Rock Creek Park System
Soapstone Valley Park
Washington, DC

National Park Service
U.S. Department of the Interior

SOAPSTONE VALLEY PARK SEWER REHABILITATION

ENVIRONMENTAL ASSESSMENT

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1 PURPOSE AND NEED

INTRODUCTION

This Environmental Assessment (EA) identifies and evaluates potential environmental effects of the proposed Soapstone Valley Sewer Rehabilitation Project. The District of Columbia Water and Sewer Authority (DC Water) is responsible for operating and maintaining the existing sanitary sewers serving the District of Columbia (DC or District). DC Water has identified multiple sanitary sewers throughout its collection system that have exceeded their design life and are in need of rehabilitation, including those within the Soapstone Valley sewer system. The Soapstone Valley Sewer Rehabilitation Project's study area is generally located within and adjacent to the Soapstone Valley Park, southeast of the intersection of Connecticut Ave NW and Albemarle St NW, extending to Broad Branch Rd NW, which is the boundary between Soapstone Valley Park and Rock Creek Park (**Appendix B - Figure 1**). Soapstone Valley Park is 24.59 acres in size and is partially administered by Rock Creek Park, a unit of the National Park Service (NPS).

In addition to the sanitary sewer, sewers carrying urban stormwater discharge into Soapstone Valley. Stormwater flow enters the public storm sewer predominately through catch basins in roadways. The storm sewers carry the stormwater from roadways to Soapstone Creek where it then flows into Broad Branch, a tributary of Rock Creek, ultimately flowing to the Potomac River. The proposed project primarily focuses on rehabilitation of the sanitary sewer system, but it also addresses two stormwater outfall deficiencies.

The sanitary sewer system was assessed in the spring of 2011 with Closed Circuit Television (CCTV) cameras. During this assessment, most manholes exhibited structural deficiencies. Typical defects in the sanitary sewer system include pipe segments and manholes with cracks, fractures, holes, and root growth inside the pipe, as well as exposed pipes and manholes in natural streambeds.

Although the sewer system is maintained by DC Water and DC Water is responsible for the design and construction of the proposed project, the project is predominantly located on federal land administered by NPS. The primary role of NPS is to review, approve, and permit the proposed project. Therefore, an EA must be developed to comply with the National Environmental Policy Act of 1969 (NEPA). Although NPS is serving as the lead federal agency during the NEPA process, DC Water is assisting NPS throughout the NEPA process, including the development of the EA.

PURPOSE AND NEED FOR ACTION

The primary purposes of DC Water's proposed Soapstone Valley Sewer Rehabilitation Project are:

- To repair, rehabilitate, improve, and/or replace aging 18-inch-diameter sanitary sewer pipes within the Soapstone Valley sewer system while maintaining the functions of and limiting disturbance within the Soapstone Valley Park.
- To improve structural integrity of the sanitary sewer infrastructure, including pipes and manholes, while maintaining adequate hydraulic capacity.
- To reduce stream and groundwater infiltration into the sanitary sewer pipes and reduce potential for sanitary sewer overflows (SSOs).
- To eliminate exposed sanitary sewer pipes and manholes to the extent possible.
- To meet the regulatory requirements of the DC Municipal Separate Storm Sewer System (MS4) permit.

The rehabilitation is needed because the sewer infrastructure in the Soapstone Valley sewer system has exceeded its design life and has multiple defects throughout the system including pipe and manhole cracks, fractures, root intrusion into pipes, and stream and groundwater infiltration. Over time, the condition of the sewers is expected to continue to deteriorate. The resulting diminished performance of the system would exacerbate local pollution and increase the frequency of structural failures and emergency repairs, which are environmentally destructive and costly.

The Soapstone Valley Rehabilitation Sewer Project includes approximately 6,200 linear feet (LF) of sanitary sewer pipes, much of which is defective, 29 defective manholes, and six exposed stream crossings. These defects result in the potential for stream and groundwater infiltration and leaks. Groundwater and stormwater infiltration can increase the potential for SSOs which contaminate surface waters and impact public health. Additionally, exposed pipelines and manholes are subject to damage from stream and/or stormwater elements, which can lead to leaks into and out of the pipe.

The District Department of Energy and Environment (DOEE) has identified two stormwater outfalls within the Soapstone Valley Rehabilitation Project area that require repair per DC's MS4 permit. Because of their proximity to the Soapstone Valley sanitary sewer system, the repair of the stormwater outfalls would be constructed simultaneously.

ISSUES AND IMPACT TOPICS ANALYZED IN THIS EA

Issues are the problems or concerns associated with the impacts from current environmental conditions or operations, as well as problems that may arise from the implementation of any project alternative. During preliminary internal and external scoping, the following potential key issues associated with the construction or implementation of the project alternatives were identified:

- Degradation of vegetation and the removal of hundreds of trees within the Park
- Partial or full closures of the recreational trails during construction and impacts to existing recreational trails
- Possibility of pipe failure, which would affect water quality
- Degradation of water quality associated with stormwater discharged at MS4 Stormwater Outfall locations

Listed below are the environmental impact topics that are assessed in detail within this EA, as well as the relevant regulations and preliminary findings that led to its inclusion in this EA.

Soils. The proposed project would require grading activities to create access paths for equipment and for excavating around existing pipes and manholes to perform the repairs. Due to the extent of grading and excavation associated with the action alternative, both short- and long-term impacts on soils are addressed in this EA.

Water Quality. The Clean Water Act (CWA) establishes the federal government's authority to regulate the use of and impacts to water resources through multiple permitting programs administered by the EPA and USACE. NPS *Management Policies 2006* states that the NPS will "take all necessary actions to maintain or restore the quality of surface waters and ground waters within the parks consistent with the CWA and all other applicable federal, state, and local laws and regulations." DOEE also regulates groundwater extraction and treated groundwater discharges, and monitors groundwater quality. NPS *Management Policies 2006* states that the agency will perpetuate groundwater as integral components of park aquatic and terrestrial ecosystems. The proposed project would potentially result in excavation to or below the water table. The proposed project would also rehabilitate sanitary sewer assets located within and adjacent to Soapstone Creek and includes MS4 Outfall Repair projects. Impacts to water quality are addressed in this EA, and impacts would be mitigated as necessary.

Wetlands and Waters of the U.S. NPS *Management Policies 2006* state that NPS will manage wetlands, include riverine wetlands, in compliance with NPS mandates and the requirements of EO 11990 *Protection of Wetlands*; the CWA; and the procedures described in Director's Order 77-1, *Wetland Protection*. The proposed project would potentially impact wetlands and waterways. Therefore, potential impacts to wetlands and waterways are addressed in this EA as well as within the Wetlands and Floodplains Statement of Findings (SOF) (see **Appendix E),** and impacts would be mitigated as necessary.

Hydrology. In the context of the proposed project, impacts to hydrology include potential alterations to the movement of water across the local landscape, which can be affected by temporary and permanent

changes in watershed topography and streamflow, land cover, soil permeability, and man-made structures and stormwater discharges. The proposed project would involve land disturbance during construction, changes in land cover resulting from temporary access paths and sewer facilities, tree removal and reforestation, and stream alteration for stormwater outfall and sewer asset stabilization. As a result, hydrological alterations would occur within the Soapstone Creek watershed. Therefore, impacts to hydrology are addressed in this EA. Hydrological impact are also addressed in the related sections associated with physiographic resources**,** water quality, wetlands, and floodplains.

Floodplains. The proposed project involves repair of facilities located in the floodplain, construction activities in the floodplain, removal of floodplain vegetation, and/or modifications of surface hydrology and hydraulics that could affect flood elevations. Because the proposed project would have the potential to impact floodplains, floodplain impacts are addressed in detail in this EA as well as within the Wetlands and Floodplains SOF (see **Appendix E)**.

Vegetation. The proposed project is predominantly within a forested national park; additionally, portions of the proposed project would impact street trees. Therefore, impacts to vegetation are assessed in this EA, and impacts would be mitigated as necessary.

Wildlife and Wildlife Habitat. Wildlife and wildlife habitat management goals described in NPS *Management Policies 2006* include maintaining components and processes of naturally-evolving park ecosystems. The proposed project is in a forested area within a greater urban context and could potentially result in disruption to wildlife and wildlife habitat. Therefore, impacts to wildlife and wildlife habitat are addressed in this EA, and impacts would be mitigated as necessary.

Cultural Resources. The proposed project has the potential to impact three types of cultural resources: archeology, historic structures or districts, and cultural landscapes. The EA includes assessment of impacts to these resources.

Visitor Use and Experience. NPS *Management Policies 2006* states that the enjoyment of park resources and values by the people of the U.S. is part of the fundamental purpose of the national parks and that NPS is committed to providing appropriate, high-quality opportunities for visitors to enjoy the parks. The proposed project would potentially affect visitor use and experience; therefore, the impacts to visitor use and experience are evaluated in this EA.

IMPACT TOPICS DISMISSED FROM FURTHER ANALYSIS

Rare, Threatened, and Endangered Species. Section 7 of the Endangered Species Act (16 USC 1531 et seq.) and amendments (1973) requires federal agencies to consult with the United State Fish and Wildlife Service (USFWS) when their actions may affect a listed endangered or threatened species' continued existence or result in the destruction or adverse modification of critical habitat.

USFWS's online ECOS-IPaC was consulted on August 17, 2018, to determine if any listed species occur within the project area. The Hay's Spring amphipod (*Stygobromus hayi*) was the sole species listed (see **Appendix F**), and it is known to exist in only four springs along Rock Creek, not along Soapstone Creek.

Although not a federally listed species within the proposed project vicinity, NPS has expressed concern over the potential presence of the northern long-eared bat (*Myotis septentrionalis*). Therefore, NPS consulted with itself for formal Section 7 consultation and concluded that there is no designated critical habitat within the project area. The USFWS does not list the northern long-eared bat within the District as a threatened species; however, NPS has expressed concern over this species during construction because of required tree removal. The Section 7 consultation identifies conservation measures to protect the habitat during the project. The threatened northern long-eared bat's active season is from April 1st to October 31st. DC Water and NPS must check with bat researchers on the status of the northern long-eared bat within the park before any trees are removed during the active season.

2 ALTERNATIVES

A range of alternatives to address the purpose and needs related to the sewer systems in Soapstone Valley Park were considered and evaluated for technical and environmental feasibility. The environmental impacts of two alternatives are fully documented with this EA – Alternative 1: No Action and Alternative 2: Trenchless Alternative. Alternatives previously deemed unreasonable or infeasible will be discussed in **Appendix D**.

ALTERNATIVE 1: NO ACTION ALTERNATIVE

Under Alternative 1, the No Action Alternative, no improvements would be made to the existing sewer infrastructure. This alternative represents the existing condition, which includes the Soapstone Valley sanitary sewer pipes and manholes in varying stages of disrepair; exposed sewer pipes and manholes; and stormwater outfalls in need of repair. Although the sanitary sewer system would continue to degrade, the No Action Alternative represents the existing conditions. The No Action Alternative would not be in compliance with the District's MS4 permit.

ALTERNATIVE 2: TRENCHLESS ALTERNATIVE (DC WATER'S PREFERRED ALTERNATIVE)

Under Alternative 2, the Trenchless Alternative, the sanitary sewer system would be rehabilitated in place and would include the following components:

- Trenchless sanitary sewer pipe rehabilitation
- Manhole repair
- Asset (sanitary sewer pipes and manhole) protection and erosion prevention
- MS4 outfall rehabilitation

The limits of disturbance (LOD) for the Trenchless Alternative are shown on **Appendix B - Figure 2**. Construction of Alternative 2 would last between 18 and 24 months. Soapstone Valley Park would be closed to the public during construction, and portions of the park would remain closed for up to 2 years post-construction to allow for post-construction restoration. The public paths and walking trails would be reopened following construction.

Trenchless Pipe Rehabilitation - Approximately 6,200 LF of sanitary sewer pipe infrastructure within the Soapstone Valley sewer system would be rehabilitated using trenchless technology including about 4,425 LF of 18-inch VCP from Albemarle Street NW through Soapstone Valley Park to Broad Branch Road NW. Cured-in-Place Pipe (CIPP) is a type of trenchless technology that involves the insertion of a tube lining containing resin inside the existing, or host pipe. Following placement into the host pipe, the tube is cured in place. Once the liner is cured, it becomes a structural entity on its own should the host pipe fail. CIPP would be the trenchless technology used for Alternative 2, and its life expectancy is about 50 years. With this technology, most construction activity occurs at existing manholes. Given the site constraints in the study area, construction of access paths to certain manholes would be necessary. The anticipated construction sequence is as follows:

- Clearing along access paths
- Installation of super silt fence (SSF) along the boundaries of the access paths, except in locations where vehicles will be entering and exiting
- Installation of geotextile, mulch, and wooden mats along access paths
- Installation of bypass pumping equipment at manholes downstream and upstream of the project area
- Sanitary sewer line cleaning, which requires access for a truck to clean the line, a vacuum truck to remove debris, and a CCTV truck to confirm the pipe is clear of debris.
- Installation and sealing of CIPP liner, which requires access with a refrigerated delivery truck, boiler truck and CCTV truck
- Site restoration

Four access path entrances into the Park would provide sufficient access to rehabilitate the 6,200 LF of sanitary sewer pipes. Heavy Equipment (HE) access paths would be required to support the trenchless pipe rehabilitation in areas where construction activities would require the use of larger construction vehicles and/or equipment. HE access paths would be typically 16-feet wide. Access paths would employ a layer of geotextile fabric followed by a 12-inch minimum thick layer of wood chip mulch topped by wooden mats with a minimum thickness of 6 inches, which protects root zones, stream buffers, and wetlands. The LOD depicted on **Appendix B - Figure 2** is approximately 20 feet wide, which is wider than the actual width of the HE access paths that would be used during construction. The depicted LOD includes a buffer for the contractor to slightly adjust the access paths to minimize environmental impacts during construction. At some locations where access paths cross streams, temporary stream crossings (i.e., bridges) would be installed. After construction, temporary stream crossings and mulch would be removed.

