



Virginia Stormwater Management Program
Municipal Separate Storm Sewer System (MS4)
General Permit
Annual Report

Fort Monroe Authority
Permit Number: **VAR040130**
July 1, 2021 through June 30, 2022
September 30, 2022

Fort Monroe Authority
20 Ingalls Road
Fort Monroe, Virginia 23651
(757) 251-2756



MUNICIPAL SEPARATE STORM SEWER SYSTEM ANNUAL REPORT
PERMIT YEAR 4

Certification

"I certify under penalty of law that this document and all attachments were prepared under my direction of supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person and persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature

9.29.2022

Date

VAR040130

Permit Number

Fort Monroe Authority

MS4 Name

TABLE OF CONTENTS

Certification	ii
1. Introduction	2
2. Program Plan Updates.....	2
3. Additional Reporting Requirements.....	2
4. Compliance Status on Measureable Goals	3
4.1 Public Education and Outreach on Stormwater Impacts.....	3
4.2 Public Involvement and Participation.....	3
4.3 Illicit Discharge Detection and Elimination.....	5
4.4 Construction Site Stormwater Runoff Control.....	5
4.5 Post-Construction Stormwater Management.....	5
4.6 Pollution Prevention and Good Housekeeping for Municipal Operations	5
5. Chesapeake Bay TMDL Action Plan	6
6. Local TMDL Requirements	6

Appendices

Appendix A: Fort Monroe Property Ownership
Appendix B: Educational Outreach Materials
Appendix C: Stormwater System Map
Appendix D: Outfall Information Table
Appendix E: Outfall Inspection Results
Appendix F: Fort Monroe Nutrient Management Plan and Map
Appendix G: Memorandum of Agreement for SWIFT

1. INTRODUCTION

Commonwealth of Virginia owned property at Fort Monroe, managed by the Fort Monroe Authority (FMA), was designated a Phase II regulated small Municipal Separate Storm Sewer System (MS4) and was issued a Virginia Stormwater Management Program (VSMP) MS4 General Permit #VAR040130 on August 23, 2013, by the Virginia Department of Environmental Quality. The permit was issued on August 12, 2014. The permit was renewed for an additional five years on November 1, 2018 and remains valid until October 31st, 2023.

Fort Monroe consists of approximately 565 acres of which 108 are submerged and 85 are wetlands. Fort Monroe is located at the southeastern tip of the Virginia Lower peninsula between Hampton Roads to the southwest and the Chesapeake Bay to the east. Fort Monroe formerly served as U.S. Army Garrison Fort Monroe, a largely administrative post with few troop and industrial activities. In September 2011, the Army decommissioned Fort Monroe as an active Army base and transferred by quitclaim deed a portion of the lands at Fort Monroe to the Commonwealth of Virginia in June 2013 (~312.75 acres).

Land ownership and boundaries as they currently exist, are depicted on the Property Ownership map in **Appendix A**.

As required by the permit, the Fort Monroe Authority has prepared this Annual Report for the reporting period of July 1, 2021, through June 30, 2022. This represents year four of the FMA permit coverage. The report includes updates to the MS4 Program Plan, the status of compliance with permit conditions, progress towards achieving the identified measurable goals for each minimum control measure, and a summary of stormwater activities FMA plans to undertake in the next permit year.

2. PROGRAM PLAN UPDATES AND IMPLEMENTATION

The following updates have been made to the FMA MS4 Program Plan:

- The MS4 Program Plan was revised and updated on April 30, 2019 and posted to the FMA Environmental Webpage as required. No further Program Plan updates were done this fiscal year. No additional revisions were required this Permit Year.

The MS4 Program Plan and implementation of minimum control measures has remained effective during the reporting year. COVID-19 restrictions remained in effect during the majority of the permit year; however, continued efforts have demonstrated progress toward pollutant reduction goals. The status of specific measurable goals is detailed in Section 4.

3. ADDITIONAL REPORTING REQUIREMENTS

The permit requires that the annual report address the situation of another government entity being held responsible for the permittee satisfying some of the state permit requirements. The City of Hampton manages portions of the FMA's MS4 including the beaches and boardwalk area of Fort Monroe as well as the Fort Monroe Community Center. The City of Hampton is responsible for beach cleaning and other requested activities in these areas. As a tax paying organization (via a pilot fee) within the City of Hampton, Fort Monroe Authority relies upon education outreach programs organized by the Hampton Roads District Planning Commission (HRPDC) of which the City of Hampton is a member locality.

4. COMPLIANCE STATUS ON MEASUREABLE GOALS

4.1 PUBLIC EDUCATION AND OUTREACH ON STORMWATER IMPACTS

Part I.E.1.g requires the permittee to include the following in this annual report:

- A list of high-priority stormwater issues the permittee addressed in the public education and out program; and
- A list of strategies used to communicate each high-priority stormwater issue.

FMA identified the following three (3) High-Priority Stormwater Issues during the latest update of the MS4 Program Plan:

- Disconnection of basement sump pumps from sanitary sewer and conversion to stormwater discharge
- Pet Waste / bacteria management
- Floatables reduction

4.1.1 **DISCONNECTION OF BASEMENT SUMP PUMPS FROM SANITARY SEWER**

Implementation of Phase I of this program, the Inner Fort Sump Pump Disconnect Project, has been completed. Phase II design is ongoing and will include areas along Tidball Road. The residents impacted by the sump pump disconnection process will be provided with education materials on keeping areas of their homes/basements drained by the sump pumps free from pollutants that may negatively impact the stormwater system.

4.1.2 **PET WASTE / BACTERIA MANAGEMENT**

The FMA continues to install and maintain additional pet waste stations on public space as needed to allow visitors and residents a place to properly dispose of these items. The FMA Environmental Website directs visitors to the HR Green website for additional information.

4.1.3 **FLOATABLE REDUCTION**

The FMA has sent out flyers to residents and commercial tenants with information covering the various ways household activities effect Bay health. An example titled “A Clean, Healthy Bay Starts at Home” is included in **Appendix B**. FMA also maintains signage and trash cans for the use of visitors and residents. The FMA Environmental Website directs visitors to the HR Green website for additional information.

4.2 PUBLIC INVOLVEMENT AND PARTICIPATION

Part I.E.2.f requires the permittee to include the following in this annual report:

4.2.1 **SUMMARY OF PUBLIC INPUT RECEIVED ON MS4 PROGRAM**

FMA has received no comments, complaints, and/or public input on the MS4 Program as of the writing of this report. The FMA Environmental Website contains both a telephone

number and an e-mail link for the submittal of comments, questions, concerns, and for reporting suspected illicit discharges.

4.2.2 WEBSITE AND/OR FACEBOOK PAGE

FMA continues to update the website with copies of MS4 annual reports and additional educational information as needed.

Link to website: <http://www.fmauthority.com/about/the-fort-monroe-authority/environmental-remediation/>

4.2.3 PUBLIC INVOLVEMENT EVENTS

4.2.3.1 Storm Drain Marking Events

The Fort Monroe Authority has identified target areas for the storm drain marking program at Fort Monroe. These areas were selected based on frequency of pedestrian traffic and potential for illicit discharges. The target areas include: Continental Park, in the Inner Fort around the Casemate Museum, along Ingalls Road, and along Fenwick Road.

Per the MS4 Program Plan, FMA planned to do storm drain marking events in the warmer months of April 2022 through June 2022, however COVID pandemic limitations have made it necessary to postpone. FMA will hold these events as soon as practicable.

4.2.3.2 Environmental Awareness Events

Fort Monroe Authority holds public events focused around water quality on an annual basis. During this permit year the FMA held one (1) environmental awareness event in the form a beach cleanup. During the event volunteers picked up trash and debris from the shorelines and property of Fort Monroe. Table 1 lists the events, number of participants, and type of activity completed. Beach cleanups improve water quality by limiting the amount of debris flowing into local waterways and are directly related to the high-priority issue of floatables. Additional planned beach cleanups and group environmental awareness events were cancelled due to COVID pandemic gathering restrictions.

TABLE 1: ENVIRONMENTAL AWARENESS EVENTS AT FORT MONROE, MS4 PERMIT YEAR FOUR

Date	Group	Area	# of Participants
06/04/2022	Clean the Bay Day	0.71 miles of shoreline	68
TOTAL:			68

4.3 ILLICIT DISCHARGE DETECTION AND ELIMINATION

4.3.1 STORMWATER MAP

A map of the stormwater system, including outfalls, at Fort Monroe is included as **Appendix C**. This map represents the current best available data on the stormwater system at Fort Monroe. No changes to the MS4 area or outfalls have been made in the FY22 permit year.

A summary table of Outfalls with all required information is located in **Appendix D**.

FMA and Veolia Water will continue to update the stormwater maps as new data are gathered or portions of the system change.

4.3.2 ILLICIT DISCHARGE SURVEY AND REMOVAL

The Fort Monroe Authority has contracted with Veolia Water to perform certain tasks associated with compliance in the identification of illicit discharges. The Veolia Project Manager has developed procedures for illicit discharge surveys, included in a previous year Annual Report. During the permit year, FMA inspected a total of 49 outfalls (or downstream inlets of submerged outfalls) in the permitted system and reported no illicit discharges observed at the time of inspection. A summary table of the results is included in **Appendix E**. Additionally, Veolia cleared all outfalls and drop inlets of debris as needed this year.

The FMA and Veolia Water will continue to assess the effectiveness of the survey procedures and make changes as necessary. Veolia Water will continue to survey FMA outfalls annually for illicit discharges.

4.4 CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

The FMA did not have any activities during this permit year that required construction site inspections.

4.5 POST-CONSTRUCTION STORMWATER MANAGEMENT

The FMA does not own, operate, or maintain any stormwater management BMPs.

4.6 POLLUTION PREVENTION AND GOOD HOUSEKEEPING FOR MUNICIPAL OPERATIONS

4.6.1 POLLUTION PREVENTION AND GOOD HOUSEKEEPING PROCEDURES

The FMA continues to implement all good housekeeping procedures per its Operations and Maintenance Program manuals. No procedures were developed or modified during this permit year.

4.6.2 IDENTIFICATION OF HIGH PRIORITY FACILITIES AND SWPPP DEVELOPMENT

The FMA conducted an annual review of these facilities prior to June 30, 2022 and identified the facilities in Table 2 as “high priority facilities”.

TABLE 2: HIGH PRIORITY FACILITIES

Location	Use	Reason for SWPPP
North Gate Road (no address)	Landscaping & Maintenance Laydown Yard	Large equipment/machinery storage, fueling activities
100 McNair Road (Building 207)	Marina	Fuel activities, minor boat maintenance
57 Patch Road (Building 57)	Veolia Maintenance Shop	Large machinery and equipment storage and maintenance.

High priority locations for SWPPPs may change as property transfers to and from Commonwealth of Virginia ownership to other governmental entities or private leaseholders.

SWPPPs were developed for the Landscaping & Maintenance Laydown Yard and Marina during this permit year. The SWPPP for the Veolia Maintenance Shop was revised to maintain accurate representation of site uses and activities.

4.6.3 NUTRIENT MANAGEMENT PLAN

FMA contracts landscape management of public lands at Fort Monroe to James River Grounds who are responsible for nutrient application. No changes to the Nutrient Management Plan or areas of application were made during the permit year.

Appendix F provides a map of lands at Fort Monroe on which nutrients are applied, the plan, and approval letter.

4.6.4 ENVIRONMENTAL AWARENESS TRAINING

FMA continues to be committed to keeping their employees trained on the latest environmental regulations as they pertain to MS4 related matters. Veolia performs their own staff training to comply with regulations. Other trainings planned during the spring and summer of 2022 were cancelled and/or postponed due to the COVID pandemic and will resume as soon as practicable.

5. CHESAPEAKE BAY TMDL ACTION PLAN

The FMA updated the Chesapeake Bay Phase II Action Plan in October 2019 to include plans to meet the 40% reduction goals for the current permit cycle. FMA has finalized a Memorandum of Agreement (MOA) with the Hampton Roads Sanitation District (HRSD) for joining the Sustainable Water Initiative for Tomorrow (SWIFT) program to obtain the remaining credits. This MOA allows the FMA to meet their 40% reduction goal with significantly less cost than traditional nutrient credit trading programs. A copy of the MOA is included in **Appendix G**.

