



INSTALLATION OF FIRE SUPPRESSION SPRINKLER SYSTEMS AT THE ROCK CREEK PARK NATURE CENTER, PUBLIC HORSE CENTER AND MAINTENANCE YARD



Environmental Assessment (EA) / Assessment of Effect (AoE)

June 2011

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Note to Reviewers and Respondents

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CHAPTER 1: PURPOSE AND NEED

INTRODUCTION

The National Park Service (NPS) proposes to install fire suppression sprinkler systems at three facilities within Rock Creek Park (the “park”):

- **Rock Creek Park Nature Center** – Built during the National Park Service’s 50th anniversary, this mid-1960s masonry and timber structure is the main visitor center for Rock Creek Park and, as such, the main gathering spot for park visitors. From this location, rangers offer interpretive programs about the park’s natural and cultural environments. The Nature Center contains a large exhibit hall with an extensive natural history collection, a bookstore, a 103-seat auditorium and a planetarium. It also houses offices for the park’s rangers and an education specialist.
- **Public Horse Center** – Operated by a park concessioner, the Public Horse Center offers boarding services, riding lessons, trail rides, pony rides and other programs to the public. The Center is constructed largely of timber and has a large corral and covered riding ring. The Center also provides administrative offices for the facility’s staff.
- **Maintenance Yard** – This facility, built in the 1960s, houses the majority of the staff and equipment used to maintain the park. It consists of a U-shaped brick building with staff offices, a lunchroom, locker rooms, restrooms, a conference room, storage areas, a carpentry shop and an auto repair area. A second, L-shaped building contains several equipment storage bays. Both buildings surround a square asphalt lot containing a diesel and gasoline fuel-dispensing bay. Several other structures, including storage areas for equipment, sand and salt, are located to the southeast of these buildings. Natural Resource Management staff and equipment also are located at the Maintenance Yard.

Rock Creek Park is located in Washington, D.C. The project area is within U.S. Reservation 339, near the intersection of Military Road and Glover Road, NW. This environmental assessment (EA) evaluates two project alternatives: A no-action alternative (Alternative A) and the preferred alternative (Alternative B). Alternative A would not change the current layout, condition, or management of the park or these facilities. Alternative B proposes adding sprinkler systems at all three facilities and installing a diesel water pump at each facility to boost water pressure as required. To provide water to these systems, Alternative B proposes constructing a new water main from Military Road to the Maintenance Yard. The proposed water main is marked on the Project Location map (see Figure 1).

NPS staff prepared this EA under the following laws and regulations:

- The National Environmental Policy Act of 1969 (NEPA).
- 40 CFR Parts 1500-1508.
- NPS Director’s Order #12 and the handbook, “Conservation Planning, Environmental Impact Analysis, and Decision-making (DO-12).”
- Section 106 of the National Historic Preservation Act of 1966 (NHPA).

NPS staff conducted Section 106 compliance in conjunction with the NEPA process.

PURPOSE OF AND NEED FOR ACTION

The purpose of the project is to improve fire protection at three facilities within Rock Creek Park: the Nature Center, Public Horse Center, and Maintenance Yard. These facilities currently have fire alarms, fire extinguishers, and/or lighted exits.

However, NPS policy (Reference Manual 58, “Structural Fire Management”) stresses the importance of installing automatic sprinkler protection in NPS buildings, and requires it in buildings undergoing construction or renovation. The project is needed because each facility lacks an automatic sprinkler system.

PROJECT BACKGROUND

The park’s enabling legislation, enacted in 1890, continues to guide park planning and management. It states that Rock Creek Park is to be “perpetually dedicated and set apart as a public park or pleasure ground for the benefit and enjoyment of the people of the United States.” It specifies that the park is to “provide for the preservation from injury or spoliation of all timber, animals, or curiosities within said park, and their retention in their natural condition, as nearly as possible.” In order to facilitate public use of Rock Creek Park, the enabling legislation directed the Commissioners of the District of Columbia and the Chief of Foundation for Planning and the Chief of Engineers of the United States Army “to lay out and prepare roadways and bridle paths, to be used for driving and for horseback riding, respectively, and footways for pedestrians.”

The park promotes safety and accessibility at all of its facilities. The three facilities under consideration for this project – the Nature Center, Public Horse Center, and Maintenance Yard – are located within U.S. Reservation 339, near the intersection of Glover Road and Military Road, NW (see Figure 1). The Nature Center is the main visitor center for the park (see Figure 2). The Public Horse Center, operated under contract, provides horse boarding and offers equestrian programs and services to the public (see Figure 3). The Maintenance Yard houses the park’s Maintenance division and Natural Resource Management staff (see Figure 4). Despite being constructed during the second half of the twentieth century, these facilities do not have sprinkler systems.



Figure 1 - Project Location



Figure 2 - Nature Center (outside and inside)



Figure 3 - Public Horse Center (outside and inside)

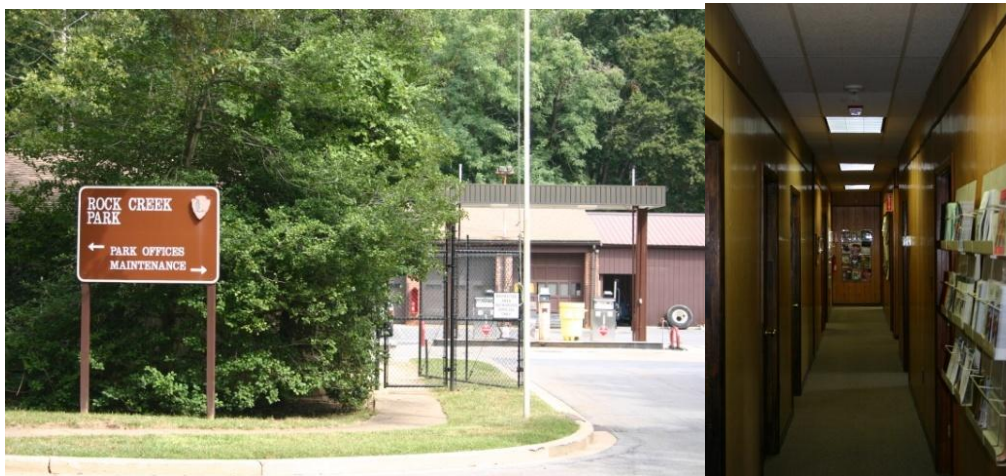


Figure 4 - Maintenance Yard (exterior and interior)

SCOPING PROCESS

NEPA and NHPA require an “early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action.” To determine the scope and significant issues for this project, Rock Creek Park staff researched applicable laws and policies, conducted site visits, and met with NPS natural and cultural resource specialists. Given the scale of this project, the park focused on internal sources of information for scoping purposes. The park is required to conduct external scoping, but only with federal, state, and local agencies and any affected Indian tribe (DO-12). External scoping is described below in the “Consultation and Coordination” chapter.

Beginning in March 2006, NPS staff held internal meetings to review the specifications of fire suppression sprinkler systems capable of protecting the facilities and their occupants. The staff also examined possible issues related to the proposed project, including: (1) impacts to environmental resources; (2) connected, similar, and cumulative actions; and (3) legal compliance requirements.

First, staff evaluated the facilities using NPS fire protection policies and standards as a guide. NPS Reference Manual 58, “Structural Fire Management,” stresses the importance of installing automatic sprinkler protection in NPS buildings. Under the accompanying Director’s Order 58, NPS must enforce the most current version of the National Fire Protection Association’s (NFPA) Fire Prevention Code (NFPA 1), Life Safety Code (NFPA 101), and all other associated structural fire codes and standards, including Standard 13 (Installation of Sprinkler Systems). Compliance with these standards greatly improves the protection of life and property should a fire occur.

Next, park staff evaluated the available water supply. Currently, the facilities’ water is provided by a 12-inch water main installed in the 1950s. However, this water main cannot handle the pressure and water flow required by modern fire suppression systems. A previous attempt by the local utility, DC Water, to upgrade the water main was unsuccessful. Therefore, the proposed fire suppression sprinkler systems would require that new, larger water main be installed. The proposed water main would start at Military Road and extend to the Maintenance Yard, roughly parallel to the existing water main along Glover Road.

Finally, park staff examined how to minimize project impacts. (This topic is discussed in further detail below). For example, the park sought to limit ground disturbance caused by installing the new water main. From previous projects, the park knew that by using a jack-and-bore method instead of open trenching, contractors could dig an underground passageway for the water main, which could be accessed via six or seven open boring pits. To further minimize disturbance, the new water main could be installed near the current water main, with much of the alignment passing through previously disturbed soils.

IMPACT TOPICS

NPS defines impact topics as “specific natural, cultural, or socioeconomic resources that would be affected by the proposed action or alternatives (including no action).” For the proposed project, impact topics were identified based on the following:

1. Issues raised during scoping.
2. Site conditions.
3. Federal laws, regulations, Executive Orders, NPS Management Policies 2006 (NPS 2006), and Director’s Orders.
4. NPS staff knowledge of the park’s resources.
5. The completion of an Environmental Screening Form (ESF).

NPS staff dismissed any impact topics from further consideration that were determined not to apply or were negligible. All other impact topics were analyzed in the context of the proposed project (e.g., severity, duration, and timing; direct and indirect effects; and cumulative effects).

IMPACT TOPICS ANALYZED

Impact topics are introduced here and discussed further in the “Affected Environment” and “Impacts to Resources” sections of this document.

Cultural Resources

The National Historic Preservation Act (NHPA; 16 USC 470 et seq.), NEPA, the NPS Organic Act, NPS 2006, DO-12, and NPS-28 (“Cultural Resources Management Guidelines”) require NPS to consider any cultural resources that might be affected by this project. The NHPA specifically requires consideration of impacts on cultural resources either listed in, or eligible to be listed in, the National Register of Historic Places (NRHP). Cultural resources include archeological resources, cultural landscapes, historic structures and districts, ethnographic resources, and museum objects, collections, and archives.

Historic Structures and Districts: In order for a structure or building to be listed in or be eligible for listing in the NRHP, it must possess historic significance and the integrity to convey that significance with respect to location, setting, design, feeling, association, workmanship, and/or materials. The Rock Creek Park Historic District National Register nomination dated 1990 identifies the Public Horse Center, Maintenance Yard, and Nature Center as non-contributing resources to the historic district. Further, none of these buildings is individually listed in the NRHP. However, each of these buildings potentially could be eligible for listing as part of a proposed expansion/update of the Rock Creek Park Historic District. The Nature Center and Maintenance Yard were constructed as part of the 1960s-era “Mission 66” park facilities improvement program, conducted nationwide between 1956 and 1966. The Public Horse Center supports an early planning mission of Rock Creek Park, as bridle trails have played an integral role in park operations since 1890 and are noted in the park’s enabling legislation.

Archeological Resources: Archeological resources are the material remains of past human activity. A four-year investigation conducted within Rock Creek Park has identified over 50 archeological sites within the Park (Berger 2008). As some of these sites are within the vicinity of the proposed project, it is possible that archeological resources would be disturbed. Archeological testing was conducted during the Summer of 2010 to determine whether this would occur.

Vegetation

Vegetation would be directly affected by the proposed project. For example, certain trees would need to be removed due to root damage caused by the digging of bore pits for underground drilling.

Visitor Use and Experience

The Nature Center and Public Horse Center host approximately 79,000 visitors per year. The proposed project would affect the visitor experience by impacting access to and enjoyment of these facilities. Also, construction activities would temporarily diminish the aesthetic character of the surrounding area.

Concession Operations

The Public Horse Center is a NPS facility that is managed, operated, and maintained by Guest Services, Inc., under a concessions contract with the NPS. The Public Horse Center is open to the public for boarding, riding classes, trail rides, and therapeutic riding. The proposed project involves the installation of a fire suppression sprinkler system (including a diesel pump) at the Public Horse Center and the connection of a water main to that system. Construction activities could temporarily disrupt Public Horse Center activities.

IMPACT TOPICS DISMISSED FROM FURTHER ANALYSIS

Water Resources (Water Quality, Wetlands, and Floodplains)

Rock Creek is approximately 33 miles long and runs south from its source near Laytonsville, Maryland, to the Potomac River in Washington, D.C. It is surrounded predominately by urban and suburban areas.

Water Quality: Rock Creek's water quality is impaired due to urban development and associated storm water runoff from impervious surfaces. Within the District of Columbia, the major sources of pollution in Rock Creek are discharges from storm sewers and combined sewer outfalls (USGS 2002; USEPA 2003; DCDOH 2004). The proposed project would not adversely affect water quality because it would not increase storm water flows or cause contaminants to leach into the creek or any of its tributaries.

Wetlands: Wetlands include areas inundated or saturated by surface or groundwater for a sufficient length of time during the growing season to develop and support characteristic soils and vegetation. The NPS classifies wetlands based on the Cowardin system, which requires that wetlands possess one or more of the following attributes:

- The habitat at least periodically supports predominately hydrophytic vegetation (wetland vegetation).
- The substrate is predominately undrained, hydric soil.
- The substrate is non-soil and saturated with water, or covered by shallow water at some time during the growing season (Cowardin 1979).

The proposed project area does not exhibit any of these characteristics. Site visits and a review of National Wetland Inventory maps revealed no wetlands in the project area (USFWS 2004; DC Guide 2004).

Floodplains: Executive Order 11988 (Floodplain Management) requires that all federal agencies conduct an examination of impacts to floodplains and the potential risk involved in placing facilities within floodplains when undertaking construction projects (also see NPS 2006, Section 4.6.4, Floodplains; 1993 NPS Floodplain Management Guidelines; DO 77-2; and 1983 General Management Plan). The project area follows a ridgeline lacking streams or stream segments. It does not contain a floodplain (FEMA Flood Insurance Rate Map, November 1985).

Because of the lack of effects on water resources, these impact topics were dismissed from further analysis.

Transportation/Traffic

The project area is located in a moderately high-traffic area for visitors. However, proposed construction activities would have, at most, a negligible impact on the use of nearby roads and parking lots, as the vast majority of the project will take place on or under green space. Further, any lane closures or detours caused by the project would be brief and disseminated to the public well in advance, and they would follow traffic management guidelines in the Manual of Uniform Traffic Control Devices (MUTCD). Therefore, this impact topic was dismissed from further analysis.

Health and Safety

The contractor chosen to perform the proposed project work would abide by all applicable health and safety regulations and guidelines. Further, the safety of the three facilities would be significantly enhanced by the installation of fire suppression sprinkler systems. Because the proposed project would have a negligible adverse impact, if any, on health and safety, this topic was dismissed from further analysis.

Air Quality

The Clean Air Act and NPS 2006 require decision-makers to consider air quality impacts from NPS projects. Currently, the Washington, D.C. metropolitan area does not meet the National Ambient Air Quality Standards set forth by the U.S. Environmental Protection Agency (EPA). City officials have worked with local, state, and federal environmental agencies to curb emissions and prevent additional sources of new emissions. Similarly, the NPS strives to improve air quality.

The proposed project would have a negligible impact on air quality. During construction, emissions from construction vehicles would have an adverse effect on air quality. However, this impact would be temporary and the contractor would comply with all federal and city regulations regarding construction-related air quality. Furthermore, once installed, the water main and fire suppression systems would have no impact on air quality, with one minor exception. As specified in NFPA 110 (“Standard for Emergency and Standby Power Systems”), the fire suppression systems’ diesel pumps would be run for 30 minutes per week, emitting a negligible amount of pollution. Therefore, the impact topic of air quality was dismissed from further analysis.

Cultural Resources

Cultural Landscapes: There is no identified cultural landscape in or around the proposed project area. The NPS defines a cultural landscape as “a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person exhibiting other cultural or aesthetic values” (NPS 2006). A preliminary park-wide cultural landscape inventory was initiated, but never completed, in 1997. From this effort, two cultural landscapes were identified: Peirce Mill (NPS 2003a) and Linnaean Hill (NPS 2003b), neither of which is close to the project area. In 2010, NPS began to develop a Cultural Landscape Report on historic trails in the Park. The proposed project will not affect this resource because no trails will be modified. Therefore, the impact topic of cultural landscapes was dismissed from further analysis.

