

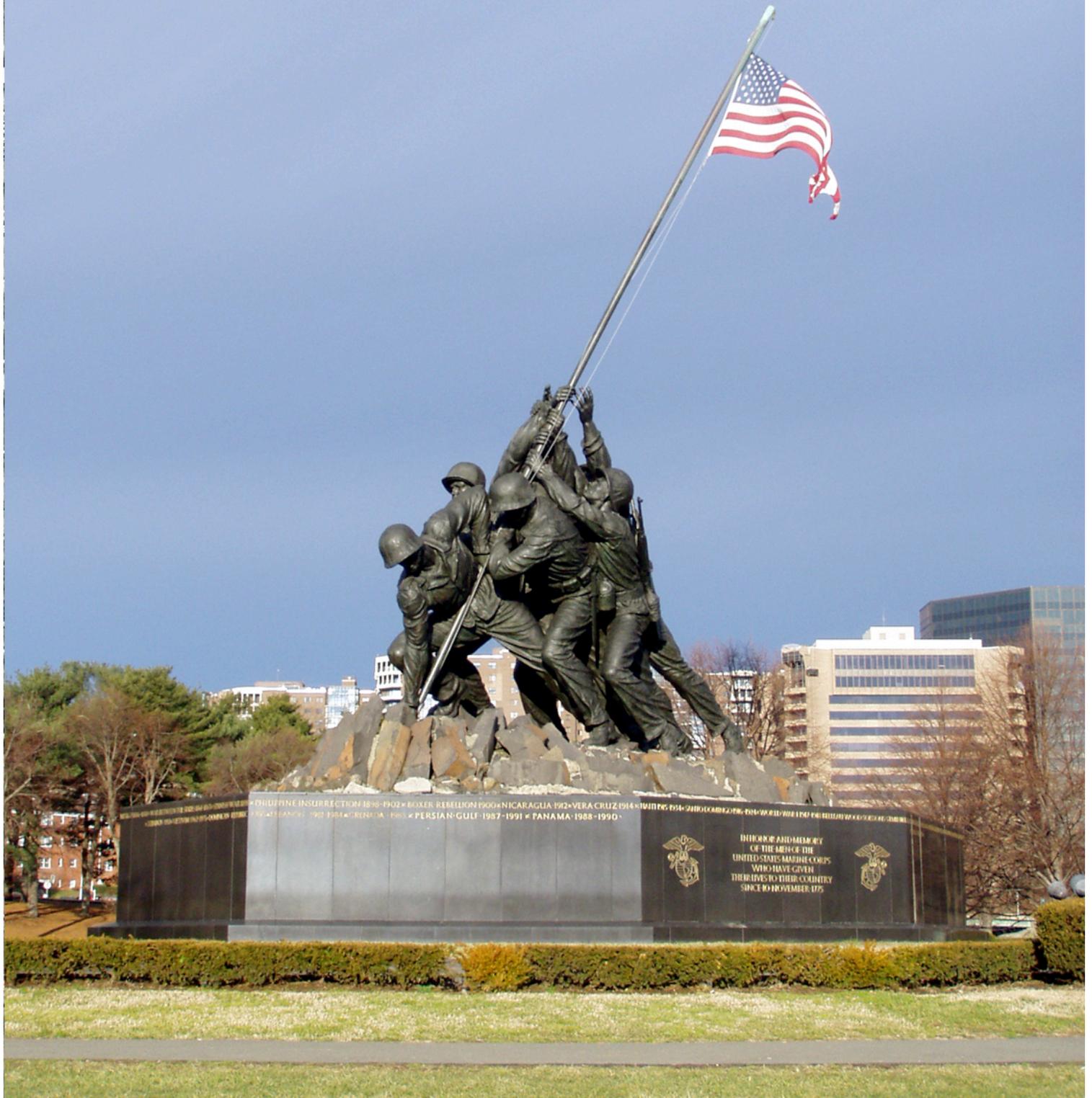
National Park Service  
U.S. Department of the Interior

George Washington Memorial Parkway  
Arlington County, Virginia



# U.S. Marine Corps War Memorial Rehabilitation Environmental Assessment

July 2004





**ENVIRONMENTAL ASSESSMENT**  
**U.S. MARINE CORPS WAR MEMORIAL REHABILITATION**

**July 2004**

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**GEORGE WASHINGTON MEMORIAL PARKWAY**  
Arlington County, Virginia

United States Department of the Interior • National Park Service



**U.S. DEPARTMENT OF THE INTERIOR  
NATIONAL PARK SERVICE**

**ENVIRONMENTAL ASSESSMENT  
U.S. MARINE CORPS WAR MEMORIAL REHABILITATION**

**GEORGE WASHINGTON MEMORIAL PARKWAY  
ARLINGTON COUNTY, VIRGINIA**

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**Summary**

The National Park Service proposes to rehabilitate the U.S. Marine Corps War Memorial on the George Washington Memorial Parkway. The major project components include rehabilitation of the sculpture and memorial base; rehabilitation of the plaza, reviewing stand, and walkways; site improvements to the parade and memorial grounds; and upgrading the existing electrical service and other site utilities.

This Environmental Assessment analyzes the potential impacts of three alternatives (a No-Action Alternative and two action alternatives) on the human environment in accordance with the National Environmental Policy Act of 1969. Under the No-Action Alternative, the National Park Service would continue management of the site including minor repairs to the plaza and grounds to support safe use of the site. Under Alternatives B and C, the National Park Service would install new lighting to illuminate the sculpture, rehabilitate the plaza, reviewing stand, and walkways; implement site improvements to the parade and memorial grounds; and upgrade the existing electrical service and other site utilities. The difference in the action alternatives is Alternative B would include only partial replacement (20 percent) of the concrete panels on the plaza; whereas, Alternative C (the Preferred Alternative) would include full replacement (100 percent) of the concrete panels on the plaza.

The No-Action Alternative and the action alternatives would either have no or negligible impacts on water resources; coastal zone management; air quality; soundscape management; Indian Trust resources; ethnographic resources; topography, geology, and soils; agricultural lands, prime and unique farmlands; wildlife; rare, threatened, endangered, candidate species, and species of special concern; socio-economic environment; land use; environmental justice; community facilities and services; and infrastructure.

Under the No-Action Alternative, there would be moderate, long-term, adverse impacts on historic structures/sites; health and safety; and visitor use and experience. The No-Action Alternative would have minor, long-term, adverse impacts on the cultural landscape, aesthetics and visual resources, and park operations.

Under Alternative B, there would be moderate, long-term beneficial impacts on historic structures/sites; aesthetics and visual resources; health and safety; and visitor use and experience. A minor, long-term, beneficial impact on park operations would occur. A minor, long-term, adverse impact would occur on the cultural landscape.

Under Alternative C (Preferred Alternative), there would be moderate, long-term, beneficial impacts on historic structures/sites; aesthetics and visual resources; health and safety; and visitor use and experience. A minor, long-term, beneficial impact on park operations would occur. A minor, long-term, adverse impact would occur on the cultural landscape. The rehabilitation of 100 percent of the concrete panels on the panel would be a more sustainable, long-term solution than Alternative B.

For Alternatives B and C, moderate, short-term, adverse impacts to historic structures/sites, aesthetics and visual resources, and visitor use and experience would occur and a minor, long-term adverse impact on lightscape management would occur. The National Park Service would conduct additional investigation is to determine whether archeological resources exist in the project area for the new accessible pathway and utility lines.

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## PURPOSE OF AND NEED FOR ACTION

The National Park Service proposes to rehabilitate the U.S. Marine Corps War Memorial on Arlington Ridge Park just off the George Washington Memorial Parkway (see Figure 1) in Arlington County, Virginia. The project includes rehabilitating the sculpture and memorial base; rehabilitating the plaza, reviewing stand, and walkways; site improvements to the parade and memorial grounds; and upgrading the existing electrical service and other site utilities.

The purpose of the project is to rehabilitate the U.S. Marine Corps Memorial to increase safety, enhance the visitor experience, protect park resources, provide access in accordance with the Americans with Disabilities Act (ADA) and increase park operational efficiency. This action is needed because 1) the existing lighting infrastructure is composed of older technology and is in need of repair and therefore, does not adequately illuminate the sculpture, 2) rehabilitation of the plaza, reviewing stand, and walkways is needed because of deterioration and settlement of the concrete panels on the plaza, approach walks, steps, pedestals, and the parade ground reviewing stand, steps on the plaza leading to the sculpture are loose, most of the concrete panels have cracks that allow moisture to penetrate into the substrate and compound the settlement problem; 3) the existing concrete panels present a safety hazard to visitors and the existing ramps do not meet ADA requirements; thus, the replacement of the concrete panels is needed to also eliminate a safety hazard and to provide an ADA compliant access route at the memorial; 4) rehabilitation of the parade and memorial grounds is needed because many of the existing utilities (water and electrical) and associated systems (irrigation and lighting) are inadequate and therefore, need to be replaced and/or upgraded to increase safety, increase efficient use of the site and to provide for a better visitor experience at the memorial.

This Environmental Assessment analyzes the potential environmental impacts that would result from the implementation of these actions. This Environmental Assessment has been prepared in accordance with the National Environmental Policy Act of 1969, the regulations of the Council on Environmental Quality for implementing the Act (40 Code of Federal Regulations 1500-1508), the National Park Service Director's Order # 12 (*Conservation Planning, Environmental Impact Analysis, and Decision-making*) (NPS, 2001) and the National Historic Preservation Act of 1966 (as amended).

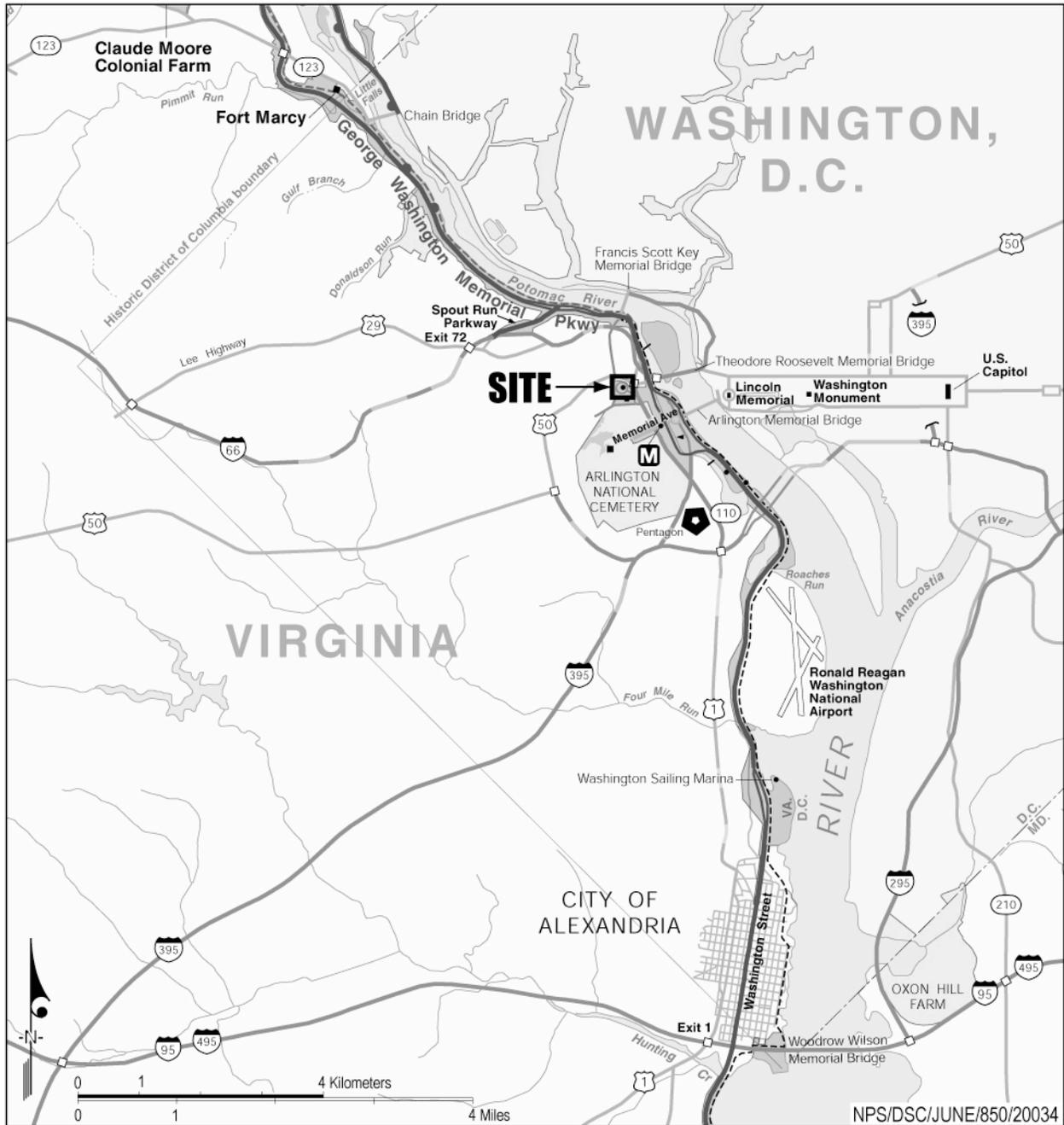


Figure 1: Site vicinity map

## **SIGNIFICANCE OF THE U.S. MARINE CORPS WAR MEMORIAL AND ARLINGTON RIDGE PARK**

The U.S. Marine Corps War Memorial stands for a symbol of this grateful Nation's esteem for the honored dead of the U.S. Marine Corps. The statue represents one of the most famous incidents of World War II and the memorial is dedicated to all the Marines who have given their lives in the defense of the United States since 1775 (NPS, 2003).



**Figure 2. Aerial view of the statue, memorial base, and plaza**

The heroic bronze sculpture depicts the raising of the American flag over Mount Suribachi on the island of Iwo Jima by five marines and a Navy hospital corpsman (see figure 2). A Pulitzer Prize winning photograph by news photographer Joe Rosenthal inspired Sculptor Felix W. de Weldon to create a scale model and a life size model of the scene. For nearly three years, a team of artisans in Brooklyn, New York took the plaster statue and cast the image in bronze. After the parts had been cast, cleaned, finished, and chased, they were reassembled into approximately a dozen pieces and brought to Washington, DC where they were bolted and welded together.

Erection of the memorial, which was designed by Horace W. Peaslee, began in September 1954. The site included a parade ground, reviewing stand, memorial plaza, paths, and general parking. The memorial, standing 78 feet tall, was officially dedicated by President Dwight D. Eisenhower on November 10, 1954, the 179<sup>th</sup> anniversary of the U.S. Marine Corps. The memorial has a 10-foot tall base made of polished black Swedish granite. Incised and inlaid in gold leaf on the granite are the names and dates of every principal Marine Corps engagement since the founding of the Marine Corps, as well as the inscription "In honor and in memory of the men of the United States Marine Corps who have given their lives to their country since November 10, 1775." Inscribed into the base is "Uncommon Valor was a Common Virtue", which was a tribute from Fleet Admiral Chester W. Nimitz to the fighting men of Iwo Jima. Mounted on the base are the 32-foot high figures shown erecting a 60-foot bronze flagpole. On the flagpole, a cloth flag flies 24 hours a day in accordance with a presidential proclamation (Milner 2001). The exposed aggregate concrete panels, entry pathways, and reviewing stand represent the work of John Joseph

Earley Studios and have high artistic value because the panels' unique texture, color, and pattern qualities. From an artistic standpoint, Earley's primary innovation was what he called "architectural" or "mosaic" concrete – a method of mixing and exposing the small stones and other materials called aggregate. Earley transformed concrete work into a high craft, and before Earley, no one paid much attention to the texture, color, and pattern qualities of concrete aggregate (Washington Post, 2001).

The U.S. Marine Corps War Memorial serves an estimated 1.2 million visitors annually. The memorial provides a backdrop for military exercises from the adjacent field and reviewing stand area. The Marine Corps routinely uses the parade grounds for sunset parades as well as other events. The memorial and Arlington Ridge Park is also the focal location for the U.S. Marine Corps Marathon as well as a popular viewing area for the Forth of July fireworks celebration. Figure 3 is an aerial photograph showing the key features of Arlington Ridge Park and the surrounding area.



Figure 3. Aerial photograph (2003) of project area

## KEY FEATURES OF THE U.S. MARINE CORPS WAR MEMORIAL

This section illustrates the existing characteristics of the memorial grounds and memorial base to allow the reader to comprehend the National Park Service’s alternatives for the rehabilitation of the U.S. Marine Corps War Memorial. Figure 4 depicts the site characteristics of the memorial grounds.

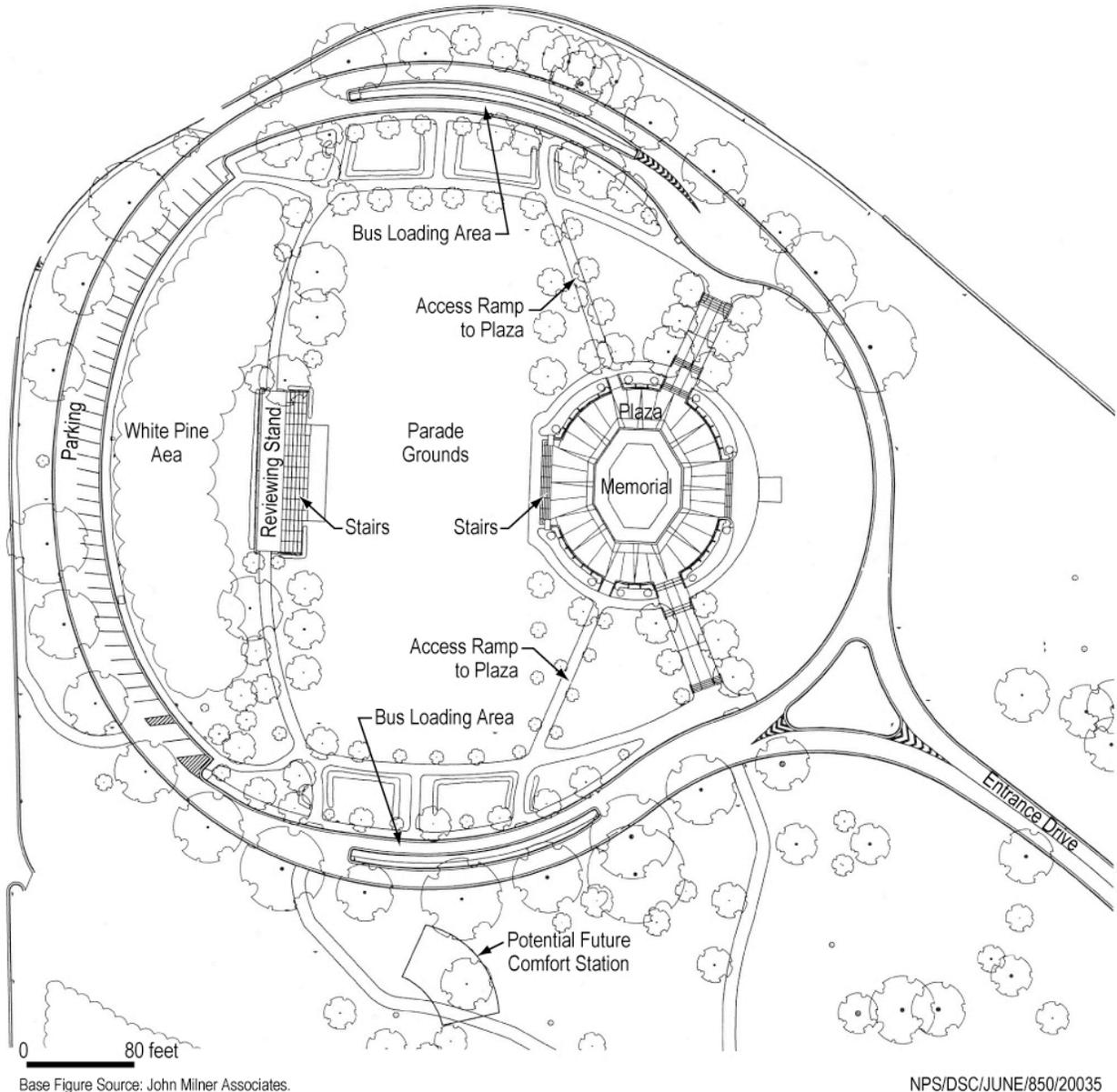
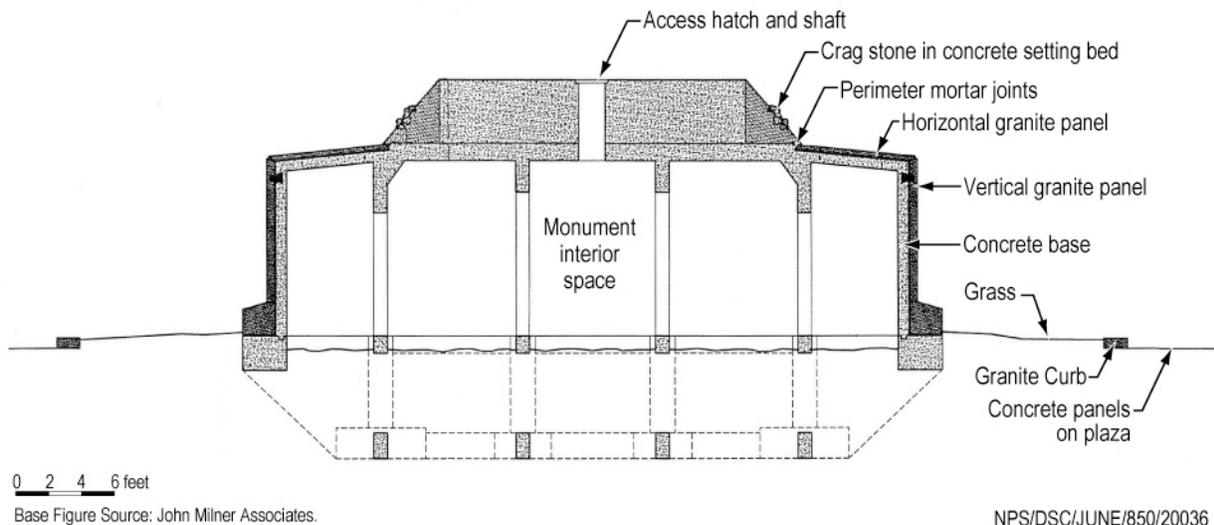


Figure 4. Site layout and reference plan

Figure 5 is a cross section of the memorial base showing the access hatch and shaft, the monument interior compartment, the vertical granite panels, horizontal granite panels, concrete base, mortar joints, and crag stones. The figure also shows the relationship between the memorial base and the granite curbs and plaza concrete aggregate panels.



**Figure 5. Cross section of memorial base**

## PROJECT BACKGROUND AND PLANNING

A series of condition assessments have been conducted for the memorial. These condition assessments established the need for the National Park Service to take corrective action to maintain the memorial for resource protection and health and safety reasons. From the results of these condition assessments, the National Park Service proceeded to develop the rehabilitation project for the U.S. Marine Corps War Memorial. In June 1998, the park staff completed a Project Management Information Statement (PMIS) for the project and this information was updated again in August 2002. The project emphasis was health and safety, resource protection, and deferred maintenance.

In a letter received October 29, 1999, the Keeper of the National Register of Historic Places determined that the U.S. Marine Corps War Memorial is individually eligible for the National Register of Historic Places, and that the Netherlands Carillon and Arlington Ridge Park are eligible for the National Register as contributing elements to the George Washington Memorial Parkway (USDIO, 1999).

The National Park Service contracted with John Milner Associates, Inc. to prepare a treatment plan for the U.S. Marine Corps War Memorial. The treatment plan was completed May 24, 2001 and has five sections: the sculpture and memorial base; the plaza, reviewing stand, and walkways; the parade and memorial grounds; the existing electrical service; and construction of a new comfort station and visitor services center. For each section, the treatment plan described the ex-

isting conditions and identified the problem or reason for improvements. Also, the treatment plan presented design options for rehabilitation. Class C cost estimates were also provided for each option.

On May 30 and 31, 2001, the National Park Service project team conducted a two-day value analysis workshop to evaluate the alternatives for the rehabilitation of the memorial. The purpose of that workshop was to review and assess the schematic design and rehabilitation alternatives developed by the project design consultant, John Milner Associates, Inc.

The National Park Service conducted a second smaller value analysis on June 27 and 28, 2002 focused more on specific statue and site related issues at the U.S. Marine Corps War Memorial. The study objective of this analysis was to evaluate the areas of work stated in the purpose and need section. This second value analysis excluded the proposed visitor contact and comfort station, which was part of the original proposal. The comfort station's purpose was to support the U.S. Marine Corps War Memorial, the Netherlands Carillon, and the future U. S. Air Force Memorial. This evaluation and construction of a new comfort station was postponed because on December 12, 2001, the National Defense Authorization Act for Fiscal Year 2002 conference committee met and agreed to Title XXVII Section 2863 (g) Preservation of the Arlington Ridge Tract. The general rule of this act stated "after the date of the enactment of this Act, no additional structure or memorials shall be constructed on the Arlington Ridge Tract."

On October 9, 2003, geotechnical testing was conducted at the U.S. Marine Corps War Memorial by representatives from Schnabel Engineering, Inc. Eight concrete cores were taken from six locations. In addition, hand-auger soil sampling was performed. On October 10, 2003, the test areas were cleaned and sampling locations were patched (Milner, 2003a). Following the fieldwork, a report of all the test findings was prepared and submitted to the National Park Service by Schnabel Engineering, Inc.

On October 20, 2003, additional shallow core samples were taken and assessed by the Armbuster Company. Fifteen cores were taken from five locations. Issues associated with the concrete were described in a geotechnical report (Milner, 2003b). The geotechnical information was used by project designers to further refine the rehabilitation alternatives.

The National Park Service completed a Cultural Landscape Inventory for Arlington Ridge Park in 2002 and subsequently revised the inventory in 2003. The Cultural Landscape Inventory identifies and documents each landscape's location, physical development, significance, National Register of Historic Places eligibility, and condition as well as other valuable information for park management. The Cultural Landscape Inventory, like the List of Classified Structures, assists the National Park Service in its efforts to fulfill the identification and management requirements associated with the National Historic Preservation Act, National Park Service *Management Policies, 2001*, and Director's Order #28 *Cultural Resource Management* (NPS, 2002).

The project team met on November 19, 2003 to initiate the environmental assessment for the project. The team discussed the project history, purpose and need, no-action and action alternatives, potential impacts, issues or controversy, agency coordination, public involvement, and cumulative effects. The team reviewed the Director's Order #12 Environmental Screening Form and conducted a site visit following the meeting.