The CIPP liner must be installed with no sanitary sewer flow present within the host pipe. As a result, bypass pumping would be provided as needed to maintain functional sanitary sewer service during construction. Bypass pumping would be installed at manholes upstream of the installation, and flow would be carried to a manhole downstream of the installation via temporary hoses and/or pipes. Once construction is complete, the temporary bypass operation would be removed, and standard gravity flow would be returned to the system.

Manhole Repair - There are 29 sanitary sewer manholes that require repairs associated with the sanitary sewer pipe repair. Most of the manhole rehabilitation methods would be accomplished without the need for vehicle access to the manhole by walking materials to the site with non-vehicular equipment such as wheelbarrows, motorized wheelbarrows, and dollies. Those areas are identified on **Appendix B - Figure 2** as walking paths. Walking paths would not require clearing nor the installation of mulch and would generally follow existing Park trails.

Asset Protection and Erosion Prevention - Asset protection would be provided for exposed sanitary sewer assets at six sites, numbered from west to east. (see **Appendix B - Figure 2**). Four of the six asset protection sites are located on NPS property. One location would protect two neighboring exposed manholes adjacent to the stream. The asset at these protection sites were identified by DC Water as currently having a higher risk of structural damage and/or deformation, as well as groundwater or stormwater infiltration. Asset protection would protect the assets from debris and would help to preserve structural integrity of the sanitary sewer pipes and/or manholes using combinations of rock cascades, riffle grade controls, pools, cross vanes, rock sills, and imbricated rock walls. In conjunction with the asset protection measures, erosion prevention (i.e., bank stabilization) would be employed to protect the streambed from scour and the stream banks from soil loss. Protection of the streambank from soil loss would further protect DC Water's sanitary sewer assets by avoiding exposure as a result of the continuing erosion. Protective methods used at each location would vary. At each asset protection site, one or several of the following general asset protection methodologies would be employed:

- Exposed pipes would require a minimum of 12-inches of soil or streambed cover over the pipe to be provided by pipe encasement and constructed riffles. Cascades would be utilized at the end of the riffle approximately 10 feet downstream of the pipe crossing. Cascades provide grade control (stabilization of the streambed elevation) and tie the grade of the proposed stream channel elevation at the pipe crossing to the existing stream channel invert downstream. Due to their short and steep nature, rock cascades require shorter lengths of in-stream grading than other asset protection techniques. To achieve 12-inch cover while maintaining stream integrity, it is sometimes necessary to elevate the streambed at the pipe crossing and upstream of the crossing.
- For each asset protection location, erosion prevention measures would be utilized including gradually tying constructed stream embankments back into existing grade, utilizing cascades to reconnect channels, utilizing stone for stability, and vegetating disturbed banks.

- For exposed manholes, each site would be protected by an imbricated rip-rap wall made of large, stacked rocks to shield manholes from debris and erosion. Imbricated walls, also referred to as manhole armoring, provide adequate erosion protection within a small footprint.

Primary access to the asset protection locations would be provided through the four entrance access paths used for the trenchless pipe rehabilitation. Additional HE access paths would be necessary to connect the primary access paths to the asset protection sites. The LOD is inclusive of storage and staging areas. Workers would utilize access paths to bring in necessary equipment. Temporary stream bypass pumping equipment would be installed and would be comprised of the following:

- Sand bag dikes (coffer dams) at the upstream and downstream limits of the in-stream work area;
- Clear water diversion pump with flexible pipe to route stream water around the work area; and
- Dewatering pump with flexible pipe and filter bag used to remove water from the work area and filter the sediment before discharging back into the stream.

The bypass would maintain the clear water flow within the Soapstone Creek, while creating a temporarily dry condition to install the asset protection features. Upon completion of each work day, the bypass would be deactivated at each location and flow would be directed back into Soapstone Creek.

MS4 Outfall Rehabilitation - In January 2012, EPA issued the National Pollutant Discharge Elimination System (NPDES) Permit No. DC0000221, which requires the repair of stormwater outfalls identified as contributing to water quality degradation within the District's MS4 system. There are two outfalls within the Soapstone Valley Park that require repair, Outfalls F-117 and F-140.

MS4 Outfall F-117 is listed in the DC Water MS4 Permit Outfall Repair Schedule and Report (prepared by DC Water, December 2012) and has a large fracture in the crown of the pipe, a broken security gate, and scour under the outfall spillway. In addition, there is extensive slope erosion of the banks surrounding the outfall to the north and east, which affects water quality at the outfall and poses public safety and natural resource degradation concerns. Therefore, three areas comprise the MS4 Outfall F-117 rehabilitation (see **Appendix B - Figure 2**).

- Albemarle Street Regrading Area – The existing debris placed to stabilize the eroded section of the slope would be removed. A water quality catch basin would be installed on the south side of Albemarle Street NW. The existing sidewalk would be extended to provide a scenic overlook area into Soapstone Valley Park. South of the overlook, the existing slope would be regraded and reinforced with a geocell stabilization system and vegetative plantings. The grading between Albemarle Street NW and the reinforced slope would be oriented north towards Albemarle Street NW.
- Soapstone Trail Regrading Area – The existing Soapstone Trail would be regraded such that stormwater would be directed to the east, away from the Park. A new swale would be constructed on the eastern side of the trail that would divert stormwater and runoff to a culvert installed under the trail. The culvert would discharge on the west side of the trail to a rock cascade that would replace the existing wooden stabilization structures.
- F-117 Outfall Area – Between 30 and 50 feet of the exposed outfall structure would be removed, eliminating the scour beneath the outfall lip by cutting the pipe back to discharge at grade. Any remaining fracture in the existing pipe would be repaired by placement of cementitious grout or structural epoxy. A new gate would be installed and, depending on structural needs of the pipe, a new headwall may be installed as well. The repaired and rehabilitated outfall would then discharge onto a proposed rock cascade structure, leading to an existing plunge pool downstream of the cascade.

Primary access to the MS4 outfall rehabilitation areas locations would be provided through one of the four entrance access paths used for the trenchless pipe rehabilitation. Additional HE access paths would be necessary to connect the primary access paths to the Outfall F-117 rehabilitation area.

The second MS4 Outfall that requires rehabilitation is Outfall F-140, which is an existing stormwater outfall at the southern end of Linnean Avenue NW. It currently collects stormwater runoff from Linnean Avenue and conveys flow down the slope leading to Soapstone Valley Park and ultimately into Soapstone Creek. It discharges stormwater approximately 200 feet south of the terminus of Linnean Avenue NW. The biggest concern at this location is the development of an approximately seven-foot ridge created just beyond the outfall due to excessive erosion, which requires repair.

Outfall F-140 exists within District Department of Transportation (DDOT) right-of-way, and given its criticality and severe erosion issues, DDOT entered into a joint venture with DOEE to repair the outfall. This has resulted in the design and construction of a Step Pool Stormwater Conveyance (SPSC) that replaced portions of the defective stormdrains to limit the erosion potential of the slope close to the NPS property line. SPSCs are comprised of a series of shallow aquatic pools, riffle grade controls, native vegetation, and underlying sand and woodchip beds to treat, detain, and convey stormwater flow. Asset Protection Site 4 includes the design of two step pools and a cascade that would connect flow from an existing SPSC to Soapstone Creek. A portion of the existing floodplain and relic channel would be left in place between the existing and proposed work. The existing trail would cross this cascade with stepping stones. The proposed work would stabilize the streambed of the tributary and the steep streambanks.

DC Water is committed to evaluating opportunities to eliminate sewers from the streambeds and reducing impacts and construction footprints. Since 2011, DC Water has studied several alternatives that meet the project's purpose and needs and were technically feasible but were ultimately eliminated from further evaluation (see **Appendix D**). Because it is not possible to entirely eliminate the sanitary sewer system from the Park, Alternative 2 is DC Water's preferred alternative. Compared to other alternatives that were considered and dismissed, it reduces environmental impacts both during construction and long-term, its design is consistent with the Park's natural environment, and is more cost effective.

MITIGATION SUMMARY

DC Water and NPS place strong emphasis on avoiding, minimizing, and mitigating potentially adverse environmental impacts. DC Water has coordinated with various agencies to identify appropriate mitigation for environmental impacts and effectively integrated suggestions in the project design. To help ensure the protection of natural and cultural resources, DC Water would implement an appropriate level of monitoring throughout construction to ensure that protective measures are being properly implemented and to achieve their intended results. DC Water would use the actions listed in **Appendix C** to mitigate potential environmental impacts associated with the construction and implementation of Alternative 2.

3 AFFECTED ENVIRONMENT

This chapter describes current environmental conditions in and surrounding the project area. The discussion is focused on resources that could potentially be affected by the implementation of the proposed project and provides a baseline for understanding the current condition of the resources.

SOIL RESOURCES

As stated in the *General Management Plan Environmental Impact Statement*: *Rock Creek Park and the Rock Creek and Potomac Parkway Washington, DC* (2005), the Soapstone Valley Park's soil resources are adversely affected by accelerated erosion, compaction, and deposition caused by human activities inside and outside of the Park boundaries. Some areas that receive heavy visitor use are subject to soil compaction, removal of vegetative cover, and erosion. These effects are particularly evident along stream banks and along heavily used trails. Accelerated erosion caused by increased runoff from the upstream watershed is occurring along the northern stream channels of Soapstone Valley Park. Along Linnean Avenue NW, soil erosion has contributed to the degradation of the MS4 stormwater outfall.

WATER QUALITY

The area surrounding Soapstone Valley Park consists of impervious surfaces such as buildings, roads, driveways, and compacted pedestrian trails, as well as pervious surfaces such as grass and wooded areas. Impervious surfaces do not allow rainfall to infiltrate the soil and increase the volume and velocity of stormwater that enters surface drainages (including urban streams) during storms. The high level of development and predominance of impervious surfaces within the watershed has led to increased stormwater runoff, which has damaged Rock Creek and its tributaries by increasing sedimentation and carrying other pollutants into creek waters (DOEE, 2010a).

Section 510 of the CWA grants authority to the states, including the District, to develop their own water quality standards, provided they are at least as stringent as the federal standards. Section 13.4 of the EPA Water Quality Standards (Standards), CFR Title 40, Part 131, assigns to states the responsibility for reviewing, developing, and revising water quality standards, subject to EPA approval and certification. Section 131.10 mandates that each state specify appropriate water uses to be achieved and protected, and to classify each resource by use; and Section 131.4 defines "states" to include the District.

Section 303(d) of the CWA, requires states, including the District, to develop lists of impaired waters, which are defined by the CWA as waters that are too polluted or otherwise degraded to meet the designated water quality standards, and to submit these lists to EPA for approval. For each of the listed waters, states are required to develop a Total Maximum Daily Load (TMDL). TMDLs detail the allowable concentration or load of pollutants that can enter each waterbody without violating state water quality standards. For Rock Creek and its tributaries, TMDLs are in place for two categories of water pollutants:

- **Fecal coliform bacteria or *E. coli***, which can be transported to receiving waters through SSOs resulting primarily from (1) leaky or undersized sanitary sewer pipes; (2) storm water runoff, including overland flow and flow conveyed through storm sewer pipes; and (3) direct deposits of feces into the water from wildlife sources (DCDOH, 2004a).
- **Organics and metals**, which include a wide range of toxic substances such as arsenic, lead, polychlorinated biphenyls (PCBs), polyaromatic hydrocarbons (PAHs), and pesticides. These compounds tend to accumulate in the tissues of fish and shellfish and can adversely impact the health of both types of aquatic species, as well as that of humans who regularly consume aquatic species (DCDOH, 2004b).

The DOEE Water Quality Division annually monitors two sites on the main stem of Rock Creek and one site on each of the 12 tributaries of Rock Creek for physical, chemical and bacterial parameters. DOEE also monitors biological activity in Rock Creek using benthic macroinvertebrate studies (DOEE, 2012). The 2016 Integrated Report includes ambient water quality data from 2011 to 2015. It also describes that

levels of pH, turbidity, and *E.coli*, a type of fecal coliform found within Soapstone Creek, violated the water quality standards. Additionally, the 2016 Integrated Report details that the 2003 habitat assessment score suggests that Soapstone Creek suffers from organic pollution (DOEE, 2016). The 2016 EPA Waterbody Report for Soapstone Creek indicates TMDLs are needed or in place for specific metals, pesticides, pathogens, PCBs, and toxic organics (EPA, 2016).

The 2016 Integrated Report assessment of the northern segment of Rock Creek is based on a five-year evaluation (2011-2015) of ambient water quality data. This segment of Rock Creek did not support uses A, B, C, or D; though, did support use E, which is for navigation. Formative conditions of support designations include exceedances in standards for *E. coli*, pH, turbidity, temperature, and dissolved oxygen (DO) (DOEE, 2016). The 2016 EPA Waterbody Report for Rock Creek indicates TMDLs are needed or in place for metals, pathogens, mercury, PCBs, turbidity, and pH.

Under the District's anti-degradation program, Rock Creek and its tributaries are designated "Special Waters of the District of Columbia" for their scenic and aesthetic importance. It is intended that the water quality of such designated waters be maintained and not allowed to degrade.

