur to direct visitors into the Park.
- Information on temporary road closures would be made available on the PRWI website, in the visitor center and at the Park entrance station.
- Construction zones outside of the existing disturbed area would be identified and fenced with construction fencing or some similar material prior to any construction activity. The fencing would define the construction zone and confine activity to the minimum area required for construction.
- Staging areas would be fenced. Any temporary fencing established around staging areas would be inspected at least weekly, and corrective actions would be taken to maintain the integrity of the tortoise barrier.
- All protection measures would be clearly stated in the construction specifications and workers would be instructed to avoid conducting activities beyond the construction zone, as defined by the construction zone fencing. This includes necessary temporary structures such as erosion control fencing.
- All tools, equipment, barricades, signs, surplus materials, and rubbish would be removed from the project work limits upon project completion. Any asphalt surfaces damaged due to work on the project would be repaired to original condition. All demolition debris would be removed from the project site, including all visible concrete and metal pieces.
- Contractors would be required to properly maintain construction equipment (i.e., mufflers) to minimize noise from use of the equipment.
- A hazardous spill plan would be in place, stating what actions would be taken in the case of a spill and identifying preventive measures to be implemented, such as the placement of refueling facilities, storage, and handling of hazardous materials, etc.
- Equipment used on the project would be maintained free of external petroleum

based products while working at the project locations.

- Where appropriate, vegetable or mineral oil based grease, hydraulic oil, and bar and chain oil would be used. These lubricants are less toxic than typical lubricants and are biodegradable.
- All equipment on the project would be maintained in a clean and well functioning state to avoid or minimize contamination from automotive fluids; all equipment would be checked daily.

#### Cultural Resource Mitigation Measures:

- An archeologist would monitor the project area during ground disturbing activities near known archeological sites to observe the area for the presence of cultural resources.
- If previously unknown archaeological resources are discovered during project construction, a park archaeologist would be contacted immediately. All work in the immediate vicinity of the discovery would be halted until the resources could be identified and documented and an appropriate mitigation strategy developed, if necessary. The significance of these finds would be assessed in consultation with the Virginia State Historic Preservation Office (SHPO).
- In the unlikely event that human remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered during construction, provisions outlined in the Native American Graves Protection and Repatriation Act (25 USC 3002) of 1990 would be followed. All human remains, funerary objects, sacred objects, or objects of cultural patrimony would be left in place until the culturally affiliated tribe(s) was consulted and an appropriate mitigation or recovery strategy developed between the affiliated tribes, SHPO, and the NPS.
- The configuration of the Staging Area in Orenda Historic District would be specified to avoid impacts to cultural landscape features and historic structures.
- Archeological impacts to the Orenda Historic District would be avoided by confining the staging area to previously disturbed areas.
- NPS would document the bridges, stone masonry culvert head and endwalls, guardrail, and parking lots that would be impacted. Features such as headwall length, height, color, size of stones, spacing, mortar color, mortar type, and overall wall condition would be recorded. A representative sample of the headwalls would be photographed and a sketch drawing would be completed.
- Any new stone work would use as much of the existing stone as feasible. The new work would match to the extent possible the color, texture, size of stones, and spatial relationship between the stone and mortar of the existing stone work and be constructed in a manner consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes.
- To avoid creating a false historical appearance, replacement or new stone headwalls would not be a reconstruction but rather would be visually compatible to existing stone headwalls and the surroundings, e.g. similar in scale, massing and materials, texture, and orientation.
- PRWI staff would assist in the selection and approval of materials and design for any stone headwall construction or reconstruction.

- The use of native stone (from existing stone stockpiles) within the Park would be utilized for reconstruction of stone headwalls where possible.
- Steel-backed timber guardrail would replace existing wood guardrail. The steel-backed timber guardrail would be similar in appearance, color, and texture to the existing wood guardrail.

#### Soil Mitigation Measures:

- To the extent possible, construction in areas with steep slopes would be avoided.
- Soils removed from areas of construction and would be stored for later use. The topsoil would be redistributed in as near the original location as possible and supplemented with scarification, mulching, seeding, and/or planting with species native to the immediate area.
- An appropriate Sediment and Erosion Control Plan would be implemented.
- Sustainable best management practices would be utilized to control stormwater runoff.
- A Storm Water Pollution Prevention Plan (SWPPP) would be implemented, as required under the Virginia Stormwater General Permit.
- A Resource Protection Area (RPA) exemption form would be submitted to Prince William County for approval prior to construction. RPA includes all water bodies with perennial flow, any adjacent wetlands, and a 100-foot protection buffer.
- A Virginia Stormwater Management Program General Permit for construction related stormwater discharges would be obtained from the VDCR by EFLHD.
- Disturbance in the RPA would be minimized as much as possible through appropriate best management practices. These practices would include all or some of the following, depending on site-specific requirements:
  - Keep disturbed areas as small as practical to minimize exposed soils and the potential for erosion;
  - Locate waste and excess excavated materials outside of drainages to avoid sedimentation;
  - Install silt fences, temporary earthen berms, temporary water bars, sediment traps, stone check dams, or other equivalent measures including installing erosion-control measures around the perimeter of the stockpiled fill material prior to construction;
  - Conduct regular site inspections during the construction period to ensure that erosion-control measures were properly installed and are functioning effectively;
  - Store, use, and dispose of chemicals, fuels, and other toxic materials in a proper manner; and
  - Revegetate disturbed areas as soon as possible after construction is completed.

#### Vegetation Mitigation Measures:

- Construction areas would be restored and re-vegetated with native Virginia species.
- Prior to being off-loaded in the Park, all equipment would be inspected by approved NPS staff to prevent possible means of non-native plant/plant seed introduction.
- Non-native vegetation would not be introduced. Disturbed areas would be monitored for up to three years following construction to identify growth of noxious

weeds or non-native vegetation. Treatment of non-native vegetation would be completed in accordance with NPS-13, Integrated Pest Management Guidelines.

- Vegetation impacts and potential compaction and erosion of bare soils would be minimized by replacement of topsoil in as near the original location as possible, scarification, mulching, and seeding/planting with species native to the immediate area.
- Remedial actions could include installation of erosion-control structures, reseeding and/or replanting the area, and controlling non-native plant species.
- All topsoil, straw, etc. must be certified weed/seed free and/or be acquired from an approved NPS source.
- To maximize vegetation restoration efforts after completion of construction activities, the following measures would be implemented:
  - Salvage topsoil from construction areas for reuse during restoration of disturbed areas.
  - Salvage native vegetation for subsequent replanting in disturbed areas.
  - Monitor revegetation success for up to three years following construction, implementing remedial and control measures as needed.

#### Wetland and Stream Mitigation Measures:

- Wetlands and streams adjacent to the project area would be protected during construction using appropriate sediment and erosion control measures and construction fencing to prevent accidental construction equipment access. This would include the protection of the vernal pool identified adjacent to parking lot D.
- If required, a permit from the U.S. Army Corps of Engineers would be obtained by the EFLHD for work occurring within waters of the United States. If necessary based on the terms of the permit, stream mitigation would be implemented.

#### Air Quality Mitigation Measures:

- To control fugitive dust, water sprinkling would occur, as needed, on active work areas where dirt or fine particles are exposed.
- Construction debris would be immediately hauled from the Park to an appropriate disposal location.

### **GENERAL CONSTRUCTION SCHEDULE AND COSTS**

The project is scheduled to begin construction activities in March 2010. Construction activities are expected to be complete by November 2010, with the EFLHD final construction report to be released in February 2011. The construction cost for the project, estimated as of July 16, 2007, is \$6,700,000.

## ALTERNATIVES CONSIDERED BUT DISMISSED

Council of Environmental Quality (CEQ) regulations for implementing NEPA require that Federal agencies explore and objectively evaluate all reasonable alternatives to the preferred alternative, and to briefly discuss the rationale for eliminating any alternatives that were not considered in detail. This section describes those alternatives that were eliminated from further study and documents the rationale for their elimination.

During the course of internal scoping, several alternatives were considered, but were deemed to be unreasonable and were not carried forward for analysis in this EA. Justification for eliminating these options from further analysis was based on the following factors:

- Technical or economic feasibility.
- Inability to meet project objectives or resolve need.
- Duplication with other, less environmentally damaging or less expensive alternatives.
- Conflict with an up-to-date and valid park plan, statement of purpose and significance, or other policy, such that a major change in the plan or policy would be needed to implement.
- Too great an environmental impact.

The following alternatives were considered but dismissed for the listed reasons.

### **ALTERNATIVE C - RESURFACING, RESTORATION, REHABILITATION OF ROADS AND PARKING LOTS WITH RECONFIGURATION OF INTERSECTION OF SCENIC DRIVE AND TURKEY RUN ROAD, THE EXPANSION OF PARKING LOTS D & E AND THE EXTENSION OF THE ONE WAY**

Under this alternative, the extension of the one-way portion of Scenic Drive between Oak Ridge Road and Turkey Run Road was considered along with the transportation network improvements identified in the preferred alternative. This alternative was dismissed based on its inability to meet the project purpose and need. Although the expansion of the one-way portion of Scenic Drive would provide an uninterrupted dedicated recreational lane all the way around Scenic Drive, it fails to remedy the parking or roadway deficiency problems identified during the early project planning stages.

## **ALTERNATIVE D – RESURFACING, RESTORATION, REHABILITATION OF ROADS AND PARKING LOTS WITH RECONFIGURATION OF INTERSECTION OF SCENIC DRIVE AND TURKEY RUN ROAD, THE EXPANSION OF PARKING LOTS D & E AND THE RESTORATION OF THE HISTORIC BRIDGE**

Under this alternative, the restoration of the historic character of a CCC-constructed Park bridge was considered along with the transportation network improvements identified in the preferred alternative. The historic bridge is located on Scenic Drive over the South Fork Quantico Creek. This asphalt paved bridge was historically a wood deck bridge. NPS considered the restoration of the historic character of the bridge. However, NPS determined that the restoration of the bridge was outside of the scope of this project and did not meet the purpose and need. Therefore, NPS has decided to pursue alternate funding for the bridge restoration project. Further, the restoration of this bridge fails to address the parking or roadway deficiency problems identified.



### **THE ENVIRONMENTALLY PREFERRED ALTERNATIVE**

In accordance with DO-12 and NEPA, the NPS is required to identify the environmentally preferred alternative in its NEPA documents. The Council on Environmental Quality defines the environmentally preferred alternative as the alternative that would promote the national environmental policy as expressed in Section 101 of NEPA. In their Forty Most Asked Questions, Council on Environmental Quality further clarified the identification of the environmental preferred alternative, stating that: “Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources” (CEQ, NEPA’s 40 Most Asked Questions).

After completing the environmental analysis, the NPS identified alternative B as the environmentally preferred alternative in this EA because it best meets the definition established by the U.S. Council on Environmental Quality. This alternative would provide improved visitor experience and Park operations by addressing deficient transportation related facilities within the Park, including access roads and parking facilities. Specifically, the action alternative:

- Offers a long term sustainable solution for preservation of the Park’s significant resources and provides continued public use and Park enjoyment for future generations
- Assures a safe and aesthetically pleasing environment with a variety of individual choices without degradation of natural or cultural resources; and

- Provides additional parking and improved transportation facilities without impacting Park resources, which achieves a balance between population and resource use.

Table 1 compares how well each of the proposed alternatives meets the purpose and need of the project. The Environmental Consequences chapter describes the effects on each impact topic under each of the alternatives. These impacts are summarized in Table 2.

### ALTERNATIVES COMPARISON

The table provided below compares and contrasts the alternatives, including the degree to which each alternative accomplishes the purpose or fulfills the need identified in the purpose and need section.

Table 1: Comparative Summary of Alternatives

Alternative A-No Action	Alternative B-Preferred Alternative
<p>Under the no action alternative, the NPS would continue to operate and manage Prince William Forest Park under the current conditions. Impacts to visitor use and experience would continue due to delayed necessary maintenance, traffic safety hazards and lack of adequate parking.</p>	<p>The preferred alternative includes the resurfacing, restoration, rehabilitation of Park Entrance Road, Scenic Drive, Turkey Run Road, Oak Ridge Road, Telegraph Road, and 13 parking areas along those routes. Scenic Drive would be reconfigured at the mile marker 2 intersection. Most of the existing signs along the Park roads would be replaced. Parking lots D and E may be expanded. Most of the existing guardrails would be replaced, and some new guardrails would be installed. New culverts would be installed and some of the existing culverts would be removed, with new culverts installed in their place. Some existing headwalls, end sections and drop inlets would be replaced. Existing headwalls would be removed and reset as needed. New headwalls, end sections, and drop inlets would be added in some locations. Stone rip rap placement would occur at culvert inlets and outlets. The replacement of bridge railings and reconditioning or replacement of paved waterways would also occur.</p>
<b>Meet Project Needs?</b>	
<p>This alternative fails to address the need for the transportation network improvements which would impact visitor use and experience and public health and safety.</p>	<p>This alternative meets the project needs by providing the needed transportation facility improvements. This alternative would have a positive impact on visitor use and experience and public health and safety by improving the transportation network within the Park.</p>

## SUMMARY OF ENVIRONMENTAL CONSEQUENCES

A summary of potential environmental effects for each of the alternatives is presented in Table 2 below.

Table 2: Summary of Environmental Consequences

Impact Topic	Alternative A-No Action	Alternative B-Preferred Alternative
Cultural Landscapes	<p>There would be no new impacts to cultural landscapes under the no action alternative. Because the no action alternative would not impact cultural landscapes, there would be no contribution to cumulative impacts from the no action alternative. No unacceptable impacts to potential cultural landscapes would occur. Since there would be no major adverse impacts to potential cultural landscapes, this alternative would not result in impairment of Park resources or values.</p>	<p>Impacts to the potential cultural landscape as a result of construction activities would be short term and long term, negligible to minor and adverse. The proposed changes would repair existing culvert head and end walls, reconstruct head and end walls to accommodate larger culverts, add structural elements that are similar in material type, texture, and color, and reconfigure the existing circulation pattern to its original design as portrayed in the 1964 <i>General Development Plan</i>. Wood guardrail along roadways would be replaced with steel-backed timber. The bridge railings on two concrete slab bridges over the South Branch of Quantico Creek would be replaced with steel-backed timber bridge railings. Parking Lot D would be reconfigured and Parking Lot E would be expanded to accommodate up to 15 additional parking spaces. These actions would not diminish or detract from the overall integrity of the landscape. The cumulative impacts of past, present, and reasonably foreseeable future projects, in combination with the preferred alternative would be short term to long term, negligible to minor and adverse. No unacceptable impacts to potential cultural landscapes would occur. Since there would be no major adverse impacts to potential cultural landscapes, this alternative would not result in impairment of Park resources or values.</p> <p><b>Section 106 Summary:</b> After applying the Advisory Council on Historic Preservation criteria of adverse effects (36 CFR Part 800.5, Assessment of Adverse Effects), the National Park Service concludes that implementation of the preferred alternative would have <i>no adverse effect</i> on potential Park cultural landscapes.</p>
Soil	<p>The no action alternative would have minor, adverse, long term effects on soils due to the continued soil erosion from the deteriorating pavement conditions in the Park. Cumulative effects would be short term and long term, minor and adverse. There would be no unacceptable impacts to soils. Since there would be no major adverse impacts to soils, this alternative would not result in impairment of Park resources or values.</p>	<p>The preferred alternative would have minor, adverse, short term effects on soils due to the construction activities. Cumulative effects would be minor, adverse and short term. There would be no unacceptable impacts to soils. Since there would be no major adverse impacts to soils, this alternative would not result in impairment of Park resources or values.</p>

