

**FLETCHER'S PARK STREAM RESTORATION
AND FLOODPLAIN ENHANCEMENT PROJECT
ENVIRONMENTAL ASSESSMENT**



JUNE 2020

ENVIRONMENTAL ASSESSMENT

Lead Agency: National Capital Planning Commission

Title of Proposed Action: Fletcher's Park Stream Restoration, 5200 Kenilworth Avenue, Riverdale, Maryland 20737

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Abstract:

The Maryland-National Capital Park & Planning Commission, Department of Parks and Recreation (Prince George's County) proposes a stream restoration and floodplain enhancement project in Fletcher's Field Park (Riverdale, MD), which is part of the Northeast Branch Stream Valley Park. The project would create approximately 31,000 square feet of forested wetland area; 8,500 square feet of emergent wetland area; and relocate (re-center) an existing unnamed tributary, with stabilized banks and stepped pools. The project would also construct a new 100-foot sidewalk extension from an existing sidewalk, with educational signage at its terminus related to wetlands. This Environmental Assessment (EA) analyzes and documents the potential impacts of the proposed stream restoration and floodplain enhancement project at Fletcher's Park. A No Action Alternative serves as a baseline by which impacts of the proposed stream restoration and floodplain enhancement projects are evaluated.

Review Period:

Interested parties are invited to review and comment on the EA from June 12, 2020 to June 26, 2020. Please submit any comments to Stephanie Free, PLA, LEED GA through the NCPC website at www.ncpc.gov. In addition, the CWP works through their outreach team to obtain comments and concerns from the community. The CWP will be hosting a Virtual town hall meeting on June 11, 2020. Due to Covid 19 limitations, a public meeting was not feasible. In addition, the CWP outreach team has worked to notify the residents closest to the park to make them aware of the project.

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1.1 PURPOSE AND NEED

Pursuant to the National Environmental Policy Act (NEPA) of 1969, The CleanWater Partnership (CWP), has prepared an Environmental Assessment (EA) to evaluate potential impacts to the natural and human environment from the proposed stream restoration and floodplain enhancement project. The EA will enable the National Capital Planning Commission (NCPC) to satisfy approval authority for the project pursuant to the Capper-Crampton Act of 1930, which allocated federal funding to purchase parkland in the Region. NCPC's review focuses on protecting the character and setting of the parks and ensuring that all development is for park-related purposes. This EA has been prepared in accordance with NEPA (Title 42, US Code § 4331 and the National Capital Planning Commission's (NCPC) Environmental and Historic Preservation Policies and Procedures. The Capper Crampton act specifically addresses water quality as part of the activities for which the land is to be preserved. Please see below from the Capper Crampton Plan:

“Along with allocating funds for a comprehensive park, parkway, and playground system in the nation's capital, the Capper-Crampton Act allocated funds for the acquisition of certain enumerated stream valleys in order to preserve land and to protect the water quality of the region's waterways .The CCA preserved and protected more than 2,200 acres of stream valley parks in the National Capital Region. In addition to funding for acquisition, CCA authorized the National Capital Park and Planning Commission (now NCPC), to approve any development projects in parks acquired under CCA to ensure protection and preservation of the region's valuable watersheds and parklands in perpetuity.”

1.2 INTRODUCTION:

The stream site was selected for restoration by the CleanWater Partnership, a Public Private Partnership formed with Prince George's County and operated by the Prince George's County Department of the Environment (DoE). The project is required as part of the Prince George's County's ongoing MS 4 permit obligation. The CWP is tasked by the DoE to select, design, fund, build, and maintain various water quality improvements such as pond retrofits, ESD facilities, and Stream Restoration projects including this proposed action to address the State MS-4 requirements. The MS 4 (or Municipal Separate Storm Sewer) permit mandates the removal of harmful pollutants from the watercourses across many jurisdictional boundaries in Maryland including Prince George's County via, in part, adopting procedures to ensure structural stormwater management practices are installed and maintained properly after construction. These watercourses ultimately discharge into the Bay thereby reducing the health of the Bay. With the construction and certification of these devices, the CWP can report credits (measured as impervious acres) for the benefit of Prince George's County to the Maryland Department of the Environment (MDE). Approximately 760 linear feet of stream will be disturbed. The restoration project will provide removal of Nitrogen, Phosphorus and Total Suspended Solids as measured in impervious acres treated. This project will result in 101.43 impervious acres treated for the benefit of Prince George's County

The Prince George's County CleanWater Partnership (CWP) is a unique Private-Public Participation organization formed by Prince George's County Department of the Environment and Corvias, a private company that specializes in leveraging funds and

managing the construction of infrastructure. Unique to this operation is the commitment of the CWP to engage with local and disadvantaged firms to provide administration, design, construction, and certification for the program, designed to provide Prince George's County with MS-4 permit obligation deliverables (calculated as previously untreated acreage). To date, the team has completed over 100 water quality projects with more planned. These projects include a variety of water quality devices such as micro-bioremediation facilities, Sand Filters, Submerged Gravel Wetlands, Pond Retrofits, and stream restoration such as the Proposed Action for Fletcher's Park. The CWP has completed two phases of contractual obligations with Prince George's County and is now negotiating a third phase. All projects include no less than 30 years of maintenance provided by Corvias for the benefit of their partners and the land owners in Prince George's County, including the Maryland National Capital Park and Planning Commission who operates the Fletcher Park Stream Restoration project/property. These programs have provided Prince George's County with well over 2,000 acres of credit to date. For location of projects in the area, please see their website: <https://thecleanwaterpartnership.com>

1.3 STUDY AREA LOCATION

Fletcher's Park is a community park asset owned by the State of Maryland, under the jurisdiction of the Maryland National Capital Park & Planning Commission (MNCPPC), with project approval authority given to NCPA under the Capper-Crampton Act. The site is located at 5200 Kenilworth Avenue in Hyattsville, Maryland and within the jurisdictional boundary of Prince George's County. The site is located on the west side of the North-South Kenilworth Avenue and has ample parking. The property is 46 acres and is identified as Parcel 34 sometimes also referred to as Tanglewood Park. Within the park is the area of Proposed Action and is an approximate 760' linear of stream. See Figure 1.

1.4 BACKGROUND

Fletcher's Park is a 46-acre community park that includes parking, multiple ballfields, multiple asphalt courts, playground equipment, open fields, and a highly erosive unnamed tributary to the Northeast Branch of the Anacostia River. The entire stretch of the stream channel that is the subject of this proposed improvement is incised and over-widened and is no longer connected to the adjacent floodplain. Based on historic aerial photos, it appears the stream was realigned when an adjacent construction occurred. This was a typical practice in the 1950's and 1960's which is no longer allowed today. The Unnamed Tributary lies within the Maryland Coastal Plain physiographic region and is designated as a Use 1 Stream. The Fletcher's Field Stream location is located on Firm Panel 24033C0133E (See Figure 2), and is considered Waters of the United States. The site is considered as having poor biotic integrity for fish and macroinvertebrates. The site is not located in a Tier II watershed and no marine clays have been identified.

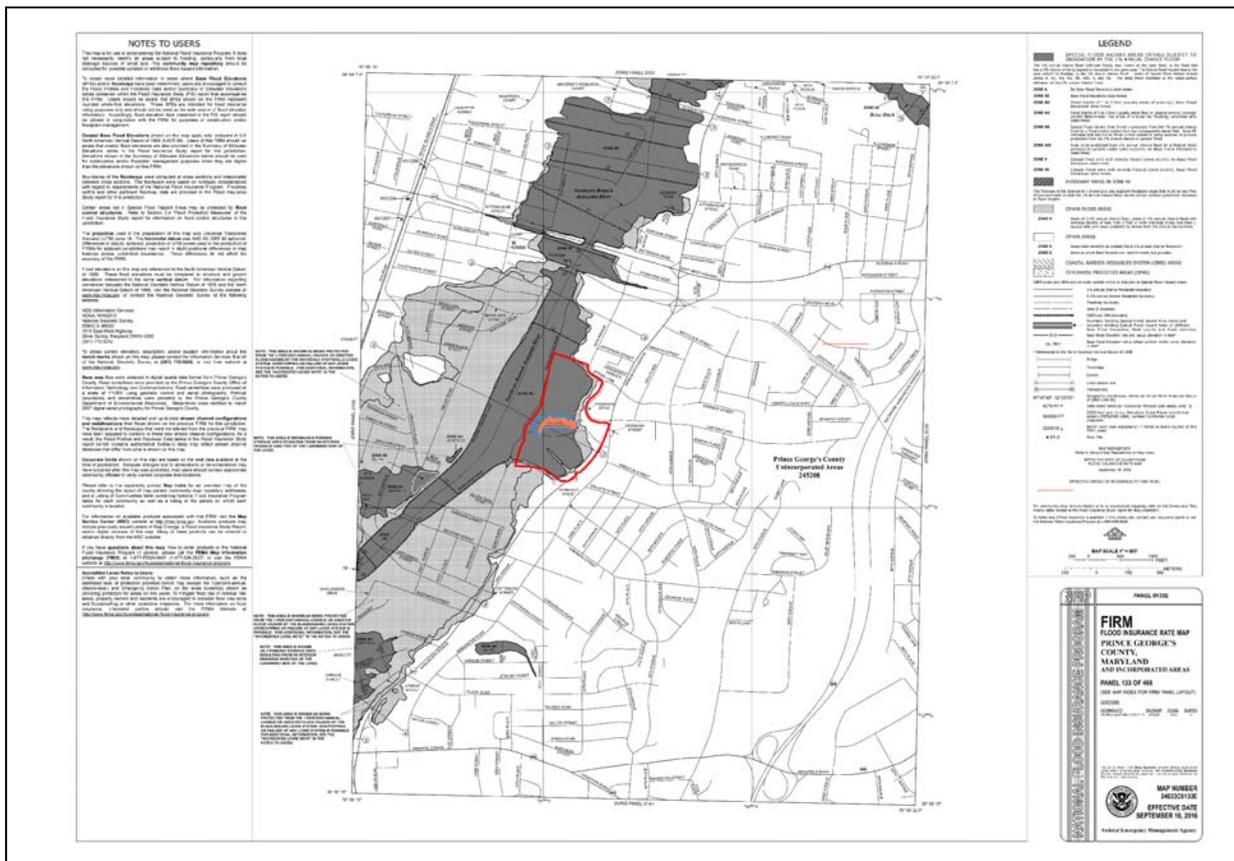
The CWP is working closely with MNCPPC to identify stream locations throughout the County that may serve as stream restoration projects in an effort to meet the County's state mandated MS-4 permit obligations for water quality credits and required by MDE. This location was addressed by MDE as a Tier II impaired stream and fits the parameters of the CWP program.

Figure 1: Project Location Map



¹ NCPC Resource Guide: Review of Projects on Lands Acquired Under Capper Crampton Act

Figure 2 – Firm Map



1.5 PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of the proposed action is to prevent further deterioration of the stream by relocating the stream to the center of the floodplain and constructing a floodplain bench set below the existing bankfull elevation of the stream channel to allow for frequent floodplain reconnection. The proposal also expects to regrade and stabilize the streambanks. This project is needed to stop the stream from continuing to migrate, erode, and pollute downstream receiving waters.

