Appendix A: Public Education and Outreach



George Washington Memorial Parkway Just now · ③

The parkway's 4,580 acres are home to at least 81 plants and animals considered rare, threatened, or endangered in Virginia or Maryland. These include 37 species of vascular plants, 2 vertebrates, and 19 invertebrates.

The environment is composed of the air we breathe, the water we drink, and the sun that provides us with energy and heat. While about 71 percent of earth's surface is covered by water, only a small fraction of that is fresh water. Additionally, the amount of water on earth is essentially the same as it was millions of years ago; new water is not created. By effectively protecting the quality of stormwater, we also safeguard our creeks and rivers, and ultimately the water we need to survive. Without these water systems, life would cease to exist on our planet.

"Only within the moment of time represented by the present century has one species — man — acquired significant power to alter the nature of his world." ~ Rachel Carson



Appendix B: Public Involvement / Participation

National Pa	ark Service	(PEPC) Planning, Environment & Public Comment						
ind a Park Discover H	listory Explore Nature	Get Involved	Working With Communities	Teachers	Kids /	bout Us		
PEPC Home	Documents by Park	Policy/Guida	nce Park Planning	Sear	ch Docum	ents		
PROJECT LINKS								
Project Home	MS4 Virginia	amorial Parlman a	MS4 Virginia = Dogument List					
Plan Process	George Washington Sh	anoriai rarkway = i	viod virginia - pocument hist					
Meeting Notices	MS4 Program Plan							
Links	Virginia Stormwater Man	agement Act, the Vir	ginia Stormwater Management Pro	gram (VSMP)	Permit			
Document List	(MS4) as point source di collecting or moving wate	an water Act regulate scharges. Publicly of er to surface waters i	e discharges from municipal separa whed systems such as storm drains must obtain permit coverage and di	te storm sewer s, pipes, ditche evelop a storm	s or swales water			
Open For Comment (1)	management program.	management program.						
A comment period for this project closes Oct 01, 2028: 2196 Days, 15 Hours, 10 Min.	MS4 programs must be of sewer system to the may streams, rivers, wetlands	designed and implem dmum extent practica and bays.	nented to control the discharge of p able in a manner that protects the v	ollutants from t vater quality in	their storm nearby			
	The General Permit for t from MS4s, such as, De implement, and enforce	he Discharge of Stor partment of Defense a program that includ	mwater from Small MS4s regulates facilities. The general permit requir ses the following "minimum control	stormwater dis es small MS4s measures:"	scharges develop,			
	1) Public Education and	Outreach						
	2) Public Involvement an	d Participation						
	3) Illicit Discharge Detec	tion and Elimination						
	4) Construction Site and	Stormwater Runoff (Control					
	5) Post-Construction Sto Lands	rmwater Manageme	nt in New Development and Develo	pment on Prior	r Developed			
	6) Pollution Prevention a	nd Good Housekeep	ing for Municipal Operations					
	Please use the contact in stormwater issues or to activities within the GWN	nformation below to o report any suspected MP area.	contact George Washington Memor illicit discharges, improper disposa	ial Parkway rej is, spills, or lar	garding nd-disturbing	,		

Appendix C: Illicit Discharge Detection and Elimination

OBJECTID	Date	(Editor
ODJECHD	Date	C Luitoi

Out

52 9/28/2021 rmocko@nps.gov_nps

53 9/28/2021 rmocko@nps.gov_nps

54 9/28/2021 rmocko@nps.gov_nps

56 9/28/2021 rmocko@nps.gov_nps

57 9/28/2021 rmocko@nps.gov_nps

58 9/28/2021 rmocko@nps.gov_nps

59 9/28/2021 rmocko@nps.gov_nps

rmocko@nps.gov_nps

55 9/28/2021

Dry, no discharge, no odor.

fair

fair

fair

fair

fair

fair

fair

fair

outfall

outfall

outfall

outfall

outfall

outfall

outfall

outfall

-77.0562 38.8839

-77.0426 38.8734 -77.0411

38.8832

38.8805

38.8802

38.8799

38.8792

38.872

-77.0554

-77.0518

-77.0512

-77.0508

-77.0499

v

On June 20, 2022, GWMP inspected 45 outfalls. Starting in Old Town Alexandria and going south on the George Washington Memorial Parkway (all the way to Mount Vernon). Below are the outfall locations and what was observed. It has previously rained on June 16, 2021 (4/5 dry days in a row before the inspections). **Note, there was no period from April to July where there was more than 6 days without rain, so once we say 4 dry days in a row, we conducted the inspections