Soapstone Valley is served by a separate sanitary sewer system that collects only sanitary sewage, while stormwater is transported and discharged via individual pipe networks to stream channels. The separate sanitary sewer line flows directly to a wastewater treatment facility and should have no stormwater inlets to the system. Due to the age of the sanitary sewer system, the sewer infrastructure shows evidence of structural deterioration that can lead to sanitary sewer line leaks. Water infiltrates into the sanitary sewer pipes, which affects the capacity of the sewer system and can lead to SSOs. Additionally, sanitary sewer pipe leaks have a detrimental impact on water quality. SSOs and sanitary sewer leaks can contain a variety of pollutants, including fecal coliform bacteria, suspended solids, oil and grease, organics, and metals. The discharge of these pollutants contributes to low DO levels, which adversely impact the health of aquatic organisms; poses human health hazards; and can reduce the aesthetic quality of the surface waters.

The 2016 EPA Waterbody Reports for Soapstone Creek and Rock Creek indicate that *E. coli* is a cause of impairment that necessitates a TMDL for both waterbodies; Soapstone Creek's TMDL needs to be developed, and Rock Creek's TMDL is established. Likewise, the 2016 Integrated Report details that levels of *E. coli*, a type of fecal coliform, violated the water quality standards for both Soapstone Creek and Rock Creek. In 2014, EPA approved TMDL revisions from fecal coliform to *E. coli for the Potomac River and its tributaries* (DOEE, 2016).

Separate stormwater systems collect stormwater runoff from streets and parking lots. Runoff is then directly discharged to nearby rivers or streams. Therefore, during storm events, there is a combination of direct stormwater runoff and stormwater being carried by pipes to receiving water bodies including Soapstone Creek. An MS4 is a stormwater conveyance or system of conveyances that is:

- Owned by a state, city, town, village, or other public entity that discharges to wetlands or streams
- Designed or used to collect or convey stormwater (including storm drains, pipes, ditches, etc.)
- Not a combined sanitary and stormwater sewer
- Not part of a sewage treatment plant

Polluted stormwater runoff is commonly transported through MS4s, which is then discharged untreated into local waterbodies. This requires a NPDES permit which details stormwater management protocols and practices to reduce untreated stormwater discharge. Two of the six MS4 Outfall areas that discharge into Soapstone Creek must be repaired.

WETLANDS AND WATERS OF THE U.S.

In accordance with NPS Director's Order #12, areas that are classified as a wetland habitat according to the USFWS *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin, et al., 1979) are subject to implementation of procedures outlined in the Procedural Manual #77-1: Wetland

Protection (NPS, 2012). The wetland definition used for the USACE 404 permit program (33 CFR 328.3) is narrower than the Cowardin wetland definition used for NPS compliance under Procedural Manual #77-1 (Cowardin et al., 1979). Therefore, a broader range of aquatic habitat types fall under NPS' definition of wetlands than under the CWA 404 permit program. Under the Cowardin system, intermittent and perennial waterways are classified as riverine wetlands.

A wetland delineation of the project area was conducted between December 22, 2011, and January 6, 2012. On April 23, 2015 and June 23, 2015, field studies were conducted to confirm the presence and extent of the previously documented and undocumented wetlands and waterways within the project vicinity.

Within Soapstone Valley Park, two perennial waterways (riverine wetlands), eight intermittent waterways (riverine wetlands), and four ephemeral waterways were identified during the field investigation; as well as one forested wetland, one scrub-shrub wetland, and one emergent wetland (see **Appendix B - Figure 3 and Table 1**). The results of the wetland and waterways investigation are documented in the *Wetland Investigation Report: Sewer Rehabilitation Projects at Soapstone Valley and Glover Archbold Foundry Branch Parks Washington, DC* (Straughan Environmental, 2017), and shown on **Appendix B - Figure 3**.

TABLE 1: WETLANDS OBSERVED IN THE PROJECT VICINITY

System Name	Type of Resource	Classification	Length (LF) within Study Area
WL001 (Soapstone Creek)	Riverine Wetland	Perennial	1,487
WL005	Riverine Wetland	Intermittent	12
WL006 (Broad Branch)	Riverine Wetland	Perennial	0
WL007	Waterway	Ephemeral	21
WL008	Riverine Wetland	Intermittent	44
WL009	Waterway	Ephemeral	0
WL010	Riverine Wetland	Intermittent	98
WL015	Riverine Wetland	Intermittent	0
WL016	Riverine Wetland	Intermittent	0
WL017	Riverine Wetland	Intermittent	16
WL018	Waterway	Ephemeral	30
WL063	Waterway	Ephemeral	36
WL064	Riverine Wetland	Intermittent	0
WL065	Riverine Wetland	Intermittent	0
WP003	Wetland	PFO – palustrine forested wetland	-0.03
WP066	Wetland	PEM – palustrine, emergent wetland	-<0.01
WP067	Wetland	PSS – palustrine, scrub-shrub, wetland	-0.01

HYDROLOGY

The Soapstone Creek subwatershed, within the larger Rock Creek watershed, encompasses approximately 512 acres (0.8 square mile) of primarily urbanized land (moderate to high density residential and commercial land use). Surface water drainage in the upper 80 percent of the Soapstone watershed is contained in pipes, with the lower 20 percent of drainage occurring in open, natural stream systems (DOEE, 2012). As a result, the Soapstone hydrologic system conveys base stream flow along with intense, concentrated pulses, or flashes, of urban stormwater flow. Soapstone Creek begins in the park at a pipe

outfall and continues through the valley receiving water from natural tributaries, stormwater outfalls, overland storm flows, and groundwater. High volume and high velocity storm surges have eroded the banks of Soapstone Creek and its tributaries, disconnected Soapstone Creek from its floodplain, and exposed sanitary sewer assets. The topography of the creek is primarily moderate to steep forested slopes with areas of exposed bedrock. Storm flows are somewhat attenuated by flatter floodplain terraces, existing forest cover, and exposed sewer assets that disrupt natural stream flow.

Hydrology and hydraulic assessments of Soapstone Creek conducted in 2018 included preliminary calculations to evaluate existing stormwater runoff, stream velocity, floodplain connectivity, and erosion potential. The initial 50 feet of Soapstone Creek flows within a failing outfall pipe and is disconnected from its floodplain. The velocities of flow exiting the pipe are high, but the average velocity decreases as water moves into the natural channel, and connection to the floodplain improves as the creek flows through areas with floodplain terraces. In the central reaches of the creek, exposed bedrock and steep valley walls increase the velocity of flow and reduce the ability of the creek to spread out across a floodplain during high water events. Closer to the creek's confluence with Broad Branch, Soapstone Valley widens to support another floodplain terrace where the creek can reconnect to the floodplain. Vegetation along the banks of the creek throughout the valley intercepts precipitation and increases infiltration of surface water and riparian soil stability. However, the majority of Soapstone Creek exhibits evidence of streambank instability due to the presence of exposed roots, active areas of erosion, and undercut banks.

FLOODPLAINS

Floodplains can serve many functions, including improved floodwater storage and tempered conveyance; improved water quality and groundwater recharge; increased biological productivity and biodiversity; and potential for aesthetic open space for active and passive uses. EO 11988, Floodplain Management, requires federal agencies to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains.

NPS Director's Order 77-2, Floodplain Management, establishes NPS procedures for implementing floodplain protection and management actions in units of the national park system as required by EO 11988. EO 11988 prohibits federal agencies from funding construction in the 100-year floodplain unless there are no practicable alternatives.

Pursuant to DC Law 1-64 (the "DC Applications Insurance Implementation Act"), DC Code §§ 5-301 et seq., and Mayor's Order 98-46, DOEE is the delegated authority to review building permits and determine whether building sites are at risk for flooding; ensure that construction is designed to minimize flood damage; ensure that public utilities and facilities are located, elevated, and constructed to minimize flood damage; and generally implement and enforce the Act. The DOEE's Watershed Protection Division coordinates the National Flood Insurance Program for the District and coordinates general floodplain management activities with District of Columbia Homeland Security and the Emergency Management Agency.

The Soapstone Creek floodplain is a narrow riverine floodplain contained by a steep-sloped valley comprised natural, forested, and open space. Improved property in the floodplain consists of dirt surface trails and sanitary and stormwater sewer pipes. The Soapstone Creek floodplain attenuates flooding and improves water quality.

As indicated on the FEMA Flood Insurance Rate Maps for Soapstone Valley Park, Panels 1100010004C and 1100010008C, effective September 27, 2010, Soapstone Creek has an associated A Zone floodplain from the storm drain outfall under Albemarle Street NW to its confluence with Broad Branch (see **Appendix B - Figure 4**) (FEMA, 2010). A Zones are areas within the 100-year floodplain with no flood elevations determined. A desktop assessment estimates the overall floodplain area in Soapstone Valley Park to be about 9.5 acres. The floodplain width generally ranges between 50 and 150 feet. Based on

detailed topographic maps of Soapstone Valley Park, it is estimated that 100-year flood elevations within the project area are between six and eight feet above base flow.

VEGETATION

The vegetative community within Rock Creek has been characterized in the National Biological Survey (NBS)/NPS Vegetation Mapping Program's *Vegetation Classification of Rock Creek Park* (TNC, 1998). The NBS study indicates that the study area falls within three forest associations in Soapstone Valley Park:

- Sycamore – Green ash forest (floodplain forest)
- Beech – White oak/Mayapple forest (classic type)
- Mixed oak/Beech variant of Beech – White oak/Mayapple forest

Field investigations were conducted in February 2012, October 2014, June 2015, and August 2017 to identify forest communities, street trees, and trees greater than four inches diameter at breast height (DBH) within the study area and within a five-foot buffer of the study area. All street trees and non-street trees greater than four inches DBH were measured and identified to species (see **Appendix B - Figure 5**). Saplings between 2.5- and 3.9-inches DBH located within the study area and within a five-foot buffer of the study area were tallied. The tree assessment identified 39 tree species, of which seven are non-native invasive and 32 are native:

- American beech (*Fagus grandifolia*)
- American elm (*Ulmus americana*)
- American sycamore (*Platanus occidentalis*)
- Bitternut hickory (*Carya cordiformis*)
- Black cherry (*Prunus serotina*)
- Black locust (*Robinia pseudoacacia*)
- Black oak (*Quercus velutina*)
- Black walnut (*Juglans nigra*)
- Blackgum (*Nyssa sylvatica*)
- Boxelder (*Acer negundo*)
- Catalpa (*Catalpa speciosa*)
- Chestnut oak (*Quercus prinus*)
- Eastern cottonwood (*Populus deltoides*)
- Flowering dogwood (*Cornus florida*)
- Green ash (*Fraxinus pennsylvanica*)
- Honey locust (*Gleditsia triacanthos*)
- Japanese zelkova (*Zelkova serrata*)*
- Mimosa (*Albizia julibrissin*)*
- Mockernut hickory (*Carya tomentosa*)
- Northern red oak (*Quercus rubra*)
- Musclewood (*Carpinus caroliniana*)
- Norway maple (*Acer platanoides*)*
- Norway spruce (*Picea abies*)*
- Pin oak (*Quercus palustris*)
- Post oak (*Quercus stellata*)
- Princess tree (*Paulownia tomentosa*)*
- Red maple (*Acer rubrum*)
- Red mulberry (*Morus rubra*)
- Riverbirch (*Betula nigra*)
- Sassafras (*Sassafras albidum*)
- Slippery elm (*Ulmus rubra*)
- Sugar maple (*Acer saccharum*)
- Sweetgum (*Liquidambar styraciflua*)
- Tree of heaven (*Ailanthus altissima*)*
- Tulip poplar (*Liriodendron tulipifera*)
- White ash (*Fraxinus americana*)
- White mulberry (*Morus alba*)*
- White oak (*Quercus alba*)
- White pine (*Pinus strobus*)

*Denotes non-native invasive species

Also, the general health of all trees surveyed greater than or equal to four inches DBH was assessed (see **Appendix B - Figure 6**). Each tree received a rating of Very Good, Good, Good/Fair, Fair, Fair/Poor, Poor, or Very Poor. A certified arborist evaluated each tree by performing a general health assessment of the roots, trunk, scaffold branches, small branches, and foliage/buds. The forest within the study area is dominated by canopy species typical of mid to late successional forests. During field investigations, basal area was measured at two random positions in the park and ranges from 60 square feet to 90 square feet per acre. The forested area was given an overall health rating of "fair to good" due to the majority of the dominant tree species having a "good/fair" or better health rating and the common occurrence of non-native invasive species in all strata. Dominant tree species found throughout the study area include tulip poplar, American beech, white oak, and northern red oak, with tulip poplar as the most abundant species.

Co-dominant tree species include green ash, American beech, and tulip poplar. Common understory species include boxelder, burningbush (*Euonymus alatus*), Asiatic bittersweet (*Celastrus orbiculatus*), white oak, and slippery elm. Common herbaceous species include fig buttercup (*Ranunculus ficaria*), English ivy (*Hedera helix*), Japanese honeysuckle (*Lonicera japonica*), Asiatic bittersweet, grass species (Poacea*e* sp.), raspberry species (*Rubus* sp.), and Christmas fern (*Polystichum acrostichoides*). Non-native invasive species were found throughout the study area, occurring more heavily in the herbaceous strata. Asiatic bittersweet vines have grown into the canopy of a small percentage of dominant tree species. Evidence of mechanical efforts to control vine species infestations were observed. Non-native invasive species found within the understory include Asiatic bittersweet, Mimosa, Japanese zelkova, tree of heaven, white mulberry, Norway maple, Norway spruce, princess tree, Japanese honeysuckle, fig buttercup, English ivy, bush honeysuckle, and burningbush.