The stream was selected for stream restoration based on the following criteria as established by the CWP on all stream restoration projects:

- 1) What is the overall biological health of the stream? A desktop analysis was performed and it determined that this stream is rated in "Poor Condition"
- 2) Who owns the stream and can the CWP obtain the ability to construct the stream? The stream is located on property owned by MNCPPC, MNCPPC has agreed the project can move forward assuming all permit requirements are obtained.

- 3) Is the site in a location where it can be accessed for improvement? In order to improve a stream construction, equipment must be able to access the site within the available area for land disturbance.
- 4) Once the three constraints above were met, Soltesz employees conducted a thorough and onsite stream assessment utilizing Rosgen Level II and III field techniques. These techniques allowed Soltesz staff to determine the stability of the stream and its potential need for improvement or restoration. According to this inspection and based upon field measurements the unnamed tributary was undergoing considerable erosion. If action is not taken, the stream will continue to erode, thereby producing, contributing, and releasing a significant amount of Total Suspended Solids and other pollutants downstream eventually into the Chesapeake Bay via the Anacostia River (See Appendix D – Stream Restoration Assessment). Based on the above assessment it was determined that the stream has too much water flowing through too small of a space and it has eroded enough that it meets the standards as outlined by MDE to fix the stream.

1.6 AGENCY AND PUBLICATION PARTICIPATION

The CWP project development process for all projects includes review by multiple local, State, and federal agencies, with the following required signature level approvals.

Prince George's County Department of the Environment – Stormwater Management Plan

Prince George's County Soil Conservation District – Erosion and Sediment Control Plan

MNCPPC – Natural Resource Inventory

MNCPPC – Tree Conservation Plan Type 2

Maryland Department of the Environment – Permit to Disturb Jurisdictional Wetlands and Waters

Corp of Engineers - Permit to Disturb Jurisdictional Wetlands and Waters

NCPC – Approval review with a focus on protecting the character and setting of the parks and ensuring that all development is for park-related purposes.

Public participation is encouraged with many of the above approvals including the Permit to Disturb Jurisdictional Wetlands. With respect to the EA and decision making on the Proposed Action opportunities are guided by 32 CFR Part 651. The EA is to be made available to the public for 14 days. Public outreach efforts by the CWP outreach team is scheduled for June 11, 2020, in an effort to inform the local citizens regarding the stream restoration. The CWP is staffed with public outreach professionals who notify local residents and educate the general public regarding the project. Observations and comments are taken and addressed.

The CWP is staffed with public outreach professionals who notify local residents through a variety of means in an effort to inform and educate the general public regarding the project. Observations and comments are taken and addressed.

1.7 ENVIRONMENTAL LAWS AND REGULATIONS

This Environmental Assessment (EA) has been prepared in accordance with the National Environmental Policy Act (NEPA) as amended (Title 42, United States Code [USC § 4321 et seq.) and NEPA-implementing regulations of the Council on Environmental Quality (40 Code of Federal Regulations [CPR] Parts 1500-1508. NEPA was passed by Congress in 1969 as a national policy that encourages harmony between human beings and the environment and the promotion of efforts to prevent or eliminate environmental harm. NEPA requires federal agencies to fully consider the impacts of proposals that would affect the human environment prior to deciding to take an action, with involvement of interested and affected members of the public in the decision-making process. An EA is meant to be a “brief” and “concise” document at a level of detail that is sufficient to demonstrate that a project would not result in significant (major) environmental impacts (1508.9; 46.310(e)). This EA addresses potential project impacts to the natural and human environment that are deemed to be relevant for assessing the proposed stream restoration and floodplain enhancement project. Specific impact topic areas include: Clean Water Act, Chesapeake Bay Protection and Restoration, and Floodplain Management

Table 1-2: Compliance with Federal Environmental Statutes and Executive Orders

ACTS
American Indian Religious Freedom Act of 1987 (42 United States Code [U.S.C.] ch. 21 subch. I §§1996 & 1996a)
Archaeological and Historic Preservation Act of 1974 (16 U.S.C. §§469-469c)
Archaeological Resources Protection Act, as amended (16 U.S.C. §§470aa-470mm)
Bald and Golden Eagle Protection Act (16 U.S.C. §668 et seq.)
Clean Air Act, as amended (42 U.S.C. ch. 85, subch. I §7401 et seq.)
Clean Water Act, as amended (33 U.S.C. ch. 23 §1151)
Coastal Zone Management Act (16 U.S.C. ch. 33 §1451 et seq.)
Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 (42 U.S.C. §9601 et seq.)
Emergency Planning and Community Right-to-Know Act (42 U.S.C. ch. 116 §§11001-11050)
Endangered Species Act of 1973, as amended (16 U.S.C. ch. 35 §1531 et seq.)
Energy Independence and Security Act of 2007 (42 U.S.C. ch. 152 §17001 et seq.)
Energy Policy Act of 2005 (42 U.S.C. ch. 149 §15801 et seq.)
Fish and Wildlife Conservation Act of 1980 (16 U.S.C. §2901 – 2912)
Fish and Wildlife Coordination Act, as amended (16 U.S.C. §661-667e)
Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. ch. 38 §1801 et seq.)
Migratory Bird Treaty Act (16 U.S.C §§703-712, et seq.)
National Environmental Policy Act of 1969 (42 U.S.C. §4321 et seq.)
National Flood Insurance Act of 1968, as amended and Flood Disaster Protection Act, as amended (42 U.S.C. §4001 et seq.)
National Historic Preservation Act of 1966, as amended (16 U.S.C. ch. 1A, subch.II §470 et seq.)
Native American Graves Protection and Repatriation Act of 1979 (25 U.S.C. ch. 32 §3001 et seq.)
Noise Control Act of 1972, as amended (42 U.S.C. §§4901-4918, et seq.)
Occupational Safety and Health Act (29 U.S.C. ch. 15 §651 et seq.)
Resource Conservation and Recovery Act (42 U.S.C. ch. 82 §6901 et seq.)
Safe Drinking Water Act, as amended (42 U.S.C. §300f)
Toxic Substances Control Act of 1976 (15 U.S.C. ch.53, subch. I §§2601-2629)
EXECUTIVE ORDERS
Chesapeake Bay Protection and Restoration (Executive Order [EO] 13508)
Efficient Federal Operations (EO 13834)
Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (EO 12898)
Floodplain Management (EO 11988)
Indian Sacred Sites (EO 13007)
Invasive Species (EO 13112)
Promoting Energy Independence and Economic Growth (EO 13783)
Protection of Children from Environmental Health Risks and Safety Risks (EO 13045)

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

The proposed action involves restoring the stream by relocating the stream and connecting it to the center of the floodplain (see figure 3). Bank stabilization is also proposed. The Proposed Action involves the following:

- Establishment of a Limit of Disturbance and implementation of all Sediment Control Devices
- Clearing and Grubbing of all vegetation within the Limits of Disturbance
- Grading operations
- Installation Stream bank protection efforts
- Planting
- Stabilization

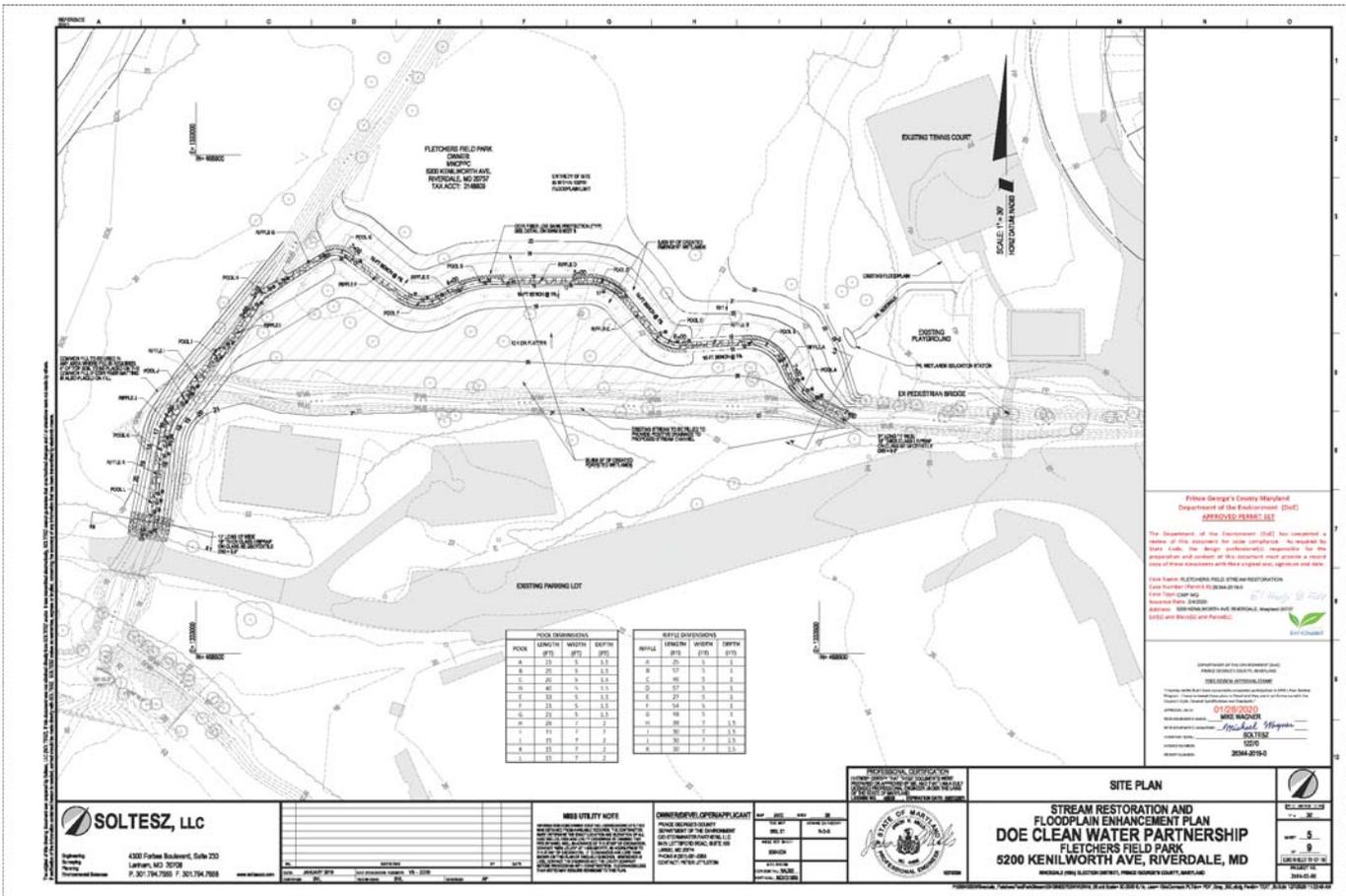
Standard grading equipment would be staged at the nearby parking lot and used on site. Laydown area is adjacent to the stream and would be used for material storage, material handling, assembly, mobilization, and demobilization. Parking for construction personnel would be accommodated in the on-site parking lots for to 6-8 workers on site. Equipment storage is anticipated to remain within the laydown areas identified on the plan and for mechanized equipment, within the parking lot. The project duration is anticipated to be 10 weeks for the bulk of the work starting in July. See Page 10 of 29 for the Approved Erosion and Sediment Control Plan.