1 6/20/2022	rmocko@nps.gov_nps	Outfall by dyke marsh. Dry.	Outfall	Fair	-77.052	38.7776
2 6/20/2022	rmocko@nps.gov_nps	Outfall. Dumps into stream by mount vernon trail. Dry	Outfall	Fair	-77.0516	38.7767
3 6/20/2022	rmocko@nps.gov_nps	Outfall on southbound lanes. Dry	Outfall	Fair	-77.0526	38.7725
4 6/20/2022	rmocko@nps.gov_nps	Outfall on southbound lanes. Dry.	Outfall	Fair	-77.054	38.767
5 6/20/2022	rmocko@nps.gov_nps	Outfall across street. Stream. No flow observed, clear water.	Outfall	Fair	-77.0526	38.7638
6 6/20/2022	rmocko@nps.gov_nps	Half filled with silt (a stream used to run here). Dry.	Outfall	Fair	-77.0508	38.7627
7 6/20/2022	rmocko@nps.gov nps	Dry, no discharge, no odor.	Outfall	Fair	-77.0506	38.762
8 6/20/2022	rmocko@nps.gov_nps	Dry, no discharge, no odor.	Outfall	Fair	-77.0503	38.7617
9 6/20/2022	rmocko@nps.gov_nps	Outfall under road then pipe under MVT. Dry.	Outfall	Fair	-77.0495	38.7556
10 6/20/2022	rmocko@nps.gov_nps	Drv. no discharge, no odor.	Outfall	Fair	-77.0493	38.7561
11 6/20/2022	rmocko@nps.gov_nps	Dry, no discharge, no odor.	Outfall	Fair	-77.0492	38.7564
12 6/20/2022	rmocko@nps.gov_nps	Dry, no discharge, no odor.	Outfall	Fair	-77.0497	38,7543
13 6/20/2022	rmocko@nps.gov_nps	No discharge, no odor.	Outfall	Fair	-77.0502	38,7526
14 6/20/2022	rmocko@nns.gov_nns	Stream. No flow observed, clear water.	Outfall	Fair	-77 0513	38 7901
15 6/20/2022	rmocko@nps.gov_nps	Outfall near MVT Dry no discharge no odor	Outfall	Fair	-77 0498	38 7508
16 6/20/2022	rmocko@nps.gov_nps	Outbound side drains into grassy swale. Dry no discharge no odor	Outfall	Fair	-77.0486	38 7449
17 6/20/2022	rmocko@nps.gov_nps	Dry no discharge no odor	Outfall	Fair	-77.0482	38 7421
18 6/20/2022	rmocko@nps.gov_nps	Dry, no discharge, no oddr.	Outfall	Eair	-77.0484	28 7205
10 6/20/2022	rmocko@nps.gov_nps	Dry, no discharge, no oddr.	Outfall	Fall	-77.0484	20.7222
20 6/20/2022	rmocko@nps.gov_nps	Dry, no discharge, no odor.	Outfall	Fair	-77.0485	20 7226
20 0/20/2022	rmocko@nps.gov_nps	Dry, no discharge, no odor.	Outfall	Fall	-77.048	20.7220
21 0/20/2022	mocko@nps.gov_nps	Dry, no discharge, no oddi.	Outrall	Fall	-77.0441	20.7202
22 6/20/2022	mocko@nps.gov_nps	Dry, no discharge, no odor.	Outfall	Fair	-77.0442	30.7293
23 6/20/2022	rmocko@nps.gov_nps	Dry, no alscharge, no odor.	Outrall	Fair	-77.0425	38.7278
24 6/20/2022	rmocko@nps.gov_nps	Dry, no discharge, no odor.	Outfall	Fair	-77.042	38.7273
25 6/20/2022	rmocko@nps.gov_nps	Dry, no discharge, no odor.	Outfall	Fair	-77.0418	38.7262
26 6/20/2022	rmocko@nps.gov_nps	Dry, no discharge, no odor.	Outfall	Fair	-77.0423	38.7241
27 6/20/2022	rmocko@nps.gov_nps	Dry, no discharge, no odor.	Outfall	Fair	-77.0457	38.7162
28 6/20/2022	rmocko@nps.gov_nps	Stream through outfall. No odor, no unusual water color.	Outfall	Fair	-77.0463	38.7153
29 6/20/2022	rmocko@nps.gov_nps	Dry, no discharge, no odor.	Outfall	Fair	-77.0482	38.7139
30 6/20/2022	rmocko@nps.gov_nps	Dry, No discharge, no odor.	Outfall	Fair	-77.0486	38.7135
31 6/20/2022	rmocko@nps.gov_nps	Wetland drainage outfall. No odor, no unusal water color.	Outfall	Fair	-77.0531	38.7112
32 6/20/2022	rmocko@nps.gov_nps	Dry, no discharge, no odor.	Outfall	Fair	-77.0551	38.7106
33 6/20/2022	rmocko@nps.gov_nps	Dry, no discharge, no odor.	Outfall	Fair	-77.0568	38.7103
34 6/20/2022	rmocko@nps.gov_nps	Small stream through this outfall. No odor, no unusual water color.	Outfall	Fair	-77.0581	38.7104
35 6/20/2022	rmocko@nps.gov_nps	Dry, no discharge, no odor.	Outfall	Fair	-77.0592	38.7101
36 6/20/2022	rmocko@nps.gov_nps	Stream outfall under road No odor, no unusual water color	Outfall	Fair	-77.0621	38.7103
37 6/20/2022	rmocko@nps.gov_nps	Dry, no discharge, no odor.	Outfall	Fair	-77.0651	38.7103
38 6/20/2022	rmocko@nps.gov_nps	Stream. No odor, no unusual water color	Outfall	Fair	-77.0663	38.7103
39 6/20/2022	rmocko@nps.gov_nps	Dry, No discharge in any, no unusal odor.	Outfall	Fair	-77.074	38.7129
40 6/20/2022	rmocko@nps.gov_nps	Dry, no discharge, no odor.	Outfall	Fair	-77.0761	38.7146
41 6/20/2022	rmocko@nps.gov_nps	Stream under road. No odor, no unusual water color	Outfall	Fair	-77.077	38.7152
42 6/20/2022	rmocko@nps.gov_nps	Stream. No odor, no unusual water color	Outfall	Fair	-77.0784	38.7161
43 6/20/2022	rmocko@nps.gov_nps	Creek under road. No odor, no unusual water color	Outfall	Fair	-77.0803	38.7172
44 6/20/2022	rmocko@nps.gov_nps	Stream underneath. No odor, no unusual water color	Outfall	Fair	-77.0853	38.7148
45 6/20/2022	rmocko@nps.gov_nps	Stream underneath. No odor, no unusual water color	Outfall	Fair	-77.0853	38.7148
falls observed fron	n boat (From Spout Run to	o DCA, going north to south):				
**Weather	was dry for the previous 5	days (1.43 inches of rain on 9/23)				
16 0/28/2021	rmocko@pps gov pps	Stream under road, his outfall from Oak Streat. No unusual color, no noticeable odor	outfall	fair	-77 0720	28 002
40 3/20/2021	rmocko@nps.gov_nps	Outfall near Key Bridge. No unucal color, no noticeable odor.	outfall	fair	-77.0739	20 0012
4/ 3/20/2021	mocko@nps.gov_nps	Half full of water (was during high tide), but no noticeable flow, no unusual color or oder	outfall	fair	-77.07	30.5013
48 9/28/2021	mocko@mps.gov_nps	Half full of water (was during high tide), but no noticeable flow, no unusual color or odor. Half full of water (was during high tide), but no noticeable flow, no unusual color or odor. (one on each ride of	outrall	Idli	-77.0585	58.8894
10 0/20/2021	rmocko@npc cov n=c	memorial bridge)	outfall	fair	-77 0576	20 0021
43 3/20/2021 E0 0/28/2021	mocko@nps.gov_nps	Dry no discharge ne eder	outfall	fair	-77.0570	30.0001
50 9/28/2021	mocko@nps.gov_nps	Dry, no discharge, no odor.	outfall	idii fair	-77.0574	20 0052
51 9/28/2021	mocko@nps.gov_nps	Dry, no discharge, no odor.	outrall	rair	-77.0568	38.8853

Half full of water (was during high tide), but no noticeable flow, no unusual color or odor.