6. LOCAL TMDL REQUIREMENTS


The FMA is not subject to any local TMDLs.

Appendix A: Fort Monroe Property Ownership



Property Ownership

Fort Monroe, VA

 NPS Easement Boundary

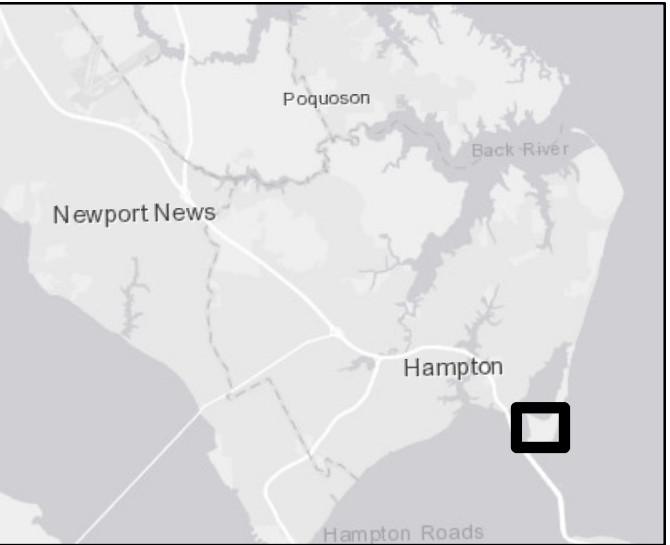
Ownership

 Commonwealth of Virginia

 Army - Delayed Reversion

 U.S. Coast Gaurd

 National Park Service



1 inch = 500 Feet (@11"x17")

0 250 500 1,000 Feet



Prepared For:



Prepared By:

Kimley»Horn

Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

Data source: Fort Monroe Authority

Date: 9/18/2019

Appendix B: Educational Outreach Materials

Item	Method	Disposal
CFLs, cleaning products, fungicides, insect repellants & stains, varnish, sprays, paints, pesticides, weed killers, swimming pool chemicals	Label contents of containers	Hazardous waste recycling event or collection facility
Household batteries	Recycle	Battery stores or E-cycling event
Electronics	Recycle	E-cycling event
FOG (fats, oils, & grease)	Cool or freeze in sealed container	Trash or recycling event
Prescription drugs	Remove personal information, crush or dilute meds and mix with cat litter, sawdust, etc. Seal in original container	Deposit in trash or take to pharmacy
Antifreeze, car batteries, motor oil, brake & transmission fluid, car wax, gasoline	Label contents of containers and recycle	Auto parts store, VPPSA or SPFA collection facility or recycling event

Recycle. Bring leftover hazardous waste materials to a hazardous waste event (VPPSA holds numerous throughout the year for Peninsula residents, www.vppsa.com), one of the five SPFA hazardous waste collection facilities (www.spsa.com), or the Virginia Beach Landfill at 1989 Jake Sears Road.

Reduce. Buy and use only the amount needed. Leftovers can be shared or donated.

Use alternative products. Select non-hazardous or less hazardous components that do the same job.

Household Hazardous Waste

Start at Home

Every day activities greatly affect the health of our waterways. This guide contains tips on how you can help protect our waterways, starting at home.



What is Stormwater Runoff?

Stormwater runoff occurs when rain or melted snow flows over parking lots, sidewalks, streets, or any other surface that cannot absorb water. As stormwater runoff moves, it picks up dirt, trash, oil, grease, fertilizers, and other pollutants and carries them into the storm drain system, which empties directly into local waterways.

Stormwater runoff does not flow to a treatment plant; it flows directly into our streams, bay and ocean. Pollution from untreated stormwater runoff affects drinking water supplies, recreation, fisheries and wildlife.



Wash vehicles on grass or gravel. Wash your car only in areas that allow water to soak into the ground. If you wash your car on a street, use soap sparingly, and use a hose nozzle with flow restriction or a bucket and sponge to minimize runoff and save water. Dispose of the dirty, soapy water in a utility sink, on grass or gravel.

Be mindful of runoff. Do not store used vehicle parts in areas that drain to the storm drain.

Recycle used batteries. Many auto parts stores accept old batteries for recycling.

Recycle antifreeze/coolant. Bring used coolant to an auto parts store or hazardous waste collection facility. Check your radiator hoses when changing your oil and inspect your car at the first sign of a coolant leak.

Recycle waste oil. When you change your own oil, use an oil change box. Change your oil away from storm drains and have old rags or other absorbent materials available to respond in case of a spill. Take used oil to an auto parts store or hazardous waste collection facility.



Clean up leaks or spills promptly. Use dry, absorbent materials, such as cat litter, and a broom to clean up leaks. Be careful to keep dirty water from running into the street and storm drain when hosing down garage floor or driveway.

Repair Leaks. If you discover spots in your driveway, or have to fill fluids often, make repairs right away.

Vehicle Maintenance

Drain water to grassy areas. Grassy areas will soak up water rather than let it flow to nearby storm drains.

Clean your pool, fountain or spa regularly. Maintain proper chlorine levels, water filtration and circulation.



Check PH and drain only clear water. Water should not appear murky and PH should be between 6.5 and 8.5 before draining.

Avoid algaecides. Maintain your pool's chemicals properly and avoid use of copper sulfate.

Break down chlorine. Add sodium thiosulphate to break down chlorine faster.

Let it be. Before draining, let pool water sit for several days without treating to allow chlorine to dissipate.

Pools & Spas

Carry extra bags. Take along bags when walking your dog and make them available to other pet owners who are without. When traveling with your dog, ensure you always have extra bags in your car.



Pick up pet waste. Always clean up after your dog, whether it's on your lawn, in the park or at the beach.

Your Pets

for tips on keeping it clean and finding your inner green.

"Ask HR Green" is a regional awareness campaign sponsored by 16 Hampton Roads cities and counties working together with the Hampton Roads Planning District Commission.



Lawn & Garden

A healthier Bay means a safer environment for us all to enjoy for years to come. Your yard can be one of the greatest defenses against water pollution. Choose native trees, shrubs and plants to help stabilize soil, absorb and filter stormwater runoff. There are plenty of ways to maintain a beautiful, healthy, Bay-friendly landscape. Here are just a few of them...

PLANT MORE PLANTS

Plant Native Flowers, Trees and Shrubs

Trees, shrubs and hardy perennials can beautify your home and help reduce stormwater runoff. Use plants that are adjusted to local growing conditions. Consider native plants; they are typically more resistant to insects and disease and use less water and fertilizer.



Mulch, Mulch, Mulch

Mulch helps to control erosion, retain moisture and stabilize soil temperature. A two-inch layer of mulch material, such as fir bark, pine needles or wood chips, will reduce water loss and maintain uniform soil moisture around roots. Mulch can also reduce or eliminate weeds that compete with landscape plants for moisture, nutrients, and sunlight.



By planting more plants, homeowners can improve the health of the Chesapeake Bay.

As stormwater flows across hard surfaces and through landscaped areas, it carries particulates through drainage systems and into local waterways. Harmful amounts of nitrogen, phosphorus, sediments and other pollutants are channeled from residences directly into the waters of the Bay.

These pollutants include:

- fertilizer
- pesticides
- topsoil
- oil and gasoline
- pet waste

Homeowners can mitigate the amount of harmful elements that reach the Bay through landscaping practices that include reducing hard surfaces, fertilizing responsibly and planting native trees, shrubs, plants and grasses.

Choosing the right species and planting in abundance will establish expansive root systems to hold soil in place, creating a natural filter that reduces the harmful effects of fertilizers, pesticides and spilled fuels.

Graphic used with permission from PlantMorePlants.com

Sweep It Up

Clean up anything that is lying on pavement. Fertilizer spill? Sweep or blow it into the yard, not into the street.



Mow It

Proper mowing is important for a well-kept lawn. Newly seeded lawns should be mowed early and often, leaving 1.5 to 2.0 inches of grass height. Once your lawn is established, set the mower blade higher, leaving 2 to 3.5 inches of grass.



Test Your Soil

Save money by having your soil tested. Soil testing will ensure you get the right fertilizer with the nutrient levels that your lawn requires and will determine the right amount needed so you don't over fertilize. Testing should be done every 3-4 years in the fall.



Fertilize in the Fall

Apply fertilizer in the fall when there is typically less rain and less chance for it to be washed off your lawn. Keep fertilizer off paved surfaces and never apply it to driveways, sidewalks, or roadways.



Know Your Grass

For cool season grass, such as fescue or ryegrass, seed in the late summer. For warm season grass, such as zoysiagrass or Bermuda grass, seed in early spring. Seed bare areas during the appropriate time of year to reduce erosion potential.



Leave Lawn Clippings




After mowing, leave grass clippings on your lawn. Clippings break down and return nitrogen to the lawn, generating up to 25% of the lawn's fertilizer needs.



Appendix C: Stormwater System Map



Fort Monroe, VA Stormwater System Map

-  MS4 Outfall
-  Stormwater Pipe
-  MS4 Area



0 2 4 8 Miles

Data Sources: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community, Fort Monroe Authority

Appendix D: Outfall Information Table

MS4 Outfall Informatin Table

Asset ID	Approximate Drainage Area (Acres)	Longitude (X)	Latitude (Y)	HUC	Receiving Water	TMDL	Predominant Land Use
SSOF_002	0.58	-76.311769	37.000238	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_003	5.7	-76.309019	37.006171	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_004	23.24	-76.309533	37.004043	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_006	5.39	-76.313752	37.003184	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_007	9.45	-76.310682	37.002386	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_008	9.61	-76.313890	37.005915	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_009	14.15	-76.304006	37.004247	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_010	32.88	-76.304674	37.010090	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_011	16.26	-76.309174	37.009370	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_013	12.12	-76.312140	37.010680	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_014	13.91	-76.314192	37.007458	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_015	4.64	-76.304682	37.002870	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_016	0.76	-76.306314	37.002270	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_017	3.09	-76.306797	37.002000	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_018	8.02	-76.308316	37.006306	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_019	0.96	-76.312777	37.010957	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_020	1.27	-76.314354	37.011573	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_021	0.45	-76.313579	37.004362	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_022	0.93	-76.305710	37.002561	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_023	0.69	-76.313971	37.006505	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_024	0.47	-76.313861	37.005821	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_025	0.75	-76.314674	37.001671	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_026	1.01	-76.314335	37.002923	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_027	1.16	-76.314744	37.010446	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_028	1.09	-76.313718	37.011327	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_029	0.25	-76.314011	37.006661	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_030	1.57	-76.307699	37.001802	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_031	0.11	-76.307328	37.001883	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_032	0.31	-76.310439	37.003431	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_033	0.23	-76.309820	37.001966	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_034	0.93	-76.315196	37.011210	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_041	2.06	-76.306189	37.001095	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_042	0.57	-76.308448	37.000929	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_043	3.82	-76.310806	37.000480	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_044	4.76	-76.310318	37.003876	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_045	1.05	-76.310336	37.004549	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_046	3.41	-76.310425	37.005583	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_047	4.5	-76.310276	37.005897	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_049	0.02	-76.310676	37.002352	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_050	4.03	-76.309457	37.001803	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_051	5	-76.306351	37.002644	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_055	13.48	-76.305548	37.006254	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_056	0	-76.305526	37.006245	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_057	0	-76.305508	37.006232	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_058	5.57	-76.304822	37.003743	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_059	0.04	-76.304824	37.003741	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_060	0.56	-76.305408	37.002822	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_061	0.06	-76.307025	37.001951	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_062	0.1	-76.304079	37.004180	JL58	Mill Creek	Chesapeake Bay TMDL	Public