Museum Objects, Collections and Archives: The NPS defines a museum object as “a material thing possessing functional, aesthetic, cultural, symbolic, and/or scientific value, usually moveable by nature or design. Museum objects include pre-contact Native American and historic objects, artifacts, works of art, archival material, and natural history specimens that are part of a museum collection” (NPS 1998a). Within the proposed work area, the Nature Center exhibits a number of natural history specimens, including a bald eagle. Likewise, one Maintenance Yard work bay is serving temporarily as a storage location for large objects associated with Peirce Mill, a NRHP-listed property in Rock Creek Park. These exhibits and objects would be affected negligibly, if at all, by the proposed project because the fire suppression sprinkler system would be installed on the ceiling, above the exhibits and objects. In the event of water discharge, most (if not all) of the museum collections at the Nature Center would be protected by the glass boxes in which they reside. Therefore, the impact topic of museum collections was dismissed from further analysis.

Ethnographic Resources: The NPS defines ethnographic resources as any “site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence or other significance in the cultural system of a group traditionally associated with it” (DO-28 at 181). No ethnographic resources exist in or around the proposed work area. Therefore, this impact topic was dismissed from further analysis.

Soundscapes

As described in NPS 2006 and D0-47 (“Soundscape Preservation and Noise Management”), preservation of natural soundscapes associated with national park units is an important part of the NPS mission. Natural sounds associated with each park administered by the NPS are contextual, depending on factors such as location, surrounding activities, vegetation, and wildlife. Tolerance for the introduction of human-generated noise increases as one approaches developed areas and moves away from natural areas.

The proposed project would have a negligible, adverse impact on existing soundscapes of Rock Creek Park. In and around the work area, existing noise from vehicular traffic is noticeable, exceeding any short-term noise associated with construction or the fire suppression systems' diesel water pumps. Therefore, the impact topic of soundscapes was dismissed from further analysis.

Indian Trust Resources

Department of the Interior (DOI) Secretarial Order 3175 ("Departmental Responsibilities for Indian Trust Resources") requires that any anticipated impacts to Indian Trust Resources be explicitly addressed in environmental documents. The Federal Indian Trust imposes a fiduciary obligation on the United States to protect tribal lands, assets, resources, and treaty rights, as well as a duty to carry out mandates of federal law with respect to American Indian and Alaskan native tribes.

This impact does not apply to the proposed project. In the project area, there is no known Indian Trust Resource or unfulfilled federal mandate with respect to American Indians. Therefore, this impact topic was dismissed from further analysis.

Topography, Geology, and Soils

The impact of the proposed action on topography, geology and soils is negligible. The proposed project would occur at the boundary of the Piedmont and Coastal Plain physiographic provinces. The topography is relatively flat in the developed areas and sloped along the multipurpose trail, and this would not change under the proposed project. Although the proposed project would require the displacement of soil, any adverse impact would be greatly reduced by the jack-and-bore technique and mitigated by returning excavated soils to preexisting locations and conditions (with the exception of a negligible amount of soil displaced by new infrastructure). Moreover, the proposed water main would be installed next to an existing main, in previously disturbed soils, and this project will not increase the area of impervious surfaces. Therefore, the impact topic of topography, geology, and soils was dismissed from further analysis.

Wildlife and Wildlife Habitat

The NPS protects the abundance and diversity of all naturally occurring plant and animal communities within its jurisdiction (NPS 2006; DO-77). Birds commonly observed in the proposed project area are species associated with human activity, such as house sparrows (*Passer domesticus*), European starlings (*Sturnus vulgaris*), Red-bellied Woodpeckers (*Melanerpes carolinus*), and Downy Woodpeckers (*Picoides pubescens*). As a migratory flyway, the area is also visited by migratory birds twice a year, during the spring and fall. Mammals present include, but are not limited to, the eastern chipmunk (*Tamias striatus*), gray squirrels (*Sciurus carolinensis*), house mice (*Mus musculus*), white footed mouse (*Peromyscus leucopus*), and raccoon (*Procyon lotor*).

The proposed project would have a negligible, short-term adverse impact on wildlife and wildlife habitat. The project would occur near developed areas (e.g., major roads, schools). By applying the jack-and-bore technique, most of the project work would occur underground. Also, the project's footprint would be small, and the surrounding landscape offers potential, alternate habitat for any species relocated by the project. Therefore, the impact topic of wildlife and wildlife habitat was dismissed from further analysis.

Rare, Threatened, Endangered, Candidate Species, and Species of Special Concern

In addition to NPS policy, the Endangered Species Act of 1973 protects rare, threatened, and endangered species (flora and fauna). The United States Fish and Wildlife Service (USFWS) lists one endangered or threatened species – the endangered Hay's Amphipod – that occurs within Rock Creek Park.

Hay's Amphipod is a small, colorless and eyeless crustacean that lives at natural springs. The proposed project would occur far from Hay's Amphipod habitat and would not affect the groundwater flows that create the crustacean's habitat. Therefore, the impact topic of rare, threatened, endangered, candidate species, and species of special concern was dismissed from further analysis.

Socioeconomic Resources and Adjacent Lands

Higher-income areas surround the proposed project location. These areas contain residences, commercial businesses, schools, federal installations, District of Columbia government buildings, and foreign embassies. The proposed project would not affect the operation or enjoyment of these facilities. It would, however, have a short-term, beneficial impact on these facilities by providing temporary employment for construction workers, whose purchases would stimulate the local economy. Any increase, however, would be temporary and negligible, lasting only as long as construction. Therefore, the impact topic of socioeconomic resources and adjacent lands was dismissed from further analysis.

Environmental Justice

Executive Order 12898 (“Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations”) requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing the disproportionately high and/or adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. The goal is “fair treatment”: identifying potentially disproportionately high and adverse effects on populations and alternatives that may mitigate these impacts.

There are both minority and low-income populations in the vicinity of Rock Creek Park. However, the proposed project would not result in any identifiable adverse human health effect. Also, the impacts associated with the proposed project would not disproportionately affect any minority or low-income population or community. Therefore, the impact topic of environmental justice was dismissed from further analysis.

Park Operations and Management

The proposed project would not have a noticeable effect on park operations and management. Although the project entails new infrastructure that would require ongoing maintenance, its incremental burden on the park would be negligible. Annual maintenance costs of the fire suppression systems and water main would likely consume a miniscule portion of the park’s operating budget, which is approximately 10 million dollars. Also, the diesel water pumps, which would be run for 30 minutes each week, turn on and off automatically. Therefore, the impact topic of park operations and management was dismissed from further analysis.

IMPAIRMENT

According to NPS 2006, an action constitutes an impairment when an impact “would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values” (NPS 2006 § 1.4.5). Whether an impact meets this definition depends on the following:

1. The particular resources and values that would be affected.
2. The severity, duration, and timing of the impact.
3. The direct and indirect effects of the impact.
4. The cumulative effects of the impact in question and other impacts.

An impact on any park resource or value may constitute an impairment, but an impact would be more likely to constitute an impairment to the extent that 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 the opportunity for enjoyment of the park;
- or

- Identified as a goal in the park's General Management Plan (GMP) or other relevant NPS planning documents.

Impairment findings relate back to park resources and values. Because the impact topics of visitor use and experience and concession operations are not generally considered to be park resources or values according to the Organic Act, they are omitted from the impairment analysis.

A draft impairment determination for the NPS preferred alternative is provided in Appendix A of this document. Park resources considered in this determination include historic structures, archeological resources and vegetation. A final impairment determination will be provided in the decision document developed on the findings of this EA.

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CHAPTER 2: ALTERNATIVES

NEPA requires federal agencies to explore reasonable alternatives aimed at addressing the purpose and need of the proposed project. The alternatives under consideration must include the “no-action” alternative (40 CFR § 1502.14). Project alternatives may originate from the proponent agency, local government officials, or members of the public. Alternatives may also originate from coordinating or cooperating agencies.

In accordance with NEPA, the alternatives analyzed in this EA are the result of internal scoping. These alternatives satisfy the management objectives of the park while meeting the overall purpose and need of the proposed action. They were selected in lieu of alternatives (also described below) that were considered but rejected because they were not technically feasible, created excessive adverse impacts to cultural or natural resources, and/or conflicted with the overall management principles of the park.

The NPS explores and objectively evaluates two alternatives in this EA, including:

- Alternative A: No Action
- Alternative B: Installation of fire suppression sprinkler systems at the Nature Center, the Public Horse Center and the Maintenance Yard, and installation of a new water main to supply those systems.

ALTERNATIVE A – NO ACTION

Under Alternative A, the Nature Center, the Public Horse Center, and the Maintenance Yard would continue to lack fire suppression sprinkler systems. These facilities and their occupants would be protected only by fire alarms, fire extinguishers, and/or lighted exits, as well as response personnel from the District of Columbia’s Fire Department, who are automatically notified when an alarm is triggered. This no-action alternative provides a baseline for assessing the effects of the other alternative.

ALTERNATIVE B – INSTALLATION OF FIRE SUPPRESSION SPRINKLER SYSTEMS, FED BY A NEW WATER MAIN

Under Alternative B, fire suppression sprinkler systems would be installed at the Nature Center, the Public Horse Center, and the Maintenance Yard, fed by a new water main. The water main would run from Military Road, NW, to the Nature Center, the Public Horse Center, and the Maintenance Yard. Its installation would roughly parallel an existing (but limited) water main that already serves these facilities. In order to minimize the ecological impact (e.g., felled trees), approximately 2430 linear feet of water main piping would be installed using a jack-and-bore approach with directional, underground drilling. Boring pits would be located in previously disturbed areas, if possible. (See Figure 1 above.)

The uphill slope from Military Road to the three facilities (see Figure 5 below) would reduce water pressure in the new water main, which would compromise the efficacy of the sprinkler systems (see Water Distribution Analysis in Appendix C). To fix this condition, a diesel water pump would be installed at each location to increase water pressure to that location’s fire suppression sprinkler system. The first pump would be installed at the Horse Center. In order to accommodate this pump, the former tack room at the Horse Center would be enlarged and extended outward from the current building, maintaining the existing roofline to preserve architectural continuity (see Figure 6). Diesel water pump installations at the Maintenance Yard and Nature Center would be postponed pending a performance review of the pump at the Horse Center and the availability of additional funding. However, the impact analysis set forth below assumes that such additional water pump installations would occur.



Figure 5 - Slope from Military Road to the Three Facilities



Figure 6 - Sketch of Proposed Pump Room at Horse Center

MITIGATION MEASURES

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

Cultural Resources

- Archeological investigations were conducted to determine whether resources are present in the proposed project area. These investigations were carried out by the NPS in coordination with the DC Archeologist. No archeological resources were found. If unknown archeological resources

are discovered, all work in the immediate vicinity of the discovery would be halted until the resources were evaluated and an appropriate mitigation strategy developed, if necessary. This strategy would be developed in consultation with the District of Columbia Historic Preservation Office (SHPO), following the procedures for post-review discoveries found in the Advisory Council on Historic Preservation's Protection of Historic Properties (36 CFR 800.13). 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 3001) of 1990 would be followed.

Vegetation

- Use of an approved erosion and sediment control plan.
- Revegetate disturbed areas using native grasses and other native species.
- Within the project's limits of disturbance (LOD), use flagging or snow fencing along the drip lines of trees to protect the trees' root zones.
- Install the new water main roughly parallel to the existing one, in previously disturbed soils, using a jack-and-bore installation method to minimize plant and tree damage. In consultation with the park's certified arborist, locate all boring pits to avoid loss of, and damage to, large trees, including their roots systems.

Visitor Use and Experience & Concessions Operations

- In consultation with NPS staff and concessions operators, minimize disruptions to visitor services and other park operations.
- Ensure that any road closures are publicized widely and in a timely manner.

ALTERNATIVES CONSIDERED BUT DISMISSED

Several alternatives or alternative elements were identified during the design process and scoping. Some of these elements were determined to be unreasonable, or much less desirable than similar options included in the analysis, and were therefore not carried forward for analysis in this EA. Justification for eliminating alternatives from further analysis was based on factors relating to:

- Technical or economic infeasibility;
- Conflicts with already-established park uses;
- Duplication with other less environmentally damaging alternatives;
- Conflict with the statement of purpose and need, or other policy; and/or
- Severe impact on environmental or cultural resources.

Each of the dismissed alternatives has one feature in common with Alternative B: the installation of a new water main to supply water to the fire suppression systems. Yet, the dismissed alternatives differ in terms of how they provide sufficient water pressure to each system. The first dismissed alternative contemplated installing a below-grade pump station along the new water main. The second dismissed alternative would boost water pressure by using an elevated water storage tank. Each of these alternatives was dismissed from further consideration because it would entail duplication of the less environmentally damaging option of, and/or be considerably more expensive than, Alternative B.

ENVIRONMENTALLY PREFERABLE ALTERNATIVE

The environmentally preferable alternative is defined by the Council on Environmental Quality (CEQ) as the alternative that would promote the national environmental policy as expressed in NEPA Section 101. This includes:

- Fulfilling the responsibilities of each generation as trustee of the environment for succeeding generations.
- Assuring for all generations safe, healthful, productive, and aesthetically and culturally pleasing surroundings.
- Attaining the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences.
- Preserving important historic, cultural and natural aspects of our national heritage and maintaining, wherever possible, an environment that supports diversity and variety of individual choice.
- Achieving a balance between population and resource use that would permit high standards of living and a wide sharing of life's amenities.
- Enhancing the quality of renewable resources and approaching the maximum attainable recycling of depletable resources (NEPA, Section 101).

The NPS is required to identify the environmentally preferable alternative in its NEPA documents for public review and comment. The NPS, in accordance with the Department of the Interior policies contained in the Departmental Manual (516 DM 4.10) and the CEQ's *NEPA's Forty Most Asked Questions*, defines the environmentally preferable alternative (or alternatives) as the alternative that best promotes the national environmental policy expressed in NEPA (Section 101(b) (516 DM 4.10). In their *Forty Most Asked Questions*, the CEQ further clarifies the identification of the environmentally preferable alternative, stating "[o]rdinarily, 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."

After completing the environmental analysis contained herein, the NPS identifies Alternative A as the environmentally preferable alternative because it best meets the definition established by the CEQ. Whereas Alternative B involves the installation of a water main through a forested area and sprinkler systems in buildings potentially eligible for listing on the NRHP, Alternative A relies upon existing fire countermeasures (e.g., alarms, lighted) to protect people and property. Consequently, Alternative A has the smallest ecological and cultural/historical impact.

A summary of environmental consequences associated with each alternative is shown in Table 1.

Table 1: Summary of Environmental Consequences

Impact Topic	Alternative A: No-Action Alternative	Alternative B: Installation of Fire Suppression Sprinkler Systems and Water Main
Historic Structures	The Nature Center, Horse Center and Maintenance Yard, which are potentially eligible for listing in the National Register, would continue to lack fire suppression sprinkler systems. There would be no alternation of a historic or potentially historic structure. Direct/Indirect Impacts: none. Cumulative Impacts: none. There would be no adverse effect under the NHPA.	Installing a fire suppression system at the Nature Center, Horse Center and Maintenance Yard would alter these buildings by introducing visual changes, such as exposed pipes and sprinklers on the inside, and possibly diesel water pumps and pump sheds on the outside. Direct/Indirect Impacts: Alternative B would result in local, minor, short-term and long-term, adverse impacts due to alterations of the buildings and the risk of water damage in the event of a fire. This alternative would also result in a local, long-term beneficial impact from the enhanced fire protection. Cumulative Impacts: There would be a park-wide, long-term, beneficial cumulative impact due to greater protection and interpretation of historic structures located inside and outside the project area. There would be no adverse effect under the NHPA.
Archeological Resources	No ground disturbing activities would occur under Alternative A. Direct/Indirect Impacts: none. Cumulative Impacts: none. There would be no adverse effect under the NHPA.	Alternative B would entail ground-disturbing activities, but archeological testing has been conducted along the path of the water main at the sites of proposed ground disturbance, and no archeological resources were found. Direct/Indirect Impacts: none. Cumulative Impacts: none. There would be no adverse effect under the NHPA.
Vegetation	No construction or digging would occur under Alternative A. Direct/Indirect Impacts: none. Cumulative Impacts: none.	Under Alternative B, the Nature Center, Horse Center and Maintenance Yard would each receive a fire suppression sprinkler system, which would require the construction of a new water main under a forested area. Direct/Indirect Impacts: The systems would prevent a fire from spreading to surrounding vegetation, a local, long-term, beneficial impact. On the other hand, construction activities would adversely impact vegetation, a local, long-term, minor, adverse impact.