WILDLIFE AND WILDLIFE HABITAT

Of the nearly 3,000 acres managed by Rock Creek Park, Soapstone Valley Park encompasses 24.59 acres within the larger Rock Creek Park System. According to the NPS species database, 36 species of mammals, 13 species of amphibians, 6 species of reptiles, and 181 species of birds are present or likely to be present within Rock Creek Park (NPS, 2008). The study area within Soapstone Valley Park consists of canopy, understory, and herbaceous vegetation similar to that of urban parkland located within the deciduous Northeastern United States vegetative region. The woodlands in Soapstone Valley Park provide suitable habitat for common woodland fauna (NPS, 2005). Common fauna likely to occur include species adapted to disturbed habitat associated with an urban environment, and transient species associated with the adjacent forested habitat.

The following species were identified during field investigations: white tailed deer (*Odocoileus virginianus*), eastern gray squirrel (*Sciurus carolinensis*), red-tailed hawk (*Buteo jamaicensis*), tufted titmouse (*Baeolophus bicolor*), short-tailed shrew (*Blarina brevicauda*), black-capped chickadee (*Poecile atricapillus*), nuthatch (*Sitta* sp.), American robin (*Turdus migratorius*), barred owl (*Strix varia*), northern cardinal (*Cardinalis cardinalis*), and eastern box turtle (*Terrapene carolina)*.

Additional environmental stresses to terrestrial wildlife have been present for some time and are ongoing. According to the *DC Wildlife Management Plan* (2011), the top five threats to terrestrial habitats citywide include: (1) non-native invasive species, (2) recreation, (3) fragmentation, (4) dumping, and (5) contaminants. Major stressors to the habitat in Soapstone Valley Park and in the area immediately surrounding the Park are the result of many years of urban development in the area.

The primary aquatic habitat found in the Soapstone Valley Park is Soapstone Creek, which runs west to east through the Park. During the wetland delineation, two perennial waterway, eight intermittent waterways, and four ephemeral waterways were identified in the project vicinity. Three small wetlands were also identified.

A variety of environmental stresses to aquatic wildlife exist in Rock Creek Park and Soapstone Valley Park as the result of many years of urban development in the area. According to the *DC Wildlife Management Plan* (2011), the top five threats to aquatic habitats include: (1) non-native invasive species, (2) sedimentation, (3) changes to hydrologic regimes, (4) stormwater erosion, and (5) pollution. The District, as an urban center, is especially vulnerable to both point and non-point source water pollution. Point source pollution includes municipal wastewater and stormwater discharges (DOEE, 2011).

Urban pollution and stormwater runoff have adversely affected fish numbers and diversity within the tributaries of Rock Creek. In a 1993 study by NPS staff, no fish were found in nearly half of the tributaries, and only one tributary had more than a single species present (NPS, 2005). Generally, the 16 tributaries of Rock Creek are less suitable as fish habitat than the main channel (Rock Creek). Flooding and scouring during storm events, pollution from surface runoff, and periodic low flows affect the aquatic wildlife in the Rock Creek tributaries (DDOT, 2014).

Water quality in the District is evaluated on a biannual basis. In the 2016 report, Soapstone Creek was determined not to support aquatic life, which is based on the DC Stream Survey conducted in 2010 and conventional pollutant data (DOEE, 2016). However, the habitat assessment indicates an organic pollution problem in Soapstone Creek and the dominant taxa was *Chironomidae* sp., which is a pollutant-tolerant species. Soapstone Creek's habitat was reported as moderately impaired and the stream possibly suffers from organic and toxic pollution (DOEE, 2014).

According to the *2016 DC Water Quality Assessment* (EPA, 2016a), MS4 discharges, illegal dumping, modifications to hydrology, residential stormwater runoff, and other urban stormwater were most likely the source of degradation within Soapstone Creek. Habitat was moderately impaired. The *2007 DC Water Quality Assessment* habitat assessment revealed that the overall habitat quality within the Creek had diminished since the 2003 assessment. This was indicated by the large quantity of algae present at the time of the survey and the partial channelization of the stream. The 2009 assessment reported high concentrations of algal blooms, high conductivity, and no fish within Soapstone Creek (DOEE, 2010). High quantities of fine sediment were also observed and reported near Soapstone Creek (DOEE, 2012).

Contamination has adversely impacted aquatic wildlife in Rock Creek and its tributaries. According to the *2016 DC Water Quality Assessment* (EPA, 2016b), probable causes contributing to impairment in Rock Creek include MS4 discharges, residential and other urban stormwater runoff, other wet weather discharges from point and non-point sources, and other unidentified upstream source. Habitat is considered impaired due to turbidity and pH.

CULTURAL RESOURCES

The study area occupies the largely undeveloped Soapstone Creek stream valley, beginning east of Connecticut Avenue NW and ending at the confluence with Broad Branch, and adjacent upland areas. The majority of the study area is located in Soapstone Valley Park on public land legally defined as U.S. Reservation 402. This urban park has steep slopes, is largely wooded, contains Soapstone Creek, and has an unpaved 0.9-mile walking trail (DC Online, 2011). The trail crosses the creek in multiple locations and was built into the natural landscape using large stone steps, logs, and wooden planks. Within the park, sanitary sewer pipes and manholes are exposed along the stream and trail.

Seasonal, temporary camp sites, quarries, and workshops associated with the study area's indigenous occupants have been identified along terraces and uplands adjacent to the Soapstone Creek and other stream valleys in the vicinity. In 1897, William Henry Holmes documented the Rose Hill Soapstone Quarry site (51NW005) and the process by which indigenous peoples quarried bedrock steatite to make soapstone vessels. The site was destroyed by the construction of Connecticut Avenue NW, which was occurring as Holmes was documenting the site.

In the 18th and19th centuries, the study area contained farms and large 19th and 20th century country estates of prominent Washingtonians. As streets were extended into northwest DC, the uplands surrounding the Soapstone Creek stream valley rapidly urbanized, and Soapstone Valley Park was founded in 1924. Information on historic sites, districts, landscapes, and archeological sites was obtained from the District of Columbia Historic Preservation Office (DC HPO) and the Phase I Archeological Survey completed for this project – *Phase I Archeological Survey of Portions of Soapstone Valley Park, Washington D.C., for the Soapstone Valley Creek Bed Sewer Rehabilitation Project.*

The area of potential effects (APE) for archeological resources encompasses the LOD for the Trenchless Alternative, as well as another dismissed alternative that would have partially rerouted the sanitary sewer system out of Soapstone Park. The APE takes into account areas where soils would be excavated, graded, or compacted, potentially resulting in the mixing of soils or destruction of archeological resources. The project's APE contains one archeological site mapped on the District Historic Preservation Office's Geographic Information Systems (GIS). The site, 51NW023, is not well-defined and may represent all resources within Soapstone Valley. In 2008, Louis Berger Associates noted that shovel tests in 2005 did not locate any cultural materials and Berger archeologists considered it a non-site. A 2012 archeological

investigation identified cultural materials on a broad portion of the floodplain, but the investigators concluded that the artifacts were secondarily deposited from uplands surrounding the park and no archeological sites were documented. Therefore, no documented archeological resources are located within the study area.

The APE takes into account the visual effects of the sewer rehabilitation and associated effects that would occur within the Park boundary on historic properties. The locations of the APE and historic sites and districts within the APE are shown in **Appendix B - Figure 7** and identified in **Table 2**. In 2012, NPS proposed expanding the boundaries of the Rock Creek Park Historic District to include Soapstone Valley Park, along with several other tributary parks. A National Register of Historic Places Nomination Form for the amended Rock Creek Park Historic District was prepared in November 2014. NRHP listing of the historic district, including Soapstone Valley Park, is pending. However, the nomination form indicates that Soapstone Valley Park is significant as a trail access route into the park, for its association with the planning and development of Rock Creek Park, and as a protector of Soapstone Creek's natural resources. In addition, the Soapstone Valley Trail is considered an eligible component of the Historic Trails Cultural Landscape.

Two structural elements that contribute to the significance of the Rock Creek Park Historic District have been identified. The stone culvert below Broad Branch Road that conveys Soapstone Branch to Broad Branch was determined eligible for the NRHP in 2011 by DC HPO. In 2011, the culvert collapsed, and replacement by DDOT is planned as part of Broad Branch Road improvements. The second structure, which appears to be a damaged stone spring box/pump house, is located on the north bank of Soapstone Branch approximately 550 feet west of Broad Branch Drive. This structure was likely constructed in the late eighteenth century to contain a spring or pump water from Soapstone Branch to a residence that first appears on an 1861 map and is identified as the Francis Morrow estate in later maps.

TABLE 2: HISTORIC PROPERTIES WITHIN PROJECT APE

Name	NRHP Status
Rock Creek Park Historic District (Amended Boundary)	Rock Creek Park and Soapstone Valley (U.S. Reservation 402) considered NRHP-eligible components of expanded Historic District Boundary; Listing by NPS is pending.
Soapstone Valley Trail	NRHP-eligible part of Historic Trails Cultural Landscape.
Stone Spring Box/Pump House	Considered NRHP-eligible element of Rock Creek Park Historic District.
Soapstone Creek Culvert	Determined NRHP-eligible in 2011 as part of DDOT's Broad Branch Road Rehabilitation project.

VISITOR USE AND EXPERIENCE

The study area is located in Soapstone Valley Park. This urban Park has steep slopes, is largely wooded, contains Soapstone Creek, and has an unpaved 0.9-mile walking/hiking trail (DC Online, 2011). The trail crosses the creek in multiple locations and was built into the natural landscape using large rocks, tree logs, and wooden planks. Within the Park, sanitary sewer pipes and manholes are exposed along the stream and trail and are visible to Park visitors. The Park is generally bordered by commercial and medium to high density residential development.

Visitor experience varies throughout Soapstone Valley Park, as do the types of visitors, which includes hikers, dog walkers, and residents. The Park offers its visitors a hiking trail that stretches 0.9 miles from near Connecticut Avenue NW to Broad Branch Road NW. From the trail's lower terminus at Broad Branch Road NW, visitors can access Rock Creek Park. Aesthetic resources include natural landscapes, attractive architecture, scenic vistas, and other desirable aspects of both natural and man-made views that could be impacted by the proposed project. Currently, there is an odor associated with the sanitary sewer system that is perceptible in multiple locations where sewer manholes are adjacent to the trail. Soapstone

Valley Park is surrounded by urban land uses, and is subjected to conditions such as urban noise, traffic, high population density, and commercial activities that are typical of an urban environment.

Within the District, noise is regulated under the DC Municipal Regulations, Chapter 20, Sections 27 and 28 Noise Control. Section 4.9 of the *NPS Management Policies 2006* requires preserving natural soundscapes in parks, which includes protecting park areas from unacceptable impacts from noise (unnatural and undesired sounds). Natural soundscapes include all of the natural sounds in the park, as well as the physical capacity for transmitting these sounds. Natural sounds are associated with natural biological and physical resources such as birdcalls, falling water, thunder, and wind. Activities that may obscure or interfere with these soundscapes through the introduction of noise or the elimination of natural sound sources would require measures to prevent or minimize these impacts. The District is a highly urbanized environment with numerous noise sources. The study area is in proximity to densely-developed areas and a major roadway (on the east and south sides) and is subject to constant urban noise under existing conditions. Noise in the study area results primarily from vehicles on public roadways. Recently, noise due to construction projects (University of the District of Columbia [UDC] campus, Park Van Ness) has also contributed to the soundscape.

4 ENVIRONMENTAL CONSEQUENCES

This chapter analyzes the potential environmental impacts, both beneficial and adverse, that would occur as a result of implementing Alternative 2: Trenchless, as well as the potential impacts of Alternative 1: No Action Alternative. Impact topics analyzed for this project have been identified on the basis of NEPA, CEQ regulations implementing NEPA, NPS Director's Orders, and NPS *2006 Management Policies*. The environmental resources presented in this chapter correspond to the environmental resource discussions in **Chapter 3**.

CUMULATIVE IMPACT ANALYSIS METHOD

The environmental impact analysis presented in this EA also considers cumulative impacts – 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). Cumulative impacts are addressed for each environmental resource for both the action and no-action alternatives. To determine the potential cumulative impacts, past, current, and anticipated future projects within the project site and the surrounding area were identified. These cumulative projects and reasonably foreseeable development actions are summarized in **Table 3**.

TABLE 3: CUMULATIVE IMPACT PROJECTS

Past/Present/ or Future	Project	Description
Future	UDC Campus Improvements	Elements of the plan include: Transportation (new thoroughfare and parking garage); Campus Growth (Connecticut Avenue Plaza, Student Center, Student Housing, Academic Space, and Recreation – tennis courts, soccer fields, and an open plaza); Sustainability (stormwater, open space, green building, transportation interface).
Future	Van Ness/UDC Commercial Corridor	DC Office of Planning proposes to create stormwater infiltration and rain garden landscaping along Connecticut Avenue NW to reduce storm runoff to Soapstone Creek and Broad Branch.
Future	Play DC Master Plan	Proposed skate park, playground, and community garden Identified & proposed bike lane and cycle track in proximity to the area.
Future	Capital Infrastructure Projects	DDOT manages hundreds of projects across the city. Much of this work, spread across all eight wards, is federally funded and ensures the District's transportation network is properly maintained and improved on an ongoing basis.
Future	DC Water Sanitary Sewer Improvements	DC Water manages the stormwater and sanitary sewer systems through the city. DC Water has currently identified 17 sanitary sewer rehabilitation projects that would be partially located within the Rock Creek Park System.
Future/Past	Various Rock Creek Park Improvement Projects	NPS in consultation with DDOT and DOEE have ongoing projects designed to improve the use of the parkland including projects to improvement stormwater management, wildlife management, trail system improvements, stream bank stabilization, and pedestrian safety improvements. Projects include the Rock Creek Multi-Use Trail Rehabilitation, Rock Creek Park White-tailed Deer Management Plan, Fort Totten Metro Access Trail, the Metropolitan Branch Trail, Broad Branch Stream Daylighting, etc.

