



Sharpsburg Water Intake Upgrade

Chesapeake and Ohio Canal National Historical Park



**Environmental Assessment/Assessment of Effect
March 2012**

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PROJECT SUMMARY

Introduction

The National Park Service (NPS), Chesapeake and Ohio Canal National Historical Park (Park), has received a Right-of-Way application from the Department of Water Quality Control of Washington County, Maryland, (the County) to upgrade a raw water intake pipeline across the Park at Mile 74.3. The NPS is undertaking an environmental review to evaluate impacts to the park's natural and cultural resources that would occur as a result of the proposed project, as required by the National Environmental Policy Act (NEPA), the National Historic Preservation Act (NHPA), and other legal mandates. The project study area is within Mile 73-74 of the park.

The County has a raw water intake on the Potomac River at Mile 74.3. This intake supplies water for the community of Sharpsburg, MD. The County has a water treatment plant within 0.5 mile of the park. The intake and pipeline were constructed in the 1960s by trenching through the towpath and canal prism within an easement granted by NPS. A perpetual easement was issued in February 1976 for a six-inch water line, a water intake structure, and an underground electric service. The existing easement enters and continues within the Park for approximately 805 linear feet. Numerous repairs have been made to the line over the past ten years to enable raw water conductivity to remain constant. The County submitted a request to replace the pipeline either within the existing easement or along a new alignment within the Park. This Environmental Assessment/Assessment of Effects (EA/AOE) analyzes the potential impacts that would result from the implementation of the proposed action alternative as well as impacts of other alternatives, including the No Action alternative.

Purpose and Need of the Proposed Action

The purpose of the project is to replace an existing water pipeline with a new raw water pipeline across the Park to connect the existing Sharpsburg Water Intake and the Water Treatment Plant and to replace an existing electrical control platform with a new electrical control platform. This action is needed because the existing pipeline has exceeded its useful lifespan and has at least one leak along its length, which is affecting the ability of the County to maintain a reliable safe water source for the Town of Sharpsburg. The existing water control platform is at danger of being damaged by flooding of the Potomac River at its present height, which threatens the ability of the County to control the water intake pumps during flood events.

Overview of Alternatives

Two alternatives are addressed in the EA:

Alternative A – No Action Alternative: The Council on Environmental Quality (CEQ) and the NPS NEPA regulations require consideration and analysis of the No Action alternative to provide a baseline against which the other alternatives may be considered. This alternative would continue to utilize the existing water supply pipeline. This alternative would result in continued degradation of the existing pipeline, threatening the reliability of the water supply of the Town of Sharpsburg.

Alternative C – Preferred Alternative: Alternative C would consist of the replacement of the existing underground 6-inch diameter water supply pipeline in the current easement with an underground 6-inch diameter water line, addition of a second underground 6-inch diameter water line, replacement of underground electric service line, installation of underground telecommunication line, replacement of the elevated electrical platform adjacent to the water intake pumps, and construction of a cross-over dike across the canal prism on Park lands to replace the use of one mile of canal towpath by County

utility crews. Construction Option 1, consisting of open-cut trenching within the limits of disturbance of the existing easement, is the preferred option for construction

Other alternatives were considered but dismissed. These alternatives (Alternatives B, C – Construction Option 2, D, and E) can be found in Chapter 2 – Alternatives.

Summary of Impacts

Following the NPS Director's Order 12 (DO-12) (*Conservation Planning, Environmental Impact Analysis, and Decision-making*), which requires that impacts to park resources be analyzed in terms of their context, duration, and intensity, NEPA, and NHPA, the impacts to the proposed alternatives were assessed. Many impact topics were dismissed from the detailed analysis as the proposed action alternatives would result in negligible or minor adverse impacts to those resources. No major adverse impacts are anticipated as a result of this project.

Public Involvement

Agencies and the public are encouraged to review and comment on the contents of the EA during a 30-day public review and comment period. We invite you to comment on this EA/AOE, and you may do so by one of two methods. The preferred method is through the NPS's Planning, Environment, and Public Comment (PEPC) website at <http://parkplanning.nps.gov/choh>.

You may also submit written comments to:

Kevin Brandt, Superintendent
Chesapeake and Ohio Canal National Historical Park
Sharpsburg Water Intake Upgrade
1850 Dual Highway – Suite 100
Hagerstown, MD 21740

Only written comments would be accepted. Please submit your comments within 30 days of the posting of the notice of availability on the PEPC website. Comments must be received by midnight of April 19, 2012 to be considered. **Please be aware that your entire comment would become part of the public record. If you wish to remain anonymous, please clearly state that within your correspondence, although we cannot guarantee that personal information, such as email addresses, phone numbers, etc., would be withheld.**

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PURPOSE AND NEED

Introduction

The National Park Service (NPS), Chesapeake and Ohio Canal National Historical Park (Park), has received a Right-of-Way application from the Department of Water Quality Control of Washington County, Maryland, (the County) to upgrade a raw water intake pipeline across the Park at Mile¹ 74.3 (Figures 1 and 2). The NPS is undertaking an environmental review to evaluate impacts to the Park's natural and cultural resources that would occur as a result of the proposed project, as required by the National Environmental Policy Act (NEPA: 1969, as amended), the National Historic Preservation Act (NHPA: 1966, as amended), and other legal mandates. The project study area is within Mile 73-74 of the Park.

The County has a raw water intake on the Potomac River at Mile 74.3. This intake supplies water for the community of Sharpsburg, MD. The County has a water treatment plant within 0.5 mile of the Park. The intake and pipeline were constructed in the 1960s. A perpetual easement (Appendix E) was issued in February 1976 for a six-inch water line, a water intake structure, and an underground electric service. The existing easement enters and continues within the park for approximately 800 linear feet. Numerous repairs have been made to the line over the past 10 years to enable raw water conductivity to remain constant. The County has submitted a request to replace the pipeline either within the existing easement or along a new alignment within the Park.

This Environmental Assessment/Assessment of Effects (EA/AOE) analyzes the potential impacts that would result from the implementation of the proposed action alternative (Alternative C) as well as impacts of the No Action alternative (Alternative A). This document has been prepared in accordance with NEPA and the associated implementing regulations, 40 Code of Federal Regulations (CFR) 1500-1508, and the NPS Director's Order (D.O.) #12 and Handbook (*Conservation Planning, Environmental Impact Analysis, and Decision-making* [NPS 2001]). Documentation of compliance with Section 106 of the NHPA conducted concurrent with the NEPA process is also presented in this EA/AOE.

Purpose of and Need for Action

The purpose of the project is to replace an existing water pipeline with a new raw water pipeline across the Park to connect the existing Sharpsburg Water Intake and the Water Treatment Plant and to replace an existing electrical control platform with a new electrical control platform. This action is needed because the existing pipeline has exceeded its useful lifespan and has at least one leak along its length, which is affecting the ability of the County to maintain a reliable safe water source for the Town of Sharpsburg. The existing water control platform is at danger of being damaged by flooding of the Potomac River at its present height, which threatens the ability of the County to control the water intake pumps during flood events.

¹ The use of mile as a locational convenience along the Park follows historical convention. The zero milestone or beginning of the C&O Canal is located in Georgetown where the canal empties into Rock Creek. Mile 184.5 is located at C&O Canal terminus at Cumberland, MD. C&O Canal mileposts are widely used in guidebooks (*e.g.* Hahn 1997), and many are still extant along the C&O Canal today.

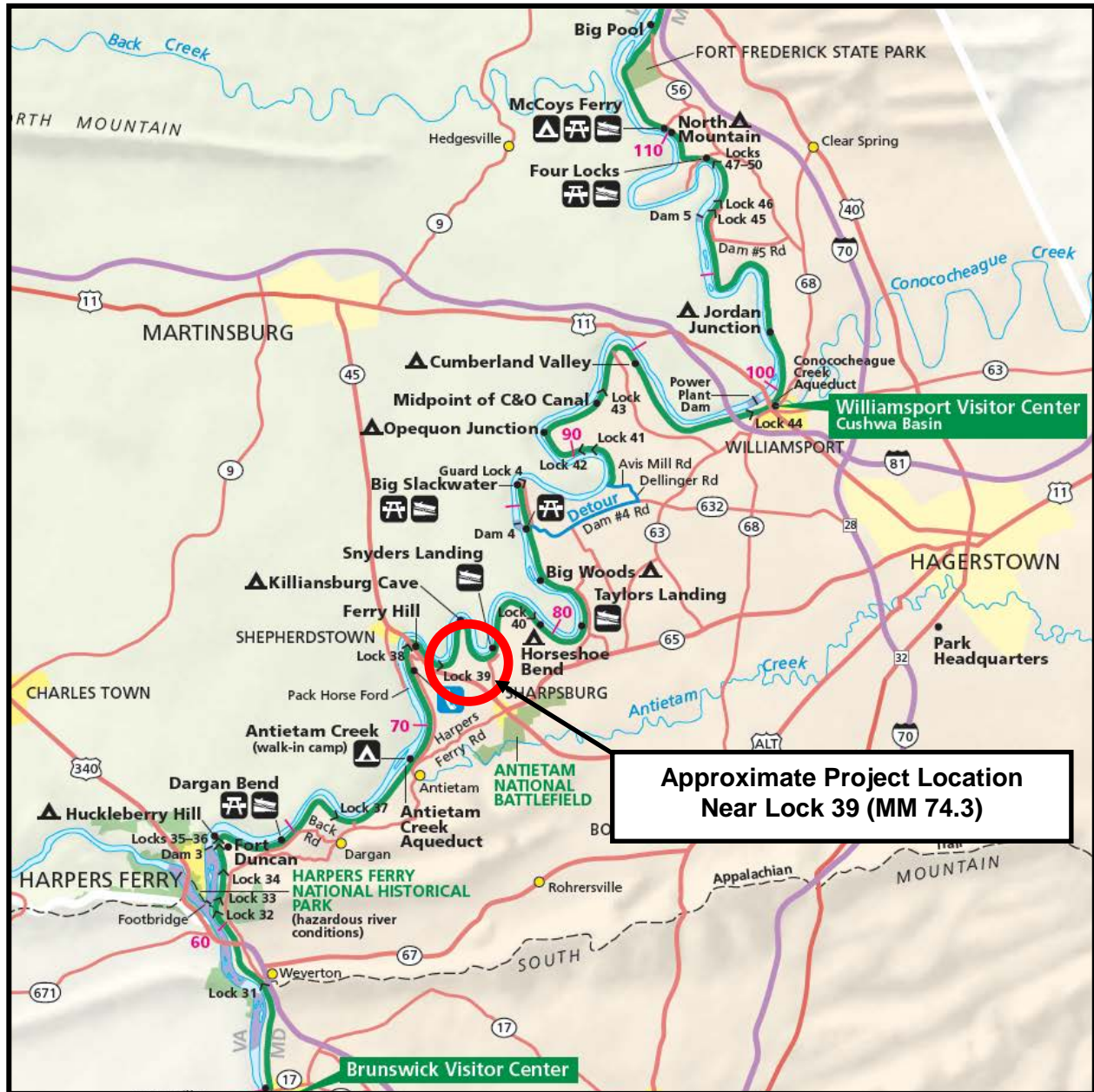


Figure 1: Approximate Project Location

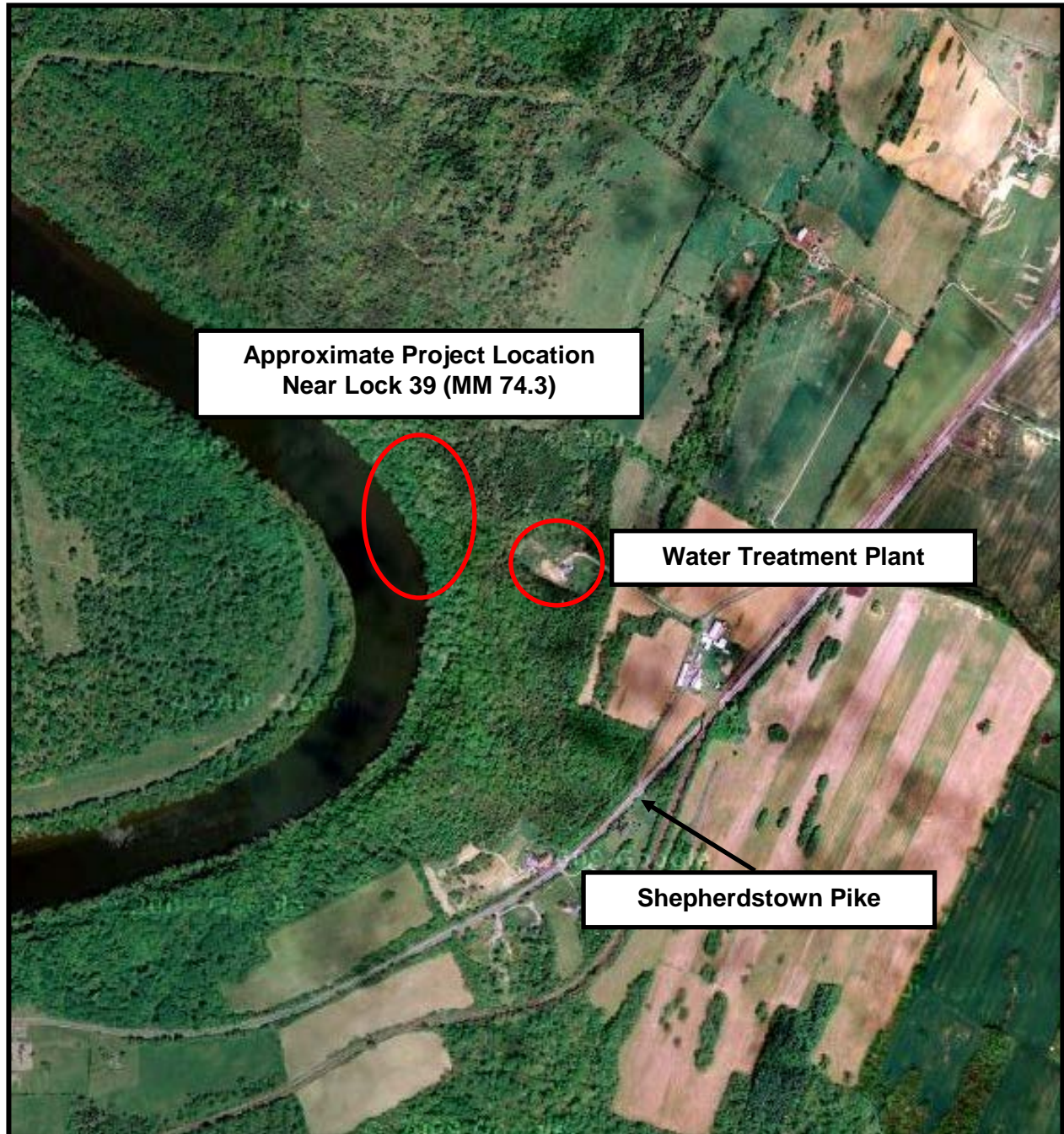


Figure 2: Project Location

Project Background

PROJECT BACKGROUND AND HISTORY

In the 1960s, the County constructed the raw water intake and pipeline to supply the water treatment plant for the Town of Sharpsburg, Maryland, including the approximately 800 feet of pipeline and raw water intake pump and power control systems at Mile 74.3 within the Park (Figure 3). The existing easement, as described in the 1976 perpetual easement (Appendix E) is 30 feet wide for 805 feet of its length, and 50 feet wide for the remaining 60 feet of its length adjacent to the east bank of the Potomac River. The existing easement was granted by the NPS for the purpose of maintaining a 6-inch water supply, a water intake structure, and an underground electric service line. Under the 1976 perpetual easement, the County is allowed to undertake routine maintenance and operations of the existing water supply pipeline, including any repair work necessary to maintain and operate the existing water supply pipeline. Vegetation maintenance and management within the easement is allowed as permitted under the existing easement.

Over the past 10 years, the integrity of the pipeline has been degrading, affecting the ability of the County to maintain a constant and reliable flow of water to the treatment plant. The County began planning to replace the existing pipeline and construct a new line and initiated coordination with the NPS regarding the proposed action in March of 2009. Continued coordination with the NPS led to the County seeking to place the replacement waterline within the existing easement.

PURPOSE AND SIGNIFICANCE OF THE PARK

The Park encompasses the approximately 185-mile long Chesapeake and Ohio (C&O) Canal, which runs from Washington, DC, to Cumberland, Maryland along the route of the Potomac River. The C&O Canal was in operation from the 1820s through the 1920s to transport coal, lumber, and agricultural products from western Maryland down to the port at Georgetown and the lower reaches of the Potomac River, which are navigable. The entire length of the C&O Canal is listed in the National Register of Historic Places (National Register). The Park provides an almost continuous trail that allows millions of annual visitors the opportunity to enjoy the historical, cultural, natural, and recreational resources found along the entire length of the Park.

ESTABLISHMENT OF THE PARK

The Park was established in 1971. The C&O Canal was originally acquired by the federal government in 1938, 14 years after it ceased operation. In 1961, President Dwight D. Eisenhower designated a portion of the C&O Canal between Seneca and Cumberland as a National Monument, which incorporated that portion of the C&O Canal into the NPS. When President Richard M. Nixon signed the bill establishing the Park, it included the lower reaches of the C&O Canal down to Georgetown (Macintosh 1991).

PARK MISSION STATEMENT

The mission of the Park is to safely preserve, protect, and interpret the park's cultural, scenic, and natural resources and to provide for compatible recreation therein (NPS 2006a).

RELATIONSHIP TO LAWS, EXECUTIVE ORDERS, POLICIES, AND OTHER PLANS

The NPS is governed by laws, regulations, and management plans before, during, and following any management action considered under any NEPA analysis. The following are those that are applicable to the proposed action.

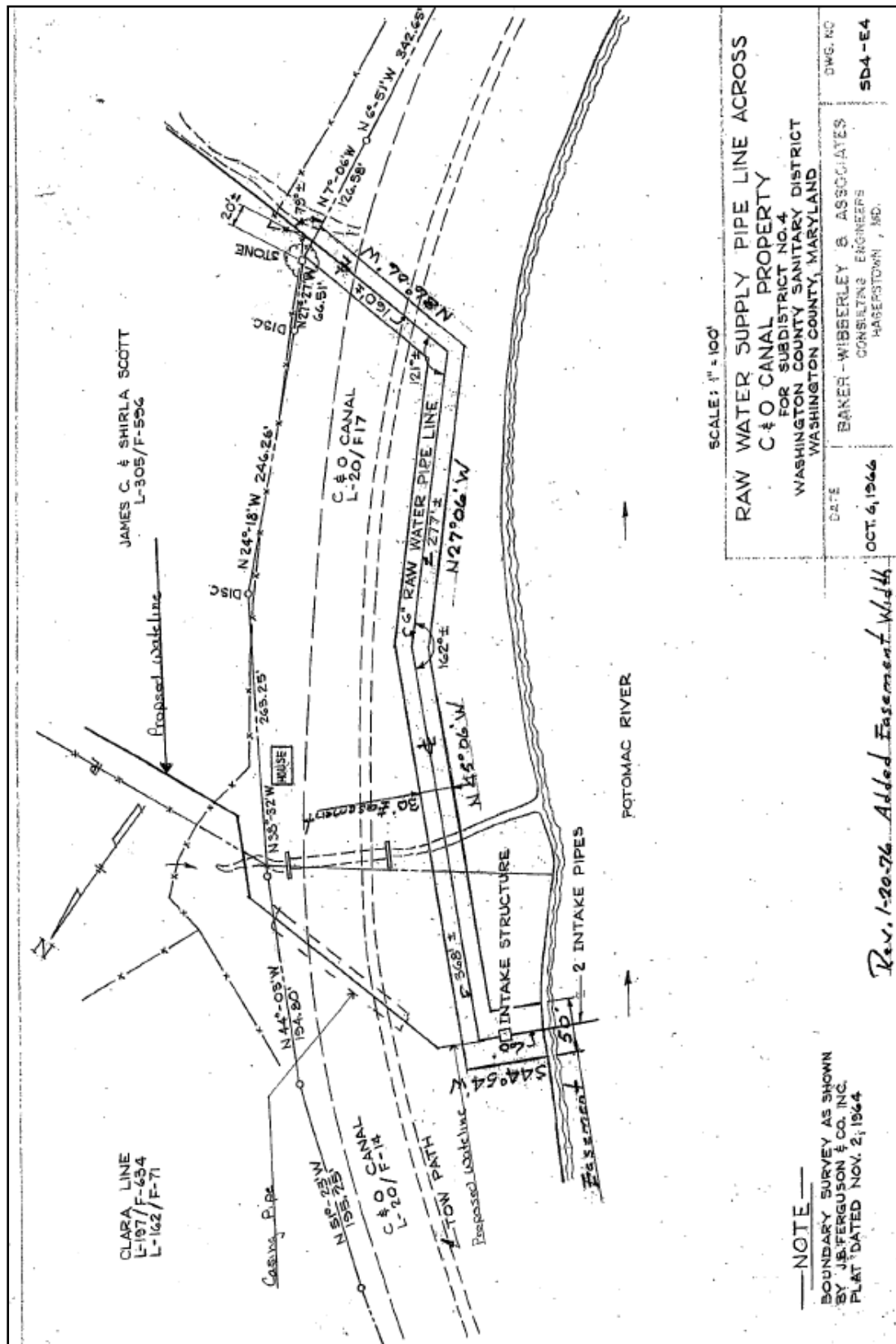


Figure 3: 1966 Survey of Easement

Applicable State and Federal Laws and Management Plans

National Park Service Organic Act of 1916

The NPS was created in 1916 by the *Organic Act* [16 (United States Code) USC 1 *et. seq.*, August 25, 1916, 19 Stat. 535] to oversee a system of national parks. The act directs the NPS to “conserve the scenery and the natural historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as would leave them unimpaired for the enjoyment of future generations.”

Management Policies 2006

According to NPS *Management Policies 2006*, an action constitutes an impairment when, in the professional judgment of the responsible manager, an impact “would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values” (NPS 2006, sec. 1.4.5). Whether an impact meets this definition depends on the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts. An impact on any park resource or value may, but does not necessarily, constitute an impairment. An impact would be more likely to constitute an impairment to the extent that it affects a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park; or
- key to the natural or cultural integrity of the park or to the opportunity for enjoyment of the park; or
- identified in the park’s general management plan or other relevant NPS planning documents as being of significance.

An impact would be less likely to constitute an impairment if it is an unavoidable result of action necessary to preserve or restore the integrity of park resources or values and it cannot be further mitigated. Based on October 31, 2011 Guidance for Non-Impairment Determination and the NPS NEPA Process, impairment determinations are no longer included as an appendix to EA documents. A written non-impairment determination will ultimately be prepared for the selected action and appended to the FONSI.

National Environmental Policy Act of 1969, as Amended

NEPA (Public L. 91-90, 42 USC 4321-4347, July 1, 1970) requires federal agencies to consider the impact of proposed federal actions on the natural and human environment and ensure that the public has an opportunity to be informed of, and comment on, those actions. NEPA also established the Council on Environmental Quality (CEQ), which has the goals of recommending national policies ensuring that the federal government promotes the improvement of the quality of the environment.

The NPS is required by NEPA to perform environmental analyses of the potential impacts on resources within its jurisdiction. The Department of the Interior (DOI) produced NEPA regulations in Part 516 of the departmental manual (DM), and the NPS Director’s Order (D.O.) #12 *Handbook* established requirements and procedures for DOI and NPS NEPA evaluations.

National Historic Preservation Act of 1966, as Amended through 2000

Section 106 of the NHPA (16 USC 470) requires federal agencies to consider effects of their proposals on historic properties, and to provide state historic preservation officers, tribal historic preservation officers, and as necessary, the Advisory Council on Historic Preservation a reasonable opportunity to review and comment on these actions. Section 106 review and NEPA are two separate, distinct processes. The DO-12 Handbook (NPS 2001) indicates they can and should occur simultaneously, and documents can be combined, but one is not a substitute for the other. They should, however, be coordinated to avoid duplication of public involvement and other requirements. The information and mitigation gathered as part of the 106 review must be included in the NEPA document, and the 106 process must be completed before a Finding of No Significant Impact (FONSI) or a Record of Decision (ROD) can be signed on a proposal that affects historic properties.

Archaeological Resources Protection Act of 1979, as Amended

The *Archaeological Resources Protection Act* (ARPA) requires federal agencies to identify archeological sites, prohibits unauthorized excavation on federal and Indian lands, establishes standards for permissible excavation, and encourages cooperation between federal agencies and private individuals.

Endangered Species Act of 1973, as Amended

Section 7 of the *Endangered Species Act* (7 U.S.C. 136; 16 U.S.C. 1531 *et seq.*) requires federal agencies to insure that any action authorized, funded, or carried out by the agency is not likely to jeopardize the continued existence of federally listed endangered or threatened species or modify their critical habitat.

Sections 404 and 401 of the Clean Water Act of 1972, as Amended

The U.S. Army Corps of Engineers (USACE) issues permits for dredge and fill activities in waters of the United States, including wetlands, under Section 404 of the *Clean Water Act*. Section 404 requires compliance evaluation by the USACE to ensure that no discharge of dredged or fill material shall be permitted in waters of the United States, including wetlands, if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences. The USACE has general permit provisions that allow many projects affecting wetlands to proceed with minimal review. Associated water quality certification under Section 401 is administered by the State. A *Joint Federal/State Application for the Alteration of any Floodplain, Waterway, Tidal or Nontidal Wetland in Maryland* would be required to be submitted and applicable permits obtained from the Maryland Department of the Environment (MDE) and USACE prior to initiating work in waters of the United States, including wetlands.

National Pollutant Discharge Elimination System (NPDES; 1972)

The NPDES permit program was authorized under Section 402 of the *Clean Water Act* for the purpose of regulating point sources of pollution for the protection of waters of the United States. NPDES permits are issued by states that have obtained Environmental Protection Agency approval to issue permits. Maryland administers NPDES permitting through the MDE. Erosion and sediment control plans are to be prepared and implemented in accordance with *Maryland Erosion and Sediment Control Guidelines for State and Federal Projects* (MDE 2004).

Maryland Erosion and Sediment Control Guidelines for State and Federal Projects (2004)

The *Maryland Erosion and Sediment Control Guidelines for State and Federal Projects* (MDE 2004) provide State and federal agencies with the information necessary for submittal of erosion and sediment control plans for review and approval. Minimum criteria for effective erosion and sediment control practices are established by the 1994 *Standards and Specifications for Soil and Erosion and Sediment Control*, which are incorporated by reference into State regulations and serve as the official guide for erosion and sediment control principles, methods, and practices.

Maryland Forest Conservation Act (1991, as Amended)

The *Maryland Forest Conservation Act* (Natural Resources Article Section 5-1601 through 5-1613) requires preparation of a Forest Conservation Plan for any activity in Maryland requiring an application for a subdivision, grading permit, or sediment erosion control permit on areas 40,000 square feet or greater, unless subject to specific exceptions or exemptions. Forest Stand Delineations and Forest Conservation Plans required by the Forest Conservation Act must be prepared by a licensed forester, licensed landscape architect, or other qualified individuals.

Maryland Waterway Construction Guidelines (2000)

The *Maryland Waterway Construction Guidelines* (MDE 2000) provide a set of recommended details for approaches frequently encountered in the waterway construction process. These guidelines cover processes for the stabilization, modification, or rehabilitation of streams and rivers due to urbanization or previous channel construction.

Executive Orders and Director's Orders

Executive Order 11988: Floodplain Management (1977)

Executive Order 11988 requires federal agencies to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever a practicable alternative exists.

Executive Order 11990: Protection of Wetlands (1977)

Executive Order 11990 requires federal agencies to avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands and to avoid direct and indirect support of new construction in wetlands wherever a practicable alternative exists.

Director's Order 12: Conservation Planning, Environmental Impact Analysis, and Decision Making (2001)

NPS Director's Order 12 and *DO-12 Handbook* (NPS 2001) establish the procedures for implementing NEPA analysis by the NPS. The processes described in the handbook are binding on all NPS personnel. The handbook derives most of its sections in whole or part from CEQ regulations or Interior NEPA guidelines, but also includes requirements to help facilitate the requirements of the law that established the NPS (the *Organic Act*) and other laws and policies that guide NPS actions.

Director's Order 28: Cultural Resources Management (1998)

NPS Director's Order 28, along with the NPS 2006 Management Policies (NPS 2006), and the 2008 Servicewide Programmatic Agreement with the Advisory Council and the National Conference of State Historic Preservation Officers, establish the NPS policies and procedures for the protection and management of cultural resources in its custody. These documents charge managers at the NPS with the task of avoiding or minimizing to the greatest extent possible adverse impacts on park resources and values. While the NPS has the discretion to allow certain impacts in parks, that discretion is limited by the statutory requirement of the *Organic Act* that park resources and values remain unimpaired.

Director's Order 77-1: Wetland Protection (2008)

NPS Director's Order 77-1 and *Procedural Manual #77-1: Wetlands Protection* establish the NPS policies, requirements, and standards for implementing Executive Order 11990: *Protection of Wetlands*. Actions that may be excepted from the Statement of Findings and compensation requirements include minor stream crossings for underground utility lines, including water pipelines, if the cumulative wetland disturbance (stream channel plus non-riverine wetlands immediately adjacent to the channel) totals 0.1 acre or less. This exception requires that: 1) directional drilling under the stream channel and adjacent

wetlands has been evaluated during the NEPA process and determined not to be practicable; 2) restoration of pre-construction contours and elevations, soil/substrate characteristics, and wetland/riparian vegetation is accomplished as part of the project; 3) the project will not result in adverse impacts on surface or ground water hydrology (e.g., no wetland drainage); and 4) best management practices for protection of aquatic life (e.g., siltation controls, measures to protect fish migration and spawning) are implemented throughout the construction and restoration process.