		Cumulative Impacts: Current and future projects would cause local, long-term, minor adverse impacts. Per the GMP, removal of invasive species and planting naturally occurring species would cause a park-wide, long-term, beneficial impact.
Visitor Use and Experience	Under Alternative A, there would be no change to visitor use and experience at the Nature Center and Horse Center. (The Maintenance Yard is not open to the public.) Direct/Indirect Impacts: none. Cumulative Impacts: none.	Under Alternative B, visitors and buildings they frequent would be protected by fire suppression sprinkler systems. Direct/Indirect Impacts: In the event of a fire, such systems would minimize damage done to the Nature Center and Horse Center and potentially reduce the amount of time that these buildings would be closed for repairs, a park-wide, long-term, beneficial impact. On the other hand, installation of the water main and fire suppression systems could cause temporary disruptions in foot and car traffic in and around visitor facilities and the unsightly view of a construction site, a local, short-term, minor, adverse impact. Also, the visitor experience could be degraded by the appearance of a diesel water pump installed at each facility in question and the temporary engine sound emitted when such pumps are tested on a monthly basis, a local, long-term, minor, adverse impact. Cumulative Impacts: Current and future construction projects would cause local, short-term, minor, adverse impacts. Also, the continued implementation of the park's GMP could lead to new interpretive and recreational opportunities for visitors throughout the park, a park-wide, long-term, beneficial impact.
Concession Operations	Under Alternative A, there would be no change to concession operations at the Horse Center. Direct/Indirect Impacts: none. Cumulative Impacts: none.	Under Alternative B, the Horse Center would be protected by a fire suppression sprinkler system. Direct/Indirect Impacts: In the event of a fire, this system would minimize damage done to the Horse Center, a park-wide, long-term, beneficial impact. On the other hand, installation of the water main could cause temporary disruptions in foot and car traffic in and around the Horse Center and the unsightly view of a construction site, a local, short-term, minor, adverse impact. Also, the diesel water pump installed at the Horse Center would be tested on a monthly basis, potentially causing temporary disruptions to people and horses from engine noise, a local, long-term, minor, adverse impact. Cumulative Impacts: Current and future construction projects would cause local, short-term, minor, adverse impacts.

CHAPTER 3: AFFECTED ENVIRONMENT

Under NEPA, the term “affected environment” is defined as the resources expected to experience environmental impacts. For each of the Analyzed Impact Topics identified above, this chapter provides a detailed description of the resources that might be affected by the project alternatives. Potential impacts on these resources are discussed below in the Environmental Consequences chapter.

CULTURAL RESOURCES

The CEQ regulations that implement NEPA require assessment of impacts on cultural resources as well as natural resources. In accordance with the Advisory Council’s regulations for implementing Section 106 of the NHPA (36 CFR Part 800 Protection of Historic Properties), before determining impacts on cultural resources, planners must determine the area of potential effects (APE) and identify cultural resources present in the APE that are either listed in or eligible for listing in the National Register. For the proposed project, an APE was delineated in consultation with the SHPO and NPS Regional Archeologist Dr. Stephen Potter. As shown in Figure 7, the APE follows the proposed project’s limits of disturbance (LOD), spanning approximately 1.75 acres.



Figure 7: APE for Fire Suppression Sprinkler Systems Project

HISTORIC STRUCTURES

The Rock Creek Park Historic District, listed in the National Register of Historic Places in 1990, encompasses U.S. Reservation 339. This district meets National Register criteria A, B, and C, and is significant under the themes of architecture, community planning and development, conservation, engineering, entertainment/recreation, industry, military, and landscape architecture. Criteria A is “property is associated with events that have made a significant contribution to the broad patterns of our history”; Criteria B is “property is associated with the lives of persons significant in our past”; and Criteria C is “property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.” There are thirty-one contributing resources within the district, ten of which are individually nominated to the National Register. The period of significance for the district is 1791 to 1941.

In and around the project area, the Nature Center is potentially eligible for listing as a historic place and as a contributing resource to the Rock Creek Park Historic District. It is a “Mission 66” visitor center, referring to the program initiated by the NPS in 1956 to celebrate the agency’s 50th anniversary in 1966. Hallmarks of this effort included improvements to infrastructure and an aggressive building campaign for new visitor centers throughout the National Park System. The “visitor center,” as envisioned by Mission 66 planners, was a new building type developed to serve the vastly larger numbers of people (and their cars) who began visiting national parks following World War II.

As Sarah Allaback explains in *Mission 66 Visitor Centers: The History of a Building Type*, the NPS’s modern visitor centers “were stripped of most overtly decorative or associative elements, and the architects typically employed textured concrete with panels of stone veneer, painted steel columns, and flat roofs with projecting overhangs, terraces, or covered walks” (Allaback 2000). Also, in Mission 66 visitor centers, the spatial procession through the facility often included wide entrances and exits, ramps and inclined planes, an open lobby, easy access to exhibit and auditorium areas, and significant views of natural features or historic sites (either from a terrace or through a window wall) to facilitate interpretive talks. These features are extant in Rock Creek Park’s Nature Center.

Although the Public Horse Center and the Maintenance Yard currently are non-contributing resources to the Rock Creek Park Historic District (Bushong 1990a), both facilities were constructed between 1957 and 1959, making them older than fifty years. The Rock Creek Park Historic District is scheduled for an update and possible expansion that will examine the significance of the post-World War II building campaign within the park. As a result, for the purposes of this EA, the Public Horse Center and the Maintenance Yard are identified as potentially eligible for listing in the NRHP. The Public Horse Center, a one-and-a-half story structure, is made of wood and concrete block. The facility includes horse stalls, tack rooms, and support facilities. A large indoor riding ring is located within the complex, as is an exterior riding ring and paddocks. The Maintenance Yard, constructed of concrete block, is a one-story structure with offices, vehicular bays, open-air storage areas, and gas pumps. The facility is surrounded by chain-link fencing and includes a large parking lot to the west.

ARCHEOLOGICAL RESOURCES

The area in and around the proposed project has a rich and varied archeology. A comprehensive archeological investigation in Rock Creek Park occurred between 2003 and 2007. (Fiedel et al. 2008). As part of this investigation, 1,281 acres of park land were surveyed and 51 archeological sites were identified. *Id.* Of these, 40 were new discoveries and the remaining 11 were components of known sites. *Id.* According to the report written about the investigation, the park contains artifacts from the Paleoindian Period, Archaic Periods, Woodland Periods, and Contact Period. *Id.*

Archeological investigations have been conducted within the APE for the proposed project. The most comprehensive effort, conducted during the aforementioned park-wide investigation, revealed two sites

located outside the APE, but within the vicinity of the proposed project. They are (1) the Dos Passos Bower Site, a 19th century tenant residence located southwest of the project area, to the west of Glover Road; and (2) a prehistoric site located southeast of the Nature Center and east of the project area. A small portion of a third site, the Nature Center Quarry (discovered during the 1970s), is located within the APE, but outside the Limits of Disturbance (LOD).

Additionally, archeological inquiries suggest the existence of a potential site within the project area. Next to the Dos Passos property is a parcel of land formerly owned by the McKeown family. An 1892 map indicates that there was a home site located near the center of this property, where the Maintenance Yard or the parking lot for the Nature Center exists today. Still, the comprehensive investigation conducted between 2003 and 2007 covered the area between Glover Road and the parking lot, and with the exception of the Passos Bower Site, no archeological site was discovered.

To further explore the existence of archeological resources in the project area, testing was undertaken during the summer of 2010 by the National Park Service – National Capital Region’s Regional Archeological Program. Preliminary findings of this testing indicate that there are no intact archeological resources in proposed areas of ground disturbance along the proposed water main alignment. A summary of these findings can be found in Appendix D.

VEGETATION

In general, vegetation types found throughout the District are the same as those found in Rock Creek Park. However, Rock Creek Park is unique in terms of preserving the largest unbroken forest in the area, providing habitat for much of the city’s wildlife, and acting as an important contributor to the region’s biodiversity. Approximately 80 percent (1,662 acres) of Reservation 339 is covered with mature second growth forest that is approximately 120 years old. Woodlands in the park are a mixture of deciduous species typical of eastern forests in the later stages of succession (NPS 2005). Inventories of park vegetation have found 238 non-native plant species within the park, 42 of which are classified as invasive, non-native species that, unless controlled, are likely to spread and adversely affect native plant populations.

A vegetation survey of the 1.75-acre proposed project area was conducted on January 28, 2010, by Rock Creek Park Natural Resource Specialist Joe Kish. The survey revealed that the project area is predominantly a hardwood forest. The tree layer consists of Black Locust (*Robinia pseudoacacia*), Honey Locust (*Gleditsia triacanthos*), Northern Red Oak (*Quercus rubra*), Southern Red Oak (*Quercus falcate*), White Ash (*Fraxinus americana*), American Holly (*Ilex opaca*), White Oak (*Quercus alba*), Mockernut Hickory (*Carya tomentosa*), Black Cherry (*Prunus serotina*), and Chestnut Oak (*Quercus prinus*). The shrub layer consists of Spicebush (*Lindera benzoin*), Box Elder (*Acer negundo*), Red Bud (*Cercis canadensis*), Flowering Dogwood (*Cornus florida*), Green Briar (*Smilax glauca*), Grape (*Vitis* spp.), Black Gum (*Nyssa sylvatica*), American Beech (*Fagus grandifolia*), Witch Hazel (*Hamamelis virginiana*), White Mulberry (*Morus alba*), Blackhaw (*Viburnum prunifolium*), Norway Maple (*Acer platanoides*), Red Maple (*Acer rubra*), Sugar Maple (*Acer saccharum*), American Elm (*Ulmus americana*), Buckeye spp. (*Aesculus* spp.), Black Cherry (*Prunus serotina*), Bush Honeysuckle (*Lonicera maackii*), and Serviceberry (*Amelanchier arborea*). Herbs consist of Garlic Mustard (*Alliaria petiolata*), Beefsteak (*Perilla frutescens*), Stiltgrass (*Microstegium vimineum*), Common blue Violet (*Viola sororia*), Yellow Wood Sorrel (*Oxalis stricta*), Broad-leaved Helleborine (*Epipactis helleborine*), and Lady’s Thumb (*Polygonum persicaria*). Numerous non-native plant species were also observed in the study area, including Amur Honeysuckle (*Lonicera maackii*), Japanese Barberry (*Berberis thunbergii*), Japanese Wineberry (*Rubus phoenicolasius*), English Ivy (*Hedera helix*), Garlic Mustard (*Alliaria petiolata*), and Beefsteak (*Perilla frutescens*).

VISITOR USE AND EXPERIENCE

According to the Rock Creek Park General Management Plan, Rock Creek was intended in part to be a “pleasure ground.” To this end, the park offers a wide array of visitor experiences and recreational opportunities. These include paved multipurpose trails, an extensive system of hiking and horseback-riding trails, an eighteen-hole golf course, tennis courts, scenic roads, picnic areas, sports fields, and community gardens, as well as Thompson Boat House, Public Horse Center, and Carter Barron Amphitheater.

Within the proposed project area, the Nature Center and Public Horse Center are open year-round to the public. The Public Horse Center provides riding lessons, guided trail rides, summer camps, and a therapeutic riding program. The Nature Center hosts interpretive programs and a sales outlet for Eastern National, a NPS cooperating association. In 2009, approximately 34,613 people visited the Nature Center, most during the three warmest seasons – spring, summer and fall. The Nature Center and Public Horse Center are surrounded by tall trees in serene, wooded settings, and both are located close to several busy roads.

CONCESSION OPERATIONS

Although the Public Horse Center is owned by the NPS, it is managed, operated, and maintained by a concessioner, Guest Services, Inc., under a long-term contract. The Center is open to the public, offering horseback riding instructions, guided trail rides, and therapeutic riding. Throughout the year, the administrative offices, locker rooms, public restrooms, stables, riding rings, and tack rooms are open Tuesday through Sunday, from 9:00 a.m. to 9:00 p.m.

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CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

This Environmental Consequences chapter analyzes both beneficial and adverse impacts that would result from implementing each of alternatives considered in this EA. This chapter also includes definitions of impact thresholds (e.g., negligible, minor, moderate, and major), methods used to analyze impacts, and the analysis methods used for determining cumulative impacts. As required by the Council on Environmental Quality (CEQ) regulations implementing NEPA, a summary of the environmental consequences for each alternative is provided in Table 1, which can be found in the Alternatives chapter above. The resource topics presented in this chapter, and their organization, correspond to the resource discussions contained in the Affected Environment chapter.

GENERAL METHODOLOGY

The following elements were used to establish impact thresholds, and measure the impacts of the alternatives, within each resource category:

- General analysis methods as described in guiding regulations, including the context and duration of environmental effects;
- Thresholds used to define the level of impact resulting from each alternative;
- Methods used to evaluate the cumulative impacts of each alternative in combination with unrelated factors or actions affecting park resources; and
- Methods and thresholds used to determine if impairment of specific resources would occur under any alternative

These elements are described in the following sections.

ANALYSIS METHODS

The analysis of impacts follows CEQ guidelines and Director's Order 12 procedures (NPS 2001) and is based on the underlying goal of supporting forest regeneration and providing for long-term protection, conservation, and restoration of native species and cultural landscapes at Rock Creek Park. This analysis incorporates the best-available scientific literature applicable to the region and setting, the species being evaluated, and the actions being considered in the alternatives.

As described in the Purpose and Need chapter, the NPS created a team of resource specialists to provide important input to the impact analysis. For each impact topic addressed in this chapter, the applicable methods of analysis are discussed, including assumptions and impact intensity thresholds.

IMPACT THRESHOLDS

Determining impact thresholds is a key component of NPS Management Policies and Director's Order 12. These thresholds provide the reader with an understanding about the intensity of a given impact on a specific resource. The impact threshold is determined primarily by comparing the effect to a relevant standard based on applicable or relevant/appropriate regulations or guidance, scientific literature and research, or best professional judgment. Because definitions of intensity vary by impact topic, intensity definitions are provided separately for each impact topic analyzed in this document. Intensity definitions are provided throughout the analysis for negligible, minor, moderate, and major impacts. Impact thresholds are provided for all adverse impacts, whereas beneficial impacts are addressed qualitatively.

Potential impacts of the alternatives are described in terms of type (beneficial or adverse); context; duration (short- or long-term); and intensity (negligible, minor, moderate, major). Definitions of these descriptors include:

Beneficial: A positive change in the condition or appearance of the resource or a change that moves the resource toward a desired condition.

Adverse: A change that declines, degrades, and/or moves the resource away from a desired condition or detracts from its appearance or condition.

Context: The affected environment within which an impact would occur, such as local, park-wide, regional, global, affected interests, society as whole, or any combination of these. Context is variable and depends on the circumstances involved with each impact topic. As such, the impact analysis determines the context, not vice versa.

Duration: The duration of the impact is described as short-term or long-term. Duration varies with each impact topic; therefore, duration definitions are provided in each impact analysis narrative.

Intensity: Because definitions of impact intensity (negligible, minor, moderate, and major) vary by impact topic, intensity definitions are provided separately for each impact topic analyzed.

CUMULATIVE IMPACTS

CEQ regulations implementing NEPA require the 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.” (40 CFR 1508.7) As stated in the CEQ handbook, *Considering Cumulative Effects* (CEQ 1997), cumulative impacts need to be analyzed in terms of the specific resource, ecosystem, and human community being affected and should focus on effects that are truly meaningful. Cumulative impacts are considered for all alternatives, including the no-action alternative.

For the proposed project, relevant past, present, and reasonably foreseeable future actions are few. In 2008 and 2009, the NPS renovated the planetarium at the Nature Center. Also, Guest Services, Inc., a concessioner that operates the Public Horse Center, built a manure shed on a concrete slab adjacent to the rear paddock and stables in 2010, and the NPS is rehabilitating Peirce Mill, a historic structure located near the intersection of Tilden Street, NW, and Beach Drive. Beyond this, there are no planned projects occurring in the reasonably foreseeable future that affect resources present within the affected environment or its surrounding area, including projects occurring on property owned by private entities or the District of Columbia. Nevertheless, the park’s General Management Plan contemplates, at an undetermined future time, potentially renovating the Maintenance Yard to add administrative offices (if office space outside the park cannot be acquired) and rehabilitating and/or expanding the Nature Center to improve the effectiveness of programs for the public. For the latter, improvements may include additional classroom space, a covered group shelter for bad weather, and staff offices.