Decades of development have increased impervious areas, increased stormwater runoff rates and volumes, and impacted regional water quality. The proposed project would rehabilitate the sanitary sewers in Soapstone Valley Park, which would improve the water quality of the watershed. In addition to improving the management of sanitary sewage and stormwater runoff within the Soapstone watershed, the

proposed project would complement larger regional efforts to address sewer overflow and stormwater discharge into Rock Creek and the Potomac River. The proposed project would have both adverse and beneficial direct environmental impacts, notably the adverse effects to vegetation and the beneficial effects to water quality. The proposed project, in conjunction with incremental environmental impacts associated with other reasonably foreseeable development and the continued effects of past development, would result in moderate, adverse cumulative impacts. To mitigate the cumulative effects, NPS, EPA, USACE, DDOT, and various federal and local public agencies have regulations and fee structures that enforce and fund project-specific, environmental resource-specific mitigation. For example, direct impacts to wetland and waterways are minimized and mitigated by project-specific federal and local protective regulations (including Sections 404 and 401 of the CWA).

IMPACT ON SOILS RESOURCES

Potential soil impacts have been evaluated with respect to changes in topography, soil stability, soil contamination, and soil disturbance.

Impacts of No Action Alternative

The No Action Alternative would not involve construction or excavation, would not cut or fill any soil, and would result in no new impact. However, soil erosion is currently ongoing within the study area, especially during high volume storm events and would continue, particularly along existing stormwater swales and around exposed sanitary sewer infrastructure in the study area.

Impacts of Alternative 2: Trenchless Alternative

Alternative 2 would have a short-term, moderate impact and a long-term, beneficial impact on soils. During construction, soil disturbance would occur throughout the study area. Alternative 2 uses a trenchless rehabilitation method which would greatly minimize the amount of excavation required to repair the sanitary sewer. Each HE access path would require clearing along the length of the path, which would temporarily affect soil stability. These paths would be ultimately covered with geotextile, mulch, and wooden mats prior to vehicle use, which would protect the soil and tree roots in these areas from compaction during construction from heavy machinery and erosion transport by both stormwater and winds. Some access paths may require grading due to the existing topography. However, the amount of cut/fill would be determined during final design. Also, staging and storage locations within the asset protection sites would impact soils due to compaction. The soil in the MS4 F-117 Stormwater Outfall area would be regraded to help control stormwater flow.

Short-term soil impacts would be controlled through the implementation of an approved Sediment and Erosion Control Plan. Best Management Practices (BMPs) would be utilized to minimize the overall impacts to soils, which would consist of DOEE-approved erosion and sediment control measures such as silt fencing and tree protection fencing. Any contaminated soil encountered during construction would be disposed of in accordance with federal and District laws and regulations. Disposal of excavated soils would be the responsibility of contractors. In addition, dust-control measures and soil erosion and sediment control plans would be utilized during construction. By utilizing BMPs, these mitigation measures could reduce the adverse impacts to soils during construction from moderate to minor.

Post construction, the disturbed areas, including soils, would be stabilized with coir mats and vegetation (e.g., permanent and temporary seeding, livestakes, and trees). Within the asset protection sites, soil would be necessary to properly construct the rock cascades. Along the access paths and in the asset protection sites, a combination of rock cascades and re-vegetation would help stabilize soils. A combination of geocells and rock cascades would be utilized along the slopes in the vicinity of the F-117 Stormwater Outfall to help protect the soils from future erosion.

Cumulative Impacts

Collectively, past and present have changed local topography because of grading and would expose soils, which would be subject to erosion or compaction, and reasonably foreseeable future project may do the same. Existing soils could be replaced by fill or impervious surfaces. Also, some of the soils may contain contaminants. To mitigate the potential cumulative soil impacts, construction contracts must include requirements for the handling and disposal of contaminated materials, should any be encountered. Also, construction documents, which are required for construction permits in the District, must include BMPs and other measures to control dust, protect exposed soil from precipitation and erosion, protect workers from exposure to soil contaminants, and include measures to manage stormwater. Considering these factors, the proposed alternatives would contribute a small amount to the overall cumulative soil impacts.

IMPACT ON WATER QUALITY

To assess the magnitude of impacts of water quality to Soapstone Creek, the District's water quality standards governing aquatic resources, as well as available baseline water quality data, were examined.

Impacts of No Action Alternative

Under the No Action Alternative, no construction would occur, and the existing conditions would continue. Soapstone Creek currently does not meet its TMDL targets and experiences high concentrations of *E. coli*, suspended solids, and other pollutants. Stormwater flows within Soapstone Creek would continue to convey sediments and pollutants originating from the urban upland into Soapstone Creek, resulting in short-term and long-term, moderate impacts to water quality.

Under the No Action Alternative, the sanitary sewer infrastructure would continue to age, and exposed sewer pipes and manholes would continue to be subject to environmental forces including stream flows, stormwater, debris, and human contact. DC Water would continue to inspect and monitor the sewer system infrastructure. Any sanitary sewer system failures would likely result in sewage leaks and would require emergency access to the Park and would be subject to emergency repairs, as regulated by the CWA and the Code of the District of Columbia. Sewage leaks and emergency repairs would have an adverse effect on water quality.

Impacts of Alternative 2: Trenchless Alternative

Alternative 2 would have an adverse short-term, minor impact and a long-term, beneficial impact on water quality. Installation of imbricated rock structures and placement of soils/cover material to construct the necessary grade changes within the stream asset protection would involve the removal and/or placement of soil. Therefore, there would be erosion and sediment transport, which would affect water quality during construction. These short-term adverse impacts would be minimized by utilizing BMPs including erosion and sediment control measures such as super silt fencing, stream diversion, dewatering bags, and a strict sequence of construction. Dewatering bags would allow the sediment to separate from the water prior to discharging into the streams. Dewatering bag size would be determined prior to construction and would be placed at various points within the asset protection areas without requiring grading. Water release outlet protection measures would depend on water velocity, bed substrate, and other factors. Sediment that has settled within the dewatering bags would be hauled off-site and disposed. All BMPs would be coordinated with NPS prior to construction and would reduce the adverse impacts such as erosion and sediment loading during construction to minor.

Alternative 2 would result in the repair and rehabilitation of sanitary sewer infrastructure, decreasing the potential for future sewage leaks from defective pipes and/or manholes that have outlived their design life. Reducing the risk for sewer leaks and/or SSOs would potentially decrease the loading of *E. coli*, suspended solids, and other pollutants associated with sanitary sewer waste in Soapstone Creek, resulting in long-term beneficial impacts to water quality. Long-term beneficial impacts to water quality would also result from increased oxygen levels. Proposed MS4 Outfall stabilization efforts would somewhat reduce

sediment and nutrient loads entering Soapstone Valley. Construction of the asset protection and MS4 outfall elements is expected to maintain existing compliance with DOEE standards supporting secondary (recreational and aesthetic) contact.

Even though implementation of Alternative 2 could have beneficial environmental impacts to Soapstone Creek, water quality standards may not be met. While the likelihood of future leaks can be greatly reduced, the sanitary sewer pipe would still be located in Soapstone Creek in the Park, never fully eliminating the risk of sewage leaks into the creek in the long-term. Additionally, other sources of pollution could prohibit the attainment of water quality standards, even if no sewage leaks occurred.

Cumulative Impacts

Collectively, past and present projects have incrementally increased the impervious surface within the watershed, and reasonably foreseeable future projects may do the same. Increased impervious surfaces exacerbate runoff and pollutant loadings within the watershed. Additionally, upstream point and non-point sources would continue to add incremental amounts of pollutants to the rivers during storm events. However, there are some reasonably foreseeable projects that are intended to improve water quality in the watershed. NPS, EPA, USACE, and various government agencies (particularly DOEE) within the District, have regulations and fee structures that enforce and fund project-specific mitigation. These same agencies are also funding other projects to improve water quality and are encouraging the public to reduce nonpoint pollution sources. Private and non-profit organizations are involved in similar initiatives. Although Alternative 2 would reduce stormwater flows and other reasonably foreseeable projects would help to improve water quality in the watershed, the various upstream point and non-point sources, as well as some development projects within the watershed, would continue to adversely affect water quality. Therefore, the long-term, cumulative effect on water quality would be adverse and minor.

IMPACT ON WETLANDS AND WATERS OF THE U.S.

To quantify and assess potential impacts to surface water resources, the footprints of all areas of proposed surface disturbance were compared against delineated wetland and waterway boundaries within those areas. Impacts to wetlands and waterways resulting from proposed construction and placement of permanent structures were assessed. Temporary wetland/waterway impacts would be short-term disturbances with conditions returned to existing conditions or better; and permanent impacts would be permanent alteration of the wetland/waterway, whether the impacts are adverse or beneficial.

Impacts of No Action Alternative

Under the No Action Alternative, there would be no construction within waterways or wetlands. Direct impacts to the wetlands and waterways under the No Action Alternative would be negligible for the short-term and long-term. There would be no direct construction impacts along the delineated portions of Soapstone Creek. Under the No Action Alternative, the sanitary sewer infrastructure would continue to age, and exposed sewer pipes and manholes would continue to be subject to environmental forces including stream flows, stormwater, debris, and human contact. DC Water would continue to inspect and monitor the sewer system infrastructure. Any sanitary sewer system failures would likely result in sewage leaks and would require emergency access to the Park and would be subject to emergency repairs, as regulated by the CWA and the Code of the District of Columbia. Emergency repairs would have an adverse effect on wetlands and/or waterways.

Impacts of Alternative 2: Trenchless Alternative

Alternative 2 would have moderate, short-term impacts and long-term beneficial impacts on wetlands and waterways. Alternative 2 would temporarily impact 24,584 square feet of riverine wetlands/waterways and permanently impact 35,666 square feet of riverine wetlands/waterways (see **Table 4** and **Appendix B - Figure 3**).

TABLE 4: SUMMARY OF WATERWAY AND WETLAND IMPACTS FOR ALTERNATIVE 2				
System	**Type of Resource**	**Classification**	**Temporary**	**Permanent**
WL001 (Soapstone Creek)	Riverine Wetland	Perennial	22,491 sf	34,081 sf
WL005	Riverine Wetland	Intermittent	225 sf	37 sf
WL006 (Broad Branch)	Riverine Wetland	Perennial	0 sf	0 sf
WL007	Waterway	Ephemeral	133 sf	0 sf
WL008	Riverine Wetland	Intermittent	563 sf	0 sf
WL009	Waterway	Ephemeral	0 sf	0 sf
WL010	Riverine Wetland	Intermittent	1,113 sf	1,166 sf
WL015	Riverine Wetland	Intermittent	0 sf	0 sf
WL016	Riverine Wetland	Intermittent	0 sf	0 sf
WL017	Riverine Wetland	Intermittent	0 sf	0 sf
WL018	Waterway	Ephemeral	0 sf	382 sf
WL063	Waterway	Ephemeral	59 sf	0 sf
WL064	Riverine Wetland	Intermittent	0 sf	0 sf
WL065	Riverine Wetland	Intermittent	0 sf	0 sf
Total Waterway Impact			**24,584 sf**	**35,666 sf**

The temporary, short-term impacts to the riverine wetlands and waterways from this alternative would primarily result from the construction of the HE access paths. Two HE paths would cross an ephemeral tributary but would allow for the maintenance of surface flow from the adjacent wetland north of the path to Soapstone Creek. The ephemeral tributaries are located between Sites 1 and 2 and Sites 5 and 6. The access paths would be temporary and would be removed at the completion of construction; pre-construction stream conditions would be restored. Construction-related impacts would be mitigated through the use of BMPs aimed at reducing impacts to water resources, specifically:

- Placement of storage areas outside of wetland boundaries
- Use of HE access paths that would circumscribe potential impacts, as practicable, and allow minor adjustment in the field to avoid resources
- Avoidance of vehicular access for most of the manhole repairs
- Use of existing trails and designated walking paths to transport materials into the site, where possible, thus avoiding clearing larger vehicular access paths
- Placement of geotextile, mulch, wooden mats, and super silt fencing along access paths
- Use of culverts in addition to the HE access paths for access across smaller (ephemeral) systems
- Removal and restoration of all storage and staging areas and access paths to pre-construction (or better) conditions
- Use of daily, temporary bypass pumping equipment for ensuring clear water flow around dry stream work areas (including coffer dams, clear water diversion pumps, dewatering pumps with filter bags)
- Avoidance of riverine wetland disturbance during temporary sewer bypass pumping
- Use of erosion and sediment control practices

Additional BMPs may be stipulated in the CWA Section 404 permit. These BMPs would be coordinated with USACE and NPS prior to construction. By using BMPs, mitigation measures could reduce the adverse impacts during construction from moderate to minor.

The long-term impacts to the waterways from this alternative would involve repair and replacement of MS4 Outfall F-117 and F-140, asset protection measures, streambank stabilization measures, and stream restoration measures. The permanent impacts from this alternative would result from the following actions:

- Installation of rock cascade structures south of Albemarle Street NW would permanently impact WL001.

