City of Virginia Beach

Total Phosphorus Total Maximum Daily Load Action Plan

Final Approved by Virginia DEQ

STORMWATER MANAGEMENT

Public Works Department

VSMP MS4 Permit # VA0088676

July 2018 | Final

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Acronyms and Abbreviations

action plan	TMDL action plan
City	City of Virginia Beach
DEQ	Department of Environmental Quality
DO	dissolved oxygen
HRPDC	Hampton Roads Planning District Commission
kg/yr	kilogram per year
lb/ac/yr	pound per acre per year
lb/yr	pound per year
MS4	Municipal Separate Storm Sewer System
NA	not applicable
NMP	Nutrient Management Plan
POC	pollutants of concern
SWMF	storm water management facility
TMDL	total maximum daily load
TP	total phosphorus
USEPA	United States Environmental Protection Agency
VACS	Virginia Agricultural Cost-Share
VSMP	Virginia Stormwater Management Program
WLA	wasteload allocation

Acknowledgements

This action plan was prepared for the City of Virginia Beach by:

JACOBS®

Certification Statement

"I certify under penalty of law that this document and all attachments were prepared under my direction or 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 or 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."

Melanie Coffey

Typed Name: Melanie Coffey, P.E.
Title: MS4 Permit Administrator

Date: 7-13-18

1 Introduction

The City of Virginia Beach (City) is located in the coastal area of southeastern Virginia and has three primary watersheds: the Chesapeake Bay Watershed, the Atlantic Ocean Watershed, and the Southern Rivers Watershed. The City owns and operates a storm sewer system to collect and convey stormwater runoff to streams, lakes, and other waterbodies located in these three primary watersheds. The City is authorized to discharge stormwater runoff from the storm sewer system under its Municipal Separate Storm Sewer System (MS4) Permit No. VA0088676.

When a stream or other waterway does not meet regulatory water quality criteria and is determined to be impaired by one or more pollutants, the Virginia Department of Environmental Quality (DEQ) establishes a total maximum daily load (TMDL) for the pollutant(s). A TMDL is the maximum amount a pollutant of concern (POC) can be discharged to a waterbody so that it will meet and continue to meet water quality standards for that pollutant. The TMDL is used to determine how much the existing pollutant contribution will need to be reduced and allocates load reductions necessary to the source(s) of pollutant in the watershed. Pollutant sources are characterized as either point sources that receive a wasteload allocation (WLA), or nonpoint sources that receive a load allocation. For purposes of assigning WLAs, point sources include all permitted sources such as the City's MS4.

The City is required by its MS4 permit to develop action plans for TMDLs established as of July 1, 2016, to address the sources of the POCs to meet its assigned WLAs. In the City, there are four total phosphorus (TP) TMDLs located in the City's Southern Watersheds, which are assigned to the following waterways:

- Ashville Bridge Creek – Lower
- North Landing River – Middle
- Northwest River
- Pocaty River

The location of the TP TMDL subwatersheds located in the Southern Rivers Watershed are

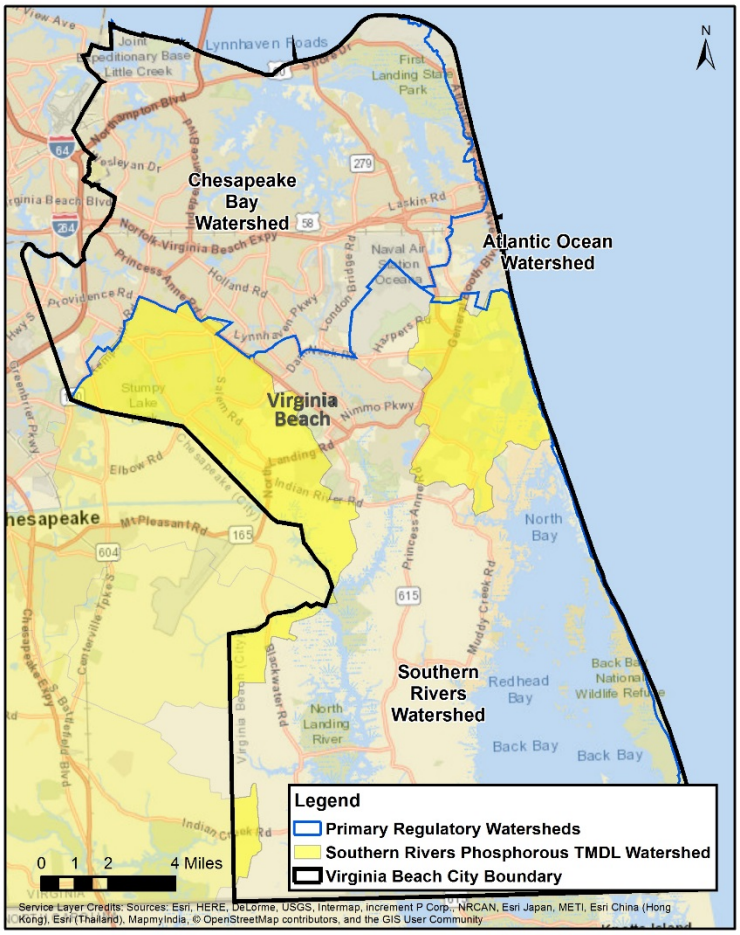

Figure 1 Phosphorus TMDL Watersheds in the Southern Rivers Watershed

shown in Figure 1. The City of Chesapeake has also been assigned a TP WLA for the North Landing River – Middle, the Northwest River, and the Pocaty River.

This TMDL action plan (action plan) uses an adaptive, iterative approach in the planning and implementing of management practices to address the four TP WLAs. This action plan was prepared in accordance with the requirements of the City's MS4 permit Section I.D.2 and follows the Virginia DEQ Guidance Memo No. GM-16-2006, *TMDL Action Planning for Local Total Maximum Daily Loads as Required in the Small MS4 General Permit (VAR04) Effective July 1, 2013 and MS4 Individual Permits* (Virginia DEQ, 2013).

An overview of the action plan organization and how each section addresses the City's MS4 permit and the DEQ local TMDL action plan guidance are provided in Table 1. The City will submit the TMDL action plan to Virginia DEQ by June 30, 2018 for review and will report on the implementation of the TMDL action plan yearly in its MS4 Annual Report submitted to Virginia DEQ.

Table 1. Action Plan and Permit Compliance

Action Plan	Action Plan Element	Virginia DEQ Local TMDL Action Plan Guidance	MS4 Permit
Section 1	Introduction	NA	NA
Section 2	TMDL Report	1. The name(s) of the final TMDL report(s).	Part I.D.2
Section 3	Pollutant of Concern	2. The pollutant(s) causing the impairment(s).	Part I.D.2.b)1)
Section 4	Waste Load Allocations	3. The WLA(s) assigned to the MS4 as aggregate or individual WLAs.	Part I.D.2.b)2)
Section 5	Assessment of Significant Sources of Phosphorus from City Facilities	4. Significant sources of POC(s) from facilities of concern owned or operated by the MS4 operator that are not covered under a separate Virginia Pollutant Discharge Elimination System permit. A significant source of pollutant(s) from a facility of concern means a discharge where the expected pollutant loading is greater than the average pollutant loading for the land use identified in the TMDL.	Part I.D.2.b)4)
Section 6	Existing and Planned Management Practices	5. Existing or new management practices, control techniques, and system design and engineering methods that have been or will be implemented as part of the MS4 Program Plan that are applicable to reducing the pollutant identified in the WLA.	Part I.D.2.b)2)
Section 7	Legal Authorities	6. Legal authorities such as ordinances, state and other permits, orders, specific contract language,	Part I.D.2.b)1)

Table 1. Action Plan and Permit Compliance

Action Plan	Action Plan Element	Virginia DEQ Local TMDL Action Plan Guidance	MS4 Permit
		and inter-jurisdictional agreements applicable to reducing the POCs identified in each respective TMDL.	
Section 8	Public Education, Outreach, and Employee Training	7. Enhancements to public education, outreach, and employee training programs to also promote methods to eliminate and reduce discharges of the POC(s) for which a WLA has been assigned.	Part I.D.2.b)3)
Section 9	Schedule of Interim Milestones and Implementation of Strategies	8. A schedule of interim milestones and implementation of the items in 5, 6, and 7.	Part I.D.2.b)5)
Section 10	Methods to Assess TMDL Action Plan Effectiveness	9. Methods to assess TMDL Action Plans for their effectiveness in reducing the pollutants identified in the WLAs.	Part I.D.2.b)5)
Section 11	Measurable Goals and Metrics	10. Measurable goals and the metrics that the permittee and Department will use to track those goals (and the milestones required by the permit). Evaluation metrics other than monitoring may be used to determine compliance with the TMDL(s).	Part I.D.2.b)5)
Section 12	Public Comments on Draft Action Plan	NA	Part I.D.2.b)6)

Notes:

NA = not applicable

2 Total Maximum Daily Load Reports

The Virginia DEQ TMDL reports describing development of the TP TMDLs are as follows:

- *Total Maximum Daily Load Development for the Albemarle Canal/North Landing River – A Total Phosphorus TMDL Due to Low Dissolved Oxygen Impairment* (Virginia DEQ, 2010)
- *Total Maximum Daily Load Development for the Back Bay, North Landing River, and Pocaty River Watersheds - E. coli, and Enterococci Due to Recreation Use Impairments, and Total Phosphorus Due to Low Dissolved Oxygen in Aquatic Life Use Impairments* (Virginia DEQ, 2013, revised 2014) (includes Ashville Bridge Creek and Pocaty River TP TMDLs)

- *Total Maximum Daily Load Development for the Northwest River Watershed – A Total Phosphorus TMDL Due to Low Dissolved Oxygen Impairment* (Virginia DEQ, 2011)

3 Pollutant of Concern

The phosphorus TMDLs were developed because of a low dissolved oxygen (DO) impairment where the levels of DO were below the minimum DO water quality standard in the four waterbodies listed in Section 1. In the Virginia DEQ TMDL reports mentioned in Section 2, it was determined that the impairments were caused by excessive phosphorus.