Half full of water (was during high tide), but no noticeable flow, no unusual color or odor.

Half full of water (was during high tide), but no noticeable flow, no unusual color or odor.

Dry, no discharge, no odor. Guard around the outfall to prevent materials from entering during a higher tide

Appendix D: Pollution Prevention / Good Housekeeping for Municipal Operations

Urban Nutrient Management Plan For

George Washington Memorial Parkway

Prepared For:

National Park Service- George Washington Memorial Parkway Attn: Morgan German

Revision By:

Matthew Austin Essential Elements NMP, LLC 172 Old Carriage Way Williamsburg VA 23188 Certification #724 <u>essentialelementsnmp@gmail.com</u>

Site Information:

George Washington Memorial Parkway Alexandria, Virginia **Watershed**- Potomac River-Pimmit Run **VAHU6**-PL24 Plan Written- 5/27/2022 Plan Expires- 5/27/2025 *Memorial Circle- 3.93 acres Memorial Ave-1.00 acres* U.S. Marine Corps Memorial- 3.30 acres Arlington House- 1.11 acres **Total Acres- 9.34**

Signature: Matthew W. Austin







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Narrative

Location

The George Washington Memorial Parkway (GWMP) is a 25-mile-long parkway that runs along the Potomac River from Mount Vernon to Langley, Virginia. The Park headquarters is located at 700 George Washington Memorial Parkway in Mclean, Virginia. This plan covers turf located in four adjacent areas all under the control of GWMP: Memorial Circle (38°53'8.68"N/ 77° 3'34.73"W), Memorial Ave (38°53'2.60"N/ 77° 3'53.97"W), Arlington House (38°52'52.30"N/ 77° 4'21.55"W) and the U.S. Marine Corps Memorial (38°53'24.85"N/ 77° 4'12.15"W).

Frost Dates

	Killing Frost Dates	Cool Season Applications	Warm Season Applications
Spring	April 10th	February 27th	April 10th
Fall	October 25th	December 6th	September 25th

Discussion of Use and Past Management Activities

The turf areas are used primarily as medians and open space use is restricted by busy roads or small pedestrian barriers. Due to the proximity to roads, walkways, and urban areas many of the turf areas are severely compacted.

The turf is maintained by the George Washington Memorial Parkway who utilizes third party contractors for mowing, fertilization, and aeration. Fertilization of established turf areas in the past included granular fertilizer application using a tractor mounted single disk spreader with a



Figure 1: Turf near impervious areas

minimum spread width or 10'. Fertilizer blends of 18-2-18 with 40% of the total nitrogen required to be polymer coated (slowly available) nitrogen was required. The Memorial Avenue site is also aerated annually.

Sensitive Sites

The identified sites are all located within a National Park and near highly visible visitor areas. There are no streams, wetlands, or other sensitive sites located on or adjacent to the nutrient management areas.



General Budget and Capacity Note

The National Park Service has minimal budget for fertilizer, lime, and reseeding. Therefore, nutrient applications (particularly Spring nitrogen applications) are often slightly reduced to save money – especially if the turf has a good appearance.

Plan Updates

The worksheets in this plan represent maintenance recommendations for the turf grass for the next three years. Nutrient applications will be repeated each year at the same designated times. This plan will need to be revised at the end of the three-year period in order to remain current. Revising a plan takes some time, so the process should begin at least 4 weeks prior to the expiration of the plan.

Location Maps





Site Maps

Overall Site Map: GWMP Nutrient Management Locations



GWMP Turf Management Area: Memorial Circle





GWMP Turf Management Area: Arlington House



GWMP Turf Management Area: United States Marine Corp Memorial



Soil Composition Maps

The National Resources Conservations Service's (NRCS) Web Soil Survey (WSS) provides soil data and information from the National Cooperative Soil Survey. The WSS website can be consulted to determine the soil types at all of the Areas of Interest (AOI) identified within the nutrient management areas. The percentage of each soil type within the AOI can be found directly found below the illustrated map of each site location.

An understanding of the predominant soil types in each managed area will greatly aid in the fertilizer application management of each site by looking at soil characteristics with regards to potential leaching of nutrients, water holding capacity, Cation Exchange Capacity, etc.

Note: The AOI was manually drawn and does not exactly correspond with the exact property boundaries of these identified areas.

Description of Soil Classification

The major soil types found throughout the identified AOI's within this NMP are outlined within this section.

 Udorthents-Dumps Complex is a loamy to clayey soil type. Udorthents-Dumps complex is the primary soil type found within all the identified management areas within this plan. It is described as a heavily modified soil type that primarily consists of overburden and waste rock that have been stockpiled during mining and soil material has been cut and filled during road or building construction. This soil type is very deep, well drained or somewhat excessively drained, nearly level to very steep. These soils are mainly found on side slopes in upland areas. Slopes range from 0-45 percent. Because of the variability of modified soils, a typical profile is not given.

GWMP Site: Memorial Circle



GWMP Site: Memorial Circle (WSS) Soil Types

District of Columbia (DC001)							
District of Columbia (DC001)							
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI				
U1	Udorthents	6.3	100.0%				
Totals for Interest	Area of	6.3	100.0%				

GWMP Site: Memorial Avenue



GWMP Site: Memorial Avenue (WSS) Soil Types

Arlington County, Virginia (VA013)								
Arlington County, Virginia (VA013) 🛛 🛞								
Map Unit Symbol	Map Unit Name Acres Percent of AOI AOI							
12	Urban land- Udorthents complex, 2 to 15 percent slopes	3.8	100.0%					
Totals f Interes	or Area of t	3.8	100.0%					

GWMP Site: Arlington House



GWMP Site: Arlington House (WSS) Soil Types

Arlington County, Virginia (VA013)								
Arlington County, Virginia (VA013)								
Map Unit SymbolMap Unit NameAcres in AOIPercent o AOI								
5 Arlington National Cemetery		1.6	100.0%					
Totals fo Interest	r Area of	1.6	100.0%					

GWMP Site: United States Marine Corp Memorial



GWMP Site: United States Marine Corp Memorial (WSS) Soil Types

Arlington County, Virginia (VA013)								
Arlingtor	Arlington County, Virginia (VA013)							
Map Unit Symbol	Map Unit Name Acres Percen							
12	Urban land- Udorthents complex, 2 to 15 percent slopes	5.1	100.0%					
Totals f Interes	or Area of t	5.1	100.0%					

Soil Test Results



Essential Elements representatives collected samples from the management areas on February 27th, 2022. Samples were taken from the upper 4" of soil, excluding the thatch layer, and in random locations throughout the field area. Soil from each sample was thoroughly mixed, packaged, and sent to Waypoint Analytical in Richmond, VA. This process allows a representative overall average to be obtained to set thresholds for fertilization and lime recommendations.