Director's Order 77-2: Floodplain Management (2003)

NPS Director's Order 77-2 and *Procedural Manual #77-2: Floodplain Management* establish the NPS procedures for implementing Executive Order 11988: *Floodplain Management*. The floodplain procedures require that a floodplain Statement of Findings documenting consistency with Executive Order 11988 be prepared for proposed activities that would result in occupation or modification of floodplains or that would result in impacts to floodplain values. Since wetlands are often located within floodplains, such proposed activities may require compliance with both Executive Order 11988 and Executive Order 11990. In such cases, the floodplain Statement of Findings and the wetland Statement of Findings may be combined into one Statement of Findings as long as the requirements for both procedural manuals (#77-1 and #77-2), including all specified signatures, are met.

Scoping Process and Public Participation

INTERNAL AND AGENCY SCOPING

Park personnel conducted internal scoping to define the purpose and need for the project, review the Environmental Screening Form (ESF), and to gather information on potential impacts and alternatives. The ESF (Appendix F) was completed in September 16, 2009. A project kick-off meeting, attended by NPS personnel and County representatives was held on 23 September 2009 to initiate the NEPA and concurrent Section 106 process and to review internal scoping results and preliminary designs. An on-site meeting was held as part of the project kick-off, at which preliminary impact topics were identified.

PUBLIC SCOPING

In accordance with NEPA and DO-12, the project was issued to the public for a 30-day public scoping comment period, which ran from February 8, 2010 to March 9, 2010. The public scoping comment period was announced through a press release and was posted on the Planning, Environment, and Public Comment (PEPC) website at <http://parkplanning.nps.gov/choh>. The press release and public scoping document are provided in Appendix A of this document.

A public scoping meeting was held by the NPS on February 25, 2010 to facilitate public involvement and obtain community feedback on the proposed action. This meeting was held at Park Headquarters at 1850 Dual Highway, Suite 100, in Hagerstown, Maryland, from 7-9 PM. Two people signed in at the meeting.

No comments were received via e-mail or other types of correspondence during the public scoping period.

Issues and Impact Topics

Issues are general categories of problems or concerns about environmental or operational impacts that may arise from the implementation of an alternative, be it the no-action, preferred, or other identified alternative. Once general issues have been identified, specific impact topics are developed to address issues that may result from the proposed action. The range of potential issues were identified through internal agency and public scoping, internal NPS knowledge of the project study area and resources including NPS documents, and the range of applicable federal laws, regulations, and Executive Orders.

General issues and concerns identified during the internal and agency scoping include effects on visitor use and safety, including maintaining public access to the Park during construction, adverse impacts to the towpath from construction and the movement of construction equipment, visual adverse impacts and invasive species from clearing the existing easement, and avoidance of adverse impacts to cultural resources.

Impact Topics Analyzed in this EA/AOE

The following impact topics were developed from issues identified during the internal and agency scoping and public scoping meeting and comment period. These topics are discussed in the “Affected Environment” chapter and analyzed in the “Environmental Consequences” chapter:

SOILS

Removal of the existing waterline and construction of a new waterline would result in the disturbance of soils in the area of construction on Park lands and along the Potomac River. As a result of the impacts on soils in the project area resulting from the proposed action, this topic is addressed as an impact topic in this EA.

WETLANDS

Construction associated with the proposed replacement of a waterline would result in minor temporary impacts to an intermittent stream within the existing easement on NPS lands. The streambed would be returned to its present condition following construction. Minor permanent impacts would occur to the canal prism. As a result of the impacts on wetlands in the project study area resulting from the proposed action, this topic is addressed as an impact topic in this EA. The proposed action would be an excepted action and not require a Statement of Findings under Director’s Order 77-1 documenting consistency with Executive Order 11990: *Protection of Wetlands* based on the following:

- the proposed action is for replacing/renovating an underground water pipeline within the same alignment as currently exists (not expanding),
- the cumulative wetland disturbance is less than 0.1 acre,
- pre-construction contours and elevations would be restored,
- soil/substrate characteristics and riparian vegetation would be restored,
- the project would not result in adverse impacts on surface or ground water hydrology (no wetland drainage), and
- best management practices for protection of aquatic life implemented throughout the construction and restoration process,

Similarly, because the proposed action would not result in occupation or modification of floodplains or result in impacts to floodplain values, this project would not require a Statement of Findings under Director’s Order 77-2 documenting consistency with Executive Order 11988: *Floodplain Management*. Although some construction activities would occur within the floodplain of the Potomac River, construction would occur within the existing easement, pre-construction contours and elevations would be restored, soil/substrate characteristics would be restored, and riparian vegetation would be restored. Therefore the proposed action would have no adverse impacts on floodplains or floodplain values within the Park. Floodplains were dismissed from further analysis (see Impact Topics Dismissed from Further Analysis).

VEGETATION

Construction associated with the proposed replacement of a waterline would result in impacts on vegetation on Park land because trees, shrubs, and grasses would potentially be removed during this

construction period. The number of trees removed would be kept to a minimum and the area would be revegetated to NPS standards after construction is completed, but some impacts would still occur. As a result of the impacts on vegetation that would occur from the proposed actions, this topic is addressed as an impact topic in this EA.

WILDLIFE

Activities associated with the proposed installation of new water lines would potentially result in the clearing of a limited number of trees, which could disturb or displace terrestrial wildlife using the area. Construction equipment would also produce periodic noise during the construction period, resulting in potential short-term impacts on wildlife in the area. As a result of the potential impacts on terrestrial wildlife and wildlife habitat from clearing of trees and noise from construction, this topic is addressed as an impact topic in this EA.

CULTURAL RESOURCES

The NHPA (16 USC 470 et seq.), NEPA, Organic Act, NPS *Management Policies 2006* (NPS 2006a), Director's Order 12, and Director's Order 28 require the consideration of impacts on any cultural resources on park lands that might be affected; NHPA, in particular, addresses impacts on cultural resources either listed in, or eligible to be listed in, the NRHP. As defined by NPS, cultural resources include archeological resources, museum objects, ethnographic resources, historic districts and structures, and cultural landscapes. For this study, efforts to identify cultural resources included a review of information provided by the Park, supplemented by interviews with Park staff and other published and unpublished sources, including the listings of the NRHP.

The Area of Potential Effect (APE) for determining potential impacts to cultural resources includes the existing easement within the boundaries of the Park as well as areas within the existing easement immediately bordering the Park and the immediately surrounding areas. The APE also extends to Lock 38 due to the current towpath access under the no action alternative.

Historic Structures and Districts - The C&O Canal is listed on the NRHP as a historic district. As a historic district, the C&O Canal contains numerous individual structures that contribute to its historical significance. In addition to the towpath and canal prism, other structures include locks, bridges, culverts, tunnels, aqueducts, associated industrial structures, lock keeper's houses, ruins, *etc.* Potential impacts of the new waterlines on these contributing structures on park lands are analyzed in this EA. This study will retain the historic structures and historic district for further analysis. Cultural landscapes, archeological resources, ethnographic resources, and museum objects were dismissed from further evaluation (see Impact Topics Dismissed from Further Analysis).

VISITOR USE AND EXPERIENCE

During construction of the waterline, impacts on visitor use could result from noise, disruption, and change in access. Post-construction, there would be a break in the vegetation along the easement on private property as seen from the towpath and cleared vegetation within the current easement. To minimize impacts to visitor use and experience during construction, construction across the towpath and canal prism would be planned to occur during nighttime hours. A visitor bypass will be implemented. The park will remain open during regular hours. As a result of potential impacts on visitor use and experience, this topic is addressed as an impact topic in this EA.

PUBLIC HEALTH AND SAFETY

During construction of the waterline, impacts to public safety could result from the open-cut trenching within the easement between the water intake pump station and towpath and across the towpath and canal

prism. To minimize impacts during construction, construction activities involving trenching across the towpath and canal prism would be planned to occur during nighttime hours and safety fencing and/or other forms of barriers would be temporarily erected. A visitor bypass will be implemented. As a result of potential impacts on public safety, this topic is addressed as an impact topic in this EA.

Impact Topics Dismissed from Further Analysis

The following impact topics were eliminated from detailed analysis in this EA/AOE. A brief rationale for dismissal is provided for each topic. Potential impacts on those resources would be less than minor, localized, and most likely immeasurable.

Geology, Geologic Hazards, Topography

There would be no alteration to geology or topography as a result of the proposed actions; therefore, these resource areas were dismissed from further analysis in this EA. The project will be conducted within the limits of disturbance (LOD) for the existing pipeline/easement. Geologic hazards that might affect a project include avalanche zones, slide areas, and earthquake zones. There are no known geologic hazards within the project area; therefore, this topic was dismissed from further analysis in this EA.

Hydrology

The proposed project would not result in any measurable alterations to the streamflow characteristics of the Potomac River or its tributaries. Therefore, this resource topic was dismissed from further analysis in this EA.

Water Quality

The project area is located within the Conococheague-Opequon watershed (USGS Hydrologic Unit Code 02070004), which is part of the upper portion of the Potomac River Basin. The MDNR has established a monitoring station on the Potomac River at Rumsey Bridge crossing to Shepherdstown, West Virginia, as part of the Core/Trend Program and Non-tidal Network for determining long-term water quality trends. This station (POT1830) is located approximately one mile downstream from the project area. The agency has undertaken extensive water chemistry monitoring at the station as well as benthic macroinvertebrate sampling. In 2008, pH ranged from a minimum daily value of 6.2 in February to a high of 8.8 in January, which exceeds the MDNR criteria for pH. This reach of the Potomac River has been listed for “impairments” as defined under the *Clean Water Act* in the 2008 *Integrated report of Surface Water Quality in Maryland* (MDE 2008). Polychlorinated biphenyls and methylmercury have been found in fish tissue in the area in amounts that exceed MDNR criteria. These substances are toxic and accumulate in fish and human tissue. There are also benthic, total suspended solids, and phosphorus impairments to the aquatic life and wildlife designated use. Such impairments indicate that the health of aquatic life and wildlife is threatened by heavy phosphorus loads and high levels of suspended solids.

The proposed project would not add to or decrease the impairments associated with this section of river. The County would adhere to Maryland standards for sediment and erosion control during construction and stabilize the construction area with a native seed mix immediately following construction. Specific best management practices and mitigations described in association with “Soils” within the Environmental Consequences section of this document would ensure that the proposed project would not result in more than local, short-term and negligible adverse impacts to water quality. Preventative measures would be implemented during construction to minimize the potential for adverse impacts from fuel leaks or spills. The proposed project would not result in any permanent adverse impacts to water quality. Therefore, this resource topic was dismissed from further analysis in this EA.

Floodplains

Although some construction activities would occur within the floodplain of the Potomac River, construction would occur within the existing easement, pre-construction contours and elevations would be restored, soil/substrate characteristics would be restored, and riparian vegetation would be restored. Therefore the proposed action would have no adverse impacts on floodplains or floodplain values within the Park. Because the proposed action would not result in occupation or modification of floodplains or result in impacts to floodplain values, this project would not require a Statement of Findings under Director's Order 77-2 documenting consistency with Executive Order 11988: *Floodplain Management*. Therefore, this resource topic was dismissed from further analysis in this EA.

Rare, Threatened, and Endangered Species

Federal Threatened and Endangered Species. The *Endangered Species Act* requires an examination of impacts on all federally listed or proposed for listing as threatened or endangered species. In accordance with Section 7 of the *Endangered Species Act*, a letter was sent by NPS in the fall of 2010 to solicit comments from USFWS regarding the existence of T&E species within the project area. The USFWS responded in a letter dated October 16, 2010, that with the exception for occasional transient individuals, no federally proposed or listed endangered or threatened species are known to exist within the project area. The USFWS stated that no additional coordination or Biological Assessment is required (correspondence included in Appendix D). As such, Federal Threatened and Endangered Species were dismissed from further analysis in this EA.

State Rare, Threatened, and Endangered Species. NPS policy also requires examination of the impacts on federal candidate species, as well as state-listed threatened, endangered candidate, rare, declining, and sensitive species. On behalf of the NPS, a letter dated November 5, 2009 was submitted to the MDNR Wildlife & Heritage Service (WHS) to determine if the proposed project would have any effects on rare plant and animal species. In a response dated 16 December 2009 the MDNR stated that reported one documented occurrence of arbor-vitae (*Thuja occidentalis*), a state-listed Threatened tree species, is located on or within very close proximity to the project study area and that documented occurrences of twenty other state-listed species are also located within 3.0 miles of the project study area. No individuals of arbor-vitae were identified in the project study area during tree surveys conducted to identify trees that would be removed by project actions. The NPS submitted a follow-up letter to the MDNR WHS dated April 5, 2010. In a response dated June 29, 2010 the MDNR stated that there are no State or Federal records for rare, threatened, or endangered species within the project boundaries. However, the letter did identify six species that are known to occur in limestone cliff habitat along the Potomac River in close proximity to the project boundaries and noted that the maintenance of water quality is crucial to the continued existence of rare species of freshwater mussels in the Potomac River. The referenced correspondence has been included in Appendix D. The proposed action would occur within the existing easement that was previously disturbed by installation of the existing water pipeline, would not disturb intact limestone cliff habitat located outside the easement, and would undertake appropriate erosion and sediment control measures to protect water quality. As such, State Rare, Threatened, and Endangered Species were dismissed from further analysis in this EA.

Scenic Resources

The NPS *Management Policies 2006* states that scenic views and visual resources are considered highly valued characteristics and requires them to be protected. The proposed actions would not impact any scenic views or vistas in the project area because the new waterline would be buried underground and as the viewshed is dominated by mature forest. The new electrical control platform would be located adjacent to the existing electrical control platform. The new electrical control platform would be 5 feet higher than the existing structure, but would be placed adjacent to the existing elevated electrical control platform, which would then be removed. The change in height would be to elevate the electrical controls

above the 100-year flood level for safety considerations and would represent a negligible change to scenic resources. The permanent cross-over dike would be designed to blend in with the surrounding environment. During construction, construction activities and equipment would be visible; however, these impacts would be short-term and negligible. Also, visual impacts are taken into account in the analysis of impacts on historic structure and districts and visitor use and experience. Therefore, this topic was dismissed from further analysis in this EA.

Cultural Resources

Archeology. Based on reviews of the NPS Archeological Site Management Information System (ASMIS), the overview and assessment of the Park's archeology and history (Barse and Wuebber 2002), and the results of an archeological survey program (Bedell *et al.* 2009), there are no known archeological sites within the boundary of the proposed action. Additionally, all construction activities would occur within the existing easement, which was disturbed during the construction of the current waterline in the 1960s. Any archeological resources that may be located within the project study area have been adversely impacted by prior construction activities, would have no integrity, and would not be considered significant. As such, archeological resources were dismissed as a separate impact topic.

Museum Collections. There are no museum collections involved in the proposed action nor would any museum collections be expected to be encountered during construction. Therefore the proposed action would have no adverse impacts on museum collections.

Ethnography. No properties meeting the definition of a Traditional Cultural Property (TCP) as defined in Parker and King (1998) are located in the vicinity of the proposed action. Therefore the proposed action would have no adverse impacts to ethnographic resources.

Cultural Landscapes. According to Director's Order 28 (*Cultural Resources Management Guideline*), a cultural landscape is:

“...a reflection of human adaptation and use of natural resources and is often expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and the types of structures that are built. The character of a cultural landscape is defined both by physical materials, such as roads, buildings, walls, and vegetation, and by use reflecting cultural values and traditions.”

There have been 15 cultural landscapes identified associated with the Park (NPS 2009a), but there has not yet been a formal survey to identify all cultural landscapes within the Park (NPS 2009b). All potential impacts to historic features and viewsheds are addressed under the historic structures and districts topic and the visitor use and experience topic. As such, Cultural Landscapes was dismissed as a separate impact topic.

American Indian Traditional Cultural Properties

There are no American Indian traditional cultural properties, trust resources or sacred sites in the vicinity of the proposed action. Therefore the proposed action would have no adverse impacts on American Indian traditional cultural properties, trust resources or sacred sites.

Park Operations and Management

Proposed construction activities would not have any appreciable or noticeable effect on normal Park operations and management. As such, this topic was dismissed from further analysis in this EA.

Socioeconomics

There are no residential dwellings in the vicinity of the proposed action, nor are there any low income or minority populations in the vicinity of the proposed action. Additionally, there are no populations of children in the vicinity of the proposed action. Therefore the proposed action would have no adverse impacts on socioeconomics.

Transportation

Under the proposed action, short-term impacts on local traffic may occur from the introduction of construction vehicles hauling materials to and from the site. However, this change in vehicle use patterns surrounding the Park would be limited and temporary, and vehicle impacts to the Park are addressed under the Historic Structures and Districts impact topic. Therefore, this topic was dismissed from full analysis.

Land Use

The existing land use within the Park would not change as a result of implementation of the proposed action. Under the action alternative, the existing easement would be modified to allow an additional water line and communication line, and the easement would be expanded to allow for new access that would eliminate construction traffic and future maintenance and operations traffic on one mile of towpath. Because this is addressed under the Historic Structures and Districts topic, this topic was dismissed from full analysis.

Environmental Justice

On February 11, 1994, President Clinton issued Executive Order 12898: *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. This order directs agencies to address environmental and public health conditions in minority and low-income communities to avoid the disproportionate placement of any adverse effects from federal policies and actions on these populations. Local residents may include low-income populations, but these populations would not be particularly or disproportionately affected by construction of a new water intake pipeline; therefore, this topic was dismissed from further analysis in this EA.

Air Quality

The proposed action would result in short-term and localized air pollutant emissions (e.g., emissions from construction equipment and fugitive dust from ground disturbance). Impacts to air quality would be negligible because emissions would be low and resource protection measures would be implemented; therefore, this topic was dismissed from further analysis in this EA.

ALTERNATIVES

Introduction

Federal agencies that are proposing an action are required by NEPA to investigate a range of reasonable alternatives that are aimed at addressing the purpose and need of the proposed action. Under the CEQ regulations for the implementation of NEPA, the range of alternatives under investigation must include a “no action” alternative. The alternatives discussed below and further analyzed in this document, identified as Alternatives A and C, were found to both meet the purpose and need for the proposed action while also meeting the management objectives for the Park. Those proposed alternatives that did not meet the purpose and need, were deemed not feasible, or conflicted with the management objectives of the Park were dismissed from further analysis; descriptions of the dismissed alternatives, identified as Alternatives B, D, and E, are provided in this chapter.

DESCRIPTIONS OF ALTERNATIVES

ALTERNATIVE A: NO ACTION

Alternative A is the No Action alternative. The CEQ and the NPS NEPA regulations require consideration and analysis of the No Action alternative to provide a baseline against which the other alternatives may be considered. Under the No Action Alternative, the County would continue to undertake routine maintenance and operations of the existing water supply pipeline, including any repair work necessary to maintain and operate the existing water supply pipeline. Vegetation maintenance and management within the easement would be allowed as permitted under the existing easement. Currently, the existing water supply pipeline is a 6-inch diameter pipe that has at least one identified leak along its length. Trees that have grown up within the easement may be removed to reduce the risk of failure of the existing water supply pipeline resulting from additional damage caused by roots. In the event emergency repairs are required, the County would undertake appropriate measures to rectify the emergency situation as allowed under the 1976 perpetual easement (Appendix E) granted by the NPS. Repair work would not expand the dimensions of the existing water supply pipeline or add future capacity, add new utilities, or change access within the easement. Consistent with the 1976 perpetual easement, the County may utilize the towpath for vehicular access during emergencies. Any damage caused to the Park property would be promptly repaired and/or restored by the County. The canal works would be restored in accordance with the best practices of historic canal construction and restoration. Any such repair work to be performed by the County would be accomplished subject to general supervision by the NPS.

The County would continue use of over one mile of towpath to access the intake for daily operations and maintenance. The historic towpath would also be the route used for emergency repair equipment.

ALTERNATIVE C: EXISTING EASEMENT (PREFERRED)

Alternative C (Figure 4) would consist of removal of the existing, leaking underground 6-inch diameter water supply pipeline from within the current easement and replacement with an underground 6-inch diameter water line in the same place. A second underground 6-inch diameter water line would be installed for future use. In addition, this alternative would include replacement of underground electric service line, installation of underground telecommunication line, replacement of the elevated electrical platform adjacent to the water intake pumps, and construction of a cross-over dike across the canal prism on Park lands. The existing easement, as described in the 1976 perpetual easement (Appendix E) is 30 feet wide for 805 feet of its length, and 50 feet wide for the remaining 60 feet of its length adjacent to the east bank of the Potomac River. The existing easement was granted for the purpose of maintaining a 6-inch water supply, a water intake structure, and an underground electric service line.

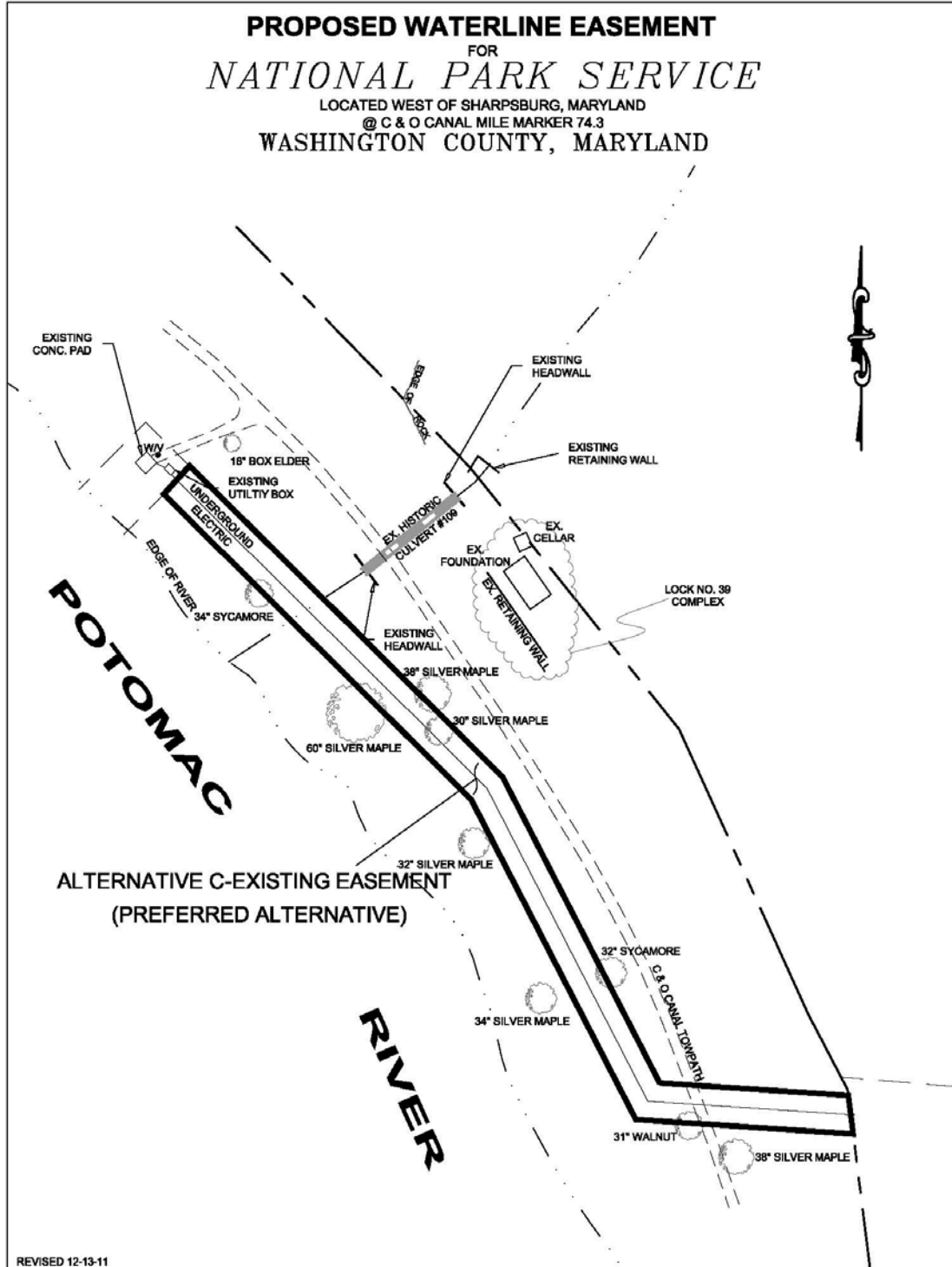


Figure 4: Alternative C.

The water lines and conduit for electric and communication lines would run the entire length of the easement on NPS lands. For the portion of the proposed new water line crossing under the canal prism and towpath, the County would install a 36-inch diameter steel casing sleeve as a conduit to handle the two water lines so that the canal prism and towpath would not need to be disturbed for any future maintenance. The casing would accommodate the two 6-inch diameter water lines. One of the water lines would be used to supply the current needs of the Town of Sharpsburg, while the second water line would allow for bringing additional water capacity on-line in the future without necessitating new construction. The water lines would have one foot of horizontal separation. A 6-inch PVC conduit for electric service line and a 2-inch conduit for telecommunication line would be installed on top of the 36-inch diameter steel casing sleeve with no separation required between conduits, but would be one foot apart and have one foot of horizontal separation.

The County would lay a temporary, bypass water line (Figure 5) from the water intake to the water treatment plant to ensure that water service to the Town of Sharpsburg is not interrupted. The temporary bypass water line would be above-ground for most its route, and generally cross the access lane after leaving the intake, run parallel to the access lane, cross the towpath and canal prism, and then continue parallel to the canal before turning east towards the water treatment plant off Park lands. Final routing of the temporary bypass water line across the towpath will be determined in consultation with NPS prior to construction and following review and approval by the NPS. The temporary water line would be placed, by hand, on top of the existing ground except for the crossings of the access lane and towpath. The temporary water line would be installed in shallow, narrow trenches excavated across the access lane and towpath. The temporary water line would be placed in a 12-inch diameter protective steel sleeve at these crossings. A steel plate or approximately 6 inches of earthen overburden placed over the protective sleeve to protect the water line from vehicular traffic. The overburden would be graded on the towpath to provide a gradual slope up and over the water line to prevent disruption to passage by motorized vehicles, bicyclists, and pedestrians. In the event of any forecasted major storm event that could elevate to 100-year floodplain stage, the temporary water line would be weighted down with sandbags to prevent flotation.

Upon completion of the proposed new water line, this temporary bypass water line would be immediately removed. No soil or tree disturbance would occur from installation of the temporary bypass water line on the ground. Minimal soil disturbance would occur from installation of the temporary bypass water line within shallow trenches across the access lane and towpath. Construction activities would have to occur during warmer months to prevent the temporary bypass water line from freezing and bursting. A temporary easement would be required for the bypass water line.

The County would also construct a new elevated electrical platform adjacent and upstream of the intake (Figure 5). The electrical platform is used to control the water intake pumps. The new location would be required to allow construction to occur cleanly and to avoid existing lines. The new elevated electrical platform would be 5 feet higher than the existing platform and placed on pilings to minimize ground disturbance. The purpose of this proposed height change would be to raise the electrical panels above the 100-year flood level to protect the panels from damage and shorting out from Potomac River flood events. The waters of the flood of January 20, 1996 rose to only 6 inches below the base of the existing panels. The old platform would be removed following activation of the new electrical controls. Construction activities associated with the new elevated electrical platform would occur within the existing easement.

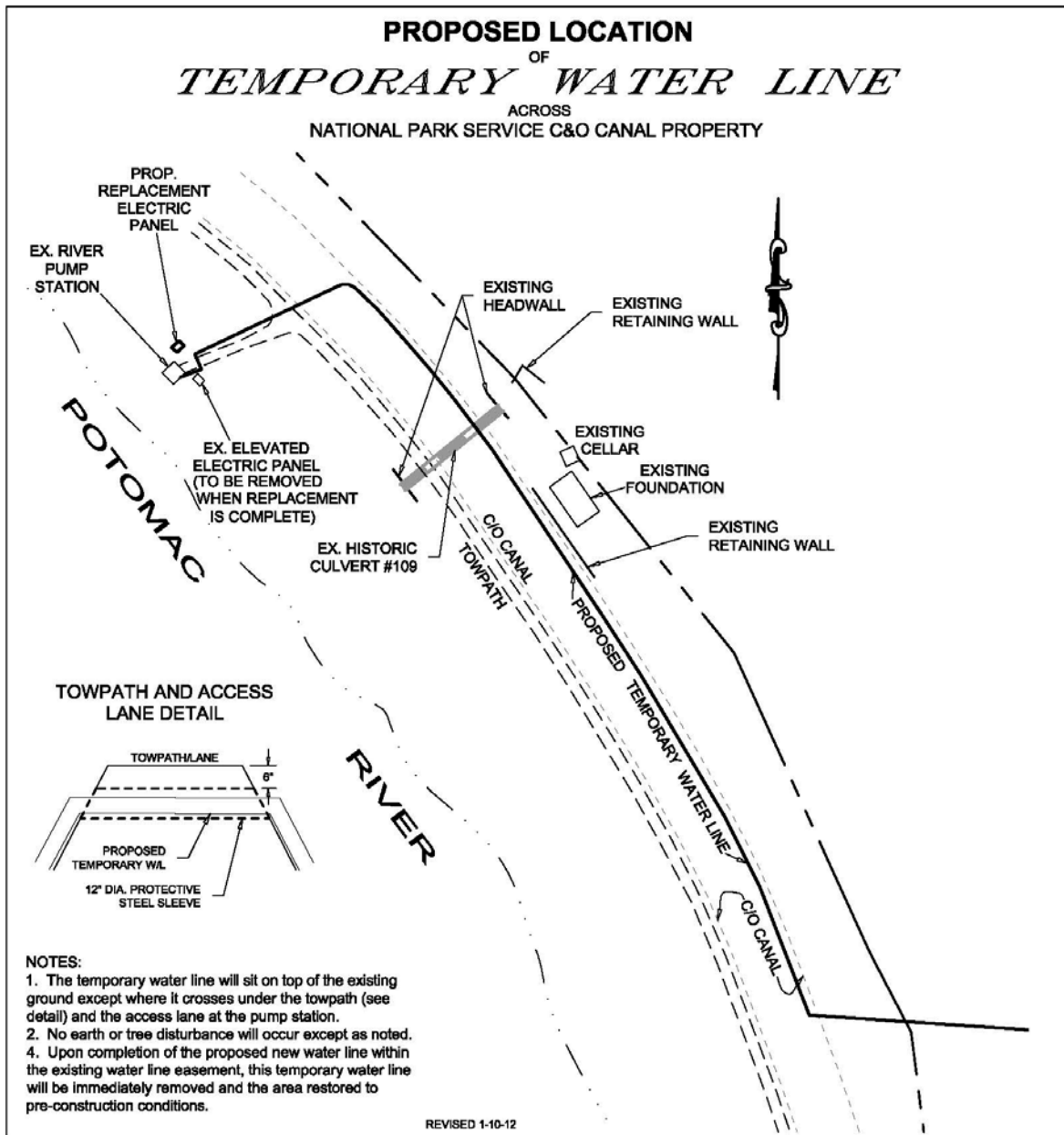


Figure 5: Proposed Location of Temporary Water Line.