CULTURAL RESOURCES

CEQ regulations that implement NEPA require assessment of impacts on cultural resources as well as natural resources. In this EA/AoE, impacts on cultural resources are described in terms of type, context, duration, and intensity, as defined above, which is consistent with CEQ regulations. These impact analyses are intended, however, to comply with the requirements of both NEPA and Section 106 of the NHPA. In accordance with the Advisory Council’s regulations for implementing Section 106 of the NHPA (36 CFR Part 800 Protection of Historic Properties), impacts on cultural resources also were identified and evaluated by (1) determining the area of potential effect (see Figure 7), (2) identifying cultural resources present in the area of potential effects that were either listed in or eligible for listing in the National Register, (3) applying the criteria of adverse effect to affected cultural resources either listed in or eligible for listing in the National Register, 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 be made for affected, National Register-listed or -eligible cultural resources. An adverse effect occurs whenever an impact directly or indirectly alters any characteristic of a cultural resource that qualifies it for inclusion in the National Register. This includes diminishing the integrity (or the extent to which a resource retains its historic appearance) of the resource's location, setting, design, feeling, association, workmanship, or materials. Adverse effects also include reasonably foreseeable effects caused by the alternatives 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 that there is an effect, but the effect would not diminish the characteristics of the cultural resource that qualify it for inclusion in the National Register of Historic Places.

CEQ regulations and NPS DO #12: Conservation Planning, Environmental Impact Analysis, and Decision-making also call for a discussion of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact – for example, reducing the intensity of an impact from major to moderate or minor. However, any resulting reduction in the intensity of impact due to mitigation 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. Cultural resources are non-renewable resources, and adverse effects generally consume, diminish, or destroy the original historic materials or form, resulting in a loss in the integrity of the resources that can never be recovered. Therefore, although actions determined to have an adverse effect under Section 106 may be mitigated, the effect remains adverse.

A Section 106 summary is included in the impact analysis sections for cultural resources. 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 upon the criteria of effect and the criteria of adverse effect found in the Advisory Council regulations.

ANALYSIS OF IMPACTS TO RESOURCES

HISTORIC STRUCTURES

Methodology and Assumptions

Impacts were determined by considering the effects of existing conditions on, and proposed changes to, historic or potentially historic structures. For cultural resources, it is rarely possible to measure impacts in quantifiable terms; therefore, impact assessments rely heavily on the professional judgment of resource experts.

Study Area

The geographic study area for historical structures includes the Nature Center, Public Horse Center and the Maintenance Yard.

Impact Thresholds

For purposes of analyzing potential impacts on historic structures/buildings, the thresholds of change for the intensity of an impact are defined as follows:

Negligible: Impact is at the lowest levels of detection, and a determination of no adverse effect under Section 106 of the NHPA.

Minor: Alteration of a character-defining feature that does not affect the overall integrity of the resource, and a determination of no adverse effect under Section 106 of the NHPA.

Moderate: Alteration of a character-defining feature that would affect the overall integrity of the resource, and if detrimental, a determination of adverse effect under Section 106 of the NHPA. A MOA would be executed among the NPS and applicable state or tribal historic preservation officer and, if necessary, the Advisory Council in accordance with 36 CFR 800.6(b).

Major: Alteration of a character-defining feature that would affect the overall integrity of the resource, and if detrimental, a determination of adverse effect under Section 106 of the NHPA. Measures to minimize or mitigate adverse impacts cannot be agreed upon, and the NPS and applicable state or tribal historic preservation and/or Advisory Council are unable to negotiate and execute a MOA in accordance with 36 CFR 800.6(b).

Impacts of Alternative A: No-Action Alternative

Direct/Indirect: Under the no-action alternative, there would be no alteration of a historic or potentially historic structure. Therefore, no impact to historic structures would occur.

Cumulative: Because there is no impact to a historic structure, the no-action alternative would not contribute any cumulative effects.

Section 106 Summary: Alternative A does not change the structures in any way or affect the fire suppression countermeasures that already exist. After applying the Advisory Council's regulations 36 CFR 800, the NPS finds that Alternative A would have no adverse effect on historic structures.

Conclusion: The Nature Center, Horse Center and Maintenance Yard, which are potentially eligible for listing in the National Register, would continue to lack fire suppression sprinkler systems. However, Alternative A would have no direct, indirect or cumulative effect on a historic structure. There would be no adverse effect under the NHPA.

Impacts of Alternative B: Installation of Fire Suppression Sprinkler Systems and Water Main

Direct/Indirect: Installing a fire suppression system at the Nature Center, Public Horse Center and Maintenance Yard would alter these buildings by introducing visual changes, such as exposed pipes and sprinklers on the interior, and possibly diesel water pumps and pump sheds on the exterior, a local, long-term, minor, adverse impact. However, these changes would not alter character-defining features of the buildings or affect their overall integrity as resources. To mitigate the adverse impact, prior to the installation of the fire suppression systems, local and regional cultural resource specialists would be consulted regarding strategies for minimizing impacts of the systems on the buildings. Further, in the unlikely event of a fire at one of these locations, the fire suppression system would douse the structure, and its contents, with water, causing some water damage, a local, short-term, minor, adverse impact. (Fortunately, most of the exhibits in the Nature Center are stored in plastic display cases.) On the other hand, the system would protect the building, and its contents, from catastrophic loss due to fire, a local, long-term, beneficial impact.

Cumulative: Past, present, and reasonably foreseeable future actions, including the continued implementation of the park's GMP, have impacted, and would continue to impact, historic structures in the northern portion of U.S. Reservation 339. For example, the NPS is rehabilitating Peirce Mill, and implementation of the GMP would result in greater protection and interpretation of the park's other historic structures. Such improvements, along with Alternative B, would result in a park-wide, long-term beneficial impact (due to greater protection and interpretation of historic structures located inside and outside the project area), as well as local, minor, short-term and long-term, adverse impacts and a local, long-term beneficial impact.

Section 106 Summary: Although long-term construction-related impacts would occur, Alternative B would protect the Nature Center, Public Horse Center and Maintenance Yard from catastrophic loss due

to fire. After applying the Advisory Council's regulations 36 CFR 800, the NPS finds that Alternative B would have no adverse effect on historic structures.

Conclusion: The Nature Center, Public Horse Center and Maintenance Yard, which are potentially eligible for listing in the National Register, would acquire fire suppression sprinkler systems. Alternative B would result in local, minor, short-term and long-term, adverse impacts due to alterations of the buildings and the risk of water damage in the event of a fire. This alternative would also result in a local, long-term beneficial impact from the enhanced fire protection, and a park-wide, long-term, beneficial impact due to greater protection and interpretation of historic structures located inside and outside the project area. There would be no adverse effect under the NHPA.

ARCHEOLOGICAL RESOURCES

Methodology and Assumptions

As archeological resources exist essentially in subsurface contexts, potential impacts to archeological resources are assessed according to the extent to which the proposed alternatives would involve ground-disturbing activities such as excavation or grading. Analysis of possible impacts to archeological resources was based on a review of previous archeological studies, consideration of the proposed design concepts, and other information provided by the NPS.

Study Area

The geographic study area for archeological resources includes the proposed areas along the path of the water main.

Impact Thresholds

For potential impacts to archeological resources, intensity metrics are as follows:

Negligible: Impact is at the lowest levels of detection, and a determination of no adverse effect under Section 106 of the NHPA.

Minor: Impact results in little, if any, loss or gain of integrity, and a determination of no adverse effect under Section 106 of the NHPA.

Moderate: Impact results in loss or gain of integrity, and if detrimental, a determination of adverse effect under Section 106 of the NHPA.

Major: Impact results in a significant loss or gain of integrity, and if detrimental, a determination of adverse effect under Section 106 of the NHPA.

Impacts of Alternative A: No-Action Alternative

Direct/Indirect: Because ground disturbing activities would not occur under Alternative A, there would be no impact on archeological resources.

Cumulative: Because there are no impacts on archeological resources, the no-action alternative would not contribute any cumulative effects.

Section 106 Summary: Not installing a fire suppression system avoids ground-disturbing activities that might affect archeological resources. After applying the Advisory Council's regulations 36 CFR 800, the NPS finds that Alternative A would have no adverse effect on archeological resources.

Conclusion: Alternative A would have no direct, indirect or cumulative effect on archeological resources. There would be no adverse effect under the NHPA.

Impacts of Alternative B: Installation of Fire Suppression Sprinkler Systems and Water Main

Direct/Indirect: Alternative B would entail ground-disturbing activities. Archeological testing has been conducted along the path of the water main, at the sites of proposed ground disturbance, and no archeological resources were found. To minimize the risk of disturbing undiscovered resources, underground drilling (i.e., jack and bore) would be used, with open trenching performed only in select locations. Also, the new water main would be installed near an area previously disturbed by utility lines. Finally, during project implementation, archeological monitoring would occur. If resources were uncovered, work would be halted pending an assessment by the Regional Archeologist and Cultural Resource Program Manager, in consultation with the Superintendent.

Cumulative: Because there are no anticipated impacts on archeological resources, Alternative B would not contribute any cumulative effects.

Section 106 Summary: Although ground-disturbing activities pose a risk to archeological resources, implementation of Alternative B avoids known archeological resources in the vicinity of the project area, and several safeguards have been introduced (see above) to minimize the risk of disturbing undiscovered archeological resources. After applying the Advisory Council's regulations 36 CFR 800, the NPS finds that Alternative B would have no adverse effect on archeological resources.

Conclusion: Alternative B has no direct, indirect or cumulative effect on archeological resources. There would be no adverse effect under the NHPA.

VEGETATION**Methodology and Assumptions**

Available information on vegetation and vegetative communities occurring within the project area was compiled and reviewed. Predictions about short- and long-term project impacts on vegetation were based on general characteristics and proposed actions affecting vegetated areas associated with the alternatives.

Study Area

The geographic study area for vegetation includes the project area, activities would not occur outside this area.

Impact Thresholds

The following thresholds were used to determine the magnitude of impacts on vegetation:

Negligible: Individual native plants might be affected, but there would be no overall effect on a species population. Effects would occur on a small scale and no species of special concern would be affected.

Minor: Individual native plants would be affected, as would a relatively small portion of a species population. If detrimental, mitigation to offset adverse effects, including special measures to avoid species of concern, would be required and would be effective.

Moderate: Individual native plants would be affected, as would a sizable segment of a species population, over a relatively large area. If detrimental, mitigation to offset adverse effects could be extensive, but would likely be successful. Some species of special concern could be affected.

Major: The action would have a considerable effect on native plant populations, including species of special concern, and could affect a relatively large area in and around the park. If detrimental, mitigation measures would be required and extensive, and the success of those measures would not be guaranteed.

Impacts of Alternative A: No-Action Alternative

Direct/Indirect: Because no construction or digging would occur under Alternative A, there would be no impact on vegetation.

Cumulative: Because there is no anticipated impact on vegetation, Alternative A would not contribute any cumulative effects.

Conclusion: Alternative A would have no direct, indirect or cumulative effect on vegetation.

Impacts of Alternative B: Installation of Fire Suppression Sprinkler Systems and Water Main

Direct/Indirect: Under Alternative B, the Nature Center, Public Horse Center and Maintenance Yard would receive fire suppression sprinkler systems. In the unlikely event of a fire originating within one of these buildings, the systems would prevent the fire from spreading to surrounding vegetation, a local, long-term, beneficial impact. On the other hand, construction activities would adversely impact vegetation (but no species of special concern). To mitigate, jack-and-bore digging technology would minimize damage to vegetation, and trenches and pits would be kept to a minimum. As a result, roughly 16 trees would be impacted (damaged or removed) during the project (12 small trees (e.g., 3" dbh) and 3-4 mature trees), in addition to limited amounts of grasses and shrubs, a local, long-term, minor, adverse impact. Such vegetation would be replaced with native species upon project completion. Finally, the installation of diesel water pumps at the Nature Center, Public Horse Center and Maintenance Yard would have a negligible, adverse effect, if any, on vegetation. Therefore, Alternative B would have a local, long-term, beneficial impact, and local, long-term, minor adverse impacts, on vegetation.

Cumulative: Past, present and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on vegetation in and around the project area. These actions include the construction of a manure shed at the Public Horse Center, which involves the removal of a small number of plants but no removal of trees, and the rehabilitation of Peirce Mill, which might result in the loss of some grasses, shrubs, and trees, both local, long-term, minor adverse impacts. Also, the continued implementation of the park's GMP would result in new development that could lead to vegetation loss, a local, long-term, minor adverse impact. The GMP also instructs the park to remove invasive species and plant naturally occurring species, a park-wide, long-term, beneficial impact. Therefore, this project, along with Alternative B, would have a local and park-wide, long-term, beneficial impacts, as well as local, long-term, minor adverse impacts, on vegetation.

Conclusion: In terms of vegetation, implementation of Alternative B would have a local, long-term, beneficial impact due to fire protection, a local, long-term, minor, adverse impact due to current and proposed construction projects, and a park-wide, long-term, beneficial impact due to invasive species removal.

VISITOR USE AND EXPERIENCE

Methodology and Assumptions

Impacts to visitor use and experience were determined by considering the effect of the existing conditions and proposed improvements to those affected park facilities on the experience of those visitors who use the park.

Study Area

The geographic study area for visitor experience is within the boundaries of the proposed actions.

Impact Thresholds

The following thresholds were defined:

Negligible: Imperceptible or barely perceptible to most visitors.

Minor: Would affect a small number of visitors in a noticeable way, but would result in little to no alteration of their experience.

Moderate: Would affect a large number of visitors with a noticeable alternation of their experience.

Major: Would sharply alter the visitor experience, such as the addition or elimination of a recreational opportunity. Would affect the way future generations enjoy park resources.

Impacts of Alternative A: No-Action Alternative

Direct/Indirect: Under Alternative A, there would be no change to visitor use and experience at the Nature Center and Public Horse Center. (The Maintenance Yard is not open to the public.) Therefore, there would be no impact on visitor use and experience.

Cumulative: Because there is no anticipated impact on visitor use and experience, Alternative A would not contribute any cumulative effects.

Conclusion: Alternative A would have no direct, indirect or cumulative effect on visitor use and experience.

Impacts of Alternative B: Installation of Fire Suppression Sprinkler Systems and Water Main

Direct/Indirect: Under Alternative B, visitors and buildings they frequent would be protected by fire suppression sprinkler systems. In the event of a fire, such systems would minimize damage done to the Nature Center and Public Horse Center and potentially reduce the amount of time that these buildings would be closed for repairs, a park-wide, long-term, beneficial impact. On the other hand, installation of the water main and fire suppression systems could cause temporary disruptions in foot and car traffic in and around visitor facilities and the unsightly view of a construction site, a local, short-term, minor, adverse impact. Also, the visitor experience could be degraded by the appearance of a diesel water pump installed at each facility in question and the temporary engine sound emitted when such pumps are tested on a monthly basis, a local, long-term, minor, adverse impact. These impacts would be mitigated by obscuring the water pumps from public view with a barrier (e.g., a fence or shed), performing monthly tests on the diesel pumps during off-peak hours (e.g., during the evening or on the weekends), and keeping buildings and parking lots open during normal hours of operation for the duration of construction.

Cumulative: Past, present and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on visitor use and experience in and around the proposed project. These actions include construction of a manure shed at the Public Horse Center on a concrete slab adjacent to the rear paddock and stables, a local, short-term, minor, adverse impact. Also, the continued implementation of the park's GMP would result in new development that could lead to new interpretive and recreational opportunities for visitors throughout the park, such as rehabilitating and/or expanding the Nature Center to improve the effectiveness of programs for the public, a park-wide, long-term, beneficial impact. These projects, along with Alternative B, would have both local, short-term and long-term, minor, adverse impacts, and park-wide, long-term beneficial impacts, on visitor use and experience.

Conclusion: Alternative B would have local, short-term and long-term, minor, adverse impacts on visitor use and experience due to the construction of the manure shed at the Public Horse Center and the appearance of, and noise associated with, the diesel water pumps. On the other hand, this alternative would result in park-wide, long-term, beneficial impacts due to fire protection and the continued implementation of the park's GMP.

CONCESSION OPERATIONS

Methodology and Assumptions

Rock Creek Park is responsible for managing concessions operations within the park.

Study Area

The geographic study area for concession operations is the Public Horse Center.

Impact Thresholds

The impact intensities for health and safety were defined as follows:

Negligible: A change that is imperceptible or barely perceptible to the concessioner/customers.