Waypoint completed analysis of the samples on March 2, 2022. Standard soil test results provide values for pH, cation exchange capacity, phosphorus, calcium, magnesium, potassium, and sodium. Nitrogen is not included in the standard soil sample analysis because nitrogen is extremely mobile and can change dramatically in the soil resulting in inaccurate data. The nitrogen recommendations in this plan are based on Virginia Cooperative Extension research and recommendations for the nitrogen needs of various turf grasses and ornamental plants. The soil samples collected are valid for the life of this plan (three years) or upon a major renovation or redesign of the lawn, whichever occurs sooner.

George Washington Memorial Parkway Soil Test Results								
Managed Area	Soil pH	Buffer pH	Lab* P (ppm)	VT** P (ppm)	VT (H/M/L)	Lab* K (ppm)	VT** K (ppm)	VT (H/M/L)
Memorial Circle	5.8	6.78	40	15.1	M+	156	110.8	H
Memorial Ave	5.9	6.81	39	14.6	М	113	80.2	M+
Arlington House		6.85	42	16.0	M+	129	91.6	H-
	6.4							
U.S. Marine		6.85	41	15.5	M+	107	76.0	M+
Corps								
Memorial	6.4							

*Lab P and K results are from Waypoint sample analyzed on 03/02/2022.

**VT results are Waypoint analysis results (Mehlich III) converted to Virginia Tech analysis results (Mehlich I) using equations found in Virginia Nutrient Management Standards and Criteria, July 2014.

Terms

Soil pH- The soil pH measures active soil acidity or alkalinity. A pH of 7.0 is neutral. Values lower than 7.0 are acid; values higher are alkaline. Usually, the most desirable pH range for mineral soils is 6.0 to 7.0 and for organic soils 5.0 to 5.5.

Buffer pH- An index value used for determining the amount of lime to apply on acid soils to bring the pH to the desired level for the turf to grow. The lower the buffer pH reading, the higher the lime requirement.

WIN- Water Insoluble Nitrogen. WIN is a Nitrogen source which is slowly released for use by Turf over an extended period of time.

VT P- The lab test results for phosphorus from Virginia Tech analysis (Mehlich I).

VT K- The lab test results for potassium from Virginia Tech analysis (Mehlich I).

VT Rating- Virginia Tech soil fertility rating which provides a general guideline for determining the optimum nutrient levels. The fertility rating system uses broad categories of Low, Medium, High, and Very High. It also integrates pluses (+) and minuses (-) to further refine these categories (e.g., Medium +) where plus is on the more fertile end of the scale and minus is on the less fertile end of the scale.

General Nutrient Recommendations

Lime

Lime Recommendations for Turf Areas							
Managed Area	Soil pH	Lime (lbs./1000)					
Memorial Circle	5.8	60					
Memorial Ave	5.9	50					
Arlington House	6.4	30					
U.S. Marine Corps Memorial	6.4	30					

- > Memorial Circle- 60 pounds of lime per 1000 ft² is recommended.
- > Memorial Ave- 50 pounds of lime per 1000 ft² is recommended.
 - Splitting the Memorial Circle and Memorial Ave lime application into two (2) applications 4-6 months apart is recommended.
- > Arlington House- 30 pounds of lime per 1000 ft2 is recommended.
- > U.S. Marine Corps Memorial- 30 pounds of lime per 1000 ft2 is recommended.

Phosphorus

Phosphorus Recommendations for Turf Areas										
Managed Area	Soil Test Level	Nutrient Need (lbs./1000 ft²/yr.)								
Memorial Circle	M+	1.0								
Memorial Ave	М	1.5								
Arlington House	M+	1.0								
U.S. Marine Corps Memorial	M+	1.0								

- Phosphorus levels for the Memorial Circle are in the Medium range. Applications of phosphorus are recommended and are not to exceed 1.5 lbs. /1000 ft² annually.
- Phosphorus levels for the Memorial Ave are in the Medium + range. Applications of phosphorus are recommended and are not to exceed 1.0lb. /1000 ft² annually.
- Phosphorus levels for Arlington House are in the Medium + range. Applications of phosphorus are recommended and are not to exceed 1.0 lb. /1000 ft² annually.
- Phosphorus levels for the U.S. Marine Corps Memorial are in the Medium + range. Applications of phosphorus are recommended and are not to exceed 1.0 lbs. /1000 ft² annually.

Potassium

Potassium Recommendations for Turf Areas									
Managed Area	Soil Test Level	Nutrient Need (lbs./1000 ft² /yr.)							
Memorial Circle	Н	0.75							
Memorial Ave	M+	1.0							
Arlington House	H-	1.0							
U.S. Marine Corps Memorial	M+	1.0							

- Potassium levels for the Memorial Circle are in the High range. Applications of potassium are recommended and are not to exceed 0.75 lb. /1000 ft² annually.
- Potassium levels for the Memorial Ave are in the Medium + range. Applications of potassium are recommended and are not to exceed 1.0 lb. /1000 ft² annually.
- Potassium levels for Arlington House are in the High range. Applications of potassium are recommended and are not to exceed 1.0 lb. /1000 ft² annually.
- Potassium levels for the U.S. Marine Corps Memorial are in the Medium + range. Applications of potassium are recommended and are not to exceed 1.0 lb. /1000 ft² annually.

Nitrogen

Nitrogen applications for all sites may not exceed **3.5 lbs. /1,000 ft² annually**.