Table 2: Summary of Environmental Consequences, continued

Impact Topic	Alternative A-No Action	Alternative B-Preferred Alternative
Vegetation	The no action alternative would have negligible, adverse, long term effects on vegetation due to the potential for introduction of non-native species. Cumulative effects would be long term, minor and adverse. There would be no unacceptable impacts to vegetation. Since there would be no major adverse impacts to vegetation, this alternative would not result in impairment of Park resources or values.	The preferred alternative would have minor, adverse, long term effects on vegetation due to the removal of vegetation and the potential for introduction of non-native species. Long term moderate adverse cumulative impacts to vegetation would occur. There would be no unacceptable impacts to vegetation. Since there would be no major adverse impacts to vegetation, this alternative would not result in impairment of Park resources or values.
Water Quality	The no action alternative would have negligible, adverse, long-term effects on water quality due to sedimentation and runoff. No impacts to groundwater would occur. Cumulative adverse effects would be long term and short term, negligible and adverse. There would be no unacceptable impacts to local surface water or ground water quality. Since there would be no major adverse impacts to water quality, this alternative would not result in impairment of Park resources or values.	The preferred alternative would have negligible long term adverse effects on water quality due to increased runoff; short term negligible adverse effects due to increased pollutant loading, erosion and siltation during construction; and minor, adverse, short term effects on water quality due to sedimentation and increased runoff; and a long term beneficial impact on water quality due to the repair and replacement of inadequate stormwater drainage and culverts. No impact on groundwater would occur. Cumulative impacts would be long term, minor, adverse; short term, minor, adverse; and long term beneficial. There would be no unacceptable impacts to water quality. Since there would be no major adverse impacts to water quality, this alternative would not result in impairment of Park resources or values.
Public Health and Safety	The no action alternative would result in a minor, adverse long term impact on public health and safety due to the continuing safety concerns associated with the Scenic Drive intersection at mile marker two, unauthorized parking along roadways, and the fall and trip hazards in parking lots. Cumulative impacts would be long term, minor, adverse, and long term beneficial.	The preferred alternative would have beneficial long term effects on public health and safety. Cumulative effects would be beneficial and long term.
Park Operations	The no action alternative would result in a long term, minor, adverse impact on park operations due to continuing maintenance and policing necessary by Park staff. Cumulative impacts would be long term, minor, adverse, and long term beneficial.	During construction, park operations would be impacted by road and area closures within the Park. This adverse impact would be short term and minor. After construction, the preferred alternative would have a long term beneficial effect on park operations. Cumulative effects would be beneficial and long term.
Visitor Use and Experience	The no action alternative would have a long term minor adverse impact on visitor use and experience based on the importance of the quality of the transportation network and parking facilities for a positive visitor experience. Cumulative impacts would be long term, minor, adverse, and long term beneficial.	The preferred alternative would have a minor, short term adverse impact on visitor use and experience due to temporary road and area closures during construction. Post construction, the project would have a long term beneficial effect on visitor use and experience based on the availability of appropriately located adequate parking and the improved transportation network. Cumulative effects would be short term, minor, adverse, and long term beneficial.

## AFFECTED ENVIRONMENT

This chapter of the EA describes existing environmental conditions in the areas potentially affected by the alternatives evaluated. The impact analysis is presented in the Environmental Consequences section of this EA.

### CULTURAL LANDSCAPES

Cultural landscapes reflect the relationship between human society and their place in, and use of, the natural landscape. These landscapes are the manifestation of the interaction between humans and the land, both in how humans alter or otherwise affect the natural environment and land forms over time, and how land forms and the natural environment influence the evolution of human settlement patterns, land use and the built environment (NPS, 2006b).

The NPS plans and develops infrastructure, including the transportation systems that mold the experience of many visitors by guiding where and how visitors interact with the park (Patterson et al, 1998). In the case of park roadways, the roads are typically designed to conform to the context of the park setting in a way that follows the existing land forms and preserves the natural settings as much as possible. Park transportation systems provide a critical role in shaping the experience of visitors and their perceptions of the role of the park (Louter, 2006).

The proposed staging area for the construction of the preferred alternative is located near the Orenda Historic District adjacent to Cabin Camp 3 in an area currently used as the Park's materials storage yard for routine park maintenance activities. The Orenda Historic District includes nearly 180 acres within PRWI and contains such features as CCC constructed cabin camps, stables, a former blacksmith shop, an electric shop as well as a wood truss bridge over the south branch of Quantico Creek. The contributing buildings, structures, and sites in the Orenda Historic District are related to a single theme - the culmination of a movement within the progressive era of the New Deal to build model resource-reclamation projects, and the accompanying rise of rustic architecture.

Mission 66 was a large-scale effort by the National Park Service to upgrade the nation's parks in the period following World War II. In 1949, NPS director Newton Drury described the parks as "victims of war." Neglected since the New Deal era improvements of the 1930s," observes historian Sarah Allaback, "the national



parks were in desperate need of funds for basic maintenance, not to mention protection from an increasing number of visitors” (Allaback, 2000). In 1931, 3.5 million people visited the national parks; by 1948, that number had increased to almost 30 million. But, Allaback notes, “park facilities remained essentially as they were before the war” (Allaback, 2000). Contributing to the growth in the number of visitors after World War II was the post-war economic boom and the ability of more and more Americans to buy personal automobiles, enabling them to visit the nation’s treasures. In response, the National Park Service needed new facilities to accommodate the crowds, and it needed those facilities designed in a way that would best protect the parks from resource damage.

National Park Service Director Conrad Wirth first conceptualized the idea of modernizing parks through a massive, multi-year redevelopment program in February 1955. Wirth requested a decade of funding, rather than the traditional year-by-year funding requests, “thereby ensuring money for building projects that might last many years” (Allaback 2000). As envisioned by Wirth, “Mission 66 would allow the Park Service to repair and build roads, bridges and trails, hire additional employees, construct new facilities ranging from campsites to administration buildings, improve employee housing, and obtain land for future parks...to elevate the parks to modern standards of comfort and efficiency, as well as an attempt to conserve natural resources” (Allaback, 2000). On January 27, 1956, Wirth introduced the Mission 66 concept to President Dwight Eisenhower and his cabinet, where it received immediate approval. The program was officially presented to the American public the following month (Allaback , 2000 and Carr, 2007).

The Mission 66 program resulted in a “comprehensive upgrading of roads and related facilities” (Davis et. al., 2004). Existing roads were widened, straightened, and paved to accommodate larger, faster, and more numerous automobiles (Davis et. al. 2004). Design standards dictated road widths, gradients, slope treatments and outlined landscape preservation techniques (Jackson-Retondo 2004). Roads were to be integrated into the natural setting, lie lightly on the land and evoke a “sense of intimacy” with the surrounding environment (Jackson-Retondo 2004). Davis notes, however, that “while some efforts were made to evoke traditional park road aesthetics, many new bridges and visitor facilities were unabashedly modern structures exemplifying the unadorned form-follows-function ethos of Modernist design” (2004). Jackson-Retondo (2004) suggests that “Mission 66 roads can be seen as perhaps the most widespread and representative built feature in today’s parks that reflect a shift in patterns of park use – a significant transformation of the nature, frequency and increasing volumes of recreational travel occurring through the United States at mid-century.”

Consistent with Mission 66 program goals, Prince William Forest Park’s 1964 *General Development Plan* defined a new motorized visitor experience for the park. Segments of new roads were constructed in the park and existing roads were reconstructed to meet Mission 66 park road design standards and construction policy. The Scenic Drive loop was created by linking existing CCC era constructed trails and roads with new road sections. New campgrounds and parking lots were also constructed to serve the automotive tourist. The Mission 66 development in the park then as now defines the visitor experience in Prince William Forest Park.

The following resources designed and constructed during the Mission 66 era (1945 – 1972) are contributing resources to the NPS developed landscape at Prince William Forest Park:

- Scenic Drive constructed 1968-1972
- Parking Lots A-C constructed in 1972
- Parking Lots D-F constructed 1968
- Parking Lots G-I constructed 1970
- South Fork Concrete Bridge #1 constructed 1970
- South Fork Concrete Bridge #2 constructed 1970
- Turkey Run Access Road and Campground constructed 1968
- Oak Ridge Access Road and Campground constructed 1964
- Telegraph Road and parking area constructed 1962

## SOILS

Soils within the Park are sandy, relatively infertile and easily disturbed. The steep terrain and poor quality soils combine to create severe erosion problems (NPS, 1999). According to the Natural Resources Conservation Service (NRCS) Soil Survey for Prince William and Stafford Counties in Virginia the soils present in the project area have erosion hazards ranging from slight to severe based on the slope and erodibility of these soil types. The soil survey map and the full soil descriptions for each soil type within the project area are provided in Appendix B.

## VEGETATION

The park contains a wide array of plant species. There are at least two distinct types of forest ecosystems in the upland areas of the park. On the ridges and upper slopes is a mixed oak (*Quercus* spp.) forest, and on the lower slopes above the floodplain is a mesic hardwood forest. Some common understory vegetation includes dogwood (*Cornus* spp.), redbud (*Cercis canadensis*), mountain laurel (*Kalmia latifolia*), spotted wintergreen (*Pyrola* sp.), and sassafras (*Sassafras albidum*). Ferns, mosses, vines, briars, and numerous wildflowers form the groundcover (NPS, 2008a). Native vegetation has been disturbed by soil compaction and trampling in the developed areas of the Park, particularly in the cabin camps. This soil compaction has resulted in vegetation loss and increased erosion, which has led to an increase in stream sedimentation. As a result, the native vegetation in these disturbed areas has been replaced with invasive or exotic species, such as honeysuckle (*Lonicera* spp.) and wisteria (*Wisteria* spp.) creating resource management problems (NPS, 1999). According to Park staff, Chinese wisteria (*Wisteria sinensis*) is the most pervasive and destructive within PRWI (NPS, 2008c).

Areas of exposed ground are susceptible to the introduction of non-native plant species. Since many of the species present within the unique ecotone present in PRWI are on the outer limits of their range, they can be particularly sensitive to changes in species composition, abundance and diversity brought on by non-native species introduction. Once established, invasive and exotic species can spread rapidly, replacing or limiting native

species, and are usually difficult to eradicate.

## **WATER QUALITY**

The NPS 2006 Management Policies state that the NPS has a responsibility to take all necessary actions to maintain or restore the quality of surface waters and ground waters within the parks consistent with the Clean Water Act and all other applicable federal, state, and local laws and regulations. The streams present within the Park are shown on Figure 2. The project area is within the Quantico Creek watershed. Numerous smaller headwater habitat streams feed into the north and south branches of Quantico Creek. Together, the two stream branches receive greater than 90 percent of runoff in the Park and encompass a watershed of approximately 18 square miles. The water quality in the two branches is generally good and supports a diverse community of aquatic organisms. Several studies have classified Quantico Creek as one of the highest quality and most biologically diverse streams in northern Virginia. As a result, the creek is often used as a reference stream reach in scientific investigations. The natural stream flow of Quantico Creek has been slightly altered by the creation of dams, which act as sediment traps for stormwater runoff.

Prince William County is located within the Chesapeake Bay watershed, which indicates that all of the creeks and streams in the County feed into the Potomac River and eventually the Chesapeake Bay. To protect the Bay, Prince William County adopted the Chesapeake Bay Preservation Act into its local ordinance in 1990. Within this ordinance, there are provisions for the protection of Resource Protection Areas (RPAs). RPAs include all water bodies with perennial flow, any adjacent wetlands, and a 100-foot protection buffer. In general, no development, land disturbance, or vegetation removal is allowed in an RPA without the approval of the Prince William County Department of Public Works. However, with approval, vegetation can be removed within the 100 foot buffer zone for the following reasons (PWC, 2008):

- For water dependent uses, such as docks, piers and outfalls.
- To create a water access path (boardwalk, trail), as long as it does not cause erosion.
- To provide for shoreline erosion control, provided that the buffer is replanted with native, woody vegetation.
- To remove dead, dying or diseased trees and shrubs, and to remove noxious weeds or invasive exotic plants.
- For utilities, public roads and driveways.
- To provide limited water views, but removed vegetation must be replaced with other lower growing vegetation to provide equivalent water quality protection.

Groundwater within the Park is susceptible to the effects of pollution due to the sandy nature of the soils. Infiltration of surface water into the ground occurs from all pervious surfaces within the Park.

## **PUBLIC HEALTH AND SAFETY**

The Park roadways provide access for emergency services, NPS resource management, maintenance personnel and Park visitors. The parking lots and pull offs within the park were constructed in 1968 and have never had a pavement overlay. As a result, the parking lots have uneven surfaces which present a safety hazard to bicycles and a tripping hazard to Park visitors and employees who use them. The *Eastern Federal Lands Highway Division*

*Engineering Study* dated June 2004 indicates that most of the existing guardrails and signs associated with the roadways and parking facilities are substandard.

Currently, parking lots D and E provide a total of only 16 parking spaces. These lots serve popular destinations in the Park, particularly Quantico Falls and the best access point for the dedicated recreational lane on Scenic Drive, and they fill quickly during peak Park use. This lack of adequate parking facilities causes visitors to park along road shoulders, creating unsafe conditions as visitors are exiting their vehicles directly adjacent to the roadway.

Safety issues are also present at the Y-intersection of Scenic Drive at mile marker two. Currently, large vehicles have difficulty making the turn from the northwest leg of the Scenic Drive into the appropriate travel lane on the south leg of Scenic Drive, due to the inadequate intersection radius. In order to make the turn, these longer vehicles swing wide across both directional travel lanes, potentially blocking traffic that is traveling in the opposite direction. This occupation of both travel lanes poses an accident hazard to Park staff, motoring visitors or cyclists using these roads.

## **PARK OPERATIONS**

The Park roadways provide access for emergency services, NPS resource management and maintenance personnel. Currently, Park staff spends resources for on-going minor repairs (filling potholes, repairing cracks) to improve the pavement condition in the roadways and parking lots. While some emergency situations requiring road closures do occur, such as snow or fallen trees, complete road closures are uncommon (NPS, 2009c).

As indicated in the previous section, during peak Park use, visitors occasionally park in unauthorized areas along road shoulders due to lack of available parking. During these peak use periods, Park staff monitor the area to remind visitors that parking along the road shoulder is not authorized.

## **VISITOR USE AND EXPERIENCE**

Within an hour's drive for more than 4 million people, PRWI provides a rare undeveloped landscape of mixed hardwood forest and many opportunities to experience the outdoors. Recreational activities such as camping, hiking, picnicking, and biking have become increasingly popular in the Park. There are 37 miles of hiking trails, three wooden bridges, five actively used cabin camps, the Cabin Branch Pyrite Mine, Civil War-era plantation sites, and more than 25 miles of streams within the Park. The Park contains a tributary to the Chesapeake Bay, Quantico Creek, which is a high quality aquatic resource that is used for scientific research as a reference stream. Four of the CCC cabin camps are listed on the National Register of Historic Places as historic districts.

Park records indicate that PRWI receives over 200,000 visitors annually (NPS, 2008d). Historically, the number of visitors to the Park is highest in the summer months and lowest in mid winter. In a recent visitor survey, the most important reasons for visiting Prince William Forest Park include being close to nature, getting away from the usual demands of life, enjoying the sounds of nature, and getting exercise (Lawson, et. al., 2006). The survey indicated that visitors rank the maintenance of Park facilities, roads and trails (Lawson, et.

al., 2006) as an important component of their Park experience. Adequate parking facilities were also rated as important to most respondents.

## ENVIRONMENTAL CONSEQUENCES

This section provides a description of the resources potentially impacted by the alternatives and the likely environmental consequences. It presents impact topics that were derived during internal and external scoping activities. Impacts are evaluated based on their type, context, duration, intensity, and whether they are direct, indirect or cumulative. An alternative's potential to impair Park resources is also evaluated. The analysis of the environmental consequences assumes that mitigation measures would be implemented for the Preferred Alternative.

### Methodology for Assessing Impacts

The NPS based the impact analysis and conclusions based on a review of existing literature and Park studies, information provided by experts within the Park and other agencies, professional judgments of Park staff and public input. Several factors are considered while assessing the impacts of each alternative on each impact topic. The following factors were used to determine the nature of impacts associated with the alternatives:

**Type** – Impacts can be beneficial or adverse.

**Context** - Context is the affected environment within which an impact would occur, such as local, Park-wide, regional, global, affected interests, society as a whole, or any combination of these. Context is variable and depends on the circumstances involved with each impact topic.