## SCOPING

Scoping is the effort to involve agencies and the general public in determining issues to be addressed in the environmental document. Among other tasks, scoping determines important issues; eliminates issues that are not important; allocates assignments among the interdisciplinary team members and/or other participating agencies; identifies related projects and associated documents; identifies other permits, surveys, consultations, etc., required by other agencies. Internal scoping at the park level creates a schedule that allows adequate time to prepare and distribute the environmental document for public review and comment before a final decision is made.

External Scoping. The National Park Service did not initiate any formal external scoping for this project. The National Park Service is consulting with the U.S. Commission of Fine Arts about the lighting options at the memorial and would initiate Section 106 consultation with the Virginia Department of Historic Resources as part of the Environmental Assessment review.

Internal Scoping. Internal scoping is an integral part of the National Park Service value analysis workshops described in the previous section. The team met on two separate occasions to refine the scope of the project and study. In addition, a multidiscipline team meeting was conducted on November 19, 2003 to initiate the Environmental Assessment analysis. At this meeting, the team discussed the project background and existing site conditions, and identified potential issues, feasible alternatives, and potential impacts.

## ISSUES AND IMPACT TOPICS

The National Park Service staff completed an Environmental Screening Form that identifies potential issues and impact topics that require additional investigation to address the requirements of the National Environmental Policy Act of 1969 and Director's Order #12 (NPS, 2001). These issues were identified from previous park planning efforts, input from various interested public groups and individuals, and input from local, state, and federal agencies.

Resources were considered in accordance with National Park Service *2001 Management Policies* (NPS, 2002). The National Park Service manages resources of parks to maintain them in an unimpaired condition for future generations in accordance with the National Park Service specific statutes, including the Organic Act of 1916 and the National Parks Omnibus Management Act of 1998; general environmental laws such as the Clean Air Act, the Clean Water Act, the Endangered Species Act of 1973, National Environmental Policy Act, and the Wilderness Act; Executive Orders; and applicable regulations.

The National Environmental Policy Act is the basic national charter for protection of the environment. It requires Federal agencies to use all practicable means to restore and enhance the quality of the human environment and to avoid or minimize any possible adverse effects of their actions upon the environment.

Resources include soils, wildlife, habitats, vegetation; cultural, historic, and prehistoric resources, and socioeconomic resources, among others. The National Environmental Policy Act requires federal agencies to use all practicable means to restore and enhance the quality of the

human environment and to avoid or minimize any possible adverse effects of their actions on the environment. Additionally, National Park Service policy is to protect the natural abundance and diversity of all naturally occurring communities at the park.

## **ISSUES**

### **PROTECTING THE HISTORIC INTEGRITY OF THE MEMORIAL AND THE CULTURAL LANDSCAPE**

The U.S. Marine Corps War Memorial is eligible for listing on the National Register of Historic Places because of its significance in American history and high artistic value. Increasing deterioration of the concrete on the plaza and walkways is adversely affecting this resource. In addition, the replacement of the concrete panels would alter and remove the memorial's historic fabric. As a result, the rehabilitation of the memorial and surrounding area needs to be conducted in a manner that maintains the existing historic integrity of the memorial. To accomplish this, the rehabilitation design and implementation needs to adhere to the *Secretary of Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Restoring, and Reconstructing Historic Buildings* and the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*.

### **INCREASING HEALTH AND SAFETY**

The deteriorating condition of the concrete panels on the plaza has attributed to at least one known safety-related incident. Poor ventilation in the memorial interior space presents another unsafe condition for maintenance personnel. Inadequate site lighting on the memorial grounds is another safety concern for visitors as well as a security issue.

### **PRESERVING THE VISUAL QUALITY OF THE MEMORIAL**

The Iwo Jima bronze statue is one of the most recognizable international memorials of its kind. Impacts to the visual quality of the memorial must be considered in the rehabilitation design and construction. In addition, the memorial sits atop Arlington Ridge where visitors can view many of our capitals' treasures at a distance. Views to and from the memorial must be maintained and new lighting at the site must fully consider the impact on the memorial and surrounding resources.

### **REDUCING SHORT-TERM IMPACTS DURING CONSTRUCTION**

The memorial and parade grounds are used by the U.S. Marine Corps for a number of special events during the course of the year. The rehabilitation of the memorial would require closure of portions of the memorial grounds during the construction phase (approximately 9 to 12 months); therefore, the timing of construction is important to minimize the impact on special events such as the Marine Corps Marathon and sunset parades. Also, the National Park Service desires to minimize the length of time the memorial is closed to reduce the short-term impacts on visitor use and experience.

## IMPACT TOPICS INCLUDED IN THIS DOCUMENT

Impact topics are derived from the issues identified above and are specific resources of concern that could be affected, either beneficially or adversely, by implementing one of the alternatives. Impact topics were identified based on Federal laws, regulations, Executive Orders, National Park Service *Management Policies, 2001* (NPS, 2000), the Environmental Screening Form from Director's Order #12 and from the National Park Service knowledge of limited or easily impacted resources. The Environmental Screening Form was completed by the National Park Service staff and identifies the impact topics that required additional investigation to address the requirements of the National Environmental Policy Act of 1969 and Director's Order #12. Specific impact topics were developed to ensure the alternatives were compared based on the most relevant topics. As a means of evaluation, impact topics included in this document were analyzed in more detail to compare the environmental consequences of the No-Action Alternative and the two action alternatives.

## HISTORIC STRUCTURES/SITES

The Keeper of the National Register of Historic Places determined the U.S. Marine Corps War Memorial is individually eligible for listing in the National Register of Historic Places because it is a famous World War II monument that memorializes a significant event in American history, and is of high artistic value. (USDOJ, 1999). The rehabilitation must be conducted in such a manner to maintain the historic character and integrity of this symbolic memorial. The rehabilitation must be conducted in accordance with the *Secretary of Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Restoring, and Reconstructing Historic Buildings*. Therefore, Historic Structures/Sites has been retained as an impact topic in this document.

## CULTURAL LANDSCAPES

The U.S. Marine Corps War Memorial and its contributing features are part of the Arlington Ridge cultural landscape (NPS, 2002). Any construction must fully consider the potential impacts to the cultural landscape and be performed in a manner consistent with *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. Therefore, Cultural Landscapes has been retained as an impact topic in this document.

## ARCHEOLOGICAL RESOURCES

There are no recorded archeological resources within the project area; however, in certain areas proposed for trenching and disturbance, there is insufficient data available to assume that there would be no impact to archeological resources. Due to the high level of ground disturbance during construction of the U.S. Marine Corps War Memorial, the likelihood is low that there are historic or prehistoric archeological artifacts buried within the limits of disturbance of the proposed rehabilitation with the exception of the areas proposed for the ADA accessible trail realignment and new sewer or water utilities. Therefore, Archeological Resources has been retained for further analysis in this Environmental Assessment.

## **AESTHETICS AND VISUAL RESOURCES**

The U.S. Marine Corps War Memorial is of high artistic value. The surrounding landscape offers visitors an aesthetically pleasing setting. The rehabilitation has the potential to have short-term and long-term impacts on Aesthetics and Visual Resources; therefore, the National Park Service retained Aesthetics and Visual Resources for further analysis in this Environmental Assessment.

## **LIGHTSCAPE MANAGEMENT**

The U.S. Marine Corps War Memorial site has minimal site lighting at areas other than the plaza. Any new lighting must be completed in such a manner to be non-obtrusive with respect to how the memorial is lit, its character, and how it is viewed from surrounding areas. Any proposed lighting must take into consideration pedestrian and vehicular circulation areas, heavy use areas, major views of other resources and from other resources, and the location of site amenities in order to provide basic illumination of the site for safety and security purposes (Milner, 2001). Therefore, Lightscape Management has been retained as an impact topic in this document.

## **HEALTH AND SAFETY**

The existing ramps at the memorial are not ADA compliant because they are too steep and the current conditions of the concrete on the plaza presents tripping hazards for pedestrians on the plaza. Therefore, Health and Safety has been retained as an impact topic in this document.

## **VISITOR USE AND EXPERIENCE**

The visitor experience is being affected because visitors must cope with uneven pavements, inaccessible walkways, and frequent repair and maintenance activities. In addition, inadequate utilities and associated systems affect the aesthetics and use of the site. Therefore, Visitor Use and Experience has been retained as an impact topic in this document.

## **PARK OPERATIONS**

The conditions at the memorial require that the National Park Service maintenance staff conduct frequent maintenance repairs to the plaza area and exert extra efforts to maintain the turf and landscaping at the memorial. The rehabilitation must consider how to increase the park operational efficiency at the site. Therefore, Park Operations has been retained as an impact topic in this document.

## **TOPICS DISMISSED FROM FURTHER ANALYSIS**

The non-controversial topics listed below would have no effect, a negligible effect or in some specific cases, a minor effect for each alternative evaluated in this document. For specific definitions of negligible and minor, please refer to the Environmental Consequences Section. In general, negligible effects are effects that are localized and immeasurable. Topics that are readily apparent to have either no, negligible, or minor effect are briefly discussed in this section of the Environmental Assessment and then dismissed from further consideration or evaluation.

**WATER RESOURCES (WETLANDS, SURFACE WATERS, FLOODPLAINS, GROUNDWATER, AND SCENIC RIVER DESIGNATIONS)**

Executive Order 11988 “*Floodplain Management*” requires an examination of impacts to floodplains and potential risk involved in placing facilities within floodplains. *National Park Service Management Policies, 2001*, Director’s Order – 2: *Planning Guidelines*, and Director’s Order – 12: *Conservation Planning, Environmental Impact Analysis, and Decision-making* provide guidelines for proposals in floodplains. The 1972 Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977, is a national policy to restore and maintain the chemical, physical, and biological integrity of the nation’s waters; to enhance the quality of water resources; and to prevent, control, and abate water pollution. *National Park Service Management Policies, 2001* provide direction for the preservation, use, and quality of water in national parks. Executive Order 11990 “*Protection of Wetlands*” requires an examination of impacts to wetlands.

There are no existing wetlands or surface waters within the project area (USFWS, 2003). The project area and this portion of the George Washington Memorial Parkway are located in a small unnamed watershed that drains into the Potomac River about ½ mile east of the project area. The Potomac River is the closest waterway (see Figure 6). No stream segment near the project area is designated as a Scenic River by the National Park Service.

A review of the Federal Emergency Management Agency Flood Insurance Rate Maps, to define the extent of 100-year floodplains in the project area, indicated that the project area is not located in the 100-year regulatory floodplain (FEMA, 1982). Therefore, the project poses no to negligible potential impacts to the 100-year floodplain. Groundwater aquifers underlying the project area are unconsolidated deposits, primarily of alternating layers of sand, gravel, shell rock silt, and clay. A shallow unconfined aquifer system lies above relatively impermeable clay beds. The principal source of groundwater withdrawal is a deeper system of unconfined aquifers (VDEQ, 2003a). This project would have a negligible increase on the area of impervious surfaces and, therefore, the infiltration capacity of the soils would not be affected. Therefore, this project poses no to negligible potential impacts to groundwater resources.

Because the effects listed in the Water Resources section of this Environmental Assessment would have no or negligible effects on water resources in or near the project area, Water Resources has been dismissed as an impact topic in this document.

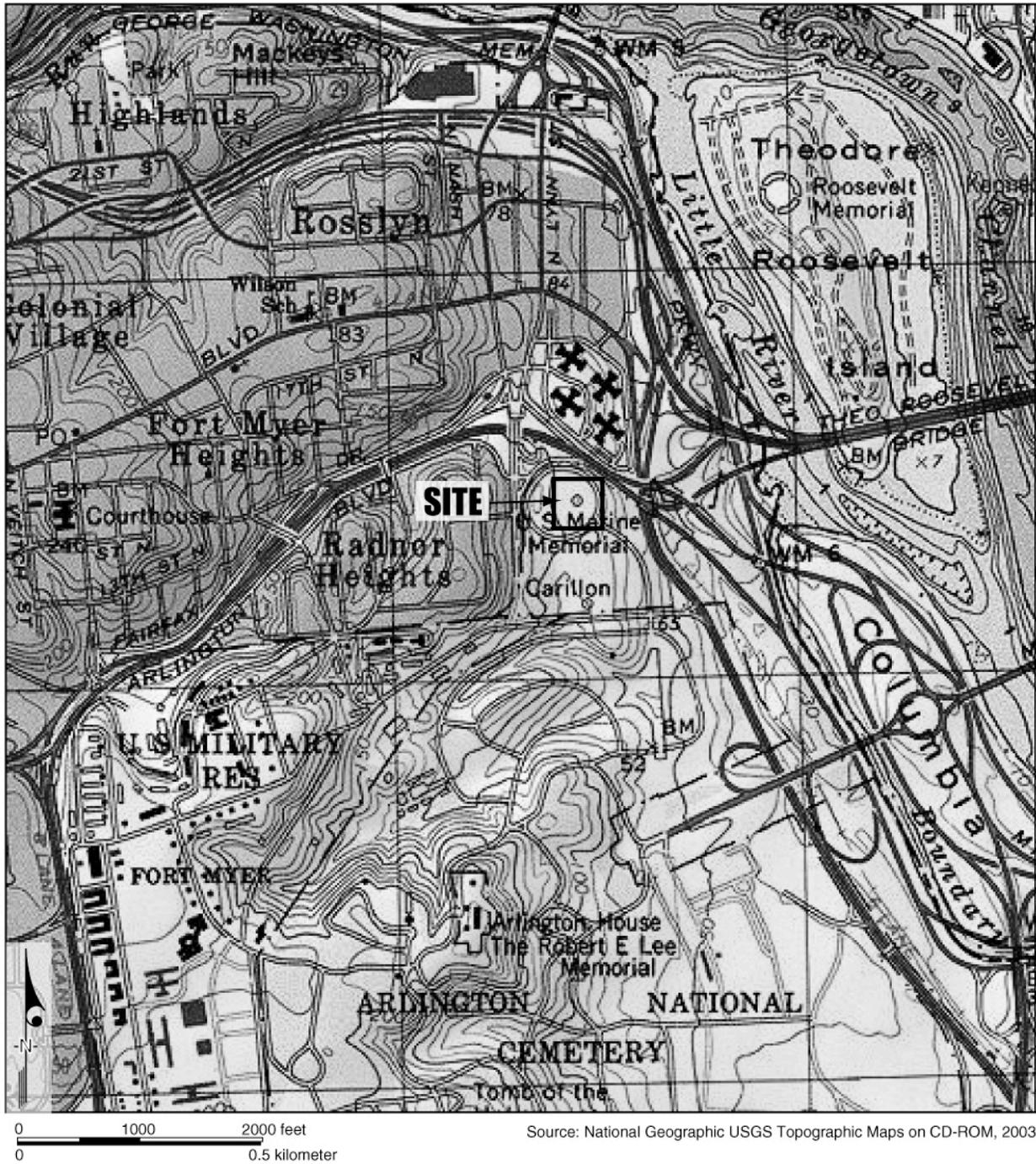


Figure 6. USGS topographic map - Alexandria quadrangle

## **COASTAL ZONE**

Arlington County is within the state's Coastal Zone Management Area (VDEQ, 2003b) and therefore, the project area is within Virginia's Coastal Management Zone and subject to Federal Consistency requirements under the Virginia Coastal Zone Management Program. As discussed previously in the Water Resources section, the project alternatives would not take place in or near or have an affect on wetlands, floodplains, waters of the United States, or other resources associated with the state's coastal zone. The project would not result in any actions that would have any foreseeable direct, indirect, secondary, or cumulative impacts on Virginia's coastal zone; therefore, Coastal Zone has been dismissed as an impact topic in this document. The Coastal Zone Federal Consistency determination can be found after the discussion on the preferred alternative.

## **AIR QUALITY**

Air quality became a national concern in the mid-1960s, leading to the passage of the Air Quality Act in 1967. The Act (now referred to as the Clean Air Act) and subsequent amendments have established procedures for improving conditions, including a set of National Ambient Air Quality Standards. The U.S. Environmental Protection Agency is directed to set levels for pollutants in order to protect the public health. The National Ambient Air Quality Standards are adopted for six pollutants: carbon monoxide, nitrogen dioxide, ozone, particulate matter, sulfur dioxide, and lead. A system of monitoring stations is established across the country to measure progress in meeting these goals. If an area is found to exceed the allowable concentrations, local officials are required to develop a plan for achieving air quality that meets the standards.

In addition to these six criteria pollutants, volatile organic compounds (VOCs), which are created when fuels or organic waste materials are burned, are a source of concern and are regulated as precursors to ozone. Ozone is formed in, and downwind of, urban areas when sunlight and high temperatures cause photochemical reactions between emissions of VOCs and nitrogen oxides (NO<sub>x</sub>). Major sources of VOC and NO<sub>x</sub> include motor vehicles and construction equipment. Most hydrocarbons are presumed to be VOCs in the regulatory context, unless otherwise specified by the U.S. Environmental Protection Agency.

The project site is located within the National Capital Interstate Air Quality Control Region, which includes Washington, DC, and several surrounding counties in Maryland and Virginia. The region currently meets National Ambient Air Quality Standards for all criteria pollutants except ozone. The U.S. Environmental Protection Agency has designated the region as a "serious non-attainment area" for ozone. The existing air pollutant sources on and adjacent to the project site are emissions from vehicular traffic on the parkway, State Route 110, U.S. Route 50, Interstate 395, and the Pentagon.

Only negligible, short-term, adverse impacts would occur from emissions and fugitive dust caused from construction activities. Best management practices such as watering for fugitive dust control and mufflers for reduced emissions would minimize construction related impacts. No cumulative or long-term impacts would result. Therefore, Air Quality has been dismissed as an impact topic in this document.

## SOUNDSCAPE MANAGEMENT

In accordance with the National Park Service *Management Policies, 2001* (NPS, 2000a) and Director's Order #47, *Sound Preservation and Noise Management* (NPS, 2000b), an important objective of the National Park Service's mission is the preservation of natural soundscapes associated with National Park Service units. Natural soundscapes exist in the absence of human caused sound. The natural ambient soundscape is the aggregate of all the natural sounds that occur in park units, together with the physical capacity for transmitting natural sounds. Natural sounds occur within and beyond the range of sounds that humans can perceive and can be transmitted through air, water, or solid materials. The frequencies, magnitudes, and duration of human caused sound considered acceptable varies among National Park Service units. Acceptance levels of noise for each park unit are generally greater in developed areas and less in undeveloped areas.

Several transportation-related noise sources currently exist in the project area (i.e., George Washington Memorial Parkway traffic, and aircraft activity flying into Ronald Reagan Washington National Airport). Arlington County has adopted a noise ordinance that sets stringent standards on noise generators, depending on the zoning district classification of the receiving property. Construction activities can occur at anytime; however, there are noise limits by time of day for construction. The normal noise decibel level can be exceeded from 7:00 a.m. to 9:00 p.m. Monday through Friday and 10:00 a.m. to 9:00 p.m. on weekends and legal holidays. This would include the use of power equipment and other activities.

Construction activities would be expected to contribute negligible, short-term noise impacts but still expected to be within the acceptable levels set forth in the Arlington County's noise ordinance. With the several transportation-related noise sources that currently exist (State Route 110, and Arlington Boulevard (U.S. Route 50)), the noise levels associated with the construction activities would have no to negligible impacts on the soundscape of the Arlington Ridge Park and the change in frequencies, magnitudes, and duration of human-caused sound would be short-term and not perceptible or the change would be negligible. Therefore, Soundscape Management has been dismissed as an impact topic in this document.

## INDIAN TRUST RESOURCES

The Department of the Interior Secretarial Order 3175 (Departmental Responsibilities for Indian Trust Resources) requires that any anticipated impacts to Indian Trust Resources from a proposed action by Department of Interior agencies be explicitly addressed in environmental documents. The Federal Indian Trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry out the mandates of Federal law with respect to American Indian and Alaskan native tribes. Based on past project experience and discussions with the park's historian, Indian Trust Resources do not exist within the project site and the lands are not held in trust by the Secretary of Interior for the benefit of Indians. Therefore, Indian Trust Resources has been dismissed as an impact topic in this document.

## **ETHNOGRAPHIC RESOURCES**

The National Park Service 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” (Director’s Order # 28, *Cultural Resources Management Guidelines*, p. 181) (USDOJ, 1998). Based on the professional judgment of the park staff on this project, ethnographic resources do not exist in the project area. Therefore, Ethnographic Resources has been dismissed as an impact topic in this document.

## **TOPOGRAPHY, GEOLOGY, AND SOILS**

The project area is located in Arlington County, Virginia, situated within the Coastal Plain Province (Bailey, 1999). The elevation of the U.S. Marine Corps War Memorial at the project site is approximately 100 feet above mean sea level (Arlington County, 2003a). The Coastal Plain Province extends from the fall line to the Atlantic Ocean. In geography the term “fall line” applies generally to any boundary between an upland region and a coastal plain. The Virginia Coastal Plain is underlain by a thick wedge of sediments that increases from feathered edge at the fall line to more than 13,000 feet under the continental shelf. The Coastal Plain proper is characterized by low relief. The geology of the project site itself is Lowland Terrace Deposits of Middle Pleistocene origin and consists of gravel, sand, silt, and clay and may be up to 105 feet thick (Arlington County, 2003a). There are no known faults or high-strain zones mapped in the area (Bailey, 2000).

The project area and the surface soils are highly disturbed urban soils. Because of the highly disturbed nature of the soils in the area, the soils along this section of the George Washington Memorial Parkway and the adjacent U.S. Marine Corps War Memorial have not been surveyed by the Natural Resources Conservation Service (Arlington County, 1999). The small earth disturbance of the proposed project would have negligible, adverse impacts on soils because the project area consists of highly disturbed soils and material from the construction of the memorial. The National Park Service, with sediment and erosion control and other best management practices, would minimize any effects associated with erosion and compaction at the project area. Overall, the alternatives are expected to have no or negligible impacts on the topography, geology, or soils in the project area. Therefore, Topography, Geology, and Soils has been dismissed as an impact topic in this document.

## **AGRICULTURAL LANDS, PRIME AND UNIQUE FARMLAND SOILS**

The soils mapped on the project site are not regulated under the Federal Farmland Protection Policy Act (7 CFR Part 658 of July 5, 1984, as superseded by the Farmland Protection Policy Act Final Rule of June 17, 1994). The existing soils on the project area are fill material or soils that have been subjected to prior disturbances by urban and industrial activities. The soils on the site are mapped as Urban Land, which is not classified as a Prime Farmland Soil. Because the soils in the project area are in an urbanized area, the alternatives would not cause any impact to prime farmlands soils as defined by the U.S. Department of Agriculture nor would they be regulated under the Federal Farmland Protection Policy Act. Therefore, Agricultural Lands, Prime and Unique Farmland Soils has been dismissed as an impact topic in this document.

## WILDLIFE

Due to the U.S. Marine Corps War Memorial's proximity to the George Washington Memorial Parkway and other highways, Arlington National Cemetery, and highly developed residential and urban areas, wildlife within the project site is typically limited to those species that have adjusted to human activity. Common wildlife species noted in the project area are primarily those associated with open spaces and forest edge habitats. Species expected to be present include gray squirrel (*Sciurus carolinensis*), eastern cottontail (*Sylvilagus floridanus*), mice and other small rodents, house sparrow (*Passer domesticus*), common pigeon (*Columba livia*), mourning dove (*Zenaida macroura*), European starling (*Sturnus vulgaris*), American crow (*Corvus brachyrhynchos*) and American robin (*Turdus migratorius*). No aquatic habitat is located within the immediate project area. The Potomac River tidal basin, directly east of the project area, is a fish and waterfowl habitat.

Should any of the alternatives be implemented, only a negligible, short-term disruption would occur to wildlife because the project area is located within a maintained and human-dominated landscape near major roadways, urbanized areas, and Arlington National Cemetery and is subject to continuing disturbance. Therefore, Wildlife has been dismissed as an impact topic in this document.

## RARE, THREATENED, ENDANGERED, CANDIDATE SPECIES AND SPECIES OF SPECIAL CONCERN

Due to the maintained landscape and adjacency to highly occupied human areas, it is highly unlikely that the project area provides suitable habitat to any rare, threatened or endangered species or species of special concern. In recent consultation for an Environmental Assessment for the multiuse trail along Fort Myers Marshall Drive, the U.S. Fish and Wildlife Service indicated no Federally listed rare, threatened, and endangered species or species of concern were known to exist in the general vicinity of the project. The Virginia Department of Conservation and Recreation indicated that there are no records of any rare, threatened, or endangered species or critical habitats (Horne Engineering Services, Inc. 2001). Should any of the alternatives be implemented, no impacts to any listed special status species or designated critical essential habitats are anticipated because species or habitats are not likely to exist in the project area. Therefore, Rare, Threatened, Endangered, or Candidate Species and Species of Special Concern has been dismissed as an impact topic in this document.

## SOCIO-ECONOMIC ENVIRONMENT

The U.S. Marine Corps War Memorial rehabilitation project is located in Arlington County. It is adjacent to the George Washington Memorial Parkway, State Route 110, and Arlington National Cemetery, and it is in close proximity to medium and high-medium density residential housing, office complexes, and hotels. The Services sector and the Government and Government Enterprises sector are the major employment sectors in the county, providing approximately 145,000 jobs in 2000 (Arlington County, 2003b).

There would be no change in employment in the area because of construction or implementation of any of the alternatives. Minimal employment opportunities and some related revenues for construction materials are anticipated for the rehabilitation of the memorial. The proposed project is

expected to have no impact on the socio-economic environment. Therefore, the Socioeconomic Environment has been dismissed as an impact topic in this document.

## **ENVIRONMENTAL JUSTICE**

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations directs Federal agencies to identify and address as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority or low-income populations.

According to the 2000 U.S. Census figures, the minority community in Arlington County, Virginia, is approximately 30 percent and approximately 9 percent of the population is over the age of 65 (U.S. Census, 2002a, b). The percentage of all individuals living below the poverty line in Arlington County is approximately 5 percent, which is considerably lower than the national average of 13 percent. Minorities and low-income populations exist in Arlington County; however, none exists within the project area or would they be negatively impacted by the alternatives. Therefore, Environmental Justice has been dismissed as an impact topic in this document.

## **LAND USE**

The project area is located proximate to and west of the George Washington Memorial Parkway, and adjacent to State Route 110 and Arlington National Cemetery. Under the Arlington County Zoning Ordinance, the Memorial, the Arlington National Cemetery, George Washington Memorial Parkway and the airport are zoned Special District S-3A by Arlington County. This zoning district is to encourage the retention of property in a relatively undeveloped state and for institutional and recreational use. Properties to the west and north of the project are zoned as RA6-15 and RA4.8, which are for apartments. The rehabilitation of the memorial would not affect any existing land use at or near the project area because the existing use of the memorial grounds would not change. Therefore, Land Use has been dismissed in this document as an impact topic.