2.2 ALTERNATIVES

2.2.1 No Action Alternative

No Action Alternative: NEPA regulations refer to the continuation of the present course of action without the implementation of, or in the absence of, the Proposed Action, as the “No Action Alternative”. Inclusion of the No Action Alternative is required by NEPA to use as the baseline by which to assess potential beneficial and adverse impacts to the natural and human environment from the project. Under the No Action Alternative, the CWP, MNCPP, and Prince George’s County would forgo the proposed restoration of the Unnamed Tributary to the Northeast Branch of the Anacostia River thereby maintaining the current rate of erosion of the parkland and the current rate of deposition of Total Suspended Solids, Nitrogen, and Phosphorous into the Anacostia River. This situation would result in the lack of treated impervious acres equivalents to be reported to the State of Maryland Department of the Environment and ultimately the EPA as a part of the Prince George’s County MS 4 obligations. Further, the erosion from this stream would continue to contribute to the decline of the health of the Chesapeake Bay. Thus the No Action Alternative would not satisfy the Purpose and Need of the Proposed Action requirement

Figure 3 – SWM



This Site Plan shows the relocation of the stream to the north. The centerline modification of the stream is to avoid trees where possible and the overall limit of the restoration. Grade controls consists of specific placement of small to medium size stones in a pattern to prevent the stream from cutting and eroding in the future. Riffle pools were created to establish aquatic habit. The side slopes of the stream were re-graded and vegetation has been planted to limit future erosion along the stream bank.

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED

In selecting possible alternatives for the Stream Restoration to the Unnamed Tributary to the Northeast Branch of the Anacostia River, the CWP evaluated alternatives that met the following screening criteria:

- Property Control and Access
- Environmental Impact
- Economics
- Logistics

The following potential alternatives that might meet the purpose and need were considered:

2.3.1 Traditional Maintenance Devices

This alternative would involve minor maintenance and trash removal in the stream including rip rap (a range of rocky material placed to protect from scour and erosion) and other structural devices. These devices would result in some removal of downstream pollution including Total Suspended Solids (organic or inorganic particular matter that is suspended in the water column that can be filtered out such as clay, silt, and sand) but are not eligible for MS 4 credit (as identified in Maryland, previously untreated impervious area now provided with a BMP such that runoff is filtered before leaving the site) nor are they supported by environmental permit regulatory agencies as a best practice. In addition, this solution does not create an environment conducive to habitat creation nor the overall goals of the project. Over time the stream would continue to erode and reduce usable park area ultimately threatening the integrity of the current park improvements.

2.3.2 Upstream Improvements

This alternative would be proposed to provide an upstream stormwater management facility to dissipate the flow in large storm events. The majority of the upstream property either has no viable outfall or is privately owned. Construction of an upstream device results in significant impact to environmental features. It would not be economically viable as property would have to be obtained in order to construct an upstream device. Logistically, there would not be enough room to construct the device without interruption to adjacent public rights-of-way.

2.3.3 Pipe Enclosure System

This alternative would propose the elimination of the stream and the replacement of the natural conveyance system with concrete storm drain conveyance pipe or channel sized to handle the appropriate storm events. The pipe would be placed at the centerline of the stream and covered with material to create a level field and then stabilized. This solution is an extreme solution and normally only contemplated when property improvements are so threatened with destruction or

damage that there is no other means of protection. This solution is generally not found to be acceptable in the conditions that exist for this project. It will not meet the needs or purpose of the project.

3.0 AFFECTED ENVIRONMENT

3.1 Archaeological Resources

Fletcher’s Park was visited and reviewed for archaeological and historic resources and none was visibly present. In addition, a Project Review Form along with maps, project description, and site plans was submitted to the Maryland Historic Trust. MHT returned a response of “There are no Historic Properties in the area of potential effect.” There is no impact to archaeological resources.

Conditions - Attach a brief description of past and present conditions of the project area (wooded, mined, developed, agricultural uses, etc) including construction dates of buildings, if known.

MHT Determination MHT Reviewer: Diana Henry Date: 3/26/2020

There are **NO HISTORIC PROPERTIES** in the area of potential effect The project will have **NO ADVERSE EFFECT WITH CONDITIONS**

The project will have **NO EFFECT** on historic properties **MHT REQUESTS ADDITIONAL INFORMATION**

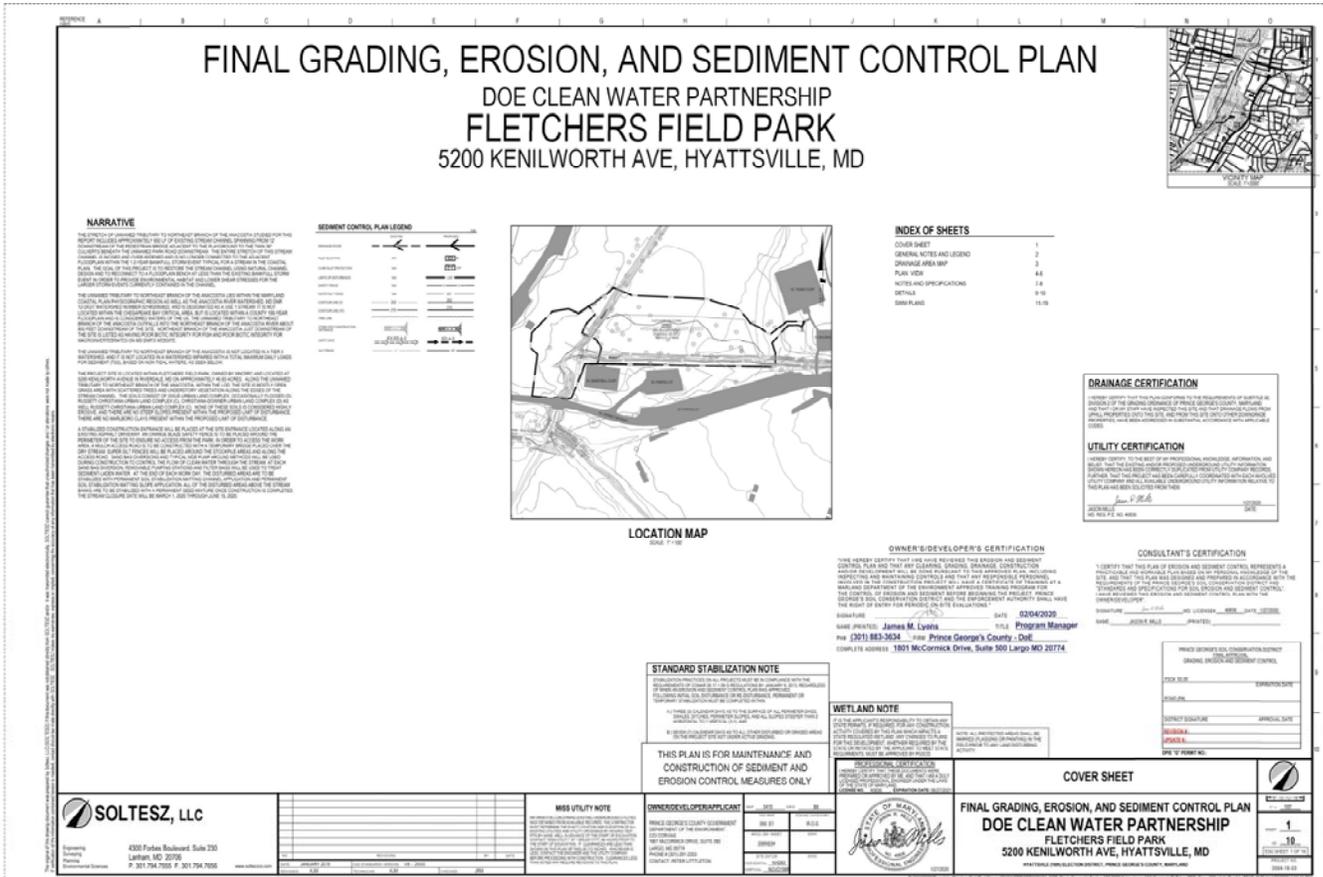
The project will have **NO ADVERSE EFFECT** on historic properties The project will have **ADVERSE EFFECTS** on historic properties

3.2 Geology & Soils

Soil resources were investigated for both plant and animal communities, proper soil conservation, and project viability. The Web Soil Survey was used to identify the soils types. The soils survey shows the site as mainly Issue-Urban Land Complex (lu) soils series of hydric class B/D. These soils are ideal for the stream restoration project and its associated plantings. Fletcher’s Park has relatively flat to gentle slopes. The Prince George’s County Soil Conservation District reviewed and approved the Sediment and Erosion Control plans. Their approval attests that this project meets all the regulations for soil preservation and erosion prevention. There is a minimal temporary impact to the soils during construction.

SOILS TABLE						
MAP UNIT SYMBOL	MAP UNIT NAME	PERCENT SLOPES	K-FACTOR (WHOLE SOIL)	HYDRIC RATING	HYDROLOGIC SOIL GROUP	DRAINAGE CLASS
lu	ISSUE-URBAN LAND COMPLEX	0 TO 2 PERCENT SLOPES	0.37	10	B/D	SOMEWHAT POORLY DRAINED

Figure 5 – Sediment Control Plan



3.3 WATER RESOURCES

This project is geared around improving the water resource at our specific site and downstream of our project. The stream in its current condition is contributing sediment to the stream today through erosion. Sediment in stream beds disrupts the natural food chain by destroying the habitat where the smallest stream organisms live and causing massive declines in fish populations.

Water sources are protected by the Clean Water Act and State laws and regulations. The stream that is being restored is an unnamed tributary of the Anacostia River. The project is within the Middle Potomac Tributary Watershed of the Anacostia watershed covers over 14246 acres. Drainage area is about 50% impervious, large drainage area of about 250 acres. This stream is in a park like setting, with a pipe outfall as the upstream entrance in to the park. Current channel is an F channel with no connection to the floodplain at bankfull stage. Proposed channel is a C channel with connection to the floodplain on one side at bankfull stage. There are no concentrated flows on the floodplain coming into the channel, however there is evidence of some erosion on the floodplain in existing conditions. The riparian buffer has been mowed and currently has little to no vegetation, less than 5' in most cases. The proposed stream channel will be planted with at least a 25' vegetated buffer when possible due to location of adjacent infrastructure. No macroinvertebrates or fish species observed at time of field investigation. Potential for biological uplift with proposed design, fish species could possibly travel from northeast branch of Anacostia River. In general the existing water resources are not ideal or pristine. MDE and the Army Corps of Engineers have both approved the impacts to the stream via Authorization MDE 19-NT-03381 and the Army Corps via Authorization NAB-2019-61709. The proposed activity will improve the water quality, treatment and volume. There is no negative affect to the water resource.

3.4 FLOODPLAINS

According to FEMA Firm Map 24033C0133E this site is within the AE Zone of the 100-year floodplain. There will be no increases to impervious surfaces and no increases to the floodplain itself. The entire stretch of this stream channel is incised and over-widened and is no longer connected to the adjacent floodplain within the 1.2-year bankfull storm event typical for a stream in the Coastal Plain. The goal of this project is to relocate the stream channel to center of the existing floodplain and restore the stream channel using natural channel design. The proposed stream channel will reconnect to the floodplain at less than the existing bankfull storm event in order to lower shear stresses for the larger storm events currently contained in the channel and will provide wetland habitat on the floodplain through more frequent inundation. There is no negative affect to the floodplain resource.