**Impact intensity** – Impact intensity is defined individually for each impact topic, since they vary by impact topic. Impacts can be negligible, minor, moderate, or major.

**Duration** - Since it is dependent on the impact topic being analyzed, duration of impact is analyzed separately for each impact topic. Depending on the resource, impacts may last as long as construction takes place, or a single year or growing season, or longer. For purposes of this analysis, impact duration is described as either short or long term.

**Direct and indirect impacts** – A direct impact is an effect that is caused by an action and occurs at the same time and place. An indirect impact is an effect that is caused by an action but is later in time or farther removed in distance, but still reasonably foreseeable.

### Cumulative Impacts

NEPA regulations require an assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions” (40CFR 1508.7). Cumulative effects can result from individually minor, but collectively moderate or major actions that take place over a period of time.

Cumulative impacts are considered for all alternatives, including the no action alternative. Cumulative impacts were determined by combining the impacts of the alternative being

considered with other past, present, and reasonably foreseeable future actions. The following actions were identified as having the potential for impacts to the resources that are evaluated in this environmental assessment.

### **Projects Contributing to the Cumulative Effects Scenario**

As part of the analysis for cumulative impacts, other past, present and reasonably foreseeable projects were identified. The potential for cumulative effects is discussed under each impact area in the impact analysis section. The various transportation, development and Park projects are described below.

*Planned Residential Communities on Dumfries Road* – According to the Prince William County 2008 Comprehensive Plan, several residential communities are planned for the area north of Dumfries Road, which borders the Park on its northeast side.

*The National Museum of the Marine Corps* - The Marine Corps Heritage Foundation, in partnership with the U.S. Marine Corps, recently built a new museum which opened in late 2006. It is located off Jefferson Davis Highway (U.S. 1), south of the Park on a 135-acre parcel.

*VA 234 Expansion* – This project included the widening of Route 234/Dumfries Road from two lanes to four to accommodate traffic from residential development in the southern part of Prince William County. This road is known as an “outer beltway” connecting the I-95 corridor and U.S. 1 to points west and north and ultimately terminating at Interstate 66.

*PRWI Water Line* - The NPS installed a new water line through 12 miles of the Park that replaced 1930s era wells and pipeline. This project was completed in 2006.

*PRWI Establishment of Multi-Use Trails* – The NPS established multi-use trails in the Park to provide additional recreational opportunities for off-road bicycling. This project was completed in 2006.

*PRWI Long Range Interpretive Plan* – The PRWI Long Range Interpretive Plan identified the need to expand the interpretive program to emphasize the Park’s mission. This plan calls for an improved visitor center with new enhanced exhibits at interpretive waysides at major trailheads and parking lots along Scenic Drive and interpretive displays at the historic cabin camps.

*New Entrance to Chopawamsic Backcountry Camping Area* – The NPS is proposing to build a new entrance to the Chopawamsic Backcountry Camping Area along with an associated parking lot and a toilet facility on the southwest side of the Park. Some trail improvements would also occur as part of this project.

### **Impairment of Park Resources or Values**

The fundamental purpose of the National Park System, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve Park resources and values. NPS managers must always seek ways to avoid or minimize to the greatest degree practicable adverse impacts on Park and monument resources and values.

However, the laws do give NPS management discretion to allow impacts to Park resources and values when necessary and appropriate to fulfill the purposes of a Park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given NPS management discretion to allow certain impacts within Parks, that discretion is limited by statutory requirement that the NPS must leave Park resources and values unimpaired, unless a particular law directly and specifically provides otherwise.

The prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of Park resources or values, including opportunities that otherwise would be present for the enjoyment of those resources or values. An impact to any Park resource or value may constitute impairment. However, an impact would more likely constitute impairment to the extent it affects a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the Park;
- key to the natural or cultural integrity of the Park or to opportunities for enjoyment of the Park; or
- identified as a goal in the Park's Master Plan or General Management Plan or other relevant NPS planning documents.

The Park resources and values that are subject to the no-impairment standard include:

- The Park's scenery, natural and historic objects, and wildlife, and the processes and conditions that sustain them, including, to the extent present in the Park: the ecological, biological, and physical processes that created the Park and continue to act upon it; scenic features; natural visibility, both in daytime and at night; natural landscapes; natural soundscapes and smells; water and air resources; soils; geological resources; paleontological resources; archeological resources; cultural landscapes; ethnographic resources; historic and prehistoric sites, structures, and objects; museum collections; and native plants and animals;
- Opportunities to experience enjoyment of the above resources, to the extent that can be done without impairing any of them;
- The Park's role in contributing to the national dignity, the high public value and integrity, and the superlative environmental quality of the national Park system, and the benefit and inspiration provided to the American people by the national Park system; and
- Any additional attributes encompassed by the specific values and purposes for which it was established.

### **Unacceptable Impacts**

Since an impact threshold at which impairment occurs is not always readily apparent, the NPS applies a standard that offers greater assurance that impairment would not occur. This is accomplished by avoiding impacts that the NPS determines to be unacceptable.

Unacceptable impacts are those that don't cause impairment, but are still not acceptable within a particular park's environment. In order to prevent uses that would cause unacceptable impacts, park managers must evaluate existing or proposed uses and determine whether the impacts on park resources and values are acceptable. For the

purposes of these policies, unacceptable impacts are impacts that, individually or cumulatively, would be inconsistent with a park's purposes or values or would:

- Be inconsistent with a park's purposes or values, or impede the attainment of a park's desired future conditions for natural and cultural resources as identified through the park's planning process, or
- Create an unsafe or unhealthful environment for visitors or employees, or diminish opportunities for current or future generations to enjoy, learn about, or be inspired by park resources or values, or
- Unreasonably interfere with:
  - park programs or activities, or
  - an appropriate use, or
  - the atmosphere of peace and tranquility, or the natural soundscape maintained in wilderness and natural, historic, or commemorative locations within the park, or
  - NPS concessioner or contractor operations or services.

### **Impacts to Cultural Resources and Section 106 of National Historic Preservation Act**

In this EA, impacts to cultural resources are described in terms of type, context, duration, and intensity, as described above, which is consistent with the regulations of the Council on Environmental Quality that implement NEPA. These impact analyses are intended, however, to comply with the requirements of both NEPA and Section 106 of the NHPA. In accordance with Advisory Council on Historic Preservation regulations implementing Section 106 of the NHPA (36 CFR Part 800, *Protection of Historic Properties*), impacts to archeological and cultural resources were identified and evaluated by (1) determining the area of potential effects; (2) identifying cultural resources present in the area of potential effects that were either listed in or eligible to be listed in the NRHP; (3) applying the criteria of adverse effect to affected cultural resources either listed in or eligible to be listed in the NRHP; and (4) considering ways to avoid, minimize, or mitigate adverse effects.

Under Advisory Council regulations, a determination of either adverse effect or no adverse effect must also be made for affected, NRHP-eligible cultural resources. An adverse effect occurs whenever an impact alters, directly or indirectly, any characteristics of a cultural resource that qualify it for inclusion in the NRHP, e.g., diminishing the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association. Adverse effects also include reasonably foreseeable effects caused by the preferred alternative that would occur later in time, be farther removed in distance, or be cumulative (36 CFR Part 800.5, *Assessment of Adverse Effects*). A determination of no adverse effect means there is an effect, but the effect would not diminish in any way the characteristics of the cultural resource that qualify it for inclusion in the NRHP.

Council on Environmental Quality regulations and Director's Order -12: Conservation Planning, Environmental Impact Analysis, and Decision-making also call for a discussion of the appropriateness of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of an impact from major to moderate or minor. Any resultant reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation under NEPA only. It does not suggest that the level of effect, as

defined by Section 106, is similarly reduced. Although adverse effects under Section 106 may be mitigated, the effect remains adverse.

A Section 106 summary is included in the impact topic analysis sections for all cultural resource topics under the preferred alternative. The Section 106 summary is intended to meet the requirements of Section 106 and is an assessment of the effect of the undertaking (implementation of the alternative) on cultural resources, based on the criterion of effect and criteria of adverse effect found in Advisory Council regulations.

## IMPACTS TO CULTURAL LANDSCAPES

### Impact Intensity

Cultural landscapes are the result of the long interaction between people and the land, the influence of human beliefs and actions over time on the natural landscape. Shaped through time by historical land-use and management practices, as well as politics and property laws, levels of technology, and economic conditions, cultural landscapes provide a living record of an area's past, a visual chronicle of its history. The dynamic nature of modern human life, however, contributes to the continual reshaping of cultural landscapes; making them a good source of information about specific times and places, but at the same time rendering their long term preservation a challenge.

The definitions of intensity levels and duration for this specific impact topic are as follows:

- Negligible: Impact(s) is at the lowest levels of detection with neither adverse nor beneficial consequences. The determination of effect for Section 106 would be “*no adverse effect.*”
- Minor: Adverse impact - alteration of a pattern(s) or feature(s) of the landscape would not diminish the overall integrity of the landscape. The determination of effect for Section 106 would be “*no adverse effect.*”
- Moderate: Adverse impact - alteration of a pattern(s) or feature(s) of the landscape would diminish the overall integrity of the landscape. The determination of effect for Section 106 would be “*adverse effect.*” A memorandum of agreement is executed among the NPS and applicable state or tribal historic preservation officer and, if necessary, the Advisory Council on Historic Preservation in accordance with 36 CFR 800.6(b). Measures identified in the MOA to minimize or mitigate adverse impacts would reduce the intensity of impact under NEPA from moderate to minor.
- Major: Adverse impact - alteration of a pattern(s) or feature(s) of the landscape would diminish the overall integrity of the landscape. The determination of effect for Section 106 would be “*adverse effect.*” Measures to minimize or mitigate adverse impacts cannot be agreed upon and the NPS and applicable state or tribal historic preservation officer and/or Advisory Council are unable to negotiate and execute a memorandum of agreement in accordance with 36 CFR 800.6(b).

- Short Term Duration: Occurs only during the implementation of the alternative.
- Long Term Duration: Occurs after the implementation of the alternative.

#### ALTERNATIVE A –NO ACTION

**Direct/Indirect Impacts:** Under the no action alternative, there would be no changes in current park management of the Mission 66 era roads, parking lots, and associated features. As a result, the NPS developed landscape would not be impacted by the proposed project alternative.

**Cumulative Impacts:** Past, present, and reasonably foreseeable future projects with the potential to affect cultural landscapes include the new entrance to the Chopawamsic backcountry camping area and PRWI long range interpretive plan. These projects would have the potential to disturb the NPS developed landscape by changes to the features or character. The projects would be designed to minimize impacts to cultural landscapes. As a result, assuming appropriate mitigation measures are enacted for the cumulative projects, impacts to cultural landscapes would be short term to long term, negligible to minor, and adverse. However, because the no action alternative would not impact cultural landscapes there would be no cumulative impacts.

**Conclusion:** There would be no new impacts to cultural landscapes under the no action alternative. Because the no action alternative would not impact cultural landscapes, there would be no contribution to cumulative impacts from the no action alternative. No unacceptable impacts to potential cultural landscapes would occur. Since there would be no major adverse impacts to potential cultural landscapes, this alternative would not result in impairment of Park resources or values.

#### ALTERNATIVE B – PREFERRED ALTERNATIVE

**Direct/Indirect Impacts:**

**Roadways and Contributing Features.** The NPS in consultation with the VA SHPO have, for purposes of Section 106, determined that the Mission 66 era resources are contributing features of the National Register eligible NPS developed landscape at PRWI. Scenic Drive, Parking Lots A-I, South Fork Concrete Bridges #1 and #2, Turkey Run access road and campground, Oak Ridge access road and campground, and Telegraph Road and parking area as well as numerous stone masonry culverts, stone gutters and stone retaining walls have been identified as contributing features to the NPS developed landscape.

Under this alternative, proposed changes would have the potential to impact the contributing features of the NPS developed landscape. Parking Lot D adjacent to Scenic Drive at mile marker 2.4 would be reconfigured within the existing footprint to accommodate more parking spaces; the circulation pattern would remain the same as originally designed. Parking Lot E adjacent to Scenic Drive at mile marker 3.1 would be expanded to accommodate up to 15 additional parking spaces; the circulation pattern would remain the same as originally designed. Scenic Drive intersection at mile marker 2 would be reconfigured to its original design (as constructed in 1970 and as depicted in the 1964 PRWI General Development Plan). Existing wood guardrail would be replaced with steel-backed timber guardrail and some new steel-backed guardrail would be installed. New guardrail would be set back further from the road edge to meet current safety standards. Guardrail on

South Fork Concrete Bridges #1 and #2 would be replaced with steel-backed timber. Some stone masonry culvert head and end walls would be repointed/repared as needed, two culverts would be enlarged and the stone masonry head and end walls would be dismantled and reset using original stone, and some new stone masonry culverts would be added. Existing stone and asphalt waterways would be cleaned and repaired as necessary. Some existing concrete head walls would be removed and replaced in kind, and some new concrete head walls would be built for new culverts, and drop inlets would be added in some locations. Potential impacts to cultural landscapes would be short term and negligible from construction activities and long term minor and adverse as the proposed changes would add structural elements that are similar in material, type, texture, and color, but would not diminish or distract from the overall integrity of the landscape.

**Orenda Historic District.** The proposed staging area for the preferred alternative is located near the Orenda Historic District adjacent to Cabin Camp 3, in an area currently used as the Park's maintenance materials storage yard. The staging area would be fenced and configured to avoid impacts to the cultural landscape. Impacts to the Orenda Historic District from the preferred alternative would be short term and negligible.

**Cumulative Impacts:** Past, present, and reasonably foreseeable future projects with the potential to affect cultural landscapes include the new entrance to the Chopawamsic backcountry camping area and PRWI long range interpretive plan. These projects would have the potential to disturb the Mission 66 era contributing resources of the NPS developed landscape by changes to the features or character. The projects would be designed to minimize impacts to cultural landscapes. As a result, assuming appropriate mitigation measures are enacted for the cumulative projects, impacts to cultural landscapes would be short term to long term, negligible to minor, and adverse. The preferred alternative would have short term and long term, negligible to minor, adverse impacts to the NPS developed landscape. The cumulative impacts of past, present, and reasonably foreseeable future projects, in combination with the preferred alternative, would be short term and long term, negligible to minor, and adverse.

**Conclusion:** Impacts to the potential cultural landscape as a result of construction activities would be short term and long term, negligible to minor and adverse. The proposed changes would repair existing culvert head and end walls, reconstruct head and end walls to accommodate larger culverts, add structural elements that are similar in material type, texture, and color, and reconfigure the existing circulation pattern to its original design as portrayed in the 1964 *General Development Plan*. Wood guardrail along roadways would be replaced with steel-backed timber. The bridge railings on two concrete slab bridges over the South Branch of Quantico Creek would be replaced with steel-backed timber bridge railings. Parking Lot D would be reconfigured and Parking Lot E would be expanded to accommodate up to 15 additional parking spaces. These actions would not diminish or detract from the overall integrity of the landscape. The cumulative impacts of past, present, and reasonably foreseeable future projects, in combination with the preferred alternative would be short term to long term, negligible to minor and adverse. No unacceptable impacts to potential cultural landscapes would occur. Since there would be no major adverse impacts to potential cultural landscapes, this alternative would not result in impairment of Park resources or values.

**Section 106 Summary:** After applying the Advisory Council on Historic Preservation criteria of adverse effects (36 CFR Part 800.5, Assessment of Adverse Effects), the National Park Service concludes that implementation of the preferred alternative would have *no adverse effect* on potential Park cultural landscapes.

## IMPACTS TO SOILS

### Impact Intensity

The definitions of intensity levels and duration for this specific impact topic are as follows:

- **Negligible:** Impacts to soils would be at or below the level of detection.
- **Minor:** Impacts would be detectable. Effects to soil areas would be small. Mitigation may be needed and would likely be successful.
- **Moderate:** A change in the soil character would occur over a sizable amount of area. Mitigation would be needed and would likely be successful.
- **Major:** The effects would be readily apparent and substantially change the character of the soils over a large area both inside and outside the Park. Mitigation would be required but the success of these measures would not be guaranteed.
- **Short Term Duration:** Recovery takes less than three years.
- **Long Term Duration:** Recovery takes over three years.