On non-Park lands between the Park boundary and treatment plant the County would improve the existing dirt and gravel road leading from the water treatment plant down towards the canal prism. To connect the improved access road from off Park lands to the towpath and the easement between the towpath and the Potomac River on Park lands, the County would construct a cross-over dike across the canal prism on Park lands (Figure 6). This road would be used to allow construction traffic to more directly access the easement within the Park, thus eliminating the need to bring construction vehicles along the towpath from Lock 38. The cross-over dike would remain as a permanent component of the County's new operations and maintenance access. The elevation of the cross-over would tie in to the towpath at the same grade as the towpath.

The installation of this cross-over dike would eliminate travel by construction equipment and post-construction maintenance equipment on one mile of towpath. The improved access road would have a travel surface 12 feet in width and side slopes with a 3:1 grade for an ultimate width of approximately 16 feet. Standard construction practices and best management practices would be utilized for construction. The cross-over dike would contain two 36-inch diameter culverts to allow for water flow within the canal prism and to minimize the potential for ponding. The cross-over dike would require granting of an expanded easement of approximately 0.11 acre from the NPS for an additional width of right-of-way for a permanent crossing approximately 40 feet wide by 120 feet long on the north side of the existing easement starting along the common property line (east side) with the lands owned by the County and running across the canal prism (towards the river) for the length of approximately 120 feet until reaching the towpath.

The construction of Alternative C would necessitate a new easement between the County and the NPS to allow the additional infrastructure, as the existing easement agreement limits the water line within the easement to a single 6-inch diameter water line and an electrical conduit, with a controlled access point within the ROW from private land to Park property. The existing easement would also need to be expanded to include the additional right-of-way needed for the proposed permanent cross-over dike. This document would be filed at the Washington County, Maryland Courthouse.

There are two construction options identified under Alternative C for installing the 36-inch diameter steel casing sleeve under the towpath and canal prism. The two construction options differ in construction method, duration of construction activities, and number and types of equipment required. The two construction options also differ in construction impacts to Park lands and the extent of temporary construction easements that would be required for encroachment on Park lands outside the existing easement. The preferred construction option would be Option 1. In comparison to Construction Option 2, Construction Option 1 would minimize disturbance to previously undisturbed areas, minimize the time construction activities would be occurring within or adjacent to the towpath, minimize safety concerns from open excavations within or adjacent to the towpath, and minimize safety concerns from construction equipment within or adjacent to the towpath. Construction Option 2 was dismissed from full analysis as it would result in larger adverse impact to Park resources. A description of the dismissed Construction Option 2 is provided in this chapter under Alternatives Considered but Dismissed.

Option 1 would be open-cut trenching to place the 36-inch diameter steel casing sleeve under the towpath and canal prism (Figure 7). General construction methodologies would include open-cut trenching along the length of, and within, the easement parallel to the Potomac River and the towpath, and open-cut trenching through the towpath and the canal prism. Open-cut trenching would continue from the opposite side of the canal to the water treatment facility. For the open-cut trenching option, work would be within the limits of disturbance of the previous/existing installation. Additionally, the permanent cross-over dike would be built across the canal prism from the existing access road on private property to the towpath to allow for construction access and post-construction access by the County to the water line and pump station for maintenance and emergencies.

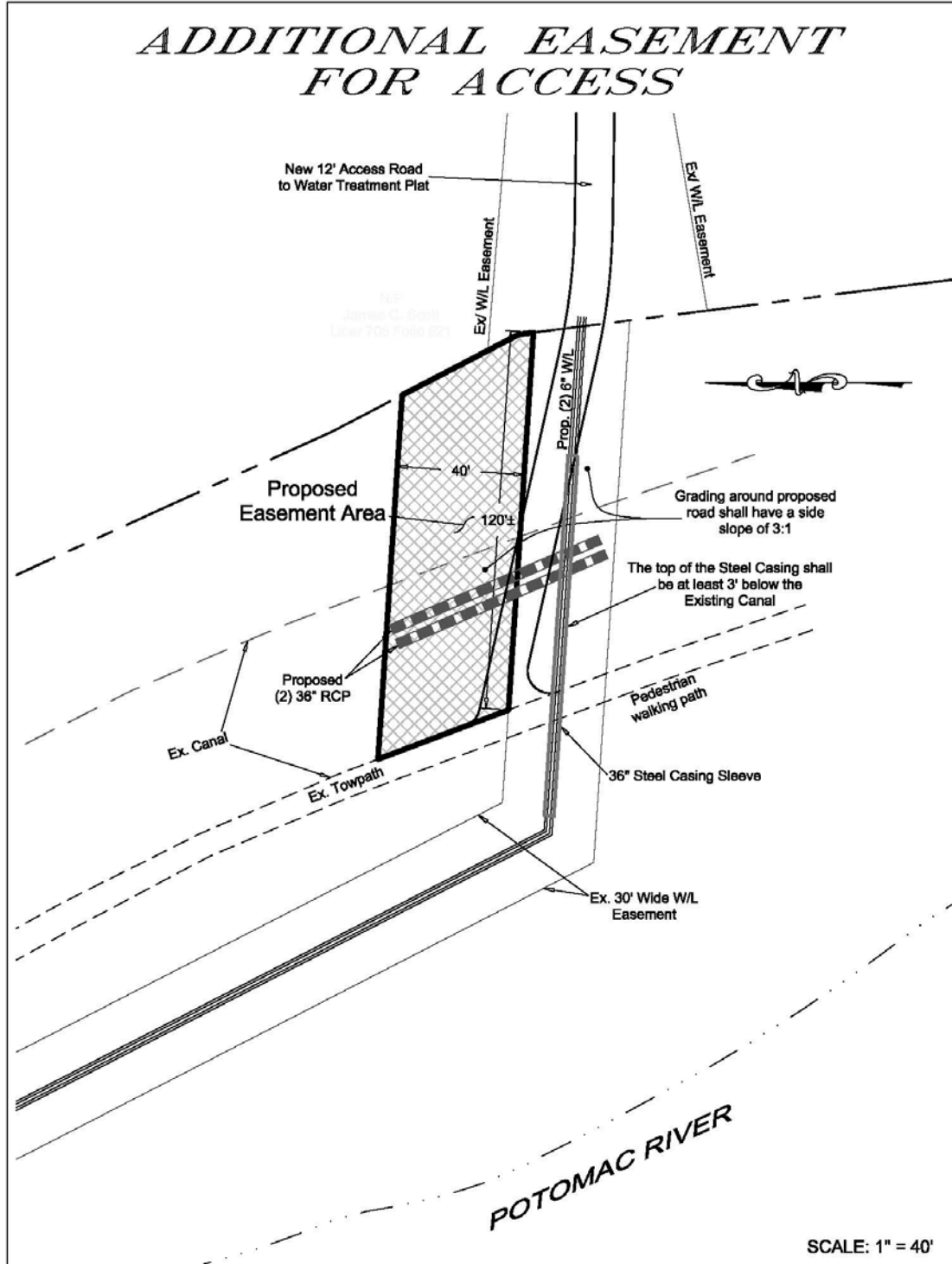


Figure 6: Additional Easement for Access.

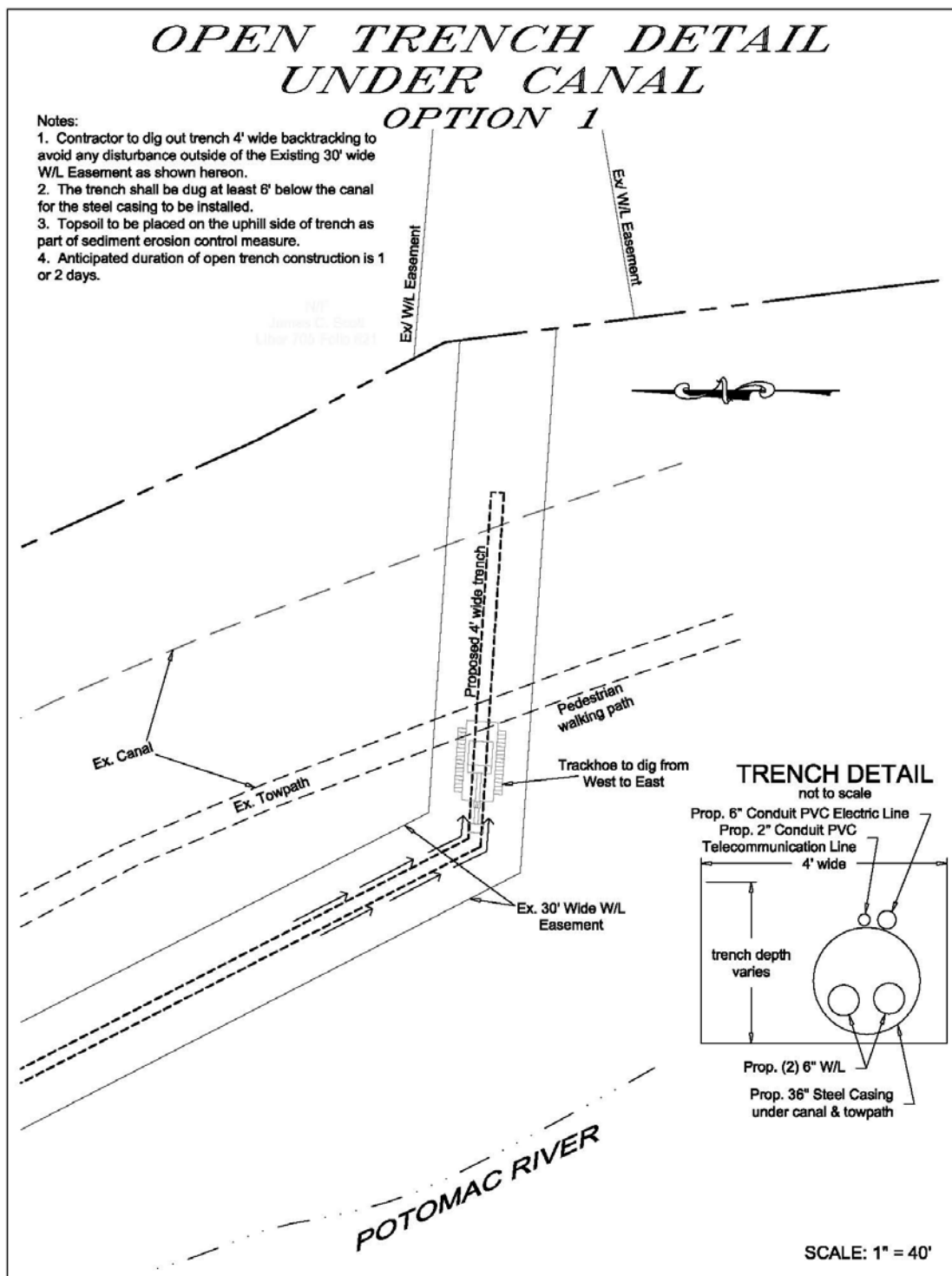


Figure 7: Alternative C, Construction Option 1 – Open Trench under Canal.

The County proposes to use a tracked hydraulic excavator, also known as a trackhoe, for the digging of the open-cut trench for placement of the new water lines and conduit. According to the operating manual for the Caterpillar CAT 329DL Hydraulic Excavator, the different models have an operating weight of 64,460 pounds, or over 32 tons. Construction of the open cut trench within the existing easement would be conducted by a Caterpillar CAT 420E wheeled backhoe loader, which has a nominal operating weight of 15,201 pounds (7.5 tons) and a maximum operating weight of 24,251 pounds (12.1 tons).

Additionally, the County proposes to use a single axle Kenworth T470 dump truck that has a licensed gross vehicle weight (loaded) of 12 tons. Equipment would access the project site along the new location access road and would have to cross the canal prism and towpath in order to dig the open-cut trench on the river side of the canal. Under Alternative C the County would also construct a permanent cross-over dike across the canal prism to allow for the access of County maintenance vehicles to the easement and existing pump station and to avoid the use of one mile of Park towpath during construction and future operations and maintenance activities.

The NPS has established a 12-ton weight limit for vehicles for most of the towpath to minimize risk of damage. Although the trackhoe exceeds the 12-ton vehicle limit recommended by the NPS for the towpath, the weight of the trackhoe would be distributed over the entire length and width of the tracks; thus the trackhoe would exert fewer pounds per square inch than the 12-ton dump truck. The tracks on the trackhoe are 32 inches wide by 50 feet in length (per side). With 20 feet of the track in contact with the ground, the weight would be distributed over an area equating to 17.76 square feet of contact area, equal to 0.9 ton per square foot. By comparison, the dump truck would exert a point load of 3 tons per front tire. Based on the reduced tonnage per square inch that would be exerted on the towpath by the trackhoe in comparison to a 12-ton rubber tired vehicle, the trackhoe would minimize concerns for damage to the towpath, meeting the intent of the NPS vehicle weight limitation. The trackhoe would make a nearly perpendicular crossing across the towpath (Figure 7) for the purposes of excavation for removal of the existing water line and installation of the new water lines and conduit. The trackhoe would operate within the limits of previous disturbance for the existing water line.

The total elapsed time of construction within the Park and on private property is estimated at a total of 6 months. Construction time on Park property is estimated at 8 weeks, but the temporary bypass water line would be in place on Park property during the entire construction process until the new water pipeline is connected and functional. Proposed construction durations are estimates only and may vary depending upon the conditions found during construction. In the event of any forecasted major storm event that could elevate to 100-year floodplain stage, all equipment would be removed from the 100-year floodplain, open areas would be closed, and temporary water line weighted down with sandbags to prevent flotation.

Vegetation within the existing easement would be cleared. Trees will be flush cut and roots within the active trench zone would be cut out of the way, leaving remaining roots in place to deteriorate naturally. Stumps would be treated with NPS approved herbicide to prevent regrowth. Trees adjacent to, but outside, the easement may be trimmed to remove branches obstructing construction access. All vegetation work will be undertaken to meet NPS arborist standards for the protection trees to remain.

All excavation work would be anticipated to be conducted within areas previously disturbed by construction of the existing water pipeline, including the crossing of the towpath. This would also limit the possibility of encountering rock during construction that might have to be removed by hydraulic hammering or blasting. Hydraulic hammering is the preferred method for rock removal, but should blasting be required, NPS standards and blasting permit would be applied. The County would use a trackhoe to excavate an open-cut trench approximately 4 feet in width along most of the existing easement. The width of the trench through the towpath may be wider to accommodate benching for safety considerations.

Under Option 1, construction of the open-cut trench through the towpath would necessitate the removal of a section of the towpath to place a steel casing sleeve through which the new water pipelines and conduit would run. The County would place a steel casing sleeve in the portion of the trench that runs underneath the towpath so that the towpath would not have to be re-excavated to conduct any necessary maintenance to the new water pipeline or electrical wires. The County would plan to undertake the installation of the steel casing sleeve under the towpath in a single construction episode between sunset and following morning sunrise, when the towpath would be closed to Park visitors, with backfilling of the trench expected to be completed by morning when the Park opens. Full reconstruction of the towpath to its original contours would be anticipated to take an additional two days.

During the period in which reconstruction activities are occurring within the towpath, a temporary pedestrian bypass would be established (Figure 8). A 4-foot wide steel plate with handrails on both sides would be placed over the trench to allow pedestrians to continue using the towpath. Reconstruction activities would be limited to one side of the towpath at a time with the temporary pedestrian bypass occupying the other side of the towpath. The temporary pedestrian bypass would be moved to the completed side of the towpath to allow completion of reconstruction activities on the remaining side of the towpath. Project staff would be posted on the towpath to ensure safe visitor travel through the work zone during open park hours. Although the towpath is closed at dusk, there may be visitors who are in the Park after dark. Battery-operated blinker barricades would be placed to warn visitors in the project area after hours.

OPEN TRENCH TEMPORARY PEDESTRIAN BYPASS

(to be used in conjunction with Option 1 only)

Notes:

1. All work done within the towpath will be done between sunset and the following morning sunrise to minimize any potential complications between pedestrians and the construction.
2. The construction of the 36" steel sleeve is intended to be done in a single evening.
3. A 4' wide steel plate with handrails on both sides will be placed over the trench to span the 4' wide open cut to allow pedestrians to continue using the towpath.

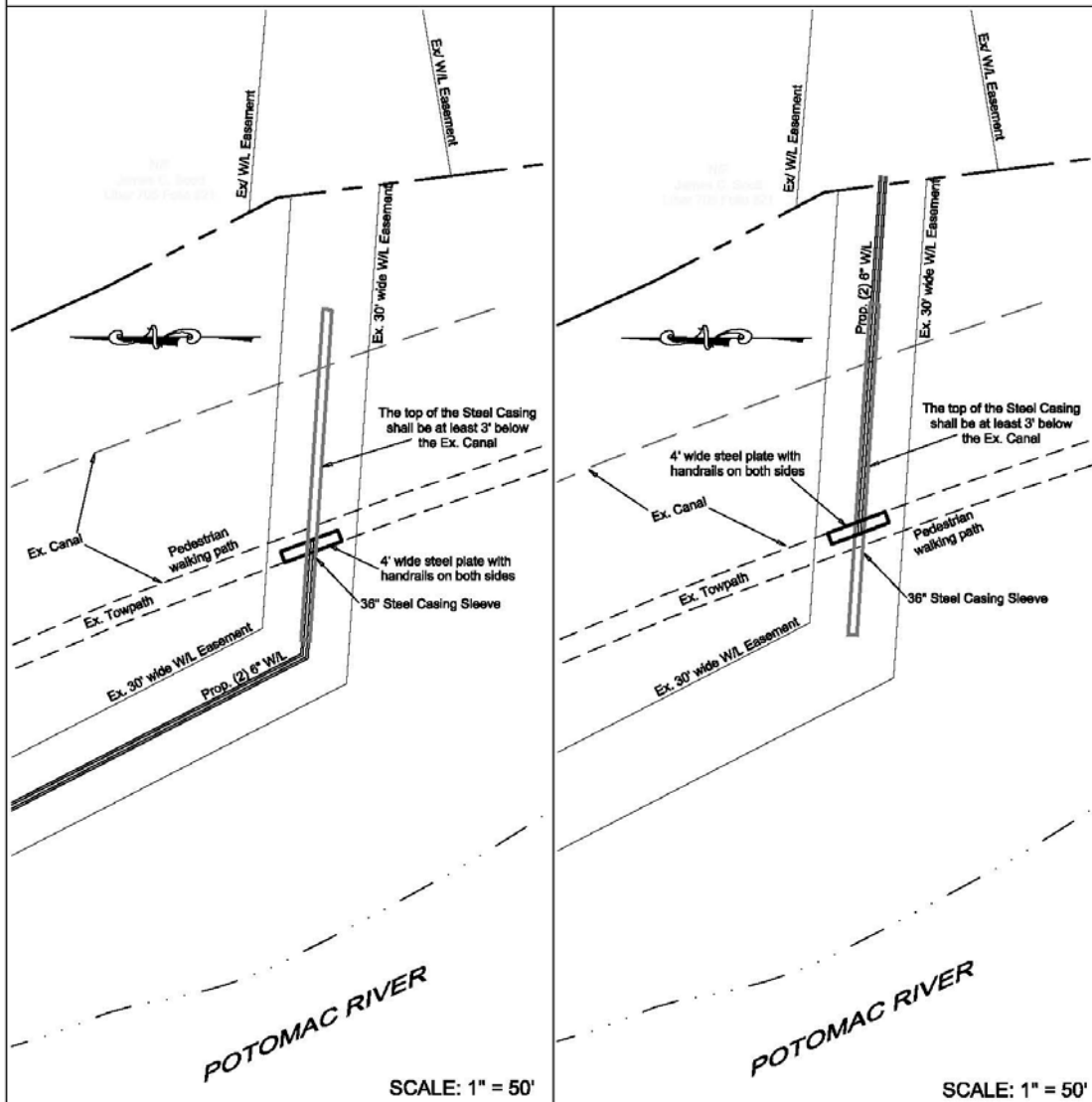


Figure 8: Open Trench Temporary Pedestrian Bypass.

Mitigative Measures of the Action Alternatives

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

Soils

- Ensure that an erosion and sediment control plan is completed and followed in accordance with the *Maryland Erosion and Sediment Control Guidelines for State and Federal Projects* to prevent, reduce, and control soil erosion and sedimentation during construction.
- Close open trenches in the event of any major storm event forecasted within 24 hours that could elevate Potomac River to 100-year floodplain stage.
- Reseed soils disturbed within the proposed construction area with NPS approved native vegetation seed mix to stabilize the soil, repair compaction, and/or improve soil productivity.
- Spill containment kits will be on site during construction. An emergency response plan will be developed.

Wetlands

- Return contours of the stream channel and canal prism to their former condition immediately upon installation of the new infrastructure.
- Install filter fabric on existing grade within the canal prism prior to placement of fill material for the cross-over dike. The filter fabric is a visual marker of the existing grade should any future work to the cross-over dike be necessary.
- Install adequately-sized culverts through the cross-over dike to allow for water flow within the canal prism.
- Reseed disturbed wetlands and cross-over dike with NPS approved native vegetation seed mix suitable for wetlands.
- Implement any additional mitigation measures determined during the Maryland Department of the Environment (MDE)/United States Army Corps of Engineers (USACE) permitting process.

Vegetation

- Follow NPS standards for tree impacts and mitigation, including all tree work to be done under the direction and general supervision of an Arborist certified by the International Society of Arboriculture (ISA) who possesses verifiable technical competence in tree physiology, identification, diagnosis of disorders, and current tree care and safety practices in accordance with accepted industry standards.
- All tree workers shall abide by any code of ethics or professional conduct established by the National Arborist Association and International Society of Arboriculture.
- All spray applications must be pre-approved by the Park Integrated Pest Management Coordinator. Park approved applications shall be under the direct supervision of a Certified Pesticide Applicator licensed to spray within the state of Maryland.
- All tree pruning and removal activities will be in accordance with the American National Standard for Tree Care Operations – “*Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices, ANSI A300 (Part 1) – 2000 Pruning*” and “*Pruning, Repairing,*

Maintaining and Removing Trees and Cutting Brush – Safety Requirements” – ANSI Z133.1.-2000.

- Follow NPS arborist standards for root pruning practices in an effort to protect root systems of trees adjacent to the existing easement. When tree root systems are to be impacted, practices for cleanly pruning the root systems of existing trees must be followed. Tree pruning standards will be provided by Park staff.
- Revegetate cleared portions of the easement using NPS approved native vegetation seed mix seed and ensuring that the seed mix properly germinates.
- County to routinely mow grassed easement areas to minimize or prevent the intrusion of invasive species onto Park property while easement is in use.
- Wash all construction equipment prior to entry onto NPS lands to reduce the risk for the spread/introduction of invasive plant species.
- Consultation with Park staff prior to placement of temporary water line to ensure no impacts to vegetation.

Wildlife

- Reduce risk for spread/introduction of invasive plant species into wildlife habitat by implementing appropriate mitigative measures identified for vegetation.
- Ensure preventative measures are taken to minimize potential for adverse impacts to aquatic wildlife from fuel leaks or spills. Remove all construction equipment from the 100-year floodplain in the event of any major storm event forecasted within 24 hours that could elevate to 100-year floodplain stage.
- No overnight parking of equipment within the 100 year floodplain.
- Tree removal will be undertaken outside of bird nesting season.

Historic Structures and Districts

- Minimize physical adverse impacts to the towpath from construction vehicles by limiting ingress and egress from construction areas and using a rubber tired backhoe loader and single axle dump truck, each with gross operating weights under 12 tons. Larger trackhoe used for trenching would be limited to crossing the towpath within limits of disturbance for original water line.
- Improve access to the APE for construction of Alternative C as well as for future maintenance of the waterline and pump station via an improved access road along the private property easement and the construction of a cross-over dike, which would be designed to blend in with the surrounding environment. The cross-over dike would be a grassed to minimize potential erosion and the road gated on the private property side to minimize unintended use. Project design would be reviewed for acceptable design/finish of the dike.
- Through consultation with the NPS and adhering to Secretary of Interior Standards for the Treatment of Historic Properties, repair any damage to the towpath resulting from construction or the movement of construction vehicles.
- Restore canal features in accordance with best practices of historic canal construction and restoration.
- If during construction, archeological resources are discovered, all work in the immediate vicinity of the discovery would be halted until the resources can be identified and documented and an appropriate mitigation strategy developed. If necessary, consultation with the Maryland Historic Preservation Officer, NPS, and/or the NPS Regional Archeologist will be coordinated to ensure that the protection of resources is addressed. In the unlikely event that human remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered during construction,

provisions outlined in the Native American Graves Protection and Repatriation Act (25 USC 3001) of 1990 would be followed.

Visitor Use and Experience

- Establish temporary pedestrian bypass during the period in which reconstruction activities are occurring within the towpath.
- Ensure that construction activities are avoided during periods of peak visitor use of the Park.
- Place signs at Lock 38 and between the project area and Snyder's Landing to notify park visitors of the construction work. The signs would remain until repairs finished.
- If steel plate is used to cover the temporary waterline at the towpath, ensure that edges of the steel plate are not an impediment to visitor travel.
- If earthen overburden is placed over the temporary bypass water line, grade overburden to provide a gradual slope up and over the water line to prevent disruption to passage by motorized vehicles, bicyclists, and pedestrians on the towpath.
- Restore towpath to NPS standards and approval.

Public Health and Safety

- Develop a safety plan to ensure the safety of park visitors, NPS personnel, and construction workers.
- Place signs at Lock 38 and between the repair area and Snyder's Landing to notify park visitors of the construction work. The signs would remain until construction is finished.
- Limit construction activities through or on either side of the towpath to those times of day least used by the public.
- Limit trenching through the towpath and installation of the steel casing sleeve under the towpath in a single construction episode between sunset and following morning sunrise, when the towpath would be closed to Park visitors, with backfilling of the trench expected to be completed by morning when the Park opens.
- Establish temporary pedestrian bypass during the period in which reconstruction activities are occurring within the towpath.
- Post project staff on the towpath to ensure safe visitor travel through the work zone during open park hours. Place battery-operated blinker barricades to warn visitors in the project area after hours.
- Use construction fencing or safety tape to demarcate limits of open-cut trenches within and adjacent to Park boundaries.
- Mark the temporary bypass water line location so that it is easily seen by park visitors.
- Keep people a safe distance away during any hydraulic hammering activities so they do not encounter flying debris.

Alternatives Considered but Dismissed

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

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

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

Based on the alternatives screening process and NPS NEPA regulations, the following alternatives were considered but dismissed for the listed reasons: Alternative B, Alternative C Construction Option 2, Alternative D, and Alternative E.

Alternative B (Figure 9) would consist of the abandonment of the existing easement and the construction of a new water supply pipeline and associated power line conduit within a new ROW. This alternative would run from the existing pump station perpendicular across the Park for approximately 200 feet before entering private property. General construction methodologies would include excavation of bore pits near the existing pump station and on the opposite side of the canal near the edge of the park property, use of the jack-and-bore construction technique to place pipeline and conduit underneath the canal prism and towpath, and open cut trenching from the bore pit to the water treatment facility and the construction of a new access road, the majority of which would occur on private property. Alternative B was dismissed from the full consideration as it would result in permanent impacts to rock outcrops associated with cultural resources within the Park that would be considered a significant adverse impact to park resources.

Alternative C, Construction Option 2 would be the same as Option 1, but rather than extending the open-cut trench through the towpath and canal prism, the jack-and-bore method would be used to place the 36-inch diameter steel casing sleeve underneath the towpath and canal prism (Figure 10). This would entail the excavation of two open pits, one between the towpath and the Potomac River near the existing water intake and one on the berm side of the canal. The pits required for the jack-and-bore option each would be approximately 30 feet wide and 35 feet long. The pit on the river side would also require fill be placed close to the river to create a level area for construction equipment. The pits would be excavated on Park lands outside the existing easement, as would the temporary fill required for construction equipment operation adjacent to the Potomac River. Option 2 would require additional temporary construction easement for two areas adjacent to the bore pits. These two areas would be located on Park lands outside the existing easement, and each would be approximately 30 feet wide by 35 feet long. If Option 2 were implemented, all areas outside of the limits of disturbance of the existing pipeline would require archeological survey/clearance in accordance with the Archaeological Resources Protection Act. Vegetation would be removed from these temporary construction easement areas, and the areas used for placement of excavated material during construction. Following construction, these temporary construction areas would be returned to original grade and revegetated using a native seed mix.