## **COMMUNITY FACILITIES AND SERVICES**

***Emergency, Fire, and Rescue Services*** – The Arlington County Fire Department has 10 stations in the county staffed by career and volunteer firefighters and paramedics. Station 10, Rosslyn Fire Station, located at 1559 Wilson Boulevard, approximately 0.6 mile northwest of the project area, provides the nearest fire and medic equipment. The Virginia Hospital Center in Arlington would most likely provide medical services for any incidents. Rehabilitation of the war memorial would have no to negligible, short-term, adverse impacts on emergency, fire, or rescue response during the rehabilitation.

***Police*** – The George Washington Memorial Parkway is patrolled by U.S. Park Police from the Turkey Run Park in McLean, Virginia. Rehabilitation of the war memorial would have no impact on police capabilities or emergency response of the Park Police.

***Schools*** - The county school system includes 37 public schools and 9 private schools. The project would not have any impact on bus routes because the memorial is not on any school bus

route and there would be no traffic delays associated with the proposed project. No impact to the school system would occur.

**Nearby Parks and Recreation** - In Arlington County, there are approximately 50 community parks and recreational areas within about 3 miles of the project area. Additional National Park Service facilities exist along the George Washington Memorial Parkway both north and south of the project area. Users and visitors to the area would continue to take advantage of the nearby park and recreational activities available and would not be impacted by the memorial rehabilitation. Access restrictions to the memorial during rehabilitation would not affect the user's ability to access other nearby resources; therefore, no impact to nearby parks and recreation would occur. Potential impacts on activities at the U.S. Marine Corps War Memorial are described in the Visitor Use and Experience section.

Overall, community facilities and services are not anticipated to be directly affected by implementing any of the alternatives. Therefore, Community Facilities and Services has been dismissed as an impact topic in this document.

## INFRASTRUCTURE

**Water and Sewer Service** - The Arlington County Department of Public Works provides water and sewer service to county residents. The water supply source is the Potomac River. Arlington County operates its own sewage treatment facility. The Potomac River is the receiving water body for the sewage treatment facility. The National Park Service plans to upgrade the site utilities, which includes connecting into an existing water line along North Meade Street and sewer line near the State Route 110. This sewer line is known as the Potomac Interceptor. Water and sewer connections serving the area would not be taken out of service. Rehabilitation of the memorial would not impact water and sewer service in the area.

**Storm Drainage** - Storm drainage in the area of the memorial is primarily sheet-flow runoff with storm drains collecting runoff from the area. The construction of this project would comply with State of Virginia sediment and erosion control practices. Under current state regulations, sites less than 1 acre in size are not required to obtain a General Permit for Stormwater Management from the state and, therefore, the state would not require post construction stormwater management. The change to the existing memorial footprint and area of disturbance for the project would be less than 0.5 acre, and the total increase in impervious area would be negligible. Changes to the existing stormwater management practices on the memorial would not be required.

**Electrical Power and Natural Gas** - The National Park Service plans to upgrade the electrical infrastructure at the memorial. Electrical conduits extend from North Meade Street at the northwestern corner of the memorial. The upgrade would remove all the existing underground conduits, conductors and other distribution elements, and install new electrical load centers, associated conduit and feeder for power and lighting. A new site electrical main panel board would also be installed. Damaged or abandoned lighting would be replaced. The new electrical system would also serve the sculpture and memorial ground lighting system. The existing lighting infrastructure at the site would be replaced with modern lighting equipment. Rehabilitation of the

memorial would not impact the electrical power service in the project area. There is no natural gas line in the area.

**Communication** – Local telephone service is provided by Verizon. Telephone cables extend along North Meade Street on the western side of the memorial. There is no existing fiber-optic cable line in the project area. Rehabilitation of the memorial would not impact the telephone service in the project area.

**Waste Management** – Solid waste generated from rehabilitation of the memorial would be collected and transferred to the maintenance area by the National Park Service, and subsequently disposed of by a commercial licensed waste management company that would comply with all Federal and state requirements.

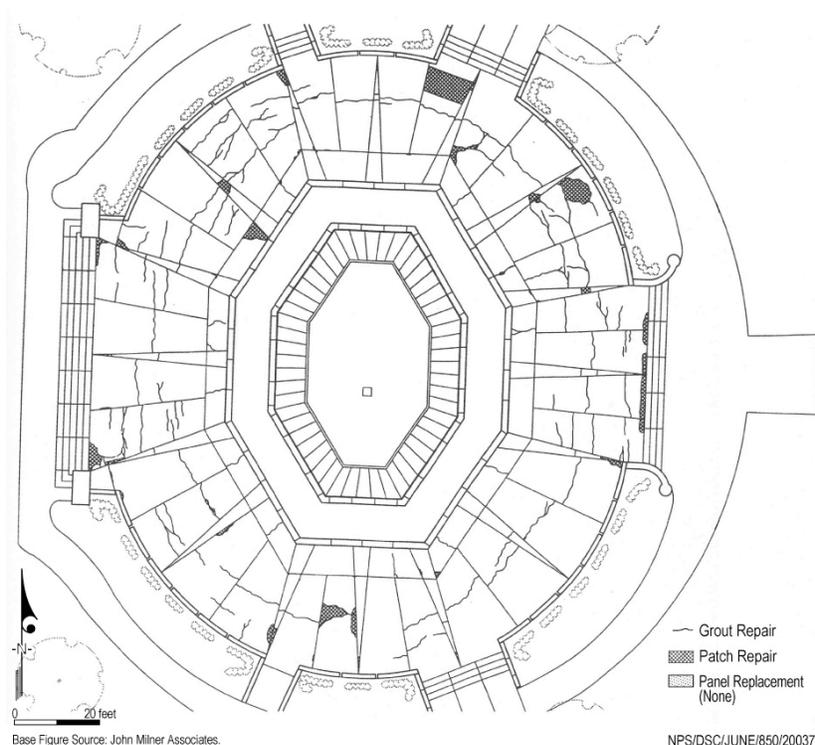
The existing infrastructure within the project area is not anticipated to be directly affected by the restoration and rehabilitation of the memorial. The memorial would not negatively impact water and sewer service, storm drainage, electrical power and natural gas, communication, and waste management. Therefore, Infrastructure has been dismissed as an impact topic in this document.

## PREFERRED ALTERNATIVE AND OTHER ALTERNATIVES

This section describes the George Washington Memorial Parkway's management alternatives for the rehabilitation of the U.S. Marine Corps War Memorial. Alternatives for this project were developed to resolve potential issues associated with safety, accessibility, park operations, deteriorating conditions of the memorial and insufficient utilities at the site.

### ALTERNATIVE A – NO-ACTION

The No-Action Alternative describes the action of continuing the present management operations and conditions. It does not imply or direct discontinuing the present action or removing existing uses, development, or facilities. The No-Action Alternative provides a basis for comparing the management direction and environmental consequences of the alternatives. Should the No-Action Alternative be selected, the National Park Service would respond to future needs and conditions associated with the memorial without major actions or changes in present course. Under the No-Action Alternative, the National Park Service would conduct minimum concrete rehabilitation of the U.S. Marine Corps War Memorial. The National Park Service would leave all the concrete panels in place and make temporary repairs to the broken and/or displaced panels. The National Park Service would install mechanical exhaust for acceptable ventilation and code compliance. Also, there would be no changes to the current placement and type of lighting. Figure 7 shows the minimum restoration efforts to the plaza under the No-Action Alternative.



**Figure 7. Minor concrete repairs to the plaza under the No-Action Alternative**

## **ALTERNATIVE B – MEMORIAL REHABILITATION WITH PARTIAL REPLACEMENT OF CONCRETE PANELS ON PLAZA**

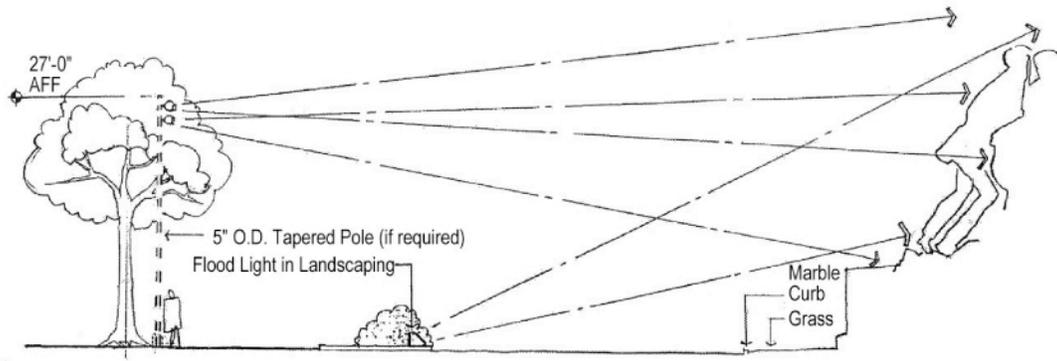
Alternative B consists of four project components: rehabilitating the sculpture and memorial base; rehabilitating the plaza, reviewing stand, and walkways; site improvements to the parade and memorial grounds; and upgrading the existing electrical service and other site utilities at the site. For Alternative B, each component is described in detail below.

### Sculpture and Memorial Base

The National Park Service proposes to rehabilitate certain aspects of the sculpture and memorial base. To improve ventilation to the monument open space, the existing hatch and ladder would be removed and replaced and a passive ventilation system would be installed. The existing ladder would be replaced with an alternating tread ladder that is more user friendly for the confined space. In addition, the National Park Service proposes to upgrade the lighting components to better illuminate the Iwo Jima sculpture. The National Park Service considered three different lighting methods: pole lights, flood lights on the plaza, and upward directional lighting behind the crag stone in the memorial base.

The pole lights would be installed near the existing trees to make them less visible. The floodlights on the plaza would be placed in fixtures in the landscaping. For the upward directional lighting on the memorial base, the light fixtures would be installed in the crag stone near the vertical granite panels and a granite panel would be installed between the fixture and the plaza to shield views of the fixture.

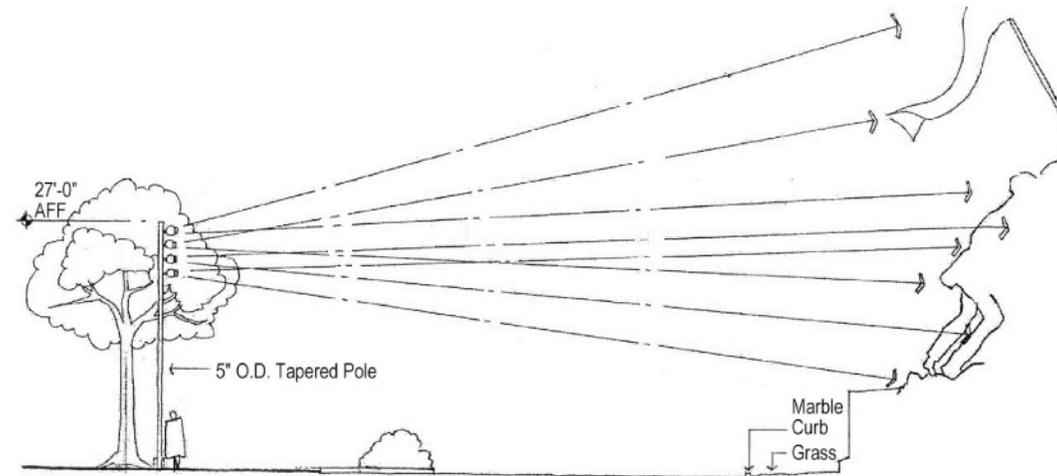
The exact combination, number, and positioning of fixtures, and intensity of the lighting has not been finalized. The National Park Service conducted a lighting mock up on March 18, 2004 for the purposes of reviewing different lighting options at night and giving representatives of the U.S. Commission of Fine Arts an opportunity to review and comment on the different lighting methods. Figures 8 illustrates the three different combinations of options presented at the lighting mockup. Following the lighting mock-up, a modification of status lighting option 3, with two pole lights on the South (statue front) side was favorably reviewed by the U.S. Commission of Fine Arts on April 15, 2004. This modified Statute Lighting Option 3 is now the preferred options as part of both Alternatives B and C.



Base Figure Source: John Milner Associates.

Option 1

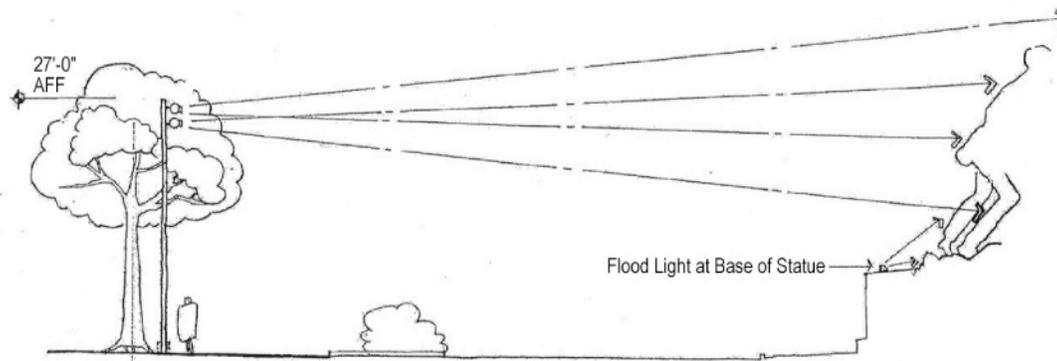
Not to Scale



Base Figure Source: John Milner Associates.

Option 2

Not to Scale



Base Figure Source: John Milner Associates.

Option 3

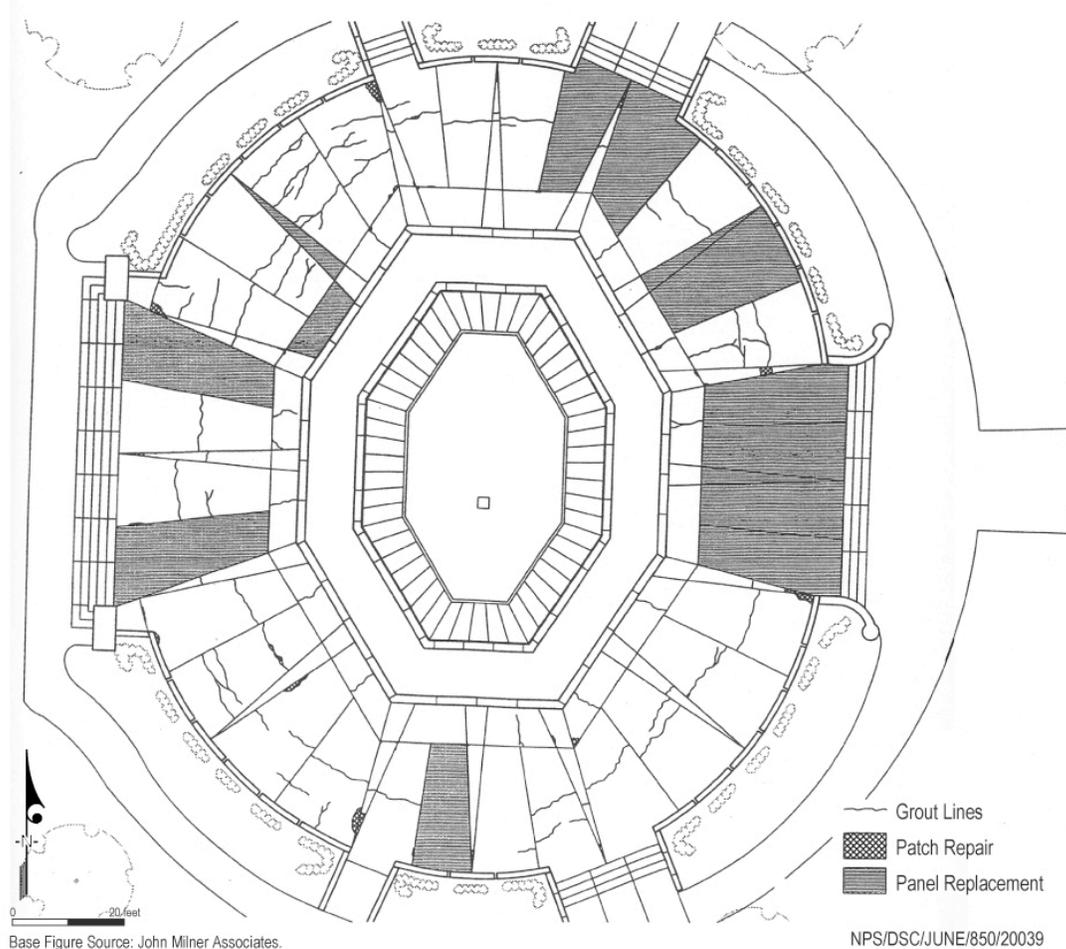
Not to Scale

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Figure 8. Statue lighting options

### Plaza, Review Stand, and Walkways

Under Alternative B, the National Park Service would remove and replace only those concrete panels on the plaza that are substantially deteriorated. Figure 9 illustrates the location of the concrete panels that would be removed and replaced. The first step in the rehabilitation of the plaza is to remove the various elements that surround the plaza such as the concrete panels, granite curbs, stairs, and concrete curbs. The location of the granite curbs, stairs, and concrete stair curbs would be documented and salvaged for installment following the concrete panel replacements. Once all surfaces of exposed aggregate are cleaned and properly prepared, new concrete panels would be poured in place. The concrete panels on the plaza would be replaced in-kind to match the unique texture, color, and pattern qualities of the original Earley Studios exposed aggregate concrete for the memorial plaza. Additional construction joints are necessary to make the large concrete panels more sustainable and minimize deterioration over time. The reviewing stand would be rehabilitated in a similar manner as to the plaza and involve partial replacement of the concrete aggregate stairs. The rehabilitation would be conducted in a manner consistent with the *Secretary of Interior's Standards for the Treatment of Historic Properties with Guidelines for Rehabilitating, Preserving, Restoring, and Reconstructing Historic Buildings*.



**Figure 9. Substantially deteriorated concrete panels on the plaza**

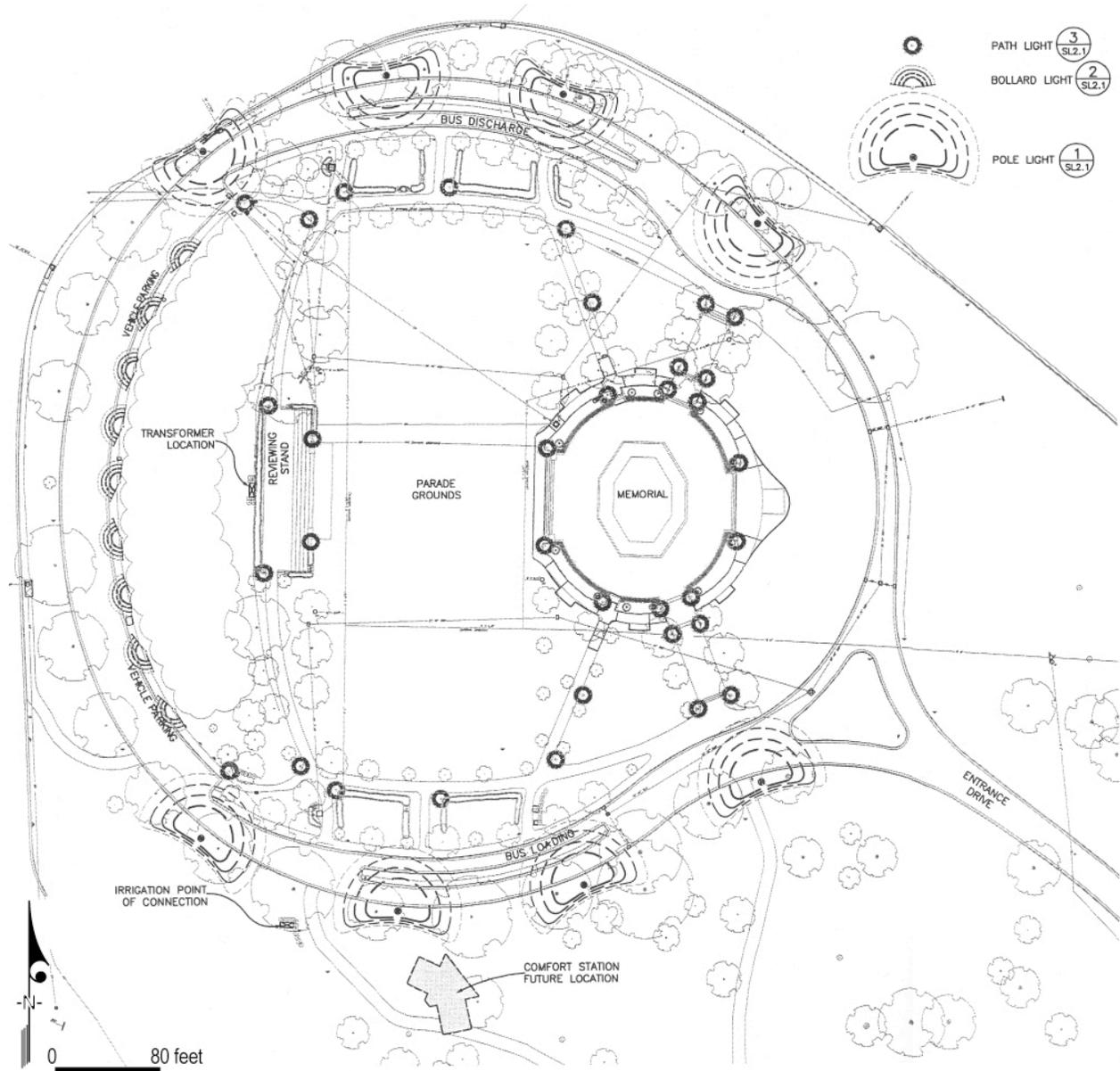
Other improvements to the plaza include installing new ADA accessible ramps and walkways.

#### Parade and Memorial Grounds

To help maintain the parade and memorial grounds, the National Park Service would replace the inadequate quick coupler irrigation system with a new automatic, zoned irrigation system. This system would be designed to cover the area inside the memorial circle and to the east of the memorial circle with one exception; the pine tree area would not be included within the irrigation zone. The parade grounds would be regraded to allow for better site drainage and minimize ponding.

To increase visitor services, the National Park Service would install new site amenities (drinking fountains, seating, trash receptacles, and communications system). The National Park Service would replace missing or damaged trees and shrubs, install new pine needle mulch in the pine tree area, and install sod in areas within the limits of grading. The National Park Service would repair portions of the existing asphalt trails and install a new asphalt trail to connect North Meade Street to an existing trail to improve mobility and accessibility in accordance with the Americans with Disability Act (ADA) requirements. The new trail alignment would replace the portions of the existing trail, and parts of the existing asphalt trail would be removed and the ground restored to grass. The new trail would require the construction of a small retaining wall to achieve the desired slope to make the trail ADA accessible. The layout of the new trail takes into consideration the future comfort station location.

Site lighting does not exist for the memorial grounds except for the lighting of the statue. Overall, the new lighting system would vastly improve the quality, efficiency, and safety aspects of the general lighting plan. Figure 10 shows a conceptual level of the lighting plan.



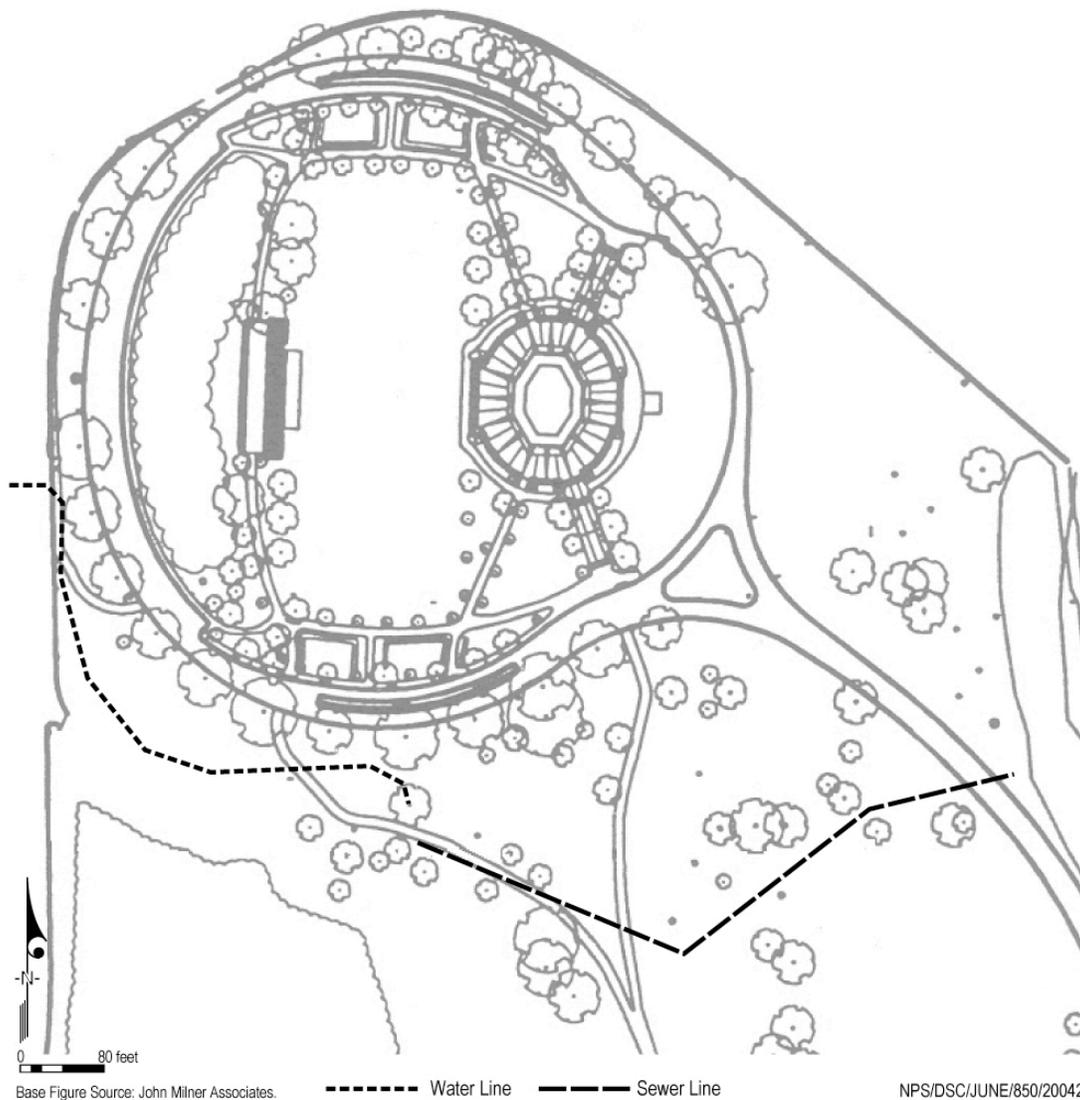
Base Figure Source: John Milner Associates.