### ALTERNATIVE A – NO ACTION

**Direct/Indirect Impacts:** Under the no action alternative, NPS would continue to operate and manage PRWI under the current conditions. The inadequate and deteriorating storm water culverts would not be repaired. As a result, insufficient capacities and uncontrolled storm water runoff would cause soil erosion adjacent to the paved surfaces. This adverse impact would be minor and long term.

**Cumulative Impacts:** The previously implemented or future projects in the area such as the waterline project, the new park entrance and the proposed Chopawamsic entrance would have short term minor adverse impacts due to the soil exposure and subsequent erosion during construction. The long term plans for the park for new exhibits, and the enhancement of interpretive elements at the visitor center would not contribute to soil impacts. The impacts from the no action alternative, combined with the impacts of the projects identified in the cumulative effects scenario, would result in short term and long term, minor, adverse cumulative impacts.

**Conclusion:** The no action alternative would have minor, adverse, long term effects on soils due to the continued soil erosion from the deteriorating pavement conditions in the Park. Cumulative effects would be short term and long term, minor and adverse. There would be no unacceptable impacts to soils. Since there would be no major adverse impacts to soils, this alternative would not result in impairment of Park resources or values.

## **ALTERNATIVE B – PREFERRED ALTERNATIVE**

**Direct/Indirect Impacts:** Under the preferred alternative, the resurfacing, restoration, rehabilitation of roadways and parking lots and related facilities would be conducted. While the majority of these activities would be limited to the existing parking lot and roadway prisms, some soil disturbance would be expected in most areas. More extensive soil disturbance would occur for the expansion of parking lot E, the reconfiguration of the Scenic Drive mile marker two intersection, the replacement of culverts and the reconditioning or replacements of paved waterways. The soil disturbances would increase the erosion in these areas of the Park during construction. Appropriate erosion and sediment control measures would be specified in the site specific Stormwater Pollution Prevention Plan which would be implemented during construction. Soil stabilization measures with species native to the immediate area would be implemented as soon as possible after the soil disturbance occurs. Any topsoil removed during construction would be stored for later use and would be redistributed in as near the original location as possible. Based on the planned mitigation measures to address the potential for erosion and sedimentation, the resulting adverse impacts would be minor and short term.

**Cumulative Impacts:** The previously implemented or future projects in the area such as the waterline project, the new park entrance and the proposed Chopawamsic entrance would have short term minor adverse impacts due to the soil exposure and subsequent erosion during construction. The long term plans for the park for new exhibits, and the enhancement of interpretive elements at the visitor center would not contribute to soil impacts. The impacts from the preferred alternative, combined with the impacts of the projects identified in the cumulative effects scenario, would result in short term, minor, adverse, cumulative impacts.

**Conclusion:** The preferred alternative would have minor, adverse, short term effects on soils due to the construction activities. Cumulative effects would be minor, adverse and short term. There would be no unacceptable impacts to soils. Since there would be no major adverse impacts to soils, this alternative would not result in impairment of Park resources or values.

## **IMPACTS TO VEGETATION**

### **Impact Intensity**

The definitions of intensity levels and duration for this specific impact topic are as follows:

- **Negligible:** Some individual native plants would be affected, but there would be no effect on native species populations.
- **Minor:** Some individual native plants and a small portion of that species population would be impacted. Mitigation would be required and would likely be successful at attenuating the impacts.
- **Moderate:** A sizeable segment of the species population over a relatively large area would be impacted. Mitigation would be required and would likely be successful at attenuating the impacts.
- **Major:** A considerable effect on native plant populations, including species of special concern would be impacted. A large area could be affected within and

outside the Park boundaries. Mitigation would be required but the success of these measures would not be guaranteed.

- Short Term Duration: Impacts persist less than three years.
- Long Term Duration: Impacts would persist beyond three years.

#### **ALTERNATIVE A – NO ACTION**

**Direct/Indirect Impacts:** Under the no action alternative, NPS would continue to operate and manage PRWI under the current conditions. Since the deterioration of the existing pavement and parking lots would continue, areas of exposed ground would occur, which would be susceptible to the introduction of non-native plant species. Native species can be particularly sensitive to changes in species composition, abundance and diversity brought on by non-native species introduction. Non-native species have the potential to disrupt ecosystem processes and cause alterations in plant community composition and structure. They establish readily in natural systems and spread rapidly. These resulting adverse impacts would be negligible and long term.

**Cumulative Impacts:** The previously implemented or future projects in the area such as the waterline project and the new park entrance and the proposed Chopawamsic entrance would have long term minor adverse impacts due to the removal of native vegetation. The long term plans for the park for new exhibits and the enhancement of interpretive elements at the visitor center would not contribute to vegetation impacts. The impacts from the no action alternative, along with the impacts of the projects identified in the cumulative effects scenario, would result in a long term, minor, adverse, cumulative effect.

**Conclusion:** The no action alternative would have negligible, adverse, long term effects on vegetation due to the potential for introduction of non-native species. Cumulative effects would be long term, minor and adverse. There would be no unacceptable impacts to vegetation. Since there would be no major adverse impacts to vegetation, this alternative would not result in impairment of Park resources or values.

#### **ALTERNATIVE B – PREFERRED ALTERNATIVE**

**Direct/Indirect Impacts:** Under the preferred alternative, short term impacts to vegetation would occur along the roadways from the construction equipment. If Options #2 or #3 are selected for parking lot E, the vegetation to the east of the existing parking lot would be removed for the expansion of this lot. The reconfiguration of the Scenic Drive intersection also has the potential to impact native vegetation. The potential area of disturbance for the Scenic Drive reconfiguration and the parking lot expansion is currently occupied by native grasses that are widespread within the Park.

The removal of native herbaceous vegetation and trees would occur for the replacement of some of the guardrails in the Park and for culvert related work. Park staff reviewed the potential areas of disturbance and have indicated that no locally rare or important native vegetation is present in these areas (NPS, 2009a).

Any areas of exposed ground would be susceptible to the introduction of non-native plant species. Native species can be particularly sensitive to changes in species composition, abundance and diversity brought on by non-native species introduction. Non native species

would have the potential to disrupt ecosystem processes and cause alterations in plant community composition and structure. Any areas disturbed by the construction activities would be replanted with species native to the immediate area. Monitoring would occur in the restored areas to ensure the restoration was successful and to determine if additional measures would be necessary. No non-native vegetation would be introduced. The combined impact to vegetation from the preferred alternative and the mitigation measures implemented would be long term, minor and adverse.

**Cumulative Impacts:** The previously implemented or future projects in the area such as the waterline project and the new park entrance and the proposed Chopawamsic entrance would have long term minor adverse impacts due to the removal of native vegetation. The long term plans for the park for new exhibits, and the enhancement of interpretive elements at the visitor center would not contribute to vegetation impacts. The impacts from the preferred alternative, along with the impacts of the projects identified in the cumulative effects scenario, would result in a long term, minor, adverse, cumulative effect.

**Conclusion:** The preferred alternative would have minor, adverse, long term effects on vegetation due to the removal of vegetation and the potential for introduction of non-native species. Long term moderate adverse cumulative impacts to vegetation would occur. There would be no unacceptable impacts to vegetation. Since there would be no major adverse impacts to vegetation, this alternative would not result in impairment of Park resources or values.

## IMPACTS TO WATER QUALITY

### Impact Intensity

The definitions of intensity levels and duration for this specific impact topic are as follows:

- Negligible: chemical, physical or biological impacts which would barely be detectable.
- Minor: The effects would be detectable but within water quality standards or criteria and within historical or desired water quality conditions.
- Moderate: The effects would be detectable but within water quality standards or criteria. The effects would cause short-term exceedances of the historical baseline or desired water quality conditions.
- Major: The effects would be detectable and frequent exceedances of the historical baseline or desired water quality conditions would occur. Water quality standards or criteria would be slightly and singularly exceeded.
- Short Term Duration: Recovery in less than one year.
- Long Term Duration: Recovery would take longer than one year.

### ALTERNATIVE A – NO ACTION

**Direct/Indirect Impacts:** Under the no action alternative, NPS would continue to operate and manage PRWI under the current conditions. During any pavement repair activities necessary, pollutants from the asphalt patch materials would be carried in the storm water

runoff from these areas. In addition, the identified culvert inefficiencies would not be corrected, which would impact local water quality with the volume and velocity of the stormwater runoff. No impacts to groundwater would occur. These adverse impacts would be negligible and long term.

**Cumulative Impacts:** The past and foreseeable future Park projects and the construction activities in the neighboring areas would have a short-term negligible adverse impact on water quality. The impacts from the no action alternative, along with the impacts of the projects identified in the cumulative effects scenario, would result in long term and short term, negligible, adverse, cumulative effects.

**Conclusion:** The no action alternative would have negligible, adverse, long-term effects on water quality due to sedimentation and runoff. No impacts to groundwater would occur. Cumulative adverse effects would be long term and short term, negligible and adverse. There would be no unacceptable impacts to local surface water or ground water quality. Since there would be no major adverse impacts to water quality, this alternative would not result in impairment of Park resources or values.

#### **ALTERNATIVE B – PREFERRED ALTERNATIVE**

**Direct/Indirect Impacts:** Under the preferred alternative, the resurfacing, restoration, rehabilitation of roadways and parking lots and related facilities would be conducted. The potential expansion of parking lots D and E and the Scenic Drive intersection realignment would increase the impervious surfaces within PRWI and would increase the stormwater volume entering local receiving streams. The adverse impact on water quality from the increased runoff would be long term and negligible.

In order to construct the proposed improvements, ground disturbances and vegetation removal would occur in the areas surrounding the roadways, parking lots and culverts. The removal of vegetation in these areas would have a short term minor adverse impact on local water quality due to the reduced pollutant and sediment attenuation capacity and increased soil erosion and siltation.

Existing paved waterways along the roadways would also be reconditioned or replaced as necessary. This would impact water quality in the receiving streams during construction due to increased siltation. Based on the nature of flowing water, the siltation effects would only have short term, minor adverse impacts on water quality. The best management practices and specific erosion and sediment control measures specified in the Stormwater Pollution Prevention Plan prepared for the project along with the soil mitigation measures described in the mitigation measures for the action alternative section of this EA would limit impacts on water quality from sedimentation as much as practicable.

During construction, pollutants present in the repaving materials would be carried in the storm water runoff from these areas. This adverse impact would be short term and negligible.

Culvert reconditioning and replacement would occur in conjunction with the roadway and parking lot improvements. The culvert reconditioning and replacement activities would adversely impact the water quality in the watercourses running through the structures

during and shortly following the construction activities. This adverse impact would be short term and negligible. However, the repair of inadequate stormwater drainage and failing or deteriorating culverts would have a long-term beneficial effect on water quality due to reduced erosion and siltation potential in the receiving stream.

Groundwater impacts could occur during construction from spills and improperly maintained equipment. However, as mentioned in the mitigation measures for the action alternative, measures would be implemented to prevent ground and surface water contamination. These mitigations include implementing a hazard spill plan, using equipment free of external petroleum products, using less toxic, biodegradable lubricants, and conducting daily construction equipment checks to prevent the release of contaminants. The implementation of the action alternative with these preventive mitigations would be expected to have no resulting impact on groundwater quality in the area.

**Cumulative Impacts:** The past and future construction related park and area projects would have short-term and long-term minor impacts on water quality. The impacts from the action alternative, along with the impacts of the projects identified in the cumulative effects scenario, would result in long term, minor, adverse; short term, minor, adverse; and long term beneficial cumulative impacts.

**Conclusion:** The preferred alternative would have negligible long term adverse effects on water quality due to increased runoff; short term negligible adverse effects due to increased pollutant loading, erosion and siltation during construction; and minor, adverse, short term effects on water quality due to sedimentation and increased runoff; and a long term beneficial impact on water quality due to the repair and replacement of inadequate stormwater drainage and culverts. No impact on groundwater would occur. Cumulative impacts would be long term, minor, adverse; short term, minor, adverse; and long term beneficial. There would be no unacceptable impacts to water quality. Since there would be no major adverse impacts to water quality, this alternative would not result in impairment of Park resources or values.

## IMPACTS TO PUBLIC HEALTH AND SAFETY

### Impact Intensity

The definitions of intensity levels and duration for this specific impact topic are as follows:

- **Negligible:** Changes in public health and safety would be just at the level of detection.
- **Minor:** Changes in public health and safety would be detectable, although the changes would be slight. Visitors and Park staff would be unaware of the effects.
- **Moderate:** Changes in public health and safety would be readily apparent. Visitors and Park staff would be aware of the effects and would likely be able to express an opinion about the changes.
- **Major:** Changes in public health and safety would be readily apparent and severely adverse or exceptionally beneficial. Visitors and Park staff would be aware of the effects and would likely be able to express a strong opinion about

the changes.

- Short Term Duration: Occurs only during the implementation of the alternative.
- Long Term Duration: Occurs after the implementation of the alternative.

#### **ALTERNATIVE A –NO ACTION**

**Direct/Indirect Impacts:** While there are ongoing safety issues with the current condition of the road, the Park would not allow the road to degrade to a condition that poses an immediate risk to public safety. If such a condition were to arise (i.e., sink hole, eroded shoulder, crumbling pavement), the Park would make the necessary repairs as soon as possible.

The no action alternative would fail to provide a long-term solution to the uneven surfaces of the deteriorating parking lots which pose a safety hazard to bicycles and a tripping hazard to Park visitors and employees. In addition, substandard guardrails and signs would not be updated to meet current safety standards. The Park would continue to have inadequate, inappropriately located parking for visitors accessing the trails and the dedicated recreational lane on Scenic Drive. Without adequate parking in these areas, visitors would continue to park in unsafe areas on the shoulder of the roadway. Finally, the safety of the Scenic Drive intersection at mile marker two would also be left unaddressed. These impacts would be adverse, minor and long term.

**Cumulative Impacts:** The VA 234 roadway widening project was implemented to address a traffic congestion and safety issue and is a long term beneficial impact. The replacement of the 1930s era wells and waterlines in the park was a long term beneficial impact on park public health and safety since the quality of the drinking water infrastructure within the park was improved. The proposed Chopawamsic entrance would be expected to have no impact on public health and safety. The impacts from the no action alternative, along with the impacts of the projects identified in the cumulative effects scenario, would result in long term, minor, adverse and long term beneficial cumulative impacts.

**Conclusion:** The no action alternative would result in a minor, adverse long term impact on public health and safety due to the continuing safety concerns associated with the Scenic Drive intersection at mile marker two, unauthorized parking along roadways, and the fall and trip hazards in parking lots. Cumulative impacts would be long term, minor, adverse, and long term beneficial.

#### **ALTERNATIVE B – PREFERRED ALTERNATIVE**

**Direct/Indirect Impacts:** The preferred alternative would repair the uneven surfaces of the deteriorating parking lots which pose a safety hazard to bicycles and a tripping hazard to Park visitors and employees. During construction, either temporary traffic control details or a traffic control plan would be used to safely direct traffic in areas with temporary road closures. Visitors wishing to utilize PRWI during these off-peak times would be directed to open areas of the Park by construction signage and interpretive wayside exhibits. Information on temporary road closures would be made available on the PRWI website, in the visitor center and at the Park entrance station.

The preferred alternative also includes the replacement or repair of the substandard

guardrails and signs associated with the parking lots, improving the sign visibility and the safety of the roadways. By providing adequate parking facilities, the unsafe, unauthorized parking on the shoulder of the roadway would decrease. Finally, the safety of the Scenic Drive intersection at mile marker two would also be improved. These impacts would be beneficial and long term.

**Cumulative Impacts:** The VA-234 roadway widening project was implemented to address a traffic congestion and safety issue and is a long term beneficial impact. The replacement of the 1930s era wells and waterlines in the park was a long term beneficial impact on public health and safety since the quality of the drinking water infrastructure within the park was improved. The impacts from the preferred alternative, along with the impacts of the projects identified in the cumulative effects scenario, would result in long term beneficial cumulative impacts.