Environmentally Sensitive Sites

Curb and gutter stormwater systems were observed near Memorial Avenue and Memorial Circle. Covers over the openings to the stormwater system are recommended during fertilizer applications. Ensure all granular fertilizer applied near these areas stays in the turf covered area. In locations adjacent to roadways or potential watershed runoff areas it is recommended to use a drop style spreader or a rotary style spreader with a deflector shield to minimize fertilizer onto impermeable surfaces or potential watershed runoff areas. Should particles land on impermeable surfaces, the particles of fertilizer must be collected and removed immediately. No other environmentally sensitive sites were observed within the nutrient management areas.

Detailed Nutrient Recommendations

The tables below provide detailed recommendations for nutrient applications. The worksheet represents the recommended fertilization amount and timing based on the Virginia DCR standards. The amount specified in each month cannot be exceeded but may be reduced. Deviations from the exact date may occur but the interval between applications must be consistent with the worksheet. Changes in fertilizer formulations will require revisions to the tables. No application of nutrients shall be made to frozen or snow-covered ground per 4VAC50-85-140. A.4.f.

Roadway and walking path hard surfaces were observed throughout each of the four sites. When applying granular fertilizers near these areas, please remove all fertilizers back onto the turfgrass areas. Do not apply phosphorus to areas testing on or above 55ppm Mehlich I P. If any questions or concerns arise during the implementation of this

plan, contact the plan writer. If you make any changes to the plan, contact the plan writer to update the plans.

N	National Park Service-George Washington Memorial Parkway												
Management Area	Management Area Memorial Circle								Area (A	Area (Acres) 3.93			
Turf Species	Turf t	f type Tall Fescue											
Application Month/Day		An	alys	is		Application Interval	Fertilizer Type	Fertilizer Description	Rate per 1000ft ²	lbs. or oz.	%Slow Release	Total NPK lbs./1000ft ²	Total Product (lbs. per
	N	-	Р	-	K		71	•			N	$N - P_2O_5 - K_2O$	Area)
September 15	18	-	2	- 1	18	30 Days	WIN		5.00	lbs.	78%	0.90 - 0.10 - 0.90	856
October 15	18	-	2	- 1	18	30 Days	WIN		5.00	lbs.	78%	0.90 - 0.10 - 0.90	856
November 15*	18	-	2	- 1	18	30 Days	WIN		5.00	lbs.	78%	0.90 - 0.10 - 0.90	856
	0	-	0	-	0				0.00	lbs.	0%	0.00 - 0.00 - 0.00	
	0	-	0	-	0				0.00	lbs.	0%	0.00 - 0.00 - 0.00	
	0	-	0	-	0				0.00	lbs.	0%	0.00 - 0.00 - 0.00	
April 15*	18	-	2	-	18	30 Days	WIN		4.45	lbs.	78%	0.80 - 0.09 - 0.80	762
	0	-	0	-	0				0.00	lbs.	0%	0.00 - 0.00 - 0.00	
										Total		3.50 - 0.39 - 3.50	

*Optional applications in fall after Veterans Day and Spring if needed.

N	National Park Service-George Washington Memorial Parkway												
Management Area	Mem	oria	l Ave	ş					Area (A	Area (Acres) 1.00			
Turf Species	Turf t	rf type Tall Fescue											
Application		An	alys	is		Application	Fertilizer	Fertilizer	Rate per	lbs.	%Slow Release	Total NPK lbs./1000ft ²	Total Product
wonth/ Day	Ν	-	Ρ	-	K	Interval	туре	Description		or oz.	N	$N - P_2O_5 - K_2O$	Area)
September 15	18	-	2	-	18	30 Days	WIN		5.00	lbs.	78%	0.90 - 0.10 - 0.90	219
October 15	18	-	2	-	18	30 Days	WIN		5.00	lbs.	78%	0.90 - 0.10 - 0.90	219
November 15*	18	-	2	-	18	30 Days	WIN		5.00	lbs.	78%	0.90 - 0.10 - 0.90	219
	0	-	0	-	0				0.00	lbs.	0%	0.00 - 0.00 - 0.00	
	0	-	0	-	0				0.00	lbs.	0%	0.00 - 0.00 - 0.00	
	0	-	0	-	0				0.00	lbs.	0%	0.00 - 0.00 - 0.00	
April 15*	18	-	2	-	18	30 Days	WIN		4.45	lbs.	78%	0.80 - 0.09 - 0.80	194
	0	-	0	-	0		WIN		0.00	lbs.	0%	0.00 - 0.00 - 0.00	
										Total		3.50 - 0.39 - 3.50	

*Optional applications in fall after Veterans Day and Spring if needed.

N	National Park Service-George Washington Memorial Parkway													
Management Area	agement Area U.S. Marine Corps Memorial							Area (A	Area (Acres) 3.30					
Turf Species	Turf t	rf type Tall Fescue												
Application		An	alys	is		Application	Fertilizer	Fertilizer	Rate per	ate per Ibs. 000ft ² or oz.	lbs.	%Slow Release	Total NPK lbs./1000ft ²	Total Product
Month/Day	N	-	Ρ	-	К	Interval	Туре	Description	1000ft ²		N	$N - P_2O_5 - K_2O$	(lbs. per Area)	
September 15	18	-	2	-	18	30 Days	WIN		5.00	lbs.	78%	0.90 - 0.10 - 0.90	720	
October 15	18	-	2	-	18	30 Days	WIN		5.00	lbs.	78%	0.90 - 0.10 - 0.90	720	
November 15*	18	-	2	-	18	30 Days	WIN		5.00	lbs.	78%	0.90 - 0.10 - 0.90	720	
	0	-	0	-	0				0.00	lbs.	0%	0.00 - 0.00 - 0.00		
	0	-	0	-	0				0.00	lbs.	0%	0.00 - 0.00 - 0.00		
	0	-	0	-	0				0.00	lbs.	0%	0.00 - 0.00 - 0.00		
April 15*	18	-	2	-	18	30 Days	WIN		4.45	lbs.	78%	0.80 - 0.09 - 0.80	641	
	0	-	0	-	0		WIN		0.00	lbs.	0%	0.00 - 0.00 - 0.00		
										Total		3.50 - 0.39 - 3.50		