NPS/DSC/JUNE/850/20041

Figure 10. Site lighting plan

### Electrical Service and Other Site Utilities

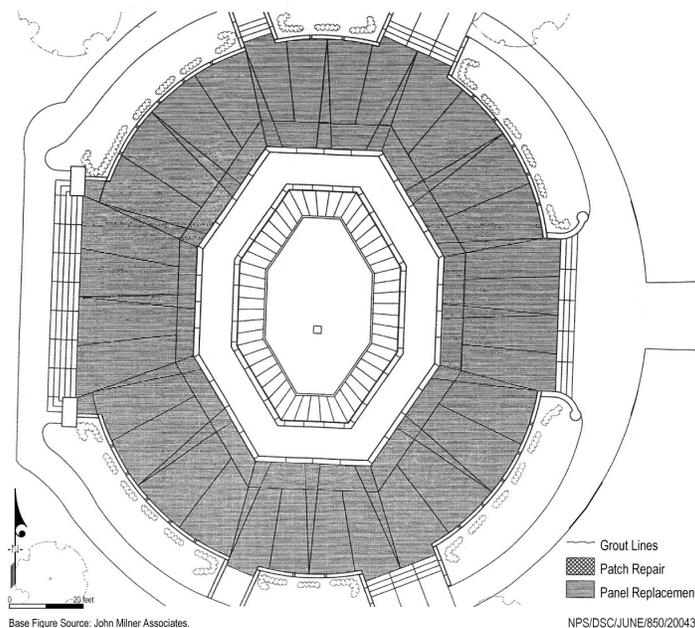
To increase electrical power capacity to accommodate electrical needs during special events and to reduce the need to use portable generators, the National Park Service would remove all the existing underground conduits, conductors and other distribution elements, and install new electrical load centers, associated conduit and feeder for power and lighting. A new site electrical main panel board would also be installed. The new electrical system would also serve the sculpture and memorial ground lighting system. In addition to upgrading the electrical system, the National Park Service would install a new water line for the new irrigation system and drinking fountains. To accommodate a future comfort station, a sewer line would be installed. The locations of the water and sewer lines and connection to the existing utility mainlines are shown in Figure 11.



**Figure 11. Proposed location of water line and sewer line**

## ALTERNATIVE C – MEMORIAL REHABILITATION WITH FULL REPLACEMENT OF CONCRETE PANELS ON PLAZA (PREFERRED ALTERNATIVE)

Alternative C (the Preferred Alternative) presents the National Park Service’s proposed action and defines the rationale for the action in terms of resource protection and management, visitor and operational use, costs, and other applicable factors. Similar to Alternative B, Alternative C consists of four project components: rehabilitating the sculpture and memorial base; rehabilitating the plaza, reviewing stand, and walkways; site improvements to the parade and memorial grounds; and the upgrading the existing electrical service and utilities at the site. For Alternative C, the rehabilitation to the sculpture and memorial base, rehabilitation of the parade and memorial grounds, and the rehabilitation of the existing electrical service at the site are the same as described for Alternative B. The primary difference between Alternative B and Alternative C is with the plaza rehabilitation. Under Alternative C, the National Park Service would remove and replace all the concrete panels on the plaza. The plaza would be replaced in-kind to match the unique texture, color, and pattern qualities of the original Earley Studio’s exposed aggregate concrete for the memorial plaza, entry pathways, and reviewing stand. Additional construction joints are necessary to make the large concrete panels more sustainable and minimize deterioration over time. Figure 12 illustrates the concrete panels that would be removed and replaced. The steps in the rehabilitation of the plaza and other improvements such as new ADA compliant ramps, and site lighting would be the same as described for Alternative B. The rehabilitation would be conducted in a manner consistent with the *Secretary of Interior’s Standards for the Treatment of Historic Properties with Guidelines for Rehabilitating, Preserving, Restoring, and Reconstructing Historic Buildings*.



**Figure 12. Full concrete panel replacement on plaza**

## STAGING AREA

The staging area for the project would be the existing parking lot. Portions of the memorial grounds would be closed to pedestrians during construction so this area would be available for use as the staging area. The circle around the memorial would remain open to the public. The benefits of using the existing parking for staging is that there would be no new land disturbance and convenient access.

## MITIGATION MEASURES OF THE ACTION ALTERNATIVES

Mitigation measures or conditions are presented as part of the Preferred Alternative and have been developed to lessen the adverse effects of the Preferred Alternative. The following mitigation measures are recommended for the implementation of the Preferred Alternative:

Section 106 Compliance. The rehabilitation of the U.S. Marine Corps War Memorial would be conducted in a manner that is consistent with the *Secretary of Interior's Standards for the Treatment of Historic Properties with Guidelines for Rehabilitating, Preserving, Restoring, and Reconstructing Historic Buildings* and *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*.

Archeological Investigation. An archeological survey would be conducted in the location of earth disturbance for placement of the new trails or utilities that are away from the memorial plaza area. If archeological resources were found to exist, the National Park Service would consult the Virginia State Historic Preservation Officer to determine appropriate mitigation and if necessary, a Memorandum of Agreement would be developed. In the unlikely event that human remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered during the survey or during construction, provisions outlined in the Native American Graves Protection and Repatriation Act (25 USC 3002) of 1990 would be followed. All human remains, funerary objects, sacred objects, or objects of cultural patrimony would be left in place until the culturally affiliated tribe(s) was consulted and an appropriate mitigation or recovery strategy developed.

Use of Best Management Practices. Best Management Practices would be implemented by the contractor during construction. Soil compaction and disturbance would be kept to a minimal amount of space needed for construction activities. Appropriate sediment and erosion control measures (such as the installing silt fences and inlet protection) would be implemented to reduce soil erosion and runoff from the construction area. Disturbed soils would be revegetated based on the recommendations of the park staff and specified in the construction contract.

Notification of Construction and Memorial Grounds Closure. The National Park Service would notify the general public of the timeframe for construction and closure of the memorial and associated grounds. Notification would be accomplished through press releases, posting of information on the park's website and signs at the site. The National Park Service would also coordinate with the U.S. Marines to assure that their staff has access to the memorial base to adhere to the presidential mandate to fly the flag at the U.S. Marine Corps War Memorial 24 hours a day, 7 days a week, and 365 days a year.

Timing of Construction. The timing of construction would occur to minimize impacts to the Marine Corps Marathon, sunset parades and the Independence Day celebration. To do this, the project construction would start in November 2004 (after the Marine Corps Marathon) with the goal of completing construction before September 2005. The construction activities may be phased to accommodate certain Marine Corps events at the site.

## **ENVIRONMENTALLY PREFERRED ALTERNATIVE**

In accordance with Director's Order #12 (NPS, 2001), the National Park Service is required to identify the "environmentally preferred alternative" in all environmental documents, including Environmental Assessments. The environmentally preferred alternative is determined by applying the criteria suggested in National Environmental Policy Act of 1969, which is guided by the Council on Environmental Quality. The Council on Environmental Quality provides direction that "[t]he environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in Section 101 of the National Environmental Policy Act, which considers:

1. Fulfilling the responsibilities of each generation as trustee of the environment for succeeding generations;
2. Assuring for all generations safe, healthful, productive, and aesthetically and culturally pleasing surroundings;
3. Attaining the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;
4. 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;
5. Achieving a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities; and
6. Enhancing the quality of renewable resources and approaching the maximum attainable recycling of depletable resources (National Environmental Policy Act, Section 101).

The No-Action Alternative fails to meet all the criteria listed above. Implementation of the No-Action Alternative fails to preserve an important historic aspect of our national heritage (criterion 3), which in turn would not fulfill the National Park Service responsibilities to future generations as a trustee of the environment (criterion 1). The No-Action Alternative would not have the greatest beneficial uses without risk of health and safety (criterion 2). The No-Action Alternative does not achieve a balance between visitor use and resource use at a high standard of living (criterion 5). Lastly, the No-Action Alternative does not enhance the quality of a renewable resource (criterion 6) such as the concrete on the plaza.

Alternative B and C have similar benefits and fulfill all the criteria above. Alternatives B and C both offer resource protection and preservation of our national heritage as described in Criterion 4; however, Alternative C offers a better long-term, sustainable solution because the full

replacement of the concrete panels on the plaza corrects the underlying problems and would create a uniform surface. As a result, Alternative C is the environmentally preferred alternative.

## **COASTAL ZONE CONSISTENCY DETERMINATION**

“Pursuant to the Coastal Zone Management Act, in 1986, the National Oceanic and Atmospheric Administration approved the Virginia Coastal Resources Management Program. Accordingly, federal activities which are reasonably likely to affect any land or water use or natural resources of Virginia's designated coastal resources management area must be consistent with the enforceable policies of the Virginia Coastal Resources Management Program” (VDEQ, 2003b). All federal development projects inside the coastal zone are automatically subject to consistency and require a Consistency Determination. The project would not result in any actions that would have any foreseeable direct, indirect, secondary, or cumulative impacts on Virginia’s coastal zone; therefore, the National Park Service has determined the project to be consistent with Virginia’s Coastal Zone Management Program.

## **SUSTAINABILITY**

The National Park Service has adopted the concept of sustainable design as a guiding principle of facility planning and development. The objectives of sustainability are to design park facilities to minimize adverse effects on natural and cultural values, to reflect their environmental setting, and to maintain and encourage biodiversity; to construct and retrofit facilities using energy-efficient materials and building techniques; to operate and maintain facilities to promote their sustainability; and to illustrate and promote conservation principles and practices through the sustainable design and ecologically sensitive use. Essentially, sustainability is living within the environment with the least impact on the environment.

Alternative B and C are consistent with the National Park Services concepts on sustainability. The project would be implemented in a manner as to minimize impacts to the memorial. The materials and design would reflect the environmental setting. In this case, it would be consistent with the cultural landscape. The electrical upgrades and new lighting would be upgraded with energy efficient equipment and systems.

The deteriorated concrete panels on the plaza cannot be reused. The primary difference between Alternatives B and C is Alternative C would replace 100 percent of the concrete panels on the plaza, which would allow the National Park Service to correct the underlying problems associated with cracking, settlement, and moisture. Alternative B would only replace those concrete panels that are substantially deteriorated. Alternative C is a more sustainable alternative in that it promotes long-term preservation that would minimize the need for future maintenance and repairs.

## **CONSTRUCTION COST AND SCHEDULE**

The cost of the project is estimated to be \$2.3 million. The National Park Service plans to perform the construction in the Fiscal Year 2005 timeframe.

## **ALTERNATIVES CONSIDERED BUT DISMISSED**

Two action alternatives and the No-Action Alternative were retained for further analysis in this Environmental Assessment; however, a number of other alternatives or design options were considered during the planning stages and project scope development for this project. Major alternatives considered, but dismissed, and the reasoning for their dismissal, are provided below.

The treatment plan prepared by John Milner Associates presented numerous options to each of the four components of the project and included an alternative for a visitor comfort station. The visitor comfort station was postponed because of Title XXVII Section 2863 (g) Preservation of the Arlington Ridge Tract. The general rule of this act stated “after the date of the enactment of this Act, no additional structure or memorials shall be constructed on the Arlington Ridge Tract”. Thus, this alternative was considered, but dismissed from consideration in this Environmental Assessment.

To mediate the differential settlement of the granite panels, the National Park Service considered removing the existing displaced horizontal and vertical panels and resetting each panel. This option was dismissed because of the risk involved with potentially cracking the granite panels during the removal and resetting.

In the Treatment Plan, various other options for each of the four components were presented. National Park Service considered different lighting options, different preservation methods, and different degrees of rehabilitation, and different curb and seating options. The National Park Service chose the options that best met the purpose and need of the project. From an impact analysis standpoint, the level of intensity and difference between these options would not be readily apparent because the options were so similar with only slight variation of the concept or design. Thus, these options were not described in detail in this Environmental Assessment and dismissed from further consideration. For more information on the other options considered by the National Park Service, please refer to the treatment plan.

## **IMPACT COMPARISON MATRIX**

Table 1 compares and contrasts each of the alternatives, including the degree to which each alternative accomplishes the purpose or fulfills the need identified in the Purpose and Need section. Table 2 presents impacts of the project alternatives, including the No-Action Alternative, for comparative purposes, and a concise summary of each alternative’s potential effects by impact topic.

**TABLE 1: COMPARATIVE SUMMARY OF THE NO-ACTION AND ACTION ALTERNATIVES**

<p align="center"><b>Alternative A (No-Action Alternative)</b></p>	<p align="center"><b>Alternative B Memorial Rehabilitation with Partial Replacement of Concrete Panels</b></p>	<p align="center"><b>Alternative C Memorial Rehabilitation with Full Replacement of Concrete Panels (Preferred Alternative)</b></p>
<p>Under the No-Action Alternative, the National Park Service would conduct minimum rehabilitation of the U.S. Marine Corps War Memorial. The National Park Service would leave all the concrete panels in place and make temporary repairs to the broken and/or displaced panels. The National Park Service would install passive exhaust for acceptable ventilation and code compliance. The walkways would remain noncompliant with ADA requirements. The National Park Service would not upgrade sewer and water utilities to the site or install an irrigation system in the near future knowing that future repairs would be necessary. The electrical system would not be upgraded. Only spot repairs to the lighting to the monument and its grounds would be conducted.</p> <p><b>Meets Project Objectives?</b></p> <p>Alternative A does not fulfill the project objectives: protecting a vital cultural resource, enhancing the visitor experience, increasing public safety, and improving park operational efficiency.</p>	<p>Alternative B consists of rehabilitation of the sculpture and memorial base; rehabilitation of the plaza, reviewing stand and walkways; rehabilitation of the parade and memorial grounds; and the rehabilitation of the existing electrical service and other site utilities at the site. Under Alternative B, the National Park Service would remove and replace only those concrete panels on the plaza that are substantially deteriorated. The major project components include reinstalling access opening hatch and ladder, providing ventilation to the interior of the monument and installing metal rail and wood slat seating, new ADA accessible ramps, new site lighting, new site amenities, and new irrigation, rehabilitating the electrical system, and increasing the utilities at the site (sewer and water).</p> <p><b>Meets Project Objectives?</b></p> <p>Alternative B does not meet the project objectives. Alternative B does not provide for a long-term, sustainable solution to protect the vital cultural resource, increase public safety, enhance the visitor experience, or improve park operational efficiency because the corrective actions would not solve the underlying problem for the entire plaza area; therefore, cracking and settlement would continue to persist in the near future.</p>	<p>Alternative C consists of rehabilitation of the sculpture and memorial base; rehabilitation of the plaza, reviewing stand and walkways; rehabilitation of the parade and memorial grounds; and the rehabilitation of the existing electrical service and other site utilities at the site. Under Alternative C, the National Park Service would remove and replace all the concrete panels on the plaza. The major project components include reinstalling access opening hatch and ladder, providing ventilation to the interior of the monument and installing metal rail and wood slat seating, new ADA accessible ramps, new site lighting, new site amenities, and new irrigation, rehabilitating the electrical system, and increasing the utilities at the site (sewer and water).</p> <p><b>Meets Project Objectives?</b></p> <p>Alternative C does meet the project objectives. Alternative C provides for a long-term, sustainable solution to protect the vital cultural resource, increase public safety, enhance the visitor experience, and improve park operational efficiency because the corrective actions would solve the underlying problem for the entire plaza area.</p>

**TABLE 2: COMPARATIVE SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS**

Impact Topic	Alternative A (No-Action Alternative)	Alternative B Memorial Rehabilitation with Partial Replacement of Concrete Panels	Alternative C Memorial Rehabilitation with Full Replacement of Concrete Panels (Preferred Alternative)
<b>Historic Structures/Sites</b>	The No-Action Alternative would result in a minor, long-term, adverse impact because the memorial plaza and base would continue to deteriorate to a point where the National Park Service would not be able to maintain the existing integrity and character of the historic structure. No impacts on surrounding historic structures/sites would occur. No cumulative effect would occur.	Alternative B would have a moderate, long-term, beneficial impact, as it would correct many existing deficiencies to the memorial and grounds and overall help preserve the historic character and integrity of the memorial. Alternative B falls short of addressing the full scope of the deteriorating panels. A minor, long-term, beneficial, cumulative effect would occur.	Alternative C would result in a moderate, long-term, beneficial impact, as it would correct many existing deficiencies to the memorial and grounds and help preserve the historic character and integrity of the memorial. The full replacement of the concrete panels on the plaza would fully address the underlying problems. A minor, long-term, beneficial, cumulative effect would occur.
<b>Cultural Landscapes</b>	The No-Action Alternative would have a minor, long-term, adverse impact on cultural landscapes because the memorial plaza and base would continue to deteriorate. The adverse impact is minor because the plaza and base represent a small portion of the features and patterns of the cultural landscape. No cumulative effect would occur.	Alternative B would have some beneficial impact to cultural landscapes, as it would preserve the features and patterns of the cultural landscape, but overall a minor, long-term, adverse impact would occur because of changes in the pathway alignments and grading necessary for constructing the accessible paths and retaining wall. No cumulative effect would occur.	Alternative C would have some beneficial impact to cultural landscapes, as it would preserve the features and patterns of the cultural landscape, but overall a minor long-term, adverse impact would occur because of changes in the pathway alignments and grading necessary for constructing the accessible paths and retaining wall. No adverse, cumulative effect would occur.
<b>Archeological Resources</b>	The No-Action Alternative would have no impact on archeological resources. No cumulative effect would occur.	Additional archeological field investigation is necessary to verify that resources are or are not present in the proposed areas of the new trails and utilities. If intact artifacts are discovered, the park would consult with the Virginia Department of Historic Resources and determine the appropriate next steps to minimize and mitigate potential impacts.	

Impact Topic	Alternative A (No-Action Alternative)	Alternative B Memorial Rehabilitation with Partial Replacement of Concrete Panels on the Plaza	Alternative C Memorial Rehabilitation with Full Replacement of Concrete Panels on the Plaza (Preferred Alternative)
<b>Aesthetics and Visual Resources</b>	The No-Action Alternative would have a minor, long-term adverse impact on aesthetics and visual resources because of the cracking concrete panels and substandard lighting would persist. No cumulative effect would occur.	Alternative B would result in a moderate, long-term, beneficial impact to aesthetics and visual resources, as it would correct many existing deficiencies to the memorial and grounds, thereby enhancing aesthetics and visual resources. A minor, short-term, adverse impact would occur during construction from temporary disturbance of the memorial and its grounds. A minor, long-term, beneficial, cumulative effect would occur.	Alternative C would result in a moderate, long-term, beneficial impact to aesthetics and visual resources, as it would correct many existing deficiencies to the memorial and grounds, enhancing aesthetics and visual resources. A minor, short-term, adverse impact would occur during construction from temporary disturbance of the memorial and its grounds. A minor, long-term, beneficial, cumulative effect would occur.
<b>Lightscape Management</b>	The No-Action Alternative would have no impact on lightscape management or views of the night sky because there would be no change in lighting levels or intensities. No cumulative effect would occur.	The lighting options proposed under Alternatives B and C would have a minor, long-term, adverse impact on the lightscape and views of the night sky because there would be a slight increase in light intensities and levels at the memorial. Prior to implementing any of the lighting options, the National Park Service would consider the recommendations made by the U.S. Commission of Fine Arts and the State Historic Preservation Office to sustain the statues character when lit at night and minimize the impacts to the viewshed of other nearby memorials. There would be no cumulative effect.	
<b>Health and Safety</b>	The No-Action Alternative would have a moderate, long-term, adverse impact on health and safety because the tripping hazards (cracked concrete and loose stairs) on the plaza would persist. No cumulative effect would occur.	The combination of the replacement of the concrete panels, alterations to the ramps and walkways, installation of a new passive ventilation system, installation of new general site lighting and other enhanced site amenities would have a moderate, long-term, beneficial impact on health and safety. However, the partial replacement of the concrete panels on the plaza would not be a long-term, sustainable solution because it would not fix the underlying problems causing the cracking and settlement of the concrete panels. A minor, long-term, beneficial, cumulative effect would occur.	The combination of the replacement of the concrete panels, alterations to the ramps and walkways, installation of a new passive ventilation system, installation of new general site lighting and other enhanced site amenities would have a moderate, long-term, beneficial impact on health and safety. The full replacement of the concrete panels on the plaza would be a long-term, sustainable solution because it would correct the underlying problems associated with cracking for the entire plaza area. A minor, long-term, beneficial, cumulative effect would occur.

Impact Topic	Alternative A (No-Action Alternative)	Alternative B Memorial Rehabilitation with Partial Replacement of Concrete Panels on the Plaza	Alternative C Memorial Rehabilitation with Full Replacement of Concrete Panels on the Plaza (Preferred Alternative)
<b>Visitor Use and Experience</b>	A moderate, long-term, adverse impact would occur because the cracking and settlement of the concrete panels on the plaza would persist. No cumulative effects would occur.	Moderate, long-term, beneficial impacts would occur from the combination of site improvements, added site amenities and alterations to the ramps and walkways; however, the partial replacement of the concrete panels would not be a long-term, sustainable solution. A minor, long-term, beneficial, cumulative effect would occur.	Moderate, long-term, beneficial impacts would occur from the combination of site improvements, added site amenities and alterations to the ramps and walkways. The full replacement of the concrete panels on the plaza would be a long-term, sustainable solution. A minor, long-term, beneficial, cumulative effect would occur.
<b>Park Operations</b>	The No-Action Alternative would have a minor, long-term, adverse impact on park operations because of extra maintenance effort to repair the concrete plaza and maintain the memorial and parade grounds. No cumulative effects would occur.	Alternative B would have a moderate, short-term, beneficial impact on park operations because of reduced maintenance requirements. Long-term, the National Park Service staff would again have to spend additional effort repairing the displaced and cracked panels. As a result, the long-term benefits of the rehabilitation would be reduced and a minor, long-term, adverse impact would occur on park operations because the plaza concrete panels would require repair. The enhanced utilities and associated systems at the site would have a minor, long-term, beneficial impact on park operations. A negligible, long-term, beneficial, cumulative effect would occur	Alternative C would have a moderate, long-term, beneficial impact on park operations because the replacement of all the concrete panels would offer more of a long-term, sustainable solution and reduced future maintenance requirements at the site. The enhanced utilities and associated systems at the site would have a minor, long-term, beneficial impact on park operations. A minor, long-term, beneficial, cumulative effect would occur

## AFFECTED ENVIRONMENT

Detailed information on resources may be found in the *Resource Management Plan, George Washington Memorial Parkway - 1994* (NPS 1994). A summary of the resources identified as impact topics associated with this project follows.

### CULTURAL RESOURCES

Cultural resources for the purposes of this Environmental Assessment are further characterized as historic structures/sites, archeological resources, and cultural landscapes.

“Historic properties,” as defined by the implementing regulations of the National Historic Preservation Act (36 CFR 800), are defined as any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places. This term includes artifacts, records, and the remains that are related to and located within such properties, as well as traditional and culturally significant Native American sites and historic landscapes. The term “eligible for inclusion in the National Register” includes both properties formally determined eligible and all other properties that meet National Register listing criteria.

The significance of historic properties is generally judged against a property's ability to meet the four criteria for inclusion on the National Register of Historic Places (36 CFR 60):

- Association with events that have made a significant contribution to the broad patterns of our history; or
- Association with the lives of persons significant in our past; or
- That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- That has yielded, or may be likely to yield, information important in prehistory or history.

Properties may be eligible for the National Register for contributions at the national, state, or local level. Ordinarily, properties achieving significance within the last 50 years are not considered eligible unless they are integral parts of historic districts or unless they are of exceptional importance. The most common types of properties less than 50 years old listed on the National Register are works of modern architecture or scientific facilities. Additionally, in order for a structure or building to be listed in the National Register, it must possess historic integrity of those features necessary to convey its significance (i.e., location, design, setting, workmanship, materials, feeling, and association see National Register Bulletin #15, *How to Apply the National Register Criteria for Evaluation* (NPS, 1990).

## **HISTORIC STRUCTURES/SITES**

The project area has a number of historic, commemorative, and cultural resources in the immediate vicinity. Historic resources that potentially would be impacted by either action alternative include Arlington National Cemetery, Arlington House - the Robert E. Lee Memorial, Netherlands Carillon, Fort Myer Historic District, George Washington Memorial Parkway, Pentagon, Theodore Roosevelt Island, Arlington Memorial Bridge, Lincoln Memorial, Jefferson Memorial, Washington Monument, and a number of other commemorative sites located within these areas. The majority of these resources are listed on the National Register of Historic Places. Of the resources listed, only the United States Marine Corps War Memorial and the Netherlands Carillon are not listed on the National Register of Historic Places; however, they are considered eligible.

Those resources within the visual area of potential effect for the project are the Arlington National Cemetery, the Netherlands Carillon, Arlington Memorial Bridge (Memorial Avenue), the George Washington Memorial Parkway, and the Lincoln Memorial. Although the Jefferson Memorial and the Washington Monument can be seen from the United States Marine Corps War Memorial, they are both nearly two miles removed from it and the line-of-sight is limited to only a small portion of the top of the monument. Therefore, any of the proposed rehabilitation and lighting alternatives presented for the United States Marine Corps War Memorial would likely have no effect on the views of the monument from these locations. One additional resource over 50 years of age within the area of potential effect is a complex of apartment buildings directly north of the Marine Corps Memorial at 1400 – 1414 North Meade Street. The resources within the area of potential effect are detailed below.

### **STRUCTURES/SITES WITHIN THE AREA OF POTENTIAL EFFECT**

**United States Marine Corps War Memorial.** Commonly referred to as "the Iwo Jima Memorial," the United States Marine Corps War Memorial is located on Marshall Drive, between Route 50 and Arlington National Cemetery, in Arlington, Virginia. It is dedicated to all Marines who have given their lives in defense of the United States since 1775.

The sculpture was based upon news-photographer Joe Rosenthal's Pulitzer Prize winning photograph of the flag raising on the island of Iwo Jima. Sculptor Felix W. de Weldon constructed a scale model and then a life-size model of it while in the Navy. Three of the survivors of the flag raising posed for de Weldon during his construction of the sculpture. The U.S. Marine Corps War Memorial was designed by Horace W. Peaslee. Erection began in September of 1954 and it was dedicated by President Dwight D. Eisenhower on November 10, 1954, the 179th anniversary of the U.S. Marine Corps (NPS, 2003).