Appendix E: Outfall Inspection Results

2022 Outfall Inspection Report

Outfall ID	Receiving Water	Date	Time	Investigators	Form Completed By	Temperature	Rainfall 24 Hrs	Tide Elevation (+/- ft)	Land Use in Drainage Area	Material & Diameter	Shape & Configuration	Submerged %	Illicit Discharge	Flow	Prioritization	Growth	Notes
SSOF_001	Mill Creek	6/29/2022	8:10:00 AM	Eason	Woods	73	0	2.00	Open Space / Commercial	CMP 32"	Circular / Single	20	Unlikely	None	Low	Mollusk / Algae	Mollusk inudating inside bottom of pipe and around sides.
SSOF_005	Mill Creek	6/29/2022	8:20:00 AM	Eason	Woods	73	0	2.05	Residential / Commercial	CMP 32"	Circular / Single	70	Unlikely	None	Low	Heavy Groth of Mollusk / Algae	Heavy Pipe End Corrision w/ linear crack
SSOF_002	Chesapeake Bay	6/29/2022	8:25:00 AM	Woods	Woods	73	0	2.06	Residential / Commercial	Cast Iron 40"	Circular / Single	20	Unlikely	None	Low	None	Crack has formed on top of Tideflex valve
SSOF_010	Mill Creek	6/29/2022	8:35:00 AM	Eason	Woods	73	0	2.13	Open Space / Commercial / Industrial	CMP 34"	Circular / Single	45	Unlikely	None	High	Heavy Groth of Mollusk / Algae	Corroded and Cracked/ Significant mollusk growth
SSOF_006	Chesapeake Bay	6/29/2022	8:45:00 AM	Woods	Woods	74	0	2.19	Residential / Commercial / Industrial	RCP 30"	Circular / Single / Check Valve	30	Unlikely	None	Low	Heavy Groth of Mollusk / Algae	Chip at 11 O'Clock
SSOF_011	Mill Creek	6/29/2022	8:50:00 AM	Eason	Woods	74	0	2.21	Commercial / Industrial	CMP 24"	Circular / Single	5	Unlikely	None	Medium	Mild Groth of Mollusk / Algae	Heavy Corrosion on top
SSOF_008	Chesapeake Bay	6/29/2022	9:00:00 AM	Woods	Woods	74	0	2.24	Residential / Open Space / Commercial	RCP 30"	Circular / Single / Check Valve	35	Unlikely	None	Medium	Heavy Groth of Mollusk / Algae	Mollusk inudating inside bottom of pipe and Heavy Pipe End Corrision
SSOF_013	Mill Creek	6/29/2022	9:05:00 AM	Eason	Woods	74	0	2.26	Residential & Open Space	CMP 12"	Circular / Single	0	Unlikely	None	Medium	Thick vegetation	Outfall end damaged from rocks/sands/grasses
SSOF_012	Chesapeake Bay	6/29/2022	9:07:00 AM	Woods	Woods	75	0	2.27	Residential / Commercial	HDPE 34"	Circular / Single / Check Valve	15	Unlikely	None	Low	None	Several Cracks in Tideflex Valve
SSOF_014	Chesapeake Bay	6/29/2022	9:20:00 AM	Woods	Woods	75	0	2.33	Residential / Open Space	RCP 30"	Circular / Single / Check Valve	0	Unlikely	None	Medium	Heavy Groth of Mollusk / Algae	Mollusk inudating inside bottom of pipe
SSOF_019	Mill Creek	6/29/2022	9:25:00 AM	Eason	Woods	75	0	2.34	Open Space	RCP 15"	Circular / Single	0	Unlikely	None	Low	None	
SSOF_020	Mill Creek	6/29/2022	9:38:00 AM	Eason	Woods	75	0	2.39	Open Space	RCP 15"	Circular / Single	0	Unlikely	None	Medium	None	End Broken Off/Covered with grass and debris
SSOF_021	Chesapeake Bay	6/29/2022	9:40:00 AM	Woods	Woods	75	0	2.38	Residential / Commercial	RCP 14"	Circular / Single	0	Unlikely	None	Medium	None	End Broken Off
SSOF_023	Chesapeake Bay	6/29/2022	9:55:00 AM	Woods	Woods	76	0	2.39	Open Space	RCP 15"	Circular / Single	0	Unlikely	None	Low	None	
SSOF_024	Chesapeake Bay	6/29/2022	10:05:00 AM	Woods	Woods	76	0	2.40	Open Space	RCP 12"	Circular / Single	0	Unlikely	None	Low	None	
SSOF_025	Chesapeake Bay	6/29/2022	10:26:00 AM	Woods	Woods	76	0	2.37	Commercial / Industrial	HDPE 12"	Circular / Single / Check Valve	0	Unlikely	None	Low	None	
SSOF_026	Chesapeake Bay	6/29/2022	10:35:00 AM	Woods	Woods	77	0	2.33	Commercial / Industrial	PVC 12"	Circular / Single / Check Valve	0	Unlikely	None	Low	None	
SSOF_027	Chesapeake Bay	6/29/2022	10:57:00 AM	Woods	Woods	77	0	2.31	Open Space	RCP 12"	Circular / Single	0	Unlikely	None	Low	None	
SSOF_034	Chesapeake Bay	6/29/2022	11:10:00 AM	Woods	Woods	78	0	2.30	Open Space	PVC 8"	Circular / Double	0	Unlikely	None	Low	None	
SSOF_041	Chesapeake Bay	6/29/2022	11:30:00 AM	Woods	Woods	78	0	2.09	Open Space	HDPE 12"	Circular / Single / Check Valve	0	Unlikely	None	Low	None	
SSOF_042	Chesapeake Bay	6/29/2022	1:00:00 PM	Woods	Woods	81	0	1.35	Open Space	HDPE 12"	Circular / Single	0	Unlikely	None	Low	Algae	
SSOF_003	Moat	6/30/2022	8:18:00 AM	Eason	Woods	74	0	1.66	Commercial / Industrial	CMP 21"	Circular / Single	10	Unlikely	None	Medium	Mollusk / Algae	BOTTOM PORTION CORRODED AWAY
SSOF_004	Moat	6/30/2022	8:30:00 AM	Eason	Woods	74	0	1.78	Residential	CMP 36"	Circular / Single	45	Unlikely	None	Medium	None	Heavy Pipe End Corrision
SSOF_007	Moat	6/30/2022	9:00:00 AM	Eason	Woods	74	0	2.04	Residential	PVC 21"	Circular / Single	50	Unlikely	None	Low	Algae Groth	
SSOF_032	Moat	6/30/2022	9:15:00 AM	Eason	Woods	75	0	2.05	Commercial / Industrial	PVC 6"	Circular / Single	0	Unlikely	Trickle	Low	None	
SSOF_033	Moat	6/30/2022	9:35:00 AM	Eason	Woods	75	0	2.14	Residential	CMP 21"	Circular / Single	0	Unlikely	None	High	None	Wall failure due to discharge erosion
SSOF_009	Moat	6/30/2022	9:45:00 AM	Eason	Woods	75	0	2.20	Open Space / Industrial	HDPE 24"	Circular / Single	20	Unlikely	None	Low	Mollusk / Algae	Mollusk inudating inside bottom of pipe
SSOF_044	Moat	6/30/2022	9:50:00 AM	Woods	Woods	76	0	2.22	Commercial / Industrial	HDPE 18"	Circular / Single / Check Valve	0	Unlikely	None	Low	None	Mollusk growth
SSOF_045	Moat	6/30/2022	10:15:00 AM	Woods	Woods	77	0	2.27	Residential / Commercial / Industrial	Cast Iron 8"	Circular / Single	0	Unlikely	Trickle	Medium	None	Flow from Building AC Condensation. Linear crack from nine end to wall: 2" at widest

2022 Outfall Inspection Report


Outfall ID	Receiving Water	Date	Time	Investigators	Form Completed By	Temperature	Rainfall 24 Hrs	Tide Elevation (+/- ft)	Land Use in Drainage Area	Material & Diameter	Shape & Configuration	Submerged %	Illicit Discharge	Flow	Prioritization	Growth	Notes
SSOF_015	Moat	6/30/2022	10:20:00 AM	Eason	Woods	77	0	2.29	Open Space	CMP 21"	Circular / Single	0	Unlikely	None	Medium	None	Bottom end corroded away causing wall damage
SSOF_016	Moat	6/30/2022	10:30:00 AM	Eason	Woods	77	0	2.27	Residential	PVC 12"	Circular / Single / Check Valve	0	Unlikely	None	Low	None	
SSOF_046	Moat	6/30/2022	10:30:00 AM	Woods	Woods	77	0	2.27	Residential / Commercial	HDPE 12"	Circular / Single / Check Valve	1	Unlikely	None	Low	None	
SSOF_047	Moat	6/30/2022	10:40:00 AM	Woods	Woods	78	0	2.29	Residential	PVC 18"	Circular / Single / Check Valve	0	Unlikely	None	Low	None	
SSOF_017	Moat	6/30/2022	10:42:00 AM	Eason	Woods	78	0	2.30	Residential / Open Space	CMP 21"	Circular / Single	0	Unlikely	None	High	None	Wall collapsing on and deforming pipe. Heavy Corrosion
SSOF_018	Moat	6/30/2022	11:30:00 AM	Eason	Woods	80	0	2.26	Commercial / Industrial	CMP 18"	Circular / Single	25	Unlikely	None	Low	Mollusk / Algae	Mollusk inudating inside bottom of pipe
SSOF_049	Moat	6/30/2022	11:35:00 AM	Woods	Woods	80	0	2.24	Residential	PVC 21"	Circular / Single	1	Unlikely	None	Medium	None	Broken Pipe End. Gap between pipe and wall
SSOF_050	Moat	6/30/2022	12:38:00 PM	Woods	Woods	83	0	1.87	Residential	VCP 8"	Circular / Single	0	Unlikely	None	Medium	None	Erosion around Pipe Seal & Heavy Erosion Above and Behind Wall
SSOF_022	Moat	6/30/2022	12:45:00 PM	Eason	Woods	83	0	1.80	Residential	PVC 12"	Circular / Single / Check Valve	0	Unlikely	None	Low	None	
SSOF_051	Moat	6/30/2022	1:15:00 PM	Woods	Woods	84	0	1.57	Residential / Commercial	Cast Iron 24" x 24"	Square / Single	1	Unlikely	None	Low	None	Minor Corrosion
SSOF_030	Moat	6/30/2022	1:20:00 PM	Eason	Woods	84	0	1.50	Residential	VCP 6"	Circular / Single	0	Unlikely	None	Low	None	
SSOF_043	Chesapeake Bay	6/30/2022	1:20:00 PM	Woods	Woods	84	0	1.50	Open Space	HDPE 12"	Circular / Single / Check Valve	0	Unlikely	None	High	None	Tideflex valve missing
SSOF_031	Moat	6/30/2022	1:35:00 PM	Eason	Woods	85	0	1.38	Residential	VCP 6"	Circular / Single	0	Unlikely	None	Low	None	
SSOF_055	Moat	6/30/2022	1:45:00 PM	Eason	Woods	85	0	1.26	Open Space		Circular / Single	1	Unlikely	None	Low	None	Bottom Corrosion
SSOF_056	Moat	6/30/2022	2:00:00 PM	Eason	Woods	87	0	1.14	Open Space	RCP	Circular / Single	1	Unlikely	None	Low	None	Cracked Top
SSOF_057	Moat	6/30/2022	2:15:00 PM	Eason	Woods	87	0	1.00	Open Space	PVC 12"	Circular / Single	0	Unlikely	None	Low	None	PVC Extends for approx. 2' then Connects to 10" Cast Iron Pipe. Leaf Litter Build Up In Pipe
SSOF_058	Moat	6/30/2022	2:25:00 PM	Eason	Woods	87	0	0.91	Residential	Cast Iron 6"	Circular / Single	0	Unlikely	None	Low	None	
SSOF_059	Moat	6/30/2022	2:37:00 PM	Eason	Woods	87	0	0.81	Residential	CMP 26"	Circular / Single	0	Unlikely	None	Low	None	Corrosion. Appears to be Abandoned.
SSOF_061	Moat	6/30/2022	2:47:00 PM	Eason	Woods	88	0	0.77	Residential	VCP 6"	Circular / Single	0	Unlikely	None	Low	None	Appears to be Abandoned.
SSOF_062	Moat	6/30/2022	3:05:00 PM	Eason	Woods	89	0	0.62	Open Space	VCP 6"	Circular / Single	0	Unlikely	None	Medium	None	Appears to be Abandoned.