**Conclusion:** The preferred alternative would have beneficial long term effects on public health and safety. Cumulative effects would be beneficial and long term.

## IMPACTS TO PARK OPERATIONS

### Impact Intensity

The definitions of intensity levels and duration for this specific impact topic are as follows:

- Negligible: Changes in park operations would be just at the level of detection.
- Minor: Changes in park operations would be detectable, although the changes would be slight. Visitors and Park staff would be unaware of the effects.
- Moderate: Changes in park operations would be readily apparent. Visitors and Park staff would be aware of the effects and would likely be able to express an opinion about the changes.
- Major: Changes in park operations would be readily apparent and severely adverse or exceptionally beneficial. Visitors and Park staff would be aware of the effects and would likely be able to express a strong opinion about the changes.
- Short Term Duration: Occurs only during the implementation of the alternative.
- Long Term Duration: Occurs after the implementation of the alternative.

### ALTERNATIVE A –NO ACTION

**Direct/Indirect Impacts:** Under the no action alternative, the Park would continue to have inadequate, inappropriately located parking around parking lots D and E. Without adequate parking in these areas, visitors would continue to park on the shoulder of the roadway, which creates additional work for Park staff to monitor and correct this unauthorized parking. Park staff would also have to continue the on-going repair of cracks and potholes in the existing parking areas and roadways. These impacts would be adverse, minor and long term.

**Cumulative Impacts:** The new entrance to the Chopawamsic backcountry area would have a beneficial impact on operations since staff would not be required to unlock gates along the

existing access point each time visitors desired access. The other projects in the cumulative effects scenario would not be expected to impact park operations. The impacts from the no action alternative, along with the impacts of the projects identified in the cumulative effects scenario, would result in long term, minor, adverse and long term beneficial cumulative impacts.

**Conclusion:** The no action alternative would result in a long term, minor, adverse impact on park operations due to continuing maintenance and policing necessary by Park staff. Cumulative impacts would be long term, minor, adverse, and long term beneficial.

#### **ALTERNATIVE B – PREFERRED ALTERNATIVE**

**Direct/Indirect Impacts:** During construction, park operations would be impacted by road and area closures. This impact on park operations would be negligible, short term and adverse. The implementation of the preferred alternative would provide additional parking facilities and would reduce the monitoring of unauthorized parking on the shoulder of the roadways near parking lots D and E. The continuing maintenance of deteriorating pavement conditions would also be eliminated. These impacts would be beneficial and long term.

**Cumulative Impacts:** The new entrance to the Chopawamsic backcountry area would be expected to have a long term beneficial impact on operations since staff would not be required to unlock gates along the existing access point each time visitors desired access. The other projects in the cumulative effects scenario would not be expected to impact park operations. The impacts from the preferred alternative, along with the impacts of the projects identified in the cumulative effects scenario, would result in short term, negligible, adverse, and long term beneficial cumulative impacts.

**Conclusion:** During construction, park operations would be impacted by road and area closures within the Park. This adverse impact would be short term and minor. After construction, the preferred alternative would have a long term beneficial effect on park operations. Cumulative effects would be beneficial and long term.

### **IMPACTS TO VISITOR USE AND EXPERIENCE**

#### **Impact Intensity**

The definitions of intensity levels and duration for this specific impact topic are as follows:

- **Negligible:** Visitors would likely be unaware of impacts associated with implementation of the alternative. There would be no noticeable change in visitor use and experience or in any defined indicators of visitor satisfaction or behavior.
- **Minor:** Changes in visitor use and/or experience would be slight and detectable, but would not appreciably limit or enhance critical characteristics of the visitor experience. Visitor satisfaction would remain stable.
- **Moderate:** Few critical characteristics of the desired visitor experience would change. The number of participants engaging in a specified activity would be altered.

Some visitors who desire their continued use and enjoyment of the activity/visitor experience might be required to pursue their choices in other available local or regional areas. Visitor satisfaction would begin to either decline or increase.

- Major: Multiple critical characteristics of the desired visitor experience would change and/or the number of participants engaging in an activity would be greatly reduced or increased. Visitors who desire their continued use and enjoyment of the activity/visitor experience would be required to pursue their choices in other available local or regional areas. Visitor satisfaction would markedly decline or increase.
  - Short Term Duration: Occurs only during the implementation of the alternative.
  - Long Term Duration: Occurs after the implementation of the alternative.

#### **ALTERNATIVE A –NO ACTION**

**Direct/Indirect Impacts:** Under the no action alternative, NPS would continue to operate and manage PRWI under the current conditions. The appearance and condition of the parking lots and roadways would impact the visitor experience due to both the poor aesthetic appearance and the bumpy condition of the pavement. This alternative would also fail to provide an adequate number of appropriately located parking facilities, which could result in visitors not utilizing certain areas of the Park. These adverse impacts would be minor and long term.

**Cumulative Impacts:** The Park waterline project and new entrance road would have a long term beneficial impact on visitor use and experience. The expansion of VA-234 would be expected to make traveling to and from the park easier, therefore improving visitor experience. The proposed Chopawamsic entrance would be expected to have a long term beneficial impact on visitor experience. The impacts from the no action alternative, along with the impacts from the projects identified in the cumulative effects scenario, would result in long term, minor, adverse and long term beneficial cumulative impacts.

**Conclusion:** The no action alternative would have a long term minor adverse impact on visitor use and experience based on the importance of the quality of the transportation network and parking facilities for a positive visitor experience. Cumulative impacts would be long term, minor, adverse, and long term beneficial.

#### **ALTERNATIVE B – PREFERRED ALTERNATIVE**

**Direct/Indirect Impacts:** During the construction of the preferred alternative, visitor experience would be negatively impacted by temporary roadway closures and rerouting, and by the temporary closure of the Orenda Historic District. Access to certain areas of the Park may also be limited during peak construction periods. To minimize these impacts, construction activities would be limited to weekdays, during which the Park experiences the fewest visitors. Visitors wishing to utilize PRWI during these off-peak times would be directed to open areas of the Park by construction signage and interpretive wayside exhibits. Information on temporary road closures would be made available on the PRWI website, in the visitor center and at the Park entrance station.

Visitor use and experience would also be impacted during construction as a result of the

attendant human activity and noise associated with implementation of the preferred alternative. The intrusiveness of the construction activities on the visitor use and experience would be minimized by confining activities to the fenced construction zone, and by requiring construction contractors to properly maintain construction equipment to minimize noise from their use. The resulting adverse impact on visitor use and experience would be short term and minor.

Post construction, the preferred alternative would improve the aesthetic appearance of the parking lots and roadways and would be expected to enhance visitors' enjoyment of the Park. The project would contribute to the evolution of the roadside cultural landscape as guardrail and roadside sign improvements are proposed to improve safety and enhance way-finding within the park. The maintenance and preservation of the Park roadways' historic function and appearance would also occur. The resulting impacts on visitor use and experience would be long term and beneficial.

This alternative would also provide up to 41 parking spaces in parking lots D and E, which currently have a total of only 16 parking spaces. More visitors would be expected to utilize the trails and other amenities in these areas based on the additional available parking spaces. Since local visitors rank the maintenance of the transportation facilities and adequate parking as important, the implementation of the preferred alternative would be a long term beneficial impact on visitor use and experience.

**Cumulative Impacts:** The Park waterline project and new entrance road would have a long term beneficial impact on visitor use and experience. The expansion of VA-234 would be expected to make traveling to and from the park easier, therefore improving visitor experience. The impacts from the preferred alternative, along with the impacts of the projects identified in the cumulative effects scenario, would result in short term, minor, adverse, and long term beneficial cumulative impacts.

**Conclusion:** The preferred alternative would have a minor, short term adverse impact on visitor use and experience due to temporary road and area closures during construction. Post construction, the project would have a long term beneficial effect on visitor use and experience based on the availability of appropriately located adequate parking and the improved transportation network. Cumulative effects would be short term, minor, adverse, and long term beneficial.

## CONSULTATION AND COORDINATION

### PUBLIC INVOLVEMENT AND NOTIFICATION

This EA would be distributed for public and agency review with a comment period of at least 30 days. The NPS would consider all comments in making its final decision.

### AGENCIES CONSULTED

The NPS is conducting Section 106 consultation with the Virginia Department of Historic Resources as part of this project. PRWI sent a letter to the Virginia Department of Historic Resources on November 10, 2008 to make them aware of their intention to use the EA to complete Section 106 consultation. On June 5, 2009, PRWI obtained concurrence from the SHPO that the Mission 66 era developed landscape at the Park is eligible for inclusion in the National Register of Historic Places for the purposes of Section 106 (Eaton, 2009).

PRWI requested information from USFWS and from VDCR, Division of Natural Heritage on November 11, 2008 and November 18, 2008, respectively. Copies of these coordination letters are provided in Appendix A. On December 17, 2008, VDCR responded that they have no records of rare, threatened, or endangered plant or animal species, unique or exemplary natural communities within the project area. A copy of the response letter from VDCR is provided in Appendix A. VDCR recommended contacting the Virginia Department of Agriculture and Consumer Services (VDACS) for endangered species coordination. On May 12, 2009, VDACS indicated that they concurred with NPS and VDNH that the project would not affect any state recognized threatened or endangered species (Tignor, 2009). To date, no response has been received from USFWS.

Since Prince William County is located within the Virginia Coastal Zone Management Area, coordination with the VA DEQ under the Coastal Zone Management Act was initiated on April 15, 2009. A copy of the letter to VA DEQ is provided in Appendix A.

In addition, published information was obtained from the following agencies:

- U.S. Department of the Interior, Fish and Wildlife Service
- U.S. Department of Agriculture, Natural Resources Conservation Service
- Virginia Department of Natural Resources
- Virginia State Historic Preservation Office
- Prince William County

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**APPENDIX A**  
**Agency Correspondence**





IN REPLY REFER TO:

# United States Department of the Interior

NATIONAL PARK SERVICE  
Prince William Forest Park  
18100 Park Headquarters Road  
Triangle, VA 22172



H30 (PRWI)

December 17, 2008

Ms. Kathleen Kilpatrick,  
State Historic Preservation Officer  
Virginia Department of Historic Resources  
2801 Kensington Avenue  
Richmond, VA 23221

Dear Ms Kilpatrick:

The National Park Service (NPS) has completed an initial draft of an environmental assessment (EA) describing the impacts of a road resurfacing project in Prince William Forest Park. During the review we identified an element of the preferred alternative that will require a further assessment for cultural resources.

The Purpose and Need in the EA identifies the need for a redesign/alignment an intersection of the park Scenic Drive, at mile-post two. To modify the road junction, the preferred alternative identifies a small portion of road to be re-aligned with a historic road trace which is now covered in grass. The movement of the road would have a beneficial affect on the safety of visitors within the park. However, the road trace is identified as existing and as potentially having been constructed by the Civilian Conservation Corps.

The purpose for this consultation is to notify the State Historic Preservation Office (SHPO) that we are in the process of developing a contract to conduct a Determination of Significance for the road trace. Due to the nature of the resource and the time-table for the environmental assessment, the park proposes to conduct the survey while the EA is available for public comment, and commit to submitting the findings to the SHPO prior to completing the compliance process.

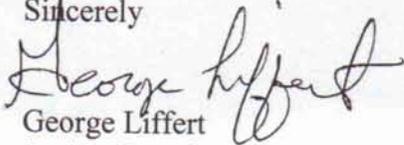
If you concur with our approach, please indicate your concurrence on the line below.

Chad R. Cota  
Signature

12-22-08  
Date

For questions, please contact me at (703) 221-2366 (email [George\\_Liffert@nps.gov](mailto:George_Liffert@nps.gov)), or Paul Petersen, Acting Chief of Resource Management at (703) 221-3266 (email [Paul\\_E\\_Petersen@nps.gov](mailto:Paul_E_Petersen@nps.gov)).

Sincerely

A handwritten signature in cursive script that reads "George Liffert".

George Liffert  
Acting Superintendent

Cc: Ethel Eaton

L. Preston Bryant, Jr.  
Secretary of Natural Resources



Joseph H. Maroon  
Director

**COMMONWEALTH of VIRGINIA**  
**DEPARTMENT OF CONSERVATION AND RECREATION**

217 Governor Street  
Richmond, Virginia 23219-2010  
(804) 786-7951 FAX (804) 371-2674

December 17, 2008

George Liffert  
National Park Service  
Prince William Forest Park  
18100 Park Headquarters Road  
Triangle, VA 22172

Re: #L7617, Prince William Forest Park Federal Highway Road Repaving

Dear Mr. Liffert:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

DCR supports the continued work on the Isotria Management Plan. However, due to the legal status of the Small Whorled Pogonia, DCR recommends coordination with the Virginia Department of Agriculture and Consumer Services (VDACS) and the United States Fish and Wildlife Service (USFWS) to ensure compliance with protected species legislation.

The Virginia Department of Agriculture and Consumer Services (VDACS), which has regulatory authority to conserve rare and endangered plant and insect species through the Virginia Endangered Plant and Insect Species Act, has established a Memorandum of Agreement with the Virginia Department of Conservation and Recreation (DCR). Under this Agreement DCR's Division of Natural Heritage, in consultation with VDACS, represents VDACS in its comments and recommendations regarding the potential impact of reviewed projects or activities on state-listed plant and insect species. Since it has been determined that this project or activity may impact a state-protected plant, **Small whorled pogonia**, VDACS will respond directly to ensure compliance with Virginia's Endangered Plant and Insect Species Act. Further correspondence regarding the potential impacts of this project or activity on state-listed plant and insect species should be directed to VDACS.

In addition, our files do not indicate the presence of any State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

The Virginia Department of Game and Inland Fisheries maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from <http://vafwis.org/fwis/> or contact Shirl Dressler at (804) 367-6913.

Should you have any questions or concerns, feel free to contact me at 804-692-0984. Thank you for the opportunity to comment on this project.

Sincerely,

A handwritten signature in black ink, appearing to read "Kristal McKelvey". The signature is written in a cursive style with a large, looping initial "K".

Kristal McKelvey  
Coastal Zone Locality Liaison

CC: Tylan Dean, USFWS  
Keith Tignor, VDACS



# United States Department of the Interior

NATIONAL PARK SERVICE  
Prince William Forest Park  
18100 Park Headquarters Road  
Triangle, VA 22172

IN REPLY REFER TO:

H30 (PRWI)

November 10, 2008

Ms. Kathleen Kilpatrick,  
State Historic Preservation Officer  
Virginia Department of Historic Resources  
2801 Kensington Avenue  
Richmond, VA 23221

Dear Ms Kilpatrick:

The National Park Service (NPS) is beginning to study alternatives for a Federal Highways road re-pavement project at Prince William Forest Park, in Triangle, Virginia. We are proposing the expansion of two parking lots on Park Scenic Drive. These are Parking Lots D and E. All resurfacing will occur within the existing roadway footprints. Some drainage structures may be repaired and/or replaced based on their condition. Impacts to cultural, historic, and archeological resources are not expected.

We have begun the National Environmental Policy Act (NEPA) process for this project and are beginning preparation of an environmental assessment. In accordance with Title 36 CFR 800.8 © of the Advisory Council on Historic Preservation regulations, we are notifying your office in advance of the park's intention to use the NEPA process to meet its obligations under Section 106 of the National Historic Preservation Act.

We look forward to working with your organization as we proceed with the environmental planning process for this project. If require more details for your assessment, we would be pleased to arrange a meeting with you at your convenience. Please contact me at (703) 221-2366 (email [George\\_Liffert@nps.gov](mailto:George_Liffert@nps.gov)), or Paul Petersen, Acting Chief of Resource Management at (703) 221-3266 (email [Paul\\_E\\_Petersen@nps.gov](mailto:Paul_E_Petersen@nps.gov)).