Minor: A noticeable change to service or safety of concessioner/customers that results in little inconvenience or benefit.

Moderate: A noticeable change to service or safety of concessioner/customers that affects the concessioner's business.

Major: A substantial, highly noticeable effect on service or safety of concessioners/customers that significantly affects the concessioner's business.

Impacts of Alternative A: No-Action Alternative

Direct/Indirect: Under Alternative A, there would be no change to concession operations at the Public Horse Center. Therefore, there would be no impact on concession operations.

Cumulative: Because there is no anticipated impact on concession operations, Alternative A would not contribute any cumulative effects.

Conclusion: Alternative A would have no direct, indirect or cumulative effect on concession operations.

Impacts of Alternative B: Installation of Fire Suppression Sprinkler Systems and Water Main

Direct/Indirect: Under Alternative B, the Public Horse Center would be protected by a fire suppression sprinkler system. In the event of a fire, this system would minimize damage done to the Horse Center and potentially reduce the amount of time that buildings within the complex would be closed for repairs, a park-wide, long-term, beneficial impact. On the other hand, installation of the water main could cause temporary disruptions in foot and car traffic in and around the Horse Center and the unsightly view of a construction site, a local, short-term, minor, adverse impact. Also, the diesel water pump installed at the Horse Center would be tested on a monthly basis, potentially causing temporary disruptions to people and horses from engine noise, a local, long-term, minor, adverse impact. These impacts would be mitigated by minimizing the area of construction disturbance around the Public Horse Center, keeping the facility and its adjoining parking lots open during normal operating hours for the duration of the project, and performing monthly tests on the diesel pumps during off-peak hours (e.g., during the evening or on the weekends).

Cumulative: Past, present and reasonably foreseeable future actions have and continue to contribute to the cumulative impact on concession operations in and around the proposed project. These actions include the construction of a manure shed at the Public Horse Center on a concrete slab adjacent to the rear paddock and stables, a local, short-term, minor, adverse impact. This project, along with Alternative B, would result in a park-wide, long-term, beneficial impact as well as local, short-term and long-term, minor, adverse impacts.

Conclusion: At the Public Horse Center, Alternative B would have a park-wide, long-term, beneficial impact on concession operations due to fire protection, as well as local, short-term and long-term, minor, adverse impacts resulting from construction activities.

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CHAPTER 5: CONSULTATION AND COORDINATION

NPS guidance implementing the provisions of NEPA and CEQ regulations requires the NPS to make “diligent” efforts to involve the interested and affected public and government agencies in the NEPA process. This chapter documents the involvement of other agencies and the public for the proposed action and identifies future compliance needs and permits.

Agency Consultation

Via letter dated June 18, 2009, the NPS initiated consultation under Section 106 of the NHPA with the District of Columbia SHPO. On July 10, 2009, the SHPO responded, indicating that there are archeological sites in the immediate vicinity of the proposed project. The SHPO recommended that a “Phase I identification survey should be conducted for untested areas of the proposed water main alignment prior to initiating any ground disturbing activities for the project.” As discussed above, this survey has been completed.

Other parties that received scoping letters from the park were the National Capital Planning Commission (NCPC), the Commission for Fine Arts (CFA) the Environmental Protection Agency (EPA), District of Columbia Department of Transportation (DDOT), the U.S. Fish and Wildlife Service (USFWS), and the District of Columbia Office of Planning. These parties received scoping letters on August 19, 2009, and January 25, 2011.

Shane Dettman of the NCPC replied via email on February 23, 2011, requesting that the NPS submit a formal request for NCPC review. Likewise, on February 24, 2011, Frederick Lindstrom requested by phone that the NPS submit a formal request for CFA review.

The USFWS responded on March 31, 2011, stating that there are no documented occurrences of any federally listed species within the project area.

Appendix B contains exemplary scoping letters sent by NPS to potentially interested parties and all responsive correspondence from state and federal agencies.

Future Compliance Needs/Permits

Prior to the implementation of the proposed action, the NPS would obtain appropriate land disturbance permits and abide by local and state erosion and sediment control standards. Additional approvals and reviews would be required prior to construction. These include reviews by the NCPC and CFA, and Section 106 consultations with the District of Columbia SHPO.

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CHAPTER 6: REFERENCES

ACRONYMS

APE	Area of Potential Effect
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
DO	Director's Order
DOI	Department of the Interior
EA	Environmental Assessment
ESF	Environmental Screening Form
GMP	General Management Plan
LOD	Limits of Disturbance
NCPC	National Capital Planning Commission
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
NPS	National Park Service
RM	Reference Manual
SHPO	State Historic Preservation Officer
U.S.C.	United States Code
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Service

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CHAPTER 7: APPLICABLE LAWS, EXECUTIVE ORDERS, POLICIES AND OTHER PLANS

ARCHEOLOGICAL INVENTORY AND EVALUATION STUDY, ROCK CREEK PARK (2004-2008)

The four-year archeological inventory and evaluation study of Rock Creek Park was completed in 2008. During this study, more than 1,100 acres of the Park were surveyed for archeological remains, leading to the identification of 51 new sites. Of these, 11 were associated with known historic sites, such as Fort Totten and Peirce Mill, and 40 were associated with new sites. Sites include Native American camps and quarries, trash dumps and a barracks area associated with Civil War forts, colonial farms, 19th-century tenant dwellings, and remnants of the Battle of Fort Stevens.

CODE OF FEDERAL REGULATIONS, TITLE 36, CHAPTER 1

This chapter provides regulations “for the proper use, management, government, and protection of persons, property, and natural and cultural resources within areas under the jurisdiction of the NPS.”

DIRECTOR’S ORDER 12 (2001)

This policy document (known as DO 12) is entitled “Conservation Planning, Environmental Impact Analysis, and Decision Making.” Along with an accompanying handbook, it guides parks through the NEPA compliance process.

DIRECTOR’S ORDER 28 (1998)

This policy document, and its accompanying guideline (known as DO 28), guide parks in their management of cultural resources.

EXECUTIVE ORDER 11593 – PROTECTION AND ENHANCEMENT OF THE CULTURAL ENVIRONMENT

This executive order directs the NPS to support the preservation of cultural properties, identify and nominate appropriate cultural properties within parks to the National Register, and “exercise caution . . . to assure that any NPS-owned property that might qualify for nomination is not inadvertently transferred, sold, demolished, or substantially altered.”

HISTORIC RESOURCE STUDY: ROCK CREEK PARK, DISTRICT OF COLUMBIA (1990)

The Historic Resource Study for Rock Creek Park surveyed, identified, and evaluated Rock Creek Park’s above-ground historic resources. In advance of the park’s centennial celebration, the study documented sites and structures potentially eligible for listing in the NRHP.

HISTORIC SITES ACT OF 1935

This act declares as national policy the preservation for public use of historic sites, buildings, objects, and properties of national significance. 16 U.S.C. § 461-67. It authorizes the Secretary of the Interior and the NPS to restore, reconstruct, rehabilitate, preserve, and maintain historic or prehistoric sites, buildings, objects, and properties of national historical or archeological significance.

NATIONAL ENVIRONMENTAL POLICY ACT OF 1969

The National Environmental Policy Act (NEPA) requires federal agencies to integrate environmental values into their decision-making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions. 42 U.S.C. § 4321. It is implemented through regulations of the Council on Environmental Quality (CEQ). 40 CFR § 1500-08.

NATIONAL HISTORIC PRESERVATION ACT OF 1966

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to consider the effects of their undertakings on properties listed or potentially eligible for listing on the National Register

of Historic Places (NRHP). 16 U.S.C. § 470. All actions affecting the park’s cultural/historical resources must comply with this legislation.

NPS MANAGEMENT POLICIES 2006

NPS Management Policies 2006 (NPS 2006) recognizes that resource conservation takes precedence over visitor recreation. The policy dictates that “when there is a conflict between conserving resources and values and providing for enjoyment of them, conservation is to be predominant.” NPS 2006 § 1.4.3. Still, the NPS has discretion to allow a negative impact on park resources when necessary and appropriate to fulfill park purposes, as long as the impact does not constitute “impairment.” *Id.* § 1.4.3.

NPS ORGANIC ACT OF 1916

In the National Park Service Organic Act of 1916 (the “Organic Act”), Congress directed the U.S. Department of the Interior and the NPS to manage park units “to conserve the scenery and the natural and historic objects and wildlife therein and to provide for the enjoyment of the same in such a manner and by such a means as will leave them unimpaired for the enjoyment of future generations.” 16 U.S.C. § 1. Although the Organic Act affords the NPS latitude when making decisions about visitor recreation and resource preservation, actions that permanently “impair” park resources are prohibited unless otherwise specifically allowed by law. *Id.* § 1a-1.

REDWOOD NATIONAL PARK ACT OF 1978

All NPS units are to be managed and protected as parks, whether established as a recreation area, historic site, or any other designation. This act states that the NPS must conduct its actions in a manner that will ensure no “derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress.” 16 U.S.C. § 1a-1.

REFERENCE MANUAL 58 (2004)

Stresses the importance of installing automatic sprinkler protection and automatic smoke detection systems in all new building, all buildings undergoing renovation, remodeling, rehabilitation or other alteration, and buildings with a change in occupancy. Also recognizes that per DO 58, the NPS enforces the most current version of the National Fire Protection Association’s (NFPA) Fire Prevention Code (NFPA 1), Life Safety Code (NFPA 101), and all other associated structural fire codes and standards.

RESOURCES MANAGEMENT PLAN – ROCK CREEK PARK (1996)

The Resources Management Plan for Rock Creek Park provides specific management objectives. Those that pertain to this project include:

- Work cooperatively with other federal agencies, agencies in Maryland and the District of Columbia, private organizations, and members of the public in developing programs to reduce flooding and pollution in the Rock Creek watershed and to prevent or repair damage to park resources caused by human activities;
- Improve the quality of the visitor experience by better protecting natural resources;
- Preserve and perpetuate the park’s plant and wildlife resources in as natural a condition as possible, and reduce the adverse effects of human activities and exotic species on the natural environment;
- Identify, protect, and perpetuate the park’s historic resources, including its mills, Civil War fortifications, and archeological sites;
- Monitor and evaluate current recreational uses of the park’s lands and redirect these activities in order to reduce adverse impacts;

- Foster understanding and appreciation of the park's natural and cultural values through interpretive and educational programs focusing on Rock Creek Park's biological, geological, historic, and prehistoric resources; and
- Establish contact and cooperation with citizen associations, governmental agencies, and other groups or individuals that surround, or have direct effects on or interests in the welfare of, the park.

ROCK CREEK PARK AND ROCK CREEK AND POTOMAC PARKWAY FINAL GENERAL MANAGEMENT PLAN/ENVIRONMENTAL IMPACT STATEMENT (2005)

This document, known as the GMP, is a comprehensive management plan for the park. The purpose of the GMP is to specify resource conditions and visitor experiences to be achieved in the park and Rock Creek and Potomac Parkway, and to provide a foundation for decision-making and the preparation of more specific resource plans. In addition to articulating goals for natural and cultural resource management, the GMP describes the following potential projects:

- Rehabilitate the Peirce Mill complex to focus on the history of milling and land use in the area. This would expand on the already completed rehabilitation of the Peirce Mill Barn;
- Move the park administrative offices out of the Peirce-Klingler Mansion at Linnaean Hill to commercial office space outside the park, or to a new office facility that would be constructed at an already disturbed area within the park, such as at the Maintenance Yard;
- Rehabilitate the Linnaean Hill complex for adaptive use compatible with park values;
- Move the U.S. Park Police substation out of the Lodge House on Beach Drive at Joyce Road to commercial space outside the park, or to a new park police substation that would be constructed within an already disturbed area in the park, such as near the existing U.S. Park Police H-3 stables;
- Convert the Lodge House to a visitor contact station to provide park orientation, information, and interpretation; and
- Rehabilitate and expand the Nature Center and upgrade its planetarium to improve effectiveness of public programs.

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CHAPTER 8: LIST OF PREPARERS

The following people helped prepare this EA.

NPS – Rock Creek Park

Nick Bartolomeo, Chief Ranger

Michael Buckler, Environmental Protection Specialist

Cynthia Cox, Deputy Superintendent

Don Kirk, Chief of Maintenance

Joe Kish, Natural Resource Specialist

Simone Monteleone, Cultural Resources Program Manager

Bill Yeaman, Natural Resource Specialist

NPS – National Capital Region

Steve Doulis, A/E Project Manager

Stewart Fox, Chief, Design and Construction Branch

Joel Gorder, Regional Environmental Coordinator and Lands Liaison

Stephen Potter, Regional Archeologist

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APPENDICES

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APPENDIX A – DRAFT IMPAIRMENT DETERMINATION

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DRAFT IMPAIRMENT DETERMINATION: The NPS has determined that the implementation of the NPS preferred alternative **will not** constitute an impairment. It **will not** harm the integrity of park resources and values, including opportunities that would otherwise be present for the enjoyment of those resources and values. It will not cause a major, adverse impact on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified in the park's management plan or other relevant NPS planning documents as being of significance. This determination is based on the thorough analysis of environmental impacts described in the EA, relevant scientific studies, the comments provided by the public and others, and the professional judgment of decision makers guided by NPS management policies.

As required by federal law, for the preferred alternative, below are impairment findings for the analyzed impact topics. Note that such findings are not necessary for visitor use and experience and concession operations because under the Organic Act, these resources cannot be impaired in the same way as the other resources potentially impacted by the proposed project, namely historic structures, archeological resources, and vegetation.

Historic Structures

The Nature Center, Public Horse Center and Maintenance Yard are located in and around the project area. Although none of these buildings currently are listed in the NRHP, each could be potentially eligible for listing as part of a proposed expansion/update of the Rock Creek Park Historic District. The Nature Center and Maintenance Yard were constructed as part of the 1960s-era "Mission 66" park facilities improvement program, conducted nationwide between 1956 and 1966. The Public Horse Center supports an early planning mission of Rock Creek Park, as horse trails have played an integral role in park operations since 1890.

Under the preferred alternative, historic structures will not be impaired. Although at least the Nature Center and Public Horse Center are necessary to fulfill the purposes for which the park was established, key to opportunities for enjoyment within the park, and identified as significant resources in the park's planning documents, the preferred alternative does not constitute an impairment because it does not cause a major, adverse impact to these resources. Indeed, all adverse impacts of the preferred alternative on the structures in question are minor.

Archeological Resources

Archeological investigations have been conducted within the APE for the proposed project. The most comprehensive effort, conducted between 2003 and 2007, revealed two sites located outside the APE, but within the vicinity of the proposed project. They are (1) the Dos Passos Bower Site, a 19th century tenant residence located southwest of the project area, to the west of Glover Road; and (2) a prehistoric site located southeast of the Nature Center and east of the project area. A small portion of a third site, the Nature Center Quarry (discovered during the 1970s), is located within the APE, but outside the Limits of Disturbance (LOD).

Additionally, archeological inquiries suggest the existence of a potential site within the project area. Next to the Dos Passos property is a parcel of land formerly owned by the McKeown family. An 1892 map indicates that there was a home site located near the center of this property, where the Maintenance Yard or the parking lot for the Nature Center exists today. Still, the comprehensive investigation covered the area between Glover Road and the parking lot, and with the exception of the Passos Bower Site, no archeological site was discovered. Furthermore, archeological testing performed by the NPS revealed no resources along the water main alignment.

Under the preferred alternative, archeological resources will not be impaired. Although archeological resources are necessary to fulfill specific purposes identified in the park's establishing legislation and are

key to the cultural integrity of the park, the preferred alternative does not constitute an impairment because there are no resources that would likely be affected.

Vegetation

In general, vegetation types found throughout the District of Columbia are the same as those found in Rock Creek Park. However, Rock Creek Park is unique, preserving the largest contiguous forest in the area, providing habitat for much of the city's wildlife, and acting as an important contributor to the region's biodiversity. Approximately 80 percent (1,662 acres) of Reservation 339 is covered with mature second growth forest that is approximately 120 years old. Woodlands currently in the park are a mixture of deciduous species typical of eastern forests in the later stages of succession (NPS 2005). Inventories of park vegetation have found 238 non-native plant species within the park, 42 of which are classified as invasive, non-native species that, unless controlled, are likely to spread and adversely affect native plant populations.