- Repair and replacement of MS4 outfall F-117 south of Albemarle Street NW would permanently impact WL001 and WL018.
- Repair and replacement of MS4 outfall F-140 south of Linnean Ave NW would permanently impact WL009 and WL010.
- Asset protection and streambank stabilization measures at six sites with exposed pipe segments and manholes would include rock cascades, imbricated rock walls, riffle grade controls, rock sills, step pools and two plunge pools. These activities would permanently impact WL001, WL010, and WL005.

The impacts would occur within the study area and would require a CWA Section 404 permit issued by USACE and CWA Section 401 water quality certificate issued by DOEE. These permits would stipulate requirements for mitigation, if necessary, that must be carried out to replace the lost functions and values resulting from long-term impacts to Soapstone Creek, its tributaries and its associated wetlands.

Any adverse long-term wetland impacts would be minimized through the following BMPs:

- Minimization of fill used in outfall repair, asset protection, and streambank stabilization to only what is necessary to maintain appropriate flow velocities and manage storm surges
- Installation of site-specific streambank stabilization elements (including live stakes, permanent seeding, imbricated rock walls, and adjustment of eroding streambank slopes) to provide functional uplift to Soapstone Creek and its tributaries by reducing soil loss and scour protection
- Re-use of select stream channel material and importation of natural materials that closely match the existing visual elements and augment streambed macroinvertebrate habitat
- Installation of post-construction plantings including species native to Rock Creek Park to ensure contiguous habitat and suppression of invasive species
- Implementation of stormwater management, such as, installing additional inlet capacity to mitigate for stormwater along Albemarle Street NW and along the right-of-way to reduce erosion and stormwater impacts in the Park

As described in the SOF (**Appendix E**), Alternative 2 would result in maintenance or uplift of functions and values associated with the impacted waterways. NPS has concurred that long-term, minor, beneficial impacts would result from the MS4 outfalls and asset protection rehabilitation, which results in riffle and pool creation and bank stabilization using imbricated rock walls. These structures would provide overall functional maintenance and/or uplift of the hydraulics, geomorphology, physiochemistry, and biology of the affected systems. Compensatory mitigation is not required because this project would be classified as a repair and renovation of an existing facility. If determined to be needed during future design phases, compensatory mitigation would be finalized through future coordination with USACE, DOEE, and NPS.

Cumulative Impacts

Adverse, cumulative impacts from past, present, and reasonably foreseeable projects have and would continue to include potential dredging, filling and conversion of wetlands and waterways; increases in impervious surfaces; increased point source and non-point source pollutant loads associated with past, present, and future actions. Generally, direct and cumulative impacts to wetland and waterways are minimized and mitigated by project-specific federal and local protective regulations (including Sections 404 and 401 of the CWA) and stormwater, sediment, and erosion control measures that would be conditions of individual construction permits. The District also has multiple fee-based programs that support stormwater management and pollution control. NPS, EPA, USACE, various public agencies within the District and the surrounding states are enforcing regulations that require mitigation, funding projects to restore or mitigate wetlands and waterways, and educating the public about wetland benefits. Private and non-profit organizations are involved in similar initiatives. However, there would still be incremental, adverse cumulative impacts to wetlands, especially associated with pollution loads, and both alternatives would contribute to these incremental cumulative effects.

IMPACT ON HYDROLOGY

A functional uplift assessment was conducted along four representative segments of Soapstone Creek associated with proposed asset protection, bank stabilization, and outfall repair and rehabilitation. The functional uplift assessment was adapted from the *FINAL DRAFT Function-Based Rapid Field Stream Assessment Methodology* (Starr et al., 2015) and involves the comparison of existing stream functions with potential functions following proposed construction activities. The specific components assessed include hydrology, hydraulics, and geomorphology. Parameters and measures within these components were assessed as "functioning," "functioning at risk," or "not functioning" based on designed ranges as described in **Appendix E**. See **Table 5** for a summary of hydrologic components and the specific measures.

TABLE 5: SUMMARY OF HYDROLOGY ASSESSMENT COMPONENTS, PARAMETERS, AND MEASURES

Component	Description	Parameter Assessed	Measures
Hydrology	How water travels across the watershed and into the creek	Stormwater Runoff	Concentrated Flow and Flashiness
Hydraulics	How water travels through the creek and valley landscape	Velocity and Floodplain Connectivity	Bankfull Velocity, Entrenchment Ratio, and Bank Height Ratio
Geomorphology	How water moves sediment and affects the shape and dynamics of the creek	Riparian Vegetation	Riparian Vegetation Zone and Dominant Erosion Potential

Impacts of No Action Alternative

Under the No Action Alternative, there would be no project-related land disturbance. The watershed of Soapstone Creek and its tributaries would remain primarily urbanized, producing high velocity flows during storm events. Soapstone Creek would remain largely disconnected from its floodplain and would continue to exhibit streambank erosion, and the vegetation within the valley would remain intact. The impacts to hydrologic function would be negligible for the short-term and long-term.

Impacts of Alternative 2: Trenchless Construction

Based on the functional uplift assessment, Alternative 2 would have negligible short-term impacts to hydrology and beneficial long-term impacts. Alternative 2 would involve land disturbances for the CIPP structural rehabilitation of defective pipe segments within the project limits, including HE access paths, walking paths, bypass pumping lines, MS4 outfall repairs, existing manhole rehabilitation, temporary staging areas to be used for lining equipment and setup vehicles, and asset protection measures using combinations of rock cascades, riffle grade controls, pools, cross vanes, rock sills, and imbricated rock walls within Soapstone Creek. BMPs to mitigate short-term and long-term impacts would be used, including but not limited to the following efforts:

- Placement of access paths to avoid vegetation disturbance
- Use of existing trails and walking paths to reduce the need for vegetation clearing
- Use of daily, temporary bypass pumping equipment for ensuring clear water flow around dry stream work areas
- Avoidance of riverine wetland disturbance during temporary sewer bypass pumping
- Use of erosion and sediment control practices
- Minimization of fill used in outfall repair, asset protection, and streambank stabilization to only what is necessary to maintain appropriate flow velocities and manage storm surges
- Installation of site-specific streambank stabilization elements (including live stakes, permanent seeding, imbricated rock walls, and adjustment of eroding streambank slopes) to provide functional uplift to Soapstone Creek and its tributaries by reducing soil loss and scour protection

- Implementation of stormwater management along Albemarle Street NW and along the right-of-way to reduce erosion and stormwater impacts in the Park

Under Alternative 2, the watershed of Soapstone Creek and its tributaries would remain primarily urbanized and would continue to convey high concentrated, flashy flows during storm events into Soapstone Valley Park. Proposed design elements intended to protect sewer assets (Asset Protection Sites 1-6) and improve pipe outfall function (MS4 Outfalls F-117 and F-140) specifically target stabilizing stream banks, which would diffuse high velocities and reduce erosion. As a result, the creek would maintain existing status or improve function for measures assessing velocity, floodplain connectivity, and dominant erosion potential. The proposed rehabilitation of MS4 Outfall F-117 would daylight the initial 30 to 50 feet of Soapstone Creek by removing a segment of outfall pipe and restoring flow in a rock cascade channel. This activity would also reestablish floodplain connectivity and restore floodplain connection to "functioning" status. At MS4 Outfall F-140, rehabilitation efforts would have no substantial change to floodplain connectivity because this section of Soapstone Creek occurs in a naturally steep-sloped valley with exposed bedrock.

The changes in the land cover with clearing, site grading, access paths, tree removal and reforestation would result in hydrological alteration within Soapstone Creek's watershed both short-term, during construction and long-term, after the project site is fully stabilized and restored to the designed conditions. Riparian vegetation along the left and right banks would be reestablished using tree, shrub, and herbaceous species native to the Soapstone Valley. In doing so, the proposed riparian vegetation zones would maintain their pre-construction widths, with no change in riparian vegetation zone function. Overall, hydrologic functions under Alternative 2 would result in an overall maintenance or uplift of function throughout the Soapstone Valley.

Cumulative Impacts

Past, present and reasonably foreseeable projects have and would potentially have adverse cumulative impacts on hydrology result from the filling and conversion of waterways; unmanaged stormwater flows, increases in impervious surfaces; increased point source and non-point source pollutant loads associated with past, present, and future actions. Generally, direct and cumulative impacts to wetland and waterways are minimized and mitigated by project-specific federal and local protective regulations (including Sections 404 and 401 of the CWA) and stormwater, sediment, and erosion control measures that would be conditions of individual construction permits. The District also has multiple fee-based programs that support stormwater management and pollution control. NPS, EPA, USACE, various public agencies within the District and the surrounding states are enforcing regulations that require mitigation, funding projects to restore or mitigate wetlands and waterways, and educating the public about wetland benefits. Private and non-profit organizations are involved in similar initiatives. However, there would still be incremental, adverse cumulative impacts on hydrology, and the both alternatives would contribute to these incremental cumulative effects. There would be a minor, adverse cumulative impact on hydrology.

IMPACT ON FLOODPLAINS

To quantify and assess potential impacts to floodplains, the proximity of the regulated floodplain to the project site was evaluated, as well as the topographic elevation data collected during site survey. The potential for the alternatives to impact flood elevation or velocities upstream and downstream; whether the alternatives would result in promoting development or occupancy of the floodplain; the risk of damage to capital improvements that could occur in the event of a flood; and impacts to the natural functions and values that could occur in the short-term and long-term were analyzed.

Impacts of No Action Alternative

The No Action Alternative would not involve construction and would have negligible short-term and long-term impacts to floodplains. Impacts to the biological and recreational floodplain attributes would be

negligible. Flood elevations and velocities upstream and downstream would remain unchanged. The sanitary sewer would remain in the floodplain exposed to long-term, minor risk due to flood events.

Impacts of Alternative 2: Trenchless Alternative

Floodplain impacts for Alternative 2 include short-term minor impacts, and long-term, negligible impacts. Short-term impacts would include temporary placement of HE access paths within the floodplain which consist of geotextile, mulch, and wooden mats, tree and vegetation removal, and operations of heavy equipment within the floodplain (see **Appendix B - Figure 4**). Operation of heavy equipment within and adjacent to the floodplain would have the potential to compact soils within the floodplain, reducing flood storage. To minimize soil disturbance, geotextile, mulch, and wooden mats would be placed on the HE access paths within the floodplain during construction. HE access paths would be removed post-construction. If a significant storm is forecast during construction, measures would be taken to secure the mulch to reduce the risk of mulch being washed away downstream potentially causing flow impediments and flooding. Equipment would be operated in the floodplain during work hours. Generally, equipment and/or materials would be staged and stored outside the floodplain, minimizing the chance for flood impacts. However, portions of proposed staging areas coincide with the floodplain boundaries primarily due to space limitations. Staging areas would be refined during final engineering design, and DC Water would coordinate with the appropriate regulatory agency prior to and during construction. Tree and vegetation removal would have the potential to increase runoff by allowing more precipitation to reach the ground and flow into the waterways.

Long-term, negligible impacts include occupancy of permanent structures within the floodplain such as rock cascades, riffle grade controls, pools, cross vanes, rock sills, and imbricated rock walls, as well as tree removal (see **Appendix B - Figure 5**). Stream stabilization structures within Soapstone Valley Park are designed to moderate flood velocities when flows rise above designed channels, reconnect extant floodplains to increase flood storage, and stabilize the grade of the channel and eroding streambanks. Flood elevations would also increase in proximity to the stabilization structures as floodplains are reconnected to the stream. Although reconnecting extant floodplains is considered a long-term, beneficial impact, it is likely minor because of the relatively small area impacted. Tree and vegetation removal would occur within the floodplain; however, trees would be replanted within the floodplain, potentially increasing flood storage by increasing the amount of rain water being stored on leaves and within roots.

Cumulative Impacts

Past, present and reasonably foreseeable projects have and would potentially impact floodplains due to the impervious surfaces within the general Soapstone Creek subwatershed although most of the reasonably foreseeable development would be conducted outside of the floodplain. Ongoing stormwater management concerns could potentially affect flood intensity, as they relate to cumulative impacts to physiographic resources. The Alternative 2 would have long-term, minor cumulative impacts.

IMPACT ON VEGETATION

In determining impacts to vegetation, the type, size, and integrity of each area of vegetative cover was considered. To quantify and assess potential impacts, the LOD for each alternative was compared with known vegetated areas, special trees, and street trees.

Impacts of No Action Alternative

The No Action Alternative would have a short-term and long-term, minor impact to vegetation. The No Action Alternative would not involve construction and would not involve any direct disturbance of vegetative communities. However, vegetation would continue to be adversely impacted by heavy stormwater flows during storm events. Stormwater flows would continue to cause erosion, sedimentation, channel incising, and destabilization of nearby rooted vegetation.

Under the No Action Alternative, the sanitary sewer infrastructure would continue to age, and exposed sewer pipes and manholes would continue to be subject to environmental forces including stream flows, stormwater, debris, and human contact. DC Water would continue to inspect and monitor the sewer system infrastructure. Any sanitary sewer system failures would likely result in sewage leaks and would require emergency access to the Park and would be subject to emergency repairs, as regulated by the CWA and the Code of the District of Columbia. Emergency repairs would have an adverse effect on vegetation.

Impacts of Alternative 2: Trenchless Alternative

Alternative 2 would result in both short-term and long-term, adverse impacts to vegetation. Much of the vegetation within the limits of disturbance would be removed for construction activities.