*Optional applications in fall after Veterans Day and Spring if needed

N	National Parks Service-George Washington Memorial Parkway												
Management Area	Vanagement Area Arlington House Turf Area						Area (A	Area (Acres) .24					
Turf Species	Turf t	ype	Tall	Fescu	е								
Application		An	alys	is		Application	Fertilizer	Fertilizer	Rate per	lbs.	%Slow Release	Total NPK lbs./1000ft ²	Total Product
Month/Day	Day N - P - K Interval Type Description 1000f	1000ft ²	Oft ² or oz.	N	$N - P_2O_5 - K_2O$	(lbs. per Area)							
September 15	18	-	2	- 18	3	30 Days	WIN		5.00	lbs.	78%	0.90 - 0.10 - 0.90	54
October 15	18	-	2	- 18	8	30 Days	WIN		5.00	lbs.	78%	0.90 - 0.10 - 0.90	54
November 15*	18	-	2	- 18	8	30 Days	WIN		5.00	lbs.	78%	0.90 - 0.10 - 0.90	54
	0	-	0	-	0				0.00	lbs.	0%	0.00 - 0.00 - 0.00	
	0	-	0	-	0				0.00	lbs.	0%	0.00 - 0.00 - 0.00	
	0	-	0	-	0				0.00	lbs.	0%	0.00 - 0.00 - 0.00	
April 15*	18	-	2	- :	18	30 Days	WIN		4.45	lbs.	78%	0.80 - 0.09 - 0.80	48
	0	-	0	- ()				0.00	lbs.	0%	0.00 - 0.00 - 0.00	
										Total		3.50 - 0.39 - 3.50	

*Optional applications in fall after Veterans Day and Spring if needed

Fertilizer Application Record

The attached worksheet is provided as a tool to assist with tracking and recording fertilizer applications and should be completed after each application. This worksheet can assist in providing some of the information that may be required by Virginia DCR or DEQ to demonstrate compliance with this plan. Additionally, completed forms can help inform revisions to this plan and/or recommendations in future plans.

George Washington Memorial Parkway - Fertilizer Application Record										
Date of Application (M/D/Y)	Management Area	Applicator	Fertilizer Analysis (ex. 10-0-10)	Rate of Total Product per 1,000 ft ²	Area Fertilized (ft ²)	Total Amount of Product Used (For Entire Area)				

References

Department of Conservation and Recreation Revised (2014) Virginia Nutrient Management Standards & Criteria

Google Earth Imagery dated October 2021

National Park Service https://www.nps.gov/gwmp/index.htm

U.S. Department of Agriculture (2015); Natural Resources Conservation Service https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx

Virginia Department of Conservation and Recreation. Virginia Hydrologic Unit Explorer. <u>https://consapps.dcr.virginia.gov/htdocs/maps/HUExplorer.htm</u>

Waypoint Analytical Laboratory Richmond, Virginia

Appendix A: General Nutrient Application Worksheets

Product applications outlined in the worksheets below will be made each year (2022-2025). The "General Nutrient Recommendations" provided below represent the **maximum** amount of that nutrient allowed by law annually. The following worksheets represent the recommended fertilization amount and timing based on the Virginia DCR standards. The amount specified in each month cannot be exceeded in a 30-day period.

National Park Service-George Washington Memorial Parkway										
Management Area	Memorial Circle	Area (Sq. Ft.)	171,119							
Turf Species	Turf Type Fescue Blend	Turf Type Fescue Blend								
Application Timing	lbs/N/1,000 ft² lbs/P2O5/1,000 ft² lbs/K2O/1,									
After August 15	0	0	0							
September	0.9	0.375	0.187							
October	0.9	0.375	0.187							
November	0.9	0.375	0.187							
April 15- May 15	0.8	0.375	0.187							
June 1- June 15	0	0	0							
Total	3.5	1.5	0.75							

National Park Service- George Washington Memorial Parkway										
Management Area	Memorial Ave Area (Sq. Ft.)		43,560							
Turf Species	Turf Type Fescue Blend	Turf Type Fescue Blend								
Application Timing	lbs/N/1,000 ft ² lbs/P2O5/1,000 ft ² lbs/K2O/1,0									
After August 15	0	0	0							
September	0.9	0.375	0.25							
October	0.9	0.375	0.25							
November	0.9	0.375	0.25							
April 15- May 15	0.8	0.375	0.25							
June 1- June 15	0	0	0							
Total	3.5	1.5	1.0							

National Park Service- George Washington Memorial Parkway										
Management Area	Arlington House	Area (Sq. Ft.)	10,454							
Turf Species	Turf Type Fescue Blend	Turf Type Fescue Blend								
Application Timing	lbs/N/1,000 ft ²	lbs/P2O5/1,000 ft ²	lbs/K ₂ O/1,000 ft ²							
After August 15	0	0	0							
September	0.9	0.250	0.250							
October	0.9	0.250	0.250							
November	0.9	0.250	0.250							
April 15- May 15	0.8	0.250	0.250							
June 1- June 15	0	0	0							
Total	3.5	1.0	1.0							

National	National Park Service- George Washington Memorial Parkway										
Management Area	U.S. Marine Corps Memorial	Area (Sq. Ft.)	143,748								
Turf Species	Turf Type Fescue Blend										
Application Timing	lbs/N/1,000 ft ²	lbs/P2O5/1,000 ft ²	lbs/K ₂ O/1,000 ft ²								
After August 15	0	0	0								
September	0.9	0.250	0.250								
October	0.9	0.250	0.250								
November	0.9	0.250	0.250								
April 15- May 15	0.8	0.250	0.250								
June 1- June 15	0	0	0								
Total	3.5	1.0	1.0								

Nutrient Application Notes

Slow-release nitrogen fertilizer **must contain a minimum of 15 % slowly available or controlled release sources of Nitrogen**. This information will be present on the fertilizer label.

Waypoint recommendations- 2 fall applications of 16-4-8 followed by a spring application of 21-3-7, 18-2-18 fertilizer analysis was chosen based on availability of fertilizer to the contractor applying the fertilizer to these 4 sites, and this fertilizer analysis is compliant with all regulations.

Potassium- This plan calls for additional applications of K₂O above the soil test recommendations. Due to the highly visible nature of the four locations, it is advisable to provide additional potassium to facilitate drought tolerance, cold hardiness, disease resistance, and increase plant vigor during times of stress.