Appendix F: Fort Monroe Nutrient Management Plan and Map

Fort Monroe, VA

Turf Applications Area Map

Legend

 Areas of Application

Google Earth

1000 ft

N



Matthew J. Strickler
Secretary of Natural Resources

Clyde E. Cristman
Director



Rochelle Altholz
Deputy Director of
Administration and Finance

Russell W. Baxter
Deputy Director of
Dam Safety & Floodplain
Management and Soil & Water
Conservation

Thomas L. Smith
Deputy Director of Operations

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

Samantha Henderson
Fort Monroe Authority
20 Ingalls Road
Fort Monroe, VA 23651

3/1/2018

Subject: Fort Monroe Authority Nutrient Management Plan Approval

The following nutrient management plan has been reviewed by Chantel Wilson and approved by the Virginia Department of Conservation & Recreation as compliant with the provisions of the Code of Virginia 10.1-104.4. Please note that this plan has not been reviewed for compliance with more restrictive requirements from other specific legislative, regulatory or incentive programs.

Plan Name	Planner	Acres	Start Date	Expiration Date
Fort Monroe Authority	Angela C. Whitehead	46	2/7/2018	2/7/2021

A copy of this letter should be kept with your nutrient management plan. Initiation of plan revision is recommended by the Department to occur at least six months prior to the expiration date. If you have any questions concerning this letter or approvals, please contact me via phone or email.

Sincerely,

A handwritten signature in blue ink, appearing to read "Chantel Wilson".

Chantel Wilson
Urban Nutrient Management Specialist
Department of Conservation and Recreation
600 East Main St., 24th Floor
Richmond, Virginia 23219
(804) 887-8917
chantel.wilson@dcr.virginia.gov

Nutrient Management Plan

Prepared For:

Fort Monroe Authority
Building 83
20 Ingalls Rd.
Fort Monroe, VA 23651

Prepared By:

Angela C. Whitehead
Soil Horizons, LLC
300 Buford Rd.
Williamsburg, VA 23188
804-892-6678
soilmapper@yahoo.com
Certification Code: # 386

Acreage: 46

County: City of Hampton
Watershed: JL58

Plan Written: 2/7/18

Plan Expires: 2/7/21

Planner Signature



The purpose of this Nutrient Management Plan is to ensure minimum movement of nitrogen and phosphorus from the specified area of application to surface and groundwater where they can potentially have a detrimental effect on water quality as well as ensuring that plants have optimum soil nutrient availability for good productivity and quality. By following this soil test based plan you are helping to protect local waters and the Chesapeake Bay.

If you have questions, please contact your plan writer, local Virginia Cooperative Extension Agent, or the Department of Conservation and Recreation Nutrient Management Program.



Nutrient Management Plan for:		
Fort Monroe Authority		
Superintendent Information		
Project Name	Fort Monroe Authority	
Project Contact	Samantha Henderson	
Mailing Address	20 Ingalls Rd.	
City State Zip	Fort Monroe, VA 23651	
Phone	757-637-7778	
Fax		
Email	shenderson@fmauthority.com	
Planner Information		
Planner Name	Angela C. Whitehead	
Mailing Address	Soil Horizons LLC, 300 Buford Rd.	
City State Zip	Williamsburg, VA 23188	
Phone	804-892-6678	
Fax		
Email	soilmapper@yahoo.com	
Certification Code	386	
Location Information		
Physical Address	20 Ingalls Rd.	
City State Zip	Fort Monroe, VA 23651	
<u>VAHU6 Watershed Code</u>	JL58	
County	City of Hampton	
Acreage		
Total	46	
Plan Start Date	2/7/18	
Plan End Date	2/7/21	

Table of Contents

1. Site Description and Supporting Information	4
A. Management Area Description	4
Site Map A–Location Map	5
Site Map B–FMA Usage Zones	6
Site Map C–Fertilizer Application Areas	7
B. Fertilization Season	8
C. Environmentally Sensitive Sites	8
2. Soil Test Summary and Results	9
A. Fort Monroe Authority Turf, 46.0 acres	9
3. Summary of Recommended Annual Nitrogen, Phosphorous, and Potassium Application	10
A. Fertilizer Recommendations Summary: Fort Monroe Authority Turf, 46.0 acres	10
B. Recommended Monthly Fertilizer Application: Fort Monroe Authority Turf, 46.0 acres	10
4. Fertilizer Application Record	11
5. Virginia Nutrient Management Standards and Criteria, Revised July 2014	12
VI. Turfgrass Nutrient Recommendations	12
6. Soil Reports	16

The Fort Monroe Authority Department agrees to comply with all requirements set forth in the Nutrient Management Training and Certification Regulations, 4 VAC 50-85 et seq., and to follow recommendations for turf fertilization and management as described in the Virginia Nutrient Management Standards and Criteria, Revised July 2014. This includes implementing the Department of Conservation and Recreation's approved Nutrient Management Plan and maintaining fertilization records. All nutrient applications performed by Fort Monroe Authority staff shall comply with the provisions of this Nutrient Management Plan as of February 7, 2018.

1. Site Description and Supporting Information

Fort Monroe's current boundaries encompass approximately 565 acres, including 110 acres of submerged lands and 85 acres of wetlands. The namesake stone fort was begun in 1818 and presently there are approximately 150 buildings, sites, structures, and objects contributing to the Fort Monroe National Historic Landmark (NHL) District. Fort Monroe served as the headquarters for the US Army Training and Doctrine Command. In 2011, Fort Monroe was deactivated as an active military base. The Fort Monroe Authority (FMA) was created to preserve, protect, and manage Fort Monroe and Old Point Comfort after the base closure. Approximately half of Fort Monroe was designated a National Monument on November 1, 2011 and is to be managed by the National Park Service (NPS). In 2013, the US Army quitclaimed a majority of the property to the Commonwealth of Virginia.

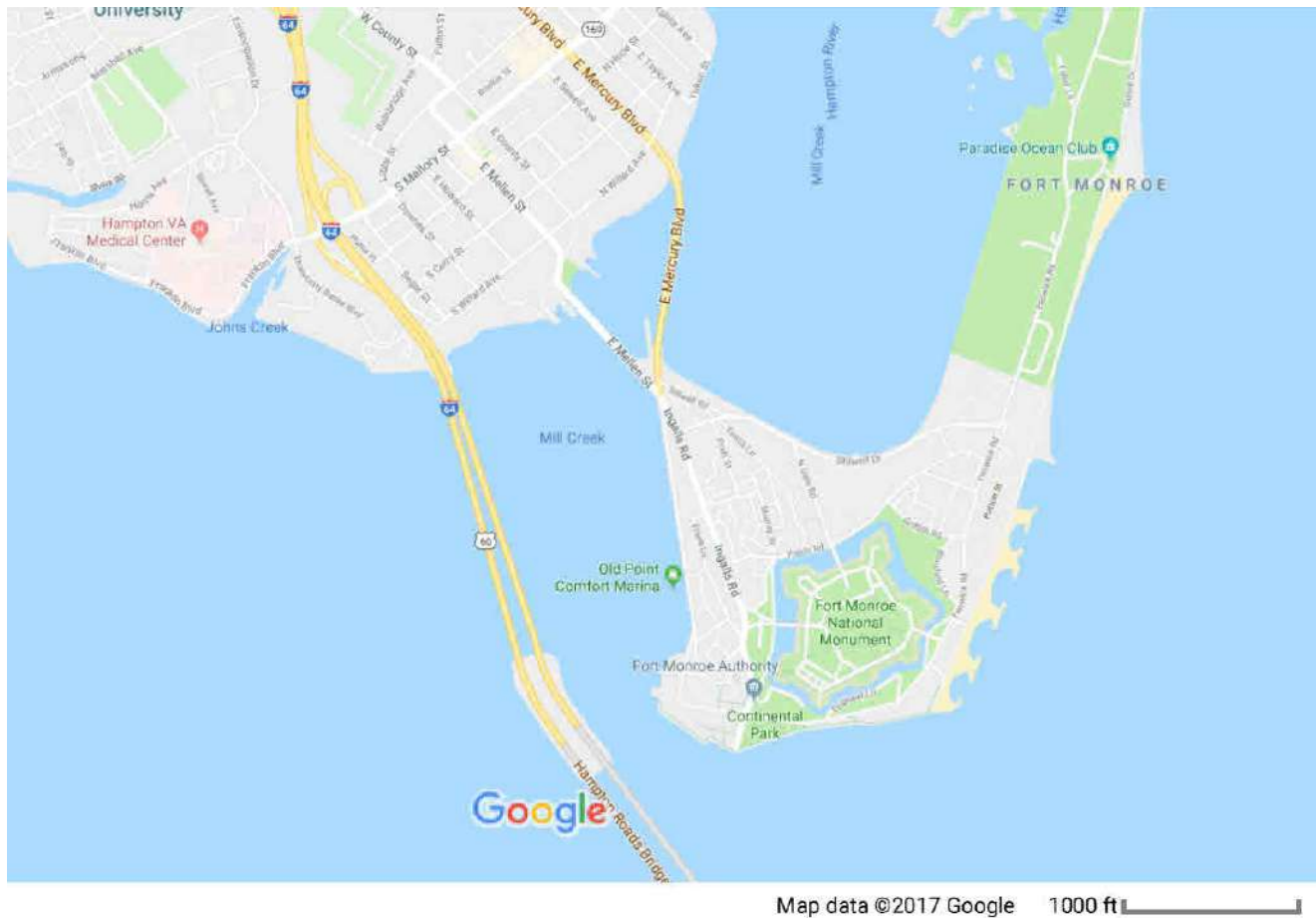
A. Management Area Description

Fort Monroe is located in Hampton, Virginia—at Old Point Comfort, the southern tip of the Virginia Peninsula. From Interstate 64 (exit 268) access to Fort Monroe is gained via E. Mellen Street or E. Mercury Boulevard. Fort Monroe is bound by the Chesapeake Bay to the east and Mill Creek/Hampton River to the west. Fort Monroe is located within the Hampton Roads/Hampton River watershed. (Site Map A)

Fort Monroe is divided into five usage zones: Historic Village, Inner Fort, North Gate, Wherry Quarter, and the Park and Recreation Area (Site Map B). A commercial lawncare company uniformly maintains 46 acres of predominately warm season turfgrass within the non-residential portions of the Historic Village (20 acres), Inner Fort (9.5 acres), North Gate (7.5 acres), and Wherry Quarter (9 acres). (Site Map C) Small areas of cool season turf are included in the management area acreage, typically occurring in shaded locations, but are managed to encourage warm season establishment and growth. Landscape beds are located throughout each zone. These landscape beds do not receive any additional nutrients aside from what is applied to the adjacent turf. The Fort Monroe grounds are less intensively managed, receiving only one annual fertilization application. Within the boundaries of Ft. Monroe, turf areas are maintained that do not receive fertilization or irrigation. The unfertilized portions of Ft. Monroe are not included in this plan. Additionally, areas owned by NPS and the Parks and Recreation zone are excluded from this plan.

Municipal water provides the primary source of irrigation water for turfgrass irrigated around Buildings 138, 83, 119, and Continental Park down to the fishing pier. All additional turfgrass areas are non-irrigated.