4 Waste Load Allocations

The City has prepared this action plan to address the TP WLAs assigned to Ashville Bridge Creek – Lower, North Landing River – Middle, Northwest River, and Pocaty River as described in Table 2. This action plan applies to the City's MS4 service area located in the TP TMDL watersheds. The MS4 service area or regulated area is defined as the area draining to a storm sewer system owned or operated by the permittee that discharges to surface waters. The TMDL watersheds and the City-delineated preliminary MS4 service areas are shown in the figure provided in Attachment 1. The City may revise the MS4 service area delineation, per Part I Section B.2.h.6 of the City's MS4 permit that states that the City has until 60 months after the effective date of the permit to map the MS4 service area and each MS4 outfall.

5 Assessment of Significant Sources of Phosphorus from City Facilities

The City has analyzed all facilities owned or operated by the City within the TMDL watersheds. Attachment 2 lists the facilities that are contained within this area. Redwing Park in the Ashville Bridge Creek Watershed was identified as having a dog park that may contribute slightly greater than the average phosphorus loading than other recreational-type facilities, but requires further investigation. Currently no other facilities have been found to be significant sources of phosphorus. Investigation of the City facilities will be an ongoing process and if any facilities are identified as having a greater than average loading rate, they will be included in the MS4 Annual Report.

6 Existing and Planned Management Practices

The City intends to use an adaptive, iterative approach in the planning and implementing of management practices to achieve the WLAs. This section describes existing and new management practices, control techniques, and system design and engineering methods that the City will use to meet the WLAs. Existing practices that help to reduce phosphorus include:

- Nutrient management plans (NMPs)
- Street sweeping
- Dry weather screening

- Stormwater management facilities (SWMFs)

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Table 2. Virginia Beach Total Phosphorus Total Maximum Daily Loads

TMDL Watershed	USEPA Approval Date	Virginia State Water Control Board Approval Date	Baseline Date[e]	Existing TP Load	TP Wasteload Allocation[a]	TP Reduction Amount	Percent Reduction of Existing TP Load
Ashville Bridge Creek – Lower[c]	6/26/2014	-	September 2006	33.26 kg/yr (73.33 lb/yr)	18.99 kg/yr (41.87 lb/yr) 0.052 kg/day (0.115 lb/day)	14.27 kg/yr (31.46 lb/yr)	42.89%
North Landing River – Middle[b]	1/13/2011	6/25/2012	August 2009	909.7 kg/yr (2005.5 lb/yr)	558.10 kg/yr (1,230.4 lb/yr)	351.6 kg/yr (775.1 lb/yr)	38.65%
Northwest River[d]	4/26/2011	6/25/2012	August 2010	4.3 kg/yr (9.48 lb/yr)	1.80 kg/yr (3.97 lb/yr)	2.5 kg/yr (5.51 lb/yr)	58.17%
Pocaty River[c]	6/26/2014	-	March 2011	2.99 kg/yr (6.59 lb/yr)	1.08 kg/yr (2.38 lb/yr) 0.003 kg/day (0.007 lb/day)	1.91 kg/yr (4.21 lb/yr)	63.96%

Notes:

[a]Virginia MS4 permit VA0088676 (Attachment A – Approved TMDLs)

[b]*Total Maximum Daily Load Development for the Albemarle Canal/North Landing River – A Total Phosphorus TMDL Due to Low Dissolved Oxygen Impairment* (Table 5.1) (Virginia DEQ, 2010)

[c]*Total Maximum Daily Load Development for the Back Bay, North Landing River, and Pocaty River Watersheds - E. coli, and Enterococci Due to Recreation Use Impairments, and Total Phosphorus Due to Low Dissolved Oxygen in Aquatic Life Use Impairments* (Virginia DEQ, 2013, revised 2014)

[d]*Total Maximum Daily Load Development for the Northwest River Watershed – A Total Phosphorus TMDL Due to Low Dissolved Oxygen Impairment* (Table 5.1) (Virginia DEQ, 2011)

[e]Baseline date is referring to the last month of water quality sampling for the development of the TMDL and will be considered the baseline date for this action plan.

kg/yr = kilogram per year

lb/yr = pounds per year

USEPA = United States Environmental Protection Agency

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The City has started planning and scoping for future management practices to meet the WLA and will continue planning future practices during this permit cycle. The planning process will include determining the scope and extent of new management practices or enhancements to existing management practices. The new practices being considered include the following:

- Enhancements to nutrient management
- New SWMFs or retrofits to existing SWMFs
- Land use changes

The City will perform an analysis of the proposed new management practices to determine expediency, cost effectiveness, and feasibility. Both existing and future practices will be implemented over several permit cycles. A permit cycle is the length of the City's MS4 permit, which is generally a 5-year permit. The current permit was made effective July 1, 2016 and will expire on June 30, 2021. The current permit is referred to as the first permit cycle in this action plan.

The following sections describe the existing and proposed new management practices in more detail and the estimated reductions of each practice towards meeting the WLA are provided in Section 11.

6.1 Nutrient Management Plans

The City developed a *Turf and Nutrient Management Plan* (City of Virginia Beach, 2014), to address all the City facilities that have fertilizer applied to more than one contiguous acre. In the TMDL watersheds, there are five City facilities that have been included in the City's NMP and six golf courses that are required by state law to develop NMPs by July 1, 2017. The acres managed from all City-owned facilities and the acres managed of private golf courses within the preliminary MS4 service area are described in Table 3. The City may choose to update the maps as per Part I Section B.2.h.6) of the City's MS4 permit, which states that the City has until 60 months after the effective date of their permit to map the MS4 service area.

Table 3. Facilities with Nutrient Management Plans

Facility (Ownership)	TMDL Watershed	Managed Area (acres)
Ocean Lakes High School Stadium Field (City)	Ashville Bridge Creek	1.82
Red Wing Golf Course (City)	Ashville Bridge Creek	127.16
Hell's Point Golf Club (Private)[a]	Ashville Bridge Creek	9.69
Princess Anne Athletic Complex (City)	North Landing River	27.06
Landstown High School Stadium Field (City)	North Landing River	1.91
Salem High School Stadium Field (City)	North Landing River	1.53

Table 3. Facilities with Nutrient Management Plans

Facility (Ownership)	TMDL Watershed	Managed Area (acres)
Tallwood High School Stadium Field (City)	North Landing River	1.36
Stumpy Lake Golf Course (City)	North Landing River	124.78
Virginia Beach National Golf Course (City)	North Landing River	37.3
Honey Bee Golf Club (Private)[a]	North Landing River	182.28
Signature at West Neck Golf Course (Private)[a]	North Landing River	12.29

Note:

[a]Acreage only includes areas within the MS4 service area

A 10-percent reduction in the phosphorus loading can be credited for the area of managed turf on these facilities, which are considered high risk facilities, as defined by the *Recommendations of the Expert Panel to Define Removal Rates for Urban Nutrient Management* (Schueler and Lane, 2013). This 10-percent reduction is in addition to the state fertilizer law as the crediting was developed in 2013, a couple of years after the state fertilizer law was enacted in 2011, and as described in *Recommendations of the Expert Panel to Define Removal Rates for Urban Nutrient Management* (Schueler and Lane, 2013). The area of managed lands for City facilities was obtained from the City's NMP. The golf course areas are derived from the sum of the turfgrass land cover from the Virginia Geographic Information Network Virginia Land Cover dataset (2016) within the golf course parcels.

Additional NMPs may be developed in the future for City-owned land leased for farming or in cooperation between the City and private partners, such as businesses and private farm land owners. For additional information on NMPs and City leases, see Section 7.3.

6.2 Street Sweeping

In August 2017, the City initiated a City-wide street sweeping program using regenerative air sweepers on public roads and municipal parking lots. Street sweeping is an annual practice and the phosphorus reduction credit will be reported in each MS4 Annual Report. The City estimates that the street sweeping will provide less than 5 percent of the reductions needed to meet the WLA requirements.

6.3 Dry Weather Screening

The City implements a dry weather screening program in compliance with its MS4 permit that requires a minimum of 50 stations screened per permit year. The City screens the required 50 stations annually, and began screening an additional 50 stations located in upstream

portions of drainage areas. All the inspections include visual inspection, in situ sampling, source tracking, source identification, and property owner education or enforcement actions. Outfall station selection includes procedures to identify outfalls or stations that meet the areas of concern listed in Sections I.B.2.l.1-2 in the City's MS4 permit. The City also selects sites across watersheds and prioritizes sites that have not been screened before, except for locations where historical exceedances have occurred. If a potential illicit discharge is found during dry weather screening, the City follows procedures for illicit discharge detection and elimination to locate the source of the discharge. If the discharge is found to be illicit, the City provides follow-up with elimination of the discharge. The additional stations screened is an annual practice and any phosphorus reduction credit from the additional screening will be reported in each MS4 Annual Report. The City estimates that the additional screenings will provide less than 5 percent of the reductions needed to meet the WLA requirements.

6.4 Stormwater Management Facilities

The Virginia Stormwater Management Program (VSMP) Regulations require that SWMFs be used for new development projects if the post-development TP load exceeds 0.41 pound per acre per year (lb/ac/yr). The SWMFs for the new development are designed to reduce the post-development TP load to 0.41 lb/ac/yr or less. The VSMP Regulations for redevelopment projects require SWMFs to reduce the existing TP load from existing developed areas by 10 or 20 percent, depending on the area of land disturbance. If the redevelopment has an increase in the impervious area, the TP load from the increased impervious area must not exceed 0.41 lb/ac/yr. The phosphorus reduction from SWMFs constructed for redevelopment will be calculated as credit towards meeting the City's phosphorus WLAs because these SWMFs are reducing the existing phosphorus load from the area being redeveloped.

Research will be performed to determine which SWMFs were built for both quantity control and water quality treatment for redevelopment sites. Within the City, Ashville Bridge Creek and North Landing River Watersheds currently have existing SWMFs and the Northwest River and Pocaty River Watersheds do not currently have any existing SWMFs.