Sincerely,

George Liffert  
Acting Superintendent

Cc: Ethel Eaton



IN REPLY REFER TO:

# United States Department of the Interior

## NATIONAL PARK SERVICE

Prince William Forest Park  
18100 Park Headquarters Road  
Triangle, VA 22172

L7617

November 10<sup>th</sup>, 2008

Mr. Tylan Dean,  
Assistant Supervisor  
Endangered Species & Federal Activities  
US Fish & Wildlife Services Ecological Services  
Virginia Field Office  
6669 Short Lane  
Gloucester, VA 23061

Dear Mr. Dean:

The National Park Service (NPS) is beginning to study different alternatives for a Federal Highways road re-pavement project at Prince William Forest Park, in Triangle, Virginia.

We have begun the National Environmental Policy Act (NEPA) process for this project and are preparing an Environmental Assessment. In accordance with Section 7 of the Endangered Species Act and 50 CFR 402 Subpart B, we are notifying your office in advance of the park's intention to use the NEPA process to meet its management obligations.

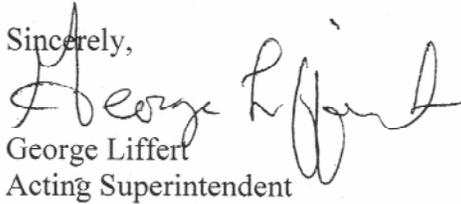
The park has worked closely with the Virginia Department of Natural Heritage (VNH) to inventory and monitor the federally threatened species, *Isotria medeoloides*, Small Whorled Pogonia, a plant that occurs in the park. Currently, park managers along with other specialists are reviewing a Draft *Isotria* Management Plan. This plan, developed by the VNH, takes into consideration multiple surveys of *Isotria medeoloides* conducted from 1983 through 2007. Suitability modeling and surveys have identified approximately 3000 acres of land within the park as potential *Isotria medeoloides* habitat. Subsequently, these lands have been surveyed for species presence and absence. Currently, there are 19 known locations of the plant in the park, ranging from a single individual plant, to colonies of up to 28 plants.

The road resurfacing project is being proposed based on recommendations provided by the Federal Highway Administration (FHWA). The resurfacing project is being

conducted on pre-existing road surfaces and formally disturbed areas, and does not include any *Isotria medeoloides* habitat. The nearest *Isotria medeoloides* colony/individual is approximately 500 meters from a paved park road.

We look forward to working with your organization, as we proceed with the environmental planning process for this project. If you require more details for your assessment, we would be pleased to arrange a meeting at your convenience. Please contact me at (703) 221-2366 (email [George\\_Liffert@nps.gov](mailto:George_Liffert@nps.gov)), or Mr. Paul Petersen, Acting Chief of Resource Management at (703) 221-3266 (email [Paul E Petersen@nps.gov](mailto:Paul_E_Petersen@nps.gov)).

Sincerely,



George Liffert  
Acting Superintendent

Paul



# United States Department of the Interior

NATIONAL PARK SERVICE  
Prince William Forest Park  
18100 Park Headquarters Road  
Triangle, VA 22172

IN REPLY REFER TO:

2008 NOV 18 AM 11:15

L7617

November 18, 2008

Ms. Rene Hypes  
Environmental Review Coordinator  
Virginia Natural Heritage Program  
217 Governor Street, Third Floor  
Richmond, VA 23219

Dear Ms. Hypes:

The National Park Service (NPS) is in the process of studying alternatives for a Federal Highways road repaving project at Prince William Forest Park (PRWI), in Triangle, Virginia.

We have begun the National Environmental Policy Act (NEPA) process for this project and are in the process of drafting an Environmental Assessment for the work. In accordance with Section 7 of the Endangered Species Act and 50 CFR 402 Subpart B, the NPS has notified the USFSW in advance of the park's intention to use the NEPA process to meet its management obligations. This letter extends notification to the Virginia Department of the Natural Heritage and the Virginia Department of Agriculture and Consumer Services for informal consultation.

Park staff has worked closely with the Virginia Department of Natural Heritage (VADNH) to inventory and monitor the federally threatened species, *Isotria medeoloides* or small whorled pogonia, a plant that occurs in PRWI. Currently, park managers and other specialists are reviewing a Draft *Isotria* Management Plan. This plan, developed by the VADNH, takes into consideration multiple surveys of *Isotria medeoloides* conducted from 1983 through 2007. Suitability modeling and surveys have identified approximately 3000 acres of land within PRWI as potential *Isotria medeoloides* habitat, and subsequently these lands have been surveyed for species presence and absence. Currently, there are 19 known locations of the plant in the park, which range from a

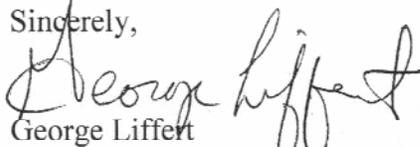
single individual plant, to colonies containing up to 28 plants. (See VA Natural Heritage Technical Report 07-08 and DRAFT Management Plan for Small Whorled Pogonia (*Isotria medeoloides*) Colonies in Prince William Forest Park, Virginia - author Kevin Heffernan).

Additionally, the VADNH has produced a number of Natural Heritage Inventory reports regarding the rare and unique natural resources in Prince William Forest Park. These include an inventory and assessment of eastern hemlock (*Tsuga Canadensis*), assessments of oligiotropic seepage swamps, and an assessment of a state listed rare sedge, *Carex vestita* (See Natural Heritage Technical Reports 95-24, 97-6, and 99-08).

The road resurfacing project is a joint project between the National Park Service and the Federal Highway Administration (FHWA). The project is being conducted on pre-existing road surfaces and formally disturbed areas, and does not include *Isotria medeoloides* habitat. The nearest *Isotria medeoloides* colony/individual is approximately 500 meters from any paved park road. The project site is neither on, nor adjacent to, any Natural Heritage Areas defined by the Virginia Department of Natural Heritage.

We look forward to working with your organization as we continue the environmental planning process for this project. If you require additional details or information for the purposes of your assessment, we can provide them to you, or we can arrange a meeting with you at your convenience. Please contact me at (703) 221-2366 (e-mail [George\\_Liffert@nps.gov](mailto:George_Liffert@nps.gov)), or Mr. Paul Petersen, Acting Chief of Resource Management at (703) 221-3266 (e-mail [Paul\\_E\\_Petersen@nps.gov](mailto:Paul_E_Petersen@nps.gov)).

Sincerely,

  
George Liffert  
Acting Superintendent

cc: Todd P. Haymore, VDAC Commissioner



# United States Department of the Interior

NATIONAL PARK SERVICE  
Prince William Forest Park  
18100 Park Headquarters Road  
Triangle, VA 22172

IN REPLY REFER TO:

L7617 (PRWI)

April 15, 2009

Ellie Irons  
Virginia DEQ  
Environmental Impact Review Program Manager  
629 East Main Street  
P.O. Box 1105  
Richmond, VA 23218

*Reference:* Road resurfacing in Prince William Forest Park  
*Subject:* Compliance with the National Environmental Policy Act, and Coastal  
Zone Management Act and Code of Virginia

Dear Ms. Irons:

The National Park Service (NPS) is studying different alternatives for a Federal Highways road repavement project at Prince William Forest Park (PRWI), in Triangle, Virginia.

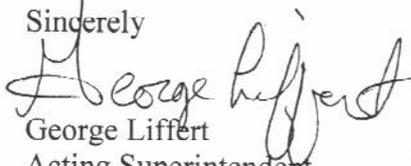
We have begun the National Environmental Policy Act (NEPA) process for this project and we are drafting an Environmental Assessment for the work. The park seeks to comply with its obligation to seek federal consistency with the policies of the Coastal Zone Management Act, as well as the National Environmental Policy Act, and the Code of Virginia (§ 10.1-1186. General powers of the Department) "5. Implement all regulations as may be adopted by the State Air Pollution Control Board, the State Water Control Board, and the Virginia Waste Management Board."

The park is conducting the road resurfacing project due to recommendations given by the Federal Highways Division of the NPS. The roads in the park are stressed by long-term environmental factors and predictable wear. The resurfacing project is being conducted on pre-existing road surfaces and includes expansions of two existing parking areas.

Prince William Forest Park requests Virginia DEQ conduct a review of the EA for both satisfaction of NEPA and CZMA. We look forward to working with your organization, and other consulting parties, and the public as we proceed with the environmental

assessment, we would be happy to arrange a meeting with you at your convenience.  
Please contact me at (703) 221-2366 (email: [George\\_Liffert@nps.gov](mailto:George_Liffert@nps.gov)), or Paul Petersen,  
Acting Chief of Resource Management at (703) 221-3266 (email:  
[Paul\\_E\\_Petersen@nps.gov](mailto:Paul_E_Petersen@nps.gov)).

Sincerely

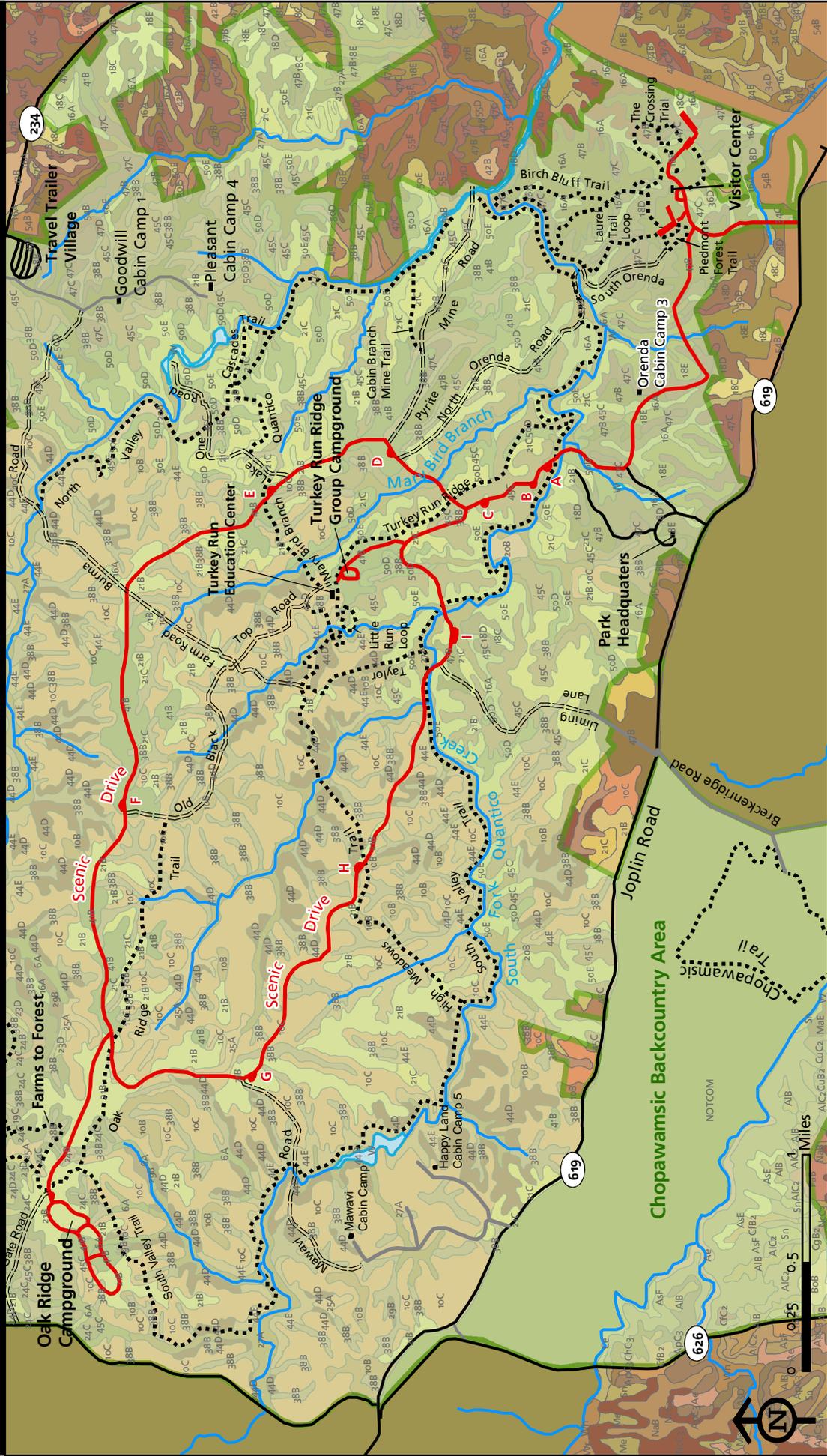


George Liffert  
Acting Superintendent



**APPENDIX B**  
**Mapping of Soils in Project Area**





- NPS Boundary
- Unpaved Road
- Hiking Trails
- Streams
- Unpaved Road (open to bicycles)
- Parking Areas
- Paved Roads

**SSURGO Soil Map,  
DSC/November 2008/ 860/20012**

Environmental Assessment  
Roadway Resurfacing

# Map Unit Description (Brief)

Prince William County, Virginia

[Only those map units that have entries for the selected description categories are included in this report]

**Map unit:** 6A - Baile loam, 0 to 4 percent slopes

**Description category:** SOI

*Baile is a nearly level to moderately sloping, very deep, poorly drained soil. Typically the surface layer is loam about 8 inches thick. The surface layer has a moderate content of organic matter. The slowest permeability is slow. It has a high available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The top of the seasonal high water table is at 3 inches. The land capability classification is 5w. The Virginia soil management group is HH. This soil is hydric.*

**Map unit:** 10B - Buckhall loam, 2 to 7 percent slopes

**Description category:** SOI

*Buckhall is a gently sloping to moderately sloping, very deep, well drained soil. Typically the surface layer is loam about 7 inches thick. The surface layer has a moderately low content of organic matter. The slowest permeability is moderate. It has a moderate available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The land capability classification is 2e. The Virginia soil management group is V. This soil is not hydric.*

**Map unit:** 10C - Buckhall loam, 7 to 15 percent slopes

**Description category:** SOI

*Buckhall is a strongly sloping to moderately steep, very deep, well drained soil. Typically the surface layer is loam about 7 inches thick. The surface layer has a moderately low content of organic matter. The slowest permeability is moderate. It has a moderate available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The land capability classification is 3e. The Virginia soil management group is V. This soil is not hydric.*

**Map unit:** 16A - Delanco fine sandy loam, 0 to 4 percent slopes

**Description category:** SOI

*Delanco is a nearly level to moderately sloping, very deep, moderately well drained soil. Typically the surface layer is fine sandy loam about 11 inches thick. The surface layer has a moderate content of organic matter. The slowest permeability is moderately slow. It has a high available water capacity and a moderate shrink swell potential. This soil is rarely flooded and is not ponded. The top of the seasonal high water table is at 21 inches. The land capability classification is 2e. The Virginia soil management group is B. This soil is not hydric.*

## Map Unit Description (Brief)

Prince William County, Virginia

**Map unit:** 18C - Dumfries sandy loam, 7 to 15 percent slopes

**Description category:** SOI

*Dumfries is a strongly sloping to moderately steep, very deep, well drained soil. Typically the surface layer is sandy loam about 10 inches thick. The surface layer has a low content of organic matter. The slowest permeability is moderately rapid. It has a moderate available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The land capability classification is 4s. The Virginia soil management group is T. This soil is not hydric.*

**Map unit:** 18D - Dumfries sandy loam, 15 to 25 percent slopes

**Description category:** SOI

*Dumfries is a moderately steep to steep, very deep, well drained soil. Typically the surface layer is sandy loam about 10 inches thick. The surface layer has a low content of organic matter. The slowest permeability is moderately rapid. It has a moderate available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The land capability classification is 6s. The Virginia soil management group is T. This soil is not hydric.*

**Map unit:** 18E - Dumfries sandy loam, 25 to 50 percent slopes

**Description category:** SOI

*Dumfries is a steep to very steep, very deep, well drained soil. Typically the surface layer is sandy loam about 10 inches thick. The surface layer has a low content of organic matter. The slowest permeability is moderately rapid. It has a moderate available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The land capability classification is 7e. The Virginia soil management group is T. This soil is not hydric.*