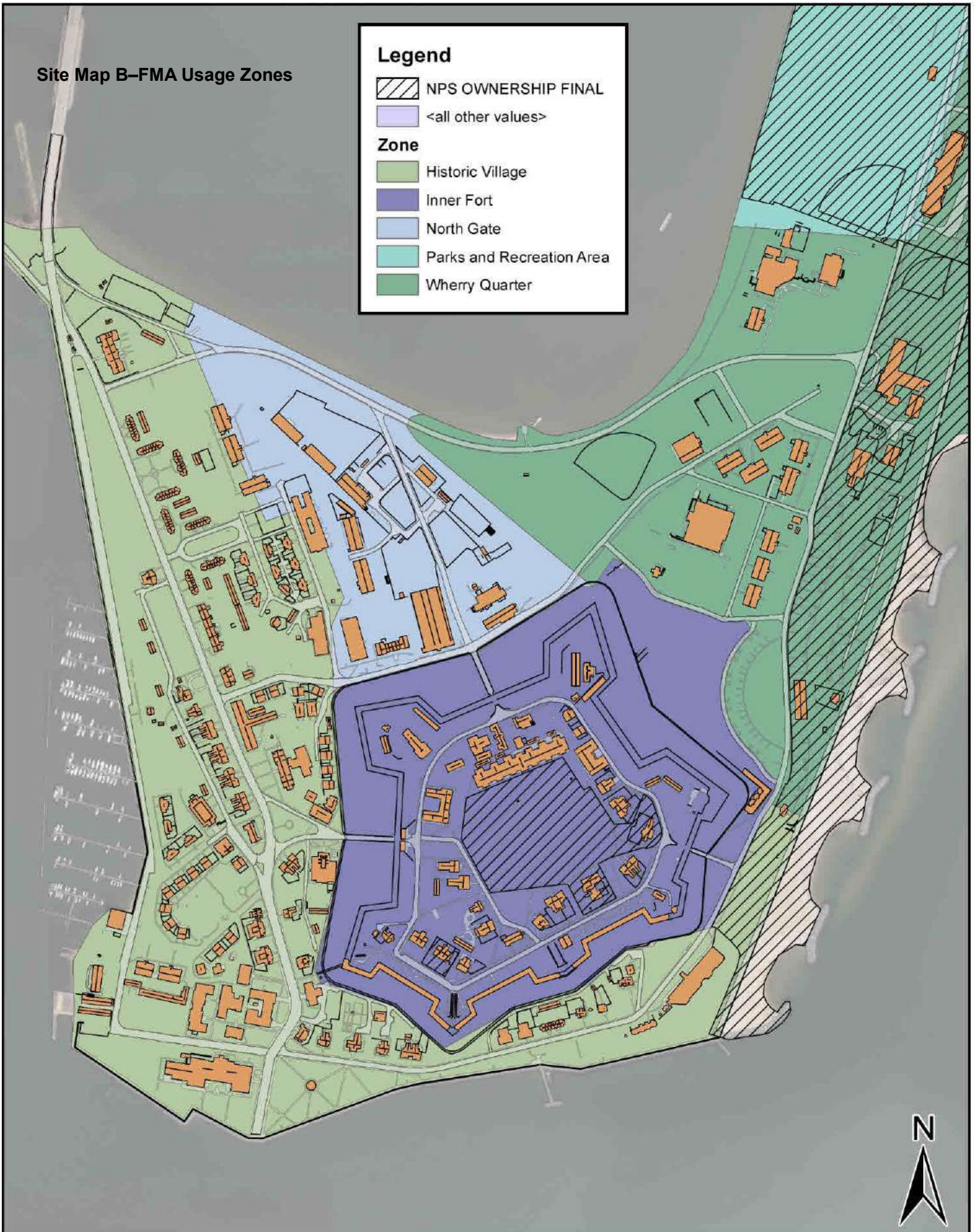
Site Map A–Location Map



Site Map B-FMA Usage Zones

Legend



-  NPS OWNERSHIP FINAL
-  <all other values>
- Zone**
-  Historic Village
-  Inner Fort
-  North Gate
-  Parks and Recreation Area
-  Wherry Quarter



Site Map C—Fertilizer Application Areas



Legend

-  Buildings with Irrigation
-  Areas of Nutrient Application



0 300 600 1,200 Feet

1 inch = 650 feet

FORT MONROE
—Where Freedom Lives—

B. Fertilization Season

The recommended nutrient management application season for nitrogen fertilizers to cool season turfgrasses begins six weeks prior to the last spring average killing frost date and ends six weeks past the first fall average killing frost date. The acceptable nitrogen fertilizer application season for non-overseeded warm season turfgrass begins no earlier than the last spring average killing frost date and ends no later than one month prior to the first fall average killing frost date.

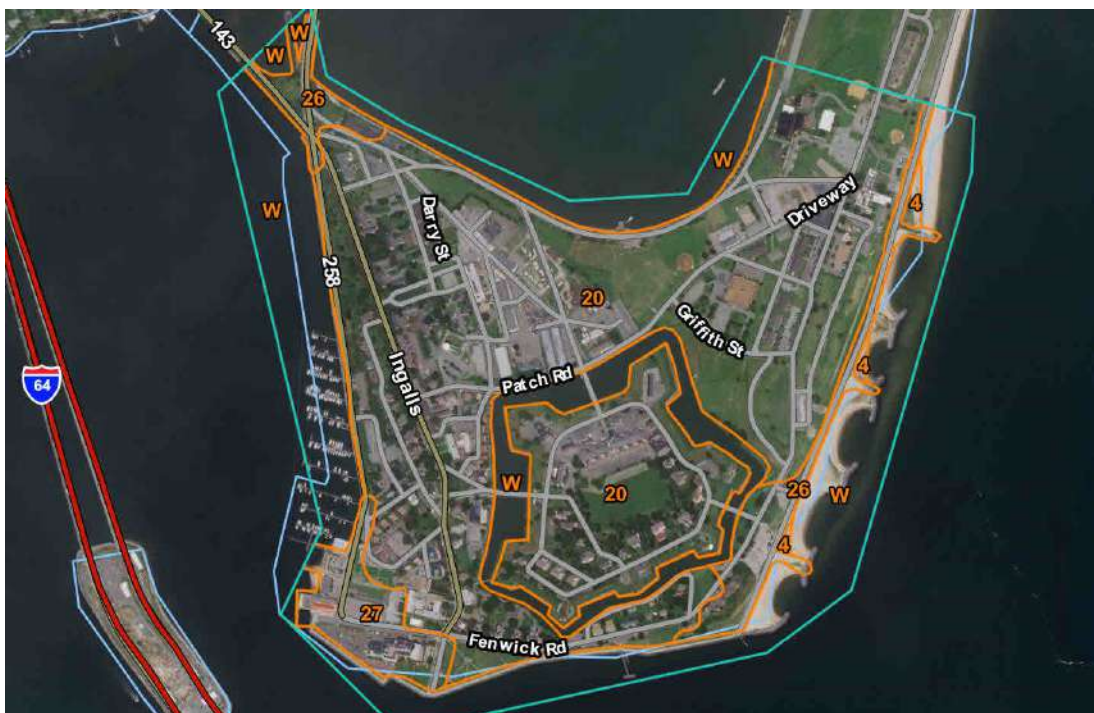
	Killing Frost Dates	Cool Season Applications	Warm Season Applications
Spring	April 4	February 21	April 4
Fall	November 6	December 18	October 9

C. Environmentally Sensitive Sites

An environmentally sensitive site is any area which is particularly susceptible to nutrient loss to groundwater or surface water since it contains or drains to areas which contain sinkholes, or where at least 33% of the area in a specific management area contains one or any combination of the following features:

1. Soils with high potential for leaching based on soil texture or excessive drainage;
2. Shallow soils less than 41 inches deep likely to be located over fractured or limestone bedrock;
3. Subsurface tile drains;
4. Soils with high potential for subsurface lateral flow based on soil texture and poor drainage;
5. Floodplains as identified by soils prone to frequent flooding in county soil surveys; or
6. Lands with slopes greater than 15%

The majority of the grounds is mapped as Seabrook – Urban Land complex (20) or Urban Land (27). Soils of the Seabrook series are very deep and moderately well drained with rapidly permeable subsoils. They formed in materials weathered from sandy marine and fluvial sediments. Special attention should be given to the timing of fertilizer applications prior to heavy rainfall to avoid nutrient loss due to leaching.



2. Soil Test Summary and Results

Soil samples were taken from fertilized turf areas. Each composite sample consisted of several sub-samples from the upper 4 inches of soil. These sub-samples were taken in a random manner to minimize the variability that is present in the sampling area. Sub-samples were thoroughly mixed, breaking apart clumps and removing all foreign matter such as roots, stalks, rocks, etc.

Soil samples were analyzed by Waypoint Analytical. Standard soil test results provide values for pH, Calculated Cation Exchange Capacity, Phosphorous, Calcium, Magnesium, Potassium, Copper, Iron, Boron, Manganese, and Calculated Cation Saturation. The soil samples collected are valid for the life of this plan (three years) or upon a major renovation or redesign of the campus grounds, whichever occurs sooner.

A. Fort Monroe Authority Turf, 46.0 acres

Customer Name: **Fort Monroe Authority**
Testing Lab: **Waypoint Analytical**
Sample Date: **12/6/17**
Planner Name, Cert. #: **Angela C. Whitehead, #386**

Area	Soil pH	Buffer pH	Lab P (ppm)	VT P (ppm)	VT (H/M/L)	P ₂ O ₅ Needs (lbs/1000ft ²)	Lab K (ppm)	VT K (ppm)	VT (H/M/L)	K ₂ O Needs (lbs/1000ft ²)
1 Inner Fort	5.8	6.82	108	46	H+		60	43	M-	
2 North Gate	7.0		68	28	H		67	48	M-	
3 Wherry Qtr.	6.3		77	32	H		77	55	M	
4 Historic Village	6.6		105	45	H+		67	48	M-	
REC:			90	38	H	0.75	68	48	M-	2.0

- Soil pH measured between 5.8 – 7.0. Additions of limestone are recommended at a rate of 45 lbs/1000ft² for Inner Fort turfgrass.
- Potassium levels averaged in the moderate - range. **Potash applications are recommended at a rate of 2.0 lbs/1000ft² annually.**
- Phosphorus levels averaged in the high range. **Phosphorous applications are recommended at a rate of 0.75 lbs/1000ft² annually.**
- **Nitrogen applications may not exceed 3.5 lbs/1000ft² annually to all less intensively managed turf areas.**

3. Summary of Recommended Annual Nitrogen, Phosphorous, and Potassium Application

The following tables provide nutrient recommendations that allow managers flexibility in selecting fertilizer products that best fit their management program. Fertilizer products and/or analysis are not specified and doing so may constrain the manager. Monthly fertilization programs are included to demonstrate the frequency and timing of nutrient applications that comply with Virginia Nutrient Management Standards and Criteria, Revised July 2014. If Class B Biosolids or raw manure is applied, the plan must be revised to meet the conditions of the Virginia Department of Environmental Quality permit.

A. Fertilizer Recommendations Summary: Fort Monroe Authority Turf, 46.0 acres

Area	Annual Lime Needs (lbs/1000ft ²)	Annual N Needs (lbs/1000ft ²) ^a	Max. Total N Rate per application (lbs/1000ft ²) ^{b, c}	Annual P ₂ O ₅ Needs (lbs/1000ft ²)	Annual K ₂ O Needs (lbs/1000ft ²)
Fort Monroe fertilized turf	45 (Inner Fort)	3.5	0.70 (min. 30 days)	0.75	2.0

^a Cool Season: Do not apply N between December 19 and February 20 or when the ground is frozen. Warm Season: Do not apply N between October 10 and April 3 or during periods of drought.

^b 100% Water Soluble N (WSN) Fertilizer

^c A maximum application rate of 0.9 lb/1000 ft² of total N (cool season) or 1.0 lb/1,000 ft² of total N (warm season) may be applied using slowly available forms of N with a minimum of 30 days between applications.

B. Recommended Monthly Fertilizer Application: Fort Monroe Authority Turf, 46.0 acres

	N ^{a, b, c} – P ₂ O ₅ – K ₂ O (lbs/1000ft ²) 2017-2020									
Area	Feb 21-Mar	April	May	June	July	August	Sept	Oct	Nov-Dec 18	Annual Need ^d
										N ^{a, b} P K
Fort Monroe fertilized turf			0.7 – 0.75 – 2.0							0.7 0.75 2.0

^a See Table 4A and Section 6 for N Rate Guidelines

^b A maximum application rate of 0.9 lb/1000 ft² of total N (cool season) or 1.0 lb/1,000 ft² of total N (warm season) may be applied using slowly available forms of N with a minimum of 30 days between applications.