The City plans to investigate potential sites for installing new SWMFs and retrofitting existing SWMFs, and determine viable options within the first MS4 permit cycle. The City estimates that the existing water quality SWMFs installed for redevelopment and City-installed SWMFs or retrofits will be able to meet 60 percent to 70 percent of the reductions needed to meet the WLAs in the Ashville Bridge Creek and North Landing River TMDL watersheds. It may be difficult to find enough suitable sites for new SWMFs within the City's MS4 service area because there is limited vacant land. Any existing SWMFs constructed for redevelopment that the City may use for phosphorus reduction credit and any newly-installed SWMFs or retrofits will be reported in each MS4 Annual Report. The City will reevaluate the planned reduction goal using SWMFs at the end of the first MS4 permit cycle.

The City has a new Park Design Standards Manual for City parks. A key component of the new standards is the conversion of mowed lawn to meadow management or regeneration areas at least 20 feet wide around all City park water areas. This practice provides a vegetative buffer

strip around SWMFs located in parks and the City will investigate if the practice will provide significant TP reduction credits. At this time, the City estimates this practice would provide less than 5 percent of the reductions needed to meet the WLA requirements.

6.5 Land Use Changes

The City will investigate sites for land use changes to receive credit for changing the land use to a type with a lower phosphorus loading rate. There may also be potential credit for past land use changes. For example, new developments that may have been built on agricultural lands may have an overall lower phosphorus loading rate than when the land was used for agricultural purposes.

The City will also investigate sites for the potential to add forested buffers along waterways within the MS4 service area. The City estimates that land use changes will provide less than 5 percent of the reductions needed to meet the WLA requirements.

7 Legal Authorities

The City's existing legal authority that pertains to stormwater quality includes both City ordinances and state laws. In some cases, as described in this section, the City may receive reduction credits for going above and beyond the state regulations or taking credit for laws passed after the baseline date used in developing the TMDLs that reduce phosphorus in stormwater.

7.1 City Codes and Ordinances

Several City codes and ordinances help to reduce phosphorus in stormwater and are further described herein. Section 8 describes how some of these ordinances are being emphasized in public education and outreach and may receive TP reduction credit. City ordinances can be found online at Code of the City of Virginia Beach, Virginia. Additional information on the City's legal authorities can be found in the MS4 Program Plan.

7.1.1 Chapter 30 Article III Erosion and Sediment Control and Tree Protection

The purpose of the Erosion and Sediment Control and Tree Protection Ordinance is to provide for local erosion and sediment control and post-construction stormwater management and, in some cases, it is more stringent than required by the Virginia regulations. This ordinance provides legal authority to control discharges from the MS4 by inspection, surveillance, monitoring, and enforcement of the ordinance at construction sites. The City requires an erosion and sediment control plan for all construction sites in the City with land disturbance equal to or greater than 2,500 square feet, which is a stricter requirement than the Virginia Erosion and Sediment Control Regulations of 10,000 square feet.

7.1.2 Appendix D – Stormwater Management

The purpose of the Stormwater Management Ordinance is to protect the quality and quantity of state waters from the potential harm of unmanaged stormwater, including protection from a

land disturbing activity causing unreasonable degradation of properties, water quality, stream channels, and other natural resources. The ordinance also establishes procedures where stormwater requirements related to water quality and quantity are administered and enforced.

This ordinance was adopted pursuant to Article 2.3 (§ 62.1-44.15:24 et seq.) of Chapter 3.1 of Title 62.1 of the Code of Virginia, and in compliance with 9VAC25-870-10 et seq. of the Virginia Stormwater Management Regulations. The most recent version of the Stormwater Management Ordinance became effective on July 1, 2014.

The City requires a land disturbance permit for sites with land disturbance equal to or greater than 2,500 square feet which is more stringent than the 10,000-square-foot minimum identified in Virginia Regulation 9VAC25-840 et seq. In addition, the City has identified stormwater design requirements that are more stringent than the state requirements.

7.1.3 Appendix G – Southern Rivers Watershed Management Ordinance

The purpose of the Southern Rivers Watershed Management Ordinance is to protect, enhance, and restore the quality of waters within the Southern Rivers Watershed of the City. Specifically, it describes performance standards that are more stringent than the state requirements. Land disturbance activities equal to or exceeding an area of 2,500 square feet are required to have an erosion and sediment control plan, as opposed to the 10,000 square feet required by the state. This ordinance also prohibits development within 50 feet of waterways to maintain an effective vegetative buffer. The City estimates that the stricter requirements of this ordinance will provide less than 5 percent of the reductions needed to meet the WLA requirements.

7.1.4 Appendix H – Storm Sewer Discharge Ordinance

The Storm Sewer Discharge Ordinance was adopted to prevent certain non-stormwater discharges to the storm sewer system and to prevent improper disposal of substances in the storm sewer system. These restrictions will reduce, to the maximum extent practicable, pollutants that may be present in discharges from the storm sewer system.

7.1.5 Other Applicable Existing Legal Authorities

There are several other City ordinances that are relevant to controlling phosphorus discharges from the City's MS4 system (or service area) and include the following:

- Chapter 5 Article V Division 3 Section 5-534 – Requirements related to dogs or horses urinating or defecating on public or private property. See Section 8.1 for more information.
- Chapter 5 Article V Division 3 Section 5-547 – Prohibitions on feeding wildlife on publicly owned property. See Section 8.1 for more information.
- Chapter 28 – Sewers and Sewage Disposal; Sec. 28-66. – Prohibited discharges related to wastewater
- Chapter 31 – Solid Waste; Sec. 31-10. – Requirements related to unlawful storage and deposits of solid waste; prohibitions on littering

7.2 Virginia Fertilizer Act (§ 3.2-3608 of the Code of Virginia)

The Virginia Fertilizer Act requires that any person or business who distributes or applies, for hire, any specialty fertilizer (fertilizer for non-farm use), soil amendment, or horticultural growing medium must obtain a contractor-applicator permit. The City may regulate the use, application, or storage of fertilizers pursuant to §3.2-3602 of the Code of Virginia; however, the City does not currently have a fertilizer ordinance in place. The Virginia Fertilizer Act also prohibits the use of phosphorus in lawn maintenance fertilizers.

7.2.1 Phosphorus Ban in Lawn Maintenance Fertilizer Credit

The Virginia Fertilizer Act was amended in 2011, to prohibit the sale, use, and distribution of lawn maintenance fertilizer containing phosphorus after December 31, 2013. In the report, *Recommendations of the Expert Panel to Define Removal Rates for Urban Nutrient Management* (Schueler and Lane, 2013), credit for urban nutrient management determined that the phosphorus reduction for states that enacted a phosphorus ban in fertilizers is 25 percent. The City is taking phosphorus reduction credit for the ban of phosphorus in lawn fertilizer because the TP TMDLs were established based on water quality data that was obtained before the phosphorus ban took effect. The reduction credits for the phosphorus ban in lawn fertilizer will be applied to the turfgrass land cover for the MS4 service area located within the TP TMDL watersheds. The turfgrass area in the MS4 service area for each TP TMDL watershed are provided in Table 4.

Table 4. Turfgrass in MS4 Service Areas within TP TMDL Watersheds

Watershed	Turfgrass (acres)
Ashville Bridge Creek	2,504
North Landing River	4,280
Northwest River	17
Pocaty River	20

The City estimates that with the phosphorus ban in lawn maintenance fertilizer and current and potential NMPs, the City will be able to meet from 5 to 30 percent of the reductions needed to meet the WLAs depending on the watershed.

7.3 Property Leases

The City leases property to various entities for different uses and has lease agreements. NMPs are not specifically required in the leases where fertilizer is applied, but some lease agreements require testing soil for nutrients. The three City properties that are leased as golf courses are required to have NMPs under Title 10.1 Chapter 1 § 10.1-104.5 of the Code of Virginia. The proposed phosphorus reduction from NMPs are described in Section 6.1.

7.4 Memorandum of Agreement Hampton Roads Planning District Commission

A memorandum of agreement between the Hampton Roads Planning District Commission (HRPDC) and 17 regional municipalities, including Virginia Beach, establishes the administrative framework to address certain stormwater management requirements under the Clean Water Act and the VSMP. HRPDC's responsibilities under the agreement include providing technical support, policy analysis, a regional stormwater education program, regional training programs, and coordinating compilation of regional data. Virginia Beach's responsibilities under the agreement include participation in regional efforts for public education and outreach, funding, technical review, and providing representatives.

8 Public Education, Outreach, and Employee Training

The City will enhance its public education and outreach and employee training programs to promote methods to eliminate and reduce discharges of phosphorus. Upon annual evaluation and review, additional programs may be added or revised to further address phosphorus in the TMDL watershed areas. The existing and planned programs are discussed in this section.

8.1 Public Education and Outreach

The City conducts public education and outreach activities for a wide variety of stormwater issues. Stormwater public outreach activities are implemented primarily by the Public Works Surface Water Regulatory Compliance Division, with some activities also implemented by the Waste Management Division.

In addition, the City collaborates with askHRgreen.org, which is a regional public awareness program consisting of the 17 Hampton Roads localities and the Hampton Roads Sanitation District. Regional collaboration enables the Hampton Roads municipalities to coordinate their efforts to deliver consistent messages, address regional challenges, and to maximize economies of scale. The askHRgreen.org program is administered through the HRPDC and is supported by the City financially and with staff assistance.

The existing public outreach activities that help the City to reduce phosphorus in stormwater runoff include the following:

- Environmental homes program
- Storm drain marker program
- Adopt-a-Drain program
- Pet waste stations
- Pet waste management outreach

Future public education and outreach activities and programs may include:

- Environmental businesses program

- Livestock waste management
- Residential and commercial fertilizer outreach
- Enhanced pet waste management
- Residential stormwater management
- Promoting programs under the Virginia Agricultural Cost-Share (VACS) Best Management Practices Program
- Wildlife management on public lands
- Septic system maintenance

The City will pick a minimum of three future programs to pursue after evaluating which programs will be the most effective in helping to reduce phosphorus in the TMDL watersheds. The City will continue to research additional outreach programs and techniques that may help to reduce phosphorus in stormwater runoff. The City estimates that 10 to 25 percent of the WLA reduction requirements will be met with public education and outreach programs in the Ashville Bridge Creek and North Landing River TMDL watersheds. The City estimates that 80 to 90 percent of the WLA reduction requirements will be met with public education and outreach programs in the Northwest River and Pocaty River TMDL watersheds. The MS4 Annual Report will include updates to the public education and outreach program with regards to progress in meeting the WLAs.

