

Montgomery County Department of Parks

Black Hill Regional Park – SEED Classroom Facility Plan 20941 Lake Ridge Drive Boyds, Maryland 20841

STORMWATER-284767

Combined SWM Concept/Site Development SWM Plan Engineering Report



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PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND

LICENSE NO.: 31168

EXPIRATION DATE: 1-12-21

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CAA Project No. 145.003

May 2019

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I. Narrative

I. Site Introduction

The site is within the Black Hill Regional Park (more than 2,000 acres total) located at 20941 Lake Ridge Drive, Boyds, Maryland 20841. The site is located on Parcel P800 as part of the Black Hill Regional Park property. The owner of the property, The Maryland-National Capital Park and Planning Commission proposes to repurpose the site as a SEED Classroom Learning facility with a small parking area and drop-off loop to be operated and maintained by the Montgomery County Department of Parks. The property is bounded to the west by Lake Ridge Drive (maintained by M-NCPPC), and to the north, east, and south by dense wooded areas. The total study area within the park property containing the project site is 19.17 acres.

II. Existing Conditions

The existing site previously served as a maintenance yard for the park. The site contains an existing fenced asphalt pavement area with various storage sheds and office trailers. There is currently one paved access driveway to the site from Lake Ridge Drive. Directly east of the fenced asphalt pavement area is a gravel pavement area for additional equipment/material storage with multiple sheds as well as an existing greenhouse adjacent to the gravel pavement area. An existing septic field is located to the east of the maintenance yard partially under the gravel pavement area on site. An existing water service line provides water to an existing hose bib onsite. There are no existing wells on-site.

The site is generally graded with a downhill slope towards the eastern wooded areas beyond the maintenance yard, flowing into Little Seneca Creek. There is a drainage swale adjacent to Lake Ridge Drive to the west of the site that drains north, eventually flowing into Little Seneca Creek.

Due to the existing nature of the topography of the site eventually leading to Little Seneca Creek, there will be one study point for the proposed improvements for the ESDv computations. Little Seneca Creek was chosen to serve as Study Point 1.

The field survey information was performed on April 12, 2016 by Potomac Valley Surveys, LLC and supplemented with Montgomery County GIS information for use in this design.

III. Proposed Conditions

The Montgomery County Department of Parks proposes to construct a new SEED Classroom Building with a wood deck, a shelter building, a greenhouse, various planter areas, and an additional driveway entrance to create a one-way drop-off loop for access to the site. The proposed site has been designed to minimize additional proposed pavement areas, while utilizing the existing asphalt pavement within the maintenance yard where necessary and remove excess existing pavement as much as possible. In addition, Parks plans to remove the existing sheds, greenhouse, and gravel pavement area to the east of the maintenance yard and restore the areas to natural meadowland and partial reforestation.

IV. Stormwater Management

The project area within the limits of disturbance was designed using ESD criteria per the Maryland Stormwater Design Manual and Montgomery County Stormwater Regulations and in compliance with the Stormwater Management Act of 2007 to the Maximum Extent Practicable (MEP). The stormwater management design strategy for this project was to replicate the natural hydrology of the site by utilizing alternative surface stormwater management practices to minimize the impact of land development on downstream water resources.

Per current Montgomery County DPS standards, the Pe required for treatment was calculated using the total property area to the proposed study point. As discussed above, the study point was chosen to be Little Seneca Creek, which runs along the eastern portion of the Black Hill Regional Park property. This Pe was then applied to the limits of disturbance to determine the required ESD volume that must be provided.

In the pre-development condition, the site drains via natural topography towards Little Seneca Creek via surface flow runoff and an existing drainage swale along Lake Ridge Road. The post-development condition will maintain the existing drainage pattern of the site towards Little Seneca Creek.

Study Point	Property Area (sf)	Total Impervious Area (sf)	% Impervious	Soil Type	Target Pe * (in)	LOD Area (sf)	Rv	ESDv Required (cf)	ESDv Provided (cf)
1	835,045	41,808	5.01%	B/C/D	1.0	58,036	0.329	1,590	1,656

*Per Chapter 5 of MDE Stormwater Manual

The ESDv will be provided via one micro-bioretention facility located to the north of the proposed SEED Classroom and Learning Centers. The existing pavement areas to be retained to the south of the planned micro-bioretention area are currently graded towards the proposed facility via surface flow. This will provide full ESDv treatment of the limits of disturbance prior to discharge. An overflow weir will be constructed along the eastern embankment of the facility to provide relief in the event ponding exceeds the 10-yr storm volume.