**Map unit:** 21B - Fairfax loam, 2 to 7 percent slopes

**Description category:** SOI

*Fairfax is a gently sloping to moderately sloping, very deep, well drained soil. Typically the surface layer is loam about 8 inches thick. The surface layer has a moderately low content of organic matter. The slowest permeability is moderate. It has a high available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The land capability classification is 2e. The Virginia soil management group is D. This soil is not hydric.*

**Map unit:** 21C - Fairfax loam, 7 to 15 percent slopes

**Description category:** SOI

*Fairfax is a strongly sloping to moderately steep, very deep, well drained soil. Typically the surface layer is loam about 8 inches thick. The surface layer has a moderately low content of organic matter. The slowest permeability is moderate. It has a high available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The land capability classification is 3e. The Virginia soil management group is D. This soil is not hydric.*

## Map Unit Description (Brief)

Prince William County, Virginia

**Map unit:** 24B - Glenelg-Buckhall complex, 2 to 7 percent slopes

**Description category:** SOI

*Glenelg is a gently sloping to moderately sloping, very deep, well drained soil. Typically the surface layer is loam about 5 inches thick. The surface layer has a moderate content of organic matter. The slowest permeability is moderate. It has a high available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The land capability classification is 2e. The Virginia soil management group is U. This soil is not hydric.*

*Buckhall is a gently sloping to moderately sloping, very deep, well drained soil. Typically the surface layer is loam about 7 inches thick. The surface layer has a moderately low content of organic matter. The slowest permeability is moderate. It has a moderate available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The land capability classification is 2e. The Virginia soil management group is V. This soil is not hydric.*

**Map unit:** 24C - Glenelg-Buckhall complex, 7 to 15 percent slopes

**Description category:** SOI

*Glenelg is a strongly sloping to moderately steep, very deep, well drained soil. Typically the surface layer is loam about 5 inches thick. The surface layer has a moderate content of organic matter. The slowest permeability is moderate. It has a high available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The land capability classification is 3e. The Virginia soil management group is U. This soil is not hydric.*

*Buckhall is a strongly sloping to moderately steep, very deep, well drained soil. Typically the surface layer is loam about 7 inches thick. The surface layer has a moderately low content of organic matter. The slowest permeability is moderate. It has a moderate available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The land capability classification is 3e. The Virginia soil management group is V. This soil is not hydric.*

**Map unit:** 25A - Glenville loam, 0 to 4 percent slopes

**Description category:** SOI

*Glenville is a nearly level to moderately sloping, very deep, moderately well drained soil. Typically the surface layer is loam about 8 inches thick. The surface layer has a moderate content of organic matter. The slowest permeability is slow. It has a low available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The top of the seasonal high water table is at 21 inches. The land capability classification is 2w. The Virginia soil management group is W. This soil is not hydric.*

## Map Unit Description (Brief)

Prince William County, Virginia

**Map unit:** 27A - Hatboro-Codorus complex, 0 to 2 percent slopes

**Description category:** SOI

*Hatboro is a nearly level to gently sloping, very deep, poorly drained soil. Typically the surface layer is silt loam about 14 inches thick. The surface layer has a moderate content of organic matter. The slowest permeability is moderate. It has a moderate available water capacity and a low shrink swell potential. This soil is frequently flooded and is not ponded. The top of the seasonal high water table is at 3 inches. The land capability classification is 3w. The Virginia soil management group is HH. This soil is hydric.*

*Codorus is a nearly level to gently sloping, very deep, moderately well drained soil. Typically the surface layer is loam about 12 inches thick. The surface layer has a moderate content of organic matter. The slowest permeability is moderate. It has a moderate available water capacity and a low shrink swell potential. This soil is frequently flooded and is not ponded. The top of the seasonal high water table is at 18 inches. The land capability classification is 2w. The Virginia soil management group is A. This soil is not hydric.*

**Map unit:** 34C - Lunt loam, 7 to 15 percent slopes

**Description category:** SOI

*Lunt is a strongly sloping to moderately steep, very deep, well drained soil. Typically the surface layer is loam about 7 inches thick. The surface layer has a moderately low content of organic matter. The slowest permeability is moderate. It has a moderate available water capacity and a high shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The land capability classification is 4e. The Virginia soil management group is AA. This soil is not hydric.*

**Map unit:** 36D - Marr very fine sandy loam, 7 to 25 percent slopes

**Description category:** SOI

*Marr is a strongly sloping to steep, very deep, well drained soil. Typically the surface layer is very fine sandy loam about 13 inches thick. The surface layer has a moderately low content of organic matter. The slowest permeability is moderate. It has a high available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The land capability classification is 6e. The Virginia soil management group is T. This soil is not hydric.*

**Map unit:** 38B - Meadowville loam, 0 to 5 percent slopes

**Description category:** SOI

*Meadowville is a nearly level to moderately sloping, very deep, well drained soil. Typically the surface layer is loam about 12 inches thick. The surface layer has a moderate content of organic matter. The slowest permeability is moderate. It has a high available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The top of the seasonal high water table is at 48 inches. The land capability classification is 2e. The Virginia soil management group is G. This soil is not hydric.*

# Map Unit Description (Brief)

Prince William County, Virginia

**Map unit:** 41B - Neabsco loam, 0 to 7 percent slopes

**Description category:** SOI

*Neabsco is a nearly level to moderately sloping, very deep, moderately well drained soil. Typically the surface layer is loam about 8 inches thick. The surface layer has a moderate content of organic matter. The slowest permeability is very slow. It has a low available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The top of the seasonal high water table is at 21 inches. The land capability classification is 2e. The Virginia soil management group is BB. This soil is not hydric.*

**Map unit:** 44D - Occoquan sandy loam, 7 to 25 percent slopes

**Description category:** SOI

*Occoquan is a strongly sloping to steep, deep, well drained soil. Typically the surface layer is sandy loam about 9 inches thick. The surface layer has a moderately low content of organic matter. The slowest permeability is moderate. It has a low available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The land capability classification is 6e. The Virginia soil management group is DD. This soil is not hydric.*

**Map unit:** 44E - Occoquan sandy loam, 25 to 50 percent slopes

**Description category:** SOI

*Occoquan is a steep to very steep, deep, well drained soil. Typically the surface layer is sandy loam about 9 inches thick. The surface layer has a moderately low content of organic matter. The slowest permeability is moderate. It has a low available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The land capability classification is 7e. The Virginia soil management group is DD. This soil is not hydric.*

**Map unit:** 45C - Orenda loam, 7 to 15 percent slopes

**Description category:** SOI

*Orenda is a strongly sloping to moderately steep, deep or very deep, well drained soil. Typically the surface layer is loam about 8 inches thick. The surface layer has a moderately low content of organic matter. The slowest permeability is moderately slow. It has a moderate available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The land capability classification is 3e. The Virginia soil management group is KK. This soil is not hydric.*

**Map unit:** 47B - Quantico sandy loam, 2 to 7 percent slopes

**Description category:** SOI

*Quantico is a gently sloping to moderately sloping, very deep, well drained soil. Typically the surface layer is sandy loam about 13 inches thick. The surface layer has a moderate content of organic matter. The slowest permeability is moderate. It has a moderate available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The land capability classification is 2e. The Virginia soil management group is R. This soil is not hydric.*

## Map Unit Description (Brief)

Prince William County, Virginia

**Map unit:** 47C - Quantico sandy loam, 7 to 15 percent slopes

**Description category:** SOI

*Quantico is a strongly sloping to moderately steep, very deep, well drained soil. Typically the surface layer is sandy loam about 13 inches thick. The surface layer has a moderate content of organic matter. The slowest permeability is moderate. It has a moderate available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The land capability classification is 3e. The Virginia soil management group is R. This soil is not hydric.*

**Map unit:** 47D - Quantico sandy loam, 15 to 25 percent slopes

**Description category:** SOI

*Quantico is a moderately steep to steep, very deep, well drained soil. Typically the surface layer is sandy loam about 13 inches thick. The surface layer has a moderate content of organic matter. The slowest permeability is moderate. It has a moderate available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The land capability classification is 4e. The Virginia soil management group is R. This soil is not hydric.*

**Map unit:** 50D - Spriggs silt loam, 15 to 25 percent slopes

**Description category:** SOI

*Spriggs is a moderately steep to steep, moderately deep, well drained soil. Typically the surface layer is silt loam about 8 inches thick. The surface layer has a moderately low content of organic matter. The slowest permeability is moderate. It has a low available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The land capability classification is 6e. The Virginia soil management group is JJ. This soil is not hydric.*

**Map unit:** 50E - Spriggs silt loam, 25 to 50 percent slopes

**Description category:** SOI

*Spriggs is a steep to very steep, moderately deep, well drained soil. Typically the surface layer is silt loam about 8 inches thick. The surface layer has a moderately low content of organic matter. The slowest permeability is moderate. It has a low available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The land capability classification is 7e. The Virginia soil management group is JJ. This soil is not hydric.*

**Map unit:** 54B - Urban land-Udorthents complex, 0 to 7 percent slopes

**Description category:** SOI

*Urban Land consists of areas where most of the surface is covered by asphalt, concrete, or other impervious surfaces.*

*Udorthents are areas where the soils have been altered during excavation or covered by earthy fill material.*

## Selected Soil Interpretations

Prince William County, Virginia

[The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The table shows only the top five limitations for any given soil. The soil may have additional limitations. This report shows only the major soils in each map unit]

\*This soil interpretation was designed as a "limitation" as opposed to a "potential" or "suitability". The numbers in the value column range from 0.01 to 1.00. The larger the value, the greater the potential limitation.

Map symbol and soil name	Pct. of map unit	ENG - Local Roads and Streets*		FOR - Potential Erosion Hazard (Off-Road/Off-Trail)*	
		Rating class and limiting features	Value	Rating class and limiting features	Value
<b>6A:</b>					
Baile	75	Very limited		Slight	
		Depth to saturated zone	1.00		
		Frost action	1.00		
		Low strength	1.00		
		Shrink-swell	0.50		
<b>10B:</b>					
Buckhall	80	Very limited		Slight	
		Low strength	1.00		
		Shrink-swell	0.50		
		Frost action	0.50		
<b>10C:</b>					
Buckhall	80	Very limited		Slight	
		Low strength	1.00		
		Shrink-swell	0.50		
		Frost action	0.50		
		Slope	0.37		
<b>16A:</b>					
Delanco	80	Very limited		Slight	
		Frost action	1.00		
		Low strength	1.00		
		Shrink-swell	0.50		
		Depth to saturated zone	0.48		
		Flooding	0.40		
<b>18C:</b>					
Dumfries	75	Somewhat limited		Slight	
		Frost action	0.50		
		Slope	0.37		
<b>18D:</b>					
Dumfries	75	Very limited		Moderate	
		Slope	1.00	Slope/erodibility	0.50
		Frost action	0.50		

# Selected Soil Interpretations

Prince William County, Virginia

Map symbol and soil name	Pct. of map unit	ENG - Local Roads and Streets*		FOR - Potential Erosion Hazard (Off-Road/Off-Trail)*	
		Rating class and limiting features	Value	Rating class and limiting features	Value
<b>18E:</b>					
Dumfries	75	Very limited		Severe	
		Slope	1.00	Slope/erodibility	0.75
		Frost action	0.50		
<b>21B:</b>					
Fairfax	80	Very limited		Slight	
		Low strength	1.00		
		Shrink-swell	0.50		
		Frost action	0.50		
<b>21C:</b>					
Fairfax	80	Very limited		Slight	
		Low strength	1.00		
		Shrink-swell	0.50		
		Frost action	0.50		
		Slope	0.37		
<b>24B:</b>					
Glenelg	45	Somewhat limited		Slight	
		Frost action	0.50		
Buckhall	35	Very limited		Slight	
		Low strength	1.00		
		Shrink-swell	0.50		
		Frost action	0.50		
<b>24C:</b>					
Glenelg	45	Somewhat limited		Slight	
		Frost action	0.50		
		Slope	0.37		
Buckhall	35	Very limited		Slight	
		Low strength	1.00		
		Shrink-swell	0.50		
		Frost action	0.50		
		Slope	0.37		
<b>25A:</b>					
Glenville	80	Very limited		Slight	
		Frost action	1.00		
		Low strength	1.00		
		Depth to saturated zone	0.48		

## Selected Soil Interpretations

Prince William County, Virginia

Map symbol and soil name	Pct. of map unit	ENG - Local Roads and Streets*		FOR - Potential Erosion Hazard (Off-Road/Off-Trail)*	
		Rating class and limiting features	Value	Rating class and limiting features	Value
<b>27A:</b>					
Hatboro	45	Very limited		Slight	
		Depth to saturated zone	1.00		
		Frost action	1.00		
		Flooding	1.00		
Codorus	35	Very limited		Slight	
		Frost action	1.00		
		Flooding	1.00		
		Low strength	1.00		
		Depth to saturated zone	0.75		
<b>34C:</b>					
Lunt	80	Very limited		Slight	
		Shrink-swell	1.00		
		Low strength	1.00		
		Frost action	0.50		
		Slope	0.37		
<b>36D:</b>					
Marr	80	Very limited		Moderate	
		Slope	1.00	Slope/erodibility	0.50
		Frost action	0.50		
<b>38B:</b>					
Meadowville	80	Somewhat limited		Slight	
		Shrink-swell	0.50		
		Frost action	0.50		
<b>41B:</b>					
Neabsco	80	Very limited		Slight	
		Frost action	1.00		
		Depth to saturated zone	0.48		
<b>44D:</b>					
Occoquan	80	Very limited		Moderate	
		Slope	1.00	Slope/erodibility	0.50
		Frost action	0.50		
<b>44E:</b>					
Occoquan	80	Very limited		Severe	
		Slope	1.00	Slope/erodibility	0.75
		Frost action	0.50		

# Selected Soil Interpretations

Prince William County, Virginia

Map symbol and soil name	Pct. of map unit	ENG - Local Roads and Streets*		FOR - Potential Erosion Hazard (Off-Road/Off-Trail)*	
		Rating class and limiting features	Value	Rating class and limiting features	Value
<b>45C:</b>					
Orenda	75	Very limited		Slight	
		Low strength	1.00		
		Shrink-swell	0.50		
		Frost action	0.50		
		Slope	0.37		
<b>47B:</b>					
Quantico	75	Very limited		Slight	
		Frost action	1.00		
		Low strength	1.00		
		Shrink-swell	0.50		
<b>47C:</b>					
Quantico	75	Very limited		Slight	
		Frost action	1.00		
		Low strength	1.00		
		Shrink-swell	0.50		
		Slope	0.37		
<b>47D:</b>					
Quantico	75	Very limited		Moderate	
		Slope	1.00	Slope/erodibility	0.50
		Frost action	1.00		
		Low strength	1.00		
		Shrink-swell	0.50		
<b>50D:</b>					
Spriggs	80	Very limited		Moderate	
		Slope	1.00	Slope/erodibility	0.50
		Frost action	0.50		
<b>50E:</b>					
Spriggs	80	Very limited		Severe	
		Slope	1.00	Slope/erodibility	0.75
		Frost action	0.50		
<b>54B:</b>					
Urban land	50	Not rated		Not rated	
Udorthents	40	Not rated		Not rated	



**APPENDIX C**  
**Wetland Delineation Report**



Wetland Survey: Parking Lot D Vernal Pool  
Prince William Forest Park  
10/21/2008

### Purpose

The purpose of this report is to review the alignment of a proposed parking lot adjacent to a potential jurisdictional wetland area, define any wetland boundaries, and make recommendations to avoid and minimize the impacts of the parking lot on wetland resources,

### Site

The site in question is Parking Area D, along the Scenic Drive, in Prince William Forest Park. The park is proposing to repave the lot and add an expansion of the lot to include 20 more parking spaces. Parking Area D is located adjacent to the Scenic Drive to the northwest, directly across from the junction with North Orenda Road, at the beginning of a one-way designation. Lying directly northwest, just inside of the forest edge from Lot D is a vernal pool approximately 10 meters wide and 50 meters long. The vernal pool lies within what seems to be the historic road trace for the Scenic Drive. Evidence of the pool origin comes from field observations which note that the road trace passes a cemetery and continues to traverse parallel with the parking area and eventually merges with the current Scenic Drive footprint.