After crossing under the canal and towpath, the two water lines and conduit would be installed in an open-cut trench off Park lands up to the existing treatment plant. If rock were to be encountered during the open-cut trenching, it would be removed by hydraulic hammering. Work under Option 2 would also include construction of the cross-over dike (Figure 6) and upgraded electrical platform in common with Option 1.

In addition to the equipment identified under Option 1, Option 2 would also require a second trackhoe, a bore rig, and a service truck. The anticipated duration for the jack-and-bore construction under the towpath and canal prism would be approximately 15 days (3 weeks) during which this additional equipment would be in use on Park lands for this phase of the construction: 2 days for preparation work, 11 days for the jack-and-bore work, and 2 days for equipment break-down. Proposed construction durations are estimates only and may vary depending upon the conditions found during construction. The jack-and-bore construction would occur during daytime. Although the pits for the jack-and-bore work would be left open at night, orange fencing would be installed for the safety. The total elapsed time of construction within the Park and on private property is estimated at a total of 6 months. Construction time on Park property is estimated at 11 weeks, but the temporary bypass water line would be in place on Park property during the entire construction process until the new water pipeline is connected and functional. A temporary pedestrian bypass would not be required for Option 2.

Both construction options under Alternative C would result in construction of the permanent cross-over dike to improve access and eliminate travel by construction equipment and post-construction maintenance equipment on over one mile of towpath. Both construction options would result in construction of a new elevated electrical platform adjacent to the existing elevated electrical platform within the existing easement. Both construction options would result in use of a temporary bypass water line that would be installed in a shallow trench across the access lane to the intake structure and in a shallow trench across the towpath. A steel plate or earthen overburden would be placed over the temporary bypass water line. The overburden would be graded to provide a gradual slope up and over the water line to avoid impeding the passage of visitors and emergency vehicles on the towpath. The access lane and towpath would be restored to original contours following removal of the temporary bypass water line.

Remaining construction activities for Option 1 would occur within the existing easement; construction activities for Option 2 would require two additional 30-foot by 35-foot areas on Park lands be cleared of trees and other vegetation for equipment access and temporary storage of material excavated from the bore pits. Option 2 would also require temporary placement of fill adjacent to the Potomac River to provide a level area for safe equipment operation. Under Option 1, the open-cut trench through the canal prism and towpath would be in the location previously trenched for installation of the existing water line; under Option 2, the bore pits would be wider and larger than the area previously excavated for installation of the existing water line, increasing the potential need for hydraulic hammering or blasting to remove rock. Under Option 1, the open-cut trench is expected to be completed and back-filled in one event occurring overnight (from sunset to next morning sunrise) with final reconstruction of the towpath completed within 2 days; Option 2 would result in the pits being open for just over two weeks (including weekends) with total construction activity under the towpath and canal prism anticipated to last 3 weeks. Option 1 would result in total estimated construction duration of 8 weeks on Park property; Option 2 would result in estimated construction duration of 11 weeks on Park property, 3 weeks longer than Option 1. Proposed construction durations are estimates only and may vary depending upon the conditions found during construction. Option 2 would also require a second trackhoe, a bore rig, and a service truck in addition to the equipment required for Option 1.

In comparison to Construction Option 2, Construction Option 1 would minimize disturbance to previously undisturbed areas, minimize the time construction activities would be occurring within or adjacent to the towpath, minimize safety concerns from open excavations within or adjacent to the

towpath, and minimize safety concerns from construction equipment within or adjacent to the towpath. Construction Option 2 was dismissed from full analysis as it would result in larger adverse impact to Park resources compared to Construction Option 1 under Alternative C.

Alternative D would consist of tapping into the water system of an adjacent community and abandoning the existing pump station and water supply pipeline. It is not feasible to tie into the water supply system of adjacent communities, because adjacent communities are actually looking to potentially tie into the water supply system of the Town of Sharpsburg due to possible future shortfalls in their water supply systems. Alternative D was dismissed from the full consideration as it would not fit the purpose and need of the project.

Alternative E would consist of relocating the water intake further downstream to where the existing easement turns perpendicular to the Park. This would include construction of a new pump station, including the placement of new water intake structures, a new subsurface structure to hold the pump or pumps, and a new above-ground structure to hold electrical controls approximately 600 feet away from the already existing structures. This construction would necessitate the clearing of additional area within the Park, including construction occurring on the bank of the Potomac River. The location of Alternative E would place the new intake on the curve of the river which would make it more susceptible to debris and siltation issues than the current location. Alternative E was dismissed from the full analysis as it would not fit the purpose and need of the project and would result in larger adverse impacts to park resources.

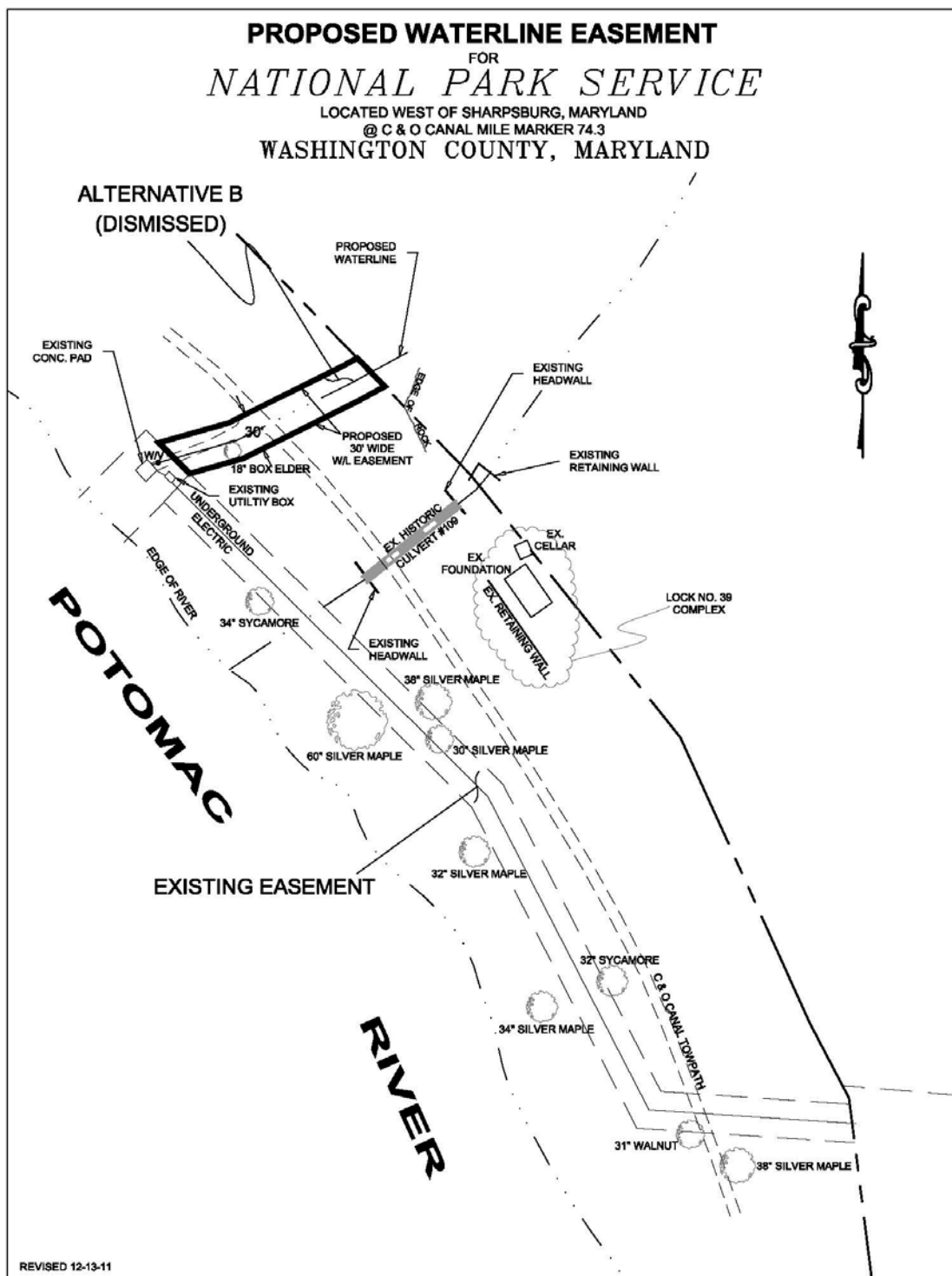


Figure 9: Alternative B (Dismissed).

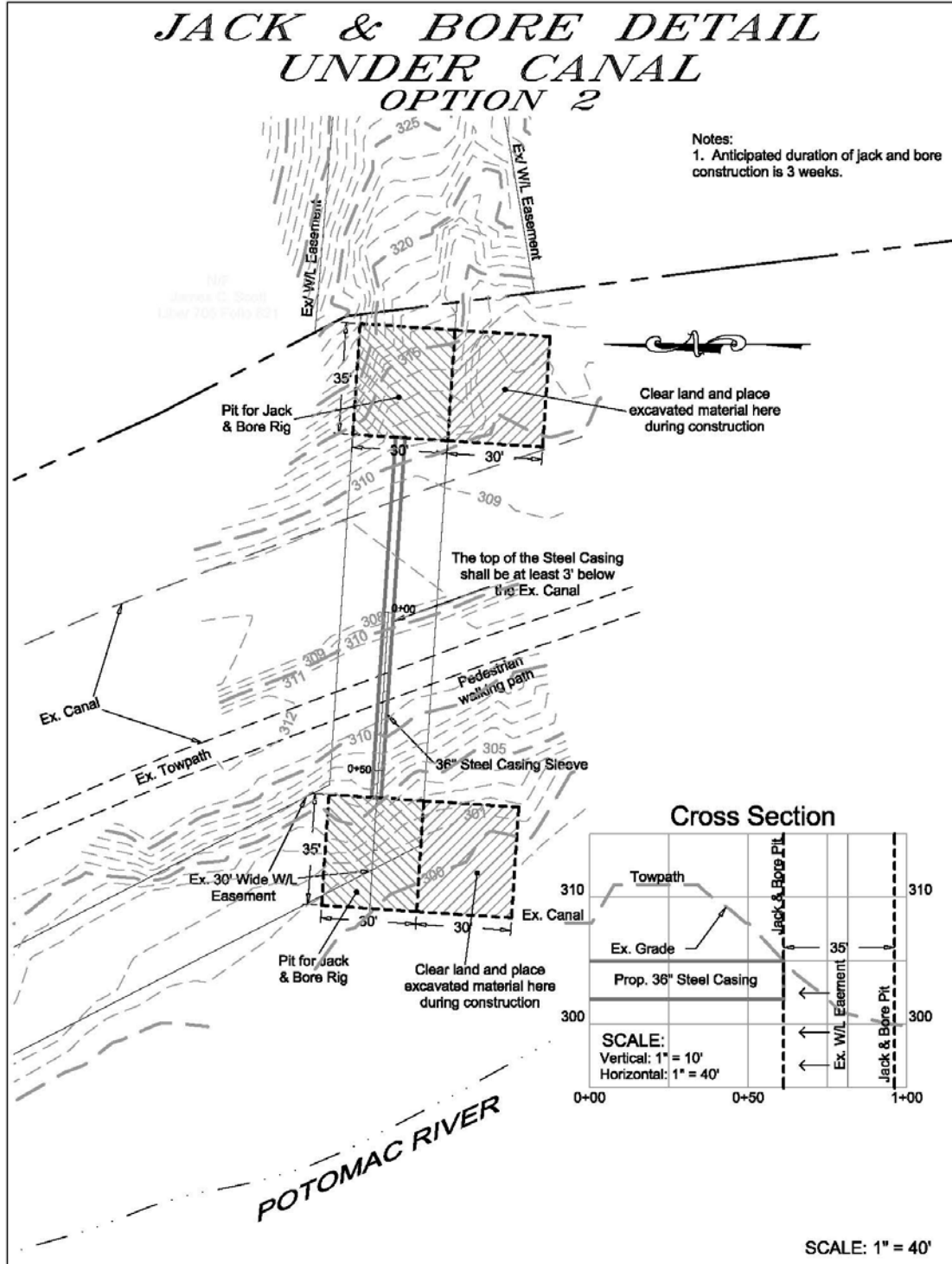


Figure 10: Alternative C, Construction Option 2 – Jack-and-Bore under Canal.

Environmentally Preferable Alternative

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

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 would 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 (NEPA, Section 101).

The NPS is required to identify the environmentally preferable alternative in its NEPA documents for public review and comment. The NPS, in accordance with the DOI policies contained in the Departmental Manual (516 DM 4.10) and the CEQ's *NEPA's Forty Most Asked Questions*, defines the environmentally preferable alternative (or alternatives) as the alternative that best promotes the national environmental policy expressed in NEPA (Section 101(b) (516 DM 4.10). In their *Forty Most Asked Questions*, CEQ further clarifies the identification of the environmentally preferable alternative, stating "Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources" (Q6a).

After completing the environmental analysis, the NPS identified Alternative C as the environmentally preferable alternative in this EA/AOE because it best meets the definition established by the CEQ. This alternative would cause the least amount of damage to the physical and biological environment while best protecting, preserving, and enhancing historic, cultural, and natural resources.

Alternative C is considered the environmentally preferable alternative, as it best meets the requirements of "achieving a balance between population and resource use that would permit high standards of living and a wide sharing of life's amenities". Alternative C would ensure the reliability of the water supply for the Town of Sharpsburg while minimizing adverse impacts to the human and natural environment. Because Construction Option 1 (open-cut trenching within previous limits of disturbance) would minimize disturbance to previously undisturbed areas, minimize the time construction activities would be occurring within or adjacent to the towpath, minimize safety concerns from open excavations within or adjacent to the towpath, and minimize safety concerns from construction equipment within or adjacent to the towpath, Option 1 is the preferred construction option. Construction Option 2 (jack-and-bore) was dismissed from full analysis as it would result in larger adverse impact to Park resources.

The no-action alternative, Alternative A, does not fit the definition of the environmentally preferable alternative. While on face value, the no-action alternative would not have any new impacts to natural or cultural resources of the Park, the current condition of the pipeline does not ensure that water supply to the Town of Sharpsburg would continue uninterrupted.

Table 1 summarizes the range of environmental consequences of Alternatives A and C in regards to the proposed action. Detailed explanations of the environmental consequences are discussed in the “Environmental Consequences” chapter.

Table 1 – Summary of Environmental Consequences

Impacted Resource	Alternative A - No Action	Alternative C - Existing Easement
Soils	<ul style="list-style-type: none"> No additional adverse or beneficial impacts under continued normal operations and maintenance. Adverse, local, short-term, minor impacts from excavation activities for emergency repairs that would be undertaken if existing water line fails. Adverse impacts would be mitigated. Adverse, short-term, minor cumulative impacts. 	<ul style="list-style-type: none"> Adverse, local, short-term, minor impacts during construction within limits of previous disturbance. Adverse, local, long-term, minor impacts from installation of new elevated electric platform pilings and construction of the permanent cross-over dike. Adverse impacts would be mitigated. Adverse, short-term and long-term, minor cumulative impacts.
Wetlands	<ul style="list-style-type: none"> No additional adverse or beneficial impacts under continued normal operations and maintenance. Adverse, local, short-term, negligible to minor impacts from emergency repair activities that would be undertaken if existing water line fails. Adverse impacts would be mitigated. Adverse, short-term, negligible to minor cumulative impacts. 	<ul style="list-style-type: none"> Adverse, local, short-term, minor impacts to intermittent stream and canal prism during construction within limits of previous disturbance. Adverse, local, long-term, minor impacts from construction of the permanent cross-over dike across the canal prism. Adverse impacts would be mitigated. Adverse, short-term minor and long-term moderate cumulative impacts.
Vegetation	<ul style="list-style-type: none"> Adverse, local, long-term, negligible impacts from removal of individual trees within existing easement to reduce risk of root damage to water line. Adverse, local, long-term, negligible impacts from emergency repair activities that would be undertaken if existing water line fails. Adverse impacts would be mitigated. Adverse, long-term, minor cumulative impacts. 	<ul style="list-style-type: none"> Adverse, local, long-term, minor impacts to vegetation due to clearing of 0.55 acre of trees and woody vegetation that has grown up within the easement, and clearing of 0.11 acre of vegetation within the proposed new easement for the permanent cross-over dike. Adverse impacts would be mitigated. Adverse, long-term, minor cumulative impacts.
Wildlife	<ul style="list-style-type: none"> No additional adverse or beneficial impacts under continued normal operations and maintenance. Adverse, local, long-term, negligible impacts to wildlife habitat from removal of individual trees within existing easement to reduce risk of root damage to water line. Adverse, local, short-term, negligible impacts from emergency repair activities that would be undertaken if existing water line fails. Adverse impacts would be mitigated. Adverse, short-term and long-term, minor cumulative impacts. 	<ul style="list-style-type: none"> Adverse, local, short-term, minor impacts by temporary displacement of wildlife during construction. Adverse, local, long-term, minor impacts to wildlife habitat due to clearing of 0.55 acre of trees and woody vegetation that has grown up within the easement, and clearing of 0.11 acre of vegetation within the proposed new easement for the permanent cross-over dike. Maintenance of native grasses within the easement would provide foraging opportunities for herbivorous wildlife. Adverse impacts would be mitigated. Adverse, short-term and long-term, minor cumulative impacts.

Impacted Resource	Alternative A - No Action	Alternative C - Existing Easement
Historic Structures and Districts	<ul style="list-style-type: none"> No additional adverse or beneficial impacts under continued normal operations and maintenance. Adverse, local, short-term, negligible to minor impacts from emergency repair activities that would be undertaken if existing water line fails; negligible or minor depends on where the failure and resulting repairs would occur. Adverse impacts would be mitigated. Adverse, short-term, minor cumulative impacts. <p><i>No adverse effect</i></p>	<ul style="list-style-type: none"> Adverse, local, short-term, minor impacts to towpath and canal prism from trenching for installation of new water lines and conduit within limits of previous disturbance within easement. Adverse, local, long-term, minor impacts to canal prism from construction of permanent cross-over dike. Adverse, local, short-term, minor impacts to towpath from construction equipment passage. Beneficial, local, long-term, minor impacts to towpath by elimination of County maintenance vehicle use of one mile of towpath. Adverse, local, short-term, minor impacts to towpath from temporary bypass water line crossing. Adverse, local, long-term, negligible impacts to visual conditions from construction of new elevated electrical platform and removal of existing platform. Adverse, local, long-term, minor impacts to visual conditions from clearing of easement. Adverse impacts would be mitigated Adverse, short-term and long-term, minor cumulative impacts. <p><i>No adverse effect</i></p>
Visitor Use and Experience	<ul style="list-style-type: none"> No additional adverse or beneficial impacts under continued normal operations and maintenance. Adverse, local, short-term, minor impacts from emergency repair activities that would be undertaken if existing water line fails. Adverse impacts would be mitigated. Adverse, short-term, minor cumulative impacts. 	<ul style="list-style-type: none"> Adverse, local, short-term, minor impacts during construction. Adverse, local, long-term, minor impacts from visual changes in easement following construction. Adverse impacts would be mitigated Adverse, short-term and long-term, minor cumulative impacts.
Public Health and Safety	<ul style="list-style-type: none"> No additional adverse or beneficial impacts under continued normal operations and maintenance. Adverse, local, short-term, negligible impacts to public safety from emergency repair activities that would be undertaken if existing water line fails. Adverse impacts would be mitigated. Adverse, short-term, negligible cumulative impacts. 	<ul style="list-style-type: none"> Adverse, local, short-term, minor impacts to public safety during construction. No adverse long-term impacts. Adverse impacts would be mitigated. Adverse, short-term, minor cumulative impacts to public safety.

AFFECTED ENVIRONMENT

This chapter describes the existing environmental conditions in the areas that could be potentially affected by the proposed action alternatives. The following resource topics are described: soils; wetlands; vegetation; wildlife; historic structures and districts; visitor use and experience; and public health and safety. The potential impacts to each resource topic are discussed in the chapter on “Environmental Consequences.”

Soils

The Soil Survey of Washington County, Maryland (NRCS 2001) depicts two soil mapping units in the project study area: Combs fine sandy loam (Co) and Opequon-Rock outcrop complex, 25 to 65 percent slopes (OrF). Combs fine sandy loam occurs along both sides of the towpath within the floodplain of the Potomac River. The soil map unit consists of deep, well drained soils with moderate permeability. These soils occur on floodplains and low stream terraces and floodplains formed in loamy alluvium derived from limestone, sandstone, and shale. Opequon-Rock outcrop complex occurs within the eastern portion of the project area. This soil map unit consists of shallow, well-drained soils with moderately slow permeability. These soils occur on uplands and are formed in clayey residuum weathered from limestone (NRCS 2001).

Soils in the direct project study area, the existing easement, have been disturbed by the prior construction of the current water pipeline. Excavation activities for installation of the existing water pipeline would have altered the original soil profile and resulted in a mixing of soil horizons within the back-filled trench.

Wetlands

The NPS defines wetlands based the USFWS *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin *et al.* 1979). Based on this classification system, a wetland must have one or more of the following attributes:

- The habitat at least periodically supports predominately hydrophytic vegetation;
- The substrate is predominately undrained hydric soil; and/or
- The substrate is nonsoil and saturated with water, or is covered by shallow water at some time during the growing season.

In 1977, President Carter issued Executive Order 11990: *Protection of Wetlands*. In response to this Executive Order, the NPS issued Director’s Order 77-1: *Wetland Protection* (NPS 2008). Director’s Order 77-1 instructed the NPS to use the USFWS definition and methodology as the standard for identifying, classifying, and taking inventory of wetlands when NPS actions have the potential to adversely impact wetlands. The NPS must also comply with Section 404 of the Clean Water Act when those actions involve the discharge of dredged or fill materials in wetlands or other “Waters of the United States”. As required by Director’s Order 77-1, NPS must avoid adverse impacts on wetlands to the extent practicable, must minimize any adverse impacts that could not be avoided, and must compensate for any remaining unavoidable adverse impacts on wetlands (NPS 2008).

A wetland assessment of the proposed Sharpsburg Water Intake Upgrade was conducted by Frederick, Seibert and Associates, Inc. (FSA) in October 2009 using the criteria from the USACE manual and Cowardin *et al.* (1979). The FSA wetland investigation determined that there is one intermittent stream channel within the project study area for Alternative C. This channel is classified as a riverine, intermittent stream according to USACE criteria and is considered a wetland by the NPS. The crossing of

the stream by Alternative C may require Section 404 permits. According to 33 CFR 329.9(a), the prism of the C&O Canal is considered a navigable water of the United States, as it was once navigable in its improved state prior to its abandonment. Alternative C crosses the prism of the C&O Canal and may require Section 404 permits for the crossing. A wetlands report was submitted by FSA to NPS in June 2010 and can be found as Appendix B.

Vegetation

The proposed Washington County Water Intakes Upgrade project is located immediately adjacent to the Potomac River. As a result, the natural vegetation in this area resembles that of a Piedmont/ Central Appalachian Rich Floodplain Forest. Historically, this area has experienced various agricultural and silvicultural land uses. The maturing floodplain forest that is currently present next to the Potomac River extends approximately 500-1,000 feet from the riverbank. Beyond this buffer, a rural, agricultural community is present outside of the Town of Sharpsburg.

Piedmont/Central Appalachian Rich Floodplain Forests typically develop in low terraces of major Mid-Atlantic rivers. Canopy vegetation within the project area is dominated by sycamore (*Platanus occidentalis*), green ash (*Fraxinus pennsylvanica*), American beech (*Fagus grandifolia*), box elder (*Acer negundo*), and silver maple (*Acer saccharinum*). The understory consists primarily of box elder, paw paw (*Asimina triloba*), and spicebush (*Lindera benzoin*).

Multiflora rose (*Rosa multiflora*), an invasive species, is also present in a small portion of the project area. Invasive species such as multiflora rose, tree of heaven (*Ailanthus altissima*), and Japanese stilt grass (*Microstegium vimineum*), are common within the Park.

A forest stand delineation of the proposed Sharpsburg Water Intake Upgrade was conducted by FSA in October 2009. The FSA forest stand delineation identified nine specimen trees within and immediately adjacent to the project study area for Alternative C. One specimen tree, a 30-inch diameter breast height (DBH) silver maple, was identified within the existing easement. The eight trees identified immediately adjacent to the existing easement include: a 34-inch DBH sycamore, a 60-inch DBH silver maple, a 38-inch DBH silver maple, a 32-inch DBH silver maple, a 32-inch DBH sycamore, a 34-inch DBH silver maple, a 31-inch DBH black walnut (*Juglans nigra*), and a 38-inch DBH silver maple. The locations of these trees are depicted on Figure 4. The report was submitted by FSA to NPS and can be found as Appendix C.

Wildlife

The proposed Sharpsburg Water Intake Upgrade project is located entirely within a terrestrial forest habitat. The Potomac River and portions of the Park outside of the proposed waterline corridor do provide aquatic habitat, but these areas would not be included in the project area. The prism of the C&O Canal within the project area is a wetland according to 33 CFR 329.9(a); it is considered a navigable water of the United States, as it was once navigable in its improved state prior to its abandonment. As it pertains to the presence of wildlife habitat, the historic siltation that has now stabilized and vegetated has eliminated open-water habitat and prevents the canal from providing habitat conditions necessary for aquatic wildlife. However, ephemeral surface water in the wetland may still provide habitat for some semi-aquatic wildlife species.

Terrestrial wildlife observed within the project area include white-tailed deer (*Odocoileus virginianus*), gray squirrel (*Sciurus carolinensis*), and eastern cottontail (*Sylvilagus floridanus*). Other common mammals in the area are red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*), raccoon (*Procyon lotor*), fox squirrel (*Sciurus niger*), white-footed mouse (*Peromyscus leucopus*), and eastern mole

(*Scalopus aquaticus*). Bird species including wild turkey (*Meleagris gallopavo*) and various songbird species were observed in the project area.

Historic Structures and Districts

Cultural resources can include prehistoric and historic archeological sites, historic structures and historic districts, cultural landscapes, ethnographic resources, and museum objects. Section 106 of the NHPA requires that federal agencies take into account the effect of federal undertakings on significant cultural resources. A significant cultural resource is one that is listed in, or eligible for listing in, the National Register.

The C&O Canal is located within the APE of the proposed action. It is listed in the National Register as an historic district. Information on the C&O Canal in general can be found on the 1979 National Register Nomination Form (Romigh and Mackintosh 1979). Additionally, specific structures within the Park, such as locks, bridges, and culverts, have been documented following Historic American Building Survey/Historic American Engineering Record (HABS/HAER) standards. Information on individual structures can be found in the HABS/HAER files. The NPS also maintains the List of Classified Structures (LCS) database. This contains an inventory of historic sites found within the Park, most of which have not been documented to HABS/HAER standards.

A number of historic structures associated with the C&O Canal can be found in the vicinity of the project area (Table 2), detailed in the NRHP Nomination Form (Romigh and Mackintosh 1979) and in the LCS database. A complex of historic structures and features associated with a canal lock are located at or in close proximity to Mile 74. These include Lock 39, a Bypass Flume, and a Section House/Lockhouse, as well as Culvert 108 (Mile 74.04), a wastew weir (Mile 74.07). A summary of structures from Mile 72.55 downstream of the project area to MM 76.65 upstream of the project area is presented in Table 2. The following discussion focuses only on those structures in the immediate vicinity of the project area.

Table 2 – C&O Canal and Related Structures in Vicinity of Project Area

Structure Name	LCS No.	Location	General Description
Shepherdstown River Lock	11701	Mile 72.55	<i>Circa (Ca.)</i> 1834 lock structure
Mule Bridge Abutments	11702	Mile 72.55A	<i>Ca.</i> 1834 abutments for mule bridge
Shenandoah Valley RR Bridge Pier #1	47512	Mile 72.63A	<i>Ca.</i> 1880 pier of railroad bridge
Shenandoah Valley RR Bridge Pier #2	47520	Mile 72.63B	<i>Ca.</i> 1880 pier of railroad bridge
John Blackford Property	17216	Mile 72.77B	<i>Ca.</i> 1800 house
John Blackford Property	47511	Mile 72.77C	<i>Ca.</i> 1800 root cellar
Franklin Blackford Property	17215	Mile 72.77D	<i>Ca.</i> 1835 store
Urias Knode House	17214	Mile 72.77K	<i>Ca.</i> 1867-1877 house
Shepherdstown Lock (Lock 38)	11703	Mile 72.80	<i>Ca.</i> 1833 lock structure
Ferry House	11787	Mile 72.80A	<i>Ca.</i> 1770 ferry house and tavern
Bypass Flume – Lock 38	11786	Mile 72.81	<i>Ca.</i> 1834 flume
Bridge Abutments – Lock 38	11704	Mile 72.81A	<i>Ca.</i> 1850-1950 abutments for bridge
Bridge Abutment 2 – Lock 38	47541	Mile 72.81B	<i>Ca.</i> 1850-1936 abutments for bridge
Ferry Hill Plantation House	11789	Mile 73.02	<i>Ca.</i> 1812 house
Culvert 107	12873	Mile 73.46	<i>Ca.</i> 1834 culvert
Bypass Flume – Lock 39	12874	Mile 74.02	<i>Ca.</i> 1890 flume
Nithce's Lock (Lock 39)	17231	Mile 74.03	<i>Ca.</i> 1834 lock structure
Section House	11788	Mile 74.03A	Foundation remains from house

Structure Name	LCS No.	Location	General Description
Lockhouse – Lock 39	45872	Mile 74.03B	<i>Ca.</i> 1835 house
Culvert 108	11816	Mile. 74.04	<i>Ca.</i> 1834 culvert
Wasteweir	11817	Mile 74.07	<i>Ca.</i> 1900 weir
Canal Company Section House	47522	Mile 74.26	<i>Ca.</i> 1828-1850 house
Culvert 109	11818	Mile 74.28	<i>Ca.</i> 1834 culvert
Sediment Entrapment Wall at Culvert 109	47527	Mile 74.29	<i>Ca.</i> 1834 culvert wall
Sharpsburg Landing Bridge	11790	Mile 76.06	<i>Ca.</i> 1880 bridge foundation
Culvert 111	11819	Mile 76.65	<i>Ca.</i> 1834 culvert

Lock 39 was completed in 1834. It is built of sandstone with standard dimensions. Due to the narrowness of the floodplain at this location, the canal is narrow, at 30 feet wide, and the towpath is of a minimal width. The lock includes gate pocket walls and a retaining wall. Due to the lack of a solid bedrock foundation, the walls were placed on wooden foundation beams, which have rotted and are causing movement and subsidence. The bypass flume consists of a concrete culvert built around 1890. Originally a 1-1/2-story building, the section house and lockhouse remains consist only of a stone foundation (Figure 11a).