3.5 BIOLOGICAL RESOURCES

The site was evaluated for biological resources by multiple visits and by requested DNR information. According to a letter provided by Maryland DNR dated July 2, 2019, the Wildlife and Heritage Service has determined that there are no official State or Federal records for listed plant or animal species within the delineated area. No rare threatened or endangered species are known to exist. There are no Wetlands of Special State Concern, Maryland Scenic and Wild Rivers, Important Bird Areas, Green Infrastructure, Anadromous fish migration routes and spawning tributaries, or other significant resources.

There are approximately 30 trees which need to be removed in order to allow for the construction of the adjacent wetland construction these trees are not part of the forest and are permitted to be cleared by MNCPPC. The project tried to minimize the removal of as many trees as possible however based on the centerline location of the stream which was placed where the original stream was located the trees needed to be removed. As a mitigation method an extensive amount of new trees were replanted in both the wetland and along the shoreline please see figure 6. There is limited affect to the biological resource.

3.6 AIR QUALITY

For this stream restoration project, there are no permanent man made items that will change the quality of the air. There may be an extremely short term impact during construction from the construction vehicles but that impact will be short term. In addition, with all the additional planting that will occur, air quality should improve. There is no negative affect to the air resource.

3.7 VISUAL RESOURCES

The proposed location of the restoration project is a compliment to the existing park setting. The park is generally flat with older trees, open play fields, and parking lots. The stream restoration only enhances the natural setting. In addition, approximately 1 acre of plant material will be installed in and around the stream restoration site. Since the character and the feel of the site will not change, there is no impact to the visual resources.

3.8 CULTURAL RESOURCES

There are no cultural resources associated with Fletcher's Park and therefore there is no impact to the cultural resources.

3.9 LAND USE PLANNING

The project site is zoned R-O-S (Reserved Open Space). Reserved Open Space - Provides for permanent maintenance of certain areas of land in an undeveloped state, with the consent of the property owners; encourages preservation of large areas of trees and open space; designed to protect scenic and environmentally sensitive areas and ensure retention of land for non-intensive active or passive recreational uses and a limited range of public, recreational, and agricultural uses. The proposed restoration is in concert with the existing land use and there is no impact to the Land Use as a resource.

3.10 SOCIOECONOMICS

Riverdale Park, MD has a population of 7,221 and is the 5,067th largest city in the United States. The population density is 4,504 per sq. mi., which is 618% higher than the Maryland average and 4871% higher than the national average. The median age in Riverdale Park is 31 which is approximately 20% lower than the Maryland average of 38. In Riverdale Park, 44% of the population over 15 years of age are married, 66% speak English and 25% speak Spanish. 20% of Riverdale Park residents were born in Maryland, 35% were born out of state, 1% were born outside of the United States and 44% were

foreign born. This project has no impact on the socioeconomics.

3.11 TRAFFIC AND TRANSPORTATION

Since this project involves a stream restoration, there are only minor impacts to traffic during construction. Environmental Consequences

3.12 SOLID AND HAZARDOUS MATERIALS WASTES

There are no hazardous materials or wastes either existing or proposed that have an impact to this site.

3.13 NOISE

Since this project involves a stream restoration, there are only minor impacts to the noise levels. These impacts are minor and short and occur only during construction.

3.14 ENVIRONMENTAL CONSEQUENCES

RESOURCES NOT EVALUATED IN THIS ENVIRONMENTAL ASSESSMENT: To the extent possible, analyses of the various resources presented in this EA are streamlined based on the anticipated level of potential impact. The focus of this EA is on the potential environmental impacts associated with the proposed stream restoration and floodplain enhancement project. The following resource areas are not analyzed in this EA because the proposed action either has no potential to affect them or the potential impacts would be negligible:

Relocation Impacts – As all work is being done on park property, no residents will be relocated to construct this project. There is no relocation impact associated with this project.

Farmland Impacts – The project site is located on property that is not considered to be prime or unique farmland, or farmland of any state or local importance as it lies within a developed urban area and was once used for industrial purposes. There is no farmland impact associated with this project.

Economic Impacts - The stream restoration and wetland creation project will provide no specific economic impact for the community.

Land Use Impacts - The project will not change the use of the property as a park. The site is park land now and will remain park land after the project is complete.

Wild and Scenic Rivers - There is no impact to Wild or Scenic Rivers as the tributary to the Anacostia River and the Anacostia River itself are not part of the National Wild and Scenic Rivers System.

3.14.1 Recreational Facilities

No Action Alternative: No change in existing use or access to park features.

Construct the Project - Preferred Alternative: Although the proposed stream restoration will be constructed in a seldom used section of the park, there is a playground and basketball court adjacent to the limit of disturbance that may experience some noise/vibrations from some of the construction equipment. It is anticipated that the adjacent basketball court and playground will remain open to public use both during and after construction. The existing stream channel provides no opportunities for fishing, swimming or any other forms of recreation. During construction there will be no access to the stream channel for park visitors within the limits of disturbance. This is not expected to cause any issues.

3.14.2 Air Quality Impacts

No Action Alternative: No change in existing air quality at the park.

Construct the Project - Preferred Alternative: The proposed stream restoration project includes the creation of about 30,000 SF of forested wetlands, its' completion will have a positive (likely negligible to minor) impact on air quality in the area. No significant change in air quality at the park is expected.

Short Term:

Construction of the project is expected to take 60-90 days. There is a Sediment and Erosion Control Plan for this project during construction that will help to minimize airborne dust associated with construction activities.

There may be some diesel smoke emissions from some of the construction equipment, although due to the small size of required excavation there will not be large amounts of construction equipment needed to construct this project.

There should be no noticeable change in air quality at the park during construction.

3.14.3 Noise Impacts

No Action Alternative: No change in existing noise level at the park.

Construct the Project - Preferred Alternative: This project entails the relocation and restoration of a stream and creation of a forested wetland system within the park property. No adverse noise impacts are expected from the resulting construction of the stream and forested wetland complex, however it would be expected that the addition of trees and underbrush to the site should help to abate existing traffic noise (though negligible to minor) from Kenilworth Avenue.

Short Term:

Construction of the project is expected to take 60-90 days. There will be on-going noise at the site during construction from the hum of construction equipment as work continues from 7am to 5pm on weekdays.

3.14.4 Water Resources

No Action Alternative: No change in existing water resources at the site. The existing stream channel will still be degraded and sediment laden with TMDL's will flow downstream into the Anacostia River.

Short Term

The construction project is expected to last 60-90 days. There will be limited impacts to the water resources in the form of sediment due to grading, which can't be removed using the approved sediment and erosion control devices.

Construct the Project - Preferred Alternative: The purpose of this stream relocation and restoration project is to enhance water quality through the removal of sediment and TMDL pollutants that would typically enter the Anacostia River and ultimately Chesapeake Bay from this minor tributary. The relocated stream channel is designed to overflow its' streambanks at less than the bankfull event to allow for a more stable stream channel. The smaller and more stable stream channel is less prone to erosion and allows for the creation of a viable forested wetland on the adjacent floodplain as it is inundated with water more frequently. With the removal of TMDL laden sediment stemming from the stream restoration as well as the nutrient uptake of the newly created forested wetland, this project is expected to improve water quality in the area. The project will also increase the passive recreational opportunities in the park by adding wetlands and enhanced vegetation. According to MNCPPC, this area of the park is not currently programed with activity and is passive today. We have also added an education space to explain the stream restoration on the project and to educate people on how streams receive runoff and pollution from receiving drainage areas.

A wetland delineation was performed at the project location and found no existing wetlands within the project limits. There are no impacts to existing wetlands, although 30,000 square feet of forested wetlands will be created as part of the project scope.

3.14.5 Wildlife Impacts

No Action Alternative: No change in existing wildlife impacts at the park. The existing stream channel bottom is difficult for animals to access as the streambanks are steep. The existing stream channel bottom is approximately 4' wide and typically contains less than an inch of base flow making it hard for any animals to take a drink.

Construct the Project - Preferred Alternative: This project entails the relocation and restoration of stream channel within the park. The proposed stream channel will have gradually sloping streambanks providing for easier access to the stream for animals. The introduction of pools and riffles into the restored stream channel will allow for easier drinking for the animals. The forested wetland created adjacent to the newly relocated stream channel will allow for the introduction of greater diversity of animal and insect species to the property.

3.14.6 Floodplain Impacts

No Action Alternative: The project would not be undertaken and existing conditions within the 100-year floodplain would remain the same.

Short Term: For the no action alternative there is negligible floodplain impact if the stream remains in the current location.

Construct the Project – Preferred Alternative: The project site falls within a FEMA 100-year floodplain and within a local Prince George's County floodplain. A proposed floodplain study was conducted based on proposed changes associated with grading of the site for the stream relocation and wetland creation. The study found no increase in either the County or Federal Emergency Management Agency (FEMA), floodplain elevation. This is due to the minor grading changes at the site and the extent of the existing 100-year flooding from the nearby Anacostia River. With the excavation required for the proposed wetland, this project has a net cut within the floodplain, and should provide more flood storage capacity (though negligible). Therefore, this project will have no impact on the 100-year floodplain elevation, will cause no flooding issues, and will provide some natural floodplain habitat. In simple terms, considering the entire project, since we are removing dirt, there is more room for water to be stored in a major flood event.

Short Term: No floodplain related impacts are expected from construction activities (approximately 60 to 90 days) at the site. The extent of flooding at the park site is due to backwatering from the nearby Anacostia River during larger storm events. During construction, the existing stream channel will be left to flow unrestricted while the new stream channel is constructed. Once water is diverted into the new stream channel the existing stream channel will be backfilled. There will be no change in hydrology at the site during construction that would cause any change in the floodplain elevation.

3.14.7 Threatened or Endangered Species

No Action Alternative: According to a letter provided by Maryland DNR dated July 2, 2019, the Wildlife and Heritage Service has determined that there are no official State or Federal records for listed plant or animal species within the delineated area. No rare threatened or endangered species are known to exist. As pollution continues, there would be incalculable impacts downstream.

Short Term: There would be negligible impacts to the rare threatened or endangered species in the area of the improvement since there are no species identified.

Construct the Project - Preferred Alternative: According to a letter provided by Maryland DNR dated July 2, 2019, the Wildlife and Heritage Service has determined that there are no official State or Federal records for listed plant or animal species within the delineated area. No rare threatened or endangered species are known to exist. There is negligible impact associated with the proposed stream restoration and wetland creation project at this site.

Short Term: According to a letter provided by Maryland DNR dated July 2, 2019, the Wildlife and Heritage Service has determined that there are no official State or Federal records for listed plant or animal species within the delineated area. No rare threatened or endangered species are known to exist. There is no impact associated with construction of the proposed stream restoration and wetland creation project.

3.14.8 Historic and Archaeological Preservation

No Action Alternative: Fletcher's Park was visited and reviewed for archaeological and historic resources and none was visibly present. A Project Review Form along with maps, project description, and site plans was submitted to the Maryland Historic Trust (MHT). MHT returned a response of "There are no Historic Properties in the area of potential effect."

Construct the Project - Preferred Alternative: Fletcher's Park was visited and reviewed for archaeological and historic resources and none was visibly present. A Project Review Form along with maps, project description, and Site Plans was submitted to the Maryland Historic Trust. MHT returned a response of "There are no Historic Properties in the area of potential effect." This project will not impact any historic or archaeological resources.