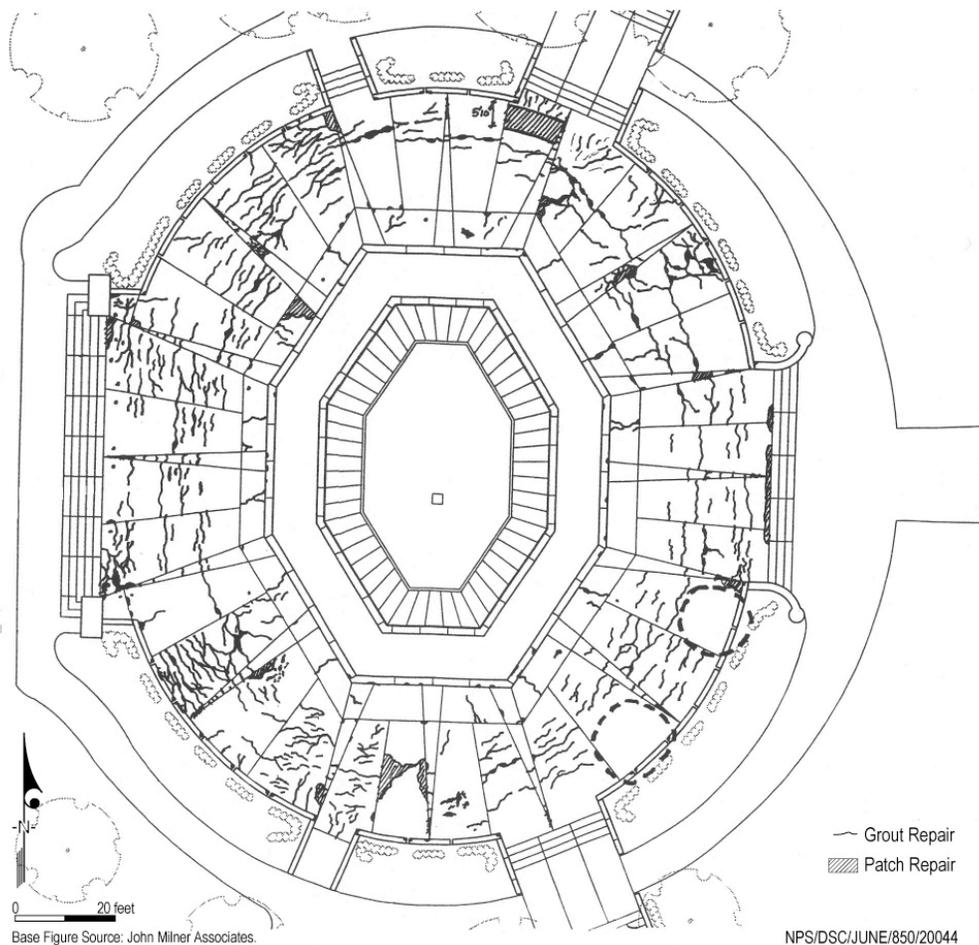
The base of the memorial is made of granite and is etched with the names and dates of every principal Marine Corps engagement since the founding of the Marine Corps, as well as the inscription: "In honor and in memory of the men of the United States Marine Corps who have given their lives to their country since November 10, 1775." Also inscribed on the base is the tribute of Fleet Admiral Chester W. Nimitz to the fighting men on Iwo Jima: "Uncommon Valor was a Common Virtue."

Both the U.S. Marine Corps War Memorial and the nearby Netherlands Carillon are administered by the National Park Service. The flag at the memorial flies 24 hours a day in accordance with a Presidential proclamation signed on June 12, 1961 (Milner, 2001).

The exposed aggregate concrete panels, entry pathways, and reviewing stand represent the work of John Joseph Earley Studios and have high artistic value because the panels' unique texture, color, and pattern qualities. From an artistic standpoint, Earley's primary innovation was what he called "architectural" or "mosaic" concrete – a method of mixing and exposing the small stones and other materials called aggregate. Earley, working with skilled craftman from his studios in Rosslyn, Virginia, received several artistic and technical awards for his efforts in casting artistic concrete panels and shapes (Washington Post, 2001).

The memorial is not currently listed on the National Register of Historic Places, nor is it listed as a historic property on State or local registers. The memorial is just approaching the 50-year standard for evaluation, and normally the memorial would not have been evaluated for National Register listing or eligibility until now. However, in 1999, Carol D. Shull, Keeper of the National Register of Historic Places (Keeper), in a letter to Mr. Don Klima, Director of Planning and Review of the Advisory Council on Historic Preservation reviewed the U.S. Marine Corps War Memorial and the Netherlands Carillon, both within Arlington Ridge Park, for National Register eligibility. The Keeper found that the U.S. Marine Corps War Memorial was individually eligible for the National Register of Historic Places under Criteria A and C. The boundary for the eligible resource is the original 7.67-acre parcel set aside for the memorial and landscape (USDOJ, 1999). The U.S. Marine Corps War Memorial is widely accepted as a structure possessing high historic and artistic significance and is eligible for the National Register under Criterion C as a historic resource possessing high artistic value, as well as Criterion A, for its historical importance as an important World War II memorial and American icon.

At present, the memorial base and plaza area suffer from normal deterioration and settlement because of its age. Twenty-nine of the 112 panels (26 percent) that make up the base of the sculpture suffer from differential settlement/displacement. Ninety percent of the concrete panels on the plaza have cracks that allow moisture to penetrate the substrate, thus contributing to the settlement problem. The deterioration in the concrete panels and patching of these areas with dissimilar materials has visually impacted the designed pattern of the concrete panels. Figure 13 shows the existing conditions of the plaza where spot repairs have occurred or are needed. The cracking, settlement, and associated patchwork of the plaza are very noticeable to those visiting the plaza.



**Figure 13. Existing condition of the plaza**

**Netherlands Carillon.** Directly adjacent to the United States Marine Corps War Memorial and also located in Arlington Ridge Park, the Netherlands Carillon is a gift from the Dutch government memorializing the gratitude of the Dutch people for American aid received during and after World War II. G. L. Verheul, a Dutch government official in The Hague, first envisioned the memorial and donations came from all sections of the Netherlands. On April 4, 1952, during a visit to the United States, Queen Juliana presented a small silver bell to President Truman as a token of the carillon to be sent in the future.

During the next few years, the bells were completed and sent to Washington, D.C., and in 1954 the forty-nine bell carillon was installed in a temporary tower in West Potomac Park. The present tower was completed in 1960 and on May 5, 1960, the carillon was officially dedicated.

With the 50th anniversary of the liberation of the Netherlands in 1995, a group of Dutch business men established a foundation to complete the modernization of the carillon and tower. With financial support of the Netherlands government, the Foundation Netherlands Carillon Washington D.C. 1945-1995 dedicated the 50th Bell of the Netherlands Carillon on May 5, 1995. The original playing console was replaced with a new unit, and the fiftieth bell was added to the carillon as a symbol of the 50 years of freedom enjoyed by Holland since 1945.

The tower housing the carillon was designed by Joost W. C. Boks, a leading Dutch architect. It is an open steel structure reinforced by steel plates. The tower is approximately 127 feet high, 25 feet deep, and 36 feet wide. It stands on a quartzite plaza and is enclosed by a low lava stone wall. Two bronze lions, designed by Dutch sculptor Paul Koning, guard the plaza steps. The verses cast on the bells were composed by the Dutch poet, Ben van Eysselsteijn (NPS, 2003).

In 1999, the National Keeper evaluated the Netherlands Carillon. The Keeper found it to be individually not eligible but was a contributing resource to the National Register-listed George Washington Memorial Parkway. The resource boundary was the original 27-acre plot selected for the memorials minus a small portion used for the widening and alteration of the roadways (USDOJ, 1999). Subsequent research documented in the 2003 Cultural Landscape Inventory for Arlington Ridge Park proposes that the entire 27.5 acre park is eligible for listing, which includes the Netherlands Carillon.

**George Washington Memorial Parkway.** The U.S. Marine Corps War Memorial is administered and maintained by the staff of the George Washington Memorial Parkway. Although, the memorial is not directly on the parkway, it is one of its many attractions. The George Washington Memorial Parkway was established in 1930 by the U.S. Congress as a memorial to George Washington. The parkway was transferred from the Office of Public Buildings and Public Works of the National Capital to the National Park Service on August 10, 1933 (The National Parks: Index 2001-2003). The Mount Vernon Memorial Highway (constructed in 1932) is the initial portion of the George Washington Memorial Parkway that links the southwestern end of Arlington Memorial Bridge on Columbia Island and Washington, DC, with Mount Vernon in Fairfax County, Virginia. The route roughly parallels the Potomac River. The highway was designed and landscaped to maximize scenic, aesthetic, and commemorative qualities and today retains much of its intended character (NPS, 1981). This portion of the George Washington Memorial Parkway was listed on the National Register of Historic Places in 1981. The remaining portions of the George Washington Memorial Parkway were listed on the National Register in 1995.

The Mount Vernon Memorial Highway is significant because it is the first parkway constructed and maintained by the U.S. Government. The highway opened in 1932 to commemorate the bicentennial of George Washington's birthday. The Mount Vernon Memorial Highway represented state of the art technology in parkway design in the 1930s. It was the work that set the standard for many Federal parkway projects to follow, such as Skyline Drive, Blue Ridge Parkway, and the adjoining George Washington Memorial Parkway (NPS, 1992). Through its location paralleling the Potomac River, the Mount Vernon Memorial Highway contributed to the establishment of a regional park system, provided protection to the shorelines of the Potomac River from private encroachment, and preserved the lands for public enjoyment (NPS, 1992). The Mount Vernon Memorial Highway portion of the George Washington Memorial Parkway was listed on the National Register of Historic Places in 1981 while the George Washington Memorial Parkway was listed in 1995 as part of a MPS for Parkways of the National Capital Region.

**Arlington Memorial Bridge/Memorial Avenue.** Arlington Memorial Bridge/Memorial Avenue links the entrance to Arlington National Cemetery with the Lincoln Memorial. The bridge and drive and its related features were designed by the architectural firm of McKim, Mead & White. The bridge composition symbolizes the reunion of North and South by visually linking the home

of Robert E. Lee, Arlington House – which stands on the hillside above the cemetery entrance – with the Lincoln Memorial on the opposite side of the river. The project was dedicated on January 16, 1932 by President Herbert Hoover.

The memorial roadway intersects by rotary with the George Washington Memorial Parkway at Memorial Circle. Arlington Memorial Bridge and its related architectural, engineering, sculptural, and landscape features are significant as important elements in the neoclassical urban design of the National Capital as it evolved during the first third of the 20<sup>th</sup> century. The bridge is widely regarded as the most beautiful in Washington. Various memorials dedicated to the service of U.S. military from different times and different wars line Memorial Avenue. The gateway to the cemetery is now the location of the Women in Military Service for America Memorial, designed by Marion Weiss and Michael Manfredi, and dedicated in 1997.

The bridge is 2,163 feet long and crosses the Potomac River on nine arches. It is constructed of reinforced concrete and sheathed in granite except for the central arch, which is a metal bascule draw span, no longer operational.

Flanking the eastern end of the bridge and the entrance to the Rock Creek and Potomac Parkway are two pairs of monumental equestrian sculptures, each composed of human figures leading or riding a massive horse. The pair called “The Arts of War,” by Leo Friedlander, stand at the end of the bridge, and the other pair, “The Arts of Peace,” by James Earle Fraser, mark the entrance to the parkway. The horses in “the Arts of Peace” are winged. Although designed in 1929 and 1931, the two pairs of sculptures were not cast and erected until 1951 (NPS, 2003). The Arlington Memorial Bridge and its related features were listed on the National Register of Historic Places in 1980

**Lincoln Memorial.** The Lincoln Memorial can be seen by visitors in the distance from the reviewing stand on the memorial grounds. The Lincoln Memorial, authorized in 1911, was designed by architect Henry Bacon in 1912 to resemble a classic Greek temple. Construction began in 1914 and the memorial was dedicated in 1922 by President Warren Harding. Lincoln’s only surviving son, Robert Todd Lincoln, was the guest of honor at the dedication.

The exterior of the building features a series of 36 Doric columns that represent the number of states in the Union when Lincoln died in 1865. The area above each column on the entablature is inscribed with the name of one of the 36 states and then above the penthouse are the names of the 48 states of the Union when the memorial was built. The inside of the building contains three chambers. The central chamber houses a marble statue of Lincoln. It was designed by American sculptor Daniel Chester French. The Lincoln Memorial was listed on the National Register of Historic Places in 1966.

**Arlington National Cemetery.** Arlington National Cemetery is located directly south of Arlington Ridge Park and the memorial. John Parke Custis, stepson of George Washington, originally purchased this land as part of a 1,100 acre tract in 1778. After the death of Custis at Yorktown, George Washington Parke Custis inherited the land. In 1802, he began construction of his mansion house, which he named Arlington. The house was completed in 1818.

Construction of the mansion began in 1802, but due to lack of cash, the wings of the house were built first, and the central hall was not completed until 1818. In 1831, his daughter, Mary Anna Randolph Custis married Lieutenant Robert E. Lee in the main hall of Arlington House. Custis died in 1857, leaving the estate to his daughter. In April 1861, Lee assumed command of the Army of Northern Virginia, the Confederacy's primary military force. During the war, the house became the symbol of the Confederacy that he represented.

As the death toll continued to rise from the war, Quartermaster General, Montgomery C. Meigs recommended that a section of the property around Arlington House be used as the military graveyard. The first soldiers were buried there in mid-May, 1864. By the early 20<sup>th</sup> century, the cemetery had become a burial place of honor for those from both North and South. Arlington National Cemetery, along with the Arlington House and the Robert E. Lee Memorial, was placed on the National Register of Historic Places in 1966 (University of Virginia, 1996).

**1400 – 1414 North Meade Street.** This property, located just west of the memorial, consists of a pair of four-story, brick apartment buildings constructed in the Colonial Revival Style. Each building is sixteen bays wide, consisting of four, four-bay sections. Above the first story windows is a continuous belt-course of cast concrete. The first story windows are nine-over-nine, double-hung sashes with flat lintels with central keystones. Second story windows are also nine-over-nine, but with triangular pediments on the outer sections, and arched pediments on the center sections. Third story windows are also nine-over-nine, but with simple lintels with keystones. The fourth story windows consist of bands of three paired twelve-light sashes on each of the four building sections. The paired sashes are capped with Palladian style arched windows. All window sashes are replacements that appear relatively sympathetic with the original style of the building. The entrance doors consist of a set of solid wood, two panel doors flanked by side lights and capped with a nine-light transom. The doors and side lights are replacements and are not in character with the Colonial Revival Style of the structures, being better suited for a Mission or Arts and Crafts motif. The roof of each building is flat, and is surrounded by a cast concrete balustrade.

The interior of each of the two buildings has been recently gutted and is currently undergoing major renovation. No original interior detailing remains within the structure. Although their appearance is good, these buildings are executed in a very common style of architecture common in the early-twentieth century. The two buildings have lost much of their original fabric, including the loss of original windows and complete gutting of the interiors. Due to the loss of integrity of materials, workmanship, and design, these buildings do not represent the best of their type, and are not associated with any significant events or persons and therefore are not eligible for the National Register of Historic Places.

## **CULTURAL LANDSCAPES**

A cultural landscape is a geographic area, including both cultural and natural resources and the wildlife and domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic value. There are four general kinds of cultural landscapes: Historic Sites, Historic Designed Landscapes, Historic Vernacular Landscapes and Ethnographic Landscape (DO#28, p. 179, 2002). The Mount Vernon Memorial Highway is a Historic Designed Landscape which is the original portion of the parkway completed in 1932. The National

Park Service's Mount Vernon Memorial Highway Cultural Landscape Report described the landscape as: "Roadway alignment, topography, planting, vistas, and parkway structures were the landscape elements employed by the Highway designer to achieve the desired 'memorial character.' Through the manipulation of these elements, the Highway's designers were able to translate the vision of a half century into a commemorative landscape that was beautiful and functional, poetic and rational." The George Washington Memorial Parkway, constructed from 1932 through 1965 is an extension of the Mount Vernon Memorial Highway and is itself a National Register eligible cultural landscape. The 27.5-acre Arlington Ridge Park is an integral component of the cultural landscape of the George Washington Memorial Parkway. Architect Horace Peaslee, who designed the landscape, sought a strictly symmetrical arrangement of trees, hedges, and paths around the memorial to help control pedestrian circulation and views in order to impart a suitably solemn atmosphere to this monument honoring Marine dead.

### **ARCHEOLOGICAL RESOURCES**

Information on archeological resources at the project site is limited. Any resources that had been near the surface prior to 1954 adjacent to the memorial were very likely destroyed by grading, landscaping, fill, and construction, on the site after that date. Archeological investigations carried out by the National Park Service in 2001 and 2002 found some artifacts associated with a small 19<sup>th</sup>-century farm as well as some midden deposits, but concluded that soil disturbance had significantly diminished the site's integrity and no further investigations were recommended (NPS 2002).

Another nearby study was performed for the Proposed Potomac Interceptor Sewer Improvements. This recent archeological survey (Cultural Resources Assessment of the Proposed Potomac Interceptor Sewer Improvements and Phase I Archeological Testing of Alternative A by Martha Williams of Goodwin & Associates in 2002) recorded an archeological site in which they labeled 44AR36 designated Iwo 1. Artifacts associated with "backyard" sheet midden deposits from the late 19<sup>th</sup> century domestic were found within undisturbed soil contexts. This survey demonstrates that there is the potential for undisturbed areas within the area, which could apply to Arlington Ridge Park. Williams indicated that within Arlington Ridge Park "current elevations ... correlated closely with historic topography mapped by the War Department in the 1860s..". This further supports that there could be additional undisturbed areas with Arlington Ridge Park.

### **AESTHETICS AND VISUAL RESOURCES**

Aesthetics and visual resources are those natural and cultural features of the environment that elicit one or more sensory reactions and evaluations by the observer, particularly in regards to pleasurable effects (Canter, 1996). The visual character of the landscape is formed by a variety of features on or near the site. At the site, the visual resource consists of the well-maintained park landscape (Arlington Ridge Park) including grass, shrubs and trees surrounding the plaza, walkways and parade grounds. Surrounding the site, the viewshed includes the Netherlands Carillon, Marshal Drive and Arlington National Cemetery to the south, Route 110 to the east, high-rise buildings and Arlington Boulevard to the north, and a string of high-rise buildings along North Meade Street to the south. From the memorial grounds, most views to the west are shielded by a large stand of white pines and other trees to the south.

Arlington Ridge Park is situated on a ridge above the Potomac River. It is a 27.5-acre site within the larger George Washington Memorial Parkway, a National Register listed National Park. Views are integral to all aspects of Arlington Ridge Park, which is located on axis with the National Mall, across West Potomac Park and the Potomac River. During the design and construction of the memorial grounds, important aesthetic elements were carefully incorporated. These included vantage points within the memorial grounds, which were calculated to dramatize a visual connection with the National Mall and Arlington National Cemetery. Contributing visual corridors include:

- The view along Ridge Path to the Netherlands Carillon
- The view from the memorial to the parade ground
- The view from the Netherlands Carillon to the flower beds below
- The view from the Netherlands Carillon to the National Mall
- The view from the reviewing stand to the parade ground, and across the parade ground to the memorial
- The view from the memorial plaza to the Monumental core (Lincoln Memorial, Washington Monument and the National Mall)
- The views along the entrance drive to the park
- The views along the pedestrian walks to the memorial
- The views along Ridge Path
- The views from the park to Arlington National Cemetery
- The views from Route 50 to the memorial (NPS, 2002).

Unfortunately, some of these visual connections have been compromised by invasive vegetation, highway signage, and the heavy traffic that now characterizes the Capital area. The expansion of Arlington National Cemetery and highway construction has somewhat isolated the memorial grounds and diminished its public accessibility, creating an atmosphere of a community park more than a site of national interest. However, the U.S. Marine Corps War Memorial and Netherlands Carillon continue to give the park a strong sense of the nationally significant site that it is, and it remains one of the most heavily visited National Parks sites in the nation's capital (NPS, 2002). The visual connections to the National Mall and Arlington National Cemetery still elicit powerful emotional responses in visitors and the visual and aesthetic components of the the memorial grounds remain critical and valuable resources that should not be impaired.

One of the most notable views of the statue is from the reviewing stand. From the reviewing stand, the Iwo Jima sculpture is in direct line of sight with the Nation's Capital, its monuments and contributing elements to the aesthetic and visual resources within the landscape. The U.S. Marine Corps War Memorial and ornamental Arlington Ridge hedges, the parade ground and wooded areas of the the Arlington Ridge Park in addition to small structures such as the metal framed wood-slat benches and two bronze lions at the Netherlands Carillon (NPS, 2002).



**Figure 14. Scenic vista from the reviewing stand**

## **LIGHTSCAPE MANAGEMENT**

In accordance with National Park Service *Management Policies (2001)* (NPS, 2000a), the National Park Service strives to preserve to the extent possible the quality of lighting associated with natural ambient landscapes and the night sky, which includes airport lighting and highway lighting in the project area. The U.S. Marine Corps War Memorial site has minimal illumination from adjacent street lights outside the memorial plaza area. The existing lighting is comprised of flood lights around the circular plaza, which illuminate the memorial statue and base. This lighting makes the memorial statue a prominent landmark at night (Milner, 2001). There is no other lighting on the plaza or near the memorial.

## **HEALTH AND SAFETY**

The plaza area consists of a series of concrete panels with joints radiating from the center of the sculpture. It is composed of a series of custom designed exposed aggregate concrete simulating the black sands of Mount Surabashi. Prolonged wear and settlement have resulted in a number of loose steps and cracks in the concrete panels on the plaza. The National Park Service has placed temporary asphalt patches between the sections to reduce tripping hazards. These conditions continue to persist due to the suspected cause of the settlement and the drainage system under the plaza, which was constructed on grade. There is one known incident where an elderly visitor lost footing on the uneven plaza and suffered a broken hip (NPS, 2002). This and other minor incidents have heightened the awareness of the structural problems at the memorial.

Access to the memorial plaza and sculpture currently consists of walkways with two series of stairs that do not meet ADA accessibility requirements and thus, presents safety concerns for individuals with disabilities trying to access the plaza.

The other health and safety concern at the site is the existing conditions in the memorial base open space. The access to the interior of the base of the sculpture is through a 20-inch square ac-

cess shaft through 4.5 feet of concrete (Milner, 2001). A precast concrete hatch that is broken covers the access shaft. The top of the concrete access shaft is now covered by a steel access hatch cover. This cover is badly rusted and has been unhinged. Inside the shaft is a badly rusted steel ladder with rebar rungs at 12 inches on center to provide for a very tight access and egress from the interior of the monument base. The structural concrete interior of the base is dead air space with no ventilation other than the access shaft. Inside, the ceiling is very damp with many areas extremely wet with hanging droplets. There is concern that the unventilated “dead air” space in the memorial base may have elevated carbon dioxide and depleted oxygen levels; and elevated levels of radon because of the bare earth floor. Because of these existing conditions, the memorial base does not meet building code requirements for “crawl space” (Milner, 2001).

## **VISITOR USE AND EXPERIENCE**

The U.S. Marine Corps War Memorial is one of many sites on and/or administered by the George Washington Memorial Parkway. In fiscal year 2002, the George Washington Memorial Parkway totaled 7,356,179 recreational visits (NPS, 2003). The parkway is open all year round, with the highest visitation in the spring and fall. The typical visitor experience includes travel to many of the historical, natural, or recreational areas along the parkway by either automobile on the roadway or by foot or bicycle on the linear trail network.

One of these designations along the parkway is the U.S. Marine Corps War Memorial. Approximately 1.2 million people visit the memorial each year (NPS, 2003). Included with these visits are special events, such as the Marine Corps Sunset Parades that attract more than a thousand visitors one night each week during the summer months, and the Marine Corps Marathon that starts and ends at the memorial. At the memorial, visitors can park and then walk to the plaza area and view at a close distance the Iwo Jima statue. There are numerous scenic vistas of Washington, DC from Arlington Ridge Park and specifically the plaza area of the memorial.

## **PARK OPERATIONS**

Arlington Ridge Park is administered, maintained, and protected by the George Washington Memorial Parkway. Annually, approximately 18 park employees are engaged in the maintenance, repair, and documentation of conditions at the memorial. This information is based on data on file since 1990. The maintenance involved with the site includes manually watering the eight-acre site in the summer time. Efficiency of grounds maintenance is affected by inadequate water pressure for irrigation and watering at the site.

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## **ENVIRONMENTAL CONSEQUENCES**

### **INTRODUCTION**

This section describes the environmental consequences associated with each alternative to the proposed action. It is organized by impact topics, which refine the issues and concerns into distinct topics for discussion analysis. These topics allow a standardized comparison between the alternatives based on their impact to the environment. The National Environmental Policy Act of 1969 requires consideration of context, intensity, and duration, direct or indirect, and cumulative impacts plus measures to mitigate the impacts. Direct or indirect effects are assessed in this document, although they may not be specifically labeled as direct or indirect. Cumulative impacts are identified separately. National Park Service policy also requires that “impairment” of park resources be evaluated in all environmental documents.

### **METHODOLOGY FOR ASSESSING IMPACTS**

Potential impacts are described in terms of:

- Type - are the effects beneficial or adverse,
- Context - are the effects site-specific, local, or regional,
- Duration - are the effects short-term or long-term,
- Intensity - are the effects negligible, minor, moderate, or major, and
- Impairment – would or would not impair park resources or values.

In this Environmental Assessment, the intensity of impacts is evaluated within a local (i.e., the project area) context, while the intensity of the contribution of effects to cumulative effects is evaluated in a regional (i.e., parkway) context. As such, the impact analysis determines the context, not vice versa. Because definitions of intensity (negligible, minor, moderate, major) vary by impact topic, intensity definitions are provided separately for each impact topic analyzed in this Environmental Assessment. In addition, the duration of the impact is analyzed independently for each resource because the impact duration is dependent on the resource being analyzed. Depending on the resource, impacts that last as long as construction takes place or a single year or one growing season are generally considered short-term or any time longer is considered long-term. Direct or in-direct effects are never specified in the analysis, however, impact topics should be considered as direct, which occurs at the same time and place or indirect which are effects caused later in time or farther removed in distance, but still reasonably foreseeable. In general, impacts were determined through consultation and collaboration with a multidisciplinary team of National Park Service and consultant professionals. In addition, regulatory agency consultation and other existing sources such as any existing literature or park planning documents were used to assess the potential impacts associated with each alternative.

## **CUMULATIVE EFFECTS**

The Council on Environmental Quality regulations, which implement the National Environmental Policy Act, requires assessment of cumulative impacts in the decision-making process for federally funded 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 non-Federal) or person undertakes such other actions” (40 CFR 1508.7). Cumulative effects can result from individually minor, but collectively moderate or major actions taking place over a period. Cumulative effects are considered for all alternatives and are presented at the end of each impact topic discussion analysis.