Pervious pavement was not considered as a feasible solution for this project as the site did not exhibit soils with the required infiltration rates within the existing/proposed pavement areas (excluding the passing infiltration rate within the footprint of the proposed micro-bioretention area outside the limits of the proposed pavement). The full ESDv requirement has been met for the site, therefore no additional stormwater management treatment is proposed. Although the proposed SEED Classroom Building will utilize rainwater collection and reuse, it was not credited towards the ESDv provided for the site.

The proposed additional driveway entrance to the site will have a driveway culvert with endwalls installed to maintain the drainage path of the existing roadway swale along Lake Ridge Road in the post-development condition.

VI. Conclusions

The proposed micro-bioretention facility will meet full ESDv requirements and provide stormwater quality treatment for the proposed site improvements while maintaining the existing flow paths from the property towards Little Seneca Creek in a non-erosive manner. Additionally, the net decrease in impervious area for the site, in conjunction with pavement area restoration to natural meadowlands and planned reforestation, will be beneficial to the improvement of the water quality of Little Seneca Creek.

II. Environmental Site Design Calculations



Project:	Black Hill Regional Park - SEED Classroom Facility Plan	Date:	5/1/2019
Project Number:	145.003	Calculated by:	ME
Calculation:	ESDv Required Calculations	Reviewed by:	JA

	Property Area Summary for ESDv Computations												
Study	Property Area	Total Post Development	% Impervious				Target Pe (in)						
Point	(sf)	Impervious Area (sf)		NV.	HSG	Area (sf)	Pe	ruiget i e (iii)					
1	835,045	41,808	5.01%	0.095	В	78,300	1.0						
					с	492,423	1.0	1.0					
					D	264,322	1.0						

	ESDv Required Computations											
Study Point	LOD Area (sf)	Total Post Development Impervious Area (sf)	% Impervious	Rv	HSG	Target Pe (in)	ESDv Required (cf)					
1	58,036	17,973	31%	0.329	B/C/D	1.0	1,590					



Project: Project Number: Calculation:

Black Hill Regional Park - SEED Classroom Facility Plan 145.003 ESDv Provided Calculations

Date: Calculated by: Reviewed by:

Summary of ESDv Required*									
Study Point	LOD Area	Target Pe	ESDv Required						
1 58,036 1.0 1,590									
*See ESDv I	Requirements Computa	tions for detai	1						

5/1/2019	
ME	
JA	

			Micro-Scale Practices	Non-Structural Practices					
	Alternative Surfaces								
R	Green Roof	RH	Rainwater Harvesting	DRR	Disconnection of Roof Runoff				
Р	Permeable Pavement	SGW	Submerged Gravel Wetlands	DNR	Disconnection of Non- Roof Runoff				
Т	Synthetic Turf	LI	Landscape Infiltration	SCA	Sheetflow to Conservation Areas				
		IT	Infiltration Trench						
		DW	Dry Wells	1					
		MB	Micro-Bioretention						
		RG	Rain Gardens						
		SW-G or B	Swales (specify grass or bio)	1					
		EF	Enhanced Filters	1					
		INF	Infiltration						

STUDY POINT 1

																								-							
						Alternative Surfaces						Micro-Scale Practices							Non-Structural Practices												
Sub-Basin	Sub	-Basin	Sub-Basin	Sub-Basin	Drainage Area	Alternative	Filter Media	P _E	Rv of	ESDv	Drainage Area	Micro-Scale	Surface	Depth of	n	ESDv	Ponding	ESDv	Total ESDv	Drainage Area	Non-Structural	Disconnect Length/	Ratio of Disconnect	Rv of	P _E	ESDv	Total ESDv	Minimum	Maximum	Credited	PE Credited
Drainage	Tota	Area*	Impervious	Rv	of Surface	Surface Used	J Thickness	Provided	DA of	Provided	to Practice	Practice	Area of	Media		Provided	of ESDv	Provided	Provided by	to Practice	Practice Used	Buffer Width	Length to	DA	Provided	Provided	Provided	ESD _v over	ESD _v over	ESD _v over	over
Area			Area					by Surface	Surface	by Surface		Used	Practice			by Media		by Ponding	Practice				Contributing Length	1	by Practice	by Practice	over Sub-Basin	Sub-Basin	Sub-Basin	Sub-Basin	Sub-Basin
(sf)	(sf)	(ac)	(sf)		(sf)		(in)	(in)	L'	(cf)	(sf)		(sf)	(ft)		(cf)	(ft)	(cf)	(cf)	(sf)		(ft)			(in)	(cf)	DA (in)	(1.0 in)	(2.6 in)		
1	17,218	0.395	7,537	0.444					í		17,218	MB	615	4.50	0.4	1107	1.00	615	1722								1722	637	1656	1656	2.60
								[]	í																						
								1	1																		l i	,	1		
	*Drainage area to facility minus area of facility and embankment												1,656																		