### Delineation

Tools: Shovel, Camera, Routine Wetland Determination Data For (1987 COE Wetlands Delineation Manual), Munsell Soil Color Charts, and Vascular Plants of Virginia plant identification book.



## Soils

Prior to the field visit, research was conducted on the soil types found in the area. A digital soil survey data set provided by the U.S. Department of Agriculture, Natural Resources Conservation Survey, with a temporal reference of 08/01/00 to 10/06/04. The data stated that the site in question contains soils consistent with the Neabsco Series, particularly Neabsco Loam. These soils are typically finely loamy, semiactive, mesic soils found in mixed pine and oak woodlands.

Two soil pits were dug, one within the area delineated in the map as a possible wetland, and the other in an area located as a typical vernal pool. Both pits were approximately 20 inches deep. Analysis was conducted on soils from both pits at 0-9 inches and 9-18 inches. The analysis concluded that the soils were consistent with a Neabsco Loam, however, the soil color was inconsistent with wetland soils. Actual values from the soil color charts can be seen on data forms 1 & 2.

## Hydrology

Hydrologic activity is obviously evident on site due to the water-stained leaves and prior reports of standing water in the area. Although no recorded data is available for historic evidence, prior park biologists have observed standing water and faunal activities of a typical vernal pool at this site. During the soil analysis, oxidized root channels were observed in the upper 12 inches of the soil profile, indicating potential wetland hydrology.

## Vegetation

A vegetative survey was conducted within the two areas identified on the map as Possible Wetland and Vernal Pool. Within the area labeled potential wetland, species were limited possibly because of the time of year. However, the site contained 100% Facultative and Facultative Wet overstory species including *Acer rubra*, *Betula nigra*, and *Carpinus caroliniana*, while the understory contained *Smilax rotundifolia* and a *Carex sp.*, the later of which could not be identified to species, however is likely a Facultative Wet or possibly Obligate species.

In the area marked as 'vernal pool' on the map, the species range was much broader. The overstory species included *Carpinus caroliniana*, *Acer rubra*, *Quercus falcata*, *Betula nigra*, *Fagus grandifolia*, *Ilex opaca*, and *Carya glabra*. Sixty-five percent of the canopy in this area is either Facultative or Facultative Wet. The understory includes *Smilax rotundifolia*, *Lonicera japonica*, *Polystichum acrostichoides*, *Vitis vulpina*, and *parthenocissus quinquefolia*; some of which are Facultative yet just as common in non-wetlands.

Again, the complete data set can be seen on data forms 1 & 2.

## Conclusions:

In accordance with National Park Service Director's Order 77-1: Wetland Protection, the location and classification of wetlands is based on the following references:

- Jurisdictional wetland determination in accordance with the guidelines of the Army Corps of Engineers' (ACOE) *Wetlands Delineation Manual* (1987).

- *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979).

For the purposes of compliance with Executive Order 11990, the National Park Service uses *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979) as the standard for defining, classifying, and inventorying wetlands. Using this standard, a wetland is defined as the predominance of hydrophytic vegetation, predominantly undrained hydric soil, and/or non-soil substrate which is saturated with water or covered by shallow water at some time during the growing season of each year.

The 1987 Corps of Engineers Manual on wetland delineation uses a three-parameter approach methodology. Jurisdictional wetlands regulated by the ACOE under Section 404 of the Clean Water Act must exhibit all three parameters of hydrology, hydrophytic vegetation, and hydric soils to be considered a wetland. This methodology does not consider unvegetated aquatic sites such as mudflats or vegetated shallow water to be wetland areas, whereas the Cowardin classification does. Per NPS DO-77-1 the National Park Service follows Cowardin in requiring that only one parameter need be present not all.

Both map delineated sites, vernal pool and possible wetland, are determined to be positive for the presence of hydrophytic vegetation and wetland hydrology. Following National Park Service procedures, both sites are considered wetlands.

Recommendations include limiting the amount of surface flow from the parking lot to the northwestern edge of Lot D. This could be accomplished by constructing a curb around the parking lot and designing it to drain towards the southwest and east away from the wetlands.

Data Form 1

**DATA FORM**  
**ROUTINE WETLAND DETERMINATION**  
 (1987 COE Wetlands Delineation Manual)

\* Outer \*

Project/Site: <u>Parkway Lot D Expansion Project - Proposed</u>	Date: <u>10/20/08</u>
Applicant/Owner: <u>DOT - NPS - PRWI</u>	County: <u>Prince William</u>
Investigator: <u>P. Petersen - Biologist - NPS</u>	State: <u>VA</u>
Do Normal Circumstances exist on the site? <input checked="" type="radio"/> Yes <input type="radio"/> No	Community ID: _____
Is the site significantly disturbed (Atypical Situation)? <input type="radio"/> Yes <input type="radio"/> No	Transect ID: _____
Is the area a potential Problem Area? <input type="radio"/> Yes <input type="radio"/> No (If needed, explain on reverse.)	Plot ID: _____

**VEGETATION**

*Overstorey*

*Understorey*

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <i>Carpinus Caroliniana</i>	I	20% FAC	9. <i>Smilax rotundifolia</i>	60%	FAC
2. <i>Acer rubra</i>	CD	25% FAC	10. <i>Lenicera japonica</i>	5%	FACU-
3. <i>Quercus falcata</i>	D	10% FACU-	11. <i>Polystrichum acrostichoides</i>	25%	FACU-
4. <i>Betula nigra</i>	CD	20% FACU	12. <i>Vitis vulpina</i>	5%	FAC
5. <i>Fagus grandifolia</i>	I	5% FACU	13. <i>Perthensisissus quinquefolia</i>	5%	FACU
6. <i>Ilex opaca</i>	I	5% FACU+	14. _____		
7. <i>Carya glabra</i>	CD	15% FACU-	15. _____		
8. _____			16. _____		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 65%

Remarks:

**HYDROLOGY**

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input checked="" type="checkbox"/> No Recorded Data Available	<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators:</b> <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands <b>Secondary Indicators (2 or more required):</b> <input checked="" type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input checked="" type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
<b>Field Observations:</b> Depth of Surface Water: _____ (in.) Depth to Free Water in Pit: _____ (in.) Depth to Saturated Soil: _____ (in.)	Remarks:

**SOILS**

Map Unit Name (Series and Phase): <u>Neabsco</u>		Drainage Class: _____	
Taxonomy (Subgroup): _____		Field Observations Confirm Mapped Type? <input checked="" type="radio"/> Yes <input type="radio"/> No	
<b>Profile Description:</b>			
Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)
0-9		5/3 10gr	
9-18		6/6 10gr	
Mottle Abundance/ Size/Contrast			
Texture, Concretions, Structure, etc.			
Hydric Soil Indicators:			
___ Histosol ___ Histic Epipedon ___ Sulfidic Odor ___ Aquic Moisture Regime ___ Reducing Conditions ___ Gleyed or Low-Chroma Colors		___ Concretions ___ High Organic Content in Surface Layer in Sandy Soils ___ Organic Streaking in Sandy Soils ___ Listed on Local Hydric Soils List ___ Listed on National Hydric Soils List ___ Other (Explain in Remarks)	
Remarks:			

**WETLAND DETERMINATION**

Hydrophytic Vegetation Present? <input checked="" type="radio"/> Yes <input type="radio"/> No (Circle) Wetland Hydrology Present? <input checked="" type="radio"/> Yes <input type="radio"/> No Hydric Soils Present? <input type="radio"/> Yes <input checked="" type="radio"/> No	(Circle) Is this Sampling Point Within a Wetland? <input type="radio"/> Yes <input type="radio"/> No
Remarks:	

Approved by HQUSACE 3/92

**DATA FORM**  
**ROUTINE WETLAND DETERMINATION**  
 (1987 COE Wetlands Delineation Manual)

\*Inner\*

Project/Site: <u>Parkway Lot D Expansion Project-Proposed</u>	Date: <u>10/26/08</u>
Applicant/Owner: <u>DOE-NPS-PRWT</u>	County: <u>Prince William</u>
Investigator: <u>P. Peterson - Biologist - NPS</u>	State: <u>VA</u>
Do Normal Circumstances exist on the site? <input checked="" type="radio"/> Yes <input type="radio"/> No	Community ID: _____
Is the site significantly disturbed (Atypical Situation)? <input type="radio"/> Yes <input type="radio"/> No	Transect ID: _____
Is the area a potential Problem Area? <input type="radio"/> Yes <input type="radio"/> No	Plot ID: _____
(If needed, explain on reverse.)	

**VEGETATION**

Overstem			Understem		
Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Acer Rubra</u>	<u>D</u>	<u>50% FAC</u>	9. <u>Smilax latifolia</u>	<u>35%</u>	<u>FAC</u>
2. <u>Betula nigra</u>	<u>CD</u>	<u>35% FACW</u>	10. <u>Carex sp.</u>	<u>65%</u>	<u>UNK</u>
3. <u>Carpinus caroliniana</u>	<u>CD</u>	<u>35% FAC</u>	11. _____	_____	_____
4. _____	_____	_____	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____
Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC): <u>75% 100%</u>					
Remarks: _____					

**HYDROLOGY**

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input checked="" type="checkbox"/> No Recorded Data Available	<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators:</b> <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands <b>Secondary Indicators (2 or more required):</b> <input checked="" type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input checked="" type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
<b>Field Observations:</b> Depth of Surface Water: _____ (in.) Depth to Free Water in Pit: _____ (in.) Depth to Saturated Soil: _____ (in.)	Remarks: <u>Site has staining and is a lowland (dip) which acts as a vernal pool after rain events</u>



LOCATION NEABSCO

VA

Established Series

Rev. DLK-JHE-DDR

03/1999

## NEABSCO SERIES

Soils of the Neabsco series are very deep and moderately well drained with very slow permeability. They formed in stratified marine and fluvial sediments of the Coastal Plain. Slopes range from 0 to 15 percent. Mean annual precipitation is about 40 inches and mean annual temperature is about 54 degrees F.

**TAXONOMIC CLASS:** Fine-loamy, siliceous, semi active, mesic Typic Fragiudults

**TYPICAL PEDON:** Neabsco loam on a 2 percent slope in a mixed pine and oak woodland. (Colors are for moist soil)

**Oi**--1 to 0 inches; partially decomposed oak leaves, pine needles and twigs.

**A**--0 to 2 inches; dark brown (10YR 4/3) loam; moderate fine and very fine granular structure; very friable; many fine, medium and coarse roots; 3 percent rounded quartz gravel; very strongly acid; clear smooth boundary. (0 to 3 inches thick)

**E**--2 to 8 inches; light yellowish brown (10YR 6/4) loam; moderate fine and very fine granular structure; very friable; many fine, medium and coarse roots; 2 percent rounded quartz gravel; very strongly acid; clear smooth boundary. (0 to 12 inches thick)

**Bt**--8 to 17 inches; yellowish brown (10YR 5/8) clay loam; moderate fine sub-angular blocky structure; friable, slightly sticky; common fine, medium and coarse roots; 2 percent rounded quartz gravel; few faint films of clay on faces of peds and clay bridging between sand grains; very strongly acid; clear smooth boundary. (6 to 18 inches thick)

**Bx**--17 to 36 inches; yellowish brown (10YR 5/8) loam; many fine, medium and coarse pale brown (10YR 6/3) and many fine distinct light gray (10YR 7/2) mottles; strong, medium and coarse platy structure, coarse polygonal structure 12 to 18 inches in diameter with gray (10YR 6/1) clay in 1/4 inch cracks; very firm and brittle; 10 percent rounded quartz gravel; common fine and medium vesicular pores; very strongly acid; gradual smooth boundary. (8 to 36 inches thick)

**2Bt**--36 to 52 inches; brownish yellow (10YR 6/8) clay loam; common, fine and medium distinct pale brown (10YR 6/3) and yellowish red.

(5YR 5/6) mottles; weak medium and coarse sub-angular blocky structure; friable, slightly plastic, slightly stick; common faint and distinct dark brown (10YR 3/3) films of

clay on vertical faces of peds; 5 percent rounded quartz gravel; strongly acid; abrupt smooth boundary. (0 to 24 inches thick)

**3C**--5 to 72 inches; mottled in shades of brown, gray and yellow; very gravelly sandy loam; massive; very friable; 45 percent rounded quartz gravel; strongly acid.

**TYPE LOCATION:** Prince William County, Virginia; in Prince William Forest Park, about 100 feet southwest of Park Central Road and about 20 feet south of Trail No. 11.

**RANGE IN CHARACTERISTICS:** Solum thickness ranges from 40 to 60 inches deep. Depth to fragipan ranges from 14 to 30 inches. Depth to bedrock is more than 60 inches. Rock fragments of rounded quartz gravel range from 0 to 10 percent in the A and upper B horizons and from 1 to 35 percent in the fragipan and lower B horizon. The C horizon ranges from 1 to more than 50 percent quartz gravel. The substratum is commonly stratified Coastal Plain sediments but ranges to loamy residuum from the Piedmont schist and gneiss. Reaction is very strongly acid or strongly acid.

The A horizon has hue of 10YR or 2.5Y, value of 3 through 7, and chroma of 2 through 4. The A and E is sandy loam, loam or silt loam.

The E Horizon has hue of 10YR or 2.5YR, value of 5 or 6 and chroma of 3 or 4. It is sandy loam, loam or silt loam.

The Bt horizon has hue of 7.5YR, 10YR or 2.5Y, value of 5 or 6, and chroma of 4 through 8. It is loam, sandy clay loam or clay loam.

The Bx horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 through 6, and chroma of 3 through 6. The Bx is commonly variegated and includes low chroma mottles. It is sandy loam, loam or sandy clay loam.

The C horizon is commonly mottled in shades of brown, yellow, red and gray. They range from gravelly sand through clay in individual strata.

**COMPETING SERIES:** The [Tarklin](#) series is the only soil in the same family. The Tarklin soils form in colluvium or alluvium from limestone and have fragments of chert throughout the soil.

**GEOGRAPHIC SETTING:** Neabsco soils are on broad drainage divides of the older Northern Coastal Plain terraces. Elevations generally range from 150 to 300 feet. Slope gradients range from 0 to 15 percent but most areas are from 0 to 7 percent. The soil developed in stratified fluvio-marine sediments. On areas where the sediments are thin,

these soils are underlain by residuum from Piedmont schist and gneiss. Mean annual precipitation range from 36 to 44 inches and mean annual temperature ranges from 52 degrees to 59 degrees F.

**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the [Buckhall](#), [Chester](#), [Fairfax](#), [Lunt](#) and [Quantico](#) soils. All these associated soils do not have a fragipan. In addition the Buckhall and Chester soils are developed in residuum from gneiss and schist. The Fairfax soil is developed partly in Coastal [Plain](#) sediments and partly in [Piedmont](#) residuum. The Quantico and Lunt soils have higher clay content in their sub-soils.

**DRAINAGE AND PERMEABILITY:** Moderately well drained. Runoff is slow on nearly level areas to moderate on the sloping areas. Permeability is slow or very slow. Perched water table is commonly above the fragipan in winter and spring months.

**USE AND VEGETATION:** Largest acreage is in hardwood and pine forest. Many areas are in residential and commercial developments. Smaller acreage is used for the general crops, corn, soybeans, small grains, pasture and hay. Native vegetation includes northern red oak, yellow-poplar, red maple, sweet gum and Virginia pine.

**DISTRIBUTION AND EXTENT:** Northern Virginia and Maryland. Moderate extent 6,500 acres in Prince William County.

**MLRA OFFICE RESPONSIBLE:** Morgantown, West Virginia

**SERIES PROPOSED:** Prince William County, Virginia; 1981. The name is from Neabsco Magisterial District in Prince William County.

**REMARKS:** This soil has previously been included in the Beltsville and Bourne soils. Both of these soils have mixed mineralogy. Also the Bourne is classified as thermic and the Beltsville is high in silt content.

Diagnostic Horizon:

- a. Argillic between 8 and 17 inches.
- b. Fragipan between 17 and 36 inches.



As the nation's principal conservation agency, the Department of the interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protection our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. Administration.