Cumulative effects were determined by combining the impacts of the proposed alternatives with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other past, ongoing, or foreseeable future projects at George Washington Memorial Parkway and, if necessary, the surrounding region. Cumulative effects are evaluated in a regional context, which varies for each impact topic. In general, the regional context is the George Washington Memorial Parkway, Spout Run, and Potomac River to the north and east, the Pentagon Reservation and Interstate 395 to the south, and the surrounding apartment and office buildings to the west of the site. Future projects that may have the potential to add to cumulative effects include the Rehabilitation of Arlington Memorial Bridge/Memorial Avenue, replacement of the Potomac Interceptor sewer line, sidewalk improvements on Meade Street, and special events such as the U.S. Marine Corps Marathon, Marine Barrack Sunset Parades, and Fourth of July fireworks celebration.

## **PROJECTS THAT MAKE UP THE CUMULATIVE IMPACT SCENARIO**

As part of the analysis and consideration of potential cumulative impacts, other past, present, and reasonably foreseeable projects were identified. For each project, the National Park Service considered the potential cumulative effect when combined with the potential impacts of the memorial rehabilitation. A brief overview of the projects identified in the immediate area follows. Projects that have the potential for cumulative effects are discussed further in the impact analysis.

- **Rehabilitation of Arlington Memorial Bridge/Memorial Avenue.** The National Park Service and Federal Highway Administration plan to rehabilitate Arlington Memorial Bridge/Memorial Avenue. The project involves resetting the granite curb and gutter, repaving the highway from the bridge to the circle, replacing the existing concrete curb on the circle with granite curb and some other minor site improvements. The project would have beneficial impacts on historic resources/sites, cultural landscapes, aesthetics and visual resources, visitor use and experience, and park operations.

The following projects or events were identified within the context/project area for cumulative impacts; however, the projects are not discussed under each impact topic because the projects are not likely to affect the impact topics retained for detailed study in this Environmental Assessment. Therefore, these projects in combination with the memorial rehabilitation would have no to negligible cumulative impacts.

- **Replacement of the Potomac Interceptor Sewer Line.** The Potomac Interceptor sewer system is a major regional sanitary sewer that serves the east-central portions of Arlington County. The existing sewer line was constructed in the mid-1930s and is nearing the end of its useful life. In addition, the sewer system is undersized and does not have the capacity to convey peak flows produced by severe storm events (Federal Register, 2003) An Environmental Assessment was completed by the National Park Service in August 2003 for the project because the project involves park land along the George Washington Memorial Parkway. Part of the Potomac Interceptor lies just east of Arlington Ridge Park near State Route 110.
- **Sidewalk Improvements on Meade Street.** Arlington County has plans to construct a sidewalk extension on North Meade Street. The National Park Service granted a special use permit and Department of the Army granted a license authorizing the County for such construction. The project is located near the intersection of North Meade and North Marshall Streets, west of the U.S. Marine Corps War Memorial, and north of Fort Myers and Arlington Cemetery. The project consists of constructing of 75 feet of sidewalk and a retaining wall (Arlington County, 2003). Other sidewalk improvements on the east side of Meade Street may be constructed in the near future.
- **U.S. Marine Corps Marathon.** The 29th Marine Corps Marathon will be held on October 31, 2004. The marathon starts near the U.S. Marine Corps War Memorial on State Route 110, goes 26 miles around parts of Arlington County and Washington, DC, and finishes at the U.S. Marine Corps War Memorial (Marine Corps Marathon, 2003). The Marathon attracts thousand of runners as well as spectators. The focal point of the race is the U.S. Marine Corps War Memorial.
- **Sunset Parades.** The U.S. Marine Corps conducts Sunset Parades under the backdrop of the U.S. Marine Corps War Memorial. The parades, which are open to the public, have been conducted since September 1956 by marching and musical units from the Marine Barracks. The parades are generally on Tuesday evenings held in the summer months (U.S. Marine Corps, 2003).
- **Independence Day and other special events.** Arlington Ridge Park is a popular area for viewing the Independence Day (Fourth of July) firework celebration on the National Mall. This celebratory event is one of the busiest times for visitor use on the mall and other sites on the George Washington Memorial Parkway.

## IMPAIRMENT TO PARK RESOURCES AND VALUES

In addition to determining the environmental consequences of the preferred and other alternatives, the National Park Service's *Management Policies, 2001* (NPS, 2000a) require analysis of potential effects to determine whether or not actions would impair park resources. The fundamental purpose of the National Park System, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. National Park Service managers must always seek ways to avoid, or to minimize to the greatest degree practicable, adversely impacting park resources and values. However, the laws do give the National Park Service the management discretion to allow impacts to park resources and values when necessary and as appropriate to fulfill the purposes of

a park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the National Park Service the management discretion to allow certain impacts, that discretion is limited by the statutory requirement that the National Park Service must leave park resources and values unimpaired unless a particular law directly and specifically provides otherwise. The prohibited impairment is the integrity of park resources or values. An impact to 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 has a major or severe adverse effect upon a resource or value whose conservation is:

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

Impairment may result from National Park Service activities in managing the park, visitor activities, or activities undertaken by concessionaires, contractors, and others operating in the park. In this chapter, a determination on impairment is made in the conclusion statement of each alternative. The National Park Service does not analyze recreational values/visitor use and experience (unless impacts are resource based), socio-economics, or park operations for impairment.

## **IMPACTS TO CULTURAL RESOURCES AND SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT**

In this Environmental Assessment, impacts to historic structures and cultural landscapes are described in terms of type, context, duration, and intensity, which is consistent with the Council on Environmental Quality regulations for implementing the National Environmental Policy Act. These impact analyses are intended to comply with the requirements of both the National Environmental Policy Act and Section 106 of the National Historic Preservation Act. In accordance with the Advisory Council on Historic Preservation's regulations implementing Section 106 (36 CFR Part 800, *Protection of Historic Properties*), impacts to historic structures, cultural landscapes, and archeological resources were identified and evaluated by: (1) determining the area of potential effects; (2) identifying cultural resources present in the area of potential effects that are either listed in or eligible to be listed in the National Register of Historic Places; (3) applying the criteria of adverse effect to affected cultural resources either listed in or eligible to be listed in the National Register; and (4) considering ways to avoid, minimize, or mitigate adverse effects.

Under the Advisory Council's regulations, a determination of either *adverse effect* or *no adverse effect* must be made for affected National Register eligible cultural resources. An *adverse effect* occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualifies it for inclusion in the National Register (e.g., diminishing the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association). Adverse effects also include reasonably foreseeable effects caused by the preferred alternative that would

occur later in time, be farther removed in distance, or be cumulative (36 CFR 800.5, *Assessment of Adverse Effects*). A determination of *no adverse effect* means there is an effect, but the effect would not diminish in any way the characteristics of the cultural resource that qualify it for inclusion in the National Register.

The Council on Environmental Quality's regulations and the National Park Service's *Conservation Planning, Environmental Impact Analysis and Decision-making* (Director's Order #12) also call for a discussion of the appropriateness of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact (e.g., reducing the intensity of an impact from major to moderate or minor). Any resultant reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation under the National Environmental Policy Act 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 resource 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 historic structures/sites and cultural landscapes. The Section 106 summary is intended to be used to assist the National Park Service with 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 criterion of effect and criteria of adverse effect found in the Advisory Council's regulations.

## IMPACTS ON HISTORIC STRUCTURES/SITES

### DEFINITION OF INTENSITY LEVELS

In order for a structure or building to be listed in the National Register of Historic Places, it must meet one or more of the following criteria of significance: associated with events that have made a significant contribution to the broad patterns of our history; associated with the lives of persons significant in our past; embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic value, or represent a significant and distinguishable entity whose components may lack individual distinction; or have yielded, or may be likely to yield, information important in prehistory or history. In addition, the structure or building must possess integrity of location, design, setting, materials, workmanship, feeling, and association (*National Register Bulletin, How to Apply the National Register Criteria for Evaluation*). For purposes of analyzing potential impacts to historic structures/sites, the thresholds of change for the intensity of an impact are defined as follows:

- *negligible*: Impact(s) is at the lowest levels of detection - barely measurable with no perceptible consequences, either adverse or beneficial. For purposes of Section 106, the determination of effect would be *no adverse effect*.
- *minor*: Adverse impact - impact would alter a feature(s) of a structure or building, but would not diminish the overall integrity of the resource. For purposes of Section 106, the determination of effect would be *no adverse effect*.

Beneficial impact - stabilization/ preservation of features in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*. For purposes of Section 106, the determination of effect would be *no adverse effect*.

- *moderate*: Adverse impact - impact would alter a feature(s) of the structure or building, diminishing the overall integrity of the resource. For purposes of Section 106, the determination of effect would be *adverse effect*. A Memorandum of Agreement is executed among the National Park Service and applicable state or tribal historic preservation officer and, if necessary, the Advisory Council on Historic Preservation in accordance with 36 CFR 800.6(b). The mitigation measures identified in the Memorandum of Agreement reduce the intensity of impact from major to moderate.

Beneficial impact - rehabilitation of a structure or building in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*. For purposes of Section 106, the determination of effect would be *no adverse effect*.

- *major*: Adverse impact - impact would alter a feature(s) of the structure or building, diminishing the overall integrity of the resource. For purposes of Section 106, the determination of effect would be *adverse effect*. The National Park Service and applicable state or tribal historic preservation officer are unable to negotiate and execute a Memorandum of Agreement in accordance with 36 CFR 800.6(b).

Beneficial impact – restoration of a structure or building in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*. For purposes of Section 106, the determination of effect would be *no adverse effect*.

*Duration*: Short-term – Effects lasting for the duration of the construction activities (less than 1 year); Long-term – Effects lasting longer than the duration of the construction (longer than 1 year).

#### ALTERNATIVE A - NO-ACTION ALTERNATIVE

Under the No Action Alternative, the National Park Service through preservation maintenance would continue to maintain the memorial to a point where the memorial's eligibility for listing in the National Register of Historic Place would not be jeopardized. Under Section 106 criteria, there would be no adverse effect. The National Park Service would leave all panels in place and make temporary repairs to the cracked and displaced concrete panels on the plaza. A more inclusive rehabilitation effort would not occur.

The No-Action Alternative would not address the underlying detrimental causes to the structure. The effects from the causes are: settlement of concrete panels; unstable intermixed substrate; and moisture penetration into the substrate. The No-Action Alternative does not address the aesthetic impact caused by the previous repair of deteriorated concrete panels that were made from dissimilar materials. The memorial would continue to deteriorate and, over time, the effects would worsen to the point that the visual and structural integrity of the structure would be compromised. As a result, a moderate, long-term, adverse impact would occur to historic structures/sites, with the potential of becoming a major adverse impact if the current preservation maintenance is not maintained in perpetuity.

Implementation of the No-Action Alternative would have no impact on nearby historic structures/sites because the deterioration of the concrete panels and other site deficiencies are localized to the plaza area and does not affect the viewshed of any other resources within the area of potential effect.

Cumulative Effects. The rehabilitation of the Arlington Memorial Bridge/ Memorial Avenue would have no adverse impact on historic resources/sites; therefore, no cumulative impact would occur.

Conclusion. The No-Action Alternative would result in a minor, long-term, adverse impact because of the continual deterioration of the memorial and the underlying structural deficiencies, thereby diminishing the integrity of the resource. No impacts on surrounding historic structures/sites would occur. No adverse cumulative impact would occur.

Because there would be no major adverse impacts to resources or values whose conservation are: (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the George Washington Memorial Parkway or its integral components including the U.S. Marine Corps War Memorial and Netherlands Carillon; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning document, there would be no impairment of the park's resources or values.

#### **ALTERNATIVE B - MEMORIAL REHABILITATION WITH PARTIAL REPLACEMENT OF CONCRETE PANELS ON THE PLAZA**

##### Rehabilitation of the Sculpture and Memorial Base

Under Alternative B, the National Park Service would install a ventilation system and replace the hatch and ladder. This change, which is needed for safety, would occur in the interior compartment of the memorial base and would not alter the exterior appearance of the memorial. These changes would have negligible, long-term, adverse impacts on the historic design of the memorial base.

The National Park Service proposes to replace the existing lighting infrastructure with modern technology. Based on the results of the lighting mockup and consultation with the U.S. Commission of Fine Arts on this matter, the preferred lighting option is two pole lights placed within the canopy of the existing trees on the south (statue front) side and low intensity upward directional lighting behind the crag stone of the memorial base. This combination of lights would correct the reversed shadowing of the existing lighting, which currently creates a ghoulish effect on the faces on the statue. The new lighting infrastructure would replace the existing floodlights located around the memorial plaza area. The new lighting infrastructure would add a new element to the landscape; and the old floodlights would be removed. The new infrastructure would be expected to have less of an impact on the aesthetics of the memorial than the existing floodlights; however, the lighting equipment would constitute a minor new element to the landscape. Modern technology would be used that would better illuminate the memorial at night. A moderate, long-term, beneficial impact on historic structures/sites would occur because the new lighting would enhance the visual quality of the memorial at night.

### Rehabilitation of the Plaza, Reviewing Stand, and Walkways

The National Park Service would remove and replace only those concrete panels on the plaza that are substantially deteriorated (about 20 percent). The original fabric of the plaza would be removed and the plaza would be replaced in-kind to match the unique texture, color, and pattern qualities of the original Earley Studio's exposed aggregate concrete for the memorial plaza, entry pathways, and reviewing stand. Additional construction joints would be necessary to make the large concrete panels more sustainable and minimize deterioration over time. Other improvements to the plaza include installing new accessible ramps and walkways to comply with the Americans with Disabilities Act and fixing the steps on the stairs of the reviewing stand and plaza.

The partial removal and replacement of the concrete panels on the plaza would have a minor, long-term, beneficial impact to historic structure/sites. The replacement would correct some of the existing deficiencies (cracking and settlement) of the plaza area, thereby preserving and improving the stability of the historic resource. A large amount of the plaza's historic fabric would be removed. The partial replacement would not correct the underlying concrete and substrate problems under the remaining panels. Also, visually matching the new aggregate concrete panels with the remaining panels would be difficult because of 50 years of weathering. The partial replacement would be visually obvious and detract from the aesthetic character of the plaza. While Alternative B addresses the substantial deterioration of the concrete panels, this alternative falls short of addressing the full scope of the deteriorating cracking panels on the plaza. Because it does not fully address all the underlying problems, the alternative is not sustainable and future corrective actions would be needed to address those panels that were not replaced.

The other site improvements under Alternative B are needed for code compliance or safety reasons. In most cases, the National Park Service proposes to replace in-kind or repair the existing features of the plaza, reviewing stand, or walkways; therefore, no adverse impact on historic structures/sites would occur. There would be no discernable visual changes to the memorial.

### Site Improvements to the Parade and Memorial Grounds

Site improvements to the parade and memorial grounds include the re-grading of parade grounds, soil improvement, re-sodding to improve surface drainage of parade grounds, installation of a new automatic zoned irrigation system, replacement of missing or distressed trees and shrubs, and the installation of new site amenities such as drinking fountains, seating, and trash receptacles. These site improvements would vastly improve the visual quality of the grounds and have negligible adverse impacts on the original design of the memorial in that most of the improvements are replacements of existing site features.

For safety reasons, the National Park Service would also add new lights under the tree canopies near the vehicle parking areas and minimal lighting along the pathways at ground level. The additional lighting would constitute a minor new physical element; however, there would be no loss of historic integrity to the memorial. Therefore, a minor, long-term, adverse impact would occur from lighting changes to the memorial grounds.

### Upgrades to the Electrical Service and Other Site Utilities

The National Park Service would remove all the existing underground conduits, conductors, and other distribution elements and install a new electrical system to service the site. In addition, a 4-inch sewer line and 4-inch water line would be installed to accommodate future visitor and maintenance services at the site. The new utility lines would not be visible or affect the visual quality of the memorial because they would be installed underground. The new electrical system would replace the old system so the change to the historic structure would be negligible. There would be no discernable structural changes to the memorial due to the installation of the new electrical system and other utilities. Therefore, the upgrades to the electrical service and other site utilities would have negligible, long-term, adverse impacts on historic structures/sites.

### Temporary Closure of the Memorial Grounds during Construction

The rehabilitation of the U.S. Marine Corps War Memorial requires that the National Park Service close the memorial and its grounds during the construction activities. During this time, various elements of the memorial would be removed and relocated to the staging area or an area within the memorial circle. As a result, the construction activities would have a moderate, short-term, adverse impact on the historic structure because of the temporary removal of certain features on the plaza and introduction of construction equipment, signage, and pedestrian barriers to the viewshed.

Cumulative Effects. Other projects such as the rehabilitation of the Arlington Memorial Bridge/Memorial Avenue would likely have a long-term, beneficial, impact on historic structures/sites resources because of preservation efforts to restore the structure or correct deficiencies associated with the site. Implementation of Alternative B, when added to these reasonably foreseeable future actions, would contribute a small and localized incremental impact because of the rehabilitation efforts such as replacement of the concrete panels on the plaza would help preserve the historic structure. Collectively, the cumulative effect is anticipated to be minor, long-term and beneficial.

Conclusion. Alternative B would result in a moderate, long-term, beneficial impact, as it would correct many existing deficiencies to the memorial and grounds and help preserve the overall historic character and integrity of the memorial. There would be no long-term impact on surrounding historic structures/sites within the area of potential effect. While Alternative B addresses the substantially deteriorated concrete panels on the plaza, the alternative falls short of addressing the full scope of the deteriorating panels and is not a sustainable solution to the underlying problems. Moderate, short-term, adverse impacts would occur during the construction because the temporary park closures and installation of safety fence, silt fence, and other construction equipment. An overall minor, long-term, beneficial cumulative effect would occur.

Because there would be no major adverse impact to resources or values whose conservation are: (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the George Washington Memorial Parkway or its integral components including the U.S. Marine Corps War Memorial and Netherlands Carillon; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's general management plan or other relevant Na-

tional Park Service planning document, there would be no impairment of the park's resources or values.

Section 106 Summary. After applying the Advisory Council on Historic Preservation's Criteria of adverse effect (36 CFR 800.5), the National Park Service proposes that implementing Alternative B would have no adverse effect on a property that meets the National Register Criteria. New lighting methods (upward directional lighting within the crag stone of the memorial base and pole lights) would constitute minor new physical elements to the historic structure. In accordance with Section 106 of the National Historic Preservation Act, these elements would not constitute a significant adverse effect in terms of historical integrity, and would thus be classified as having no adverse effect on historic properties. The effect would not alter the monument's structure and its defining features to a point that it would diminish the monument's eligibility for the National Register of Historic Places.

### **ALTERNATIVE C - MEMORIAL REHABILITATION WITH FULL REPLACEMENT OF CONCRETE PANELS ON THE PLAZA (PREFERRED ALTERNATIVE)**

#### Rehabilitation of the Plaza, Review Stand, and Walkways

Alternative C has similar impacts to Alternative B, with the exception of plaza rehabilitation. Under Alternative C, the National Park Service would remove and replace all the concrete panels on the plaza. The plaza would be replaced in-kind to match the unique texture, color, and pattern qualities of the original Earley Studios exposed aggregate concrete for the memorial plaza, entry pathways, and reviewing stand. Additional construction joints would be necessary to make the large concrete panels more sustainable and minimize deterioration over time. Alternative C fully addresses all of the underlying problems of the deteriorating panels by replacing 100 percent of the deteriorated or displaced panels. This approach prolongs the life of the structure, minimizes the need for future repairs, and adds to the memorial's preservation although a large amount of the plaza's historic fabric would be removed. Alternative C would result in a moderate, long-term, beneficial impact, as it would correct many existing deficiencies to the memorial and grounds and help preserve the memorial for future generations.

#### Activities Common to Alternative B

Under Alternative C, the improvements to the memorial sculpture and base; site improvements to the parade and memorial ground; and the upgrades to the electrical service and other site utilities are identical to Alternative B. Therefore, the impacts would be the same as described for Alternative B.

Cumulative Effects. Other projects such as the rehabilitation of the Arlington Memorial Bridge/Memorial Avenue would likely have a long-term, beneficial, impact on historic structures/sites resources because of preservation efforts to correct deficiencies associated with the site. Implementation of Alternative B, when added to these reasonably foreseeable future actions, would contribute a minor and localized incremental impact because the rehabilitation efforts such as replacement of the concrete panels on the plaza would help preserve the historic structure. The beneficial cumulative effect is anticipated to be minor and long-term.

Conclusion. Alternative C would result in a moderate, long-term, beneficial impact, as it would correct many existing deficiencies to the memorial's plaza and grounds, and help preserve the historic integrity of the memorial although a large amount of the plaza's historic fabric would be removed and replaced. There would be no discernable, long-term visual changes in views to or from any National Register listed or eligible sites within the area of potential effect. Alternative C addresses the deterioration of the concrete panels within the plaza and memorial base in a comprehensive manner and it addresses the underlying problem. Moderate, short-term, adverse impacts would occur during the construction because of the temporary park closures and installation of safety fence, silt fence, and other construction equipment. An overall minor, long-term, beneficial cumulative effect would occur.

Because there would be no major adverse impact to resources or values whose conservation are: (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the George Washington Memorial Parkway or its integral components including the U.S. Marine Corps War Memorial and Netherlands Carillon; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning document, there would be no impairment of the park's resources or values.

Section 106 Summary. After applying the Advisory Council on Historic Preservation's Criteria of adverse effect (36 CFR 800.5), the National Park Service proposes that implementing Alternative C would have no adverse effect on properties that meet National Register Criteria. The original exposed aggregate would be replaced in-kind and in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*. Pole lights and upward lighting behind the crag stone of the memorial would constitute minor new physical elements to the historic structure/site. These features would be shielded from the viewshed of the memorial to the extent possible. In accordance with Section 106 of the National Historic Preservation Act, these elements would not constitute a significant adverse effect in terms of altering the memorial's historical integrity, and thus, would be classified as having no adverse effect on historic properties. The effect would not alter the monument's structure and its defining features to a point that it would diminish the monument's eligibility for the National Register of Historic Places.

## IMPACTS TO CULTURAL LANDSCAPES

### DEFINITION OF INTENSITY LEVELS

In order for a cultural landscape to be listed in the National Register, it must meet one or more of the following criteria of significance: associated with events that have made a significant contribution to the broad patterns of our history; associated with the lives of persons significant in our past; embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic value, or represent a significant and distinguishable entity whose components may lack individual distinction; or have yielded, or may be likely to yield, information important in prehistory or history (*National Register Bulletin, How to Apply the National Register Criteria for Evaluation*). The landscape must also have integrity of those patterns and features - spatial organization and land forms; topography; vegetation; circulation networks; water features; and structures/buildings, site furnishings, or objects necessary to convey its significance (*Secretary of the Interior's Standards for the Treatment of Historic Prop-*

erties With Guidelines for the Treatment of Cultural Landscapes). For purposes of analyzing potential impacts to cultural landscapes, the thresholds of change for the intensity of an impact are defined as follows:

- *negligible*: Impact(s) is at the lowest levels of detection - barely perceptible and not measurable. For purposes of Section 106, the determination of effect would be *no adverse effect*.
- *minor*: Adverse impact - impact(s) would alter a pattern(s) or feature(s) of the cultural landscape but would not diminish the overall integrity of the landscape. For purposes of Section 106, the determination of effect would be *no adverse effect*.

Beneficial impact - preservation of landscape patterns and features in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. For purposes of Section 106, the determination of effect would be *no adverse effect*.

- *moderate*: Adverse impact - impact(s) would alter a pattern(s) or feature(s) of the cultural landscape, diminishing the overall integrity of the landscape. For purposes of Section 106, the determination of effect would be *adverse effect*. A Memorandum of Agreement is executed among the National Park Service and applicable state or tribal historic preservation officer and, if necessary, the Advisory Council on Historic Preservation in accordance with 36 CFR 800.6(b). The mitigation measures identified in the Memorandum of Agreement reduce the intensity of impact from major to moderate.

Beneficial impact - rehabilitation of a landscape or its patterns and features in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. For purposes of Section 106, the determination of effect would be *no adverse effect*.

- *major*: Adverse impact - impact(s) would alter a pattern(s) or feature(s) of the cultural landscape, diminishing the overall integrity of the resource. For purposes of Section 106, the determination of effect would be *adverse effect*. The National Park Service and applicable state or tribal historic preservation officer are unable to negotiate and execute a Memorandum of Agreement in accordance with 36 CFR 800.6(b).

Beneficial impact - restoration of a landscape or its patterns and features in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. For purposes of Section 106, the determination of effect would be *no adverse effect*.

*Duration*: Short-term – Effects lasting for the duration of the construction activities (less than 1 year); Long-term – Effects lasting longer than the duration of the construction (longer than 1 year).

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

Under the No-Action Alternative, the National Park Service through preservation maintenance would continue to maintain the landscape to a point where its integrity is not jeopardized. Under Section 106 criteria, there would be no adverse effect. A more inclusive rehabilitation effort would not occur.

Implementation of the No-Action Alternative would have a minor, long-term adverse effect on cultural landscapes because the long-term deterioration of the memorial's concrete panels would slightly diminish the landscapes integrity; however, the impact is only minor because the plaza and base represent merely a small part of the features and patterns of the landscape. Thus, the No-Action Alternative would have a minor, long-term, adverse impact on cultural landscapes.

Cumulative Effects. No other projects were identified in the cumulative impact scenario that would have adverse impacts on cultural landscapes; therefore, no cumulative effects would occur.

Conclusion. The No-Action Alternative would result in a minor, long-term, adverse impact to cultural landscapes because of the continual deterioration of the memorial and the underlying structural deficiencies. No adverse cumulative effect would occur.

Because there would be no major adverse impacts to resources or values whose conservation are: (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the George Washington Memorial Parkway or its integral components including the U.S. Marine Corps War Memorial and Netherlands Carillon; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning document, there would be no impairment of the park's resources or values.

## **ALTERNATIVE B - MEMORIAL REHABILITATION WITH PARTIAL REPLACEMENT OF CONCRETE PANELS ON THE PLAZA**

### Rehabilitation of the Sculpture and Memorial Base

The National Park Service proposes to replace the existing lighting infrastructure with modern technology. Based on the results of the lighting mockup and consultation with the U.S. Commission of Fine Arts on this matter, the preferred lighting option is two pole lights placed within the canopy of the existing trees on the south (statue front) side and low intensity upward directional lighting behind the crag stone of the memorial base. This combination of lights would correct the reversed shadowing of the existing lighting, which currently creates a ghoulish effect on the faces on the statue. The new lighting infrastructure would replace the existing floodlights located around the memorial plaza area. The new lighting infrastructure (pole lights) would add a new element to the landscape; and the old floodlights would be removed. The new infrastructure would be expected to have less of an impact on the aesthetics of the memorial than the existing floodlights; however, the lighting equipment would constitute a minor new element to the landscape. The new elements would have an adverse impact on the cultural landscape because of the change to the existing features and pattern of the cultural landscape. The impact would be minor and long-term.