Short Term: Fletcher's Park was visited and reviewed for archaeological and historic resources and none was visibly present. In addition, a Project Review Form along with maps, project description, and site plans was submitted to the Maryland Historic Trust. MHT returned a response of "There are no Historic Properties in the area of potential effect." There will be no impact to historic or archaeological resources during construction.

3.14.9 Visual and Aesthetic Resource Impacts

No Action Alternative: No change to visual or aesthetic resources at the park.

Construct the Project - Preferred Alternative: The proposed location of the restoration project is a compliment to the existing park setting. The park is generally flat with older trees, open play fields, and parking lots. During and after construction the project would adversely affect the area as several mature trees will be removed. The proposed stream restoration and forested wetlands will enhance the natural setting once the trees and vegetation have reached maturity in 15 to 20 years.

3.14.10 Tree/Vegetation Impacts

No Action Alternative: No change to trees or vegetation at the park. The wet conditions in the area of the proposed stream relocation are currently killing the existing oak trees. There is no understory vegetation in this area as it is a park-like setting.

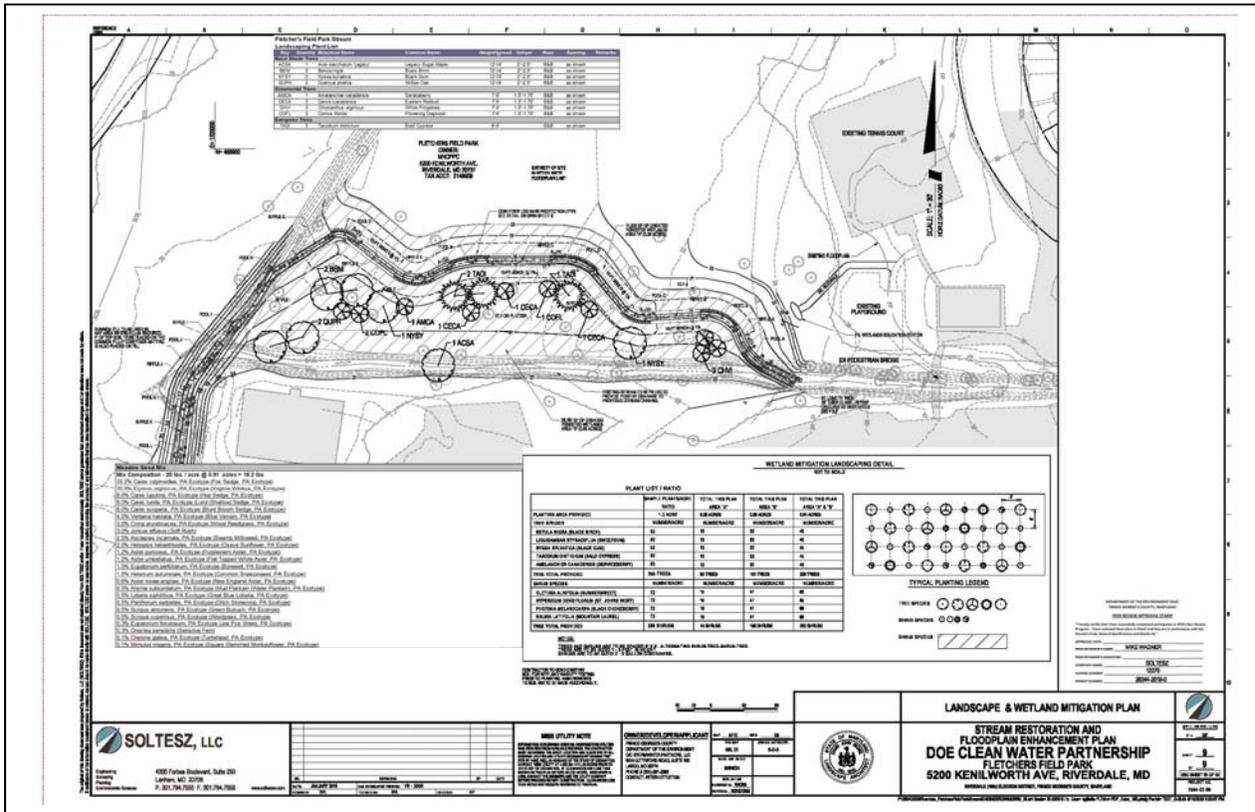
Construct the Project - Preferred Alternative: The relocation of the stream channel and planting of the area with 1 acre of forested wetlands will improve the tree cover and understory growth with plantings that are adapted to wet soils. The proposed stream restoration and forested wetlands will enhance the natural setting once the trees and vegetation have reached maturity in 15 to 20 years. The project will result in a net increase of about 200 trees and an acre of understory wetland vegetation.

3.14.11 Geology and Topography

No Action Alternative: No change to existing geology or topography at the park.

Construct the Project - Preferred Alternative: There will be topography changes associated with the construction of a new stream channel and backfilling of the old stream channel, but the majority of the topography changes will stem from excavation of the forested wetland area down closer to the groundwater elevation to sustain the proposed wetland system. No distinct geological formations will be affected by construction of the project.

Figure 6 – Landscape Plan



According to the Natural Resource Inventory approved by the Maryland National Capital Park and Planning Commission (MNCPPC) the area within the limit of disturbance for the Fletcher’s Stream project does not contain any natural existing forest. The level of vegetation there is such that there are individual trees located within the limit of disturbance that must be removed that are mature and of good size, however they are surrounded by invasive shrubs and vines which detract from their appearance and many of the existing trees are not native species in themselves, we are replacing them with native species such as:

- Upper Canopy: *Betula Nigra*(Black Birch), *Liquidambar Styraciflua*.(Sweet Gum),
- Shrub Layer: *Clethra Alnifolia*(summersweet), *Hypericum Densiflorum*, (St John’s Wart), and
- Herbaceous layer: will be a meadow seed mix with mainly *Carex vulpinoidea* and *Elymus virginicus* and a variety of *Carex*.

(Native Species Data from Metzger, Joseph Jr. 1995. Maryland Plant Checklist. Maryland plants by family and binomial name, and their prevalence in the state. Maryland Native Plant Society). The plan is to create a restored stream that will clearly and neatly delineate the stream banks as well as the elements of the stream that are provided for functional purposes such as the riffles and check dams. Native vegetation that displays seasonal color and interest as well as providing habitat and food sources has been selected to provide for a well maintained, natural, native, aesthetically pleasing experience for the park visitors in a fashion that is not available to them today with current individual trees.

4.0 FINDINGS AND CONCLUSIONS

The implementation of the Stream Restoration plan to the Unnamed Tributary to the Northeast Branch of the Anacostia River, as described under the Proposed Action Alternative will stabilize the fueling steam. A no action alternative will ultimately result in downstream pollutants in the form of nitrogen, phosphorous, and total suspended solids.

Short Term Impacts: The short term impacts to the proposed action appears to be negligible including the minor difficulties downstream due to grading operations.

The minor impacts due to the proposed action are greatly outweighed by the results of no action.

Table 4-1 provides a brief comparison of the environment impacts associated with the Proposed Action and the No Action Alternative.

- Coastal Zone Federal Consistency Determination concurrence

Table 4-1: Summary of Impacts of the Proposed Action and the No Action Alternative

Resource	Resource Evaluated in Detail in the EA	Proposed Action	No Action Alternative
Air Quality	Yes	Minor short-term impacts from construction equipment.	Negligible Impacts
Ground Water – Water Resources	No	Temporary impact due to grading	Negligible Impacts
Surface Water – Water Resources	Yes	Minor short-term impacts during construction from dust and earth disturbance. Temporary erosion and sediment control measures would be employed to mitigate stormwater runoff.	Long-term adverse impacts due to continued erosion of stream
Wetlands – Water Resources	Yes	No wetlands were delineated in this area however there is a minor temporary impact to existing stream channel.	Long-term adverse impacts due to erosion
Floodplains	Yes	Temporary negligible impacts of flood storage volume decrease due to grading.	Minor long-term adverse impacts as stream continues to erode and floodplain loses storage volume

Resource	Resource Evaluated in Detail in the EA	Proposed Action	No Action Alternative
Tree/Vegetation	Yes	Minor short-term impacts from tree removal.	Negligible Impacts
Fish and Wildlife	Yes	Minor short-term impacts	Negligible Impacts
Threatened or Endangered Species	Yes	No threatened or endangered species exist on site	Negligible Impacts
Noise	Yes	Minor short-term impacts from construction equipment.	Negligible Impacts
Geology and Topography	No	Topography will be impacted by grading	Negligible Impacts
Recreational Facilities	Yes	Negligible Impacts – a plan will be put in place to ensure that safety of the users is maintained	Negligible Impacts
Historical and Archeological Resources	Yes	No historic or archeological resources on site	Negligible Impacts
Visual and Aesthetic Resources	Yes	Existing trees will be removed, however new wetlands and enhanced environmental features will be added	Minor Impacts

Appendix A – DoE Permit

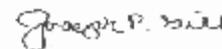


PRINCE GEORGE'S COUNTY, MARYLAND
 DEPARTMENT OF THE ENVIRONMENT
STORMWATER MANAGEMENT DIVISION



PERMIT FOR CONSTRUCTION AND RELATED ACTIVITIES WITHIN THE PUBLIC
 RIGHT-OF-WAY AND PRIVATE PROPERTY SITE WORK

PROJECT INFORMATION			
DOE PERMIT NUMBER:	26344-2019-0	ISSUE DATE:	Feb 24, 2020
PROJECT NAME:	FLETCHERS FIELD STREAM RESTORATION	CASE TYPE:	DOE CWP WQ
PROJECT ADDRESS:	5200 KENILWORTH AVE RIVERDALE, MD 20737		
PROJECT DESCRIPTION:	Stream Restoration		
EST. DISTURBED AREA:	ACRES	MUNICIPALITY:	
DRAINAGE AREA:	150.00 ACRES	IMPERVIOUS AREA:	60.00 ACRES
EX. IA PREVIOUSLY TREATED:	150.00 ACRES	SITE IA TO BE TREATED:	60.00 ACRES
CHESAPEAKE BAY CRITICAL AREA:		HISTORIC SITE NUMBER:	



JOSEPH P. GILL, ACTING DIRECTOR
 DEPARTMENT OF THE ENVIRONMENT

Appendix B – Army Corps Permit



DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, BALTIMORE DISTRICT
2 HOPKINS PLAZA
BALTIMORE, MD 21201

March 5, 2020

Operations Division

Mr. Jim Lyons
Prince George's County Department of the Environment
1801 McCormick Drive
Largo, Maryland 20774

Dear Mr. Lyons:

This is in reference to your application, NAB-2019-61709 (PG DOE Fletcher's Field/TMDL Bay Trust Fund/Stream Restoration), dated June 19, 2019 wherein you requested a Department of the Army (DA) authorization to fill and realign approximately 500 linear feet of stream creating approximately 670 linear feet of stream using riffle pool complexes and creating approximately 8,500 square feet of emergent wetlands and 30,858 square feet of forested wetlands at Fletcher's Field Park within 2 unnamed tributaries to the Anacostia at 5200 Kenilworth Avenue, Riverdale, Maryland.