Alternative 2 includes HE access paths that are typically 16-feet wide but are depicted on **Appendix B - Figure 2** with an LOD that is approximately 20 feet wide. The difference in width allows for the construction contractor to maneuver around trees if possible to minimize vegetation impacts. For the purposes of this EA, the study area is large enough to account for future design decisions. However, during final design, the LOD would be refined and DC Water would include incentives in the construction bid documents for tree retention. The tree impacts identified below include all trees within the LOD for removal. However, DC Water, NPS, and the construction contractor would walk the site prior to construction to finalize LODs, flag trees for removal, and discuss construction methods to minimize vegetation impacts. Trees located just outside of the LOD would also be impacted if limbs extending into the LOD need to be trimmed for equipment access. It is assumed that trees located within five feet of the LOD and that are less than or equal to 18-inches DBH would likely require limb removal. It was assessed that trees greater than 18-inches DBH would have limbs high enough to not interfere with access equipment. Trees located adjacent to the LOD would experience impacts to their root systems; however, geotextile, mulch, and wooden mats would be used along all HE access paths preventing soil and root compaction. Alternative 2 could remove up to 371 trees and trim up to 74 trees (see **Table 6** and **Appendix B - Figure 5**).

TABLE 6: TREE IMPACTS FOR ALTERNATIVE 2

	Total Trees Removed	**Total Trees Trimmed**
Tree Impacts on NPS Property	236	41
Tree Impacts on DDOT Property	129	32
Tree Impacts on Private Property	6	1
Total Tree Impacts	**371**	**74**

Short-term mitigation efforts would include replanting trees and other vegetation within the LOD. However, these plantings would not fully compensate for total vegetation impacts based on the total circumference of trees removed. Therefore, DC Water would pay a one-time, fee-in-lieu to NPS or NPS's designee. This fee-in-lieu would be used by NPS for onsite long-term protection as well as offsite plantings and long-term protection. All wheeled machinery would be cleaned prior to start of construction as well as completion of construction to reduce the risk of seed cross contamination and spread of non-native invasive species.

Tree health was also assessed for all trees that would be removed or trimmed by an International Society of Arboriculture Certified (ISA) Arborist. **Appendix B - Figure 6** depicts the range of health ratings for all trees removed for the Trenchless Alternative, which is summarized in **Table 7**.

TABLE 7: TREE HEALTH SUMMARY FOR ALTERNATIVE 2

Health	**Percentage**
Very Good	3%

Good	18%
Good - Fair	24%
Fair	25%
Fair - Poor	12%
Poor	14%
Very Poor	4%

Street trees along Albemarle Street NW would also be impacted by construction activities for this alternative. Trees within the LOD that meet the DDOT-UFA Special Tree designation would also be removed as a result of construction activities. **Table 8** contains a further breakdown of trees that would be removed on DDOT property for this alternative. **Table 9** contains a further breakdown of tree removal located on NPS property.

TABLE 8: TREES REMOVED ON DDOT PROPERTY FOR ALTERNATIVE 2	
Tree Size (DBH)	**Quantity**
Street Trees	
2 – 6 inches	2
6.1 inches and greater	0
Non-Special Trees	
2 – 17.4 inches	98
Special Trees	
17.5 inches and greater	29
Total	**129**

TABLE 9: TREES REMOVED ON NPS PROPERTY FOR ALTERNATIVE 2	
Tree Size (DBH)	**Quantity**
4 – 14.9 inches	153
15 – 24.9 inches	52
Greater than 25 inches	31
Total	**236**

During construction, every effort would be made to install the HE access paths to minimize adverse effects to vegetation, including trees. However, adverse impacts to the forest include the direct removal of vegetation inside the LOD, as well as to the adjacent forest by creating gaps in the contiguous forest canopy. Forest adjacent to the LOD would be retained. However, adverse impacts to the adjacent, retained forest would also be moderate and long-term as the canopy is opened and new forest edge is created, increasing exposure to sun and wind, and possibly creating a vector for non-native invasive plant and animal species colonization. These impacts would be minimized by ongoing coordination with NPS to identify additional trees that can be saved and appropriate treatment measures before and after construction; using super silt fencing and tree protection fencing around the work area to prevent stray equipment from further impacting adjacent retained forest; using the least impactful equipment necessary for the work; and using geotextile, mulch, and wooden mats to reduce compaction of soil and adjacent tree root systems. Other minimization measures, such as environmental construction monitoring, ISA Certified Arborist inspections and recommendations, and implementing BMPs during construction to reduce introduction and/or spread of non-native invasive species, could further reduce impacts.

At the end of construction activities, impacts to the forest would be mitigated by primarily planting a combination of 2.5-3-inch caliper trees, bushes, livestakes, and permanent seeding. DC Water would prepare associated planting plans for NPS approval that specify all proposed plantings with considerations of each species' characteristics and sunlight, soil, and moisture requirements. Because replanting would not fully mitigate the tree impacts, DC Water would continue to coordinate with NPS to determine the

appropriate compensation required to meet the intent of Director's Order #14. DC Water recommends a 10-foot buffer around sewer infrastructure in which trees are not replanted in order to protect the rehabilitated infrastructure from future damage. Additionally, some portions of the Park that were disturbed during construction would remain closed and fenced off for up to 2 years post-construction to support the vegetation restoration.

For trees outside of NPS property, DDOT-UFA requires a Public Space Permit for the removal or disturbance of a street tree, as well as a Special Tree Removal Permit for the removal or disturbance of a special tree. Mitigation for these potential impacts could include paying the Tree Fund a tree replacement fee of $35 per inch of circumference of each special tree to be removed.

Cumulative Impacts

Past, present and reasonably foreseeable projects have and would contribute to adverse cumulative effects on vegetation. Federal and local governments are funding projects that would provide more green space or restore waterways. However, incremental reduction in vegetation is probable. For example, DC Water is currently investigating sewer system deficiencies within multiple streambeds on NPS property. Although DC Water is evaluating all opportunities to eliminate sewers from streambeds and to reduce remaining construction footprints, tree removal throughout the Soapstone Valley Park would be required for stream access and asset protection. Moreover, vegetation takes time to mature. There would be a short-term and long-term, adverse cumulative impact on vegetation.

IMPACT ON WILDLIFE AND WILDLIFE HABITAT

A primary objective of NPS is to protect the natural habitats for wildlife and vegetation within its Park system. In a highly developed area such as the District, the goal of NPS is to minimize the human impacts on native animals and the ecosystems within each park. In determining the impacts on wildlife and wildlife habitat, the required habitat and potential adaptation of wildlife species in the study area and possible changes to existing habitat conditions were considered.

Impacts of No Action Alternative

No construction would occur under the No Action Alternative, resulting in no specific change to common aquatic and wildlife habitat and no direct impacts to wildlife species. Soapstone Creek currently does not meet its TMDL targets and experiences high concentrations of *E. coli*, suspended solids, and other pollutants. Additionally, stormwater flows within Soapstone Creek would continue to convey sediment and pollutants originating from surrounding impervious surfaces and erosion. Therefore, the No Action Alternative would have minor short-term and long-term impacts on wildlife and wildlife habitat, particularly aquatic wildlife habitat.

Under the No Action Alternative, the sanitary sewer infrastructure would continue to age, and exposed sewer pipes and manholes would continue to be subject to environmental forces including stream flows, stormwater, debris, and human contact. DC Water would continue to inspect and monitor the sewer system infrastructure. Any sanitary sewer system failures would likely result in sewage leaks and would require emergency access to the Park and would be subject to emergency repairs, as regulated by the CWA and the Code of the District of Columbia. Emergency repairs could have an adverse effect on wildlife and wildlife habitat.

Impacts of Alternative 2: Trenchless Alternative

Alternative 2 would result in both short-term and long-term, moderate impacts to terrestrial wildlife and wildlife habitat. It would result in short-term, moderate and long-term, beneficial impacts to aquatic wildlife and wildlife habitat. During construction in the study area, wildlife may be temporarily affected by noise pollution, increased or diverted human traffic, and habitat disturbance. Common wildlife species, such as deer, raccoon, squirrels, robins, and cardinals, are familiar with fragmented, urbanized habitat. They may avoid construction areas and could be expected to return to these habitats once construction is

completed, if not before. However, some wildlife identified by DOEE Fisheries and Wildlife Division as Species of Greatest Conservation Need including black-crowned night heron, wood thrush, Acadian flycatcher, Scarlet tanager or Eastern towhee may abandon a breeding or nesting site if their habitat is disturbed.

Alternative 2 would result in short-term, adverse impacts to aquatic fauna and habitat. Some aquatic habitats would incur impacts from the removal of trees along the waterways. Removing tree canopy along streams can cause more solar heating of the water which would adversely affect temperature sensitive species and promote algal growth. As part of Alternative 2, six asset protection sites would be constructed and would cause temporary in-stream disturbance. During construction, aquatic fauna would have loss of foraging, breeding, or shelter habitats in discrete areas that may cause some individuals to be exposed to starvation or predators. Some individuals may be lost directly to construction. However, once installed, the asset protection and stabilization projects would allow for re-establishment of pre-construction populations of fish, amphibians, and macroinvertebrates. Proposed asset protection efforts and MS4 Outfall stabilization efforts would possibly enhance streambed habitat complexity and reduce fish passage barriers. It is possible that post-construction conditions, over time and in conjunction with modest water quality improvements, would result in a more diverse macroinvertebrate community. However, it is assumed that any uplift to wildlife habitat would be limited by the maintenance of low water quality conditions typical of urban watersheds.

Long-term, indirect, adverse impacts would result from the removal of trees and vegetation and cause terrestrial habitat disturbance and loss. In areas of tree removal, terrestrial habitat would be disturbed and fragmented, leaving openings for non-native invasive flora and fauna to become established, at least until mature native forest conditions return. For example, removing trees would increase nest parasitism of wood thrush by brown-headed cowbird. Removing trees and other vegetation may increase competition for remaining suitable nesting, breeding, and foraging areas for many years. As another example, in general, thrushes prefer mature wooded areas for foraging and nesting. Without mature trees, many thrush species may nest unsuccessfully or refuse to nest if a proper site cannot be located. These impacts would be partially offset by replanting efforts in the study area, and restoration efforts within the watershed. Although the forest composition would change post construction, the resulting forest edges would provide suitable habitat for numerous native species adept to living in disturbed habitat associated with an urban environment and transient species associated with the adjacent forested habitat within Rock Creek Park. Additionally, Soapstone Valley Park would be closed to the public during construction, and portions of the park would remain closed for up to 2 years post-construction to allow for post-construction restoration, which would support the restoration of aquatic and terrestrial habitats.

Disturbances to aquatic habitat associated with in-stream work would be minimized by applying BMPs and adhering to CWA Section 401 and 404 permit conditions. Impacts to vegetation and habitat would be avoided and minimized to the extent possible, including implementation of BMPs to avoid introducing and/or dispersing existing non-native invasive plant materials during construction and mitigation activities.

Cumulative Impacts

Past, present and reasonably foreseeable projects have and would potentially impact wildlife and wildlife habitat in the project vicinity. Alternative 2 would contribute to cumulative effects on wildlife and wildlife habitat when combined with other past, present, and future actions. Terrestrial habitat would be vulnerable to forest cover changes, and aquatic habitat would be vulnerable to direct effects to waterways and water quality changes that result from anticipated development within the watershed. Local regulations require project specific mitigation for the removal of vegetation and impacts to wetlands and waterways. Federal and local governments are sponsoring and funding projects that would provide more green space or restore waterways. However, incremental reduction of vegetation is probable, along with associated adverse effects on water quality and hydrology. For example, DC Water is currently

investigating sewer system deficiencies within multiple streambeds on NPS property. Although DC Water is evaluating all opportunities to reduce construction footprints, tree removal throughout the Soapstone Valley Park would be required for stream access and asset protection. Although there would be regulated and monitored revegetation to offset adverse impacts, vegetation takes time to mature. Therefore, the preferred alternative would contribute to the overall adverse impacts of the area.

IMPACT ON CULTURAL RESOURCES

Impacts of No Action Alternative

Archeology. No archeological sites have been identified within the APE; therefore, the No Action Alternative would have negligible short-term and long-term impacts to archeological resources.

Historic Structures, Buildings, and Districts. The No Action Alternative would not involve construction. Ongoing deterioration of sanitary sewer infrastructure and exposure of sewer pipes and manholes along Soapstone Branch would visually detract from and adversely affect the character-defining features of the Rock Creek Park Historic District, namely the forested stream valley. Therefore, the No Action Alternative would have a short-term and long-term minor impact on historic properties.

Under the No Action Alternative, the NRHP-eligible stone culvert below Broad Branch Road that conveys Soapstone Branch to Broad Branch would continue to be affected by upstream erosion and high volumes of stormwater that results in scouring and flooding at the culvert site and the accumulation of potentially damaging fallen trees and branches in the vicinity of the upstream stone headwall. In 2011, flooding resulted in the development of a sinkhole on Broad Branch Road that caused the collapse of the culvert's barrel arch. Therefore, the No Action Alternative would have a moderate short-term and long-term impact on the NRHP-eligible culvert. At this time, DDOT proposes to replace the culvert as part of its plans to rehabilitate Broad Branch Road.

The No Action Alternative would place the stone spring box/pump house, which is located on the north bank of Soapstone Branch, at risk of further damage from bank erosion and/or flooding, which appears to have already caused collapse of a portion of the structure and loss of stone material. The No Action Alternative would have a moderate short-term and long-term impact on the NRHP-eligible stone structure.

Cultural Landscapes. The No Action Alternative would involve no improvements to the existing sewer system. The Soapstone Valley Trail is a component of the Rock Creek Park Historic Trails Cultural Landscape. Stormwater would continue to erode portions of the trail. Ongoing deterioration of sanitary sewer infrastructure and exposure of sewer pipes and manholes along Soapstone Branch would visually detract and adversely affect the character-defining features of the trail. Therefore, the No Action Alternative would have a moderate short-term and long-term impact on cultural landscapes.