Approximately 200 feet upstream of Lock 39 is Culvert 108 (Figure 11b). Built around 1834 in a small, ephemeral drainage, it consists of rough cut sandstone and was built, in part, into a natural outcropping of bedrock. The wasteweir is a concrete structure that was built sometime after 1900.

The remains of a Section House and Culvert 109 (Figure 11c) are located upstream of the project area at Mile 74.26 and Mile 74.28, respectively. The house dates to around 1828-1850, while the culvert was built around 1834 and consists of an arch of sandstone. Approximately 20 feet north and upstream along the ephemeral, unnamed drainage is a stone retaining wall. This wall was constructed to collect sediment to prevent it from filling in the culvert.

Downstream of the project area, at Mile 73.02, is the Ferry Hill Plantation House, which was built in 1812. It was originally built by Henry Thomas Swearingen, who sold it John Blackford in 1816. This building was adapted for use as the park headquarters, which have been moved to Hagerstown, Maryland.

Apart from those structures described above, the main structures within the project area are the canal prism and towpath. Typically, the towpath is 12 feet wide at its top, which sits approximately 8 feet above the base of the canal prism and 2 feet above the water. The canal prism in the stretch from Harpers Ferry to Cumberland typically has a 32-foot wide base and a 50-foot wide top dimension between the towpath and the opposite edge. Clay lined the bottom of the canal to prevent, or at least inhibit, the drainage of water out of the canal.

While not listed in the LCS database as a recorded historic structure within the NPS, an historic roadway is present in the vicinity of Mile 74. Now abandoned, it runs from near the section house at Lock 39 northeast out of the Park onto private property. This road connected the C&O Canal and the towpath with an unimproved road that ran northeast-southwest from the Shepherdstown Pike. The road is visible on the 1916 Martinsburg, WV 15-minute USGS quadrangle map.

The location of this roadway as well as that of the section house was partially dictated by the presence of outcroppings of the underlying Conococheague Limestone on the berm side of the canal. These outcroppings served as constraints on the development of the area, limiting the amount of land available

for construction, and as such, can be considered cultural features as well as natural features (NPS Field Trip Report, 29 July 2010).

The portion of the Park that runs through the project study area is forested on either side of the towpath, within the floodplain of the Potomac River as well as on the scarp and bluffs overlooking the canal, which rise over 100 feet above the floodplain in some locations. The forest and the bluffs are prominent natural features seen by visitors to this location of the Park. Although the C&O Canal parallels the Potomac River, the view of the river is partially obscured by vegetation from the towpath during much of the year.

A cultural landscape is defined by the NPS as a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values (Birnbaum 1994). Although there are 17 cultural landscapes identified within the Park (NPS Personal Communication May 2011), the area along the length of the canal within the project study area is not considered itself a cultural landscape. Rather, the project study area is a generic representative of the landscape seen along much of the length of the canal.



Figure 11a: Historic Features in Vicinity of Project Area - Structures at Lock 39.



Figure 11b: Historic Features in Vicinity of Project Area - Culvert 108.



Figure 11c: Historic Features in Vicinity of Project Area - Culvert 109.
(NPS 2012)

Visitor Use and Experience

The Park was visited by approximately 3 million people in 2008 (NPS 2008c). The Park provides a wide range of recreational and educational opportunities, including hiking and biking trails, parking lots, boat ramps, campgrounds, picnic areas, and interpretive centers. Typically, upwards of 70 percent of park use occurs between the months of April and October, the period of warmest weather and longest days.

The section of the Park within and adjacent to the project area is within a fairly rural section of Washington County, Maryland. This area is forested on either side of the towpath, within the floodplain of the Potomac River as well as on the scarp and bluffs overlooking the canal, which rise over 100 feet above the floodplain in some locations. The forest and the bluffs are prominent natural features seen by visitors to this location of the Park. Although the C&O Canal parallels the Potomac River, the view of the river is partially obscured by vegetation from the towpath during much of the year.

There is little residential or industrial occupation within a 1-mile radius of the project area, though moderately dense residential occupation is found just beyond a 1-mile radius from the project area. Due to the low density of occupation in close proximity to the project area, and the fact that the project area is surrounded by forest and that the C&O Canal is situated approximately 100-200 vertical feet below the upland areas where residential and industrial occupation occur outside the 1-mile radius, the soundscape of project area consists of ambient natural noises, the sounds of occasional boat traffic on the river, and the sounds of pedestrian, bicycle, and horse traffic on the towpath.

Pedestrian access points to this section of the canal are found downstream at Lock 38 and upstream at Snyder's Landing. The critical characteristics of the desired visitor experience in the area including finding solitude in a natural setting and interpreting the history of the C&O Canal (NPS 1976). The main activities engaged in by visitors in this section of the park include hiking, biking, and horse riding along the towpath and fishing and boating in the Potomac River.

Public Health and Safety

The Park is responsible for maintaining safe conditions for the health and protection of Park visitors and its employees. This includes providing safe facilities, utilities, and grounds within the Park. Within the project area, visitor use is confined to the towpath and typically consists of hiking, biking, and horse riding and safe conditions must be maintained for use of the towpath by visitors and Park employees. No public health issues have been identified for the proposed project. No long-term public safety issues have been identified, but public safety during construction activities is further reviewed in this document.

ENVIRONMENTAL CONSEQUENCES

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

General Methodology for Establishing Impact Thresholds and Measuring Effects by Resource

The following elements were used in the general approach for establishing impact thresholds and measuring the effects of the alternatives on each resource category:

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

These elements are described in the following sections.

GENERAL ANALYSIS METHODS

The analysis of impacts follows CEQ guidelines and Director’s Order 12 procedures (NPS 2001) and is based on the underlying goal of providing for the long-term protection and conservation of the natural physical landscape and cultural resources as well as maintenance of the visitor experience within this portion of the Park. This analysis incorporates the best available scientific literature applicable to the region and setting, the resources being evaluated, and the actions being considered in the alternatives.

The NPS created an interdisciplinary team to provide important input to the impact analysis. For each resource topic addressed in this chapter, the applicable analysis methods are discussed, including assumptions and impact intensity thresholds.

ASSUMPTIONS

Several guiding assumptions were made to provide context for this analysis. These assumptions are described below.

Geographic Area Evaluated for Impacts (Area of Analysis) – The geographic study area (or area of analysis) for the proposed Sharpsburg Water Intake Upgrade generally consists of the existing easement

across NPS lands and areas adjacent to the easement. The existing easement, as described in the 1976 perpetual easement (Appendix E) is 30 feet wide for 805 feet of its length, and 50 feet wide for the remaining 60 feet of its length adjacent to the east bank of the Potomac River. The study area for certain impact topics was also expanded to include those areas of both the Park and adjacent private property visible from the towpath in the immediate vicinity of the easement and the water pipeline route that runs through private property to the water treatment plant. The area of analysis may extend beyond farther for some cumulative impact assessments. The specific area for each impact topic is defined at the beginning of each topic discussion.

IMPACT THRESHOLDS

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

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

- **Beneficial:** A positive change in the condition or appearance of the resource or a change that moves the resource toward a desired condition.
- **Adverse:** A change that declines, degrades, and/or moves the resource away from a desired condition or detracts from its appearance or condition.
- **Context:** Context is the affected environment within which an impact would occur, such as local, park-wide, regional, global, affected interests, society as whole, or any combination of these. Context is variable and depends on the circumstances involved with each impact topic. As such, the impact analysis determines the context, not vice versa.
- **Duration:** The duration of the impact is described as short-term or long-term. Duration is variable with each impact topic; therefore, definitions related to each impact topic are provided in the specific impact analysis narrative.
- **Intensity:** Because definitions of impact intensity (negligible, minor, moderate, and major) vary by impact topic, intensity definitions are provided separately for each impact topic analyzed.

CUMULATIVE IMPACTS ANALYSIS METHOD

The CEQ regulations to implement NEPA require the assessment of cumulative impacts in the decision making process for federal projects. Cumulative impacts are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions” (40 CFR 1508.7). As stated in the CEQ handbook, “*Considering Cumulative Effects*” (CEQ 1997), cumulative impacts need to be analyzed in terms of the specific resource, ecosystem, and human community being affected and should focus on effects that are truly meaningful. Cumulative impacts are considered for all alternatives, including the no action alternative.

Cumulative impacts were determined by combining the impacts of the alternative being considered with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other ongoing or reasonably foreseeable future projects and plans at the C& O Canal and, if applicable, the surrounding area. Table 3 summarizes these actions that could affect the various resources at the park, along with the plans and policies of both the park and surrounding jurisdictions, which were discussed in the “Purpose and Need” chapter. Additional explanation for most of these actions is provided in the narrative following the table.

The analysis of cumulative impacts was accomplished using four steps:

- *Step 1* — Identify Resources Affected - Fully identify resources affected by any of the alternatives. These include the resources addressed as impact topics in the “Affected Environment” and “Environmental Consequences” chapters of the document.
- *Step 2* — Set Boundaries - Identify an appropriate spatial and temporal boundary for each resource.
- *Step 3* — Identify Cumulative Action Scenario - Determine which past, present, and reasonably foreseeable future actions to include with each resource. These are listed in Table 3 and described below.
- *Step 4* — Cumulative Impact Analysis - Summarize impacts of these other actions (x) plus impacts of the proposed action (y), to arrive at the total cumulative impact (z). This analysis is included for each resource in the “Environmental Consequences” chapter.

The following past, present, and reasonably foreseeable future actions at the Park or surrounding area have been identified as having the potential to impact the resources evaluated in this EA:

- **New Design Raw Water Main and McKinney Treated Effluent Outfall (Mile 44)** (NPS 2006d) – This project is completed, so it is a past action. This project was a raw water line upgrade for Frederick County from their Potomac River Intake (Mile 44) to the treatment plant on New Design Road. All work was below grade with installation of new conduits and an electric duct bank. The work was primarily within the existing ROW, with the exception of a short new alignment to cross under CSX railroad.
- **Point of Rocks Boat Ramp (Mile 48)** (NPS 2005) – This project recently completed construction and is a past action. This project replaced an inadequate boat ramp facility at Point of Rocks, MD with a larger Potomac River boat ramp facility. The new facility is several hundred yards downstream of the previous location. The completed project provides a more user friendly ramp with expanded, formalized parking. Parking serves the boat ramp and the general park visitor.
- **Rehabilitate, Reconstruct, and Stabilize Big Slackwater Historic Stone Wall and Towpath (Mile 84-88)** (NPS 2009a) – This project is a current action with expected completion Summer 2012. The Park is rebuilding the towpath along the backwaters of Dam #4 (historic canal supply impoundment). The work is undertaking a sustainable design to enable the towpath structure to withstand the river dynamics. The towpath is along the historic alignment.

- **Restoration of Canal Operations at Williamsport, Maryland EA - (Mile 98-100)** (NPS 2011) – Project compliance was recently completed and actual physical work is pending. This project would expand the existing rewatered segment of the canal between Mile 98.6 and 99.95. This project is looking at preservation of numerous historic structures within the project area and development of a more complete interpretive program to enable visitors to experience how the canal operated.
- **Eelways at Dams #4 and 5 - (Mile 84 and 106)** (NPS 2009b) – This project has completed the EA process and awaits funding for implementation. The project would build eelway structures at each historic dam to convey the American eel upstream to historic habitat. U.S. Fish and Wildlife Service will be lead for the implementation.

Table 3 – Cumulative Impact Scenario Table.

Impact Topic	Study Area	Past Actions	Present Actions	Future Actions
Soils	Chesapeake & Ohio Canal NHP	<ul style="list-style-type: none"> • New Design Raw Water upgrades • Point of Rocks Boat Ramp 	<ul style="list-style-type: none"> • Big Slackwater 	<ul style="list-style-type: none"> • Canal Operations at Williamsport • Eelways at Dams 4 and 5
Wetlands	Chesapeake & Ohio Canal NHP	<ul style="list-style-type: none"> • Point of Rocks Boat Ramp 	<ul style="list-style-type: none"> • Big Slackwater 	<ul style="list-style-type: none"> • Canal Operations at Williamsport • Eelways at Dams 4 and 5
Vegetation	Chesapeake & Ohio Canal NHP	<ul style="list-style-type: none"> • New Design Raw Water upgrades • Point of Rocks Boat Ramp 	<ul style="list-style-type: none"> • Big Slackwater 	<ul style="list-style-type: none"> • Eelways at Dams 4 and 5
Wildlife	Chesapeake & Ohio Canal NHP	<ul style="list-style-type: none"> • New Design Raw Water upgrades • Point of Rocks Boat Ramp 	<ul style="list-style-type: none"> • Big Slackwater 	<ul style="list-style-type: none"> • Eelways at Dams 4 and 5
Historic Structures and Districts	Chesapeake & Ohio Canal NHP	<ul style="list-style-type: none"> • Point of Rocks Boat Ramp 	<ul style="list-style-type: none"> • Big Slackwater 	<ul style="list-style-type: none"> • Canal Operations at Williamsport • Eelways at Dams 4 and 5
Visitor Use and Experience	Chesapeake & Ohio Canal NHP	<ul style="list-style-type: none"> • New Design Raw Water upgrades • Point of Rocks Boat Ramp 	<ul style="list-style-type: none"> • Big Slackwater 	<ul style="list-style-type: none"> • Canal Operations at Williamsport • Eelways at Dams 4 and 5
Public Health and Safety	Chesapeake & Ohio Canal NHP	<ul style="list-style-type: none"> • Point of Rocks Boat Ramp 	<ul style="list-style-type: none"> • none 	<ul style="list-style-type: none"> • Eelways at Dams 4 and 5

Soils

METHODOLOGY AND ASSUMPTIONS

Potential impacts were assessed based on the potential extent of disturbance resulting from an action alternative, including natural undisturbed soils, exposed bedrock outcroppings, the potential for soil erosion, and limitations posed by soils and/or underlying bedrock. The analysis of possible impacts was based on on-site inspection of the project area, a review of existing maps and literature, information provided by the NPS, and professional judgment.

STUDY AREA

The geographic extent of the study area for soil resources includes the existing easement within and immediately adjacent to the boundaries of the Park as well as any associated areas that would be temporarily used as construction staging areas for equipment and supplies. It is expected that construction activities would not occur outside of these areas. The study area for cumulative analysis includes the project area in the Park and adjacent areas around the project area.

IMPACT THRESHOLDS

Negligible: Impacts to soils would be barely detectable or not detectable at all. Impacts would be slight.

Minor: Impacts to soils would be detectable. Impacts in undisturbed areas would be of a limited areal extent. If any mitigation were necessary to offset adverse effects, it would be simple and likely successful.

Moderate: Impacts to soils would be readily apparent and result in changes to geology or soil over a relatively large areal extent. Mitigation measures would be necessary to offset adverse effects and would be extensive and likely successful.

Major: Impacts to soils would be readily apparent and result in significant changes to geology and soil over a large areal extent inside or outside the boundaries of the park. Mitigation measures would be necessary to offset adverse impacts. These measures would be extensive, and their success would not be guaranteed.

Duration: Short-term impacts would be those occurring during all or part of the implementation of an alternative or within a year. Long-term impacts would extend beyond the implementation of an alternative or more than one year.

IMPACTS OF NO ACTION ALTERNATIVE

Analysis. Alternative A is the no-action alternative, and as such, represents a continuance of current conditions in the project study area. There would be no excavation of soil, bedrock, or removal of vegetation as a result of this alternative, or any modification to soils unless emergency repairs are required.

The existing water pipeline is leaking, and according to the County, the leak appears to be located within the boundaries of the Park. If the existing water pipeline continues leaking, but does not fail, no additional adverse or beneficial impacts would occur under continued normal operations and maintenance.

If the existing water pipeline were to fail inside or upslope from the Park boundaries, as the County has stated that the pump supplying the waterline could be shut off within five minutes of an identified failure, the result would likely be local, temporary flooding and erosion of soil within and adjacent to the project study area. The magnitude of such adverse impacts would be local, short-term, and minor. According to the County, the possible location of any failure cannot be identified, though it would most likely occur between the location of the leak and the WTP. The duration of the adverse impacts is short-term as the County would quickly undertake appropriate measures to rectify the emergency situation as allowed under the 1976 perpetual easement. The level of the adverse impacts is minor as it would be confined to an area immediately surrounding the location of the pipeline and repair work would occur within the previous limits of disturbance. The County may utilize the towpath for vehicular access for emergency repairs. Any damage caused to Park property would be promptly repaired and/or restored by the County.

Any such repair work would be accomplished subject to general supervision by the NPS. Pre-failure contours and elevations would be re-established and the soils stabilized with NPS approved native vegetation seed mix and thus the riparian buffer function would return. Impacts to soils that may occur if the existing water pipeline fails and emergency repairs are required would be adverse, local, short-term, and minor.

Cumulative Impacts. If the existing water pipeline continues leaking but does not fail, the no action alternative would not contribute to cumulative impacts to soils.

If the existing water pipeline fails and emergency repairs are required, cumulative actions considered in the assessment of soils that have had or would have more than negligible impacts to soils include the New Design raw water main and effluent outfall in Frederick County at Mile 44 (NPS 2006d), the recently completed Point of Rocks boat ramp at Mile 48 (NPS 2005), current construction at Big Slackwater at Miles 84-88 (NPS 2009a), and future actions associated with the restoration of canal operations at Williamsport at Miles 98-100 (NPS 2011) and the construction of eelways at Dams 4 and 5 at Miles 84 and 106, respectively (NPS 2009b).

Effects to soils from cumulative actions would include adverse, local, short-term, minor impacts from the New Design Raw Water upgrades. Cumulative actions also would include adverse, local, short-term and long-term, negligible impacts at Points of Rock Boat Ramp from loss of soils in the area of development, but also beneficial, local, long-term, impacts from reclamation of parking areas and roadways and through a reduction in soil compaction and erosion from vehicle access in undesignated areas. Additional effects to soils from cumulative actions would include adverse, local, short-term and long-term, minor impacts during construction activities at Big Slackwater, and adverse, local, short-term, minor impacts and adverse, local, long-term, negligible-to-minor impacts for Canal Operations at Williamsport. Effects to soils from cumulative actions for the eelways at Dams 4 and 5 would be adverse, local, short-term negligible impacts. These projects have required or would require some soil disturbance, but would include mitigation to reduce soil loss and erosion. Alternative A would not result in adverse impacts to soils unless the existing water pipeline failed and emergency repairs required. Alternative A may result in adverse, local, short-term, minor impacts on soils if the existing water pipeline fails, but would also include mitigation to reduce soil loss and erosion. When combined with the impacts from the cumulative actions, Alternative A may have a slight contribution resulting in adverse, local, short-term, minor cumulative impacts to soils if the existing water pipeline fails and emergency repairs required.

Conclusion. Under the no action alternative, there would be no additional adverse or beneficial impacts, or contributions to cumulative impacts, under continued normal operations and maintenance if the water pipeline continued leaking but did not fail. As the pipeline has exceeded its use life and is currently leaking, likely within the project study area, the probability for failure of the pipeline is real. However, the timeline in which this failure could occur is unknown. There may be adverse, local, short-term, minor impacts if the existing water pipeline failed and emergency repairs required. Cumulative impacts on soils would be adverse, local, short-term, and minor, with Alternative A having a slight contribution.

IMPACTS OF ALTERNATIVE C

Analysis. Under Alternative C, impacts to soils would result from construction activities. Construction of Alternative C would include the excavation of an open-cut trench running within the existing easement from the pump station to a point outside of the park boundary and eventually to the Sharpsburg Water Treatment Plant. Installation of the waterline and electrical and communications conduits through the towpath and canal prism would be through open-cut trenching (Option 1) methods within the existing easement, within the limits of disturbance for the existing waterline. Soil and any encountered rock would be removed to allow for the placement of the two water pipelines and conduit. Because trenching

would occur within the limits of disturbance for the trench originally excavated for the existing water pipeline, this would reduce the probability of encountering bedrock needing to be removed through hydraulic hammering or blasting, as the bedrock would likely have been removed during the construction of the existing water pipeline in the 1960s. Most of the materials would be replaced within the open-cut trench. Construction activities for placing the water pipelines and conduit would result in adverse, local, short-term, minor impacts to soils.

The temporary bypass water line would be installed on the ground for most of its length, with no disturbance of soils except where the temporary bypass water line would cross the intake structure access lane and the towpath. For these two crossings, the temporary bypass water line would be installed in shallow, narrow trenches. A steel plate or earthen overburden would be placed over the temporary bypass water line and its protective steel sleeve. If overburden is used, it would be graded to provide a gradual slope up and over the temporary bypass water line to minimize disruption to passage by motorized vehicles, bicyclists, and pedestrians. The access land and towpath would be restored to original contours following removal of the temporary bypass water line. Construction activities for placing the temporary bypass water line would result in adverse, local, short-term, minor impacts to soils.

Alternative C would also include construction of a new elevated electrical platform adjacent and upstream of the intake and removal of the existing platform once the new platform became operational. Soil disturbance would be minimized by placement of the new structure on pilings. A small amount of soil would be removed during vertical boring to place the pilings for the elevated electrical platform. This soil would be permanently removed. The area around the existing and proposed new platforms was disturbed during construction in the 1960s and no new disturbance would occur outside the existing easement. The old platform would be removed following activation of the new electrical controls. Installation of the new elevated electric platform pilings would result in adverse, local, long-term, minor impacts to soils.

Additionally, the permanent cross-over dike would be built across the canal prism from the existing access road on private property to the towpath to allow for construction access and post-construction access by the County to the water line and pump station for maintenance and emergencies. Soils beneath the cross-over dike would be buried by placement of the material for the dike. Construction of permanent cross-over dike would result in adverse, local, long-term, minor impacts to soils.

Under Alternative C, adverse impacts to soils would be mitigated by measures including:

- Ensure that an erosion and sediment control plan is completed and followed in accordance with the *Maryland Erosion and Sediment Control Guidelines for State and Federal Projects* to prevent, reduce, and control soil erosion and sedimentation during construction.
- Close open trenches in the event of any major storm event forecasted within 24 hours that could elevate Potomac River to 100-year floodplain stage.
- Reseed soils disturbed within the proposed construction area with NPS approved native vegetation seed mix to stabilize the soil, repair compaction, and/or improve soil productivity.
- Spill containment kits will be on site during construction. An emergency response plan will be developed.

Cumulative Impacts. Cumulative actions considered in the assessment of soils that have had or would have more than negligible impacts to soils include the New Design raw water main and effluent outfall in Frederick County at Mile 44 (NPS 2006d), recently completed Point of Rocks boat ramp at Mile 48 (NPS 2005), current construction at Big Slackwater at Miles 84-88 (NPS 2009a), and future actions associated

with the restoration of canal operations at Williamsport at Miles 98-100 (NPS 2011) and the construction of eelways at Dams 4 and 5 at Miles 84 and 106, respectively (NPS 2009b).

Effects to soils from cumulative actions would include adverse, local, short-term, minor impacts from the New Design Raw Water upgrades. Cumulative actions also would include adverse, local, short-term and long-term, negligible impacts at Points of Rock boat ramp from loss of soils in the area of development, but also beneficial, local, long-term, impacts from reclamation of parking areas and roadways and through a reduction in soil compaction and erosion from vehicle access in undesignated areas. Additional effects to soils from cumulative actions would include adverse, local, short-term and long-term, minor impacts during construction activities at Big Slackwater, and adverse, local, short-term, minor impacts and adverse, local, long-term, negligible-to-minor impacts for Canal Operations at Williamsport. Effects to soils from cumulative actions for the eelways at Dams 4 and 5 would be adverse, local, short-term negligible impacts. These projects have required or would require some soil disturbance, but would include mitigation to reduce soil loss and erosion. Alternative C would result in adverse, local, short-term, minor impacts on soils for construction activities for the waterlines and conduit and temporary bypass water line, adverse, and adverse, local, long-term, minor impacts on soils for installation of new elevated electric platform pilings and construction of permanent cross-over dike. Alternative C would also include mitigation to reduce soil loss and erosion, and to restore and stabilize construction areas. When combined with the impacts from the cumulative actions, Alternative C may have a slight contribution resulting in adverse, local, short-term and long-term, minor cumulative impacts to soils.

Conclusion. Under Alternative C, there may be adverse, local, short-term, minor impacts to soils during construction activities and adverse, local, long-term, minor impacts to soils from installation of new elevated electric platform pilings and construction of the permanent cross-over dike. Cumulative impacts on soils would be adverse, local, short-term and long-term, and minor, with Alternative C having a slight contribution. Alternative C would also include mitigation to reduce soil loss and erosion and to restore and stabilize construction areas.

Wetlands

METHODOLOGY AND ASSUMPTIONS

A wetland assessment of the proposed Sharpsburg Water Intake Upgrade was conducted by FSA in October 2009 using the criteria from the USACE manual and Cowardin *et al.* (1979). The FSA wetland investigation determined that there is one intermittent stream channel within the existing easement constituting the study area for Alternative C. This channel is classified as a riverine, intermittent streambed type of wetland under Cowardin *et al.* (1979). A wetlands delineation report was submitted by FSA to NPS in June 2010. According to 33 CFR 329.9(a), the prism of the C&O Canal is also considered a navigable water of the United States, as it was once navigable in its improved state prior to its abandonment.

STUDY AREA

The geographic extent of the study area for wetlands includes the existing easement within and immediately adjacent to the boundaries of the Park as well as any associated areas that would be temporarily used as construction staging areas for equipment and supplies. It is expected that construction activities would not occur outside of these areas. All alternatives for the proposed Sharpsburg Water Intake Upgrade were assessed for the presence or absence of wetlands. The study area for cumulative analysis includes the project area in the Park and adjacent areas around the project area.

IMPACT THRESHOLDS

Negligible: Impacts to wetland size, integrity, or continuity could occur, but would be barely measurable or perceptible.

Minor: Impacts to wetland size, integrity, or continuity could occur and would be measurable and perceptible. The overall viability of the resource would not be affected.

Moderate: Impacts to wetland size, integrity, or continuity would occur and would be measurable and perceptible. The size of the wetland could permanently grow or shrink.

Major: Impacts to wetland size, integrity, and continuity would occur or a permanent loss of large wetland areas would result. The impacts would be substantial and highly noticeable.

Duration: Short-term impacts would be those occurring during all or part of the implementation of an alternative. Long-term impacts would extend beyond the implementation of an alternative.

IMPACTS OF NO ACTION ALTERNATIVE

Analysis. Alternative A is the no-action alternative, and as such, represents a continuance of current conditions in the project study area. There would be no planned ground-disturbing activities conducted and the intermittent stream channel and the prism of the C&O Canal would remain in their current conditions. If the water pipeline continues leaking, but does not fail, no additional adverse or beneficial impacts would occur under continued normal operations and maintenance.

However, because the existing water pipeline is leaking, the possibility exists for failure of the water pipeline. The location of any future rupture of the water cannot be identified at this time, but if a rupture occurs in the vicinity of, and upslope of, the intermittent stream channel or the canal prism, there could be local flooding and possible erosion or sediment deposition. Given the rapidity at which the County can shut off the water pumps should a failure occur, the magnitude of any adverse impacts to wetlands would be local, short-term, and negligible. Any sediment deposited within wetlands would be removed by non-mechanical means. If emergency repairs are required within the canal prism, repairs would include excavation within the existing easement within limits of disturbance for the existing pipeline. Adverse impacts to wetlands that may occur if the existing water pipeline fails and emergency repairs required within the canal prism would be local, short-term, and minor.

Under the no action alternative adverse impacts to wetlands that could occur if the existing water pipeline leaks and causes erosion or sediment deposition into the intermittent stream or canal prism, or if the existing water pipeline fails and emergency repairs required within the canal prism would be mitigated by measures including:

- Remove any sediment deposited within wetlands by non-mechanical means.
- Return the topography of repair areas to original contours.
- Reseed disturbed wetlands within the repair area with NPS approved native vegetation seed mix.

Cumulative Impacts. If the existing water pipeline continues leaking but does not fail, the no action alternative would not contribute to cumulative impacts to wetlands.

If the existing water pipeline fails and emergency repairs are required, cumulative actions within the vicinity of the project study area considered in the assessment of wetlands include the recently completed Point of Rocks boat ramp at Mile 48 (NPS 2005), current construction at Big Slackwater at Miles 84-88 (NPS2009a), and future actions associated with the restoration of canal operations at Williamsport at

Miles 98-100 (NPS 2011) and the construction of eelways at Dams 4 and 5 at Miles 84 and 106, respectively (NPS 2009b).