^c **Do not apply more than 0.7 pounds of water soluble nitrogen per 1000 ft² within a 30 day period.**

^d N and P₂O₅ applications may not exceed the Annual Need. Additional K₂O may be made annually to increase plant vigor and relieve traffic stress on damaged turf during times of extreme use.

4. Fertilizer Application Record

Customer Information					Management Area Information			
Name: Fort Monroe Authority					Management Area ID:			
Address: 20 Ingalls Rd.					Management Area Size:			
Fort Monroe, VA 23651					Plant Species:			
					Notes:			
Phone #: 757-637-7778								
Date (M/D/Y)	Supervisor/Applicator	Weather Conditions: Temp/Wind/Precip			Fertilizer Analysis	Rate	Amount Fertilizer Used	Application Equipment Used

5. Virginia Nutrient Management Standards and Criteria, Revised July 2014

VI. Turfgrass Nutrient Recommendations

Definitions

For the purposes of this section, the following definitions, as presented by the Association of American Plant Food Control Officials (AAPFCO), apply:

“Enhanced efficiency fertilizer” describes fertilizer products with characteristics that allow increased plant nutrient availability and reduce the potential of nutrient losses to the environment when compared to an appropriate reference product.

“Slow or controlled release fertilizer” means a fertilizer containing a plant nutrient in a form which delays its availability for plant uptake and use after application, or which extends its availability to the plant significantly longer than a reference “rapidly available nutrient fertilizer” such as ammonium nitrate, urea, ammonium phosphate or potassium chloride. A slow or controlled release fertilizer must contain a minimum of 15 percent slowly available forms of nitrogen.

“Water soluble nitrogen”, “WSN”, or “readily available nitrogen” means: Water soluble nitrogen in either ammonical, urea, or nitrate form that does not have a controlled release or slow response.

Nitrogen Application Guidelines

A nitrogen fertilization schedule weighted toward fall application is recommended and preferred for agronomic quality and persistence of cool season turfgrass; however, the acceptable window of applications is much wider than this for nutrient management. ***The nutrient management recommended application season for nitrogen fertilizers to cool season turfgrasses begins six weeks prior to the last spring average killing frost date and ends six weeks past the first fall average killing frost date.*** Applications of nitrogen during the intervening late fall and winter period should be avoided due to higher potential leaching or runoff risk, but where necessary, apply no more than 0.5 pounds per 1,000 ft² of water soluble nitrogen within a 30 day period. Higher application rates may be used during this late fall and winter period by using materials containing slowly available sources of nitrogen, if the water soluble nitrogen contained in the fertilizer does not exceed the recommended maximum of 0.5 pounds per 1,000 ft² rate. Do not apply nitrogen or phosphorus fertilizers when the ground is frozen.

The acceptable nitrogen fertilizer application season for non-overseeded warm season turfgrass begins no earlier than the last spring average killing frost date and ends no later than one month prior to the first fall average killing frost date.

Per Application Rates

Do not apply more than 0.7 pounds of water soluble nitrogen per 1,000 ft² within a 30 day period. For cool season grasses, do not apply more than 0.9 pounds of total nitrogen per 1,000 ft² within a 30-day period. For warm season grasses, do not apply more than 1.0 pounds of total nitrogen per 1,000 ft² within a 30-day period. Lower per application rates of water soluble nitrogen sources or use of slowly available nitrogen sources should be utilized on very permeable sandy soils, shallow soils over fractured bedrock, or areas near water wells.

Annual Application Rates for Home Lawns and Commercial Turf

Up to 3.5 pounds per 1,000 ft² of nitrogen may be applied annually to cool season grass species or up to 4 pounds per 1,000 ft² may be applied annually to warm season grass species using 100 percent water soluble nitrogen sources. Lower rates of nitrogen application may be desirable on those mature stands of grasses that require less nitrogen for long-term quality. As a result, lower application rates will probably be more suited to the fine leaf fescues (hard fescue, chewings fescue, creeping red fescue, and sheep fescue) and non-overseeded zoysiagrass. Lower rates should also be used on less intensively managed areas.

For warm season grasses, up to 0.7 lb/1,000 ft² of nitrogen may be applied in the Fall after perennial ryegrass overseeding is well established. An additional N application of 0.5 lb/1,000ft² may be made in February-March to overseeded perennial ryegrass if growth and color indicate need. Applications using WSN may not exceed 0.7 lb/1,000ft² within a 30 day period.

Use of Slowly Available Forms of Nitrogen

For slow or controlled release fertilizer sources, or enhanced efficiency fertilizer sources, no more than 0.9 pounds of nitrogen per 1,000 ft² may be applied to cool season grasses within a 30-day period and no more than 1.0 pounds of nitrogen per 1,000 ft² may be applied to warm season grasses within a 30-day period.

Provided the fertilizer label guarantees that the product can be used in such a way that it will not release more than 0.7 pounds of nitrogen per 1,000 ft² in a 30-day period, no more than 2.5 pounds of nitrogen per 1,000 ft² may be applied in a single application. Additionally, total annual applications shall not exceed 80 percent of the annual nitrogen rates for cool or warm season grasses.

Nitrogen Timing

The beginning and ending dates for application of nitrogen shall be determined using guidance and frost date maps contained in the Season of Application for Nitrogen section, Figures 6-1 and 6-2 (pg 96).

If the full rate or the highest rate of the recommendation range for a monthly application is applied in a single application, then the interval of application for nitrogen shall be at least 30 days to allow turf to utilize previous nitrogen applications. If several applications are to be made for the monthly nitrogen rate, then the timing of the applications shall be at approximately even intervals, with the rate per application to be evenly divided between each application with the total nitrogen applied not to exceed the maximum monthly rate. Use of Water Insoluble Nitrogen forms of nitrogen is encouraged.

Phosphorus and Potassium Recommendations for Established Turf

Apply phosphorus (P₂O₅) and potassium (K₂O) fertilizers as indicated by a soil test using the following guidelines:

Soil Test (VT) Rating	P ₂ O ₅ lb/1000 ft ²	K ₂ O lb/1000 ft ²
L-	3	3
L	2.5	2.5
L+	2	2
M-	2	2
M	1.5	1.5
M+	1	1
H-	1	1
H	0.75	0.75
H+	0.5	0.5
VH	0	0

Avoid the general use of high phosphorus ratio fertilizers such as 10-10-10 or 5-10-10, unless soil tests indicate phosphorus availability below the M+ level.

Recommendations for Establishment of Turf

These recommendations are for timely planted turfgrass, that is, the seed or vegetative material (sod, plugs, and/or sprigs), are planted at a time of the year when temperatures and moisture are adequate to maximize turfgrass establishment. These recommended establishment periods would be late summer to early fall for cool-season turfgrasses and late spring through mid-summer for warm-season turfgrasses.

Nitrogen Application for Establishment of Turf

At the time of establishment, apply no more than 0.9 pounds per 1,000 ft² of total nitrogen for cool season grasses or 1.0 pounds per 1,000 ft² of total nitrogen for warm season grasses, using a material containing slowly available forms of nitrogen, followed by one or two applications beginning 30 days after planting, not to exceed a total of 1.8 pounds per 1,000 ft² total for cool season grasses and 2.0 pounds per 1,000 ft² for warm season grasses for the establishment period. Applications of WSN cannot exceed more than 0.7 pounds per 1,000 ft² within a 30-day period.

Sod Installations:

Site preparation should include a soil test, which can be done several months before the project begins in order to have time to get test results back. Phosphorus, potassium and lime applications should be based on soil test analysis to increase the likelihood of a successful installation. Shallow incorporation of material into the top 2 inches of the soil is preferred prior to sod installation, especially if lime is required.

No more than 0.7 lb of WSN/1,000 ft² should be applied before sod is installed. Alternatively, using a slowly available forms of nitrogen, 0.9 lb N/1000 ft² for cool season grasses or 1 lb of N/1000 ft² for warm season grasses may be applied before sod installation.

After installation apply adequate amounts of water to maintain sufficient soil moisture (i.e. to prevent visible wilt symptoms). Excessive water will limit initial root development. After roots begin to establish (as verified by lightly tugging on the sod pieces), shift irrigation strategy to a deep and infrequent program in order to encourage deep root growth. Apply approximately 1 inch of water per week (either by rainfall or irrigation), making sure that the water is being accepted by the soil profile without running off. This will insure thorough wetting of the soil profile.

After sod has completed rooting and is well established, initiate the normal nitrogen management program as described for the appropriate use shall be recommended.

Phosphorus and Potassium Recommendations for Establishment of Turf

Soil Test (VT) Rating	P ₂ O ₅ lb/1000 ft ²	K ₂ O lb/1000 ft ²
L-	4	3
L	3.5	2.5
L+	3	2
M-	3	2
M	2.5	1.5
M+	2	1
H-	2	1
H	1.5	0.75
H+	1	0.5
VH	0	0

Other Turf Management Considerations for State-owned Lands**Lime Recommendations**

Lime should be recommended based on a soil test to maintain soil pH within an agronomic range for turfgrass.

For new seedings where lime is recommended, incorporate the lime into the topsoil for best results.

Returning Grass Clippings

Recycling of clippings on turf should be encouraged as an effective means of recycling nitrogen, phosphorus, and potassium. Proper mowing practices that ensure no more than 1/3 of the leaf blade is removed in any cutting event will enhance turf appearance and performance when clippings are returned. Return all leaf clippings from mowing events to the turf rather than discharging them onto sidewalks or streets. Rotary mulching mowers can further enhance clipping recycling by reducing the size of clippings being returned to the turfgrass canopy.

Management of Collected Clippings

If clippings are collected they should be disposed of properly. They may be composted or spread uniformly as a thin layer over other turf areas or areas where the nutrient content of the clippings can be recycled through actively growing plants. They should not be blown onto impervious surfaces or surface waters, dumped down stormwater drains, or piled outside where rainwater will leach out the nutrients creating the potential for nutrient loss to the environment.

Use of Iron

Foliar iron supplements may be used to stimulate a greening effect on the turfgrass as an alternative to additional applications of nitrogen. These applications are most beneficial if applied in late spring through summer for cool season grasses and in late summer through fall for warm-season grasses.

Impervious Surfaces

Do not apply fertilizers containing nitrogen or phosphorus to impervious surfaces (sidewalks, streets, etc.). DO NOT use urea as an ice melting substance in cold weather. Remove any granular materials that land on impervious surfaces by sweeping and collecting, and either put the collected material back in the bag, or spread it onto the turf and/or use a leaf blower etc., to return the fertilizer back to the turfgrass canopy.

Environmentally Sensitive Areas

Avoid fertilizer applications within 15 feet of waterways. This setback is reduced to 10 feet if a drop spreader, rotary spreader with deflector or targeted spray liquid is used to apply the fertilizer. The use of fertilizers with slow release nitrogen is greatly encouraged, especially where there is any reason to suspect environmental concerns.

Recordkeeping requirements and reporting for the application of fertilizer (2VAC5-405-100)

State-owned lands subject to this regulation shall maintain records of each application of fertilizer to non-agricultural land for at least three years following the application. These records shall be available for inspection. Each record shall contain the:

1. Name, mailing address of the application site;
2. Name of the person making or supervising the application;
3. Day, month, and year of application;
4. Weather conditions at the start of the application;
5. Acreage, area, square footage, or plants treated;
6. Analysis of fertilizer applied;
7. Amount of fertilizer used, by weight or volume; and
8. Type of application equipment used.