Under the preferred alternative, vegetation will not be impaired. Although vegetation, in general, is necessary to fulfill specific purposes identified in the park's establishing legislation and is key to the natural integrity of the park and to opportunities for enjoyment of the park, the preferred alternative does not constitute an impairment because it does not cause a major, adverse impact on vegetation. Indeed, all adverse impacts of the preferred alternative on vegetation are minor.

APPENDIX B – THIRD-PARTY LETTERS



IN REPLY REFER TO:

United States Department of the Interior

NATIONAL PARK SERVICE
National Capital Region
Rock Creek Park
3545 Williamsburg Lane, N.W.
Washington, D.C. 20008-1207



H30 (NCA-ROCR)

JUN 18 2009

David Maloney
State Historic Preservation Officer
Historic Preservation Division, Office of Planning
2000 14th Street, NW, 4th Floor
Washington, D.C. 20009

Dear Mr. Maloney:

The National Park Service (NPS) is currently working on an Environmental Assessment (EA) for the installation of a new water main for Rock Creek Park. The area of work for this EA is located along Glover Road, NW, with a starting point of Military Road and ending in Rock Creek Park's maintenance yard. The NPS needs to install this water main to provide adequate water pressure and volume for three structures that are lacking proper fire suppression systems.

We are working on the draft EA. The EA will govern only the new water main from Military Road to the Maintenance Facility in Rock Creek Park. We would appreciate any comments or suggestions you may have regarding important factors that should be considered and if there are any concerns within the project area that your agency feels need to be addressed please inform us.

If you have any questions regarding this project, please contact Environmental Protection Specialist Joe Kish on 202-895-6079. Please forward any additional concerns or issues directly to my office.

Sincerely,

Adrienne A. Coleman
Superintendent, Rock Creek Park

Bcc:
ROCR-CCox
ROCR-MKish
ROCR-SMoffett
ROCR-JKish
rocr.files: ~~26~~ H30

GOVERNMENT OF THE DISTRICT OF COLUMBIA
STATE HISTORIC PRESERVATION OFFICE



Simone
Joe K.
orig-file



July 10, 2009

Ms. Adrienne A. Coleman
Superintendent, Rock Creek Park
3545 Williamsburg Lane, NW
Washington, DC 20008

RE: Rock Creek Park Water Main EA, Washington D.C.

Dear Ms. Coleman:

Thank you for providing notification of the pending Environmental Assessment (EA) for the proposed Rock Creek Park Water Main to the D.C. State Historic Preservation Office (DC SHPO). Although the EA is still in preparation I have reviewed the information you provided and am writing to return my initial comments. These comments are attached as a PDF for your information.

If you should have any questions or comments regarding this matter, please feel free to contact me at ruth.troccoli@dc.gov or 202-442-8836. Otherwise, we very much look forward to working with you and others to complete the review process for this important undertaking.

Sincerely,

Ruth Troccoli
City Archaeologist
DC State Historic Preservation Office

Enclosure
09-148

Section 106 Technical Review - Archaeology

Project Location: Rock Creek Park along Glover Rd. from intersection at
Military Rd. south to NPS maintenance yard
Project Title: Rock Creek Park Water Main
Landmark/District: Rock Creek Park
Received: July 10, 2009
H.P.A. Number: 09-148
Staff Reviewer: Ruth Troccoli, Ph.D., SHPO Archaeologist

Project Description:

Construction of a new water main for Rock Creek Park. Subsurface ground disturbance will occur as part of the project.

Resource Potential:

The alignment as described will go through an area where a historic archaeological site (51NW181) was identified by Phase I testing (Fiedel et al. 2008). The general area was also part of a Phase I reconnaissance survey conducted by the NPS in 1985 (Inashima 1985) but no testing occurred in the proposed project area.

Approximately 40 archaeological sites have been identified in Rock Creek Park north of the National Zoo to date, including in the immediate vicinity of the proposed undertaking. Only portions of the proposed location of the project have been surveyed for buried resources, so there may be unidentified resources present in the area.

Recommendations:

A Phase I identification survey should be conducted for untested areas of the proposed water main alignment prior to initiating any ground disturbing activities for the project.

References Cited:

Fiedel, Stuart, John Bedell, Charles LeeDecker, Jason Shellenhamer, and Eric Griffiths
2008 "Bold, Rocky, and Picturesque" Archeological Identification and Evaluation
Study of Rock Creek Park, Vol. II. Prepared by The Louis Berger Group, Inc. for Rock
Creek Park, National Park Service. DC SHPO Archaeological Report # 352.

Inashima, Paul Y.

1985 An Archaeological Investigation of Thirty-one Erosion Control and Bank
Stabilization Sites Along Rock Creek and Its Tributaries. Prepared by the U.S. National
Park Service Denver Service Center Northeast Team, Seneca, Maryland for the Rock
Creek and Rock Creek Potomac Parkway, Washington D.C. DC SHPO Archaeological
Report # 148.





IN REPLY REFER TO:

United States Department of the Interior

NATIONAL PARK SERVICE

National Capital Region
Rock Creek Park
3545 Williamsburg Lane, N.W.
Washington, D.C. 20008-1207



L76 (NCR-ROCR)

JAN 25 2011

David Maloney
District of Columbia Historic Preservation Officer
Historic Preservation Office, Office of Planning
2000 14th Street, NW, 4th Floor
Washington, D.C. 20009

Dear Mr. Maloney:

We are writing to update you regarding a proposed fire suppression project in Rock Creek Park. As noted in previous correspondence, the project would entail installing sprinkler systems at three locations – the Nature Center, Public Horse Center, and Maintenance Yard (see attached map). To supply water to these systems, a new water main would be installed, starting at Military Road, NW, and extending to the Maintenance Yard, with branches delivering water to the Nature Center and Public Horse Center.

Since our last letter, the National Park Service has initiated an Environmental Assessment/Assessment of Effect (EA/AoE) for this project to comply with the National Environmental Policy Act and Section 106 of the National Historic Preservation Act. In accordance with Section 800.8(3)(c) of the Advisory Council on Historic Preservation's regulations (36 CFR 800), we are formally notifying your office of our intention to use the EA/AoE to fulfill all of our compliance obligations under Section 106. The EA/AoE will contain an assessment of effect for all cultural resources potentially affected. We hope that it will be available for your review and comment later this year.

Drawing upon your agency's expertise, please provide feedback, if any, regarding concerns or issues that you would like addressed in the EA/AoE. If you have any questions, please contact Environmental Protection Specialist Michael Buckler on 202-895-6076 or Michael_Buckler@nps.gov.

We look forward to receiving your input.

Sincerely,

Stephen Syphax
Acting Superintendent, Rock Creek Park

Enclosure

GOVERNMENT OF THE DISTRICT OF COLUMBIA
STATE HISTORIC PRESERVATION OFFICER



February 18, 2011

Mr. Stephen Syphax, Acting Superintendent
National Park Service
Rock Creek Park
3545 Williamsburg Lane, NW
Washington, DC 20008-1207

RE: Forthcoming Environmental Assessment (EA) for the Proposed Fire Suppression Project
(Sprinkler Systems Installation) at the Nature Center, Public Horse Center and Maintenance
Yard; Rock Creek Park

Dear Mr. Syphax:

Thank you for notifying the DC State Historic Preservation Office (SHPO) that the National Park Service (NPS) intends to develop an Environmental Assessment (EA) and use the National Environmental Policy Act (NEPA) document and review process to fulfill the requirements of Section 106 of the National Historic Preservation Act for the above-referenced undertaking in accordance with 36 CFR 800.8(3)(c). We look forward to reviewing and commenting on the EA. In the meantime, we offer the following initial comments regarding effects on historic properties.

A cursory review of the Rock Creek Park National Register of Historic Places nomination revealed that most of the subject buildings are described as “modern development” which are “low-lying utilitarian buildings constructed of cinderblock, wood and steel.” While the Nature Center is also described as having “the most distinctive architectural design of the group,” and apparently incorporates a portion of a 1935 frame building, it appears that the fire suppression project would be unlikely to constitute an adverse effect on any of these buildings which may contribute to the Rock Creek Park Historic District – especially if the sprinkler systems are installed in a manner that is consistent with *The Secretary of the Interior’s Standards for Rehabilitation*. We will provide further comments regarding effects on the historic built environment once we have an opportunity to review the additional information contained in the EA.

With regard to archaeology, there are three identified archaeological sites in the project vicinity but all are outside the proposed location of the water line. The nearest site is a National Register-eligible prehistoric quarry (51NW002, Nature Center Quarry), and the other two have not been evaluated (51NW167 and 51NW181). The important point is that it appears that the footprint of the proposed line has not been previously surveyed or tested for the presence of sites. The project footprint is located between two survey parcels that were tested during the 4-year Rock Creek Park archaeological survey conducted by the Louis Berger Group (see the map in the project report) (Fiedel et al. 2009:39). The report does not specify a rationale for excluding this particular area from the survey, but it is possible that it is known to be disturbed; Dr. Stephen Potter should be able to address that issue. If portions of the proposed project footprint are disturbed, then those areas can be excluded from archaeological testing. Otherwise, it appears that archaeological testing is needed to ensure that significant archaeological resources are not present in the proposed project footprint.

Mr. Stephen Syphax
Forthcoming EA for Proposed Fire Suppression Project (Sprinkler Systems Installation); Rock Creek Park
February 18, 2011
Page 2

If you should have any questions or comments regarding this matter, please contact me at andrew.lewis@dc.gov or 202-442-8841. Questions relating to archaeology should be directed to Dr. Ruth Troccoli at ruth.troccoli@dc.gov or 202-442-8836. Otherwise, thank you for providing this initial opportunity to review and comment.

Sincerely,



C. Andrew Lewis
Senior Historic Preservation Specialist
DC State Historic Preservation Office

09-148 & 11-079

References Cited:

Fiedel, Stuart, John Bedell, Charles LeeDecker, Jason Shellenhamer, and Eric Griffiths
2008 "Bold, Rocky, and Picturesque" Archeological Identification and Evaluation Study of Rock Creek Park, Vol. II.
Prepared by The Louis Berger Group, Inc. for National Capital Region, National Park Service, Washington, D.C. DC SHPO
Archeological Report # 352.

"Dettman, Shane" <shane.dettman@ncpc.gov>
 02/23/2011 06:06 PM To
 "'michael_buckler@nps.gov'" <michael_buckler@nps.gov>
 cc
 "Dettman, Shane" <shane.dettman@ncpc.gov>, "Levy, David W."
 <david.levy@ncpc.gov>
 bcc
 Subject
 Rock Creek Park Projects (Regenerative Stormwater Conveyances / Fire
 Suppression System)
 History:
 This message has been replied to.

Michael,

It was nice talking with you this afternoon and I appreciate you spending a little time describing the Fire Suppression System and Regenerative Stormwater Conveyances (RSC) projects to me. As I mentioned to you, given that these projects are located on federal land in the District of Columbia, they are subject to NCPC review and approval pursuant to Section 5 of the National Capital Planning Act. As we discussed, specific to the Fire Suppression project, I will brief our Director of Urban Design and Plan Review, David Levy, and we will determine whether this project can be exempt from NCPC review per our submission guidelines. Based on your description of the RSC project, this project will definitely need to be submitted for review.

As NCPC has approval authority over both of these projects we also have an individual responsibility to satisfy the requirements of NEPA and Section 106. Our rules require that we work with applicants to develop NEPA documentation that both agencies can rely upon to complete the necessary environmental compliance. Therefore, at your earliest convenience I'd like to request that you share both EA's that have been prepared for these projects so that we can assess whether they contain the information we'll need to complete our review. Any correspondence you've had with the DC SHPO regarding Section 106 would be helpful as well.

Despite the substantial completion of the project plans and environmental documentation in advance of NCPC review, I think we may still be able to complete our review within the project timelines you described on the phone based on my current understanding of the scope of each project. This may change once we get a full understanding of the scope and complexity of each project. As a near-term next step, I recommend that we talk further about NCPC's project submission process, required submission materials, and potential submission/review dates. One of our Project Review Officers will contact you shortly to begin this discussion. In the meantime, I will discuss with David Levy whether the Fire Suppression Project can be exempt from review and get back to you once a determination is made. Finally, as a way to expedite our review of the projects I recommend that you prepare: a formal letter requesting review of the projects addressed to our Executive Director, Marcel Acosta, a complete project narrative, project maps / drawings / and renderings, NEPA and Section 106 documentation (including FONSI's), and any other materials necessary. More information on our project submission guidelines, including required submission

materials, can be found by clicking the link below.

NCPC Project Submission Guidelines

In advance of one of our team members contacting you, if you have any questions or need additional information please feel free to contact me.

Sincerely,

Shane L. Dettman, AICP
Senior Urban Planner
National Capital Planning Commission
401 9th Street, NW - Suite 500
Washington, DC 20004
202.482.7267 (o) | 202.641.0327 (c) | 202.482.7272 (f)



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, Maryland 21401
<http://www.fws.gov/chesapeakebay>



March 31, 2011

United States Department of the Interior
National Park Service
National Capital region
Rock Creek Park
3545 Williamsburg Lane, N.W.
Washington, D.C. 20008-1207



RE: Installing sprinkler systems at three locations – the Nature Center, Public Horse Center and Maintenance Yard Rock Creek Park

Dear Stephen Syphax:

This responds to your letter, received January 26, 2011, requesting information on the presence of species which are federally listed or proposed for listing as endangered or threatened in the above referenced project area. We have reviewed the information you enclosed and are providing comments in accordance with section 7 of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*).

Except for occasional transient individuals, no proposed or federally listed endangered or threatened species are known to exist within the project impact area. Therefore, no Biological Assessment or further section 7 consultation with the U.S. Fish and Wildlife Service is required. Should project plans change, or should additional information on the distribution of listed or proposed species become available, this determination may be reconsidered.

This response relates only to federally protected threatened or endangered species under our jurisdiction. Limited information is currently available regarding the distribution of other rare species in the District of Columbia. However, the Nature Conservancy and National Park Service (NPS) have initiated an inventory of rare species within the District. For further information on such rare species, you should contact Mary Pfaffko of the National Park Service at (202)-535-1739.

Effective August 8, 2007, under the authority of the Endangered Species Act of 1973, as amended, the U.S. Fish and Wildlife Service (Service) removed (delist) the bald eagle in the lower 48 States of the United States from the Federal List of Endangered and Threatened Wildlife. However, the bald eagle will still be protected by the Bald and Golden Eagle

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Protection Act, Lacey Act and the Migratory Bird Treaty Act. As a result, starting on August 8, 2007, if your project may cause "disturbance" to the bald eagle, please consult the "National Bald Eagle Management Guidelines" dated May 2007.

If any planned or ongoing activities cannot be conducted in compliance with the National Bald Eagle Management Guidelines (Eagle Management Guidelines), please contact the Chesapeake Bay Ecological Services Field Office at 410-573-4573 for technical assistance. The Eagle Management Guidelines can be found at:
<http://www.fws.gov/migratorybirds/issues/BaldEagle/NationalBaldEagleManagementGuidelines.pdf>.

In the future, if your project can not avoid disturbance to the bald eagle by complying with the Eagle Management Guidelines, you will be able to apply for a permit that authorizes the take of bald and golden eagles under the Bald and Golden Eagle Protection Act, generally where the take to be authorized is associated with otherwise lawful activities. This proposed permit process will not be available until the Service issues a final rule for the issuance of these take permits under the Bald and Golden Eagle Protection Act.

An additional concern of the Service is wetlands protection. Federal and state partners of the Chesapeake Bay Program have adopted an interim goal of no overall net loss of the Basin's remaining wetlands, and the long term goal of increasing the quality and quantity of the Basin's wetlands resource base. Because of this policy and the functions and values wetlands perform, the Service recommends avoiding wetland impacts. All wetlands within the project area should be identified, and if alterations of wetlands is proposed, the U.S. Army Corps of Engineers, Baltimore District, should be contacted for permit requirements. They can be reached at (410) 962-3670.

We appreciate the opportunity to provide information relative to fish and wildlife issues, and thank you for your interests in these resources. If you have any questions or need further assistance, please contact Devin Ray at (410) 573-4531.