8.2 Employee Training

The City is developing stormwater training materials that are applicable to both the Chesapeake Bay and the local TP TMDLs. Training efforts that are applicable to the TP TMDLs include biennial training on the following topics:

- Pollution prevention practices
- Good housekeeping practices
- Recognition and reporting of illicit discharges

The pollution prevention and good housekeeping training will be provided by the City to applicable staff and will focus on general stormwater awareness for recreational facilities and road, street, and parking lot maintenance for City facilities. The training on recognition and reporting of illicit discharges for appropriate field personnel will be provided by the City and use a combination of online and in-person formats that include information on characteristics and examples of illicit discharges with special focus in the coastal plain and reporting training for the different reporting methods available through the City.

9 Schedule of Interim Milestones and Implementation of Strategies

The existing and proposed strategies described in this action plan will help the City to reduce phosphorus in the TMDL watersheds. The City will be implementing an adaptive, iterative approach to plan, implement, and evaluate the proposed strategies in the action plan. This includes a midpoint assessment to determine if the methods of phosphorus reduction are working. The midpoint assessment will be performed at the same time for all four watersheds and may include changes to the management activities and implementation schedule.

The proposed schedule in each watershed for implementing the action plan and achieving the WLAs are provided Tables 5 to 8. For each permit cycle, the incremental increase in the percent reduction towards meeting the WLA will be calculated during the action plan implementation and added to the reduction credits calculated for the preceding permit cycle. An example of how the incremental TP percent reductions for each permit cycle will be added and compared to the cumulative percent TP reduction goals is provided for the North Landing River TMDL (see Table 6) as follows:

1. North Landing River Permit Cycle #1 – Achieve 5% TP reduction goal during the permit cycle to meet the implementation schedule goal.
2. North Landing River Permit Cycle #2 – Achieve incremental 5% TP reduction during the permit cycle and cumulative 10% TP reduction to meet the implementation schedule goal.
3. North Landing River Permit Cycle #3 – Achieve incremental 15% TP reduction during the permit cycle and cumulative 25% TP reduction to meet the implementation schedule goal.
4. North Landing River Permit Cycle #4 – Achieve incremental 10% TP reduction during the permit cycle and cumulative 35% TP reduction to meet the implementation schedule goal.

Table 5. Ashville Bridge Creek – Lower Proposed TP TMDL Action Plan Adaptive Implementation Schedule

Permit Cycle	Years	Activity	Estimated Cumulative Percent TP Reduction Goal
Permit Cycle #1	2016 – 2021	• Planning and scoping of SWMFs • State Fertilizer Law • NMP • Redevelopment SWMFs • Street Sweeping • Public Education and Outreach	10% to 25% of required reductions

Table 5. Ashville Bridge Creek – Lower Proposed TP TMDL Action Plan Adaptive Implementation Schedule

Permit Cycle	Years	Activity	Estimated Cumulative Percent TP Reduction Goal
Permit Cycle #2	2021 – 2026	• Install SWMFs • Redevelopment SWMFs - ongoing • Street Sweeping- ongoing • Public Education and Outreach - ongoing	35% to 50% of required reductions
Permit Cycle #3	2026 – 2031	• Redevelopment SWMFs - ongoing • Street Sweeping- ongoing • Public Education and Outreach - ongoing	60% to 75% of required reductions
Midpoint Assessment and TP TMDL Action Plan Update			
Permit Cycle #4	2031 – 2036	• Redevelopment SWMFs - ongoing • Street Sweeping- ongoing • Public Education and Outreach - ongoing	100% of required reductions

Table 6. North Landing River – Middle Proposed TP TMDL Action Plan Adaptive Implementation Schedule

Permit Cycle	Years	Activity	Estimated Cumulative Percent TP Reduction Goal
Permit Cycle #1	2016 – 2021	• Planning and scoping of SWMFs • State Fertilizer Law • NMP • Redevelopment SWMFs • Street Sweeping • Public Education and Outreach	5% to 10% of required reductions
Permit Cycle #2	2021 – 2026	• Install SWMFs	10% to 20% of required reductions

Table 6. North Landing River – Middle Proposed TP TMDL Action Plan Adaptive Implementation Schedule

Permit Cycle	Years	Activity	Estimated Cumulative Percent TP Reduction Goal
		• Redevelopment SWMFs - ongoing • Street Sweeping - ongoing • Public Education and Outreach - ongoing	
Permit Cycle #3	2026 – 2031	• Install SWMFs • Redevelopment SWMFs - ongoing • Street Sweeping - ongoing • Public Education and Outreach - ongoing	20% to 35% of required reductions
Midpoint Assessment and TP TMDL Action Plan Update			
Permit Cycle #4	2031 – 2036	• Install SWMFs • Redevelopment SWMFs - ongoing • Street Sweeping - ongoing • Public Education and Outreach - ongoing	35% to 50% of required reductions
Permit Cycle #5	2036 – 2041	• Install SWMFs • Redevelopment SWMFs - ongoing • Street Sweeping - ongoing • Public Education and Outreach - ongoing	50% to 65% of required reductions
Permit Cycle #6	2041 – 2046	• Install SWMFs • Redevelopment SWMFs - ongoing • Street Sweeping - ongoing • Public Education and Outreach - ongoing	65% to 80% of required reductions

Table 6. North Landing River – Middle Proposed TP TMDL Action Plan Adaptive Implementation Schedule

Permit Cycle	Years	Activity	Estimated Cumulative Percent TP Reduction Goal
Permit Cycle #7	2046 - 2051	• Install SWMFs • Redevelopment SWMFs - ongoing • Street Sweeping - ongoing • Public Education and Outreach - ongoing	100% of required reductions

Table 7. Northwest River Proposed TP TMDL Action Plan Adaptive Implementation Schedule

Permit Cycle	Years	Activity	Estimated Cumulative Percent TP Reduction Goal
Permit Cycle #1	2016 – 2021	• State Fertilizer Law • NMP • Street Sweeping • Public Education and Outreach	10% to 25% of required reductions
Permit Cycle #2	2021 – 2026	• Street Sweeping- ongoing • Public Education and Outreach - ongoing	25% to 40% of required reductions
Permit Cycle #3	2026 – 2031	• Street Sweeping- ongoing • Public Education and Outreach - ongoing	40% to 80% of required reductions
Midpoint Assessment and TP TMDL Action Plan Update			
Permit Cycle #4	2031 – 2036	• Street Sweeping- ongoing • Public Education and Outreach - ongoing	100% of required reductions

Table 8. Pocaty River Proposed TP TMDL Action Plan Adaptive Implementation Schedule

Permit Cycle	Years	Activity	Estimated Cumulative Percent TP Reduction Goal
Permit Cycle #1	2016 – 2021	• State Fertilizer Law • Street Sweeping • Public Education and Outreach	20% to 30% of required reductions
Permit Cycle #2	2021 – 2026	• Street Sweeping- ongoing • Public Education and Outreach - ongoing	30% to 50% of required reductions
Permit Cycle #3	2026 – 2031	• Street Sweeping- ongoing • Public Education and Outreach - ongoing	50% to 80% of required reductions
Midpoint Assessment and TP TMDL Action Plan Update			
Permit Cycle #4	2031 – 2036	• Street Sweeping- ongoing • Public Education and Outreach - ongoing	100% of required reductions

10 Methods to Assess TMDL Action Plan Effectiveness

The measure of effectiveness for this action plan is to document progress towards meeting overall phosphorus-load reductions in an adaptive, iterative approach over multiple permit cycles. Future changes in technology may lead to the development of new activities to achieve the WLAs and discontinuing activities that are not as effective. The City will conduct a midpoint assessment of progress towards meeting the phosphorus WLAs in 15 to 20 years and update the action plan accordingly. The activities implemented to achieve the WLAs will be documented and provided to Virginia DEQ in each MS4 Annual Report.

Progress towards meeting the water quality criteria for the impaired waterways will be evaluated using information in the 305(b)/303(d) Water Quality Assessment Integrated Report submitted by the Virginia DEQ to the USEPA every even numbered year. The Water Quality Assessment Integrated Report provides a list of the impaired waters and summarizes the water quality conditions assessed for the five-year period preceding the report.

11 Measurable Goals and Metrics

The City's ultimate goal in implementing this action plan is to reduce phosphorus loads to the Northwest River, Pocaty River, Ashville Bridge Creek – Lower, and North Landing River – Middle watersheds to achieve the WLAs. The plan uses an adaptive, iterative approach for the

implementation of management controls as discussed Section 6 and in accordance with the schedule and milestones in Section 9.

For each watershed, the range of percent TP reduction for each strategy estimates how much of the overall TP reduction that strategy will achieve to meet the WLA. Some strategies will be more effective than others in the different watersheds based on the existing and future land uses in the watershed, such as amount of agricultural land or City-owned property, and therefore are assigned different percent reductions between the watersheds or are not used in every watershed as provided in Table 9. Progress towards implementing the actions in this plan will be reported to Virginia DEQ in each MS4 Annual Report.

Table 9. Estimated Percent Reductions for Strategies

TMDL Watershed	Strategy	Estimated Percent TP Reduction
Ashville Bridge Creek	SWMFs	60% - 70%
	Fertilizer Reductions	15% - 20%
	Outreach and Education • Pet waste • Livestock waste management outreach • Promoting wildlife management on public lands • Promote septic system maintenance • Promote VACS programs	10% - 25%
	Street Sweeping	<5%
North Landing River	SWMFs	60% - 70%
	Fertilizer Reductions	15% - 20%
	Outreach and Education • Pet waste • Livestock waste management outreach • Promoting wildlife management on public lands • Promote septic system maintenance • Promote VACS programs • To be developed programs	10% - 25%
	Street Sweeping	<5%

Table 9. Estimated Percent Reductions for Strategies

TMDL Watershed	Strategy	Estimated Percent TP Reduction
Northwest River	Fertilizer Reductions	5%-15%
	Street Sweeping	<5%
	Outreach and Education • Pet waste • Livestock waste management outreach • Promote septic system maintenance • Promote VACS programs	80%-90%
Pocaty River	Fertilizer Reductions	5%-30%
	Street Sweeping	<5%
	Outreach and Education • Pet waste • Livestock waste management outreach • Promote septic system maintenance • Promote VACS programs	80%-90%

12 Public Comments on Draft Action Plan

The draft action plan was posted on the City's website at www.vbgov.com/stormwater-program, 2018 with a public notice about the plan and request for public comments. The City accepted public comments for 21 days after the posting. The City held a public meeting to discuss the action plan on May 2, 2018 and there were 23 attendees.

