



Paint Branch Stream Restoration

Purple Line Light Rail Stream Mitigation
MSRA Field Trip Wednesday October 13, 2021, 4pm

Introduction

The Paint Branch Stream Restoration is located in College Park, Maryland between the College Park Airport and Lake Artemesia. Paint Branch is a fourth order stream located within the Northeast Branch sub watershed of the Anacostia River. The watershed overlaps the geologic Fall Zone which separates the Piedmont Plateau and the Coastal Plain. The site starts just downstream of the CSX railroad and Metro line bridges flowing southeast to the confluence with Indian Creek.



Pre-Construction Monitoring

- Extensive biological stream assessments were performed to inventory benthic macroinvertebrates, fish, and in-situ water quality conditions. Results indicated that benthic macroinvertebrate community was generally poor, while the fish community was generally good, based on MBSS IBIs.
- Detailed habitat assessment and mapping along entire reach used to determine habitat improvements and habitat areas to retain.
- Paint Branch historically supported migratory fish, only American eel and sea lamprey were found during pre-con surveys.
- Tracer study performed to quantify sediment load traveling through the upper reach.
- Site divided into two reaches at the pedestrian bridge:
 - Reach 1 – lower banks less shear stress, most of channel contains 2-yr flood
 - Reach 2 – more incised, all XS contain 10-yr storm, 100-yr contained in some locations, higher shears and velocities

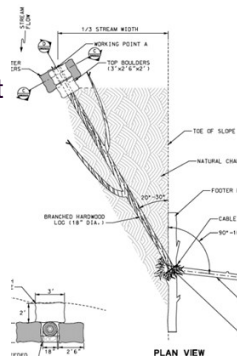
Design Approach

Mitigation Goals

- Stabilize the streambed to provide macroinvertebrate habitat
- Increase stream flow complexity
- Increase shading and wetted root density
- Minimize fish barriers
- Stabilize areas of eroding banks
- Narrow base flow channel and add floodplain benches in over-widened sections.

Restoration Design Goals:

- Stabilize Reach 1 as a C4 channel
- Create a B4 channel within Reach 2 using floodplain benches
- Avoid disturbance to levees
- Protect banks with floodplain benches, grading, or toe structures
- Stabilize sediment bars with vegetation and/or structures
- Incorporate large woody debris to create flow diversity
- Modify/lower the metal sheet pile weir to a depth below the streambed surface
- Preserve existing habitat areas
- Raise the Reach 2 streambed using Riffle Grade Controls to promote watered roots
- Backwater the WSSC RGC.
- Preserve cobble/gravel bars creating side channels in upstream reaches



Facts and Stats

Owner:

MDOT MTA
Purple Line

Landowner:

Prince George's County M-NCPPC

Restoration Size:

3,300 LF, 109,933 SF

Mitigation Required:

5,108 LF, 42,403 SF

Drainage Area:

31.2 square miles

Watershed Characteristics:

32% Impervious, 52% Urban

Design Discharge:

1145 cfs (TR-20 2-yr storm) similar to Reach 1 bankfull indicators

100-yr Discharge:

9,482 cfs

Design Cost:

\$285,000

Design Time:

2016-2019

Design Firm:

Coastal Resources, Inc.
(PE on Record)

Gannett Fleming, Inc.
(QC)



Pre-Construction—Reach 2
(Aug. 2019)



COASTAL
RESOURCES INC.
Ecological Consultants

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Permitting

Mitigation Crediting

WUS Impacts typically mitigated for on 1:1 linear foot replacement. The mitigation credit for this project was calculated using the 1:1 replacement of square feet basis due to the size disparity between the PB site and the size of the impacted streams and functional uplift.

FEMA Floodplain Approval

The project required a USACE Section 408 permit due to minor changes to an existing flood risk management project on site that would be slightly modified by the proposed stream design. CRI calibrated the HEC RAS model with a Prince George's County DOE Stream Stage Gage on the pedestrian bridge. FEMA Map approval was also obtained.

Construction

Access

Access for the site was from either side of the stream since the pedestrian bridge could not support construction equipment and the trail needed to remain open to pedestrians using the park during construction.

Tree Harvesting Plan

Originally the design team proposed to use live trees cut and installed within 2 weeks to promote sprouting and natural regrowth. The harvesting plan was designed so that trees indicated for structures were located as close to the installation point as possible, and were from the same access point, so there would not need to be large stockpiles. Many variables such as NEPA ROD time of year restrictions, tree life cycles, environmental impacts, and intended restoration use affected the tree harvesting plan. Through constant coordination between the MTA and Contractor, adjustments were made throughout the process to meet the intent of design.

College Park Airport

Routine coordination with College Park Airport control was necessary to ensure the safety of both aircraft and construction personnel, e.g. mulch could get into plane engines and helicopter rotors, gates must be kept closed to keep deer and other wildlife off of runways.

In Stream Structures

In-stream structures included: branched log vanes, log vanes and log cross vanes, rock cross vanes, longitudinal fill stone toe protection, toe log structures, an engineered log jam, and riffle pool sequences.

Dewatering/Pump-around

During the wet season pump-around for the downstream sections required up to five 12" and one 8" pumps to maintain the stream flow. Pumps were staggered downstream in some cases in order to create enough pool capacity to control flow.

Landscaping

Live stakes were planted in late March and appear to have a high success rate. Extensive planting throughout the site especially along stream banks with high density tree and shrub planting.

Facts and Stats

Client:

MDOT MTA
Purple Line

Construction Firm:

Environmental Quality Resources,
LLC with

Empire Landscape

Construction Cost:

\$4 million

Construction Duration:

June 2020 – April 2021

Linear Feet of Access Road:

6,189 LF (1.17 mi)

Pumps Required for Dewatering:

Five 12-inch pumps
One 8-inch pump
Three 3-inch pumps

Trees for use in structures:

Required for Construction – 133
Identified to be harvested from floodplain– 142

Actual Trees Harvested on-site:

142

Total Plants Installed:

1,127 Trees
5,790 Shrubs
1,688 Tubelings
4,289 Live Stakes