Sincerely,



Leopoldo Miranda
Field Supervisor

APPENDIX C – WATER DISTRIBUTION ANALYSIS FOR FIRE SUPPRESSION SPRINKLER SYSTEMS



Task 6 – Report of Findings and Recommendations For Repair and Replacement

AND

Task 7- Cost Estimates



Task Order #7 Survey of Rock Creek Park Water Distribution System, Public Stable, Nature Center and Park Maintenance Facility

**Prepared by:
Dewberry
Fairfax, Virginia.**

**FINAL REPORT
September 2007**

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APPENDIX F:	DCWASA STANDARDS, CONNECTION PERMITS AND APPLICATION FORMS & FEES

ATTACHMENTS

1. Water Distribution Map (Identifies Existing and Proposed Water Lines by a Prefix Number and Identifies System Demands by a Prefix Number referred to as a "Node")
2. National Park Service Maps to Identify Recommended Water System Improvements, dated September 2007. (Under Separate Cover)

BIBLIOGRAPHY

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I. INTRODUCTION:

The aim of this study is to provide fire protection to three buildings located in the central area of Rock Creek Park, namely the Maintenance Facility, Public Stables and Nature Center with an emphasis on the Public Stables.

Rock Creek Park is located in northwest Washington DC and the area in the park under consideration is located near the intersection of Military and Glover Roads. The facilities of interest are served by a water distribution system that was installed in the 1950's and appears to be in need of repair to meet fire flow requirements. The Park's water system connects to the District of Columbia Water and Sewer Authority (DCWASA) system via a connection to a 12-inch line on Military Road.

The standards followed in the analysis were those set forth by the National Fire Protection Association in NFPA 13, *Standard for the Installation of Sprinkler Systems*. This *standard* establishes the sprinkler supply needs and the types of supply that are acceptable. Compliance with the standard greatly improves the protection of life and property from fires. Also, the document 'Management Policies – The Guide to Managing the National Parks System', a document prepared by the National Parks Service was consulted and served as a guide in preparing this report.

The facilities at Rock Creek Park were classified in accordance with NFPA 13 standards for sprinkler installations. Occupancy classifications under NFPA 13 relate to sprinkler installations and their water source only and are not intended to be a classification of "occupancy hazard". The occupancy classifications in this standard consider the fire loading and expected severity of a fire. In accordance with NFPA 13, the Stables and Maintenance Buildings would be classified in the category 'Ordinary Group 2 Dry Pipe,' whereas the Nature Center would be classified as a Light Hazard Wet Pipe facility.

For more information on each facility such as square footage, occupancy hazard, estimated hydraulic demands and other features, refer to **Appendix A.1**.

The purpose of this task is to model, calibrate, simulate and evaluate the existing water distribution system using *WaterCAD* modeling software to identify weaknesses in the distribution system that reduce its ability to meet what has been determined as acceptable performance; and, to investigate alternative improvements necessary to provide adequate domestic needs, coupled with sprinkler demands, and hose stream allowance, where possible, for each building for full compliance with NFPA 13.

It should be noted that the Arena Building will not be sprinklered and has therefore been excluded from consideration in this report.

II. CURRENT WATER INFRASTRUCTURE

Water to Rock Creek Park is supplied by DCWASA via a connection at the corner of Military and Glover Roads. Meter readings for 2006 are included in **Appendix A2**. The service connection from DCWASA that feeds the Park consists of a 12-inch line that runs along Military Road. (See sketch in **Appendix A3**).

Fire hydrant tests were conducted by Dewberry and the National Park Service (NPS) at Rock Creek Park on the 5th day of March, 2007. Results of the fire hydrant flow tests are provided in **Appendix A4**. In general the pressures and flows from the hydrants were low.

According to maps obtained from the National Parks Service, the water mains in the park are 8-inches in size. Lateral line sizes were found to be 2-inches in diameter for the Maintenance Yard, 4-inches for the Horse Center and 3-inches for the Nature Center. None of the above buildings are currently sprinklered but there are firebreak walls installed at the Maintenance Building.

A field survey was conducted by Dewberry to gather utility location and other data of interest and that information has been compiled in CAD drawings to be submitted under separate cover.

III. SYSTEM REQUIREMENTS AND ASSUMPTIONS

A. Building and Fire Code Requirements

Sprinkler systems should function properly and meet the requirements of NFPA 13. This analysis attempts to fully comply with NFPA 13 requirements where reasonably possible to meet sprinkler flow demand, plus hose stream allowance, coupled with maximum daily domestic demands.

B. Projected Water Consumption

Domestic Demand:

Average Daily Consumption: = 3,252 gpd
(Based on DCWASA Water Meter Readings)

Peak Daily Consumption:
(Using a Max Daily Peaking Factor of 4) = 13,008 gpd

Sprinkler Demand:

Sprinkler Demand per NFPA 13: The estimated hydraulic demands for the sprinkler systems are based on the area/density method, since the buildings do not appear to have 30-minute fire separation (minimum for Light Hazard, 1 hour minimum for Ordinary Hazard) between compartments, except for the Maintenance Yard. Since the sprinkler flow requirements at the Horse Center are high, the sprinkler calculations were performed with and without a one-hour fire partition.

The facilities within the Parks generally fall within the following two occupancies:

Light Hazard Occupancy: Nature Center

0.1 gpm/Sq. ft for the most remote 1500 Sq. ft = 150 gpm and with an allowance for flow buildup = 250 gpm minimum

Ordinary Hazard Group 2 systems for maintenance occupancies: Stables and Maintenance Building.

0.2 gpm/Sq. ft for the most remote 1500 Sq. ft. = 300 gpm and with an allowance for flow build up = 500 gpm minimum

These values can be higher with area allowances for dry pipe systems, combustible concealed spaces, and steeply pitched roofs. Typically, if a fire pump is required, the designer will often make use of the available additional pressure to reduce pipe sizes. This can raise the supply flow requirements considerably due to flow build up in the smaller piping. It is often necessary to restrict the designers flexibility in this regard by specifying a maximum permitted flow (a realistic value must be specified).

NFPA 13 requires an allowance in the sprinkler water supply volume for hose streams. This value is 100 gpm for light hazard occupancies and 250 gpm for ordinary hazard occupancies. Unless inside hose stations are provided at the

judgment of the Park Service, these flow allowances would be applied to the water supply system outside the structure and before the connection to the sprinkler risers. NFPA 13 also requires that the sprinkler system still have operational pressure with the hose allowances applied so that the hose stream does not “starve” the sprinkler system. Although a strict requirement of NFPA, we did not consider this pressure maintenance a requirement for the sprinkler system unless a fire pump is used. The only hose streams involved will be those manned by the fire department from a pumper connection. This same pumper connection would be used to overcome the pressure loss in the sprinkler system due to the hose stream demand. Where the building has a fire pump, the suction pressure of the fire pump is considered to be that available with the hose stream applied.

C. Sprinkler Demand Plus Hose Stream Allowance for Each Facility

Table 1 – Sprinkler Demands for Facilities Requiring Fire Suppression

Facility	Sprinkler Requirements (gpm)	Pressure @ Base of Riser (Sprinkler Flow Only (psi))	Hose Stream Allowance (gpm)
Horse Center	915	91.5	250
Horse Center w/ partitions	675	80.3	
Maintenance Yard	797	82.3	250
Maintenance Yard (Using larger sprinkler pipes)	707	67	250
Nature Center	225	60	100

For additional information, refer to Fire Protection Notes, **Appendix A.1**.

D. Minimum Pressure and Maximum Velocity Criteria

Water lines should be designed to ensure the following criteria are met:

- Meet hose stream and sprinkler demands occurring at the same time while maintaining the required residual pressure for sprinkler flow at the base of the riser.
- Maintain a maximum line velocity less than 10.0 feet per second during all conditions of flow.
- Meet average or peak daily demand while maintaining a residual pressure of at least 30 psi at all locations.

E. Pipe Sizes and 'C' Values

The existing water distribution system consists of water lines that are nearly 50 years old, and vary in line size from 2-inch to 8-inch in diameter. Some lines are newer than others, but a conservative coefficient of friction (C value) was used because the water lines are old and to account for fittings losses in the system. See **Table 2** below for a list of the C values used.

Table 2: Coefficient of Friction Factors Used

<u>Ductile Iron Pipe</u>	<u>C-Factor</u>
2-inch	70
3-inch	70
4-inch	70
6-inch	70
8-inch	90
10-inch	100
12-inch	120

IV. METHODOLOGY

The computer simulations were run using a *WaterCAD* Version 8.0 pipe flow program. The program determines the total available flow at a single junction while maintaining the minimum required residual pressure. Before performing the analysis, water demands, pipe sizes, pipe lengths and pipe node elevations were input into the model, along with system demands at various nodes or junctions.

A. Calibration

For data entry into *WaterCAD*, existing pipe diameters, pipe lengths, nodes and elevations were obtained from the CAD drawings provided by the Park Service, survey data gathered by Dewberry and existing maps of the area.

The standard method of modeling a connection to an existing system (DCWASA System in this case) in *WaterCAD* is to use a pump and reservoir to simulate the pressure drops and the available flow from the system. Data for simulation would typically come from fire hydrant tests carried out close to the connection point with the system. Fire hydrant tests at the connection point were done by DCWASA (See **Appendix A5**) and fire hydrant tests inside of the park were done by Dewberry and NPS.

Based on the hydrant tests conducted by DCWASA and Dewberry, it was found that the flows obtained were low considering the diameter of the pipe conveying the water. From calculations performed to determine the coefficient of friction along the existing waterline, it was discerned that there were large friction losses over the entire length of the water main, too big even for a waterline of this age. Therefore, it would appear that something is restricting the flow upstream of where the hydrant tests were conducted. This could be caused by a clogged strainer just upstream of the water meter, or a partially closed gate valve on either side of the water meter. The source of the restriction was investigated by DCWASA, who reached the conclusion that the source of the problem is the water meter and not a closed gate valve; DCWASA has proposed to replace the existing water meter. At that time it is recommended that a strainer not be used at all to prevent the possibility of a 'dirty' strainer restricting flow in the event of a fire and causing loss of life or damage to property.

B. Options Investigated

To provide fire protection to all facilities within Rock Creek Park, the following options were investigated:

- A. No improvements, or the "do nothing" option.
- B. New water mains and building connections (fire lines) only.
- C. New water mains, fire lines and a below-grade water booster pump station on the incoming line supplying Rock Creek Park.
- D. New water mains, fire lines and an elevated storage tank.
- E. Fire Pumps at specific building locations, new water mains and fire lines.

V. RESULTS OF WATER DISTRIBUTION SYSTEM ANALYSIS

What follows is a discussion of the results of the hydraulic analysis. For each scenario, an assessment was made to determine if each building could meet maximum day system demands, plus the required sprinkler flow, for partial compliance with NFPA 13; or full compliance with the addition of hose stream allowance. Refer to **Table 1**, page 6, for demands. Due to poor pressure found in the existing system coupled with high fire demands it is assumed at a minimum that the DCWASA meter was upsized from 6 to 10 inches in size and the water line ahead of the meter was upsized from 8 to 12 inches in diameter. In addition since a backflow prevention valve is a requirement at

all connections to the DCWASA system; a 12-inch backflow prevention valve has been included in both scenarios. **Appendix B** shows the results of the analysis for each scenario.

A. No Improvements, or 'Do Nothing' Option

Without line changes or the use of pumps, none of the buildings can meet fire sprinkler requirements for partial or full compliance with NFPA 13. The results of the water analysis show that negligible amounts of flow could be obtained at the base of the riser, while maintaining the required residual pressure. Therefore at the very least, it is necessary to upgrade the existing water mains or laterals or both to provide adequate fire protection.

B. New Water Main and Building Connections (Fire Lines)

This scenario simulated the installation of approximately 2,260 feet of 12-inch water main laid parallel to the existing 8-inch water main and 264 feet of 12-inch water laterals installed adjacent to the existing domestic laterals, thus providing a separate fire line to each building. The existing 8-inch water main between the water meter and the 12-inch DCWASA line on Military Road, was replaced with a 12-inch line. If this is to be implemented in practice, then a number of permits will need to be obtained from DCWASA. An explanation of the permitting process, required fees and some of the required application forms are attached in **Appendix F**. In addition, the existing 6-inch water meter was replaced in the model with a 10-inch water meter.

As in the scenario above, the results of the analysis show that the sprinkler pressure and flow requirements cannot be met by providing only new water mains and fire lines to individual buildings.

C. New Water Mains, Fire Lines and a Booster Pump Station

The waterline upgrades for this scenario are the same as Option B above but also include the addition of a 60 horsepower booster pump station installed on the proposed 12-inch water main close to the Nature Center parking lot.

The results of this analysis show that the required pressures and flows for sprinkler use could be met for all the buildings under consideration, including a 250 gpm demand for hose stream allowance. Therefore if this option were implemented, the buildings under consideration would be fully compliant with NFPA 13.

D. New Water Mains, Fire Lines and Elevated Storage Tank.

This scenario involves the use of an elevated storage tank with a height of 100 feet, and the installation of approximately 2,260 linear feet of water main, and 264 linear feet of 12-inch fire lines.

The result of this analysis shows that neither partial nor full compliance with NFPA 13 requirements could be achieved for any of the buildings.

E. Installation of Fire Pumps at Buildings, New Water Main and Fire Lines.

This scenario is the same as Option C, except that fire pumps will be used in each building to provide the pressure and flow needed for fire suppression.

The results for this scenario show that full compliance with NFPA 13 is achieved after implementation.

Table 3: Water Laterals Requiring Upsizing

Buildings Served (See Appendix B)	Length	From	To (Option B, D)	To (Option C, E)
Nature Center	127 ft.	3"	12"	8"
Horse Center	71 ft	4"	12"	12"
Maintenance Yard	66 ft.	2"	12"	12"

Table 4: Pump Sizes

<u>Location</u>	<u>Pump Size</u>
Booster Pump (Option C)	60 HP Split Case Pump
Nature Center (Option E)	15 HP Split Case Pump
Horse Center (Option E)	60 HP Split Case Pump
Maintenance Yard (Option E)	30 HP Split Case Pump

VI. EVALUATION OF THE OPTIONS**Option A: Do Nothing:**

This option is not viable because the existing infrastructure falls woefully short in providing the necessary pressure and flow to enable the sprinklers in the buildings to

work. In addition, the water lines in the park are nearly fifty years old and will require at least minimal attention to maintain even the current level of domestic service.

Estimated Cost Option A: No Cost

Option B: Upsizing of Water Mains and Providing New Fire Lines to Individual Buildings:

This option, like the first, does not provide a single building with the necessary pressure and flow to enable sprinklers to function properly. Therefore, this option is not viable either.

Estimated Cost Option B: No cost estimate provided (Not a viable option).

Option C: Use of an In-Line Booster Pump Station, and New Water Mains and Fire Lines:

Option C is a viable option to consider since it does enable all the buildings to comply fully with NFPA 13.

There are less pumps to maintain with the implementation of this option but telemetry and other equipment adds to the maintenance requirements of this option.

If this option is to be implemented, a site location needs to be identified for the booster station. One potential site would be the parking area at the Nature Center where good access to the pumps is available.

Estimated Cost Option C: \$830,000

Option D: Use of a Storage Tank, New Water Mains and Fire Lines:

In this option, the requirements of NFPA 13 could not be met despite the use of a relatively tall tank (100 feet in height from the base). In addition, the presence of a 100 foot tank in the park would present an aesthetic challenge.

Estimated Cost Option D: No cost estimate provided (Not a viable option).

Option E: Fire Pumps Inside Each Facility, New Water Mains and Fire Lines:

Option E complies fully with the requirements of NFPA 13 and is therefore a viable consideration. A drawback this option presents, as opposed to Option C, is that there are physically more pumps in this option and therefore more units to maintain. However since fire pumps inside a building are easier to access than booster pumps below grade, Option E offers more convenience than Option C for maintenance related

work and pump replacement. Also Option C presents more of a challenge when trying to do work such as upgrading of the pump station, since the pumps are below grade. For these reasons, it appears that Option E is the more practical choice of the two.

In discussions with the National Park Service, it became apparent that Option E is preferred over Option C. It was also decided that fire protection for the Public Stables needed to be prioritized over the other facilities since it is in use much of the day and houses horses twenty-four hours a day. It also contains a large quantity of flammables and is therefore most vulnerable to fire. The cost to provide fire protection for this facility alone is therefore provided below and a detailed break-down of the costs is provided in the next section.

Estimated Cost Option E (Public Stables): \$442,000

Estimated Cost Option E (Nature Center & Maintenance Building): \$308,000

VII. PRELIMINARY COST ESTIMATES FOR THE VIABLE OPTIONS

Of the five options discussed above, Options C and E are the most viable options based on their ability to fully or partially comply with NFPA 13. The estimates summarized below, include all identified costs necessary to provide partial or full compliance with NFPA 13 for all facilities.