Effects to wetlands from cumulative actions would include: adverse, local, long-term, minor impacts at Point of Rocks boat ramp; adverse, short-term, negligible to minor impacts and long-term, moderate impacts at Big Slackwater; adverse, local long-term, negligible to minor impacts for Canal Operations at Williamsport; and adverse, local, long-term, minor impacts for construction of the eelways at Dams 4 and 5. Alternative A may result in adverse, local, short-term, negligible impacts on wetlands if the existing water pipeline fails upslope from the intermittent stream or canal prism and results in minor erosion or sediment deposition, or may result in adverse, local, short-term, minor impacts on wetlands if emergency repairs are required resulting in excavation within the canal prism, but mitigation measures would be taken to restore affected wetlands. When combined with the impacts from the cumulative actions, Alternative A may have a slight contribution to adverse, short-term, minor cumulative impacts to wetlands if the existing water pipeline fails.

Conclusion. No additional beneficial or adverse impacts, or cumulative impacts, would occur to wetlands under continued normal operations and management if the existing water pipeline continues to leak but does not fail. Alternative A has the potential to result in adverse, local, short-term, negligible impacts to wetlands if the existing water pipeline fails adjacent to, and upslope of, the intermittent stream channel or canal prism and causes erosion or sediment deposition within these wetlands. Alternative A has the potential to result in adverse, local, short-term, minor impacts to wetlands if emergency repairs are required resulting in excavation within the canal prism. Potential impacts would be easily mitigated. Cumulative impacts on wetlands would be adverse, short-term to long-term, minor to moderate cumulative impacts to wetlands if the existing water pipeline fails, with Alternative A having a local, short-term, negligible to minor contribution.

IMPACTS OF ALTERNATIVE C

Analysis. The project study area for Alternative C consists of the existing easement which includes a 6-foot wide intermittent stream channel and the canal prism, both of which would be impacted by the proposed project. The canal prism averages 30 feet wide at the bottom of the canal and 50 feet wide at the top within the easement area. Construction of Alternative C would include the excavation of an open-cut trench running along the existing easement from the pump station to a point outside of the park boundary and eventually to the Sharpsburg Water Treatment Plant. The excavation of an open-cut trench would impact the intermittent stream within the easement. The open-cut trench would be approximately 5 feet wide across the intermittent stream. Installation of the proposed 36-inch diameter steel casing sleeve under the canal prism would be through open-cut trenching, resulting in impacts. The open-cut trench would be approximately 5 feet wide across the canal prism. The canal prism would be impacted by construction of a permanent cross-over dike to allow for access by maintenance vehicles to the water pipeline and pump station. The cross-over dike would have a travel lane approximately 12 feet wide with 3:1 grade side slopes for a base width of approximately 16 feet within the canal prism bottom. The cross-over dike would contain two 36-inch diameter culverts to allow for water flow within the canal prism. There are no wetlands in the vicinity of the proposed elevated electrical platform, and no wetland impacts would occur from this project component.

The intermittent stream channel extends perpendicular across the easement, but only approximately 5 feet of stream length of the 30 feet of stream length within the easement would be impacted by proposed trenching under both construction options. This stream channel has been channelized at some point in the past, either associated with the construction of the culvert underneath the canal prism and towpath or the construction of the existing water pipeline. The intermittent stream channel and canal prism were previously disturbed by excavation activities associated with construction of the existing water pipeline

and as such the proposed trenching would not result in disturbance outside the limits of previous disturbance.

Alternative C would result in impacts to approximately 0.025 acre of wetland. Temporary impacts under would occur to approximately 5 linear feet of the intermittent stream channel (less than 0.001 acre) from trenching and 5 linear feet of the canal prism (less than 0.006 acre) from trenching, and permanent impacts of approximately 0.018 acre across the canal prism for fill for the construction of the permanent cross-over dike.

Impacts to the intermittent stream channel and the canal prism from trenching would be adverse, local, short-term, and minor. The duration of impacts would be on the order of a few days, the time in which the trench within the existing easement would be opened to remove the current water pipeline and place the new water pipeline. Once the new pipeline was placed, the contours of the stream channel and canal prism would be returned to their former condition. Impacts to the canal prism from construction of the permanent cross-over dike would be adverse, local, long-term, and minor. Adverse impacts would be mitigated through the use of best management practices and following sediment and erosion control guidelines. The cross-over dike would be stabilized and seeded with NPS approved native vegetation seed mix to reduce potential for erosion and sedimentation in the adjacent canal prism. The cross-over dike would contain two 36-inch diameter culverts to allow for water flow within the canal prism. Another mitigation measure would be the installation of filter fabric on existing grade within the canal prism prior to placement of fill material. The filter fabric is a visual marker of the existing grade should any future work to the cross-over dike be necessary. All construction related drawings would be reviewed and approved by the NPS prior to construction.

A Joint Federal/State Application for the Alteration of any Floodplain, Waterway, Tidal or Nontidal Wetland in Maryland would be submitted and applicable permits obtained from the MDE and USACE prior to initiating work. All regulated activities within waters of the United States and waters of the State would be conducted in accordance with permit conditions and *Maryland's Waterway Construction Guidelines* (MDE 2000).

Because the proposed action is for replacing/renovating an underground water pipeline within the same alignment as currently exists (not expanding), the cumulative wetland disturbance is less than 0.1 acre, pre-construction contours and elevations would be restored, soil/substrate characteristics and riparian vegetation would be restored, the project would not result in adverse impacts on surface or ground water hydrology (no wetland drainage), and best management practices for protection of aquatic life implemented throughout the construction and restoration process, this would be an excepted action (Section 4.2.1 of the National Park Service Procedural Manual #77-1: Wetland Protection) and not require a wetland Statement of Findings under Director's Order 77-1. A copy of the determination can be found on page B-11.

Under Alternative C adverse impacts to wetlands would be mitigated by measures including:

- Return contours of the stream channel and canal prism to their former condition immediately upon installation of the new infrastructure.
- Install filter fabric on existing grade within the canal prism prior to placement of fill material for the cross-over dike. The filter fabric is a visual marker of the existing grade should any future work to the cross-over dike be necessary.
- Install adequately-sized culverts through the cross-over dike to allow for water flow within the canal prism.
- Reseed disturbed wetlands and cross-over dike with NPS approved native vegetation seed mix suitable for wetlands.

- Implement any additional mitigation measures determined during the MDE/USACE permitting process.

Cumulative Impacts. Cumulative actions within the vicinity of the project study area considered in the assessment of wetlands include the recently completed Point of Rocks boat ramp at Mile 48 (NPS 2005), current construction at Big Slackwater at Miles 84-88 (NPS2009a), and future actions associated with the restoration of canal operations at Williamsport at Miles 98-100 (NPS 2011) and the construction of eelways at Dams 4 and 5 at Miles 84 and 106, respectively (NPS 2009b).

Effects to wetlands from cumulative actions would include: adverse, local, long-term, minor impacts at Point of Rocks boat ramp; adverse, short-term, negligible to minor impacts and long-term, moderate impacts at Big Slackwater; adverse, local long-term, negligible to minor impacts for Canal Operations at Williamsport; and adverse, local, long-term, minor impacts for construction of the eelways at Dams 4 and 5. Alternative C would result in adverse, local, short-term, minor impacts on wetlands for trenching and adverse, local, long-term, minor impacts on wetlands for construction of the cross-over dike. Trenching would occur within the limits of previous disturbance for installation of the original water line. Mitigation measures would be taken to restore wetlands impacted by trenching. When combined with the impacts from the cumulative actions, Alternative C may have a slight contribution to adverse, short-term minor and long-term moderate cumulative impacts to wetlands.

Conclusion. Under Alternative C, there may be adverse, local, short-term and long-term, minor impacts to wetlands consisting of adverse, local, short-term, minor impacts from trenching through previous limits of disturbance within the intermittent stream and canal prism and adverse, local, long-term, minor impacts to the canal prism from construction of the permanent cross-over dike. Cumulative impacts on wetlands would be adverse, short-term minor and long-term moderate, with Alternative C having a minor contribution. Alternative C would also include mitigation to restore wetlands impacted by trenching and installation of culverts through the cross-over dike to maintain flow within the canal prism.

Vegetation

METHODOLOGY AND ASSUMPTIONS

Potential impacts were assessed based on the potential extent of disturbance resulting from an action alternative. The analysis of possible impacts was based on on-site inspection of the project area, a Forest Stand Delineation (Appendix C), a review of existing maps and literature, and information provided by the NPS.

STUDY AREA

The geographic extent of the study area for vegetation includes the existing easement within and immediately adjacent to the boundaries of the Park, including the private property along the existing easement from the Park to the water treatment plant, as well as any associated areas that would be temporarily used as construction staging areas for equipment and supplies. It is expected that construction activities would not occur outside of these areas. The study area for cumulative analysis includes the project area in the Park and adjacent areas around the project area.

IMPACT THRESHOLDS

Negligible: While some individual native plants could be affected, there would be no effect on the population of a native species. Any impacts would be on a small scale.

Minor: Some individual native plants would be affected as would be a relatively minor portion of the native species population. Impacts would occur over a relatively small areal extent. Any

mitigation necessary to offset adverse impacts would be simple to implement and would likely be successful.

Moderate: Some individual native plants would be affected as would be a sizeable portion of the native species population. Impacts would occur over a relatively large areal extent. Mitigation necessary to offset adverse impacts would be extensive and would likely be successful.

Major: A considerable portion of a native species population would be affected over a large areal extent both within and outside the park boundaries. Mitigation measures would be required and would be extensive and not necessarily successful.

Duration: Short-term impacts would last less than one year. Long-term impacts would extend longer than one year.

IMPACTS OF NO ACTION ALTERNATIVE

Analysis. Alternative A is the no-action alternative, and as such, represents a continuance of current conditions in the project study area. Vegetation maintenance and management within the easement would be allowed as permitted under the existing easement. The existing water pipeline is leaking, and according to the County, the leak appears to be located within the boundaries of the Park. Trees that have grown up within the easement may be removed to reduce the risk from additional root damage to the leaking existing water pipeline as allowed under the existing easement. Removal of individual trees to reduce this risk would result in adverse, local, long-term, negligible impacts. If the existing water pipeline were to fail inside or upslope from the Park boundaries, as the County has stated that the pump supplying the waterline could be shut off within five minutes of an identified failure the result would likely be local, temporary flooding and possible disturbance of vegetation by erosion. Impacts to vegetation would likely be limited to the existing easement, but would likely result in removal of woody vegetation from the existing easement to access the repair area. Bare areas resulting from water pipeline failure and resulting emergency repairs would be stabilized with a native vegetation seed mix. The magnitude of any impacts to vegetation that may result from water pipeline failure and repairs would be adverse, local, long-term, and negligible.

Under the no action alternative adverse impacts to vegetation that could occur if the existing water pipeline leaks and emergency repairs are required would be mitigated by measures including:

- Follow NPS standards for tree impacts and mitigation.
- Reseed the repair area with NPS approved native vegetation seed mix.

Cumulative Impacts. Cumulative actions within the vicinity of the project study area considered in the assessment of vegetation include the New Design raw water main and effluent outfall in Frederick County at Mile 44 (NPS 2006d), recently completed Point of Rocks boat ramp at Mile 48 (NPS 2005), current construction at Big Slackwater at Miles 84-88 (NPS2009a), and future actions associated with construction of eelways at Dams 4 and 5 at Miles 84 and 106, respectively (NPS 2009b).

Effects to vegetation from cumulative actions would include: adverse, local, short-term, negligible impacts for the New Design raw water upgrades; adverse, local, long-term, minor to moderate impacts at Point of Rocks; adverse, local, short-term and long-term, moderate impacts at Big Slackwater; and adverse, local, short-term, minor impacts for construction of the eelways at Dams 4 and 5. Alternative A would result in adverse, local, long-term, negligible impacts if individual trees are removed as part of operations and maintenance to reduce risk of root damage to the water pipeline. Alternative A would not result in other impacts to vegetation unless the existing water pipeline failed. Alternative A may result in adverse, local, long-term, negligible impacts on vegetation if the existing water pipeline fails and

emergency repairs are required. When combined with the impacts from the cumulative actions, Alternative A may have a slight contribution to adverse, long-term, minor cumulative impacts to vegetation through operations and maintenance or if emergency repairs are required if the existing water pipeline fails.

Conclusion. Alternative A has the potential to result in adverse, local, long-term, negligible impacts to vegetation if individual trees are removed as part of operations and maintenance to reduce risk of root damage to the water pipeline. Alternative A has the potential to result in adverse, local, long-term, negligible impacts to vegetation if emergency repairs are required resulting in limited vegetation disturbance within the existing easement. Potential impacts would be easily mitigated through following NPS standards for tree impact and mitigation and reseedling the repair area with NPS approved native seed mix. When combined with the impacts from the cumulative actions, Alternative A may have a negligible contribution to adverse, long-term, minor cumulative impacts to vegetation within the Park through operations and maintenance or if emergency repairs are required.

IMPACTS OF ALTERNATIVE C

Analysis. Construction of Alternative C would result in the removal of all vegetation along the 30 feet wide and approximately 805 feet long easement within the Park, an area of approximately 0.55 acre, and revegetation with a native grass mix following construction. Vegetation would also be removed within approximately 0.11 acre for the proposed new easement for the permanent cross-over dike across the canal prism. Vegetation maintenance is currently permissible under the current easement. Clearing would also be undertaken along the route of the existing water line and proposed improved access road on private property running from the Park boundary to the water treatment plant, as well as for the proposed permanent cross-over dike across the canal prism. Alternative C would also include the construction of a new elevated electrical platform adjacent to the existing platform and the removal of the existing platform once the new platform became operational. The area around the platform was disturbed during its construction and that of the water intakes in the 1960s and clearing activities would be limited to the existing easement in this area.

All vegetation along the route of the existing water line and easement from the Park boundary to the water treatment plant would be removed. After clearing, the easement on private property adjacent to the Park would consist of an open, narrow corridor that would run to the existing water treatment plant consisting of the access road and slopes. The slopes would be stabilized with NPS approved seed mix consistent with treatments on Park property to reduce the threat for non-native, invasive plant species entering the Park.

The County's easement agreement allows for the clearing of woody vegetation within the easement for maintenance purposes, and all vegetation to bare earth for construction or repairs. However, it does not appear that the County has ever conducted maintenance mowing or other vegetative clearing activities within the easement since the existing pipeline was installed in the 1960s. The County would maintain the easement on a semi-annual basis after construction of the new pipeline.

A Forest Stand Delineation (Appendix C) conducted in October 2009 within the project study area noted that there is one 30-inch DBH silver maple tree located within the existing easement (Figure 4). Additionally, immediately adjacent to the easement are eight other trees with 31-inch or greater DBH. Other smaller trees with a range of DBH sizes of 12 inches to 29.9 inches, as well as shrubs and grasses, are located within the easement. The location of the proposed elevated electrical platform contains only grasses.

The one large (30-inch DBH) silver maple as well as other smaller trees that have grown up within the existing easement would be removed for construction. No trees would be removed for the replacement of the elevated electrical platform. Outside the existing easement, three trees would be removed on NPS lands from inside the canal prism for the permanent cross-over dike. No trees would be removed for installation of the temporary bypass waterline. Other trees adjacent to, but outside, the easement may be trimmed to remove branches obstructing construction access. It is possible that the trees located immediately adjacent to the easement could suffer damage to their root systems from digging of the open-cut trench. Significant root damage could result in death of the affected trees, but is not anticipated due to the narrowness of the open-cut trench, proposed to be 5 feet in width or less through most of the easement and the use of approved arborist standards for root pruning. Mitigative measures would be undertaken to minimize impacts to vegetation, re-establish native vegetation following construction, and reduce risk for spread or introduction of invasive species onto Park property. Alternative C would result in adverse, local, long-term, minor impacts to vegetation.

Under Alternative C adverse impacts to vegetation would be mitigated by measures including:

- Follow NPS standards for tree impacts and mitigation, including all tree work to be done under the direction and general supervision of an Arborist certified by the International Society of Arboriculture (ISA) who possesses verifiable technical competence in tree physiology, identification, diagnosis of disorders, and current tree care and safety practices in accordance with accepted industry standards.
- All tree workers shall abide by any code of ethics or professional conduct established by the National Arborist Association and International Society of Arboriculture.
- All spray applications must be pre-approved by the Park Integrated Pest Management Coordinator. Park approved applications shall be under the direct supervision of a Certified Pesticide Applicator licensed to spray within the state of Maryland.
- All tree pruning and removal activities will be in accordance with the American National Standard for Tree Care Operations – “*Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices, ANSI A300 (Part 1) – 2000 Pruning*” and “*Pruning, Repairing, Maintaining and Removing Trees and Cutting Brush – Safety Requirements*” – ANSI Z133.1.-2000.
- Follow NPS arborist standards for root pruning practices in an effort to protect root systems of trees adjacent to the existing easement. When tree root systems are to be impacted, practices for cleanly pruning the root systems of existing trees must be followed. Tree pruning standards will be provided by Park staff.
- Revegetate cleared portions of the existing easement using NPS approved native vegetation seed mix seed and ensuring that the seed mix properly germinates.
- County to routinely mow grassed existing easement areas to minimize or prevent the intrusion of invasive species onto Park property.
- Wash all construction equipment prior to entry onto NPS lands to reduce the risk for the spread/introduction of invasive plant species.
- Consultation with Park staff prior to placement of temporary water line to ensure no impacts to vegetation.

Cumulative Impacts. Cumulative actions within the vicinity of the project study area considered in the assessment of vegetation include the New Design raw water main and effluent outfall in Frederick County at Mile 44 (NPS 2006d), recently completed Point of Rocks boat ramp at Mile 48 (NPS 2005), current construction at Big Slackwater at Miles 84-88 (NPS2009a), and future actions associated with construction of eelways at Dams 4 and 5 at Miles 84 and 106, respectively (NPS 2009b).

Effects to vegetation from cumulative actions would include: adverse, local, short-term, negligible impacts for the New Design raw water upgrades; adverse, local, long-term, minor to moderate impacts at Point of Rocks; adverse, local, short-term and long-term, moderate impacts at Big Slackwater; and adverse, local, short-term, minor impacts for construction of the eelways at Dams 4 and 5. Alternative C would result in adverse, local, long-term, minor impacts to vegetation. When combined with the impacts from the cumulative actions, Alternative C would have a minor contribution to adverse, long-term, minor cumulative impacts to vegetation.

Conclusion. Impacts to vegetation from Alternative C would be adverse, local, long-term and minor. While implementation of mitigation measures within the project study area would result in the reestablishment of native vegetation, maintenance of the easement would prevent the growth of any shrubs or trees. Although trees and other vegetation that have become established within 0.55 acre of the existing easement would be permanently removed and approximately 0.11 acre cleared for construction of the permanent cross-over dike, clearing and implementation of routine vegetation maintenance within the easement would not adversely affect the contiguous nature of the forest canopy within the project study area and adjacent areas. A continuous canopy of trees would be present along and between the bank of the Potomac River and the existing easement, which connects with the forest upstream and downstream of the project study area. Additionally, although the area of cleared vegetation within the existing easement would be 30 feet in width, the canopy of mature trees on either side of the easement would still connect. When combined with the impacts from the cumulative actions, Alternative C would have a minor contribution to adverse, long-term, minor cumulative impacts to vegetation within the Park.

Wildlife

METHODOLOGY AND ASSUMPTIONS

The NPS interprets the Organic Act of 1916 to mean that native animal life should be protected and perpetuated as part of the park's natural ecosystem. The NPS 2006 Management Policies states that "the NPS would use the best available technology, within available resources, to restore the biological and physical components of these systems, accelerating both their recovery and the recovery of landscape and biological community structure and function." NPS management goals for wildlife include maintaining components and processes of natural evolving park ecosystems, along with the natural abundance, diversity, and ecological integrity of plants and animals.

Potential impacts were assessed based on the potential extent of disturbance resulting from an action alternative. The analysis of possible impacts was based on on-site inspection of the project area, a review of existing literature, information provided by the NPS, MDNR, and USFWS, and professional judgment.

STUDY AREA

The geographic extent of the study area for wildlife includes the existing easement within and immediately adjacent to the boundaries of the Park as well as any associated areas that would be temporarily used as construction staging areas for equipment and supplies. It is expected that construction activities would not occur outside of these areas. The study area for cumulative analysis includes the project area in the Park and adjacent areas around the project area.

IMPACT THRESHOLDS

Negligible: No observable or measurable impacts to native species, their habitats, or natural sustaining processes would occur. Any impacts would be within naturally occurring fluctuations.

Minor: Any impacts would be detectable, but within the natural variability of the native species population, habitats, or natural sustaining processes. If any mitigation measures were necessary, they would be slight and successful.

Moderate: Impacts would be detectable and outside the natural variability of the native species population, habitats, or natural sustaining processes. The changes would occur over a relatively large area. Mitigation measures to offset adverse impacts would be extensive and likely successful.

Major: Impacts would be easily apparent and outside the natural variability of the native species population, habitats, or natural sustaining processes. Changes would be measurable in terms of population viability and could involve the displacement, loss, or restoration of a species' population or habitat. Mitigation measures to offset adverse impacts would be required and extensive and success would not be guaranteed.

Duration: Short-term impacts would last less than one year. Long-term impacts would extend longer than one year.

IMPACTS OF NO ACTION ALTERNATIVE

Analysis. Alternative A is the no-action alternative, and as such, represents a continuance of current conditions in the project study area. There would be no ground disturbing activities conducted. Existing wildlife habitats within the project study area would not be substantially altered or disturbed other than to remove individual trees within the existing easement to reduce the risk of root damage, as allowed under the current easement. Removal of individual trees to reduce this risk would result in adverse, local, long-term, negligible impacts to wildlife habitat.

However, vegetation serving as wildlife habitat could be affected in the long term should repairs be necessary to keep the existing line in operation. The extent to which wildlife habitat would be disturbed would be dependent on the location and severity of any breaks or failures of the line necessitating repair, but would be expected to be limited to the existing easement, but would likely require disturbance of wildlife habitat to access the repair area, including the removal of woody vegetation. The magnitude of any impacts to wildlife or wildlife habitat that may result from water pipeline failure and repairs would be adverse, local, long-term, and negligible.

Under the no action alternative adverse impacts to wildlife habitat that could occur if the existing water pipeline leaks and emergency repairs are required would be mitigated by measures including:

- Follow NPS standards for tree impacts and mitigation.
- Reseed the repair area with NPS approved native vegetation seed mix.

Cumulative Impacts. Cumulative actions within the vicinity of the project study area considered in the assessment of wildlife include the New Design raw water main and effluent outfall in Frederick County at Mile 44 (NPS 2006d), recently completed Point of Rocks boat ramp at Mile 48 (NPS 2005), current construction at Big Slackwater at Miles 84-88 (NPS2009a), and future actions associated with construction of eelways at Dams 4 and 5 at Miles 84 and 106, respectively (NPS 2009b).

Effects to wildlife and wildlife habitat from cumulative actions would include: adverse, local, short-term, minor impacts for the New Design raw water upgrades; adverse, local, short-term and long-term, negligible to moderate impacts at Point of Rocks with some negligible to beneficial impacts; adverse, local, short-term and long-term, moderate impacts at Big Slackwater; and adverse, local, short-term, minor impacts for construction of the eelways at Dams 4 and 5 with beneficial long-term impacts for

American eel. Alternative A would result in adverse, local, long-term, negligible impacts to wildlife habitat whether individual trees are removed to reduce the risk of root damage to the leaking water pipeline or whether the existing water pipeline fails and emergency repairs are required. When combined with the impacts from the cumulative actions, Alternative A may have a negligible contribution to adverse, short-term and long-term, minor cumulative impacts to wildlife habitat within the Park.

Conclusion. Alternative A would not result in any changes to wildlife or wildlife habitat through continued maintenance and operation activities other than to remove individual trees within the existing easement to reduce the risk of root damage, as allowed under the current easement. Removal of individual trees to reduce this risk would result in adverse, local, long-term, negligible impacts. However, any breaks or failure in the waterline could necessitate repairs resulting in adverse, local, long-term, negligible impacts to wildlife habitat. Impacts to wildlife habitat would be expected only within the existing easement in the event of emergency repairs. Potential impacts to wildlife habitat would be easily mitigated through following NPS standards for tree impact and mitigation and reseedling the repair area with NPS approved native seed mix. When combined with the impacts from the cumulative actions, Alternative A may have a negligible contribution to adverse, short-term and long-term, minor cumulative impacts to wildlife habitat if emergency repairs are required.

IMPACTS OF ALTERNATIVE C

Analysis. Construction of Alternative C would likely temporarily displace wildlife from the immediate project area during construction activities, but would not result in changes in overall population levels in the vicinity of the project area. Temporary displacement of wildlife during construction activities would result in adverse, local, short-term, minor impacts to wildlife.

Alternative C would impact wildlife habitat by removal of all vegetation along the 30 feet wide and approximately 805 feet long easement within the Park, an area of approximately 0.55 acre. Wildlife habitat would also be removed by clearing within approximately 0.11 acre for the proposed new easement for the permanent cross-over dike across the canal prism. Alternative C would result in the clearing of vegetation, including mature deciduous forest and associated understory, within the existing easement within the Park and on private property, and revegetation with a native grass mix following construction. This area may provide habitat for some native wildlife.

The cleared areas are proposed to be replanted with a native vegetation seed mix after construction, though would be maintained to prevent the growth of shrubs and trees. However, the area proposed for clearing is only 30 feet wide, is bordered on all sides by deciduous forest, and would have only negligible effects on wildlife corridors within the NPS property. A continuous canopy of trees would be present along and between the bank of the Potomac River and the existing easement and the canopy of mature trees on either side of the easement would still connect. Construction activities may cause a temporary displacement of wildlife in the area, but should not have any effects on wildlife or their habitat within or in the vicinity of the easement. The immediate area around the proposed elevated electrical platform contains only grasses, and this vegetational regime would not change.

The proposed Sharpsburg Water Intake Upgrade project is located entirely within a terrestrial forest habitat with proposed construction activities only within the existing easement that was previously disturbed by installation of the existing water pipeline. The proposed easement would be maintained, creating a narrow corridor of open habitat under a forested canopy. Forested habitat outside of this corridor would not be disturbed. As such, Alternative C may have adverse, local, long-term, minor impact on wildlife through removal of trees and shrubs within the easement and long-term establishment and maintenance of native grasses within the easement, but no effect on overall population levels in the

vicinity of the project area. Maintenance of native grasses within the easement would provide foraging opportunity for herbivorous wildlife.

Under Alternative C adverse impacts to wildlife habitat would be mitigated by measures including:

- Reduce risk for spread/introduction of invasive plant species into wildlife habitat by implementing appropriate mitigative measures identified for vegetation.
- Ensure preventative measures are taken to minimize potential for adverse impacts to aquatic wildlife from fuel leaks or spills. Remove all construction equipment from the 100-year floodplain in the event of any major storm event forecasted within 24 hours that could elevate to 100-year floodplain stage.
- No overnight parking of equipment within the 100 year floodplain.
- Tree removal will be undertaken outside of bird nesting season.

Cumulative Impacts. Cumulative actions within the vicinity of the project study area considered in the assessment of wildlife include the New Design raw water main and effluent outfall in Frederick County at Mile 44 (NPS 2006d), recently completed Point of Rocks boat ramp at Mile 48 (NPS 2005), current construction at Big Slackwater at Miles 84-88 (NPS2009a), and future actions associated with construction of eelways at Dams 4 and 5 at Miles 84 and 106, respectively (NPS 2009b).

Effects to wildlife and wildlife habitat from cumulative actions would include: adverse, local, short-term, minor impacts for the New Design raw water upgrades; adverse, local, short-term and long-term, negligible to moderate impacts at Point of Rocks with beneficial impacts; adverse, local, short-term and long-term, moderate impacts at Big Slackwater; and adverse, local, short-term, minor impacts for construction of the eelways at Dams 4 and 5 with beneficial long-term impacts for American eel. Alternative C would result in adverse, local, long-term, minor impacts to wildlife habitat. When combined with the impacts from the cumulative actions, Alternative C may have a minor contribution to adverse, short-term and long-term, minor cumulative impacts to wildlife habitat within the Park.

Conclusion. Temporary displacement of wildlife during construction activities would result in adverse, local, short-term, minor impacts to wildlife. Alternative C would have adverse, local, long-term, minor impacts to wildlife and wildlife habitat through clearing activities for construction which would remove some woody structure from the existing wildlife habitat. Although trees and other woody vegetation would be permanently removed and prevented from re-establishing within the 0.55 acre of existing easement within the Park and approximately 0.11 acre cleared for the permanent cross-over dike, this would not adversely affect the contiguous nature of the forest canopy within the project study area and adjacent areas. The cleared areas within the easement would be reseeded with NPS approved native grass mix and mowed on a semi-annual basis to prevent regrowth of woody vegetation. Maintenance of native grasses within the easement would provide foraging opportunity for herbivorous wildlife. When combined with the impacts from the cumulative actions, Alternative C may have a minor contribution to adverse, short-term and long-term, minor cumulative impacts to wildlife habitat within the Park.

Historic Structures and Districts

METHODOLOGY AND ASSUMPTIONS

The NHPA (1969, as amended) is the main legislative authority for the management of cultural resources by the NPS. Among other things, Section 106 of the NHPA requires that all federal agencies consider the effect of their actions on significant cultural resources, which are generally defined as cultural resources listed or determined eligible for listing in the National Register (*e.g.*, Historic Properties). If a proposed action is found to result in an adverse effect to an historic property, agreement on the mitigation of the adverse effect is reached through consultation by the federal agency with the SHPO, and applicable Tribal

Historic Preservation Offices (THPO) and/or the Advisory Council on Historic Preservation (Advisory Council), if necessary. Section 110 of the NHPA charges federal agencies with the establishment of programs to identify, evaluate, and nominate to the NHPA cultural resources. Additionally, the NHPA requires that federal agencies take actions to minimize harm to historic properties that would be adversely impacted by a federal undertaking.