Our evaluation has determined that the proposed wetland creation work, if accomplished in accordance with the enclosed plan(s), is authorized by Nationwide Permit(s) for purposes of Section 404 of the Clean Water Act as published in the January 6, 2017 Federal Register, Final Notice of Issuance, Reissuance, and Modification of NWP(s) (82 FR 1860), NWP number(s) 27 Aquatic Resources Restoration, Enhancement, and Establishment, provided all State authorizations are granted. In addition, the stream realignment and stabilization work is authorized as a Category III Activity, under the DA Chesapeake Bay TMDL RGP (Bay TMDL RGP). This general permit was published in the Corps Special Public Notice #43- issued on July 1, 2015. This Bay TMDL RGP verification is provided pursuant to Section 404 of the Clean Water Act. If any of the information contained in the application and/or plan(s) is later found to be in error, this authorization may be subject to modification, suspension, or revocation.

Enclosed is a list of conditions and management practices which must be followed for purposes of the NWP(s) in performing the work. You are reminded of General Condition #5 of the Bay TMDL RGP related to the required as built survey and post-construction reporting and the timeframes for submission of the required documentation.

In addition, we have determined that the special conditions below must also be followed in performing the work to ensure that the project impacts to the aquatic environment are minimal:

Appendix C – MDE Permit

STATE OF MARYLAND
DEPARTMENT OF THE ENVIRONMENT
WATER AND SCIENCE ADMINISTRATION
AUTHORIZATION TO PROCEED

AUTHORIZATION NUMBER: 201961709/19-NT-0338

EFFECTIVE DATE: January 17, 2020

EXPIRATION DATE: January 17, 2025

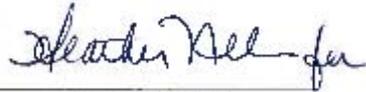
AUTHORIZED PERSON: Prince George's County Dept. of the Environment
1801 McCormick Drive
Largo, MD 20774
Attention: Jim Lyons



IN ACCORDANCE WITH ENVIRONMENT ARTICLE §5-503(a) AND §5-906(h), ANNOTATED CODE OF MARYLAND (2007 REPLACEMENT VOLUME), COMAR 26.17.04 AND 26.23.01, AND 26.08.02 AND THE ATTACHED CONDITIONS OF AUTHORIZATIONS, Prince George's County Dept. of the Environment ("AUTHORIZED PERSON"), IS HEREBY AUTHORIZED BY THE WATER AND SCIENCE ADMINISTRATION ("ADMINISTRATION") TO CONDUCT A REGULATED ACTIVITY IN A NONTIDAL WETLAND, BUFFER, OR EXPANDED BUFFER, AND/OR TO CHANGE THE COURSE, CURRENT OR CROSS-SECTION OF WATERS OF THE STATE, IN ACCORDANCE WITH THE ATTACHED PLANS APPROVED BY THE ADMINISTRATION ON January 2, 2020 ("APPROVED PLAN") AND PREPARED BY Soltesz AND INCORPORATED HEREIN, AS DESCRIBED BELOW:

To restore stream channel in tributaries to Northeast Branch of the Anacostia River. This project will temporarily impact 954 LF (45,106 SF) of stream channel. The project is located along Kenilworth Avenue, approximately 0.6 miles south of the intersection with Riverdale Road, Riverdale, in Prince George's County.

MD Grid Coordinates 142871 x 406324



Denise M. Keehner
Program Manager
Wetlands and Waterways Program

Attachments: Conditions of Authorization

cc: MDE Compliance Program w/ file, Prince George's County
US Army Corps of Engineers

Appendix D –

STREAM RESTORATION
ASSESSMENT AND DESIGN REPORT
UNNAMED TRIBUTARY TO NORTHEAST BRANCH OF
ANACOSTIA RIVER

5200 KENILWORTH AVENUE
RIVERDALE, MD

DPIE Case No.: 26344-2019-0

January, 2020



Prepared by:



4300 Forbes Blvd.
Suite 230
Lanham, MD 20706

01/27/2020

Table of Contents

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II.	Geomorphic Assessment	4
III.	Recommendations/Design	6
IV.	Crediting Calculations	9
V.	Floodplain	15
VI.	References	17

[Appendix A – Site Location Map](#)

[Appendix B – NRCS Soils Map & Report](#)

Appendix C – Drainage Area Mapping – Stream Channel Sizing

Appendix D – TR-55 Input and Output – Stream Channel Sizing

Appendix E – HEC RAS Output – Proposed 2 and 10 Year Shear Stress

Appendix F – In-roads Earthworks Report

Appendix G – [Geomorphic Assessment Field Forms](#)

[Appendix H – Site Photo Tour](#)

I. Background/Site Information

The stretch of unnamed tributary to Northeast Branch of the Anacostia studied for this report includes approximately 650 LF of existing stream channel spanning from 125' downstream of the pedestrian bridge adjacent to the playground to the twin 36" RCP culverts beneath the unnamed park road downstream. The entire stretch of this stream channel is incised and over-widened and is no longer connected to the adjacent floodplain within the 1.2-year bankfull storm event typical for a stream in the Coastal Plain. The goal of this project is to relocate the stream channel to center of the existing floodplain and restore the stream channel using natural channel design. The proposed stream channel will reconnect to the floodplain at less than the existing bankfull storm event in order to lower shear stresses for the larger storm events currently contained in the channel and will provide wetland habitat on the floodplain through more frequent inundation.

The unnamed tributary to Northeast Branch of the Anacostia lies within the Maryland Coastal Plain physiographic region as well as the Anacostia River Watershed, MD DNR 12-digit watershed number 021402050822, and is designated as a Use 1 stream. It is not located within the Chesapeake Bay critical area, but is located within a County 100-year floodplain and is considered Waters of the US. The unnamed tributary to Northeast Branch of the Anacostia outfalls into the Northeast Branch of the Anacostia River about 800 feet downstream of the site. Northeast Branch of the Anacostia just downstream of the site is listed as having poor biotic integrity for fish and poor biotic integrity for macroinvertebrates on MD DNR's website as seen below.



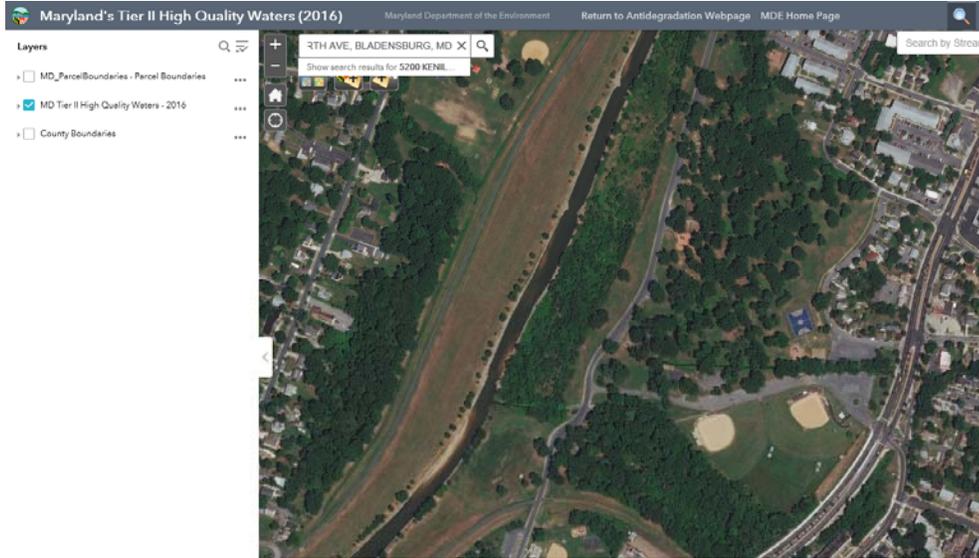
Maryland Stream Waders Benthic Macroinvertebrate Data



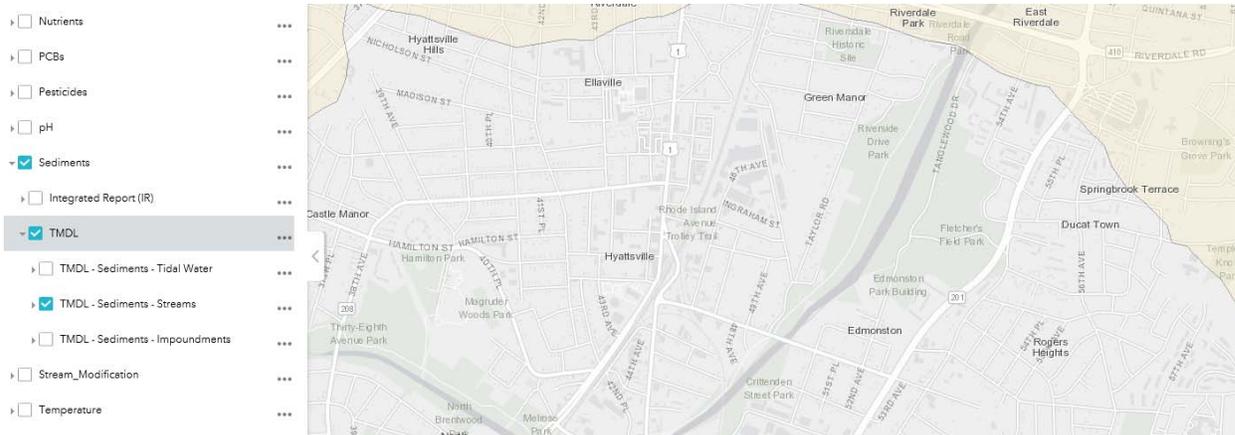
<u>Stream Name:</u>	Northeast Br. of the Anacostia	<u>Location:</u>	
<u>Site ID:</u>	0822-07-2006	<u>Location:</u>	51st & Emerson St. in Prince George's County
<u>Watershed:</u>	Anacostia River		

The Benthic Index of Biotic Integrity (BIBI) Rating is: **Poor (1.57)**

The unnamed tributary to Northeast Branch of the Anacostia is not located in a Tier II watershed as seen below.



The unnamed tributary to Northeast Branch of the Anacostia is not located in a watershed impaired with a TMDL for sediment (TSS), based on non-tidal waters, as seen below.



The project site is located within Fletcher's Field Park, owned by MNCPPC and located at 5200 Kenilworth Avenue in Riverdale, MD on approximately 46.83 acres. Along the unnamed tributary to Northeast Branch of the Anacostia, within the LOD, the site is mostly open grass area with scattered trees and understory vegetation along the edges of the stream channel. The soils consist of Issue-Urban land complex, occasionally flooded (D), Russett-Christiana-Urban land complex (C), Christiana-Downer-Urban land complex (D) as well Russett-Christiana-Urban Land complex (C). None of these soils is considered highly erosive, and there are no steep slopes present within the proposed limit of disturbance. There are no Marlboro, Christiana or Howell Clays present within the proposed limit of disturbance. There may be Christiana clays within the drainage area, however they do not exist within the limit of disturbance.

II. Geomorphic Assessment

Geomorphic Characterization:

The extent of the unnamed tributary to Northeast Branch of the Anacostia was determined to have two distinct stream reaches and was surveyed for morphological relations and stream classification using Rosgen Level II field techniques. Two riffle cross-sections for each reach were measured in the field and bankfull depths were estimated and averaged throughout each reach to determine the approximate bankfull cross-sectional areas.

The existing stream channel banks are stratified with clay, sand and gravel layers, and the stream channel bed material was analyzed in the field and determined to be gravel. Reach 1 was determined to be classified as a G4 channel, with an observed bankfull cross-section of approximately 9.8 square feet. Reach 2 was determined to be classified as an F4 channel, with an observed bankfull cross-section of 14.4 square feet. See Level II stream classification field forms in Appendix G.