13 References

City of Virginia Beach. 2014. *Turf and Nutrient Management Plan*.

Schueler, T. and Cecilia Lane. 2013. *Recommendations of the Expert Panel to Define Removal Rates for Urban Nutrient Management*. Prepared by Chesapeake Stormwater Network. https://www.chesapeakebay.net/documents/Final_CBP_Approved_Expert_Panel_Report_on_Urban_Nutrient_Management--short.pdf

Virginia Department of Environmental Quality (DEQ). 2010. *Total Maximum Daily Load Development for the Albemarle Canal/North Landing River – A Total Phosphorus TMDL Due to Low Dissolved Oxygen Impairment*

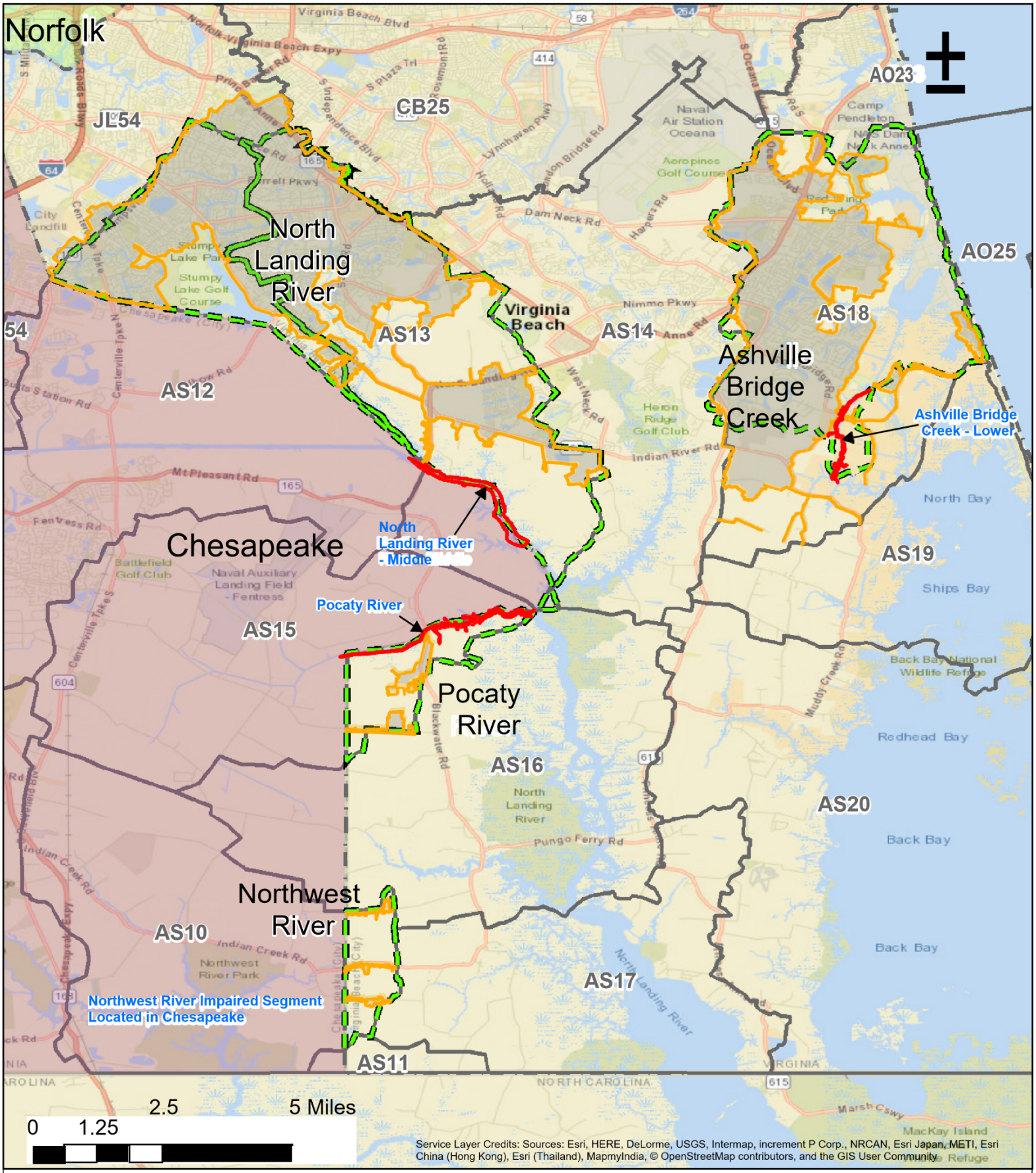
Virginia Department of Environmental Quality (DEQ). 2011. *Total Maximum Daily Load Development for the Northwest River Watershed – A Total Phosphorus TMDL Due to Low Dissolved Oxygen Impairment*

Virginia Department of Environmental Quality (DEQ). 2013. Guidance Memo No. GM-16-2006, *TMDL Action Planning for Local Total Maximum Daily Loads as Required in the Small MS4 General Permit (VAR04) Effective July 1, 2013 and MS4 Individual Permits*.

Virginia Department of Environmental Quality (DEQ). 2013, revised 2014. *Total Maximum Daily Load Development for the Back Bay, North Landing River, and Pocaty River Watersheds - E. coli, and Enterococci Due to Recreation Use Impairments, and Total Phosphorus Due to Low Dissolved Oxygen in Aquatic Life Use Impairments (includes Ashville Bridge Creek and Pocaty River TP TMDLs)*

Virginia Geographic Information Network (VGIN). 2016. Virginia Land Cover dataset. http://vgin.maps.arcgis.com/home/search.html?q=owner%3AVGIN&restrict=false&start=1&sortOrder=desc&sortField=relevance

Attachment 1
TP TMDL Watersheds and MS4 Service Area Figure



Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Legend

- MS4 Service Areas
- Phosphorus TMDL Watersheds within Virginia Beach
- 6th Order Hydrologic Unit Boundary
- Impaired Waterbody
- City of Norfolk
- City of Chesapeake

Virginia Beach Phosphorus TMDL Action Plan MS4 Service Areas

ch2m

City of Virginia Beach Public Works

Attachment 2
City Facilities Evaluated for Significant Sources of Phosphorus

Attachment 2

City Properties Evaluated for Significant Phosphorus Contribution - North Landing River Watershed

Property Address or GPIN	Property Category	Land Use	Parcel Area, acres
1021 PROSPERITY RD	Local Government	Single Family or Duplex	0.43
1025 EAGLEWOOD DR	Local Government	Single Family or Duplex	3.94
1041 WASSERMAN DR	Local Government - Park Areas	Public/Semi Public	4.98
1084 PRINCESS ANNE RD STE VL	Local Government	Unknown	0.34
1098 EAGLEWOOD DR	Local Government	Public/Semi Public	0.87
1100 NIMMO PKWY	Local Government	Single Family or Duplex	0.12
1105 EAGLEWOOD DR	Local Government - Utilities	Single Family or Duplex	0.06
1119 GALLERY CT	Charitable - Housing	Town House	0.08
1122 HUBBELL DR	Local Government - Utilities	Single Family or Duplex	0.07
1136 CROSSWAY RD	Local Government - Park Areas	Public/Semi Public	1.58
1136 PROSPERITY RD	Local Government	Public/Semi Public	294.16
1152 GUNN HALL DR	Local Government - Utilities	Single Family or Duplex	0.34
1180 GUNN HALL DR STE CM	Not available	Single Family or Duplex	0.36
1181 PROSPERITY RD	Local Government	Military Base	131.91
1200 ATLANTIC SHORES DR	Not available	Multi Family	92.27
1200 OCEANA BLVD	Local Government	Undeveloped	22.82
1201 HUBBELL DR	Local Government - Park Areas	Public/Semi Public	25.27
1213 EAGLEWOOD DR STE B	Local Government - Park Areas	Public/Semi Public	7.36
1216 PERIMETER PKWY	Local Government - Utilities	Undeveloped	0.1
1232 FAULKNER RD	Local Government - Utilities	Single Family or Duplex	0.06
1244 OCEANA BLVD	Local Government	Undeveloped	1.83
1251 OCEANA BLVD	Local Government	Single Family or Duplex	1.84
1276 TENNYSON RD	Local Government - Park Areas	Single Family or Duplex	2.01
1289 SANDBRIDGE RD	Local Government - Park Areas	WATER	2.09
1301 BEACONS REACH DR	Local Government - Utilities	Single Family or Duplex	0.04
1308 PARK CENTER DR	Local Government - Utilities	Office	0.23
1317 DERBY RUN	Local Government - Utilities	Undeveloped	0.16
1324 BOARDWALK WAY	Local Government - Utilities	Single Family or Duplex	0.07
1398 SAKURA LN	Local Government - Park Areas	Public/Semi Public	96.96
1497 GALVANI DR	Local Government - Park Areas	Single Family or Duplex	2.26
1568 CORPORATE LANDING PKWY	Local Government - Schools	Undeveloped	9.8
1577 BUNSEN DR	Local Government - Park Areas	Single Family or Duplex	2.85
1581 BUNSEN DR	Local Government - Utilities	Single Family or Duplex	0.12
1582 CORPORATE LANDING PKWY	Local Government - Utilities	Undeveloped	0.1
1590 CORPORATE LANDING PKWY	Local Government - Schools	Public/Semi Public	18.67
1597 CORPORATE LANDING PKWY	Local Government - Schools	Public/Semi Public	36.7

Attachment 2

City Properties Evaluated for Significant Phosphorus Contribution - North Landing River Watershed