Under the No Action Alternative, the sewer infrastructure would continue to age, and exposed sanitary sewer pipes and manholes would continue to be subject to environmental forces including stream flows, stormwater, debris, and human contact. DC Water would continue to inspect and monitor the sewer system infrastructure. Any sanitary sewer system failures would likely result in sewage leaks and would require emergency access to the Park and would be subject to emergency repairs, as regulated by the CWA and the Code of the District of Columbia. Emergency repairs could have an adverse effect on cultural landscapes.

Impacts of Alternative 2: Trenchless Alternative

Archeology. No archeological sites have been identified within the APE; therefore Alternative 2 would have no adverse effect to archeological resources, and negligible short-term and long-term impacts to archeological resources.

Historic Structures, Buildings, and Districts. Alternative 2 would result in a moderate, short-term impact to Soapstone Valley Park, which would be included in the proposed expansion of the Rock Creek

Park Historic District. The park would be physically and visually affected by the removal of vegetation along HE access paths, asset protection sites, and MS4 stormwater outfall areas. Overall, 351 trees would be removed, and 68 trees would be trimmed within the Soapstone Valley Park expansion area of the Rock Creek Park Historic District, which is legally entitled U.S. Reservation 402. Vegetation and tree removal in the vicinity of access paths would result in moderate short-term and long-term impacts to the historic district. Impacts to the historic district's vegetation would be mitigated by replacing trees in accordance with NPS Director's Order #14. Short-term mitigation efforts would include replanting of trees within the study area. However, these plantings would not fully compensate for total vegetation impacts based on the total circumference of trees removed. Therefore, DC Water would prepare plans to replant trees and promote the restoration of the natural landscape and would contribute to the regeneration of the natural scenery of the park. All wheeled machinery would be cleaned prior to start of construction as well as completion of construction to reduce the risk of seed cross contamination and spread of non-native invasive species.

Within the park, asset protection of exposed pipes and manholes would be constructed at six locations throughout the park. Exposed pipes would require a minimum of 12 inches of cover over the top of pipe, which would be provided by combinations of rock cascades, riffle grade controls, pools, cross vanes, rock sills, and imbricated rock walls. Exposed manholes would be protected by an imbricated rock wall made of large, stacked rocks. At each asset protection site, embankments would be tied back into existing grade, natural materials would be used, and disturbed banks would be revegetated. Asset protection would make the stream less susceptible to adverse effects caused by the large volumes of stormwater that currently scour the channel and cause streambank erosion.

Under Alternative 2, the NRHP-eligible stone culvert below Broad Branch Road would not be physically affected by the proposed sewer improvements. The culvert is located adjacent to the entrance of a heavy equipment access path from Broad Branch Road. Vegetation and trees would be removed along the proposed path to allow heavy equipment to access an asset protection site approximately 250 feet upstream on Soapstone Branch. However, the culvert is primarily NRHP-eligible for its rustic architecture and for its association with the early development of Rock Creek Park, and secondarily for its wooded setting. Vegetation and tree removal would not affect the character-defining features of the culvert.

The partially intact stone spring box/pump house would not be physically affected by the project but would be adversely affected by the visual changes in the park resulting from vegetation removal and grading. Because the woodland setting of Soapstone Valley Park is not considered a character-defining feature of the stone structure, vegetation removal would not impact to the structure.

Cultural Landscapes. Alternative 2 would have a short-term and long-term, moderate impact on cultural landscapes. The Soapstone Valley Trail is a component of the Rock Creek Park Historic Trails Cultural Landscape. Alternative 2 would regrade the northern portion of the trail to facilitate improvements to MS4 F-117 Outfall that are required by the District of Columbia's MS4 permit, as well as the Albemarle stormwater management improvements. Portions of the trail would be used as HE access paths. HE access paths would result in vegetation removal and the widening of the trail to approximately 16 feet to accommodate heavy construction vehicles, and would employ geotextile, mulch, and wooden mats. Post construction, mulch would be removed. Grading of the trail is anticipated in the vicinity of MS4 Outfall F-117 near the Soapstone Valley Trailhead at Albemarle Street. Additional grading or other modifications along access path locations may be required to support construction but would be determined during final engineering design. The visual character of the trail would be altered by vegetation removal within the LOD including the removal of up to 371 trees and trimming of up to 74 trees. The project would result in moderate short-term and long-term effects to the cultural landscape contained within the Rock Creek Park Historic District. Impacts to trailside vegetation would be mitigated by replacing trees in accordance with NPS Director's Order #14. Short-term mitigation efforts would include replanting of trees within the study area. However, these plantings would not fully compensate for total vegetation impacts based on the total circumference of trees removed. Therefore, DC Water would pay a one-time, fee-in-lieu to NPS

or NPS's designee. This fee-in-lieu would be used by NPS for onsite long-term protection as well as offsite plantings and long-term protection. All wheeled machinery would be cleaned prior to start of construction as well as completion of construction to reduce the risk of seed cross contamination and spread of non-native invasive species. Additionally, a Memorandum of Agreement (MOA) between DC Water, NPS, and the DC HPO is being developed by NPS to identify additional mitigation to document the changing cultural landscape.

Cumulative Impacts

Past, present and reasonably foreseeable projects have and would potentially impact cultural resources in the project vicinity. Cumulative impacts would involve ground disturbance in proximity to archeological sites and other construction-related activities that would impact the historic designation elements of historic structures, buildings or districts or cultural landscapes. Impacts that results from federal actions would be mitigated as part of the Section 106 process. However, incremental, adverse impacts are probable. For example, DC Water is currently investigating sanitary sewer system deficiencies within multiple streambeds on NPS property that are part of the Rock Creek Park Cultural Landscape. Although DC Water is committed to reducing impacts and construction footprints, tree removal and other impacts to the landscape throughout the Rock Creek Park system would be required for access. There would be no cumulative impacts to archeological resources.

IMPACT ON VISITOR USE AND EXPERIENCE

Methodology and Assumptions

Potential impacts to visitor use and experience were assessed based on the potential of the proposed actions to impair Park resources or values; create an unsafe or unhealthful environment for other visitors or employees; and unreasonably interfere with the atmosphere of peace and tranquility, or the natural soundscape maintained in wilderness and natural, historic, or commemorative locations within Soapstone Valley Park.

Impacts of No Action Alternative

Under the No Action Alternative, the sanitary sewer infrastructure would continue to age, and exposed sewer pipes and manholes would continue to be subject to environmental forces including stream flows, stormwater, debris, and human contact. DC Water would continue to inspect and monitor the sanitary sewer system infrastructure. Any sewer system failures would likely result in sanitary sewage leaks and would require emergency access to Park property. Sewage leaks would be subject to emergency repairs, as regulated by the CWA and the Code of the District of Columbia. Emergency repairs could have an adverse effect on visitor use and experience.

Existing odors associated with the sanitary sewer infrastructure and adverse impacts to aesthetics associated with exposed sewer infrastructure would continue to reduce the quality of visitor use and experience. Therefore, the No Action Alternative would result in a short-term and long-term, minor impact on visitor use and experience.

Impacts of Alternative 2: Trenchless Alternative

Alternative 2 would result in adverse, short-term and long-term impacts on visitor use and experience. Alternative 2 would involve the clearing of all HE access paths, as well as the MS4 Outfall F-117 rehabilitation areas, and asset protection sites. Construction of Alternative 2 would last between 18 and 24 months. During that time, there would be an active construction site within Soapstone Park. There would be various construction equipment and construction workers, as well as construction noise, within Soapstone Park. The construction would involve the removal of trees and vegetation and would cause the trail system to be closed during construction. In some locations, the trail’s current system of natural log steps, earthen paths, and stream crossings would be modified to accommodate equipment during

construction. Also, bypass pumps and piping would be needed to separately divert sewage and stream flow.

During construction, signage would be placed informing the public of construction activities, estimated construction duration, and project purpose. Also, to ensure public safety, barricades and/or other control measures would be installed to keep visitors out of the construction site. Noise impacts during construction could be mitigated by measures such as enclosed bypass pumps, and other techniques, as needed. The proposed project also must comply with the District's Municipal Regulations (Title 20, Chapter 28), which set certain standards for noise levels. Construction hours would be limited based on construction permit requirements. Fugitive dust would be generated during site grading and construction, from wind erosion and vehicular activities. Fugitive dust would be mitigated by following District regulations regarding dust control and other air quality emission reduction controls such as watering construction areas during dry periods to prevent fugitive dust from entering the air. In addition, trucks used to haul excavated materials would be covered.

Following construction, portions of Soapstone Valley Park would remain closed for up to 2 years to allow for post-construction restoration. However, the public paths and walking trails will be reopened post-construction. Trails and pedestrian paths would be largely restored to pre-construction conditions. Also, vegetation and tree replanting would occur, and the character of the forest landscape would be changed at the park as the vegetation and trees mature. Alternative 2 would have a long-term, beneficial impact as well. The sanitary sewer repairs would result in an odor reduction throughout Soapstone Valley Park and the exposed sewer infrastructure would be concealed by constructed riffles, rock cascades and imbricated walls. Also, in locations where the trail crosses the stream, stepping rocks would be placed to facilitate the ease of crossing.

Cumulative Impacts

Past, present and reasonably foreseeable projects have and would potentially impact visitor use and experience in the project vicinity. Cumulative impacts would involve changes to the existing use of the parkland including impacts to trails, waterways, vegetation, cultural resources, and structures within Soapstone Valley Park. Although NPS manages and approves all park maintenance and/or improvement activities, incremental, adverse impacts are probable. For example, DC Water is currently investigating sanitary sewer system deficiencies within multiple streambeds on NPS property that are part of the Rock Creek Park Cultural Landscape. Although DC Water is committed to evaluating opportunities to eliminate sewers from the streambeds and reducing impacts and construction footprints, tree removal and other impacts to the landscape throughout the Rock Creek Park system would be required for access. Alternative 2 would contribute to short-term and long-term, moderate, adverse cumulative impacts on visitor use and experience.

5 CONSULTATION AND COORDINATION

NPS and DC Water have consulted with various local and federal agencies regarding improvements to the Soapstone Valley sewer system since 2011. The Soapstone Valley Sewer Rehabilitation project has been discussed at numerous multi-agency meetings at various locations. DC Water is also continuously working with DDOT, as DDOT is a major property owner within the study area. There has also been ongoing coordination with DOEE, mainly associated with the MS4 stormwater outfall locations within the Park, wildlife species, and potential wetland/waterway impacts. Other agencies consulted include the National Oceanic Atmospheric Administration (NOAA), USFWS, USACE, and DC HPO. Consultation is ongoing and will continue throughout the design and construction of the project, if necessary. Consultation and coordination milestones are listed below.

District Department of Energy & Environment

- On January 23, 2012, DOEE stated that there were no known federally rare, threatened or endangered species within the project area and identified Species of Greatest Conservation Need in the region.
- On May 24, 2016, DOEE attended the Pre-Application meeting to discuss stormwater design elements, tree impacts, asset protection elements, possible impacts to the surrounding natural systems.
- On September 8, 2018, DC Water sent a follow-up letter to the Wildlife Management Branch, Fisheries and Wildlife Division of DOEE, requesting updated information concerning rare, threatened or endangered species that may occur in the project area as well as information concerning Species of Greatest Conservation Need as listed in the Wildlife Action Plan.
- Consultation is ongoing regarding MS4 stormwater outfalls, the CWA Section 401 Water Quality Certification process, and erosion and sediment control.

District Department of Transportation

- On June 24, 2015, DC Water attended a Multi-Agency meeting, DDOT-PPSA was in attendance.
- Consultation is ongoing regarding the required special tree and street tree permits.

National Oceanic and Atmospheric Administration

- On June 14, 2012, NOAA-National Marines Fisheries Service stated that no listed anadromous fish species were known to occur in the project area and no further coordination was necessary.

United States Army Corps of Engineers

- On May 24, 2016, USACE attended the Pre-Application meeting to discuss stormwater design elements, tree impacts, asset protection elements, possible impacts to the surrounding natural systems.
- Consultation is ongoing regarding the required CWA Section 404 permitting process.

United States Fish and Wildlife Service

- On May 4, 2015, August 15, 2015, February 23, 2016, and August 17, 2018, USFWS's online ECOS-IPaC was consulted to determine if any listed species occurred within the project area. The Hay's Spring amphipod (*Stygobromus hayi*) was the sole species listed.

SECTION 106 PROCESS

Section 106 of the National Historic Preservation Act requires Federal agencies to take into account the effects of their undertakings on historic properties. The process includes consultation the State Historic Preservation Officer, the identification of historic properties, an assessment of effects on historic properties, and the resolution of effects on historic properties, which would be documented in an MOA. Section 106 consultation and coordination milestones are listed below.

District of Columbia Historic Preservation Office

- On November 1, 2011, the Section 106 process was initiated.
- In April 2012, the Draft Phase I Archeology Report was submitted to DC HPO.
- In January 2016, the Section 106 process was reinitiated.
- In April 3016, the Revised Draft Archeology Report was submitted to DC HPO.
- On February 28, 2017, NPS submitted an Assessment of Effects and an updated Archeology Report to DC HPO.
- On August 8, 2018, DC HPO concurrence on with the NPS finding of "no adverse effect" for archeological resources – August 8, 2018.
- On September 15, 2017, DC HPO concurred with the NPS finding of an "adverse effect" on the natural setting of the Soapstone Valley Park/Trail and the Rock Creek Park Historic District.
- Consultation is ongoing regarding mitigating adverse project effects, which will be ultimately agreed upon and documented in an MOA.

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