Under Section 106, a determination of either *no adverse effect* or *adverse effect* must be made for any historic property that may be impacted by a proposed undertaking. An adverse effect occurs when an impact alters any characteristic or a cultural resource that qualifies it for inclusion in the National Register. An adverse effect also includes any reasonable foreseeable effects caused by the proposed action that would occur later in time, be farther removed in distance, or be cumulative (31 CFR 800.5).

The NPS is charged with the protection and management of cultural resources in its custody. A number of different documents guide the NPS in this regard, including *Director's Order #28: Cultural Resources Management Guideline* (NPS 1998), the NPS 2006 Management Policies (NPS 2006), and the 2008 Servicewide Programmatic Agreement with the Advisory Council and the National Conference of State Historic Preservation Officers. These documents charge managers at the NPS with the task of avoiding or minimizing to the greatest extent possible adverse impacts on park resources and values. While the NPS has the discretion to allow certain impacts in parks, that discretion is limited by the statutory requirement of the *Organic Act* that park resources and values remain unimpaired.

The NPS recognizes a number of different cultural resource categories: archeological resources; cultural landscapes; historic districts and structures; museum objects; and ethnographic resources. As noted in the chapter on "Alternatives," there would be no impacts, adverse or beneficial, to archeological sites, cultural landscapes, museum objects, or ethnographic resources, so the following assessment of impacts addresses only historic districts and structures.

Potential impacts were assessed based on the potential extent of disturbance resulting from an action alternative. The analysis of possible impacts was based on on-site inspection of the project area, a review of existing literature, information provided by the NPS and other agencies, and professional judgment.

If unanticipated discoveries of archeological resources are made, follow the regulations of 36 CFR 800.13 including the cessation of all construction activities and contacting the NPS. If unmarked human remains are encountered, the NPS would follow the appropriate federal regulations, including the Native American Grave Protection and Repatriation Act (NAGPRA).

STUDY AREA

The geographic extent of the study area for determining potential impacts to cultural resources includes the existing easement within the boundaries of the Park as well as areas within the existing easement immediately bordering the Park and the immediately surrounding areas. The APE also extends to Lock 38 due to the current towpath access under the no action alternative (Figure 12). The study area for cumulative analysis includes the project area in the Park and adjacent areas around the project area.

IMPACT THRESHOLDS

For a cultural resource to be assessed for adverse impacts, it must first be assessed for significance under Section 106 of the NHPA. If a resource is determined to be not eligible for listing in the National Register, there can be no adverse impacts to the resource. If a resource is determined eligible for listing in the National Register or is listed in the National Register, impacts can be assessed as having either *no adverse effect* or *adverse effect*.

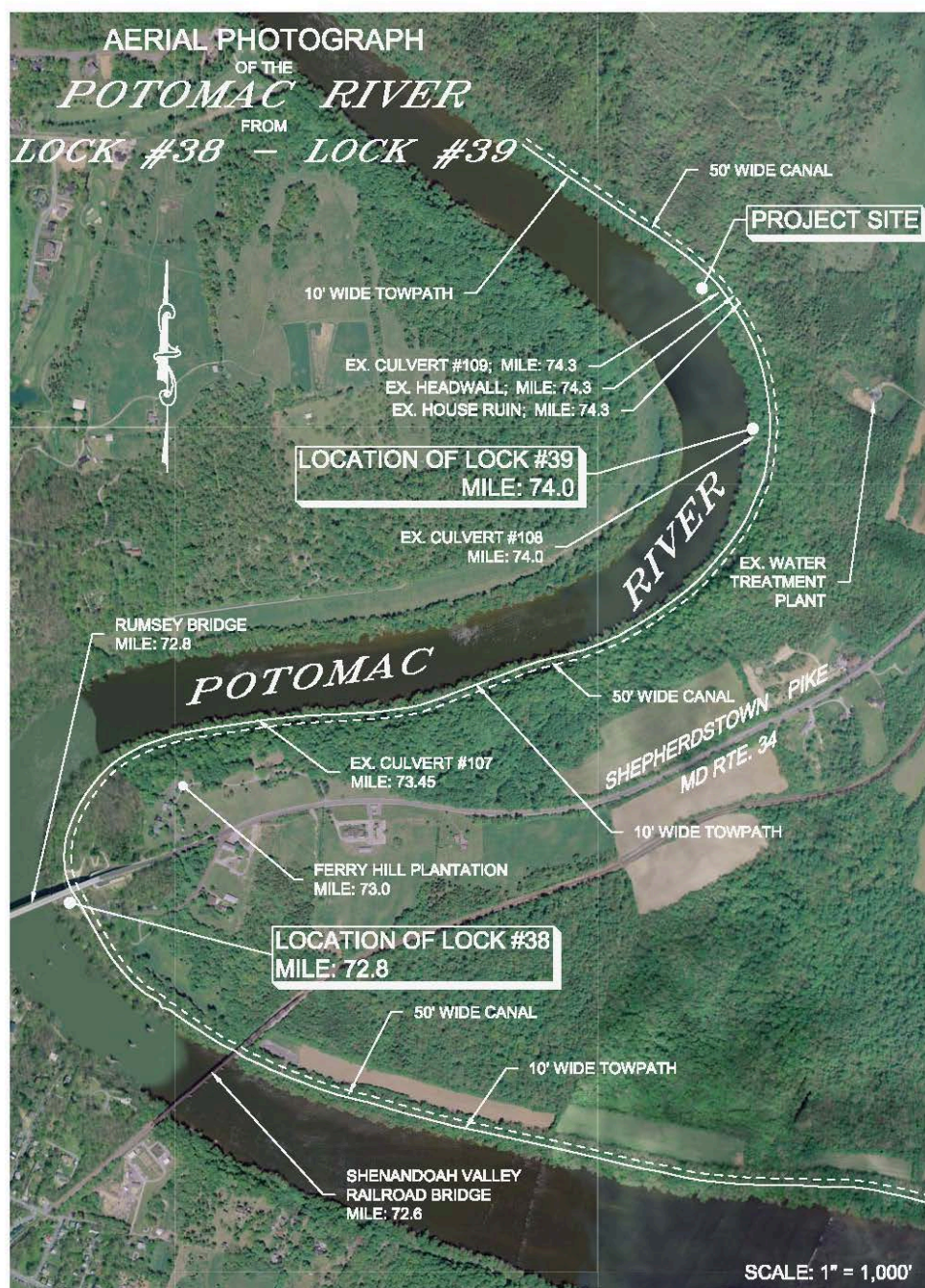


Figure 12: Section 106 Assessment of Effect, Area of Potential Effect.

Negligible: The impact would be barely detectable and would have no adverse effect on the resource. No mitigation would be necessary. The Section 106 determination would be *no adverse effect*.

Minor: The impact would be detectable, but would not diminish the physical integrity or character of the resource. There would be no adverse effect. If mitigation measures were necessary, they would be minor and successful. The Section 106 determination would be *no adverse effect*.

Moderate: The impact would be easily detectable and would alter and diminish the physical integrity and/or character of the resource. There would be an adverse effect to the resource. Mitigation measures would be necessary. The Section 106 determination would be *adverse effect*.

Major: The impact would severely alter and diminish the physical integrity and/or character of the resource. There would be an adverse effect to the resource. Mitigation measures would be necessary. The Section 106 determination would be *adverse effect*.

Duration: Short-term impacts would last during the implementation of an alternative. Long-term impacts would persist after the implementation of an alternative.

IMPACTS OF NO ACTION ALTERNATIVE

Analysis. Alternative A is the no-action alternative, and as such, represents a continuance of current conditions in the APE. There would be no ground disturbing activities conducted under continued normal operations and maintenance. There would be no additional adverse or beneficial impacts under continued normal operations and maintenance if the existing water pipeline continues leaking but does not fail.

However, as the existing water pipeline is leaking, the possibility exists for failure of the line. The extent to which cultural resources within the Park would be affected would be dependent on the location and severity of any breaks or failures of the line necessitating repair. In the event emergency repairs are required, the County would undertake appropriate measures to rectify the emergency situation as allowed under the 1976 perpetual easement (Appendix E) granted by the NPS. Repair work could include trenching through the towpath or canal prism to repair the water line but would not expand the dimensions of the existing water supply pipeline or add future capacity, add new utilities, or change access within the easement. Consistent with the 1976 perpetual easement, the County may utilize the towpath for vehicular access during emergencies. Any damage caused to the Park property would be promptly repaired and/or restored by the County. The canal works would be restored in accordance with the best practices of historic canal construction and restoration. Any such repair work to be performed by the County would be accomplished subject to general supervision by the NPS. If the existing water pipeline fails and emergency repairs are required within the towpath or canal prism, impacts to historic structures and districts would be adverse, local, short-term, and negligible to minor.

Under the no action alternative adverse impacts to historic structures and districts that could occur if the existing water pipeline leaks and emergency repairs are required would be mitigated by measures including:

- Minimize physical adverse impacts to the towpath from construction vehicles by limiting ingress and egress from construction areas and using rubber tired vehicles, each with gross operating weights under 12 tons.
- Repair any damage to the towpath resulting from construction or the movement of construction vehicles.

- Restore canal works in accordance with best practices of historic canal construction and restoration.
- Issue as-built drawings to the Park.

Cumulative Impacts. There would not be any cumulative impacts to historic structures and districts if the existing water pipeline continues to leak but does not fail.

If the existing water pipeline fails and emergency repairs are required, cumulative actions considered in the assessment of historic structures and districts that have had or would have more than negligible impacts to these cultural resources include the recently completed Point of Rocks boat ramp at Mile 48 (NPS 2005), current construction at Big Slackwater at Miles 84-88 (NPS 2009a), and future actions associated with the restoration of canal operations at Williamsport at Miles 98-100 (NPS 2011) and the construction of eelways at Dams 4 and 5 at Miles 84 and 106, respectively (NPS 2009b).

Effects to historic structures and districts from cumulative actions would include: adverse, local, short-term, minor impacts at Points of Rock boat ramp during construction; adverse, local, short-term, minor impacts at Big Slackwater, with beneficial long-term impacts due to the rebuilding of the towpath; beneficial, local, long-term impacts for Canal Operations at Williamsport; and adverse, local, long-term negligible to minor (Dam 5) and moderate (Dam 4) impacts for the eelways due to the introduction of non-historical elements into the cultural landscape and dams. Alternative A would not result in adverse impacts to historic structures and districts unless the existing water pipeline failed and emergency repairs are required. If the existing water pipeline fails and emergency repairs are required within the towpath or canal prism, impacts to historic structures and districts would be adverse, local, short-term, and negligible to minor. When combined with the impacts from the cumulative actions, if the existing water pipeline fails and emergency repairs are required Alternative A may have a slight, local, short-term contribution to adverse, short-term, minor cumulative impacts to historic structures and districts.

Conclusion. Under continued normal operations and maintenance, there would be no impacts to historic structures and districts and no cumulative impacts. The magnitude of impacts to historic structures and districts from failure of the existing waterline and any resulting emergency repairs within the towpath or canal prism would be adverse, local, short-term, and negligible to minor depending on the location of the failure and resulting repairs. The level of the adverse impacts would be minor if the towpath were to be excavated for repairs as it would be confined to an area immediately surrounding the location of the pipeline within the limits of previous disturbance in the existing easement and could be easily mitigated. When combined with the impacts from the cumulative actions, if the existing water pipeline fails and emergency repairs are required Alternative A may have a slight, local, short-term contribution to adverse, short-term, minor cumulative impacts to historic structures and districts.

IMPACTS OF ALTERNATIVE C

Analysis. Under Alternative C, the County would use the open-cut trenching method to place the new water pipeline and electrical and communications conduits within the easement onto private property, where it would continue within the existing easement to the water treatment plant. Open-cut trenching would be used to place the pipeline through the towpath and canal prism. Typically, the towpath is 12 feet wide at its top, which sits approximately 8 feet above the base of the canal prism and 2 feet above the water. The canal prism in the stretch from Harpers Ferry to Cumberland typically has a 32 feet wide base and a 50 feet wide top dimension between the towpath and the opposite edge. Clay lined the bottom of the canal to prevent, or at least inhibit, the drainage of water out of the canal. In a Field Report dated 29 July 2010, the NPS stated that the towpath and the canal prism within the easement were likely disturbed by the construction of the existing water pipeline in the 1960s. This construction would have utilized the open-cut trenching method to place the pipeline through the towpath and canal prism, which would have

then been rebuilt to their former states. Under Alternative C, trenching for the new water lines and conduit would be within the limits of disturbance for the previous installation. The towpath and canal prism disturbed by trenching would be restored to existing condition. The impact to historic structures and districts by the trenching for installation of new water lines and conduit would be adverse, local, short-term, and minor.

Under Alternative C the County would also construct a permanent cross-over dike across the canal prism to allow for the access of County maintenance vehicles to the easement and existing pump station and to avoid the use of one mile of Park towpath during construction and future operations and maintenance activities. The construction equipment would cross the towpath at the location of the new access road and cross-over dike. The dimensions of the permanent cross-over dike would approximate those of the towpath. It would be approximately 6 feet in height above the filled-in canal prism and have an approximately 12-foot wide travel lane with 3:1 grade side slopes for an ultimate width of approximately 16 feet. Current plans call for the cross-over dike to contain two 36-inch culverts to allow water to flow through the canal prism during rain events. The impact to historic structures and districts by the construction of the permanent cross-over dike would be adverse, local, long-term, and minor.

The NPS has established a 12-ton weight limit for vehicles for most of the towpath to minimize risk of damage. Although the trackhoe exceeds the 12-ton vehicle limit recommended by the NPS for the towpath, the weight of the trackhoe would be distributed over the entire length and width of the tracks; thus the trackhoe would exert fewer pounds per square inch than the 12-ton dump truck. The tracks on the trackhoe are 32 inches wide by 50 feet in length (per side). With 20 feet of the track in contact with the ground, the weight would be distributed over an area equating to 17.76 square feet of contact area, equal to 0.9 ton per square foot. By comparison, the dump truck would exert a point load of 3 tons per front tire. Based on the reduced tonnage per square inch that would be exerted on the towpath by the trackhoe in comparison to a 12-ton rubber tired vehicle, the trackhoe would minimize concerns for damage to the towpath, meeting the intent of the NPS vehicle weight limitation. The trackhoe would make a nearly perpendicular crossing across the towpath (Figure 7). The impact to the towpath by construction equipment passage would be adverse, local, short-term, and minor. Elimination of County maintenance vehicle use on one mile of towpath through construction of the permanent cross-over dike would result in beneficial, local, long-term, and minor impacts to the towpath.

A temporary bypass water line would be installed across the towpath in a shallow, narrow trench. A steel plate or earthen overburden would be placed over the temporary bypass water line and its protective steel sleeve, and the overburden graded to provide a gradual slope up and over the temporary bypass water line to minimize disruption to passage by motorized vehicles, bicyclists, and pedestrians. The towpath would be restored to original contours following removal of the temporary bypass water line. The impact to historic structures and districts by the temporary bypass water line would be adverse, local, short-term, and minor.

Alternative C would also include the construction of a new elevated electrical platform adjacent and upstream of the intake and removal of the existing platform once the new platform became operational. Disturbance would be minimized by placement of the new structure on pilings. The area around the platform was disturbed during its construction and that of the water intakes in the 1960s and Alternative C would not disturb new areas outside the existing easement for this work. The impact to the character of the C&O Canal National Register Historic District by the construction of the new elevated electrical platform would be adverse, local, long-term, and negligible.

Although this area is not considered a cultural landscape, it does exhibit the general character of much of the area along the Park, that of a mature deciduous forest. Construction of Alternative C would result in the removal of all existing vegetation within the easement, an area approximately 805 feet long by 30 feet

wide or 0.55 acre. Vegetation would also be removed within approximately 0.11 acre for the proposed new easement for the permanent cross-over dike across the canal prism. While the easement would be reseeded with NPS approved native grass seeds, it would be mowed on a semi-annual basis to prevent the regrowth of trees and shrubs.

The easement, though, is shielded from the towpath by an existing band of forest between 20 and 60 feet wide except where it currently crosses the canal and where there is an access drive from the towpath to the pump station. From spring to mid-fall, when the deciduous trees are in leaf, the mown easement would not be visible from the towpath except at the two previously mentioned locations. Additionally, in winter when the deciduous trees have lost their leaves, the mown easement would not be particularly noticeable due to the presence of trees on both sides, the narrowness of the easement, and the distance between the towpath and the easement, which serves to obscure the easement. The proposed elevated electrical platform would replace an existing elevated electrical platform; the existing visual conditions in this location would not change substantially. As such, the impact to the character of the C&O Canal National Register Historic District by the removal of mature deciduous forest within the easement would be adverse, local, long-term, and minor.

Mitigation measures have been designed to prevent weight loading to the towpath and to prevent any possible adverse impacts to the three historical culverts and one wastew weir located between the access point at Lock 38 and the APE. Measures were also designed to limited impacts to the towpath and canal prism to already disturbed sections within the existing easement.

These measures would include improving the access road along the private property easement and the construction of a permanent cross-over dike to eliminate the need for County equipment to travel on one mile towpath. The equipment to be used for the excavation of the open-cut trench and construction of the cross-over dike, as well as equipment used for future maintenance of the waterline and pump station, would access the APE via the improved access road that would lead from the water treatment plant to the Park, and construction would be confined to the existing easement. Finally, the towpath and canal prism would be returned to their current state following construction, and the cross-over dike would be designed to blend in with the surrounding environment, per NPS standards and approval. All construction related drawings would be reviewed and approved by the NPS prior to construction.

Under Alternative C adverse impacts to historic structures and districts would be mitigated by measures including:

- Minimize physical adverse impacts to the towpath from construction vehicles by limiting ingress and egress from construction areas and using a rubber tired backhoe loader and single axle dump truck, each with gross operating weights under 12 tons. Larger trackhoe used for trenching would be limited to crossing the towpath within limits of disturbance for original water line.
- Improve access to the APE for construction of Alternative C as well as for future maintenance of the waterline and pump station via an improved access road along the private property easement and the construction of a cross-over dike, which would be designed to blend in with the surrounding environment. The cross-over dike would be a grassed to minimize potential erosion and the road gated on the private property side to minimize unintended use. Project design would be reviewed for acceptable design/finish of the dike.
- Through consultation with the NPS and adhering to Secretary of Interior Standards for the Treatment of Historic Properties, repair any damage to the towpath resulting from construction or the movement of construction vehicles.

- Restore canal features in accordance with best practices of historic canal construction and restoration.
- If during construction, archeological resources are discovered, all work in the immediate vicinity of the discovery would be halted until the resources can be identified and documented and an appropriate mitigation strategy developed. If necessary, consultation with the Maryland Historic Preservation Officer, NPS, and/or the NPS Regional Archeologist will be coordinated to ensure that the protection of resources is addressed. In the unlikely event that human remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered during construction, provisions outlined in the Native American Graves Protection and Repatriation Act (25 USC 3001) of 1990 would be followed.

Cumulative Impacts. Cumulative actions considered in the assessment of historic structures and districts that have had or would have more than negligible impacts to these cultural resources include the recently completed Point of Rocks boat ramp at Mile 48 (NPS 2005), current construction at Big Slackwater at Miles 84-88 (NPS 2009a), and future actions associated with the restoration of canal operations at Williamsport at Miles 98-100 (NPS 2011) and the construction of eelways at Dams 4 and 5 at Miles 84 and 106, respectively (NPS 2009b).

Effects to historic structures and districts from cumulative actions would include: adverse, local, short-term, minor impacts at Points of Rock boat ramp during construction; adverse, local, short-term, minor impacts at Big Slackwater, with beneficial long-term impacts due to the rebuilding of the towpath; beneficial, local, long-term impacts for Canal Operations at Williamsport; and adverse, local, long-term negligible to minor (Dam 5) and moderate (Dam 4) impacts for the eelways due to the introduction of non-historical elements into the cultural landscape and dams. Alternative C would result in adverse, local, short-term, minor impacts from trenching through the towpath and canal prism for the new water lines and conduit, passage of construction equipment on the towpath, and installation of the temporary bypass water line across the towpath. Alternative C would also result in adverse, local, long-term, minor impacts to the canal prism from construction of the permanent cross-over dike across the canal prism and from visual conditions by clearing the easement, but would have beneficial, local, long-term, minor impacts by elimination of County maintenance vehicle use on one mile of towpath. Alternative C would have adverse, local, long-term, negligible impacts from construction of the new elevated electrical platform. When combined with the impacts from the cumulative actions Alternative C may have a slight contribution to adverse, short-term and long-term, minor cumulative impacts to historic structures and districts.

Conclusion. There would be adverse, local, short-term minor impacts to the towpath and canal prism within the limits of previous disturbance within the easement in the Park from trenching for installation of new water lines and conduit and from installation of the temporary bypass water line crossing. There would be adverse, local, long-term, minor impacts to the canal prism from construction of the permanent cross-over dike and adverse local, short-term, minor impacts to the towpath from construction equipment passage, but these actions would result in beneficial, local, long-term, minor impacts to the towpath through avoidance and elimination, respectively, of construction vehicle use and County maintenance vehicle use on one mile of towpath. Implementation of Alternative C would also result in adverse, long-term, negligible impacts to visual conditions from construction of the new elevated electrical platform and removal of the existing platform, and from clearing of the easement. Adverse impacts would be mitigated. The impacts would result in “no adverse effects” under Section 106 of the NHPA. When combined with the impacts from the cumulative actions Alternative C may have a slight contribution to adverse, short-term and long-term, minor cumulative impacts to historic structures and districts. The proposed mitigation measures would ensure that, while the adverse impacts to the Park would be detectable, they would not diminish the physical integrity or the character of the Park.

SECTION 106 ASSESSMENT OF EFFECT

National Historic Preservation Act Section 106 Summary

This *Sharpsburg Water Intakes Upgrade EA* analyzes the impacts of the no action alternative and one action alternative with regard to potential impacts on historic structures and districts within the C&O Canal NHP.

Alternative A - No Action

Under Alternative A, existing conditions would remain essentially constant. There would no change in the integrity of historic resources, including the canal prism and the towpath. The current level of preservation maintenance would remain in effect, so there would be *no adverse effect* on historic resources.

Alternative C – Replace Waterline within Existing Easement

Under Alternative C, the park would permit the following near Mile 74 of the Park: (1) removal of an existing water supply line and electric service conduit that run through an existing easement and construction of two new water lines, conduit for electric service line, and conduit for communications line in the same location; (2) installation of a temporary bypass water line for the duration of construction activities; (3) construction of a new elevated electrical platform and removal of the existing electrical platform within the existing easement; and (4) construction of a permanent cross-over dike on new easement across the canal prism to improve access and reduce vehicular traffic for construction and future operations and maintenance on one mile of towpath.

Removal of the existing water line and electrical conduit and installation of the new water lines and electric service and communication lines in the former location of the existing water line by the open trench construction method would result in subsurface disturbance amounting to a minor short-term loss of physical integrity to the towpath and canal prism. This trenching would occur within the previous limits of disturbance for the 1960s installation of the original water line and the towpath and canal prism would be restored to their original form with existing material immediately after installation of the new water lines and conduit. Installation of the temporary bypass water line within a narrow, shallow trench across the towpath would result in subsurface disturbance amounting to a minor short-term loss of physical integrity to the towpath. The towpath would be restored to its original form with existing material immediately after completion of project construction. The proposed elevated electrical platform would replace an existing elevated electrical platform; the existing visual conditions in this location would not change. The installation of the elevated electrical platform would have no impact to historic structures and districts. Construction of the permanent cross-over dike would result in a minor local change to the appearance of the canal prism but would reduce County vehicular traffic on the towpath for construction and future operations and maintenance on one mile of towpath. The overall impact of the project would support a finding of *no adverse effect* to historic structures and districts under Section 106.

Vegetation, currently consisting of grasses, shrubs, saplings, small trees, and one specimen tree, would be cleared from the existing easement and proposed new easement for permanent cross-over dike prior to construction, revegetated with native vegetation after the completion of construction, and mowed as part of periodic maintenance following construction under both optional construction methods. However, most of the easement would be shielded from view of the towpath by a section of mature forest between 20 and 60 feet wide, except where the easement crosses the canal and the access drive from the towpath to the pump station. These sections not shielded by existing vegetation would be visible from the towpath only temporarily as park visitors pass through the immediate area. Although the clearing and periodic maintenance of vegetation within the easement would be long-term in their duration, the adverse impacts would be limited to the existing easement and the proposed new easement for the permanent cross-over

dike. The existing easement is only 30 feet in width and is surrounded on all sides by existing vegetation, and the proposed new easement, would be only approximately 40 feet in additional width from the towpath to the Park boundary approaching the treatment plant. Because the County has the right to clear existing vegetation from and maintain the existing easement, and would revegetate the easement with native vegetation as a mitigation measure, the action would not result in an impairment to the aesthetics and viewsheds of the Park. As such, the clearing of vegetation and periodic maintenance would have *no adverse effect* to historic structures and districts under Section 106.

Conclusion. In accordance with Section 106 of the NHPA, potential adverse effects (as defined in 36 CFR 800) on archeological resources and on historic structures and districts listed on or eligible for listing on the National Register would be coordinated between the NPS and the Maryland State Historic Preservation Officer (SHPO) to determine the level of effect on the property and to determine any necessary mitigation measures. Continuing implementation of Director's Order 28 (NPS 1998) and adherence to NPS *Management Policies 2006* (NPS 2006c) and the 2008 Servicewide Programmatic Agreement with the Advisory Council on Historic Preservation (ACHP) on Historic Preservation and National Conference of State Historic Preservation Officers (NPS 2008b) would all aid in reducing the potential to adversely impact historic properties.

Copies of this *Sharpsburg Water Intakes Upgrade EA* will be distributed to the Maryland Historical Trust (MHT), Maryland's SHPO, for review and comment related to compliance with Section 106 of the NHPA. The NPS is seeking a "no adverse effect" concurrence from the SHPO as part of the ongoing consultation which included review and comment on this public document. A full description of agency consultation and coordination is available in "Chapter 5: Consultation and Coordination."

Visitor Use and Experience

METHODOLOGY AND ASSUMPTIONS

Potential impacts were assessed based on the current setting of the Park in the vicinity of the project study area, the types of visitor activities common in this section of the park, and the locations of any construction-related actions. The analysis of potential impacts was based on on-site inspection of the project area, a review of existing maps and literature, information provided by the NPS, and professional judgment.

STUDY AREA

The study area for this portion of the impact analysis is in the vicinity of Mile 73-74, from where the existing easement crosses the towpath to the access point from the towpath to the existing pump station, a distance of less than 800 feet along the towpath, as well as one mile of towpath currently in use. The study area for cumulative analysis includes the project area in the Park and adjacent areas around the project area.

IMPACT THRESHOLDS

Negligible: Visitors would most likely be unaware of impacts associated with implementation of an alternative. There would be no noticeable change in visitor use and experience or in definitions of visitor satisfaction or behavior.

Minor: Visitors would be aware of impacts associated with implementation of an alternative. However, the impacts would either not result in any notable change in visitor use or experience or in definitions of satisfaction or behavior or the changes would be contained within a local area. If mitigation measures were necessary, they would be simple and likely successful.

Moderate: Visitors would be readily aware of impacts associated with implementation of an alternative. The impacts would alter the number of participants engaging in particular activities and would likely result in a decline in visitor use or experience or in definitions of satisfaction or behavior. Mitigation measures would be necessary, but they would be simple and likely successful.

Major: Impacts would be readily noticeable and substantial. Visitors would be forced to engage in activities at other locations. There would be a significant decline in visitor experience and in definitions of satisfaction or behavior. Mitigation measures would be necessary, extensive, and success would not be guaranteed.

Duration: Short-term impacts would occur during the implementation of an alternative. Long-term impacts would persist after the implementation of an alternative.

IMPACTS OF NO ACTION ALTERNATIVE

Analysis. Alternative A is the no-action alternative, and as such, represents a continuance of current conditions in the project study area. As such, there would be no change in visitor use and experience within the study area. The County would continue to undertake routine maintenance and operations of the existing water supply pipeline, including any repair work necessary to maintain and operate the existing water supply pipeline. Vegetation maintenance and management within the easement would be allowed as permitted under the existing easement, maintaining the current views. Visitors would continue to use the towpath for recreational activities. It should be noted that under Alternative A, County vehicles would continue to use one mile of the towpath to access the intake area for routine maintenance and operations.

Currently, the existing water supply pipeline is a 6-inch diameter pipe that has at least one identified leak along its length. Trees that have grown up within the easement may be removed to reduce the risk of failure of the existing water supply pipeline resulting from additional damage caused by roots, but this action would not appreciably alter visitor use or experience. In the event emergency repairs are required, the County would undertake appropriate measures to rectify the emergency situation as allowed under the 1976 perpetual easement (Appendix E) granted by the NPS. Repair work may impact visitor use and experience for the duration of such activities. Consistent with the 1976 perpetual easement, the County may utilize the towpath for vehicular access during emergencies which would be noticeable to visitors using the towpath. Any damage caused to the towpath would be promptly repaired and/or restored by the County which would limit long-term impacts to visitor use and experience. If emergency repairs are required within the canal prism, the canal works would be restored in accordance with the best practices of historic canal construction and restoration, which would not result in noticeable changes to visitor experience. Impacts to visitor use and experience that may occur if the existing water pipeline fails and emergency repairs are required would be adverse, local, short-term, and minor.

