

## PROJECT & CATEGORY

**The Howard University School of Law (HUSL) Parking Lot Environmental Retrofit Project** (“The Project”) was substantially completed on December 31, 2020, eliminating a continuing source of erosion into a tributary to Soapstone Creek by reducing, intercepting, treating, and conveying stormwater runoff from the existing 1.7 acre parking lot and adjacent compacted grass open spaces through the **retrofit installation of three bioretention basins, three permeable paver systems, conversion of existing turf to a native meadow planting, and stabilization of an eroding gully.** The Project improves water quality and quantity by treating 6,051 cubic feet of stormwater in addition to improving air quality, reducing heat island effects, and improving native habitat function. As a substantial stormwater retrofit to the existing HUSL parking lot, **the project is applying for this year’s Best Urban BMP in the Bay Award in the “Best Retrofit in the Bay” category.**

## MAJOR SITE DESIGN CONSIDERATIONS

Stormwater runoff from the HUSL parking lot had been a continuing source of concern for the University, neighbors, and a host of environmental entities. During large storm events, untreated runoff from the parking lot and an adjacent compacted turf zone flooded an inlet in the northwest corner of the parking lot and overtopped the existing curb. Runoff then travelled down a steep 1:1 (H:V) slope for sixty feet eroding sediment and nutrients into an unnamed tributary to Soapstone Creek and Rock Creek at a location never intended to see concentrated flows. Over time, this runoff created a 14-foot wide by 6-foot-deep eroded gully that continued to erode unchecked.

## PROJECT INTENT & OBJECTIVES

During initial project assessment and concept design discussions, the primary project objective was to address flooding of the inlet in the northwest corner of the parking lot and provide a stable conveyance mechanism down the 60-foot slope, using a step-pool stormwater conveyance (SPSC) or similar approach. However, due to the demanding site conditions the Universities budget would have been utilized completely by the SPSC for design, permitting and construction costs, leaving little to now budget to address stormwater treatment elsewhere on the site or the existing lawn hill.

Subsequent re-evaluations by the design/build team, led by Biohabitats Inc., resulted in a shift to view

## PROJECT RESULTS

**TREATED** 1.97 ac of total contributing drainage area, 1.11 ac of imp. cover, & 6,051 cf of stormwater

**POLLUTANT REMOVAL/ REDUCTION** 640 lbs TSS/yr; 0.63 lbs TP/yr; & 6.5 lbs TN/yr

**CONVERTED** 0.5 acres of turf to native plantings.

Over the previous decade, untreated stormwater at the Howard University School of Law's Parking lot consistently overtopped an existing curb at a flooded storm drain inlet, eroding a 14-foot-wide, 6-foot-deep gully and carrying sediment and pollutants into a tributary to Soapstone Creek. Howard University and their design/build team decided to retrofit the parking lot with 5,500 square feet of permeable pavement, 4,000+ square feet of bioretention, and converted 0.5 acres of turf to a native plant meadow to treat the runoff and provide native habitat for a variety of pollinators, insects, birds, and other native species. With the stormwater practices designed to provide a stable conveyance of runoff, excavated material from these practices was then used to fill and stabilize the eroded gully, further reducing a potential sediment source to the Soapstone Creek Tributary, and providing substantial cost savings to the project.

providing stormwater treatment for the full 1.2” storm event and safe conveyance of stormwater within the parking lot as the primary objectives of the project.

Focusing on the project as a stormwater treatment project first, rather than a slope stabilization project allowed Biohabitats to also identify a 0.5-acre lawn hillside for conversion to a native meadow and furthering a secondary objective of the project to provide native habitat for a variety of pollinators, insects, birds, and other native species.

Lastly, spoils from the excavation of the stormwater facilities were then available to be used as fill within the eroded slope, eliminating a significant cost of transporting material through the District. This allowed the project to complete the stabilization of the eroded gully as a secondary objective of the project.