The estimates are raw construction costs only and do not include any allowance for unknown or difficult construction conditions within or outside of the existing buildings. The discussion below is based on the assumption that the design of the sprinkler system has been completed and that the funds to install sprinklers have been secured. Therefore, the cost to provide sprinklers is not considered herein.

Option C: Booster Pump Station with New Water Mains and Fire Lines

The costs associated with the construction of a below grade, pre-packaged booster pump station are shown below, as well as the costs associated with construction of approximately 2,400 feet of 12-inch water mains and laterals, 153 feet of 8-inch laterals, a new 10-inch water meter, a 12-inch backflow prevention valve and permitting costs for making a new connection to the DCWASA system.

1. <u>Pre-packaged Water Booster Pump Station Costs:</u>		
Prepackaged Pump Station and Start-up costs		\$ 100,000
Pump Station Installation and Connecting		\$ 20,000
SiteWork		\$ 15,000
Electrical		\$ 29,000
Telemetry		\$ 20,000
Generator Set		\$ 50,000
Sub-Total		<u>\$ 234,000</u>
Including 15 % Contingency		<u>\$ 269,100</u>
2. New Fire Lines (Worksheets 1 thru 3 in App. C)		<u>\$96,188</u>
3. New Water Mains		<u>\$464,167</u>
<u>Estimated Cost Option C</u>		<u>\$829,455</u>
	Rounded	<u>\$830,000</u>

Option E: Individual Fire Pumps, New Water Mains and Fire Lines

The costs associated with this option include 2,400 feet of 12-inch water mains and laterals, 153 feet of 8-inch laterals, a new 10-inch water meter, a 12-inch backflow prevention valve and the associated work including permitting costs to connect to the DCWASA system. As stated earlier, the costs associated with this option will be divided in to two parts. The first part covers the cost necessary to provide fire protection to the Public Stables and the second part, the cost of providing fire protection to the remaining facilities.

Option E - Part 1 :Cost of Upgrading the System for the Public Stables

1. New Fire Lines (Worksheet 2, Appendix. C1)	\$30,678
2. New Water Mains (Worksheet 2 Appendix C2)	\$398,297
3. Cost to replace three existing hydrants	\$13,000
<u>Estimated Cost</u>	<u>\$441,975</u>
	Rounded <u>\$442,000</u>

Option E – Part 2: Cost of Upgrading the System for the Remaining Facilities

1.	New Fire Lines (Worksheets 1 & 3 in App. C1)	<u>\$65,510</u>
2.	New Water Mains (Worksheet 2 Appendix C2)	<u>\$242,076</u>
	<u>Estimated Cost</u>	<u>\$307,586</u>
	Rounded	<u>\$308,000</u>

VIII. RECOMMENDATIONS

From the water system analysis results, it was determined that only two viable options were Option C and E. A cost comparison of the two shows Option E to be less expensive and as discussed above, more operator friendly.

Although providing fire protection to the buildings in accordance with NFPA 13 was the primary objective in the execution of this Task Order, there are other recommendations that should be undertaken to improve the distribution system on which fire protection relies; such as, ensuring that DCWASA maintains and exercises the new water valves, meter and backflow prevention valve. It is highly recommended that a strainer ahead of the meter be omitted to avoid the accumulation of debris resulting in pressure losses that may adversely affect fire protection.

It was also noticed that all the hydrants inside the park appear to be old and at least 2 of the hydrants (hydrants 2 and 3) were found to be leaking. It is therefore recommended that all the hydrants be replaced and routinely exercised except for the hydrant near the stables which appears to be in good working order.

Directional drilling was investigated as an option to the traditional methods of installing water mains. The costs associated with directional drilling was found to be generally about the same as open cut methods, however directional drilling could reduce installation time by as much as much as a 50%. Directional drilling is also far less disruptive of everyday activities at the park and requires far less restoration work at the end of construction. It is suggested that the use of directional drilling be further investigated during the design stage.

IX. PRIORITIES

FIRST PRIORITY: *Implement Option E-Part 1* : Initiate all or part of the recommended improvements defined above as **Option E- Part 1** to include the

installation of a new 12-inch DCWASA connection, a new 10-inch water meter, a 12-inch backflow preventer, new water lines up to the Public Stables and replacement of three hydrants.

Total Estimated Cost: \$442,000 (2007 dollars)

Prioritization of Work Under Option C:

Further break down of the costs associated with Option E-Part 1 is not possible without compromising the fire suppression capacity of the Public Stables.

SECOND PRIORITY: *Implement Option E-Part 2:* Initiate all or part of the recommended improvements defined above as Option E- Part 2 to include the installation of the remaining 12-inch line up to the Maintenance Building and the installation of water laterals at the Nature Center and Maintenance Yard.

Total Estimated Cost: \$308,000 (2007 dollars)

APPENDIX D – NPS ARCHEOLOGICAL TESTING RESULTS



United States Department of the Interior

NATIONAL PARK SERVICE
National Capital Region
Regional Archeology Program
Museum Resource Center
3300 Hubbard Rd
Landover, MD 20785
301-832-3969

November 16, 2010

Memorandum:

To: Simone E. Monteleone, Cultural Resource Program Manager, ROCR
From: Karen L. Orrence, Archeologist, Regional Archeology Program/NCR
Subject: Archeological Testing (Section 106 Compliance) for Water Distribution System Improvements at Rock Creek Park, PMIS Number 139725

On August 24-26, 2010 Regional Archeology Program (RAP) Archeologist, Karen L. Orrence, assisted by NCR Archeological Collections Manager, Marian C. Creveling, RAP interns Grace Gutowski and Ashley Intemann, and ROCR intern Tom Forhan conducted Phase I and II archeological investigations at Rock Creek Park. Archeological testing was conducted at the request of Simone E. Monteleone, Cultural Resource Project Manager, to provide archeological clearance for the installation of a new waterline to provide fire protection to the Public Stables, Nature Center, and Maintenance Yard. Initially, archeological testing was to be conducted only for Phase I of the Water Distribution System Improvements to the Public Stables, however, upon consultation with Simone Monteleone and Steven C. Doulis, A/E Project Manager, additional archeological testing was conducted to provide archeological clearance for Phase II of the Water Distribution System Improvements Project, which included lateral waterlines to the Nature Center and Maintenance Yard. Results of the Phase I and II archeological testing will be presented separately below.

Project Description and Justification

According to the Project Management Information System (PMIS) statement (PMIS Number 13975), the existing waterline to the three facilities, installed in the 1950's, is inadequate to meet fire flow requirements for the proper installation of fire suppression systems in the three facilities. Recent testing concluded that the capacity of the existing line, even with pumps in each building, is inadequate to fight fires. Therefore, the installation of a new, 2,300-foot, 12" waterline is needed to protect Park, public and concessionaire assets and to fully comply with NPS management policies and National Fire Protection Association 13 "Standard for the Installation of Sprinkler Systems." The new waterline will be installed parallel and adjacent to the existing service lines, which

includes lateral lines to the Public Stables, Nature Center and Maintenance Yard. The existing lines will remain in place for domestic service.

Since the majority of the line will be installed using jack and boring (underground directional boring) only a few small areas along the proposed waterline required archeological testing. This includes several boring pits (designated in the field as Boring Pits A-E), a small open cut trench (designated Test Pit 1) for the installation of an air release valve (the high point along the line), two short open trenches in the vicinity of the Nature Center and Stable, and receiving pits near the Stables and Maintenance Yard. Using project maps (90% drafts), the location of the areas to be tested were identified in the field by Steven C. Doulis, A/E Project Manager, assisted by Karen Orrence, RAP Archeologist. A total of 12 shovel tests pits were excavated for the first phase of the project, while an additional 5 shovel test pits were dug to provide archeological clearance for the second phase of the project.

Archeological Phase I Testing

Archeological testing was conducted for Phase I of the Water Distribution System Improvements Project for the waterline located between Military Road and the Public Stables. Shovel tests were excavated at six locations; for Boring Pits A-C, for an open cut trench located adjacent to the Nature Center driveway, at an open cut trench for the air release valve, and for an open cut trench in the vicinity of the Stables. A total of twelve shovel test pits (STPs) were excavated along the corridor centerline.

During Phase I archeological testing, shovel tests were excavated to an average depth of 1-foot below ground surface. Shovel tests were excavated by shovel and trowel following natural stratigraphic levels, and all soils were screened through ¼-inch wire mesh. With the approval of Archeological Collections Manager, Marian C. Creveling, modern artifacts and artifacts recovered from fill deposits were noted and discarded in the lab.

Shovel Tests 1-4 were located between the project start at Military Road and Boring Pit A. Shovel Test 1, located adjacent to four utility boxes, was not excavated because of obvious ground disturbances. Shovel Tests 2 and 3 contained three natural soil strata; a thin, dark grayish brown silty loam humus overlying a 0.4-foot thick brown silty clay loam above dark yellowish brown subsoil. Two cut or wrought iron nail fragments and a piece of slag were recovered from either the humus or second soil stratum in STP 2. No artifacts were recovered from STP 3, and both shovel tests terminated within subsoil at an average depth of 1-foot below ground surface. STP 4, located at Boring Pit A, terminated in compacted fill and gravel, 1-foot below ground surface. One piece of slag, recovered from the shovel test, was discarded in the lab.

Shovel Tests 5 and 6 were located at the west and east ends of Boring Pit B, respectively. STP 5 contained the same natural soil strata as Shovel Test Pits 2 and 3 and terminated in subsoil 0.9-foot below ground surface. Nine artifacts were recovered from the first and second soil strata, including a cut bone fragment, 7 container glass fragments, and a piece of unidentifiable metal. STP 6 terminated upon the discovery of a 4-inch gray PVC pipe, located between 0.5-foot and 0.8-foot below ground surface. The unidentified pipe runs perpendicular to the hiking trail and appears to run toward the Nature Center. In addition to the pipe, 4 artifacts were recovered, including a light blue container glass fragment, probably from a Mason/Ball jar, cinder and coal, and a piece of melted glass.

STP 7 was located 5 feet from the curb of the Nature Center driveway. The southern half of the shovel test consisted of compacted fill deposits related to the construction of the drive and curb. The northern half of the shovel test contained the same natural soil strata as seen in previous shovel tests. The fill in the southern half produced 25 artifacts, including ironstone ceramic body fragments (2), a yellowware ceramic body fragment, brick fragments (2), coal and cinder (14), container glass (3), a drain tile fragment, an oyster shell and a brick facing fragment. All of these materials appear to be from a domestic site, unrelated to the Park and bought in as fill material during road construction. These materials were inventoried and then discarded in the lab.

STP 8 was placed in the woods adjacent to the Nature Center Parking lot and loop drive, at the location for a small pit (Test Pit 1) needed for the installation of an air release valve at the high point along the waterline. Four soil strata were encountered; three fill deposits over sterile subsoil, which was encountered at 0.7-foot below ground surface. A small sewer pipe fragment and a cinder were recovered from the fill.

Shovel Tests 9 and 10 were located at Boring Pit C. STP 9, located in the woods at the west end of the boring pit, contained the same natural soils as found in previous shovel tests and produced two brick fragments and a possible lithic chunk in the first two soil strata. The shovel test terminated 0.8-foot below ground surface in sterile subsoil. STP 10, located at the east end of Boring Pit C and ten feet from the edge of the road leading to the Nature Center parking lot, contained disturbed fill deposits, likely related to the construction of the road. No artifacts were recovered from this shovel test.

Shovel Tests 11-13 were located near the Stables to test for several receiving pits and an open trench which will connect the new waterline to the existing service line; this is the termination area for this phase of the waterline project. In general, these shovel test profiles revealed fill deposits related to the construction of the stable complex. No natural soil strata were encountered and shovel tests terminated at an average depth of 1.4-feet below ground surface. Only STP 13, located adjacent to the concrete sidewalk between the office and stables produced artifacts; a wire roofing nail, a modern aluminum pull tab, a cinder, and two container glass fragments. These objects were noted and discarded in the lab.

In sum, twelve shovel tests were excavated during archeological investigations for Phase I of the Water Distribution System Improvement Project. No archeological sites or significant cultural resources were identified during testing. Archeologist Karen Orrence provided Simone E. Monteleone, Cultural Resource Project Manager, with a verbal notice to proceed.

Archeological Phase II Testing

Since Phase II of the Water Distribution System Improvements Project required only an extra day of archeological testing, it was decided, upon the approval of Steven C. Doulis, A/E Project Manager, to complete the work immediately following the completion of the Phase I archeological testing. Archeological shovel testing for Phase II of the project was completed on August 26, 2010 by RAP Archeologist, Karen L. Orrence, assisted by RAP interns Grace Gutowski and Ashley Intemann.

Phase II archeological shovel testing was conducted to provide archeological clearance for the installation of lateral waterlines to the Nature Center and Maintenance Yard. In total, five shovel tests were excavated; two for the waterline to the Nature Center (Shovel Tests 1 and 2), while the remaining three (Shovel Tests 3-5) were excavated for the lateral waterline to the Maintenance Yard.

Shovel Tests 1 and 2 contained fill deposits overlying two natural soil strata. Below the modern humus in STP 2 was a thin asphalt pavement, probably the remains of an old sidewalk to the Nature Center. A single piece of colorless container glass was recovered from the modern humus in STP 2 and was noted and discarded in the lab. The natural soil strata in both shovel tests consisted of a 0.4-foot thick, brown silty loam with natural cobbles, overlying strong brown silty clay subsoil. Both shovel tests terminated 0.45-feet within the subsoil, at an average depth of 1.2 feet below ground surface. No artifacts were recovered from the natural soil strata.

STP 4 was excavated for Boring Pit E, adjacent to the bridal path near the horse corral. It should be noted that STP 3, located at Boring Pit D, adjacent to the Stables, was not excavated since this area was previously tested during Phase I testing. STP 4 contained three soil strata; the first two soil strata are fill deposits, probably related to the construction and maintenance of the bridal path since they contained a high percentage of sand, similar to that found on the bridal trail and the shovel test was placed on a small, raised berm along the very edge of the trail. The natural soil stratum, located between 1-foot and 1.45-feet below ground surface is sterile subsoil. Two modern artifacts, a window glass fragment and an olive container glass fragment were recovered from the sandy fill and were noted and discarded in the lab.

Shovel Tests 5 and 6 were excavated in the vicinity of the Maintenance Yard. STP 5 was placed in a grassy island of the maintenance yard parking lot, ten feet from an existing fire hydrant and five feet from the driveway curb. The shovel test terminated in fills, including strong brown and pinkish gray clays, 1.7 feet below ground surface. The fill may actually be the utility trench for the fire hydrant, and modern container glass (2), coal fragments, and brick fragments were recovered and subsequently discarded in the lab. STP 6 was slightly relocated in the field by Steven C. Doulis, A/E Project Manager, to avoid an existing storm drain. It was relocated ten feet from a maintenance building and ten feet from the driveway curb, under a large holly tree. Once again, only fill deposits were encountered and the shovel test terminated 1.5 feet below ground surface. No artifacts were seen in the fill.

In conclusion, five shovel tests were excavated during archeological investigations for the Phase II of the Water Distribution System Improvement Project. No archeological sites or significant cultural resources were identified during testing. Archeologist Karen Orrence provided Simone E. Monteleone, Cultural Resource Project Manager, with a verbal notice to proceed.

Summary and Recommendations

Archeological shovel testing was conducted to provide archeological clearance (Section 106 Clearance) for the installation of a new waterline to provide fire protection to the Public Stables, Nature Center, and Maintenance Yard. A total of 12 shovel tests pits were excavated for the first phase of the project, while an additional 5 shovel test pits were dug to provide archeological clearance for the second phase of the project. No archeological sites or significant cultural resources were encountered during archeological testing for both phases of the project and RAP Archeologist, Karen L. Orrence provided Simone E. Monteleone, Cultural Resource Project Manager with verbal notice to proceed.

RAP suggests that the Park and Contractor may want to slightly move Boring Pit B to avoid impacting the 4-inch PVC pipe encountered in Shovel Test 6. The 90% draft drawings for the project state that the location of the boring pit is to be determined by the Contractor, so it should be possible to slightly shift the location or shorten the boring pit, since STP 6 was located approximately 2 feet from the eastern edge of the pit. However, if the location of the boring pit is significantly changed, additional archeological testing will be required to provide archeological clearance for the new location.