Under the no action alternative adverse impacts to visitor use and experience that could occur if emergency repairs are required would be mitigated by measures including:

- Ensure that public access to the towpath is not impeded by repair activities.
- Place signs at Lock 38 and between the repair area and Snyder's Landing to notify park visitors of the repair work. The signs would remain until repairs finished.
- Repair any damage to the towpath resulting from repairs or the movement of construction vehicles.
- Reseed repair area with NPS approved native vegetation seed mix.

Cumulative Impacts. Cumulative actions within the vicinity of the project study area considered in the assessment of visitor use and experience include the New Design raw water main and effluent outfall in Frederick County at Mile 44 (NPS 2006d), recently completed Point of Rocks boat ramp at Mile 48 (NPS 2005), current construction at Big Slackwater at Miles 84-88 (NPS2009a), and future actions associated with the restoration of canal operations at Williamsport at Miles 98-100 (NPS 2011) and construction of eelways at Dams 4 and 5 at Miles 84 and 106, respectively (NPS 2009b).

Effects to visitor use and experience from cumulative actions would include: adverse, local, short-term, minor impacts for the New Design raw water upgrades; beneficial, local, long-term, impacts at Points of Rock from construction of the new boat ramp to avoid the rock ledge navigation hazard in the Potomac River; beneficial, local, long-term, impacts at Big Slackwater due to the rebuilding of the towpath; adverse, local, short-term, minor impacts and beneficial, long-term impacts for Canal Operations at Williamsport; and adverse, local, short-term negligible impacts and beneficial, long-term impacts for the eelways. Alternative A would not result in adverse impacts to visitor use and experience unless the existing water pipeline failed and emergency repairs are required. If the existing water pipeline fails and emergency repairs are required, impacts to visitor use and experience would be adverse, local, short-term, and minor. When combined with the impacts from the cumulative actions, if the existing water pipeline fails and emergency repairs are required Alternative A may have a slight, local, short-term contribution to adverse, short-term, minor cumulative impacts to visitor use and experience within the Park.

Conclusion. Under continued normal operations and maintenance, there would be no impacts to visitor use and experience and no cumulative impacts. Repair work may impact visitor use and experience for the duration of such activities. The magnitude of impacts to visitor use and experience from failure of the existing waterline and any resulting emergency repairs would be adverse, local, short-term, and minor. When combined with the impacts from the cumulative actions, if the existing water pipeline fails and emergency repairs are required Alternative A may have a slight, local, short-term contribution to adverse, short-term, minor cumulative impacts to visitor use and experience within the Park.

IMPACTS OF ALTERNATIVE C

Analysis. Visitor use and experience would be impacted during construction activities for Alternative C. The total elapsed time of construction within the Park and on private property for Alternative C is estimated at a total of 6 months. Construction time on Park property is estimated at 8 weeks, but the temporary bypass water line would be in place on Park property during the entire construction process until the new water pipeline is connected and functional. Construction activities would be avoided during periods of peak visitor use of the Park.

The main impact to visitor use and experience would likely be from construction activities associated with trenching across the towpath for installation of the new water lines and conduit. The County would plan to undertake the installation of the steel casing sleeve under the towpath in a single construction episode between sunset and following morning sunrise, when the towpath would be closed to Park visitors, with backfilling of the trench expected to be completed by morning when the Park opens. Full reconstruction of the towpath to its original contours would be anticipated to take an additional two days. During the period in which reconstruction activities are occurring within the towpath, a temporary pedestrian bypass would be established. Impacts to visitor use and experience from installation of the new water lines and conduit by trenching through the towpath would be adverse, local, short-term, and minor.

The temporary bypass water line would be installed in a shallow, narrow trench excavated across the towpath with a steel plate or earthen overburden placed over the water line graded to provide a gradual slope up and over the water line to prevent disruption to passage by motorized vehicles, bicyclists, and

pedestrians on the towpath. Upon completion of the proposed new water line, this temporary bypass water line would be immediately removed and the towpath restored to original grade. Impacts to visitor use and experience from the temporary bypass water line would be adverse, local, short-term, and minor.

Equipment would access the project site along the new location access road and cross-over dike to cross the towpath to access the river side of the canal. As the NPS does not allow the towpath to be closed for more than five minutes at a time, crossings of the towpath by construction equipment would occur quickly. However, it is possible that visitors would be using the towpath in the construction area at the same time, and thus would have to wait for the equipment to cross before continuing along the towpath. Project staff would be required to provide flaggers along the towpath to stop visitors when equipment is moving across the towpath.

Impacts to visitors passing through or by the construction area during periods of active construction activities may include a minor diminishment of satisfaction based on any temporary delays in passage as well as noise pollution and air pollution (dust, internal combustion engine emissions) from heavy machinery within the construction area. These impacts would last for the duration of construction activities and would be adverse, local, short-term, and minor.

The visual experience would be temporarily affected as visitors passed the construction site. This would include a break in the vegetation along the easement on private property as seen from the towpath, cleared vegetation within the current easement, and construction equipment and excavated areas (bore holes, open cut trench). Post-construction, there would be adverse, local, long-term, negligible to minor impacts to visitor experience arising from the clearing of trees along the easement on private property and within the easement on Park property within sight of the towpath, especially from late fall to early spring, until the trees had grown enough leaves to obscure the easement.

During construction, Alternative C would result in adverse, local, short-term, minor impacts to visitor use and experience. Post-construction, Alternative C would result in adverse, local, long-term, minor impacts to visitor use and experience from visual changes to vegetation within the easement. The impacts would be long-term as the easement would be mown on a semi-annual basis and minor as they would be visible from the towpath for a stretch of only a few hundred feet and would be generally obscured by hardwood trees from spring through fall.

Under Alternative C adverse impacts to visitor use and experience that could occur would be mitigated by measures including:

- Establish temporary pedestrian bypass during the period in which reconstruction activities are occurring within the towpath.
- Ensure that construction activities are avoided during periods of peak visitor use of the Park.
- Place signs at Lock 38 and between the project area and Snyder's Landing to notify park visitors of the construction work. The signs would remain until repairs finished.
- If steel plate is used to cover the temporary waterline at the towpath, ensure that edges of the steel plate are not an impediment to visitor travel.
- If earthen overburden is placed over the temporary bypass water line, grade overburden to provide a gradual slope up and over the water line to prevent disruption to passage by motorized vehicles, bicyclists, and pedestrians on the towpath.
- Restore towpath to NPS standards and approval.

Cumulative Impacts. Cumulative actions within the vicinity of the project study area considered in the assessment of visitor use and experience include the New Design raw water main and effluent outfall in

Frederick County at Mile 44 (NPS 2006d), recently completed Point of Rocks boat ramp at Mile 48 (NPS 2005), current construction at Big Slackwater at Miles 84-88 (NPS2009a), and future actions associated with the restoration of canal operations at Williamsport at Miles 98-100 (NPS 2011) and construction of eelways at Dams 4 and 5 at Miles 84 and 106, respectively (NPS 2009b).

Effects to visitor use and experience from cumulative actions would include: adverse, local, short-term, minor impacts for the New Design raw water upgrades; beneficial, local, long-term impacts at Points of Rock from construction of the new boat ramp to avoid the rock ledge navigation hazard in the Potomac River; beneficial, local, long-term, impacts at Big Slackwater due to the rebuilding of the towpath; adverse, local, short-term, minor impacts and beneficial, long-term impacts for Canal Operations at Williamsport; and adverse, local, short-term negligible impacts and beneficial, long-term impacts for the eelways. Alternative C would result in adverse, local, short-term, minor impacts to visitor use and experience during construction. Post-construction, Alternative C would result in adverse, local, long-term, minor impacts to visitor use and experience from visual changes to vegetation within the easement. When combined with the impacts from the cumulative actions Alternative C would have a slight, local contribution to adverse, short-term and long-term, minor cumulative impacts to visitor use and experience within the Park.

Conclusion. Alternative C would result in adverse, local, short-term, minor impacts to visitor use and experience during construction. Post-construction, Alternative C would result in adverse, local, long-term, minor impacts to visitor use and experience from visual changes to vegetation within the easement. Mitigation measures would be implemented to minimize adverse impacts to visitor use and experience. When combined with the impacts from the cumulative actions Alternative C would have a slight, local contribution to adverse, short-term and long-term, minor cumulative impacts to visitor use and experience within the Park.

Public Health and Safety

METHODOLOGY AND ASSUMPTIONS

Potential impacts were assessed based on the current setting of the Park in the vicinity of the project study area, the types of visitor activities common in this section of the park, and the types and locations of any construction-related actions. The analysis of potential impacts was passed on on-site inspection of the project area, a review of existing maps and literature, information provided by the NPS, and professional judgment.

STUDY AREA

The study area for this portion of the impact analysis includes the existing easement as well as areas immediately adjacent to the existing easement and the vicinity of Mile 73-74, from where the existing easement crosses the towpath to the access point from the towpath to the existing pump station, a distance of less than 800 feet along the towpath, as well as one mile of towpath currently in use.. The study area for cumulative analysis includes the project area in the Park and adjacent areas around the project area.

IMPACT THRESHOLDS

Negligible: Visitors would most likely be unaware of impacts associated with implementation of an alternative. There would be no measurable or noticeable impact to visitor safety.

Minor: Visitors would be aware of impacts associated with implementation of an alternative. However, the impacts would have little impact to visitor safety. If mitigation measures were necessary, they would be simple and likely successful.

Moderate: There would be noticeable impacts to visitor safety on a local scale. Mitigation measures would be necessary, but they would be simple and likely successful.

Major: Impacts would be readily noticeable and substantial. Visitor safety would be substantially impacted on a regional scale. Mitigation measures would be necessary, extensive, and success would not be guaranteed.

Duration: Short-term impacts would occur during the implementation of an alternative. Long-term impacts would persist after the implementation of an alternative.

IMPACTS OF NO ACTION ALTERNATIVE

Analysis. Alternative A is the no-action alternative, and as such, represents a continuance of current conditions in the project study area. As such, there would be no changes to public health and safety within the study area. The County would continue to undertake routine maintenance and operations of the existing water supply pipeline, including any repair work necessary to maintain and operate the existing water supply pipeline. It should be noted that under Alternative A, County vehicles would continue to use one mile of the towpath to access the intake area for routine maintenance and operations.

Currently, the existing water supply pipeline is a 6-inch diameter pipe that has at least one identified leak along its length. Trees that have grown up within the easement may be removed to reduce the risk of failure of the existing water supply pipeline resulting from additional damage caused by roots, but with appropriate safety measures and practices, this action would pose minimal threats to the safety of the general public, NPS staff, or contractors. In the event emergency repairs are required to the existing water supply pipeline, the County would undertake appropriate measures to rectify the emergency situation as allowed under the 1976 perpetual easement (Appendix E) granted by the NPS. Safety hazards would include construction equipment on and in the vicinity of the towpath, and any open excavations necessary for repairing the water line. Appropriate safety measures and practices would be undertaken during any repair work. Safety hazards that may occur if the existing water pipeline fails and emergency repairs are required would be adverse, local, short-term, and negligible.

Cumulative Impacts. Cumulative actions within the vicinity of the project study area considered in the assessment of public health and safety include public safety considerations for the recently completed Point of Rocks boat ramp at Mile 48 (NPS 2005), and future actions associated with construction of eelways at Dams 4 and 5 at Miles 84 and 106, respectively (NPS 2009b). Past actions for the New Design raw water main and effluent outfall in Frederick County at Mile 44 (NPS 2006d), current actions at Big Slackwater at Miles 84-88 (NPS2009a), and future actions for canal operations at Williamsport at Miles 98-100 (NPS 2011) were determined to have negligible impacts to public safety with appropriate safety measures and dismissed from further assessment.

Effects to public safety from cumulative actions would include: beneficial, local, long-term impacts at Points of Rock from construction of the new boat ramp to avoid the rock ledge navigation hazard in the Potomac River; and adverse, local, short-term, minor impacts during construction and long-term negligible to minor impacts during operation of the eel ladder for the eelway at Dam 4 and no impacts to public safety for the eelway at Dam 5. With appropriate safety measures, Alternative A would result in adverse, local, short-term, negligible impacts to public safety if emergency repairs are required. When combined with the impacts from the cumulative actions Alternative A would have a slight, local contribution to adverse, short-term, negligible cumulative impacts to public safety within the Park during any required repair work, and no long-term cumulative impacts.

Conclusion. Under continued normal operations and maintenance, there would be no impacts to public health and safety and no cumulative impacts. Repair work has the potential to impact public safety for the duration of such activities. The magnitude of impacts to public safety from failure of the existing waterline and any resulting emergency repairs would be adverse, local, short-term, and negligible with appropriate safety measures. When combined with the impacts from the cumulative actions, if the existing water pipeline fails and emergency repairs are required Alternative A may have a slight, local, short-term contribution to adverse, short-term, negligible cumulative impacts to public safety within the Park.

IMPACTS OF ALTERNATIVE C

Analysis. Potential safety concerns to visitor use arise around the construction site from the excavation of the open cut trench on either side of the towpath and canal prism as well as from installation of the pipe line under the towpath and canal prism by trenching. Because the proposed action would occur within the existing easement which was previously excavated for installation of the existing waterline, it is unlikely that any rock would be encountered that would require blasting. If rock is encountered that would need to be cleared using hydraulic hammering, potential safety issues could arise from rock or other debris being projected at high velocities during hammering. The presence of construction equipment within the easement during construction could also pose a safety concern.

Under Alternative C, construction of the open-cut trench through the towpath would necessitate the removal of a section of the towpath to place a steel casing sleeve through which the new water pipelines and conduit would run. The County would plan to undertake the installation of the steel casing sleeve under the towpath in a single construction episode between sunset and following morning sunrise, when the towpath would be closed to Park visitors, with backfilling of the trench expected to be completed by morning when the Park opens. Full reconstruction of the towpath to its original contours would be anticipated to take an additional two days. Depending on the time of morning backfilling of the trench through the towpath is completed following placement of the steel casing sleeve, and the physical state of the towpath prior to its full reconstruction, a temporary detour around the construction area for park visitors may have to be established. This would entail visitors leaving the towpath, being led safely around the construction area, and reentering the towpath.

During the period in which reconstruction activities are occurring within the towpath, a temporary pedestrian bypass would be established. A 4-foot wide steel plate with handrails on both sides would be placed over the trench to allow pedestrians to continue using the towpath. Reconstruction activities would be limited to one side of the towpath at a time with the temporary pedestrian bypass occupying the other side of the towpath. The temporary pedestrian bypass would be moved to the completed side of the towpath to allow completion of reconstruction activities on the remaining side of the towpath. Project staff would be posted on the towpath to ensure safe visitor travel through the work zone during open park hours. Although the towpath is closed at dusk, there may be visitors who are in the Park after dark. Battery-operated blinker barricades would be placed to warn visitors in the project area after hours. With appropriate safety measures, potential impacts to visitor use and experience from installation of the new water lines and conduit by trenching through the towpath would be adverse, local, short-term, and minor.

Potential public safety issues would also arise around the construction site from the excavation of the open cut trench on either side of the towpath and canal prism, construction of the permanent cross-over dike, and construction activities for the new elevated electric platform. Safety during construction in the construction area and along the towpath would be maximized through mitigative measures. It is unlikely that any rock would be encountered during construction, as it likely would have been cleared during construction of the existing water pipeline. If necessary, clearing of rock within the open-cut trench located within and adjacent to the project study area would use hydraulic hammering, if possible.

Potential safety issues to park visitors would arise from rock and other debris being projected at high velocities from the hammering. This could be avoided by conducting any necessary hydraulic hammering during night time when the Park is not open to use. People in the Park, including any visitors, NPS staff, or contractors, would be kept a safe distance away so they do not encounter flying debris.

Equipment would access the project site along the new location access road and would have to cross the canal prism and towpath to access the river side of the canal. As the NPS does not allow the towpath to be closed down for more than five minutes at a time, crossings of the towpath by construction equipment would occur quickly. However, it is possible that visitors would be using the towpath in the vicinity of the project study area at the same time, and thus would have to wait for the equipment to cross before continuing along the towpath. Project staff would be posted on the towpath to ensure safe passage of visitors. With appropriate safety measures, potential impacts to public safety from construction activities near the towpath would be adverse, local, short-term, and minor.

Another safety consideration is for safe passage along the towpath within the vicinity of the temporary bypass water line crossing. The temporary bypass water line would be installed in a shallow, narrow trench excavated across the towpath with either a steel plate or earthen overburden placed over the water line graded to provide a gradual slope up and over the water line to prevent disruption to passage by motorized vehicles, bicyclists, and pedestrians on the towpath. The location of the temporary bypass water line would be marked to alert towpath users to its presence. Upon completion of the proposed new water line, this temporary bypass water line would be immediately removed and the towpath restored to original grade. Impacts to public safety from the temporary bypass water line would be adverse, local, short-term, and minor.

Under Alternative C potential adverse impacts to public safety that could occur would be mitigated by measures including:

- Develop a safety plan to ensure the safety of park visitors, NPS personnel, and construction workers.
- Place signs at Lock 38 and between the repair area and Snyder's Landing to notify park visitors of the construction work. The signs would remain until construction is finished.
- Limit construction activities through or on either side of the towpath to those times of day least used by the public.
- Limit trenching through the towpath and installation of the steel casing sleeve under the towpath in a single construction episode between sunset and following morning sunrise, when the towpath would be closed to Park visitors, with backfilling of the trench expected to be completed by morning when the Park opens.
- Establish temporary pedestrian bypass during the period in which reconstruction activities are occurring within the towpath.
- Post project staff on the towpath to ensure safe visitor travel through the work zone during open park hours. Place battery-operated blinker barricades to warn visitors in the project area after hours.
- Use construction fencing or safety tape to demarcate limits of open-cut trenches within and adjacent to Park boundaries.
- Mark the temporary bypass water line location so that it is easily seen by park visitors.
- Keep people a safe distance away during any hydraulic hammering activities so they do not encounter flying debris.

Cumulative Impacts. Cumulative actions within the vicinity of the project study area considered in the assessment of public health and safety include public safety considerations for the recently completed Point of Rocks boat ramp at Mile 48 (NPS 2005), and future actions associated with construction of

eelways at Dams 4 and 5 at Miles 84 and 106, respectively (NPS 2009b). Past actions for the New Design raw water main and effluent outfall in Frederick County at Mile 44 (NPS 2006d), current actions at Big Slackwater at Miles 84-88 (NPS2009a), and future actions for canal operations at Williamsport at Miles 98-100 (NPS 2011) were determined to have negligible impacts to public safety with appropriate safety measures and dismissed from further assessment.

Effects to public health from cumulative actions would include: beneficial, local, long-term, impacts at Points of Rock from construction of the new boat ramp to avoid the rock ledge navigation hazard in the Potomac River; and adverse, local, short-term, minor impacts during construction and long-term negligible to minor impacts during operation of the eel ladder for the eelway at Dam 4 and no impacts to public safety for the eelway at Dam 5. With appropriate safety measures, Alternative C would result in adverse, local, short-term, minor impacts to public safety during construction. When combined with the impacts from the cumulative actions Alternative A would have a slight, local contribution to adverse, short-term, minor cumulative impacts to public safety within the Park during construction, and no long-term cumulative impacts.

Conclusion. The magnitude of impacts to public safety from Alternative C would be adverse, local, short-term, and minor with appropriate safety measures during construction. When combined with the impacts from the cumulative actions Alternative C would have a slight contribution to adverse, short-term, minor cumulative impacts to public safety within the Park during construction. There would be no long-term impacts to public safety.

CONSULTATION AND COORDINATION

Agency Consultation and Public Scoping/Involvement

As part of the NEPA and NRHP Section 106 process, coordination was conducted with applicable federal and Maryland state agencies to identify issues and concerns related to natural, cultural, and human resources within the Park.

In a letter dated 23 September 2009, the NPS initiated correspondence with the Maryland Historical Trust (MHT), which serves as the State Historic Preservation Office for the state. This was conducted in accordance with Section 106 of the NHPA (1966) and as part of the merged NEPA/NHPA (Section 106) process. The MHT responded in an email dated 14 October 2009 that recognized that the project was being conducted under the merged NEPA/NHPA process and the MHT looked forward to further consultation with the NPS.

The NPS submitted a letter to the USFWS dated April 5, 2010 to determine if any known populations of threatened or endangered species were present within or in the vicinity of the project area. This coordination was conducted in accordance with Section 7 of the Endangered Species Act (1973). The USFWS responded in a letter dated 20 May 2010, which stated that “except for occasional transient individuals, no federally proposed or listed endangered or threatened species are known to exist within the project impact area.” The USFWS stated that no additional coordination or Biological Assessment is required.

On behalf of the NPS, a letter dated November 5, 2009 was submitted to the MDNR Wildlife & Heritage Service (WHS) to determine if the proposed project would have any effects on rare plant and animal species. In a response dated 16 December 2009 the MDNR stated that reported one documented occurrence of arbor-vitae (*Thuja occidentalis*), a state-listed Threatened tree species, is located on or within very close proximity to the project study area and that documented occurrences of twenty (20) other state-listed species are also located within 3.0 miles of the project study area. The NPS submitted a follow-up letter to the MDNR WHS dated April 5, 2010. In a response dated June 29, 2010 the MDNR stated that there are no State or Federal records for rare, threatened, or endangered species within the project boundaries. However, the letter did identify six species that are known to occur in limestone cliff habitat along the Potomac River in close proximity to the project boundaries and noted that the maintenance of water quality is crucial to the continued existence of rare species of freshwater mussels in the Potomac River. The referenced correspondence has been included in Appendix D

The NPS opened a 30-day public scoping comment period between February 8, 2010 and March 9, 2010 and held an initial public scoping meeting on February 25, 2010. During the public scoping comment period, no written comments were received. This EA/AOE is being made available to the public and interested and affected federal and state agencies for a 30-day review and comment period. The document would be placed on the NPS PEPC website <http://parkplanning.nps.gov/choh> for public access.

Copies of agency consultation letters can be found in Appendix D.

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GLOSSARY AND ACRONYMS

Glossary of Terms

Affected environment – Existing environment that would be affected by a proposed action and alternatives.

Archeological resource – Any material remnants or physical evidence of past human life or activities that are of archeological interest, including the record of the effects of human activities on the environment. They are capable of revealing scientific or humanistic information through archeological research. Any material remnants of human life or activities that are at least 100 years of age and which are of archeological interest (32 CFR 229.3(a)).

Archeological survey – The process of using explicitly specified methods to prospect for archeological sites. Appropriate survey methodologies vary widely for different environments and archeological resource types.

Berm – The bank of a canal opposite the towpath, regardless of whether it is natural or man-made.

Best management practices – Methods that have been determined to be the most effective, practical means of preventing or reducing pollution or other adverse environmental impacts.

Consultation – The act of seeking and considering the opinions and recommendations of appropriate parties about undertakings that might affect significant cultural resources under the *National Historic Preservation Act of 1966*. General procedures for consultation are outlined in 36 CFR 800.

Council on Environmental Quality (CEQ) – Coordinates federal environmental efforts and works closely with agencies and other White House offices in the development of environmental policies and initiatives. Established by Congress with the passage of the *National Environmental Policy Act of 1969*.

Cultural landscape – A geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with an historic event, activity, or person or exhibiting other cultural or aesthetic values.

Cultural resources – Historic districts, sites, buildings, objects, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or other reason.

Endangered species – “...any species (including subspecies or qualifying distinct population segment) that is in danger of extinction throughout all or a significant portion of its range (Endangered Species Act Section 3[6]).” The United States Fish and Wildlife Service is responsible for reviewing the status of a species on a five-year basis.

Endangered Species Act (ESA; 16 USC 1531 et seq.) – An Act to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved and to provide a program for the conservation of such endangered and threatened species.

Environmental Assessment (EA) – An analysis prepared pursuant to the *National Environmental Policy Act of 1969* to determine whether a federal action would significantly affect the environment and if a more detailed Environmental Impact Statement is necessary.

Ethnographic resource – A 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.

Executive Order – Official proclamation issued by the President of the United States that may set forth policy or direction or establish specific duties in connection with the execution of federal laws and programs.

Finding of No Significant Impact (FONSI) – A document prepared by a federal agency showing why a proposed action would not have a significant impact on the environment and therefore would not require preparation of an Environmental Impact Statement. A FONSI is issued based on the results of an Environmental Assessment.

Floodplain – The flat or nearly flat land along a river or stream or in a tidal area that is covered by water during a flood.

HABS/HAER – The Historic American Buildings Survey and the Historic American Engineering Record are two closely allied units of the NPS that produce an archival record of buildings, engineering structures, and cultural landscapes significant in American history and the growth and development of the built environment. Both provide information and assistance to federal agencies concerning standards, techniques, and procedures for recording and otherwise documenting non-archeological cultural resources.

Historic district – A geographically definable area, urban or rural, possessing a significant concentration, linkage, or continuity of sites, landscapes, structures, or objects, united by past events or aesthetically by plan or physical developments. A district may also be composed of individual elements separated geographically but linked by association or history.

Historic property – A district, site, structure or landscape significant in American history, architecture, engineering, archeology, or culture that meets the *National Register of Historic Places* criteria for significance.

Integrity – The authenticity of a property's historic identify, evidenced by the survival of physical characteristics that existed during its historic or prehistoric period; the extent to which a property retains its historic appearance.

List of Classified Structures (LCS) – A database maintained by the NPS that lists and describes all National Register-eligible and listed structures in the National Park System.

Museum object – An item kept in a museum collection that may be archeological, a work of art, an historic document, a natural history specimen, and/or other item that is maintained so that it can be preserved, studied, and interpreted for the public benefit.

National Environmental Policy Act of 1969 (NEPA; USC 432 1-4347) – The Act as amended articulates the federal law that mandates protecting the quality of the human environment. It requires federal agencies to systematically assess the environmental impacts of their proposed activities, programs, and projects including the “no action” alternative of not pursuing the proposed action. NEPA requires agencies to consider alternative ways of accomplishing their mission in ways that are less damaging to the environment.

National Historic Preservation Act of 1966 (NHPA; 16 USC 470 et seq.) – An Act to establish a program for the preservation of historic properties throughout the nation, and for other purposes.

National Register of Historic Places (National Register) – A register of districts, sites, buildings, structures, and objects important in American history, architecture, archeology, and culture, maintained by the Secretary of the Interior under authority of Section 2(b) of the *Historic Sites Act of 1935* and Section 101(a)(1) of the *National Historic Preservation Act of 1966*. The National Register provides for three levels of significance: National, State, and Local.

National Historic Landmark (NHL) – A property designated by the Secretary of the Interior under authority of the *Historic Sites Act of 1935* as having exceptional significance in the nation's history. NHLs are automatically listed in the National Register of Historic Places and subject to all preservation requirements.

Organic Act of 1916 – This Act commits the NPS to making informed decisions that perpetuate the conservation and protection of park resources unimpaired for the benefit and enjoyment of future generations.

Planning, Environment, and Public Comment (PEPC) – The NPS website (<http://parkplanning.nps.gov/>) for public involvement. This site provides access to current plans, environmental impact analyses, and related documents for public review. Users of the site can submit comments for documents available for public review.

Prism – An artificial waterway or artificially improved river used for travel, shipping, or irrigation. Prism refers to the trapezoidal cross-sectional shape of a canal's channel. The canal prism for the Chesapeake and Ohio Canal was typically 60 feet wide at the top, 40 feet wide at the bottom, and 6 feet deep.

Riparian – The area of interface between land and streams or rivers.

Scoping – Scoping, as part of the *National Environmental Policy Act of 1969*, requires examination of a proposed action and its possible impacts; establishing the depth of environmental analysis needed; determining analysis procedures, data needed, and task assignments. The public is encouraged to participate and submit comments on proposed projects during the scoping period.

Section 106 – Refers to Section 106 of the *National Historic Preservation Act of 1966*, which requires federal agencies to take into account the effects of their proposed undertakings on properties listed in or eligible for listing in the *National Register of Historic Places* and gives the Advisory Council on Historic Preservation a reasonable opportunity to comment on the proposed undertakings.

Significance – The significance of cultural resources is evaluated in terms of the *National Register of Historic Places* criteria in 36 CFR 60.

State Historic Preservation Officer (SHPO) – Official appointed by the governor of each state and United States Territory, responsible for certain responsibilities relating to cultural resources and federal undertakings within the state.

Topography – The physical features of a surface area including relative elevations and the position of natural and man-made features.

Water intake weir – An opening in the riverbank or towpath in the side of the canal prism that allows water to enter the feeder canal.

Wetlands – The USACE and the Environmental Protection Agency define wetlands as areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include landscape features such as swamps, bogs, marshes, and similar areas.

Acronyms

AOE	Assessment of Effects
ANSI	American National Standards Institute
APE	Area of Potential Effects
ARPA	Archaeological Resources Protection Act
ASMIS	Archeological Sites Management Information System
C&O	Chesapeake and Ohio
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
COMAR	Code of Maryland Regulations
CWA	Clean Water Act
DBE	Diameter Breast Height
EA	Environmental Assessment
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
ESF	Environmental Screening Form
FONSI	Finding of No Significant Impact
FSA	Frederick, Seibert & Associates, INC.
HABS	Historic American Building Survey
HAER	Historic American Engineering Record
ISA	International Society of Arboriculture
LCS	List of Classified Structures
MDE	Maryland Department of the Environment
MDNR	Maryland Department of Natural Resources
MHT	Maryland Historic Trust [Maryland State Historic Preservation Trust Office]
NAGPRA	Native American Graves Protection and Repatriation Act

NEPA	National Environmental Policy Act
NHP	National Historical Park
NHPA	National Historic Preservation Act
NPS	National Park Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
PEPC	Planning, Environment, and Public Comment
SHPO	State Historic Preservation Office
SOF	Statement of Findings
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

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