### Rehabilitation of the Plaza, Reviewing Stand, and Walkways

The National Park Service would remove and replace only those concrete panels on the plaza that are substantially deteriorated (about 20 percent). The plaza would be replaced in-kind to match the unique texture, color, and pattern qualities of the original Earley Studios exposed aggregate concrete for the memorial plaza, entry pathways, and reviewing stand. Additional con-

struction joints would be necessary to make the large concrete panels more sustainable and minimize deterioration over time. Other improvements to the plaza includes installing new ADA accessible ramps and walkways and fixing the loose steps on the stairs of the reviewing stand and plaza.

The partial removal and replacement of the concrete panels on the plaza would have a minor, long-term, beneficial impact to the cultural landscape. The replacement would correct many of the existing deficiencies (cracking and settlement) of the plaza area. While Alternative B addresses the substantial deterioration of the concrete panels within the plaza, this alternative falls short of addressing the full scope of the deteriorating cracking panels on the plaza. Because it does not fully address all the underlying problems, the alternative is not sustainable and future corrective actions would be needed to address those panels that were not replaced.

The other site improvements under Alternative B are needed for safety or accessibility reasons. In most cases, the National Park Service proposes to replace in kind or repair the existing features of the plaza, reviewing stand, or walkways; therefore, only negligible impacts on cultural landscapes would occur.

#### Site Improvements to the Parade and Memorial Grounds

Site improvements to the parade and memorial grounds include re-grading of parade grounds, soil improvement, re-sodding to improve surface drainage of parade grounds, the installation of a new automatic zoned irrigation system, replacement of missing or distressed trees and shrubs, and the installation of new site amenities such as drinking fountains, seating, and trash receptacles. These site improvements would improve the cultural landscape and have negligible, long-term, adverse impacts on the original design of the memorial in that most of the improvements are replacements of existing site features.

The existing lighting infrastructure would be replaced with modern lighting technology. For safety reasons, the National Park Service would also add new pole lights under tree canopies near the vehicle parking areas and minimal lighting along the pathways at ground level. Also, the new accessible pathway near North Meade Street would require that a small retaining wall be constructed. The additional lighting and retaining wall would constitute a minor, new physical elements. A minor, long-term, adverse impact would occur from lighting changes to the memorial grounds.

The change in the alignment and grading necessary to provide ADA accessible pathways would have a minor, long-term, adverse impact on the cultural landscape. The impacts would be mitigated through site design sensitive to the existing landscape.

#### Upgrades to the Electrical Service and Other Site Utilities

The National Park Service would remove all the existing underground conduits, conductors, and other distribution elements and install a new electrical system to service the site. In addition, a 4-inch sewer line and 4-inch water line would be installed to accommodate future visitor and maintenance services at the site. The new utility lines would not be visible or affect the cultural landscape of the memorial because they would be installed underground. The new electrical system would replace the old system so the change to the environment would be negligible.

There would be no discernable structural changes to the cultural landscape. Therefore, the upgrades to the electrical service and other site utilities would have negligible, long-term, adverse impacts on cultural landscapes.

#### Temporary Closure of the Memorial Grounds during Construction

The rehabilitation of the U.S. Marine Corps War Memorial requires that the National Park Service close the memorial and its grounds for approximately nine to twelve months during the construction activities. During this time, various elements of the memorial would be removed and relocated to the staging area or an area within the memorial circle. As a result, the construction activities would have a moderate, short-term, adverse impact on the cultural landscape because of the temporary removal of certain features on the plaza and introduction of construction equipment, signage, and pedestrian barriers.

Cumulative Effects. No other projects were identified in the cumulative impact scenario that would have adverse impacts on cultural landscapes; therefore, no cumulative effects would occur.

Conclusion. Alternative B would result in a minor, long-term, adverse impact to cultural landscapes because of the addition of minor, new physical elements to the landscape and the changes in the pathway alignment and grading necessary to make the pathways ADA accessible. It should be noted that many of the proposed actions would have beneficial impacts in that it would preserve the features and pattern of the cultural landscape. While Alternative B addresses the substantially deteriorated concrete panels on the plaza, the alternative falls short of addressing the full scope of the deteriorating panels and is not comprehensive or sustainable solution to the underlying problems. Moderate, short-term, adverse impacts would occur because the construction activities would have temporary disruption of and visual impacts to the cultural landscape and minor new elements to the landscape such as the retaining wall and lighting infrastructure. No cumulative effect would occur.

Because there would be no major adverse impact to resources or values whose conservation are: (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the George Washington Memorial Parkway or its integral components including the U.S. Marine Corps War Memorial and Netherlands Carillon; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning document, there would be no impairment of the park's resources or values.

Section 106 Summary. After applying the Advisory Council on Historic Preservation's Criteria of adverse effect (36 CFR 800.5), the National Park Service proposes that implementing Alternative B would have no adverse effect on cultural landscapes that meet National Register Criteria. Pole lights and upward directional lighting on the memorial base and changes in the pathway alignment, grading, and a retaining wall necessary to construct the accessible pathway would constitute minor new physical elements to the cultural landscape. In accordance with Section 106 of the National Historic Preservation Act, these elements would not constitute a significant adverse effect in terms of integrity or historic value, and would thus be classified as having no adverse effect on the cultural landscape. The effect would not alter the character of any cul-

tural landscapes or their defining features to a point that it would diminish their eligibility for the National Register of Historic Places.

### **ALTERNATIVE C - MEMORIAL REHABILITATION WITH FULL REPLACEMENT OF CONCRETE PANELS ON THE PLAZA (PREFERRED ALTERNATIVE)**

#### Rehabilitation of the Plaza, Review Stand, and Walkways

Alternative C has similar impacts as Alternative B, with the exception of plaza rehabilitation. Under Alternative C, the National Park Service would remove and replace all the concrete panels on the plaza. The plaza would be replaced in-kind to match the unique texture, color, and pattern qualities of the original Earley Studios exposed aggregate concrete for the memorial plaza, entry pathways, and reviewing stand. Additional construction joints would be necessary to make the large concrete panels more sustainable and minimize deterioration over time. Alternative C fully addresses all of the underlying problems of the deteriorating panels. Consequently, it replaces 100 percent of the deteriorated or displaced panels. This approach prolongs the life of the structure, minimizes the need for future repairs, and adds to the memorial's preservation. Alternative C would result in a moderate, long-term, beneficial impact, as it would correct many existing deficiencies to the memorial and grounds and help preserve many of the contributing elements of the cultural landscape.

#### Activities Common to Alternative B

Under Alternative C, the improvements to the memorial sculpture and base; site improvements to the parade and memorial ground; and the upgrades to the electrical service and other site utilities are identical to Alternative B. Therefore, the impacts would be the same as described for Alternative B.

Cumulative Effects. No other projects were identified in the cumulative impact scenario that would have adverse impacts on cultural landscapes; therefore, no cumulative effects would occur.

Conclusion. Alternative C would result in a minor, long-term, adverse impact to cultural landscapes because of the addition of minor, new physical elements to the landscape and the changes in the pathway alignment and grading necessary to make the pathways ADA accessible. It should be noted that many of the proposed actions would have beneficial impacts in that it would preserve the features and pattern of the cultural landscape. Alternative C addresses the deterioration of the concrete panels within the plaza and memorial base in a comprehensive manner and it addresses the underlying problem of the deteriorating panels and substrate. Moderate, short-term, adverse impacts would occur during construction because of temporary disruption of the visual elements of the cultural landscape. No cumulative effect would occur.

Because there would be no major adverse impact to resources or values whose conservation are: (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the George Washington Memorial Parkway or its integral components including the U.S. Marine Corps War Memorial and Netherlands Carillon; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's general management plan or other relevant Na-

tional Park Service planning document, there would be no impairment of the park's resources or values.

**Section 106 Summary.** After applying the Advisory Council on Historic Preservation's Criteria of adverse effect (36 CFR 800.5), the National Park Service proposes that implementing Alternative C would have no adverse effect on cultural landscapes that meet National Register Criteria. Pole lights and upward lighting on the memorial base would constitute minor new physical elements to the cultural landscape. In accordance with Section 106 of the National Historic Preservation Act, these elements would not create a significant adverse effect in terms of altering integrity or value of the surrounding cultural landscape. Therefore, no adverse effect on cultural landscapes would occur. The effect would not alter the defining features, integrity, or character of the cultural landscape to a point that it would diminish their eligibility for the National Register of Historic Places.

## IMPACTS ON ARCHEOLOGICAL RESOURCES

### DEFINITIONS OF INTENSITY LEVELS

In order for an archeological resource to be eligible for the National Register of Historic Places it must meet one or more of the following criteria of significance: A) associated with events that have made a significant contribution to the broad patterns of our history; B) associated with the lives of persons significant in our past; C) embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic value, or represent a significant and distinguishable entity whose components may lack individual distinction; D) have yielded, or may be likely to yield, information important in prehistory or history. In addition, the archeological resource must possess integrity of location, design, setting, materials, workmanship, feeling, association (*National Register Bulletin, Guidelines for Evaluating and Registering Archeological Properties*). For purposes of analyzing impacts to archeological resources either listed in or eligible to be listed in the National Register, the thresholds of change for intensity of an impact are defined below:

- *negligible*: Impact is at the lowest levels of detection - barely measurable with no perceptible consequences, either adverse or beneficial. For purposes of Section 106, the determination of effect would be *no adverse effect*.
- *minor*: Adverse impact - disturbance of a site(s) results in little, if any, loss of integrity. For purposes of Section 106, the determination of effect would be *no adverse effect*.

Beneficial impact – maintenance and preservation of a site(s). For purposes of Section 106, the determination of effect would be *no adverse effect*.

- *moderate*: Adverse impact - disturbance of a site(s) results in loss of integrity. For purposes of Section 106, the determination of effect would be *adverse effect*. A Memorandum of Agreement is executed among the National Park Service and applicable state or tribal historic preservation officer and, if necessary, the Advisory Council on Historic Preservation in accordance with 36 CFR 800.6(b). The mitigation measures identified in the MOA reduce the intensity of impact from major to moderate.

Beneficial impact – stabilization of a site(s). For purposes of Section 106, the determination of effect would be *no adverse effect*.

- *major*: Adverse impact – disturbance of a site(s) results in loss of integrity. For purposes of Section 106, the determination of effect would be *adverse effect*. The National Park Service and applicable state or tribal historic preservation officer are unable to negotiate and execute a Memorandum of Agreement in accordance with 36 CFR 800.6(b).

Beneficial impact – active intervention to preserve a site(s). For purposes of Section 106, the determination of effect would be *no adverse effect*.

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

Under the No-Action Alternative, the National Park Service would continue management actions that would include minor repairs to the United States Marine Corps War Memorial to maintain, to the extent possible, the existing integrity and character of the historic structure. Implementation of the No-Action Alternative would have no impact on archeological resources because excavations or ground disturbing activities would not occur.

Cumulative Effects. There would be no cumulative impact in that the No-Action Alternative would have no impacts on archeological resources.

Conclusion. The No-Action Alternative would have no impact on archeological resources. No cumulative impact would occur.

Because there would be no major adverse impacts to resources or values whose conservation are: (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the George Washington Memorial Parkway or its integral components including the U.S. Marine Corps War Memorial and Netherlands Carillon; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning document, there would be no impairment of the park's resources or values.

#### **ALTERNATIVES B AND C**

The potential impacts to archeological resources are the same for Alternatives B and C; therefore they have been grouped together for discussion purposes. Site improvement to the parade and memorial grounds under Alternatives B and C include the installation of a new automatic zoned irrigation system, replacement of missing or distressed trees and shrubs, and the installation of new site amenities such as drinking fountains, seating, and trash receptacles. In addition, the National Park Service would construct extensions to connect the existing pathways from North Meade Street and other parts between the plaza and the Netherlands Carillon. A 4-inch sewer line and 4-inch water line would also be installed to accommodate future visitor and maintenance services at the site. These site modification would involve earth disturbance, which could potentially disturb intact archeological resources. A phase I archeological survey is needed to investigate the areas for the new trails and site utilities to verify whether archeological resources exist in these areas.

Cumulative Effects. Additional field investigation is necessary to determine whether archeological resources are present and a cumulative effect would occur.

**Conclusion.** Areas of potentially intact archeological could still remain in the area of the new utility lines and pathway construction. Therefore, additional field investigation is necessary to verify whether archeological resources exist in the project area.

**Section 106 Summary.** An archeological survey would be conducted in the area where there is the potential for intact archeological resources and earth disturbance as a result of this project. Specifically, the areas proposed for the new pathway, retaining wall, and sewer and water lines would be surveyed prior to construction. If archeological resources were found to exist, the National Park Service would consult the Virginia State Historic Preservation Officer to determine appropriate mitigation and if necessary, a Memorandum of Agreement would be developed. In the unlikely event that human remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered during the survey or during construction, provisions outlined in the Native American Graves Protection and Repatriation Act (25 USC 3002) of 1990 would be followed. All human remains, funerary objects, sacred objects, or objects of cultural patrimony would be left in place until the culturally affiliated tribe(s) was consulted and an appropriate mitigation or recovery strategy developed.

## IMPACTS ON AESTHETICS AND VISUAL RESOURCES

### DEFINITION OF INTENSITY LEVELS

Analyses of the potential intensity of impacts on aesthetics and visual resources were derived from the available information in the National Park Services Cultural Landscape Inventory for Arlington Ridge Park and the Cultural Landscape Report on the George Washington Memorial Parkway, as well as various other contemporary and historical information on visual resources within the area. Additional data included field views by park personnel and its consultants in order to ascertain significant visual elements within the landscape. The thresholds of change for the intensity of impacts on aesthetics and visual resources are defined as follows:

- *negligible*: Effects to the visual quality of the landscape would be at or below the level of detection; changes would also be so slight that they would not be of any measurable or perceptible consequence to the visitor experience.
- *minor*: Effects to the visual quality of the landscape would be detectable, localized, and would be small and of little consequence to the visitor experience. Mitigation measures, if needed to offset adverse effects, would be simple and successful.
- *moderate*: Effects to the visual quality of the landscape would be readily detectable and localized, with consequences at the regional level. The action would not completely alter the viewshed, but would be a visual addition to the existing condition. Mitigation measures, if needed, would be extensive and likely successful.
- *major*: Effects to the visual quality of the landscape would be obvious, with substantial consequences to the visitor experience. Extensive mitigation would be needed to offset any adverse effects and their success would not be guaranteed.

*Duration:* Short-term – Effects lasting for the duration of the construction activities (less than 1 year); Long-term – Effects lasting longer than the duration of the construction (longer than 1 year).

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

Under the No-Action Alternative, the National Park Service would continue management actions that would include minor repairs to the U.S. Marine Corps War Memorial to maintain, to the extent possible, the existing integrity and character of the historic structure. The National Park Service would leave all panels in place and make temporary repairs to the cracked and displaced concrete panels on the plaza. No-Action Alternative does not address the aesthetic damage caused by the temporary repair of deteriorated concrete panels with dissimilar materials or deferred maintenance. The memorial would continue to suffer from deterioration and, over time, conditions would worsen to the point that spot repairs would no longer be effective. As a result, a moderate, long-term, adverse impact would occur to aesthetics and visual resources because the memorial's aesthetic value would be reduced.

Implementation of the No-Action Alternative would have no impact on nearby aesthetics and visual resources because the deterioration of the concrete panels and other site deficiencies are localized to the plaza area and would not affect the viewshed of any other resources within the project area.

Cumulative Effects. The rehabilitation of Arlington Memorial Bridge/Memorial Avenue would not have a long-term, adverse impact on aesthetics and visual resources. No cumulative effect would occur.

Conclusion. The No-Action Alternative would result in a moderate, long-term, adverse impact to aesthetics and visual resources because the continual deterioration of the memorial would lessen the aesthetic value of the memorial. A minor, long-term, adverse, cumulative impact would occur.

Because there would be no major adverse impacts to resources or values whose conservation are: (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the George Washington Memorial Parkway or its integral components including the U.S. Marine Corps War Memorial and Netherlands Carillon; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning document, there would be no impairment of the park's resources or values.

#### **ALTERNATIVE B – MEMORIAL REHABILITATION WITH PARTIAL REPLACEMENT OF CONCRETE PANELS ON THE PLAZA**

##### Rehabilitation of the Sculpture and Memorial Base

The installation of new lights with modern technology would better illuminate the memorial at night, which would have a moderate, long-term, beneficial impact on the aesthetic value of the memorial. Based on the results of the lighting mockup and consultation with the U.S. Commission of Fine Arts on this matter, the methods used are likely to be two pole lights placed within

the canopy of the existing trees on the south (statue front) side and low intensity upward directional lighting behind the crag stone of the memorial base. This combination of lights would correct the reversed shadowing of the existing lighting, which currently creates a ghoulish effect on the faces on the statue. The new lighting equipment would be non-intrusive to the existing views of the memorial. Pole lights would be placed within the tree canopy and upward direction lighting would be placed on the granite panels in front of the crags to shield the fixture from visitors viewing the memorial per National Park Service consultation with the U.S. Commission of Fine Arts on this matter. One common decision that came from the lighting mock-up at the memorial is that the floodlights in the landscaping at ground level around the plaza was not preferred because of the glare and shadows. At this position, visitors would walk directly in front of the flood lights causing a shadow on the statue and visitors would be affected by the light's intensity and direction.

### Rehabilitation of the Plaza, Reviewing Stand, and Walkways

The National Park Service would remove and replace only those concrete panels on the plaza that are substantially deteriorated (about 20 percent). Other improvements to the plaza would include installing new ADA accessible ramps and walkways, and fixing the steps on the stairs of the reviewing stand and plaza.

The partial removal and replacement of the concrete panels on the plaza would have a minor, long-term, beneficial impact to aesthetics and visual resources. The replacement would correct many of the existing deficiencies (cracking and settlement) of the plaza area. While Alternative B addresses the substantial deterioration of the concrete panels within the plaza, this alternative falls short of addressing the full scope of the deteriorating cracking panels on the plaza. Because it does not fully address all the underlying problems, the alternative is not sustainable and future corrective actions would be needed to address those panels that were not replaced.

The other site improvements under Alternative B are needed for code compliance or safety reasons. In most cases, the National Park Service would replace in-kind or repair the existing features of the plaza, reviewing stand, or walkways; therefore, no impact on aesthetics and visual resources would occur.

### Site Improvements to the Parade and Memorial Grounds

Site improvements to the parade and memorial grounds include correcting the drainage, the installation of a new automatic zoned irrigation system, replacement of missing or distressed trees and shrubs, and the installation of new site amenities such as drinking foundations, seating, and trash receptacles. These site improvements would vastly improve the visual quality of the grounds and have a moderate, long-term, beneficial impact on the aesthetics and visual resources.

The existing lighting infrastructure would be replaced with modern lighting technology. The National Park Service would install new lighting equipment at the memorial base for the sculpture and on the memorial grounds. Upward lighting would also be installed on the memorial base. The lighting would closely match the original lighting design for the memorial. The new lighting

would have a minor, beneficial impact on aesthetics because of increased and improved views of the memorial and its grounds at night.

#### Upgrades to the Electrical Service and Other Site Utilities

The new utility lines would not be visible or affect the visual quality of the memorial because they would be installed underground. The new electrical system would replace the old system so the change to the environment would be negligible. There would be no discernable visual changes to the memorial. Therefore, the upgrades to the electrical service and other site utilities would have negligible, long-term, impact on aesthetics and visual resources.

#### Temporary Closure of the Memorial Grounds during Construction

The rehabilitation of the U.S. Marine Corps War Memorial requires that the National Park Service close the memorial and its grounds during the construction activities. The closure would be scheduled beginning in November after the Marine Corps Marathon has occurred as not to affect this event. During the closure, various elements of the memorial would be removed and relocated to the staging area or an area within the memorial circle. As a result, the construction activities would have a moderate, short-term, adverse impact on the aesthetic quality of the memorial because the temporary removal of certain features on the plaza and introduction of construction equipment, signage, and pedestrian barriers would reduce the visual quality of the memorial.

Cumulative Effects. Other projects such as the rehabilitation of the Arlington Memorial Bridge/Memorial Avenue would likely have a long-term, beneficial, impact on aesthetics and visual resources because of preservation efforts to restore the structure or correct deficiencies associated with the site. Implementation of Alternative B, when added to these reasonably foreseeable future actions, would contribute a minor and localized incremental impact because of the rehabilitation efforts such as resetting of the granite panels on the memorial base and replacement of the concrete panels on the plaza. Collectively, the beneficial cumulative effect is anticipated to be minor and long-term.

Conclusion. Alternative B would result in a moderate, long-term, beneficial impact, as it would correct many existing deficiencies to the memorial and grounds and overall help preserve the character and integrity of aesthetics and visual resources. There would be no impact on surrounding aesthetics and visual resources within the project area. While Alternative B addresses the substantially deteriorated concrete panels on the plaza, the alternative falls short of addressing the full scope of the deteriorating panels and is not comprehensive or sustainable solution to the underlying problems.

Because there would be no major adverse impact to resources or values whose conservation are: (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the George Washington Memorial Parkway or its integral components including the U.S. Marine Corps War Memorial and Netherlands Carillon; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning document, there would be no impairment of the park's resources or values.

## **ALTERNATIVE C - MEMORIAL REHABILITATION WITH FULL REPLACEMENT OF CONCRETE PANELS ON THE PLAZA (PREFERRED ALTERNATIVE)**

### Rehabilitation of the Plaza, Review Stand, and Walkways

Alternative C has similar impacts to Alternative B, with the exception of plaza rehabilitation. Under Alternative C, the National Park Service would remove and replace all the concrete panels on the plaza. Alternative C fully addresses all of the underlying problems of the deteriorating panels. Consequently, it replaces 100 percent of the deteriorating or displaced panels. This approach prolongs the life of the structure, minimizes the need for future repairs, and adds to the memorial's preservation. Alternative C would result in a moderate, long-term, beneficial impact, as it would correct many existing deficiencies to the memorial and grounds.

### Activities Common to Alternative B

Under Alternative C, the improvements to the memorial sculpture and base; site improvements to the parade and memorial ground; and the upgrades to the electrical service and other site utilities are identical to Alternative B. Therefore, the impacts would be the same as described for Alternative B.

Cumulative Effects. Other projects such as the rehabilitation of the Arlington Memorial Bridge/Memorial Avenue would likely have a long-term, beneficial, impact on aesthetics and visual resources because of preservation efforts to restore the memorial structure or correct deficiencies associated with the site. Implementation of Alternative C, when added to these reasonably foreseeable future actions, would contribute a minor and localized incremental impact because of the rehabilitation efforts such as resetting of the granite panels on the memorial base and replacement of the concrete panels on the plaza. Collectively, the beneficial cumulative effect is anticipated to be minor and long-term.

Conclusion. Alternative C would result in a moderate, long-term, beneficial impact to aesthetics and visual resources, as it would correct many existing deficiencies to the memorial and grounds and help preserve the historic character and integrity of the memorial. There would be no discernable visual changes to surrounding aesthetics and visual resources. Alternative C addresses the deterioration of the concrete panels within the plaza and memorial base in a comprehensive manner and it addresses the underlying problem of the deteriorating panels and substrate.

Because there would be no major adverse impact to resources or values whose conservation are: (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the George Washington Memorial Parkway or its integral components including the U.S. Marine Corps War Memorial and Netherlands Carillon; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning document, there would be no impairment of the park's resources or values.

## IMPACTS ON LIGHTSCAPE MANAGEMENT

### DEFINITION OF INTENSITY LEVELS

Analyses of the potential intensity of impacts on lightscape management were derived from the available information on the George Washington Memorial Parkway as well as information on visual and natural resources within the area. Additional data included field views by park personnel and its consultants in order to ascertain visual elements within the landscape. The thresholds of change for the intensity of impacts on lightscape management are defined as follows:

- *negligible*: Effects to the outdoor lighting and light levels are not perceivable. Artificial lighting already is prevalent in the area and the change in light levels and intensity would have no effect on light sensitive species, views of the nightsky, and other visual resources.
- *minor*: Effects to the outdoor lighting and light levels are barely perceivable. Artificial lighting already is prevalent in the area and the change in light levels would have a small effect on light sensitive species, views of the nightsky, or other visual resources.
- *moderate*: Effects to the outdoor lighting and area ambient light levels are noticeable and limited artificial lighting exists in the area. The change in light levels would have an effect on light sensitive species, views of the nightsky, or other visual resources; however, the change would not have an effect that would jeopardize the resource.
- *major*: Effects to the outdoor lighting and area ambient light levels would result in a highly noticeable change to the area where no architectural or outdoor lighting exists. The change in light levels would have a measurable effect on light sensitive species, views of the nightsky, or other visual resources; and the change would jeopardize the resource.

*Duration*: Short-term – Effects lasting for the duration of the construction activities (less than 1 year); Long-term – Effects lasting longer than the duration of the construction (longer than 1 year).

### ALTERNATIVE A - NO-ACTION ALTERNATIVE

Under the No Action Alternative, the National Park Service would maintain the existing lighting of the memorial and new lighting would not be installed on the plaza. There would be no change in light intensities or levels in the area; therefore, the No-Action Alternative would have no impact on lightscape management or views of the nightsky.

Cumulative Effects. The No-Action Alternative would have no cumulative effect because no impact would occur on the existing lightscape or views of the nightsky.

Conclusion. The No-Action Alternative would have no impact on the lightscape management or views of the nightsky because there would be no change to existing light intensities or levels.

## **ALTERNATIVES B AND C**

Under Alternatives B and C, the National Park Service would install new lighting on the plaza and new directional lighting to illuminate the statute. The existing lighting infrastructure would be replaced with modern lighting technology. The site lighting includes pole lights in the parking areas and bollard lights and path lights in the plaza area. The plaza lighting would have negligible effects on the lightscape and nightsky because the National Park Service would install down lighting for the parking area and low intensity bollard lights and pathway lights along the walkways and plaza, which would not have a noticeable effect on light levels or views to the nightsky or other resources.

To illuminate the statue, the National Park Service proposes to implement one of three lighting methods considered. Based on a lighting mockup conducted by the National Park Service in consultation with the U.S. Commission of Fine Arts, the likely method would be two pole lights on the south (statute front) side and upward directional lighting on the memorial base. The method to illuminate the statue was carefully considered to maintain the character of the Iwo Jima Statue when lit at night and to eliminate the reverse shadowing, which creates a ghoulish effect on the faces on the statue. This option also considered the views to and from the other memorials such as the Lincoln Memorial.