The existing stream channel throughout Reach 1 does exhibit defined bedform features and contains shallow pools and riffles. The existing stream channel throughout Reach 2 contains side bars and shows signs of lateral instability, though it does exhibit some bedform features. The entire length of the existing stream channel has a very narrow riparian buffer, less than 5' in most areas, allowing for bank erosion due to runoff from adjacent paved infrastructure.

BEHI and NBS:

Rosgen Level III BEHI and NBS assessments were performed in the field to determine the approximate yearly total suspended sediment (TSS) load generated by the existing condition of the unnamed tributary to Northeast Branch of the Anacostia. See BEHI field forms in Appendix G. The existing unnamed tributary to Northeast Branch of the Anacostia extends approximately 650 LF through the project area and was determined to be composed of two distinct reaches. BEHI measurements (depth and length) were taken at representative areas of erosion along each reach and recorded on the field forms.

Reach #1 (upstream):

Reach #1 contains approximately 500 LF of stream channel that begins about 125 feet downstream of the pedestrian bridge near the playground and extends downstream to the junction with the intermittent stream channel. Both the right and left streambanks are about the same height throughout this existing reach and the stream is incised throughout showing signs of vertical instability. This reach contains long sections with bare stream banks, and has a high NBS score. This reach is considered to contribute a high sediment load downstream and is classified as a G4 channel.

Because most of existing Reach #1 is actively eroding, there are bare stream banks to generate sediment load. It was determined using a Rosgen Level III field assessment that approximately 1,000 LF of the streambanks along the reach were actively eroding. These actively eroding streambanks had a high BEHI score and a high NBS score with an average active erosion depth of 2.8 feet.

Reach #2 (Downstream):

Reach #2 contains approximately 150 LF of stream channel that extends from the junction with the intermittent stream at the end of Reach #1 to the outfall of the twin 36" RCP's below the unnamed park road downstream. Both the right and left streambanks are about the same height throughout this existing reach and the stream is over-widened and incised throughout showing signs of both lateral and vertical instability. This reach contains sections with bare stream banks, not located behind a side bar, and averages a high NBS score. This reach is considered to contribute a high sediment load downstream and is classified as an F4 channel.

Because most of existing Reach #2 is actively eroding, there are bare stream banks to generate sediment

load. It was determined using a Rosgen Level III field assessment that approximately 177 LF of the streambanks along the reach were actively eroding. These actively eroding streambanks had a high BEHI score and a high NBS score with an average active erosion depth of 3.2 feet.

Streambank Bulk Density Analysis:

Soil sampling was performed in accordance with USDA/NRCS guidance and procedures to determine the bulk (dry) density of the varying strata of streambank sediment present along the entire length existing stream channel.

Soil samples were obtained approximately every 300 feet along the existing stream banks, in each different soil strata present, alternating along both sides of the channel.

A 3" wide, 3" diameter ring was driven 3" into the streambank with a rubber mallet, extracted and weighed to determine the bulk density of the bank soil.

Sub-samples were taken and microwaved back at the office to determine the moisture content of the bank soil material.

See bulk density table below for soil testing location information and bulk density testing results.

Bulk Density Testing - Fletchers Park - Unnamed Tributary to Northeast Branch of the Anacostia												
Approximate Station	Weight of soil + Ring (grams)	Weight of Ring (grams)	Wet Density (lbs/ft ³)	Weight of Cup (grams)	Weight of Cup+ Moist Soil (grams)	Weight of Moist soil (grams)	Weight of Cup + Dry soil (grams)	Dry Weight of soil (grams)	Soil H2O content (grams H2O /gram Soil)	Soil Bulk Density (grams/in ³)	Soil Bulk (Dry) Density (lbs/ft ³)	Observation
6+60	1356.00	214.00	150.76	348.00	417.00	69.00	402.00	54.00	0.28	30.97	117.99	one soil layer present, dark green sandy clay
3+65	1362.00	214.00	151.56	348.00	426.00	78.00	407.90	59.90	0.30	30.55	116.39	one soil layer present, dark green sandy clay
0+75	1345.00	214.00	149.31	348.00	438.00	90.00	421.00	73.00	0.23	31.79	121.11	reddish brown sandy clay
											118.49	Reach 1 And 2 - Average Bulk Density

* All tests were done to 3" deep in the 3" diameter ring

Average bulk density of samples = 118.49 lbs/ft³.

III. Recommendations/Design

Reach #1

In Reach #1, the 500 LF length of the existing unnamed tributary to the Northeast Branch of the Anacostia is incised and is in the process of evolving from a 'G' channel to an 'F' channel. We propose to re-create a 541 LF length of 'E4' channel, relocated to the center of the existing floodplain, with a constructed floodplain bench set below the existing bankfull elevation of the stream channel to allow for frequent floodplain reconnection.

Design of Bankfull Cross-sectional Area Based on Hydrology and Hydraulics:

The drainage area utilized for validating the existing bankfull measurements as well as sizing of the proposed stream channel will be determined to a point of interest just upstream of the junction of the ephemeral stream channel and the unnamed tributary to Northeast Branch of the Anacostia.

The drainage area flowing down the unnamed tributary to the Northeast Branch of the Anacostia in this location is 179.03 acres, with approximately 39.4% existing imperviousness (70.48 impervious acres based on GIS data from 2014). See Drainage Area Map in Appendix C. Much of this drainage area was developed prior to typical stormwater detention measures being implemented, and as a result this channel is subjected to ‘flashy’ runoff from storm events. The only quantity management from the drainage area upstream is a result of the maximum capacity of the storm drain pipe beneath Kenilworth Avenue.

According to USFWS’ *“Maryland Stream Survey: Bankfull Discharge and Channel Characteristics in the Coastal Plain Hydrologic Region”*, July 2003, the average recurrence interval for the bankfull event in the Maryland Piedmont Region is 1.2 years.

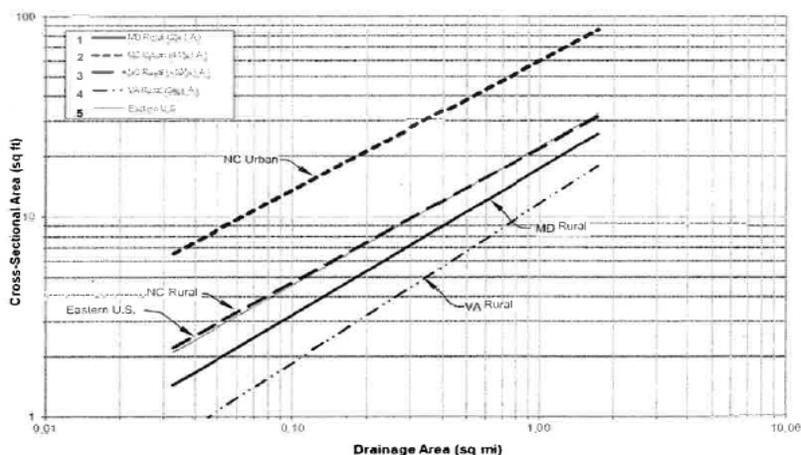


Figure 1 – Mid-Atlantic Regional Curve Data

With a drainage area of 0.279 square miles (179.03 acres) to a POI at the downstream end of Reach #1, using Rosgen’s Eastern US Curve provides a bankfull cross-sectional area of about 10 square feet.

This approximate cross-sectional area of 10 square feet compares favorably with bankfull identification from existing cross-section measurements along Reach #1 which resulted in a bankfull cross-sectional area of 9.8 square feet.

Design of Proposed Channel Size Based on Bankfull Cross-sectional Area:

As part of the proposed natural channel design along Reach #1, we are proposing to size the new channel to convey less than the existing bankfull event (based on the current drainage area characteristics to the stream channel) and to cut down one side of the channel to provide a floodplain bench.

The proposed channel for Reach #1 will be 5’ wide, 1’ deep, with 3:1 side slopes and have a bankfull cross-sectional area of 7 square feet. **Given that the observed and regional curve validated bankfull cross-sectional area for this stream is approximately 10 square feet, the proposed channel is designed to discharge to the floodplain at less than the bankfull event.**

This design will allow for more frequent access to the proposed floodplain bench and will lower shear stress in the proposed channel during larger storm events. The existing 100-yr floodplain elevation on the property will be lowered in proposed conditions due to the extra floodplain storage capacity created on the floodplain

bench.

The proposed design of Reach #1, including bedform features (pool and riffle dimensions and spacing), stream channel geometry (belt width, sinuosity, etc.) has been designed using dimensionless ratios and other reference reach data measured from an existing ‘E’ stream channel with similar watershed characteristics in Prince George’s County.

Reach #2

In Reach #2, the 219 LF length of the existing unnamed tributary to the Northeast Branch of the Anacostia is incised and is classified as an ‘F’ channel. We propose to re-grade and stabilize the streambanks of Reach #2 with coir fiber matting. Due to the existing culvert invert elevation downstream we can’t raise the invert of the stream channel to reconnect Reach #2 with its’ floodplain, and we don’t have permission from the land owner (MNCPPC) to utilize that portion of the park to create a floodplain bench.

The proposed channel for Reach #2 will be 7’ wide, with 3:1 side slopes.

The proposed design of the bedform features in Reach #2, pool and riffle dimensions and spacing), has been designed using reference reach data measured from the existing Reach #2. Proposed Reach #2 will be straightened to allow for a smooth transition into the culverts beneath the unnamed park road.

A HEC-RAS model was developed for proposed channel conditions to determine the proposed 2 and 10-year shear stresses using ultimate conditions hydrology, see Appendix E for output. With the relocation and sizing of the proposed stream channel for a bankfull event less than the 1-year storm event, the shear stresses in the proposed channel are not comparable to the existing condition as the cross sections do not line up. As seen in the table below, the in-channel 10-year shear stresses for all sections are less than 3.2 lbs/ft². Coir Mat 40 is capable of withstanding up to 3.2 lb/ft², and has been proposed as lining for the proposed streambanks. An n value of 0.04 was used within the proposed stream channel, per HEC-RAS 5.0 Reference Manual table 3-1, as the channel is clean, winding and will have some pools. An n value of 0.05 has been used for the over banks as Coir Mat 40 will be installed on the banks.

Ultimate Conditions Proposed Shear Stress		
Section	PR 2-yr Shear Stress (lbs/ft²)	PR 10-yr Shear Stress (lbs/ft²)
745	2.25	2.28
560	0.19	0.16
460	0.16	0.08
325	0.15	0.06
188	1.82	1.18
48	1.34	1.74

** Section 745 is within the rip rapped channel transition section

As seen in the table above, the highest shear value in either of the proposed channel reaches (not rip rapped) is 1.74 psf. From the Shields Equation, the maximum allowable shear stress in the streambed is equal to 0.4 times the D₇₅ particle size, 5.2”, in the riffle bed material. Based on this equation, the maximum allowable shear stress in the channel is 2.08 psf, therefore the riffle material should be sufficient with an extra factor of safety of 20%.