## PROJECT DESIGN

### BIORETENTION

Three bioretention facilities were designed and constructed for the HUSL Parking Lot. One facility, located at the location of the flooding issues provided an earthen berm to prevent overtopping down the

slope and redirect any potential overflows away from the slope. The existing inlet was integrated into the bioretention facility, allowing a mechanism to prevent clogging of the inlet grate. A second Bioretention facility bisected the 1.7-acre parking lot, providing a much needed green “break” of the open asphalt lot and directing flows away from the northwest inlet. The third bioretention facility was a much smaller lined facility adjacent to the Law School Building providing treatment of runoff from an access drive.

### PERMEABLE PAVERS

Three separate areas of permeable pavers were installed. While they have varying reservoir layer depths due to the variations in the existing pavement elevations, all areas of permeable pavement were designed with a minimum 8” sub-base depth due to the geotechnical testing results. Each area of permeable pavers contains a perforated PVC underdrain that connects to the existing stormwater infrastructure. The underdrains contain gate valves for the stormwater retention times within the systems to be maximized within DOEE’s guidelines.

### TURF CONVERSION to NATIVE MEADOW

Approximately one-half acre of open space to the southwest of the parking lot was converted from sloped compacted turf to natural cover. The hill was previously maintained as lawn which was maintained through the application of fertilizers, herbicides, and pesticides that could ultimately combine with the stormwater runoff entering the unnamed tributary. The project utilized DC Water’s “Bloom” planting product as a organic amendment, tilled into the existing thin layer of topsoil. Bloom is a DC Water initiative to convert waste sewage to a useable planting amendment and provided wonderful results within the first year of establishment. Through native upland plantings, meadow establishment, and additional native seeding the re-establishment of native cover increased infiltration within its footprint, decreasing stormwater runoff volumes to the HUSL parking lot. Conversion to a native meadow eliminates the annual use of fertilizers and pesticides within the tributary’s watershed, although significant invasives at the edges of the site will need to be continually treated to prevent

encroachment into the meadow. In addition to the stormwater benefits, the meadow provides a significant increase in the year-round vegetation supporting a diverse habitat for native birds, pollinators, and other wildlife.

### GULLY STABILIZATION

As part of this project, drainage patterns were established and a bioretention facility was installed to prevent storm flows from continuing to exit the parking lot and erode the adjacent slope. The existing gully was then able to be filled with excavated material from the stormwater facilities. Stabilization was then achieved by a combination of vertical matting checks within the fill, hydraulically applied biotic soil media and seed, covering with erosion control matting, and installation of fiber rolls cross-slope to prevent potential erosion during vegetative establishment.

### NATIVE HABITAT

As part of the projects stormwater solutions, habitat for a variety of native species was created as a result of the project. Plantings included 17 native trees consisting of red maple, beech, sweetgum, tulip poplar, white oak, northern red oak, serviceberry, sweetbay magnolias and eastern redbud. The native meadow was seeded with ogle oats, a Maryland upland mix of perennial cover species, and a native pollinator mix with wildflowers to attract a variety of pollinators and songbirds. The natural cover and planted trees provide habitat and resources to a variety of native rodents, mammals, birds, and insects that live or migrate through the Rock Creek area.

### COMMUNITY ENGAGEMENT

During the project design and permitting phase, Howard University’s Office of Sustainability engaged four Howard University Students to provide support to the design team on a range of project issues, including overall project design, public outreach within the University, and marketing material for inclusion of project benefits and results to campus newsletter and flyers.

### PROJECT SELECTION

This project was undertaken in connection with the settlement of an enforcement action initiated by the District of Columbia. As this project was the direct result of this settlement, the project team would not be willing to accept any monetary awards for the project and would donate any such awards back to the Chesapeake Stormwater Network.

### PROJECT COSTS

**DESIGN:** \$172,500

**CONSTRUCTION:** \$727,500

**TOTAL:** \$900,000