**SEED Classroom Building to utilize rainwater harvesting via internal cistern to collect rooftop runoff. This was not credited towards the ESDv provided for the site.

P _E Credited Over Required Study Area	1.04

III. Soils Information



	MAP L	EGEND		MAP INFORMATION
Area of Inter Soils	rest (AOI) Area of Interest (AOI) Soil Map Unit Polygons Soil Map Unit Lines Soil Map Unit Points Dint Features	8 0 0 0 0 0 0 0 0	Spoil Area Stony Spot Very Stony Spot Wet Spot Other Special Line Features	The soil surveys that comprise your AOI were mapped at 1:15,800. Warning: Soil Map may not be valid at this scale. Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed
S <p< td=""><td>Blowout Borrow Pit Clay Spot Closed Depression Gravel Pit Gravelly Spot Landfill Lava Flow Marsh or swamp Mine or Quarry Miscellaneous Water Perennial Water Rock Outcrop Saline Spot Sandy Spot Severely Eroded Spot Sinkhole Slide or Slip Sodic Spot</td><td>Water Feat</td><td>streams and Canals ation Rails Interstate Highways US Routes Major Roads Local Roads Aerial Photography</td><td>scale. Please rely on the bar scale on each map sheet for map measurements. Source of Map: Natural Resources Conservation Service Web Soil Survey URL: Coordinate System: Web Mercator (EPSG:3857) Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required. This product is generated from the USDA-NRCS certified data as of the version date(s) listed below. Soil Survey Area: Montgomery County, Maryland Survey Area Data: Version 14, Sep 11, 2018 Soil map units are labeled (as space allows) for map scales 1:50,000 or larger. Date(s) aerial images were photographed: May 3, 2015—Feb 22, 2017 The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background</td></p<>	Blowout Borrow Pit Clay Spot Closed Depression Gravel Pit Gravelly Spot Landfill Lava Flow Marsh or swamp Mine or Quarry Miscellaneous Water Perennial Water Rock Outcrop Saline Spot Sandy Spot Severely Eroded Spot Sinkhole Slide or Slip Sodic Spot	Water Feat	streams and Canals ation Rails Interstate Highways US Routes Major Roads Local Roads Aerial Photography	scale. Please rely on the bar scale on each map sheet for map measurements. Source of Map: Natural Resources Conservation Service Web Soil Survey URL: Coordinate System: Web Mercator (EPSG:3857) Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required. This product is generated from the USDA-NRCS certified data as of the version date(s) listed below. Soil Survey Area: Montgomery County, Maryland Survey Area Data: Version 14, Sep 11, 2018 Soil map units are labeled (as space allows) for map scales 1:50,000 or larger. Date(s) aerial images were photographed: May 3, 2015—Feb 22, 2017 The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
16B	Brinklow-Blocktown channery silt loams, 3 to 8 percent slopes	С	6.1	12.8%
16C	Brinklow-Blocktown channery silt loams, 8 to 15 percent slopes	С	18.4	38.9%
17B	Occoquan loam, 3 to 8 percent slopes	В	1.6	3.4%
54A	Hatboro silt loam, 0 to 3 percent slopes, frequently flooded	B/D	1.1	2.3%
116D	Blocktown channery silt loam, 15 to 25 percent slopes, very rocky	D	20.1	42.5%
W	Census water		0.0	0.1%
Totals for Area of Interest			47.2	100.0%

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition Component Percent Cutoff: None Specified Tie-break Rule: Higher

IV. FEMA Floodplain Map

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Legend