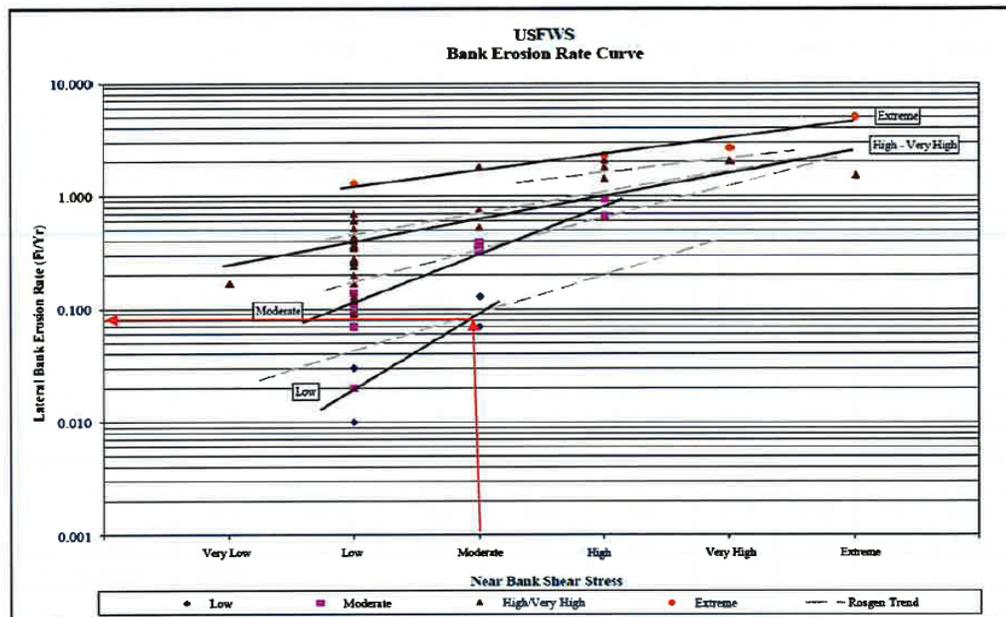
IV. Crediting Calculations

The proposed design will allow us to take impervious area credits as determined by the “Recommendations of the Expert Panel to Define Removal Rates for Individual Stream Restoration Projects, 2014” under Protocol # 1.

Protocol #1: Credit for Prevented Sediment During Storm Flow

Reach #1

Using the Regional USFWS Bank Erosion Rate Curve below and given a **high** BEHI and a **high** NBS for the actively eroding portions of the stream channel, the lateral bank erosion rate is approximately 1.0 ft/year.



USFWS Bank Erosion Rate Curve

$$\text{Sediment load (Tons/year)} = cAR/2,000$$

where $c = 118.49$ tested bulk (dry) density of the soil (lbs/ft³), $R =$ the bank erosion rate (ft/year), and $A =$ eroding bank area (ft²)

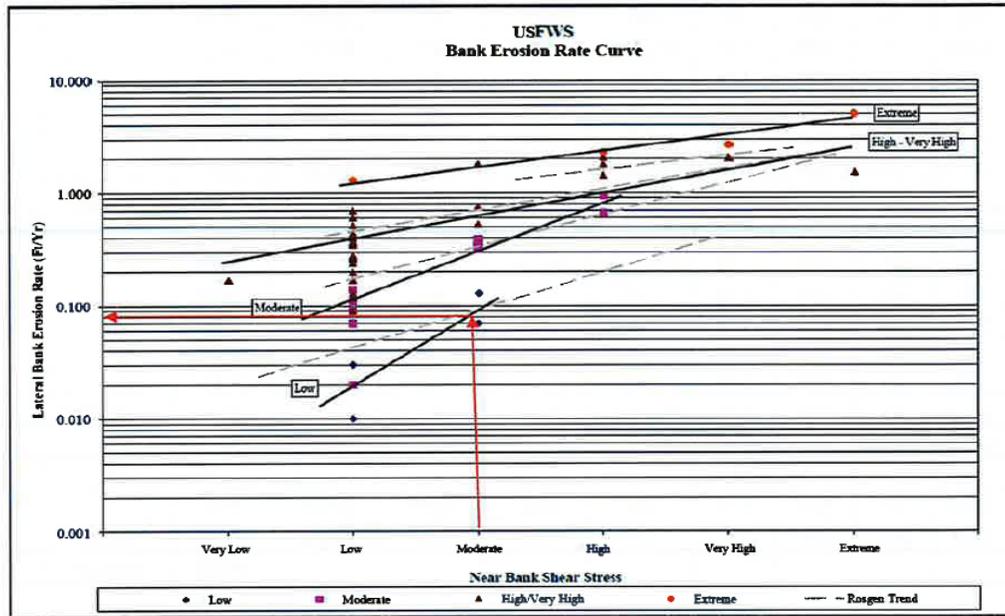
$$\text{Sediment load} = [(118.49 \times 2,800 \times 1.0) / 2,000] = 165.88 \text{ Ton/year}$$

This calculates to a sediment load (TSS) of 165.88 Ton/year over 1,000 LF of eroded stream banks along 500 LF stream reach.

Under Protocol #1 guidance, a 50% efficiency rating is applied to stream restoration projects to determine potential sediment reduction rates. Therefore, restoration of this reach would provide **82.94 Tons/year** of sediment reduction downstream.

Reach #2:

Using the Regional USFWS Bank Erosion Rate Curve below and given a **high** BEHI and a **high** NBS for the actively eroding portions of the stream channel, the lateral bank erosion rate is approximately 1.0 ft/year.



USFWS Bank Erosion Rate Curve

$$\text{Sediment load (Tons/year)} = cAR/2,000$$

where $c = 118.49$ tested bulk (dry) density of the soil (lbs/ft³), $R =$ the bank erosion rate (ft/year), and $A =$ eroding bank area (ft²)

$$\text{Sediment load} = [(118.49 \times 566 \times 1.0) / 2,000] = 33.53 \text{ Ton/year}$$

This calculates to a sediment load (TSS) of 33.53 Ton/year over 177 LF of eroded stream banks along the 150 LF stream channel.

Under Protocol #1 guidance, a 50% efficiency rating is applied to stream restoration projects to determine potential sediment reduction rates. Therefore, restoration of this reach would provide **16.78 Tons/year** of sediment reduction downstream.

Nutrient Loading Calculations:

The total sediment load calculated along the entirety of the existing stream channel is **99.72 Tons/year**. This yearly sediment load is used to calculate the yearly Nitrogen and Phosphorus loadings as per Protocol #1 of the "Recommendations of the Expert Panel to Define Removal Rates for Individual Stream Restoration Projects, 2014".

Total Phosphorus (TP) loading per year = 1.05 pounds TP/Ton sediment

$$\text{TP} = 1.05 \times 99.8 = \mathbf{104.8 \text{ pounds/year}}$$

Total Nitrogen (TN) loading per year = 2.28 pounds TN/Ton sediment

TN = 2.28 * 99.8 = **227.5 pounds/year**

Total Suspended Sediment (TSS) loading per year = **99.72 Tons/year**

This converts to impervious surface treatment credit:

99.72 TONS/year TSS / 0.43 TONS/acre/year = 231.90 acres

104.8 lbs/year TP / 1.91 lbs/acre/year = 54.87 acres

227.5 lbs/year TN / 7.69 lbs/acre/year = 29.58 acres

(231.90 + 54.87 + 29.58)/3 = 105.45 impervious acres treated

Protocol #2: Credit for Instream and Riparian Nutrient Processing During Base Flow

Since the proposed natural channel has been designed to have a bank height to bankfull height ratio of less than 1.0 throughout its' entirety, it qualifies for credit under Protocol #2 for the 541 LF of Reach #1. The 31 LF rip rap section at the upstream tie-in to the existing stream channel is subtracted from the creditable length, giving us a creditable length of 510 LF of stream channel.

Under Protocol #2, the proposed channel width is 11' wide. Using this width, plus 5' added to each side equals 21' wide.

Multiplying the 21' width by a 5' depth equates to a cross-sectional area of the adjusted hyporheic box of 105 square feet. Over the 510 LF of this reach, the volume of the hyporheic box is 53,550 cubic feet.

When multiplied by an estimated bulk density for the soil beneath the stream channel of 118.49 lbs/cubic foot, the total mass of the hyporheic box is estimated to weigh 3,173 tons. When multiplied by the unit denitrification rate of 1.06×10^{-4} pounds/ton/day of soil, it is estimated that **122.70 lbs of total nitrogen will be removed per year**.

As the nitrogen removal credit from this protocol cannot exceed 40% of the watershed total nitrogen load it is necessary to calculate the total nitrogen load of the watershed using the table below.

Parameter	Urban Impervious	Urban Pervious	Weighted All Urban
TN (lbs)	15.3	10.8	11.7
TP (lbs)	1.69	0.43	0.68
TSS (tons)	0.44	0.07	0.18

Source: CBWM version 5.3.2, Maryland Statewide average urban loading rates without BMPs provided by MDE, Science Service Administration, Jeff White, 2014b.

Given the total drainage area to the twin 36" RCP beneath the unnamed park road is 251.22 acres with an impervious area of 126.84 acres draining to the restored stream channel, the yearly total nitrogen load from runoff to this facility is 1,940.70 lbs. Since the 122.70 lbs of total nitrogen removed per year under Protocol #2 is less than 40% of the watershed's total nitrogen load per year, full credit can be claimed.

Therefore, **122.70 lbs of total nitrogen removed per year** can be claimed for the project under Protocol #2.

This converts impervious surface treatment credit:

122.70 lbs/year TN / 7.69 lbs/acre/year = **15.96 impervious acres treated**

Total Stream Crediting - Impervious Area

105.45 + 15.96 = 121.41 acres of impervious area credit calculated per Protocol #1 and Protocol #2 is more than the 101.43 acres of impervious surface in the overall drainage area to the twin 36" culverts beneath the unnamed park road.

Therefore, 101.43 acres of impervious area credit can be claimed for the project under Protocol #1 and 2.

Protocol #3 cannot be claimed as any grading associated with the project will not lower the 100-yr WSEL associated with the much larger NE Branch of the Anacostia.

V. Floodplain Impacts

The project site is inundated during 100-year storm event in both: FEMA and Prince George's County floodplain studies. The FEMA WSEL is 23.59 and the County WSEL is 27.54. The inundation is caused by the flow of water through the Northeast Branch of Anacostia River. The Tributary Channel WSEL starts at 33.24 downstream of Kenilworth Avenue and goes down to 27.54 at cross section 306.2, approximately 510 feet downstream of the Kenilworth Avenue. The proposed stream restoration work is downstream of cross section 306.2. Cross section 306.2 uses the WSEL for cross section 95, which is the cross section for Northeast Branch at the confluence with the tributary channel, as starting WSEL, thus confirming that the inundation downstream of cross section 306.2 is due to flow through Northeast Branch. Since the proposed work is contained within the tributary channel and has no impact on Northeast Branch, we believe the project has no impact on the floodplain study or delineation. The proposed floodplain delineation superimposes the existing floodplain delineation. See FPS 201948 for details. The site has a cut of 5226.55 cubic yards and a fill of 1095.35 cubic yards, most of which is filling in the existing stream channel. This was found by comparing the existing grade to the proposed grade within the limit of proposed work. The calculations can be found in appendix F.

References

- USDA NRCS Prince Georges County, Maryland Soil Data.
- Rosgen, Dave; *"Applied River Morphology, 2nd edition, 1996"*.
- *"Recommendations of the Expert Panel to Define Removal Rates for Individual Stream Restoration Projects, 2014"*.