1610 SWORD DANCER DR	Local Government - Utilities	Town House	0.16
1616 UPTON DR	Local Government - Schools	Public/Semi Public	21.34
1745 BOX ELDER ARCH	Local Government - Park Areas	Single Family or Duplex	0.46
1791 WELLSFORD DR	Local Government - Utilities	Single Family or Duplex	0.08
1848 PLEASANT RIDGE RD	Local Government	Public/Semi Public	7.18
1860 SANDBRIDGE RD	Local Government - Schools	Public/Semi Public	15.38
*1861 GENERAL BOOTH BLVD STE VL	Local Government	Undeveloped	32.37
1900 GENERAL BOOTH BLVD	Local Government	Single Family or Duplex	0.5
1900 SANDBRIDGE RD	Local Government - Park Areas	Public/Semi Public	16.76
1905 CHAMPION CIR	Local Government - Utilities	Single Family or Duplex	0.05
1916 EASTBORNE DR	Local Government - Park Areas	Public/Semi Public	3.11

Property Address or GPIN	Property Category	Land Use	Parcel Area, acres
1916 UPTON DR	Local Government - Park Areas	Single Family or Duplex	2.06
1940 FISHER ARCH	Local Government - Utilities	Undeveloped	0.25
1949 EMELITA DR	Local Government - Utilities	Single Family or Duplex	0.11
1952 ROSSINI DR	Local Government - Park Areas	Single Family or Duplex	0.67
204 SANDBRIDGE RD STE CM	Not available	Commercial	2.44
2045 HAVILAND DR	Local Government - Utilities	Single Family or Duplex	0.39
2049 UPTON DR STE 1	Local Government - Park Areas	Single Family or Duplex	0.6
2049 UPTON DR STE 2	Local Government - Park Areas	Single Family or Duplex	0.36
2173 PRINCESS ANNE RD	Local Government - Utilities	Undeveloped	4.99
2201 ELSON GREEN AVE	Local Government - Schools	Public/Semi Public	15.2
2205 ALBUQUERQUE DR	Local Government - Utilities	Single Family or Duplex	0.04
2206 NEWSTEAD DR	Local Government - Utilities	Single Family or Duplex	0.18
2348 ELSON GREEN AVE	Local Government - Utilities	Commercial	0.06
2496 ENTRADA DR	Local Government - Utilities	Single Family or Duplex	0.09
2610 ELSON GREEN AVE	Local Government - Utilities	Single Family or Duplex	0.1
2701 ATWOODTOWN RD	Local Government - Park Areas	Single Family or Duplex	1.79
2781 ATWOODTOWN RD	Local Government - Utilities	Single Family or Duplex	0.14
3120 COLECHESTER RD	Homesite Included	Agriculture - Cropland	51.55
316 SHARK LN	Local Government	Water	1.07
3180 NEW BRIDGE RD	Local Government - Park Areas	Undeveloped	35.55
632 FIREFALL DR	Local Government - Park Areas	Marsh	24.66
700 DAM NECK RD	Local Government - Utilities	Multi Family	0.06
800 ARTESIA WAY	Local Government - Utilities	Single Family or Duplex	0.26
801 CASA VERDE WAY	Local Government - Park Areas	Single Family or Duplex	0.87

Attachment 2

City Properties Evaluated for Significant Phosphorus Contribution - North Landing River Watershed

817 ARTESIA WAY	Local Government - Park Areas	Single Family or Duplex	2.68
885 SCHUMANN DR	Local Government - Schools	Public/Semi Public	49.62
900 ARTESIA WAY	Local Government - Utilities	Single Family or Duplex	0.05
916 GIDEON RD	Local Government - Park Areas	Single Family or Duplex	1.28
928 CULVER LN	Local Government - Utilities	Single Family or Duplex	1.44
945 OLD DAM NECK RD	Local Government - Utilities	Single Family or Duplex	0.06
949 S BIRDNECK RD	Local Government - Schools	Public/Semi Public	69
952 CAMINO REAL SOUTH	Local Government - Utilities	Single Family or Duplex	0.14
960 ARTESIA WAY	Local Government - Park Areas	Single Family or Duplex	3.44
980 ARTESIA WAY	Local Government - Park Areas	Single Family or Duplex	1.29
CORPORATE LANDING PKWY	Local Government	Water	6.06
GPIN 24131582990000	Local Government	Undeveloped	1.59
GPIN 24140530200000	Local Government	Undeveloped	17.29
GPIN 24140584500000	Local Government	Undeveloped	2.14
*GPIN 24141017770000	Local Government	Undeveloped	1.27
GPIN 24141142510000	Local Government	Undeveloped	0.62
GPIN 24141153790000	Local Government	Undeveloped	0.21
GPIN 24141379420000	Unknown	Unknown	6.99
GPIN 24141415320000	Unknown	Unknown	15.51
GPIN 24142276260000	Local Government	Multi Family	0.4
GPIN 24143127720000	Unknown	Undeveloped	2.6
GPIN 24143727600000	Local Government	Single Family or Duplex	3.36
GPIN 24144476990000	Local Government	Single Family or Duplex	4.39

Property Address or GPIN	Property Category	Land Use	Parcel Area, acres
GPIN 24144619430000	Local Government	Single Family or Duplex	4.83
GPIN 24145249860000	Local Government	Single Family or Duplex	2.54
GPIN 24145301810000	Local Government	Single Family or Duplex	3.58
GPIN 24145335090000	Local Government	Street Network	0.6
GPIN 24145430530000	Local Government	Single Family or Duplex	1.36
GPIN 24145536510000	Local Government	Undeveloped	0.11
GPIN 24146500910000	Local Government	Single Family or Duplex	0.55
*GPIN 24151235350000	Local Government	Office	143.94
GPIN 24151468590000	Local Government	Undeveloped	14.03
GPIN 24155782490000	Local Government - Park Areas	Undeveloped	0.4
GPIN 24155787840000	Local Government	Undeveloped	1.93
GPIN 24156452510000	Local Government - Park Areas	Single Family or Duplex	0.25

Attachment 2

City Properties Evaluated for Significant Phosphorus Contribution - North Landing River Watershed

GPIN 24156800980000	Local Government	Undeveloped	0.26
GPIN 24157383610000	Unknown	Single Family or Duplex	0.2
GPIN 24157795640000	Local Government	Single Family or Duplex	0.03
GPIN 24158755430000	Local Government	Single Family or Duplex	0.03
GPIN 24159945960000	Local Government	Undeveloped	2.83
GPIN 24165426210000	Local Government	Undeveloped	9.25
GPIN 24230778080000	Local Government - Park Areas	Single Family or Duplex	22.69
GPIN 24240245730000	Local Government	Single Family or Duplex	9.81
GPIN 24243231840000	Local Government	Marsh	17.77
GPIN 24252923600000	Local Government	Military Base	71.45

Attachment 2

City Properties Evaluated for Significant Phosphorus Contribution - North Landing River Watershed

Property Address or GPIN	Property Category	Land Use	Parcel Area, acres
1 INDIAN RIVER RD STE VL	Local Government	Single Family or Duplex	10.37
1016 BELSPRING DR	Local Government - Utilities	Public/Semi Public	0.06
1052 KINDERLY LN	Local Government - Park Areas	Public/Semi Public	8.74
1053 KINDERLY LN	Local Government - Park Areas	Single Family or Duplex	2.08
1139 ORKNEY DR	Local Government - Utilities	Single Family or Duplex	0.04
1300 INDIAN LAKES BLVD	Local Government - Utilities	Single Family or Duplex	0.15
1321 BATTLEFORD DR	Charitable - Housing	Town House	0.09
1342 KEMPSVILLE RD	Local Government	Commercial	0.5
1344 KEMPSVILLE RD	Local Government	Commercial	0.19
1352 KEMPSVILLE RD	Local Government	Commercial	0.09
1354 NORTHVALE DR	Local Government - Utilities	Single Family or Duplex	0.12
1356 HAFFORD RD	Charitable - Housing	Town House	0.05
1356 ORILLIA RD	Charitable - Housing	Town House	0.05
1372 NORTHVALE DR	Charitable - Housing	Single Family or Duplex	0.14
1376 SALEM RD	Local Government	Multi Family	0.09
1397 BRIDLE CREEK BLVD	Local Government - Utilities	Town House	0.06
1416 KEMPSVILLE RD	Local Government	Single Family or Duplex	0.3
1421 DIGHTON CT	Charitable - Housing	Town House	0.1
1465 LAKE CHRISTOPHER DR	Local Government - Utilities	Single Family or Duplex	0.14
1520 SALEM RD	Local Government	Single Family or Duplex	0.35
1524 SALEM RD	Local Government	Single Family or Duplex	0.36
1525 SALEM RD STE P1	Local Government - Park Areas	Undeveloped	9.06
1525 SALEM RD STE P2	Local Government - Park Areas	Single Family or Duplex	1.61
1525 SALEM RD STE P3	Local Government - Park Areas	Undeveloped	10.54
1526 SALEM RD	Local Government	Single Family or Duplex	0.35
1528 SALEM RD	Local Government	Single Family or Duplex	0.34
1530 SALEM RD	Local Government	Single Family or Duplex	0.35
1532 SALEM RD	Local Government	Single Family or Duplex	0.36
1538 SALEM RD	Local Government	Single Family or Duplex	0.31
1577 INDIAN LAKES BLVD	Local Government - Utilities	Multi Family	0.04
1601 SINKING CREEK DR	Local Government	Single Family or Duplex	0.14
1620 RIVERSTONE DR	Charitable - Housing	Town House	0.12

Attachment 2

City Properties Evaluated for Significant Phosphorus Contribution - North Landing River Watershed

1625 LAKE CHRISTOPHER DR	Local Government - Utilities	Single Family or Duplex	0.11
1626 MILL OAK DR	Attached Dwelling	Single Family or Duplex	0.15
1649 WAFF RD	Local Government - Utilities	Single Family or Duplex	0.19
1668 KEMPSVILLE RD	Local Government - Schools	Public/Semi Public	46.19
1680 GREY FRIARS CHASE	Local Government - Park Areas	Single Family or Duplex	2.57
1712 MOONSTONE DR	Local Government - Park Areas	Public/Semi Public	1.93
1716 GREY FRIARS CHASE	Local Government - Schools	Public/Semi Public	15.12
1760 LEGARE LN	Local Government - Park Areas	Single Family or Duplex	0.63
1771 GRAVENHURST DR	Local Government - Utilities	Single Family or Duplex	0.2
1773 HEALD WAY	Local Government - Utilities	Single Family or Duplex	0.08
1827 GREY FRIARS CHASE	Local Government - Utilities	Single Family or Duplex	0.04
1833 BURWILLOW DR	Local Government - Park Areas	Single Family or Duplex	0.53
1841 GRAVENHURST DR	Local Government - Park Areas	Undeveloped	13.08
1848 CENTENNIAL CIR	Local Government - Park Areas	Public/Semi Public	2.01