Appendix B: GWMP Soil Test Reports

Soil Test Report: GWMP Memorial Circle



7621 Whitepine Road, Richmond, VA 23237 Main 804-743-9401 ° Fax 804-271-6446 www.waypointanalytical.com

SOIL ANALYSIS

Client :	Grower :	Report No:	22-060-0790
Essential Elements	National Park Service	Cust No:	07469
Matt Austin		Date Printed:	03/02/2022
172 Old Carriage Way		Date Received :	03/01/2022
Williamsburg VA 23188		Date Analysis :	03/02/2022
	PO:	Page :	1 of 8

Lab Number: 01296

Field Id :

Sample Id : MEMCIR

Trat	Deputte		Calculated	d Cation				
lest	nesuits	Very Low	Low	Medium	Optimum	Very High	Exchange	Capacity
Soil pH	5.8						7.8	8
Buffer pH	6.78]					meq/1	00g
Phosphorus (P)	40 ppm						Calculated	d Cation
Potassium (K)	156 ppm					Í	Satura	ition
Calcium (Ca)	880 ppm					T	%K	5.1
Magnesium (Mg)	178 ppm						%Ca	56.4
Sulfur (S)							%Mg	19.0
Boron (B)		1					%Н	19.2
Copper (Cu)		1					Hmeq	1.5
Iron (Fe)		1						
Manganese (Mn)]						
Zinc (Zn)]					K : Mg	Ratio
Sodium (Na)		1					0.27	Davia
Soluble Salts		1					Ca:Mg	Ratio
Organic Matter	5.1 % ENR 141			1			2.91	
Nitrate Nitrogen					Г			
]						

SOIL FERTILITY GUIDELINES

Crop : Lawn							Rec Units:			LB/1000 SF		
(lbs)	LIŅE	(tons)	N	P2 05	K 20	Mg	S	В	Cu	Mn	Zn	Fe
60			4.0	0.5	0	0						
Crop :	Crop : Rec Units:											

Soil Test Report: GWMP Memorial Avenue



7621 Whitepine Road, Richmond, VA 23237 Main 804-743-9401 ° Fax 804-271-6446 www.waypointanalytical.com

SOIL ANALYSIS No: 22-060-0790

Grower :	Report No:	22-060-0790
National Park Service	Cust No:	07469
	Date Printed:	03/02/2022
	Date Received :	03/01/2022
	Date Analysis :	03/02/2022
PO:	Page :	3 of 8
	Grower : National Park Service PO:	Grower : Report No: National Park Service Cust No: Date Printed: Date Received : Date Analysis : PO: Page :

Lab Number: 01297

Field Id :

Sample Id : MEMAVE

Trai	Desults		Calculated	d Cation				
lest	Results	Very Low	Low	Medium	Optimum	Very High	Exchange	Capacity
Soil pH	5.9						7.0	0
Buffer pH	6.81	1					meq/1	100g
Phosphorus (P)	39 ppm						Calculated	d Cation
Potassium (K)	113 ppm		•				Satura	ation
Calcium (Ca)	847 ppm			· · · · · · · · · · · · · · · · · · ·			%K	4.1
Magnesium (Mg)	155 ppm						%Ca	60.5
Sulfur (S)							%Mg	18.5
Boron (B)		1					%Н	17.1
Copper (Cu)		1					Hmeq	1.2
Iron (Fe)		1						
Manganese (Mn)		1						_
Zinc (Zn)		1					K : Mg	Ratio
Sodium (Na)		1					0.23	3
Soluble Salts		1					Ca:Mg	Ratio
Organic Matter	3.9 % ENR 118		1				3.21	' 🔟
Nitrate Nitrogen								

SOIL FERTILITY GUIDELINES

Crop : Lawn							Rec Units:			LB/1000 SF	
(lbs) LIM	E (tons)	N	P2 05	K 20	Mg	S	В	Cu	Mn	Zn	Fe
50		4.0	0.5	2.0	0						
Crop :	Crop : Rec Units:										

Soil Test Report: GWMP Arlington House



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SOIL ANALYSIS

Client :	Grower :	Report No:	22-060-0790
Essential Elements	National Park Service	Cust No:	07469
MattAustin		Date Printed:	03/02/2022
172 Old Carriage Way		Date Received :	03/01/2022
Williamsburg VA 23188		Date Analysis :	03/02/2022
	PO:	Page :	5 of 8

Lab Number: 01298

Field Id :

Sample Id : ARLHS

Trat	Deputte		Calculated Cation					
lest	Results	Very Low	Low	Medium	Optimum	Very High	Exchange	Capacity
Soil pH	6.4						8.5	5
Buffer pH	6.85						meq/1	00g
Phosphorus (P)	42 ppm						Calculated	d Cation
Potassium (K)	129 ppm						Satura	ition
Calcium (Ca)	1211 ppm						%K	3.9
Magnesium (Mg)	159 ppm						%Ca	71.2
Sulfur (S)							%Mg	15.6
Boron (B)		1					%H	9.4
Copper (Cu)		1					Hmeq	0.8
Iron (Fe)]						
Manganese (Mn)								
Zinc (Zn)							K:Mg	Ratio
Sodium (Na)		1					0.23	Batia
Soluble Salts		1					Ca:Mg	Ratio
Organic Matter	5.2 % ENR 142			1			4.00	° 🗖 🛛
Nitrate Nitrogen					Г			

SOIL FERTILITY GUIDELINES

Crop : Law	'n							Rec Units:			LB/1000 SF	
(lbs)	LIŅE	(tons)	N	P2 05	K 2O	Mg	S	В	Cu	Mn	Zn	Fe
30			4.0	0.5	0	0						
Crop : Rec Units:												

Soil Test Report: GWMP United States Marine Corp Memorial



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SOIL ANALYSIS

Client : Essential Elements	Grower : National Park Service	Report No: Cust No:	22-060-0790 07469
Matt Austin		Date Printed:	03/02/2022
172 Old Carriage Way		Date Received :	03/01/2022
Williamsburg VA 23188		Date Analysis :	03/02/2022
	PO:	Page :	7 of 8

Lab Number: 01299

Field Id :

Sample Id : USMC

Trat	Depute		SOIL TEST RATINGS									
lest	Hesuits	Very Low	Low	Medium	Optimum	Very High	Exchange	Capacity				
Soil pH	6.4						9.3	3				
Buffer pH	6.85						meq/1	00g				
Phosphorus (P)	41 ppm						Calculated	Cation				
Potassium (K)	107 ppm						Satura	tion				
Calcium (Ca)	1311 ppm			•			%K	3.0				
Magnesium (Mg)	199 ppm						%Ca	70.5				
Sulfur (S)							%Mg	17.8				
Boron (B)]					%H	8.6				
Copper (Cu)		1					Hmeq	0.8				
Iron (Fe)]										
Manganese (Mn)												
Zinc (Zn)		1					K:Mg	Ratio				
Sodium (Na)		1					0.18	Detie				
Soluble Salts							Ca:Mg	Hatio				
Organic Matter	6.4 % ENR 150			1	1		3.90	· 🗖				
Nitrate Nitrogen												

SOIL FERTILITY GUIDELINES

Cro	op:Law	vn									Rec Units:			
	(lbs)	LIŅE	(tons)	N	P2 05	K 20	Mg	S	В	Cu	Mn	Zn	Fe	
	30			4.0	0.5	2.0	0							
Cro	rop: Rec Units:													

Photocopy this document and complete to validate that routine site inspections are being performed.