Spreader Calibration

Spreaders and boom sprayers must be properly calibrated if they are to deliver fertilizers and pesticides to turf at correct rates. If calibration is done incorrectly, the product may be misapplied and either too much or too little of the product will reach the turf. Sprayers and spreaders should be calibrated at first use and every fourth application. Spreaders and sprayers be calibrated in several ways. Refer to the following publication for detailed instructions:

[www.turfgrass.ncsu.edu/Articles/admin/2008/Calibration_of_Turfgrass_Boom_Sprayers_and_Spreaders_\(AG-628\).pdf](http://www.turfgrass.ncsu.edu/Articles/admin/2008/Calibration_of_Turfgrass_Boom_Sprayers_and_Spreaders_(AG-628).pdf)

6. Soil Reports



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

Send To: SOIL HORIZONS
300 BUFORD RD
WILLIAMSBURG VA 23188

"Every acre...Every year."™

Grower: Ft. Monroe Authority
20 Ingalls Rd
Ft. Monroe, Va 23651

SOIL ANALYSIS REPORT

Analytical Method(s): SMP Buffer pH Mehlich 3 Loss On Ignition Water pH

Date Received: 12/05/2017 Date Of Analysis: 12/06/2017 Date Of Report: 12/06/2017

Sample ID Field ID	Lab Number	OM	W/V	ENR	Phosphorus			Potassium	Magnesium	Calcium	Sodium	pH		Acidity	C.E.C
		% Rate	Soil Class	lbs/A	M3 ppm Rate	ppm Rate	ppm Rate	K ppm Rate	Mg ppm Rate	Ca ppm Rate	Na ppm Rate	Soil pH	Buffer Index	H meq/100g	meq/100g
1 InnerFt	11532	4.1 M		124	108 VH			60 L	107 H	738 M		5.8	6.82	1.1	5.8
2 NGate	11533	3.6 M		111	68 H			67 L	94 L	1372 VH		7.0		0.0	7.8
3 WherryQtr	11534	3.4 M		109	77 H			77 L	108 M	928 H		6.3		0.7	6.4
4 HistVillage	11535	4.2 M		124	105 VH			67 L	121 M	1135 H		6.6		0.4	7.3

Sample ID Field ID	Percent Base Saturation					Nitrate	Sulfur	Zinc	Manganese	Iron	Copper	Boron	Soluble Salts		
	K %	Mg %	Ca %	Na %	H %	NO ₃ N ppm Rate	S ppm Rate	Zn ppm Rate	Mn ppm Rate	Fe ppm Rate	Cu ppm Rate	B ppm Rate	SS ms/cm Rate		
1 InnerFt	2.7	15.4	63.6		19.0										
2 NGate	2.2	10.0	87.9		0.0										
3 WherryQtr	3.1	14.1	72.5		10.9										
4 HistVillage	2.4	13.8	77.7		5.5										

Values on this report represent the plant available nutrients in the soil. Rating after each value: VL (Very Low), L (Low), M (Medium), H (High), VH (Very High). ENR - Estimated Nitrogen Release. C.E.C. - Cation Exchange Capacity.

Explanation of symbols: % (percent), ppm (parts per million), lbs/A (pounds per acre), ms/cm (milli-mhos per centimeter), meq/100g (milli-equivalent per 100 grams). Conversions: ppm x 2 = lbs/A, Soluble Salts ms/cm x 640 = ppm.

This report applies to sample(s) tested. Samples are retained a maximum of thirty days after testing.

Analysis prepared by: Waypoint Analytical Virginia, Inc.

by: *Paucic McGeary*

Paucic McGeary

Appendix G: Memorandum of Agreement for SWIFT

HAMPTON ROADS WATER QUALITY CREDIT AGREEMENT FOR CHESAPEAKE BAY RESTORATION

THIS HAMPTON ROADS WATER QUALITY CREDIT AGREEMENT FOR CHESAPEAKE BAY RESTORATION (this “Agreement”) is made this 29th day of October, 2020, by and between the Hampton Roads Sanitation District, a public body and political subdivision of the Commonwealth of Virginia (“HRSD”), and Fort Monroe Authority, a public body and political subdivision of the Commonwealth of Virginia (“FMA”) (each a “Party” and jointly the “Parties”).

BACKGROUND

A. The HRSD Plants. HRSD owns and operates various wastewater treatment plants that are authorized to discharge the nutrients total nitrogen (“TN”) and total phosphorus (“TP”) as well as sediment as total suspended solids (“TSS”) to the Chesapeake Bay watershed (the “HRSD Plants”). The HRSD Plants have TN, TP and TSS waste load allocations assigned by the State Water Control Board and the Virginia Department of Environmental Quality (jointly, “DEQ”) pursuant to the Water Quality Management Planning Regulation, 9 VAC 25-720, and by the U.S. Environmental Protection Agency (“EPA”) pursuant to the Chesapeake Bay Total Maximum Daily Load (“TMDL”) and related Virginia Watershed Implementation Plan (“WIP”). The HRSD Plants are subject to the General Virginia Pollutant Discharge Elimination System (“VPDES”) Watershed Permit Regulation for TN and TP Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia, 9 VAC 25-820, most recently reissued by DEQ effective February 8, 2017, as hereafter modified or reissued from time to time (the “Watershed General Permit”). Due to exceptional performance and current operating conditions, the HRSD Plants currently discharge less TN, TP and TSS than they are authorized to discharge under the Watershed General Permit while protecting Chesapeake Bay water quality and, therefore, HRSD has the ability to provide TN, TP and TSS credits on at least a temporary basis.

B. The FMA MS4. FMA owns and operates a municipal separate stormwater sewer system (“MS4”) authorized to discharge TN, TP and TSS to the Chesapeake Bay watershed. Like the HRSD Plants, the MS4 is subject to the Chesapeake Bay TMDL as derived from the Virginia WIP. The FMA MS4 is also subject to the General VPDES Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (“MS4 Permit”) issued by DEQ. Pursuant to the TMDL, WIP and MS4 Permit, it is anticipated that FMA will reduce MS4-related TN, TP and TSS discharges pursuant to FMA-developed and DEQ-approved TMDL Action Plans for each of three, five-year permit cycles, which are referred to as the First Bay TMDL Permit Cycle (5% Progress), Second Bay TMDL Permit Cycle (40% Progress), and Third Bay TMDL Permit Cycle (100% Progress). During 2020, FMA is in its Second Bay TMDL Permit Cycle.

C. The SWIFT Project. HRSD’s Sustainable Water Initiative For Tomorrow (“SWIFT”) Project was conceived with multiple benefits in mind for the Hampton Roads region. Aside from TMDL benefits, this innovative water purification project is designed to enhance the sustainability of the long-term groundwater supply and help address other environmental pressures such as sea level rise and saltwater intrusion. The SWIFT Project is intended to achieve these benefits by taking already-treated wastewater that would otherwise be discharged into the Chesapeake Bay watershed, purifying it through additional rounds of advanced water treatment to

meet drinking water standards, and injecting the resulting drinking quality water into the Potomac aquifer deep underground. With respect to TMDL benefits, SWIFT will result in a significant reduction in the total volume of HRSD discharge to the Chesapeake Bay watershed, to achieve greater environmental benefits with corresponding significant reductions of TN, TP and TSS discharges to the Chesapeake Bay watershed.

D. Legal Authority. Pursuant to Virginia Code § 62.1-44.19:21, FMA may acquire and use TN and TP credits for purposes of compliance with the Chesapeake Bay TMDL loading reductions of its MS4 Permit, including credits generated by the HRSD Plants by discharging less TN or TP than permitted under the Watershed General Permit. Pursuant to Virginia Code § 62.1-44.19:21.1, FMA may also acquire and use TSS credits for purposes of compliance with the Chesapeake Bay TMDL loading reductions of its MS4 Permit, including credits generated by the HRSD Plants by discharging less TSS than allocated under the Chesapeake Bay TMDL. With respect to all three parameters, it is recognized that this authority does not limit or otherwise affect the authority of DEQ to establish and enforce more stringent water quality-based effluent limitations in permits where such limitations are necessary to protect local water quality and, further, that the use of water quality credits does not relieve an MS4 permit holder of any requirement to comply with applicable local water quality-based limitations.

E. Redevelopment-Based MS4 TMDL Action Plan. FMA expects to achieve its Chesapeake Bay TMDL reduction goals more cost-effectively by utilizing HRSD-generated TN, TP and TSS credits before and during operation of the SWIFT Project in lieu of stormwater retrofit projects on a condensed 10-year schedule (*i.e.*, Second and Third Bay TMDL Permit Cycles) coupled with ongoing stormwater quality improvements from redevelopment projects, which are subject to TP reduction criteria (and associated TN and TSS reductions) under the applicable water quality design requirements of DEQ's Virginia Stormwater Management Program Regulation, 9VAC25-870-63.A.2. By aligning with the normal redevelopment cycle rather than scheduling retrofits prior to redevelopment activity, FMA's Chesapeake Bay TMDL Action Plan will also conserve scarce state and local resources for other important water quality projects.

F. Credit Trading Premise of SWIFT. For all of the above reasons and others, the ability to generate TN, TP, and TSS credits through the SWIFT Project and apply those credits as progress under MS4 Permits and associated TMDL Action Plans of Hampton Roads governmental entities such as FMA is a fundamental premise for the SWIFT Project. HRSD is proceeding with the SWIFT Project, and FMA is supporting it, in large part based on reliance on these water quality trading-based benefits.

AGREEMENT

NOW, THEREFORE, in consideration of the foregoing premises (hereby incorporated as if fully set forth herein), the mutual covenants and conditions herein, and other good and valuable consideration, the receipt and sufficiency of which HRSD and FMA acknowledge, the Parties hereby agree as follows.

1. Annual Credit Transfers Prior to SWIFT Feasibility Determination. Prior to HRSD's determination of SWIFT Project feasibility as provided below, HRSD shall annually generate and transfer to FMA the quantity of water quality credits needed to meet FMA's

compliance requirements under its DEQ-Approved Chesapeake Bay TMDL Action Plan for its MS4, as provided below. This annual transfer shall be made by HRSD's execution and delivery to FMA of the Annual Water Quality Credit Transfer Form (Attachment B hereto) on or before May 20 immediately following each calendar year of HRSD's credit generation.

a. Determination of Total Reductions Needed. FMA shall determine the total TN, TP and TSS reductions required for its full MS4 implementation of the Chesapeake Bay TMDL and WIP as issued in December 2010, in accordance with the procedures established in its MS4 Permit and DEQ Guidance Memorandum 15-2005, Chesapeake Bay TMDL Special Condition Guidance (May 18, 2015).

b. Credit Demand Minimization Elements. FMA shall minimize its calculated reductions by (i) accurately mapping and delineating its existing MS4 service area, (ii) taking full credit for reductions achieved by stormwater projects and regulated redevelopment projects occurring prior to the effective date of FMA's MS4 Permit in effect as of the date of this Agreement, and (iii) other procedures or accounting measures reasonably available to FMA.

c. Credit Transfer Ceilings. HRSD's annual credit transfer obligations to FMA shall not exceed the lesser of (i) FMA's initial estimate of credit needs, or (ii) 95 percent of FMA's total calculated reductions determined in accordance with Subparagraphs 1.a. and 1.b. and set forth in a DEQ-approved Chesapeake Bay TMDL Action Plan, or (iii) the quantity of credits actually needed to meet such total calculated reductions. FMA's initial estimate of credit needs as of the date of this Agreement is set forth in Section 1 of Attachment A hereto. Following DEQ's approval of FMA's Chesapeake Bay TMDL Action Plan and subsequent acceptance of the credit needs by HRSD as consistent with the requirements of this Subparagraph 1.c., HRSD shall issue an update to Attachment A setting forth in Section 2 thereof HRSD's actual annual credit transfer obligation determined in accordance with this Subparagraph 1.c.

d. Term & Termination of Initial Credit Transfers. HRSD's annual credit transfer obligations to FMA under this Paragraph 1 shall expire upon (i) conversion to a permanent transfer of wasteload allocations as provided in Paragraph 2, (ii) termination as specifically authorized by any other provision of this Agreement, or (iii) December 31, 2036, whichever occurs first.