Property Address or GPIN	Property Category	Land Use	Parcel Area, acres
1852 HEALD WAY	Local Government - Utilities	Single Family or Duplex	0.09
1909 STILLMEADOW CT	Local Government - Park Areas	Single Family or Duplex	0.23
1917 KEMPSVILLE CROSSING LN	Local Government - Park Areas	Single Family or Duplex	0.82
1925 SALEM RD	Local Government - Utilities	Multi Family	0.05
1933 STILLWOOD LN	Local Government - Park Areas	Public/Semi Public	1.14
1942 ROCK LAKE LOOP	Local Government - Utilities	Single Family or Duplex	0.06
1960 JOHN BROWN LN	Local Government - Park Areas	Undeveloped	1.65
1980 BRECK AVE	Not available	Public/Semi Public	0.17
1985 SUNDEVIL DR	Local Government - Utilities	Public/Semi Public	0.09
1993 SUNDEVIL DR	Local Government - Schools	Public/Semi Public	50.12
2001 CONCERT DR	Local Government - Schools	Public/Semi Public	65.16
2044 LANDSTOWN CENTRE WAY	Local Government	Public/Semi Public	121.6
2056 SALEM RD	Local Government	Single Family or Duplex	0.29
2058 SALEM RD	Local Government	Single Family or Duplex	0.3
2068 LANDSTOWN CENTRE WAY	Local Government - Park Areas	Public/Semi Public	128.21
2080 CENTENNIAL CIR	Local Government - Park Areas	Public/Semi Public	3.2
2095 LYNDORA RD	Charitable - Housing	Town House	0.11
2096 BRUSH HILL LN	Local Government - Park Areas	Public/Semi Public	1.87

Attachment 2

City Properties Evaluated for Significant Phosphorus Contribution - North Landing River Watershed

2100 EAGLE ROCK RD	Local Government - Utilities	Single Family or Duplex	0.31
2101 SALEM RD	Local Government	Single Family or Duplex	0.34
2150 LYNNHAVEN PKWY	Local Government	Public/Semi Public	12.53
2152 LANDSTOWN RD	Local Government - Park Areas	Public/Semi Public	8.31
2164 LANDSTOWN RD	Local Government - Utilities	Public/Semi Public	0.25
2181 RECREATION DR	Local Government - Utilities	Public/Semi Public	0.17
2185 RECREATION DR	Local Government	Public/Semi Public	221.77
2185 S INDEPENDENCE BLVD	Local Government - Utilities	Commercial	0.13
2201 CENTERVILLE TPKE	Local Government - Schools	Public/Semi Public	15.09
2204 RECREATION DR	Local Government - Schools	Public/Semi Public	49.99
2212 SALEM RD	Local Government - Utilities	Single Family or Duplex	0.04
2213 ROUND HILL DR	Local Government - Schools	Public/Semi Public	24.64
2235 MARGARET DR	Local Government - Utilities	Single Family or Duplex	0.11
2276 NATOMA DR	Local Government	Single Family or Duplex	4.88
2285 LANDSTOWN RD	Local Government	Single Family or Duplex	0.72
*2287 LANDSTOWN RD	Local Government	Undeveloped	18.63
2289 LYNNHAVEN PKWY	Local Government	Public/Semi Public	7.55
2300 LYNNHAVEN PKWY	Local Government - Park Areas	Public/Semi Public	5.27
*2325 SALEM RD	Local Government	Single Family or Duplex	9.51
2356 SALEM RD	Local Government	Marsh	12.34
2380 LYNNHAVEN PKWY	Local Government - Schools	Public/Semi Public	34.2
2400 ORCHARD HILL LN	Local Government	Undeveloped	0.33
2400 TOURNAMENT DR	Local Government	Public/Semi Public	408.48
2401 ORCHARD HILL LN	Local Government	Undeveloped	1.28
2405 SALEM RD	Local Government - Utilities	Public/Semi Public	0.18
2433 SALEM RD	Local Government	Marsh	2.07
2437 SALEM RD	Local Government	Undeveloped	6.23
2441 ROUND HILL DR	Local Government - Park Areas	Single Family or Duplex	1.02

Property Address or GPIN	Property Category	Land Use	Parcel Area, acres
2464 SAVANNAH TRL	Local Government - Park Areas	Undeveloped	2.21
2496 ORCHARD HILL LN	Local Government	Undeveloped	1.33
2500 TOURNAMENT DR STE TP	Local Government	Public/Semi Public	0.02
*2508 SALEM RD	Local Government	Proposed Development	7.1

 *Denotes Field Investigated Parcel

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City Properties Evaluated for Significant Phosphorus Contribution - North Landing River Watershed

2509 SALEM RD	Local Government	Single Family or Duplex	0.3
2514 SALEM RD	Local Government	Proposed Development	0.39
2524 LIFETIME CIR	Local Government	Single Family or Duplex	8.95
2525 LIFETIME CIR	Local Government	Single Family or Duplex	0.96
2533 LIFETIME CIR	Local Government	Single Family or Duplex	1.08
2561 SALEM RD	Local Government	Marsh	18.41
2604 HIGHLAND DR	Local Government	Single Family or Duplex	2.99
2615 GAINES MILL DR	Local Government - Utilities	Single Family or Duplex	0.06
2640 HIGHLAND MEADOWS WAY	Local Government - Park Areas	Public/Semi Public	4.38
2665 WEST NECK RD	Local Government - Schools	Single Family or Duplex	104.98
2677 WEST NECK PKWY	Local Government - Utilities	Public/Semi Public	0.14
*2813 TWO FARMS LN	Local Government	Undeveloped	4.46
2848 INDIAN RIVER RD	Local Government	Single Family or Duplex	2.1
*2848 INDIAN RIVER RD STE VL	Local Government	Public/Semi Public	25.7
2865 INDIAN RIVER RD	Local Government	Agriculture - Cropland	772.48
2868 INDIAN RIVER RD	Local Government	Undeveloped	1.28
2876 INDIAN RIVER RD	Local Government	Single Family or Duplex	0.84
2925 NORTH LANDING RD	Local Government - Schools	Public/Semi Public	40.03
2961 CHILTON PL	Local Government - Utilities	Public/Semi Public	0.15
3001 PRINCESS ANNE RD	Local Government	Public/Semi Public	4.95
3253 PRINCESS ANNE RD	Local Government	Public/Semi Public	0.57
*3320 NORTH LANDING RD	Local Government	Undeveloped	3.2
*3400 NORTH LANDING RD	Local Government	Undeveloped	8.96
3521 INDIAN RIVER RD	Local Government	Single Family or Duplex	27.14
*3548 WINSTON AVE	Local Government	Undeveloped	56.76
3592 INDIAN RIVER RD	Local Government	Proposed Development	51.02
3597 INDIAN RIVER RD	Local Government	Undeveloped	7.66
3685 INDIAN RIVER RD STE VL	Local Government	Marsh	11.08
3701 INDIAN RIVER RD STE VL	Local Government	Single Family or Duplex	69.54
3740 DAM NECK RD	Local Government - Park Areas	Park	13.92
3781 INDIAN RIVER RD	Local Government - Utilities	Single Family or Duplex	0.08
3805 MIDDLEHAM DR	Local Government - Park Areas	Public/Semi Public	1.81
3808 AVA WAY	Not available	Undeveloped	0.19

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City Properties Evaluated for Significant Phosphorus Contribution - North Landing River Watershed

3808 DONNINGTON DR	Local Government	Public/Semi Public	0.18
3832 BUCKHORN PL	Local Government - Utilities	Single Family or Duplex	0.14
3904 INDIAN RIVER RD	Local Government	Single Family or Duplex	0.75
3921 INDIAN RIVER RD	Local Government	Single Family or Duplex	0.74
3924 INDIAN RIVER RD	Local Government	Undeveloped	9.11
3925 AVA WAY	Not available	Undeveloped	0.17
3925 INDIAN RIVER RD	Local Government	Undeveloped	3.91
3926 BORDER WAY	Local Government - Utilities	Undeveloped	0.05
3933 LANTANA PL	Charitable - Housing	Single Family or Duplex	0.05

Property Address or GPIN	Property Category	Land Use	Parcel Area, acres
3949 SHOOTING STAR DR	Local Government - Utilities	Single Family or Duplex	0.25
3961 SALEM LAKES BLVD	Local Government - Schools	Public/Semi Public	14.22
4001 DAM NECK RD	Local Government - Park Areas	Public/Semi Public	90.03
4001 DAM NECK RD STE VL	Local Government - Park Areas	Public/Semi Public	89.94
4001 DAM NECK RD STE VL1	Local Government - Park Areas	Public/Semi Public	67.44
4008 ELBOW RD	Local Government	Single Family or Duplex	0.29
4029 RAINBOW DR	Charitable - Housing	Single Family or Duplex	0.12
4052 RAINBOW DR	Local Government - Park Areas	Public/Semi Public	4.93
4076 WARE NECK DR	Local Government - Park Areas	Public/Semi Public	3.61
4077 WARE NECK DR	Local Government - Park Areas	Public/Semi Public	13.81
4081 ELBOW RD	Local Government	Undeveloped	26.41
4101 ELBOW RD	Local Government	Undeveloped	17.47
4125 ZODIAC LN	Local Government	Single Family or Duplex	0.23
4136 DAM NECK RD	Local Government - Schools	Public/Semi Public	15.39
4141 DAM NECK RD	Local Government	Public/Semi Public	48.65
4153 DAM NECK RD	Local Government	Public/Semi Public	26.45
*4153 DAM NECK RD STE VL	Local Government	Public/Semi Public	15.86
4180 O HARE DR	Local Government - Schools	Public/Semi Public	14.98
4196 PLEASANT VALLEY RD	Local Government	Public/Semi Public	1.5
4276 ELBOW RD	Local Government	Single Family or Duplex	0.12
4300 INDIAN RIVER RD	Local Government	Single Family or Duplex	0.34
4309 HILLCREST FARMS CIR	Local Government - Utilities	Public/Semi Public	0.08
4327 INDIAN RIVER RD	Local Government - Utilities	Single Family or Duplex	1.39