Twice yearly routine site inspections are required for all potential pollutant discharge and exposure areas specified in this SWP3. The goal of these inspections is to make sure that the BMPs identified in the SWP3 are being implemented and are effective in minimizing or reducing the threat of pollutant discharge. Deficiencies in the implementation of the SWP3 must be corrected within two weeks. These records must be maintained with the SWP3 and must be kept for at least three years from the date of the inspection.

Instructions: Complete the log below to track the completion of inspections. If any deficiencies are identified please explain on a separate page then document and attach the follow-up procedures.

1.	Are the grounds clear of spills and leaks?	Yes	No
2.	Are the grounds free of debris such as solid waste, trash and litter? **There was a big site clean-up a couple years ago, removing most of the trash and litter on the island, including the "bone yard" area. Everything has been removed except for two large trailers, which have since been pulled out of the woods. The park is in the process if permanent disposal of these two trailers.	Yes*	No
3.	Is the ground below vehicles and equipment free of oil that has leaked from above?	Yes	No
4.	Are vehicles and equipment that is stored for extended periods of time drained of fluids, or are absorbent rags or tubs placed below that equipment and regularly maintained?	Yes	No
5.	Are all containers of hazardous materials stored inside?	Yes	No
6.	Are universal wastes (if applicable) covered and stored in secondary containment?	Yes	No
7.	Are dumpsters (if applicable) maintained in a closed position?	Yes	No
8.	Are dumpsters and trash barrels (if applicable) present in sufficient quantity to contain all the bags of solid waste?	Yes	No
9.	Has any evidence of spills or leakage been reported or cleaned since the last inspection?	Yes	No
10.	Since the last inspection, has any SWP3 Team member observed color, odor, floating solids, foam, oil sheen or other indicators of water pollution in stormwater run-off?	Yes	No
11.	Have new employees been trained on the SWP3 within 60 days of their start date?	Yes	No
12.	Have measures to address erosion been maintained? Do the measures used to address erosion appear effective?	Yes	No

Inspector's Name:	Robert Mocko	Inspection Date:	June 6, 2022
Signature:			· · · · · ·
Specific areas inspected			
(including outfalls):	Daingerfield Island (+6 outfalls in parki	ng lot)	

Appendix B. Annual Site Evaluation Form

Photocopy this document and complete to validate that annual inspections are being performed.

This form is used to assess conditions at the GWMP Maintenance Complex that could impact stormwater quality and the effectiveness of the BMPs chosen to be implemented. Evaluations must include: all BMPs identified in this SWP3 to ensure they are functioning correctly; and a visual inspection of areas where materials or activities are exposed to stormwater as identified in the SWP3. Results of visual evaluations conducted during the year must be taken into consideration during the evaluation.

During the review the evaluator should ask:

1.	Is the area free of debris or residue that could be washed away by stormwater? If No, what are those materials and where did they come from?	Yes	No
1.	Are all pollution sources identified in the SWP3? If No, what additional areas should be included in the SWP3?	Yes	No
2.	Are the BMPs identified and implemented in the SWP3 sufficient and effective? If No, why and what changes should be made?	Yes	No
3.	Are all BMPs identified and implemented in the SWP3 sufficient to prevent or minimize polluted stormwater discharge? If No, what additional BMPs should be identified and implemented?	Yes	No
4.	Were past quarterly visual evaluation records reviewed as part of this Annual Comprehensive Site Compliance Evaluation?	Yes	No
5.	If a major leak or spill of hazardous materials occurred in the past three years, was the area evaluated for the potential for future spills and leaks?	Yes	N/A
Once and t	the evaluation has been completed, the results should be shared with the entire SWP3 Tean raining schedule should be updated as necessary.	n, and the	e SWP3
GWN	1P Maintenance Complex is in compliance with this SWP3 and with the permit issued by the I	EPA.	

Name: Robert Mocko Date:

June 24, 2021

Signature: ROBERT MOCKO

VIRGINIA DEPARTMENT PEST Expires 06/30/2023	DF AGRICULTURE AND CO ICIDE APPLICATOR CERTIFICATE GOVT EMPLOYEE	ONSUMER SERVICES Certificate Number 153382-G	C
MIREYA D STIRZAKE NATIONAL PARK SER 1622 HARVEST GREE RESTON,VA 20194	FOR BL# 3350 R VICE N CT <u>Liza</u> A	Fleeson Trossbach uthorized Representative	I
(Fold Here)			
VALID ONLY FOR	CATEGORIES LIS	STED	
2 FUREST PES	LIN PROT CONTROL	06/30/2023	
6 FUBLIC AEA		06/30/2023	
22			
Sign Here I	Pesticide Applicator		

Cut and Keep in Your wallet.

> For Questions /Concerns call: Office of Pesticide Services (804)786-3798

VIRGINIA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES P O BOX 1163, RICHMOND VA 23218-1163

PESTICIDE APPLICATOR CERTIFICATE

Issued

06/21/2021

Expires 06/30/2023 GOVT EMPLOYEE FOR BL# 3350 Fee Paid EXEMPT Certificate

153382-G



Issued in accordance with application duly executed by the person shown below who has agreed to comply with all applicable laws, rules and regulations

MIREYA D STIRZAKER NATIONAL PARK SERVICE 1622 HARVEST GREEN CT RESTON,VA 20194

Bradley Copenhaver

Commissioner



Liza Fleeson Trossbach Authorized Representative