The existing light levels are typical of a highly developed urban area affected by lights from nearby street signs, roadways, and buildings. Under the lighting option selected, a slight change in the intensities of the new lighting would occur when compared to the existing light conditions; however, this change would not be readily apparent and the directional lighting would be focused directly on the statue. No light sensitive species were identified in the project area. As a result, the low level of additional lighting proposed would have a minor, long-term, adverse impact to lightscape management and views of the nightsky and other visual resources.

Cumulative Effects. There were no other projects under the cumulative impact scenario that were identified that would have an impact on lightscape management or nightsky. Therefore, no cumulative impacts would occur.

Conclusion. Implementation of any one of the lighting options under Alternatives B or C would have minor, long-term, adverse impacts on Lightscape Management because of the slight change in lighting intensity and levels at the memorial. No cumulative effects would occur.

Because there would be no major adverse impact to resources or values whose conservation are: (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the George Washington Memorial Parkway or its integral components including the U.S. Marine Corps War Memorial and Netherlands Carillon; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning document, there would be no impairment of the park's resources or values.

## IMPACTS ON HEALTH AND SAFETY

### DEFINITION OF INTENSITY LEVELS

Analyses of the potential intensity of impacts on health and safety were derived from the available information on the parkway, and the professional judgment of the park staff. The thresholds of change for the intensity of impacts on health and safety are defined as follows:

- *negligible*: Health and safety would not be affected, or the effects would be at low levels of detection and would not have an appreciable effect on health or safety.
- *minor*: The effect would be detectable, but would not have an appreciable effect on health and safety. If mitigation was needed, it would be relatively simple and would likely be successful.
- *moderate*: The effects would be readily apparent and would result in substantial, noticeable effects to health and safety on a local scale. Mitigation measures would probably be necessary and would likely be successful.
- *major*: The effects would be readily apparent and would result in substantial, noticeable effects to health and safety on a regional scale. Extensive mitigation measures would be needed and their success would not be guaranteed.

*Duration*: Short-term – Effects lasting for the less than 5 years, Long-term – Effects lasting longer than the 5 years.

### ALTERNATIVE A - NO-ACTION ALTERNATIVE

Under the No-Action Alternative, the National Park Service would continue present management practices for the U.S. Marine Corps War Memorial, which would include minor “spot” repairs of the concrete panels on the plaza. The concrete panels would be patched to minimize tripping hazards to visitors on the plaza. The “spot” repairs would not address the underlying structural damage caused by the cracking and settlement of concrete panels, the lack of a uniform substrate, and the moisture penetration into the substrate. Similar problems exist with the stairs on the plaza and reviewing stand. As a result, a number of the steps are broken or loose. These existing conditions would continue to persist and therefore, the No-Action Alternative would have a moderate, long-term, adverse impact on health and safety because the cracks in the concrete and loose stairs present tripping hazards for visitors using the plaza area and reviewing stand.

Cumulative Effects. No other projects were identified in the cumulative impact scenario that would have adverse impacts on health and safety; therefore, no cumulative effects would occur.

Conclusion. The No-Action Alternative would have a moderate, long-term, adverse impact on health and safety because the tripping hazards (cracked concrete and loose stairs) on the plaza would persist. No cumulative effects would occur.

Because there would be no major adverse impact to resources or values whose conservation are: (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation

of the George Washington Memorial Parkway or its integral components including the U.S. Marine Corps War Memorial and Netherlands Carillon; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning document, there would be no impairment of the park's resources or values.

### **ALTERNATIVE B - MEMORIAL REHABILITATION WITH PARTIAL REPLACEMENT OF CONCRETE PANELS ON THE PLAZA**

#### Rehabilitation of the Sculpture and Memorial Base

To improve ventilation to the memorial base interior, the National Park Service would remove and replace the existing hatch and ladder, and install a new passive ventilation system. The improved ventilation would have a minor, long-term, beneficial impact because the new exhaust system would eliminate "dead air" to meet building code requirements and improved health conditions for anyone accessing the memorial base interior. The new ladder and hatch also would improve safety conditions because the existing ladder and hatch are severely rusted and in poor condition.

#### Rehabilitation of the Plaza, Reviewing Stand, and Walkways

Under Alternative B, the National Park Service would remove and replace only those concrete panels on the plaza that are substantially deteriorated. The partial replacement of the deteriorated concrete panels would have a moderate, short-term, beneficial impact on health and safety because the cracked concrete panels would be replaced with new poured concrete, thereby eliminating the tripping hazards for pedestrians. The partial replacement would not be a long-term, sustainable solution and other cracking and settlement would be expected to occur in the future to the other cracked concrete panels. Thus, the partial replacement under Alternative B would have only short-term, beneficial impact. Long-term, the remaining cracked panels not replaced would be expected to present similar safety concerns as today.

Other improvements to the plaza include installing new ADA accessible ramps and walkways, and fixing the steps on the stairs of the reviewing stand and plaza. Many of the other site improvements would have a beneficial impact on health and safety. For instance, the slope of the ramps would be lessened to comply with ADA requirements.

#### Site Improvements to the Parade and Memorial Grounds

Improved site amenities such as drinking fountains and added seating would have safety benefits to visitors during the summer months. The new irrigation system would reduce the strenuous labor involved with manually watering the parade grounds during the summer months. New general site lighting would improve the visitor's ability to see and navigate at night. Improved lighting would also increase security at the parking areas and along the paths leading to the memorial. The site improvements would have a minor, long-term, beneficial impact on safety.

#### Upgrades to the Electrical Service and Other Site Utilities

The National Park Service would remove all the existing underground conduits, conductors, and other distribution elements and install a new electrical system to service the site. The new elec-

trical system would have a negligible, long-term, beneficial impact on health and safety because of the replacement of the old electrical system with new equipment and safer technology. The installation of the 4-inch sewer line and 4-inch water line would have no impact on health or safety at the site but would support future visitor services.

Cumulative Effects. The rehabilitation of Arlington Memorial Bridge/Memorial Avenue is expected to have beneficial impacts on health and safety because of improvements to the roadway and sidewalks would eliminate safety hazards. Implementation of the Alternative B, when added to other past, present, and reasonably, foreseeable future actions, would contribute a small incremental impact because the U.S. Marine Corps War Memorial represents such a small portion of the parkway. Collectively, the beneficial cumulative effect on safety would be minor and long-term.

Conclusion. The combination of the replacement of the concrete panels, improvements to the ramps and walkways, installation of a new passive ventilation system, installation of new general site lighting and other enhanced site amenities would have a moderate, long-term, beneficial impact on health and safety. Although, the partial replacement of the concrete panels on the plaza would not be a long-term, sustainable solution because it would not fix the underlying problems causing the cracking and settlement for the entire plaza area. A minor, long-term, beneficial cumulative impact would occur.

Because there would be no major adverse impact to resources or values whose conservation are: (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the George Washington Memorial Parkway or its integral components including the U.S. Marine Corps War Memorial and Netherlands Carillon; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning document, there would be no impairment of the park's resources or values.

### **ALTERNATIVE C - MEMORIAL REHABILITATION WITH FULL REPLACEMENT OF CONCRETE PANELS ON THE PLAZA (PREFERRED ALTERNATIVE)**

#### Rehabilitation of the Plaza, Review Stand, and Walkways

The Alternative C is similar to Alternative B, with the exception of plaza rehabilitation. Under Alternative C, the National Park Service would remove and replace all the exposed aggregate concrete panels. Other improvements to the plaza include installing new ADA accessible ramps. The replacement of the deteriorated concrete panels would have a moderate, long-term, beneficial impact on visitor health and safety because the cracked concrete panels would be replaced with new poured concrete; therefore, eliminating the tripping hazards for pedestrians. The replacement of all the concrete panels would substantially reduce and suspend future cracking and deterioration of the concrete panels and therefore, Alternative C would be a long-term, sustainable solution.

#### Activities Common to Alternative B

The impacts associated with the rehabilitation of the memorial sculpture and base; site improvements to the parade and memorial ground, and the upgrades to the electrical service and other site utilities would be the same as described for Alternative B.

Cumulative Effects. The rehabilitation of Arlington Memorial Bridge/Memorial Avenue is expected to have beneficial impacts on health and safety because of site improvements. Implementation of the Alternative C, when added to other past, present, and reasonably, foreseeable future actions, would contribute a small incremental impact because the U.S. Marine Corps War Memorial represents such as small portion of the parkway. Collectively, the beneficial cumulative effect on safety would be minor and long-term.

Conclusion. Replacement of the concrete panels, improvements to the ramps and walkways, installation of a new passive ventilation system, installation of new general site lighting and other enhanced site amenities would have a moderate, long-term, beneficial impact on health and safety. The full replacement of the concrete panels on the plaza would be a sustainable solution because it would correct the underlying problems associated with cracking for the entire plaza area. A minor, long-term, beneficial cumulative impact would occur.

Because there would be no major adverse impact to resources or values whose conservation are: (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the George Washington Memorial Parkway; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning document, there would be no impairment of the park's resources or values.

## IMPACTS ON VISITOR USE AND EXPERIENCE

### DEFINITION OF INTENSITY LEVELS

Analyses of the potential intensity of impacts on visitor use and experience were derived from the professional judgment of the park staff and their understanding of visitation patterns, combined with the assessment of the activities currently available to visitors at the U.S. Marine Corps War Memorial. The impacts on the visitor's ability to experience a full range of park resources were analyzed by examining resources and objectives presented in the park's significance statement. The potential change in visitor use and experience proposed by the alternatives was evaluated by identifying projected increases or decreases in visitor uses, and determining whether or how these projected changes would affect the desired visitor experience and to what degree and for how long. The thresholds of change for the intensity of impacts on visitor use and experience are defined as follows:

- *negligible*: The impact would be a change that would not be perceptible or would be barely perceptible by most visitors.
- *minor*: The impact would change a few visitors' experiences, which would be noticeable, but would result in little distraction or improvements in the quality of the experience;

- *moderate*: The impact would change a large number of visitors' experiences and would result in a noticeable decrease or improvement in the quality of the experience. This would be indicated by a change in frustration level or inconvenience for a period.
- *major*: The impact has a substantial improvement in many visitors' experiences or a severe drop in the quality of many visitors' experiences, such as the addition or elimination of a recreational opportunity or a permanent change to an area. The impact would preclude future generations of some visitors from enjoying the park resources.

*Duration*: Short-term – Effects lasting for the duration of the construction activities (less than 9 months); Long-term – Effects lasting longer than the duration of the construction (longer than 9 months).

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

Under the No-Action Alternative, the National Park Service would continue to conduct minor rehabilitation of the memorial, plaza, and parade grounds. The National Park Service would leave all the panels in place and make temporary “spot” repairs to the broken and/or displaced panels. The spot repairs would not address the underlying structural damage caused by the cracks and settlement of concrete panels, the lack of a uniform substrate, and the moisture penetration into the substrate. The displaced and cracked panels present hazards for visitors using the memorial grounds and at times, require the National Park Service maintenance staff to close portions of the memorial grounds. The closure of portions of the plaza and memorial grounds adversely impacts the visitor experience. Also, the “spot” repairs affect the visual quality of the plaza because the repairs do not match the existing concrete texture and color. These existing conditions diminish the visitor's ability to fully enjoy the scenic and interpretive values of the memorial and therefore, implementation of the No-Action Alternative would have a moderate, long-term, adverse impact on the visitor experience.

Cumulative Effects. No other projects were identified in the cumulative impact scenario that would have a long-term, adverse impact on visitor use and experience; therefore, no cumulative impacts would occur.

Conclusion. A moderate, long-term, adverse impact would occur under the No-Action Alternative because of the existing site conditions, which inhibit the visitor to fully enjoy the memorial. No cumulative impact would occur.

#### **ALTERNATIVE B - MEMORIAL REHABILITATION WITH PARTIAL REPLACEMENT OF CONCRETE PANELS ON THE PLAZA**

##### Rehabilitation of the Sculpture and Memorial Base

The U.S. Marine Corps War Memorial is a popular nighttime destination of many visitors because the Iwo Jima Statue can be seen and remains open to the public at night. The installation of new directional lights with modern technology would better illuminate the memorial at night, which would enhance the visual quality of the memorial. As a result, a moderate, long-term, beneficial impact on the visitor experience would occur.

### Rehabilitation of the Plaza, Reviewing Stand, and Walkways

The National Park Service would remove and replace only those concrete panels on the plaza that are substantially deteriorated. The condition of plaza would be vastly improved; however, the underlying structural damage caused by the cracking and settlement, the lack of a uniform substrate, and the moisture penetration would remain for those panels not replaced. The repair of the substantially deteriorated panels would have a minor, long-term, beneficial impact on the visitor experience.

Other improvements to the plaza such as installing new ADA accessible ramps and walkways, and fixing the loose steps on the stairs of the reviewing stand and plaza would have minor, long-term, beneficial impacts on the visitor experience.

### Site Improvements to the Parade and Memorial Grounds

Site amenities (seating, lighting, water fountains, etc.) at the site would be upgraded. These enhancements would increase the visitor experience through improved and added visitor services available at the site. The irrigation system would vastly improve the appearance of the grassy area at the parade grounds during the summer months. The replacement of missing or damaged trees and shrubs would also improve the appearance of the grounds. Improved lighting would have a beneficial impact on the visitor experience through increased security and by properly lighting the sculpture to enhance the visual quality of the memorial at night. The combination of the site improvements would have a moderate, long-term, beneficial impact on visitor experience.

### Upgrades to the Electrical Service and Other Site Utilities

The National Park Service would install a new electrical system to service the site, and sewer and water lines to accommodate future visitor and maintenance services at the site. The enhanced utilities would better serve visitor use during special events. Therefore, a minor, long-term, beneficial impact would occur on the visitor experience.

### Temporary Closure of the Memorial Grounds during Construction

The rehabilitation of the U.S. Marine Corps War Memorial requires that the National Park Service close the memorial and its grounds for approximately four to five months during the construction activities. During this time, the circle would remain open to allow visitors to drive around the memorial circle and see the statue; however, the memorial plaza and parade grounds would be closed to visitor use. Also, the parade ground and memorial would be closed for use by the U.S. Marine Corps personnel with the exception that access would be provided at all time to the flag pole so that the flag can fly 24 hours a day in accordance with a Presidential proclamation of June 12, 1961.

Various elements of the memorial would be removed and relocated to the staging area or an area within the memorial circle. As a result of the temporary disturbance to the memorial and its grounds during construction, a moderate, short-term, adverse impact would occur to the visitor experience. The impact would be mitigated to the extent possible by notifying visitors of its closure and scheduling the construction to occur during non-peak visitation periods.

Cumulative Effects. The rehabilitation of Arlington Memorial Bridge/Memorial Avenue is expected to have beneficial impacts on visitor experience and use because of site improvements that add visitor services and increase the appearance of the parkway and the creation of a new attraction near the parkway. Implementation of Alternative B, when added to other past, present, and reasonably, foreseeable future actions, would contribute a small incremental impact because the U.S. Marine Corps War Memorial represents such a small part of the visitor experience on the parkway. Collectively, the beneficial cumulative effect on visitor experience would be minor and long-term.

Conclusion. Implementation of Alternative B would have a moderate, long-term, beneficial impact on the visitor experience from the combination of the partial replacement of the concrete panels, repairs to the memorial base, and various improvements to enhance visitor services at the memorial. The rehabilitation would require that the memorial grounds be closed to the public for approximately four to five months and therefore, a moderate, short-term, adverse impact would occur to the visitor experience because visitors would not be able to fully enjoy the memorial plaza and parade grounds. A minor, long-term, beneficial cumulative effect would occur.

### **ALTERNATIVE C - MEMORIAL REHABILITATION WITH FULL REPLACEMENT OF CONCRETE PANELS ON THE PLAZA (PREFERRED ALTERNATIVE)**

#### Rehabilitation of the Plaza, Reviewing Stand, and Walkways

The Alternative C is similar to Alternative B, with the exception of plaza rehabilitation and temporary closure of the memorial for construction. Under Alternative C, the National Park Service would remove and replace all the concrete panels on the plaza. The condition of plaza would be vastly improved; and the underlying structural damage caused by the cracks and settlement of concrete panels, the lack of a uniform substrate, and the moisture penetration into would be corrected. Alternative C would have a moderate, long-term, beneficial impact on the visitor experience. The replacement of all the concrete panels would substantially reduce and suspend future cracking and deterioration of the concrete panels and therefore, Alternative C would be a long-term, sustainable solution.

#### Temporary Closure of the Memorial Grounds during Construction

The rehabilitation of the U.S. Marine Corps War Memorial requires that the National Park Service close the memorial and its grounds for approximately nine to twelve months during the construction activities. During this time, the circle would remain open to allow visitors to drive around memorial circle and see the statue; however, the memorial plaza and parade grounds would be closed to visitor use. The closure would be scheduled beginning in late October after the Marine Corps Marathon has occurred as not to affect this event. Also, the parade ground and memorial would be closed for use by the U.S. Marine Corps personnel with the exception that access would be provided at all time to the flag pole so that the flag can fly 24 hours a day in accordance with a Presidential proclamation of June 12, 1961.

Various elements of the memorial would be removed and relocated to the staging area or an area within the memorial circle. As a result of the temporary disturbance to the memorial and its grounds during construction, a moderate, short-term, adverse impact would occur to the visitor

experience. The impact would be mitigated to the extent possible by notifying visitors of its closure and scheduling the construction to occur during non-peak visitation periods.

### Activities Common to Alternative B

The impacts associated with the rehabilitation of the memorial sculpture and base; site improvements to the parade and memorial ground; the upgrades to the electrical service and other site utilities; and temporary closure of the memorial grounds during construction would be the same as described for Alternative B.

Cumulative Effects. The rehabilitation of Arlington Memorial Bridge/Memorial Avenue is expected to have beneficial impacts on visitor experience and use because of site improvements that add visitor services and increase the appearance of the parkway and the creation of a new attraction near the parkway. Implementation of the Alternative C, when added to other past, present, and reasonably, foreseeable future actions, would contribute a negligible incremental impact because the U.S. Marine Corps War Memorial represents such a small part of the visitor experience on the parkway. Collectively, the beneficial cumulative effect on visitor experience would be minor and long-term.

Conclusion. Alternative C would have a moderate, long-term, beneficial impact on the visitor experience from the full replacement of the concrete panels, repairs to the memorial base, and other site improvements to enhance visitor services. The rehabilitation would require that the memorial ground be closed to the public for approximately nine to twelve months and therefore, a moderate short-term impact would occur to the visitor experience because visitors would not be able to fully enjoy the memorial plaza and parade grounds. A minor, long-term, beneficial cumulative effect would occur.

## **IMPACTS ON PARK OPERATIONS**

### **DEFINITION OF INTENSITY LEVELS**

Park operations, for the purposes of this analysis, refers to the quality and effectiveness of the infrastructure and the ability to maintain the infrastructure, used in the operations of the park in order to adequately protect and preserve vital resources and provide for an effective visitor experience. Facilities included in this project include the parade grounds, plaza area, and memorial base and their existing utilities or associated systems including the electrical, water, lighting, and irrigation.

Park staff knowledgeable about these issues were members of the planning team that evaluated the impacts of each alternative. Impact analysis is based on the current descriptions of park operations presented in the Affected Environment section of this document. The thresholds of change for the intensity of impacts on park operations are defined as follows:

- *negligible:* Park operations would not be affected, or the effect would be at low levels of detection and would not have an appreciable effect on park operations.

- *minor*: The effect would be detectable and would be of a magnitude that would not have an appreciable effect on park operations. If mitigation was needed to offset adverse effects, it would be simple and likely successful.
- *moderate*: The effects would be readily apparent and result in a substantial change in park operations in a manner noticeable to staff and the public. Mitigation measures would be necessary to offset adverse effects and would likely be successful.
- *major*: The effects would be readily apparent, result in a substantial change in park operations in a manner noticeable to staff and the public, and be markedly different from the existing operations. Mitigation measures to offset adverse effects would be needed, extensive and success could not be guaranteed.

*Duration*: Short-term – Effects lasting for the duration of the construction activities (less than 9 months); Long-term – Effects lasting longer than the duration of the construction (longer than 9 months).

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

Under the No-Action Alternative, the National Park Service would continue to conduct minor rehabilitation of the memorial, plaza, and parade grounds. The National Park Service would leave all the panels in place and make temporary “spot” repairs to the broken and/or displaced panels. The “spot” repairs would not address the underlying structural damage caused by the cracks and settlement of concrete panels, the lack of a uniform substrate, and moisture penetration. As a result, the National Park Service would continue to exert extra maintenance effort to repair the concrete plaza and memorial grounds.

An automatic sprinkler system would not be installed so the park staff would continue to have to manually water the parade grounds. During special events, the National Park Service staff would continue to use electrical generators because the electrical system would not be improved.

Overall, park operational efficiency would continue to be negatively affected because of inadequate site utilities and the plaza conditions, which require the park staff to make repairs and respond to safety-related incidents and conditions. A minor, long-term, adverse impact would continue to occur to park operations.

Cumulative Effects. No other projects were identified in the cumulative impact scenario that would have an adverse impact on park operations; therefore, no cumulative effects would occur.

Conclusion. Under the No-Action Alternative, minor, long-term, adverse impact on park operations would continue because of extra maintenance effort to repair the concrete plaza, respond to safety-related incidents, and maintain the memorial and parade grounds. No cumulative impact would occur.

## **ALTERNATIVE B - MEMORIAL REHABILITATION WITH PARTIAL REPLACEMENT OF CONCRETE PANELS ON THE PLAZA**

### Rehabilitation of the Sculpture and Memorial Base

The rehabilitation of the memorial base would have a negligible, long-term, beneficial impact on park operations. New lighting technology would require less maintenance (changing bulbs, repairing fixtures, etc.) and, if the lights are placed on pole lights and in the memorial base, the lights would be less susceptible to vandalism than the existing floodlights at the memorial.

### Rehabilitation of the Plaza, Review Stand, and Walkways

The National Park Service would remove and replace only those concrete panels on the plaza that are substantially deteriorated. The condition of plaza would be vastly improved; however, the underlying structural damage caused by the cracks and settlement of concrete panels, the lack of a uniform substrate, and moisture penetration would still remain for those panels not replaced. In the short-term, a moderate beneficial impact would occur on park operations because deteriorated panels with the most immediate problems associated with settlement and cracking would be removed and repoured. The new panels would substantially reduce the near-term maintenance efforts needed and increase the park maintenance efficiency at the site. In the long-term, the concrete panels on the plaza that are not replaced would be expected to experience similar settlement and cracking problems and the National Park Service staff would again have to spend additional time and effort addressing the displaced and cracked panels. As a result, a minor, long-term, adverse impact on park operations would occur from only partially replacing the concrete panels.

### Site Improvements to the Parade and Memorial Grounds

Site improvements to the parade and memorial grounds include the installation of a new automatic zoned irrigation system. The new irrigation system would vastly improve the park's ability to maintain the parade grounds. In the summer months, the park staff spends considerable effort trying to maintain the grass and landscaping at the parade and memorial grounds because of low water pressure and an inefficient irrigation system. The new irrigation system is expected to eliminate the need for manual watering. Therefore, the park's operational efficiency at the site would increase and a minor, long-term, beneficial impact would occur.

The existing lighting infrastructure would be replaced with modern lighting technology. The new lighting would have negligible, long-term, beneficial impacts on park operations because it would reduce the frequency of repairs needed to fix light fixtures and other lighting components.

### Upgrades to the Electrical Service and Other Site Utilities

The National Park Service would install a new electrical system to service the site. In addition, a 4-inch sewer line and 4-inch water line would be installed to accommodate future visitor and maintenance services at the site. The enhanced utilities at the site would have a beneficial impact on park operation because it would eliminate the need of the National Park Service to use port-

able generators and would increase the water pressure for the new irrigation system. A minor, long-term, beneficial impact would occur to park operations.

Cumulative Effects. Other present, and reasonably, foreseeable projects such as the rehabilitation of Arlington Memorial Bridge/Memorial Avenue are expected to have beneficial impacts on park operations because of site improvements that would reduce maintenance. Implementation of the Alternative B, when added to other past, present, and reasonably, foreseeable future actions, would contribute a small incremental impact because the maintenance of the memorial represents such as small part of the park operations on the parkway. Collectively, the cumulative effect on park operations would be negligible, long-term, and beneficial.

Conclusion. Alternative B would have a moderate, short-term, beneficial impact on park operations because of reduced maintenance requirements and enhanced utilities at the site. Long-term, the concrete panels on the plaza that are not replaced would be expected to experience similar settlement and cracking problems and the National Park Service staff would again have to spend additional effort repairing the displaced and cracked panels. As a result, the long-term benefits of the rehabilitation would be reduced and a minor, long-term, adverse impact on park operations would continue because repairs to the plaza would be needed for safety purposes. The enhanced utilities and associated systems at the site would have a minor, long-term, beneficial impact on park operations. A negligible, long-term, beneficial cumulative effect would occur.

### **ALTERNATIVE C - MEMORIAL REHABILITATION WITH FULL REPLACEMENT OF CONCRETE PANELS ON THE PLAZA (PREFERRED ALTERNATIVE)**

#### Rehabilitation of the Plaza, Review Stand, and Walkways

The National Park Service would remove and replace all the concrete panels on the plaza. The condition of the plaza would be vastly improved; and the underlying structural damage caused by the cracks and settlement, the lack of a uniform substrate, and moisture penetration would be corrected. The rehabilitation would reduce the short-term and long-term maintenance demand on the park staff at the memorial. Alternative C would have a moderate, long-term, beneficial impact on park operations at the site.

#### Activities Common to Alternative B

The impacts associated with the rehabilitation of the memorial sculpture and base, site improvements to the parade and memorial ground, and the upgrades to the electrical service and other site utilities would be the same as described for Alternative B.

Cumulative Effects. Other present and reasonably foreseeable projects such as the rehabilitation of Arlington Memorial Bridge/Memorial Avenue are expected to have beneficial impacts on park operations because the site improvements would reduce future maintenance. Implementation of the Alternative B, when added to other past, present or reasonably, foreseeable future actions, would contribute a small incremental impact because the maintenance of the memorial represents such as small part of the park operations on the parkway. Collectively, the beneficial cumulative effect on park operations would be minor and long-term.

Conclusion. Alternative C would have a moderate, long-term, beneficial impact on park operations because the replacement of all the concrete panels would offer more of a long-term sustainable solution and reduced future maintenance requirements at the site. A minor, long-term beneficial cumulative effect would occur.

## **CONSULTATION AND COORDINATION**

This Environmental Assessment will be distributed for public and agency review with a comment period of at least 30 days. The National Park Service will consider the comments prior to determining the final decision document that will be sent to the National Capital Region Director for approval and signature. In addition, the National Park Service has consulted with the U.S. Commission of Fine Arts concerning the lighting plan for the memorial and its grounds. In addition, the National Park Service would consult with the Virginia Department of Historic Resources pursuant to Section 106 of the National Historic Preservation Act.

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

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