2. Permanent Transfer After SWIFT Feasibility Determination. Upon HRSD's determination that full-scale implementation of the SWIFT Project is feasible, HRSD shall permanently transfer to FMA the quantity of TN, TP and TSS waste load allocations set forth for its MS4 on Attachment A hereto, as updated and issued by HRSD in accordance with Paragraph 1 c.

a. Factors for Feasibility Determination. Feasibility shall be determined in HRSD's sole discretion taking into account (i) whether all required permits and approvals have been acquired in final, non-appealable form acceptable to HRSD including the federal Safe Drinking Water Act Underground Injection Control Permit, (ii) whether the first full-scale HRSD plant upgrade is online and performing as desired, (iii) whether full-scale implementation of the SWIFT Project is technically and financially feasible, and (iv) other material factors.

b. Timing for Feasibility Determination. Without limiting HRSD's discretion to determine whether full-scale SWIFT Project implementation is feasible or when to make such determination, it is the mutual goal of the Parties for HRSD to make such determination as soon as reasonably possible and not later than December 31, 2025, so as to preserve the maximum amount of time prior to the termination date for FMA to implement stormwater retrofit projects or other permit compliance measures that might be necessary should it be determined that the SWIFT Project is not feasible. The Parties acknowledge that a demonstration project is already underway at the Nansemond Treatment Plant located in the City of Suffolk.

3. Regulatory Plans & Approvals. In furtherance of the annual credit transfer and, when applicable, the permanent transfer contemplated by this Agreement, the Parties shall collaborate on appropriate submittals to and requests of DEQ, as follows; however, HRSD shall have no responsibility for the failure or refusal of DEQ or other governmental authority to approve such transfers.

a. FMA's TMDL Action Plan. For purposes of annual and, when applicable, permanent transfers, FMA shall each include in its Chesapeake Bay TMDL Action Plan a provision for the receipt and use of TN, TP and TSS credits from the HRSD Plants in the form set forth in Attachment C hereto (or such other form as may be mutually agreeable to FMA and HRSD).

b. HRSD Watershed General Permit Registration. For purposes of permanent wasteload allocation transfers, when applicable, HRSD shall modify its Watershed General Permit Registration and, if necessary, individual VPDES permits to reflect such transfers.

c. Virginia Chesapeake Bay TMDL WIP. HRSD and FMA shall collaborate to seek inclusion in any future modification or phase of Virginia's WIP of recognition of the SWIFT Project and the annual and, when applicable, permanent transfers contemplated by this Agreement.

4. Authorized Use of Credits. FMA agrees that its sole and limited use of the TN, TP, and TSS credits transferred under this Agreement shall be for the purpose of MS4 Permit compliance and Chesapeake Bay TMDL implementation and that it shall not transfer any portion of HRSD-generated credits (or waste load allocations, if applicable) to any other person or entity. In the event that FMA no longer requires some or all of the credits (or waste load allocations) for such use, they shall revert to HRSD and HRSD shall update and reissue Attachment A accordingly.

5. Mutual Cooperation. The Parties shall continue to cooperate with each other as reasonably necessary to confirm or bring about the transfers contemplated by this Agreement.

6. Permits & Approvals. If for any reason any federal, state, regional or local government or agency fails to issue any necessary permit, approval or other authorization for the SWIFT Project or the transfers contemplated by this Agreement, HRSD shall be excused from its performance hereunder.

7. Force Majeure. The obligations of HRSD, including its annual or permanent transfer obligations, shall be suspended while and as long as performance is prevented or impeded

by strikes, disturbances, riots, fire, severe weather, epidemic, pandemic, acts of war, acts of terrorism, acts of God, government action (other than by HRSD), major technical, engineering or construction related delays, or any other cause similar or dissimilar to the foregoing that is beyond the reasonable control of and not due to the gross negligence of HRSD.

8. Change in Law. In the event of any material change in applicable laws or regulations, the Parties shall work together to attempt to amend this Agreement to conform to such change, while maintaining as closely as practical the provisions and intent of this Agreement. If in any such event HRSD is unable to perform its transfer obligations as provided herein, FMA shall be solely responsible for otherwise meeting its TMDL and MS4 Permit obligations.

9. Significant Financial & Budgetary Constraints. Notwithstanding any other provision of this Agreement or any prior determination of feasibility of the SWIFT Project, HRSD reserves the right to terminate or renegotiate this Agreement in the event HRSD experiences significant financial or budgetary challenges which, in HRSD's opinion, would significantly impair its ability to perform its obligations hereunder. In such event, the Parties shall work together to attempt to amend this Agreement to accommodate such challenges, with the goal of providing annual credits to FMA (and to Hampton Roads entities with similar water quality credit agreements) as practical.

10. Credit Supply Constraints. Notwithstanding any other provision of this Agreement, to the extent that HRSD determines in its sole discretion that its available quantity of water quality credits (or allocations) is insufficient to meet the total MS4 Chesapeake Bay TMDL Action Plan compliance requirements of FMA and of all other Hampton Roads entities that are party or become party to a similar water quality credit agreement, HRSD's obligations hereunder shall be limited to transferring to FMA its pro rata share of HRSD's available credits based on pollutant-specific total credit needs of all such Hampton Roads entities. HRSD agrees to provide FMA with notice of its ability only to transfer a pro rata share of HRSD's available credits as promptly as possible but no later than 90 days after becoming aware of the event limiting HRSD's ability to meet the total credit needs of all such Hampton Roads entities. For clarity, HRSD shall assume no obligation under this Agreement to install, upgrade, improve, or significantly alter the operation of any portion of its sewerage system or treatment works for purposes of providing water quality credits (or allocations).

11. No Third-Party Beneficiaries. This Agreement is solely for the benefit of the Parties hereto and their permitted successors and assigns and shall not confer any rights or benefits on any other person or entity.

12. No Assignment. This Agreement, and the rights and obligations established hereunder, shall be binding upon and inure to the benefit of any successors of the Parties. However, no Party may transfer or assign this Agreement, or its rights or obligations hereunder, without the prior written consent of the other Party, which consent shall not be unreasonably withheld.

13. Expenses; Commissions. Except as provided herein, each Party shall pay its own fees and expenses, including its own counsel fees, incurred in connection with this Agreement or any transaction contemplated hereby. The Parties represent and warrant to each other that they

have not dealt with any business broker or agent who would be entitled to a brokerage commission or finders fee as a result of this Agreement or any related transactions.

14. Governing Law; Venue; Severability. This Agreement shall be construed in accordance with and governed for all purposes by the laws of the Commonwealth of Virginia. This Agreement is a Virginia contract deemed executed and accepted in the City of Virginia Beach; and all questions with respect to any of its provisions shall be instituted, maintained, and contested in a court of competent jurisdiction in the City of Virginia Beach, Virginia. If any word or provision of this Agreement as applied to any Party or to any circumstance is adjudged by a court to be invalid or unenforceable, the same shall in no way affect any other circumstance or the validity or enforceability of any other word or provision.

15. No Waiver. Neither any failure to exercise or any delay in exercising any right, power or privilege under this Agreement by either Party shall operate as a waiver, nor shall any single or partial exercise of any right, power or privilege hereunder preclude the exercise of any other right, power or privilege. No waiver of any breach of any provision shall be deemed to be a waiver of any preceding or succeeding breach of the same or any other provision, nor shall any waiver be implied from any course of dealing.

16. Entire Agreement; Amendments. This Agreement contains the entire agreement between the Parties as to the subject matter hereof and supersedes all previous written and oral negotiations, commitments, proposals and writings. No amendments may be made to this Agreement except by a writing signed by both Parties.

17. Counterparts; Signatures; Copies. This Agreement may be executed in counterparts, both of which shall be deemed an original, but all of which together shall constitute one and the same instrument. A facsimile or scanned signature may substitute for and have the same legal effect as an original signature. Any copy of this executed Agreement made by photocopy, facsimile or scanner shall be considered the original for all purposes.

18. Authorization. Each Party represents that its execution, delivery and performance under this Agreement have been duly authorized by all necessary action on its behalf, and do not and will not violate any provision of its charter or enabling legislation or result in a material breach of or constitute a material default under any agreement, indenture, or instrument of which it is a party or by which it or its properties may be bound or affected.

IN WITNESS WHEREOF, the Parties hereto have caused the execution of this Agreement as of the date first written above.

[SIGNATURES BEGIN ON NEXT PAGE]

**SIGNATURE PAGE OF HAMPTON ROADS WATER QUALITY CREDIT
AGREEMENT FOR CHESAPEAKE BAY RESTORATION BY AND BETWEEN
HRSD AND THE FORT MONROE AUTHORITY**

**HAMPTON ROADS SANITATION
DISTRICT**, a public body and political
subdivision of the Commonwealth of Virginia

By: _____



Edward G. Henifin
General Manager

**SIGNATURE PAGE OF HAMPTON ROADS WATER QUALITY CREDIT
AGREEMENT FOR CHESAPEAKE BAY RESTORATION BY AND BETWEEN
HRSD AND THE FORT MONROE AUTHORITY**

FORT MONROE AUTHORITY, a public
body and political subdivision of the
Commonwealth of Virginia

By: 

G. Glenn Oder
Executive Director

**HAMPTON ROADS WATER QUALITY CREDIT AGREEMENT
FOR CHESAPEAKE BAY RESTORATION
ATTACHMENT A**

Water Quality Credit Needs for Second & Third Bay TMDL Permit Cycles

*Section 1: Initial Estimate of Credit Needs (lbs/yr)
[As Estimated by FMA as of the date of this Agreement]*

	James River Basin		
Parameter	2nd Permit Cycle	3rd Permit Cycle	Total Both Cycles
TN	57.31	98.67	155.98
TP	10.54	24.70	35.24
TSS	4,438.55	11,193.94	15,632.89

*Section 2: FMA-Calculated and HRSD-Accepted Credit Needs (lbs/yr)
Under DEQ-Approved TMDL Action Plan and Subparagraph 1.c. of this Agreement
[As Accepted by HRSD After DEQ Approval of FMA's TMDL Action Plan]**

	James River Basin		
Parameter	2nd Permit Cycle	3rd Permit Cycle	Total Both Cycles
TN	57.31	98.67	155.98
TP	10.54	24.70	35.24
TSS	4,438.55	11,193.94	15,632.89

- * DEQ approved FMA's TMDL Action Plan prior to the date of this Agreement. Section 2 is complete.

**HAMPTON ROADS WATER QUALITY CREDIT AGREEMENT
FOR CHESAPEAKE BAY RESTORATION
ATTACHMENT B**

Annual Water Quality Credit Transfer Form

Instructions: To be completed and executed by HRSD and delivered to FMA on or before each May 20 immediately following the calendar year of credit generation by HRSD.

By execution and delivery of this Annual Credit Transfer Form, HRSD transfers the following water quality credits in the amounts specified to FMA in accordance with, and for the specific and limited purposes of, the Hampton Roads Water Quality Credit Agreement for Chesapeake Bay Restoration.

Transferor: Hampton Roads Sanitation District

Transferee (MS4): Fort Monroe Authority

Year Credits Generated: _____

Date Credits Transfer: _____

River Basin	TN (lbs/yr)	TP (lbs/yr)	TSS (lbs/yr)
James			

Signed (for HRSD): _____

Name (Print): _____

Title: _____

**HAMPTON ROADS WATER QUALITY CREDIT AGREEMENT
FOR CHESAPEAKE BAY RESTORATION
ATTACHMENT C**

**Draft Provision for the Use of HRSD-Generated Water Quality Credits for
MS4 Chesapeake Bay TMDL Action Plan Development**

The intent of this plan is the generation and use of TN, TP and TSS credits before and during operation of the SWIFT Project in collaboration with HRSD pursuant to the Hampton Roads Water Quality Credit Agreement for Chesapeake Bay Restoration to which FMA and HRSD are signatories. This compliance method is in lieu of more traditional stormwater retrofit projects, which may not be feasible to execute on a condensed 10-year schedule (i.e., Second and Third Bay TMDL Permit Cycles). Not only does this method have the advantage of more reliably meeting the MS4 Permit's short deadlines, but it is also beneficial to the public in that it will meet FMA's Chesapeake Bay TMDL reduction goals more cost-effectively than otherwise possible. This component of the plan is fully in accordance with Virginia Code §62.1-44.19:21 (TN and TP) and §62.1-44.19:21.1 (TSS). The quantity of reduction credits from the SWIFT Project that are allocated to this TMDL Action Plan for the James River Basin are 155.98 lbs/yr TN, 35.24 lbs/yr TP, and 15,632.89 lbs/yr TSS.