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City Properties Evaluated for Significant Phosphorus Contribution - North Landing River Watershed

4360 PLEASANT VALLEY RD	Local Government - Park Areas	Public/Semi Public	3.63
4416 PRINCESS ANNE RD	Not available	Undeveloped	11.36
4468 PADDOCK LN	Local Government - Park Areas	Public/Semi Public	3
4601 GLENCOE LN	Charitable - Housing	Town House	0.1
4629 BERRYWOOD RD	Local Government - Park Areas	Public/Semi Public	2.95
*4680 INDIAN RIVER RD STE VL	Local Government	Undeveloped	4.62
4683 BERRYWOOD RD	Local Government - Utilities	Single Family or Duplex	0.07
4702 ORCHARD LN	Local Government - Utilities	Single Family or Duplex	0.12
4706 FREEWOOD CT	Local Government - Utilities	Single Family or Duplex	0.13
4728 REVERE DR	Local Government - Utilities	Single Family or Duplex	0.12
4756 INDIAN RIVER RD STE VL	Local Government	Single Family or Duplex	0.7
4757 ARDMORE LN	Local Government - Park Areas	Public/Semi Public	1.05
4797 INDIAN RIVER RD	General Commercial	Public/Semi Public	347.78
4968 INDIAN RIVER RD	Local Government - Utilities	Undeveloped	5
5001 INDIAN RIVER RD	Local Government	Public/Semi Public	0.22
5023 PROVIDENCE RD	Local Government - Utilities	Single Family or Duplex	0.08
5069 INDIAN RIVER RD	Local Government	Single Family or Duplex	0.33
5123 EAGLE RUN RD	Local Government - Utilities	Single Family or Duplex	0.13
5140 HALIFAX DR	Local Government - Utilities	Public/Semi Public	0.04
5160 SETTLERS PARK DR	Charitable - Housing	Town House	0.04
5209 STRATFORD CHASE DR	Local Government - Utilities	Single Family or Duplex	0.17
5222 SETTLERS PARK DR	Charitable - Housing	Town House	0.09
5254 INDIAN RIVER RD	Local Government	Commercial	0.54

Property Address or GPIN	Property Category	Land Use	Parcel Area, acres
5277 LYNNHAVEN PKWY	Local Government - Park Areas	Public/Semi Public	4.52
5339 ALBRIGHT DR	Local Government - Utilities	Single Family or Duplex	0.09
5356 BEAUFAIN BLVD	Local Government - Utilities	Single Family or Duplex	0.14
5569 GLEN VIEW DR	Local Government - Park Areas	Public/Semi Public	1.9
5592 LYNNHAVEN PKWY	Local Government - Park Areas	Public/Semi Public	7.19
5620 GLEN VIEW DR	Local Government - Utilities	Single Family or Duplex	0.06
900 MINDEN RD	Local Government - Park Areas	Public/Semi Public	5.56
902 CHARLESTOWN DR	Local Government - Utilities	Single Family or Duplex	0.13
906 KEMPSVILLE RD	Local Government - Utilities	Public/Semi Public	0.71

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City Properties Evaluated for Significant Phosphorus Contribution - North Landing River Watershed

908 EASTWIND RD	Local Government	Single Family or Duplex	0.92
955 OUTERBRIDGE QUAY	Local Government - Utilities	Single Family or Duplex	0.08
960 ELLIOT RD	Local Government		18.58
ELBOW RD STE VL	Local Government	Undeveloped	39.72
GPIN 14559273430000	Local Government	Commercial	1.8
GPIN 14642617230000	Local Government - Utilities	Single Family or Duplex	0.06
GPIN 14642977090000	Local Government - Park Areas	Single Family or Duplex	7.04
GPIN 14642999110000	Local Government - Park Areas	Single Family or Duplex	0.88
GPIN 14642999270000	Local Government - Park Areas	Single Family or Duplex	0.9
GPIN 14652090270000	Local Government - Park Areas	Single Family or Duplex	1.38
GPIN 14652094310000	Local Government - Park Areas	Single Family or Duplex	10.46
GPIN 14652165810000	Local Government - Park Areas	Public/Semi Public	6.62
GPIN 14652171630000	Local Government - Park Areas	Public/Semi Public	0.83
GPIN 14654002920000	Local Government - Park Areas	Single Family or Duplex	3.52
GPIN 14657047770000	Local Government - Park Areas	Water	695.93
GPIN 14657317340000	Local Government - Park Areas	Public/Semi Public	4.28
GPIN 14657387850000	Local Government	Undeveloped	0.12
GPIN 14657444080000	Local Government	Single Family or Duplex	0.18
GPIN 14657444730000	Local Government	Single Family or Duplex	0.22
GPIN 14657461940000	Local Government	Single Family or Duplex	0.13
GPIN 14657462320000	Local Government	Single Family or Duplex	0.14
GPIN 14657715400000	Local Government	Undeveloped	2.66
GPIN 14659599510000	Local Government	WATER	0.17
GPIN 14669070950000	Local Government - Utilities	Public/Semi Public	0.51
GPIN 14669225880000	Local Government	Single Family or Duplex	0.47
GPIN 14669226280000	Local Government	Single Family or Duplex	0.04
GPIN 14741759810000	Local Government	Undeveloped	1.56
GPIN 14741833200000	Local Government	Undeveloped	0.91
GPIN 14741842350000	Local Government	Undeveloped	0.39
GPIN 14742981760000	Local Government - Utilities	Public/Semi Public	0.06
GPIN 14743548770000	Local Government	Undeveloped	0.81
GPIN 14743584370000	Local Government	Single Family or Duplex	0.43
GPIN 14744394640000	Local Government	Single Family or Duplex	0.9
GPIN 14744515700000	Local Government	Single Family or Duplex	0.35

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City Properties Evaluated for Significant Phosphorus Contribution - North Landing River Watershed

GPIN 14744550560000	Unknown	Single Family or Duplex	0.51
GPIN 14745278600000	Local Government	Single Family or Duplex	6.94
GPIN 14745284470000	Local Government	Single Family or Duplex	2.52

Property Address or GPIN	Property Category	Land Use	Parcel Area, acres
GPIN 14745555540000	Local Government - Park Areas	Undeveloped	1.67
GPIN 14746224010000	Local Government	Undeveloped	1.99
GPIN 14747015780000	Local Government	Single Family or Duplex	37.04
GPIN 14747478260000	Local Government	Undeveloped	36.34
GPIN 14747722700000	Local Government	Undeveloped	1.85
GPIN 14747746810000	Local Government	Undeveloped	2.41
GPIN 14748333070000	Local Government	Undeveloped	30.75
GPIN 14749334630000	Local Government	Undeveloped	3.01
GPIN 14749400050000	Local Government	Undeveloped	17.46
GPIN 14749801940000	Local Government	Undeveloped	0.13
GPIN 14749876710000	Local Government - Park Areas	Public/Semi Public	1.61
GPIN 14750735990000	Local Government	Single Family or Duplex	0.16
GPIN 14752816610000	Unknown	Unknown	16.11
GPIN 14753417840000	Local Government	Undeveloped	0.73
GPIN 14757536800000	Local Government	Single Family or Duplex	0.62
GPIN 14757544100000	Local Government	Single Family or Duplex	0.39
GPIN 14757789590000	Local Government	Undeveloped	0.04
GPIN 14757810720000	Local Government	Undeveloped	4.17
GPIN 14757828210000	Local Government	Street Network	0.89
GPIN 14757849050000	Local Government	Street Network	1.02
GPIN 14757852980000	Local Government	Undeveloped	2.36
GPIN 14758627790000	Local Government	Single Family or Duplex	0.34
GPIN 14758720710000	Local Government	Undeveloped	0.37
GPIN 14759381890000	Local Government - Park Areas	Single Family or Duplex	0.09
GPIN 14830897590000	Local Government	Single Family or Duplex	0.42
GPIN 14831664290000	Local Government	Marsh	53.77
GPIN 14832802970000	Local Government - Park Areas	Marsh	49.22
GPIN 14832940010000	Local Government	Undeveloped	4.92
GPIN 14833459740000	Local Government	Marsh	51.08

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City Properties Evaluated for Significant Phosphorus Contribution - North Landing River Watershed

GPIN 14834614490000	Local Government	Marsh	33.05
GPIN 14835648900000	Local Government	Undeveloped	0.36
*GPIN 14835762670000	Local Government	Undeveloped	25.99
GPIN 14835801000000	Local Government	Undeveloped	46.59
GPIN 14835919070000	Local Government	Undeveloped	0.77
*GPIN 14835984900000	Local Government	Undeveloped	16.5
*GPIN 14836849390000	Local Government	Undeveloped	23.61
*GPIN 14839567560000	Local Government	Proposed Development	186.43
*GPIN 14839729770000	Local Government	Proposed Development	2.18
*GPIN 14839850010000	Local Government	Undeveloped	2.19
*GPIN 14839870340000	Local Government	Undeveloped	2.2
GPIN 14840119440000	Local Government	Single Family or Duplex	4.11
GPIN 14841092710000	Local Government - Park Areas	Marsh	30.02
GPIN 14841582690000	Local Government	Unknown	1.24
GPIN 14842159940000	Local Government	Proposed Development	12.84
GPIN 14842160470000	Local Government	Undeveloped	19.74
GPIN 14842377320000	Local Government - Utilities	Public/Semi Public	0.03

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City Properties Evaluated for Significant Phosphorus Contribution - North Landing River Watershed

Property Address or GPIN	Property Category	Land Use	Parcel Area, acres
GPIN 14842746250000	Local Government	Single Family or Duplex	0.05
GPIN 14843089940000	Local Government	Single Family or Duplex	1.01
GPIN 14843199640000	Local Government	Proposed Development	9.55
GPIN 14843785420000	Local Government	Public/Semi Public	25.62
GPIN 14844006240000	Local Government	Undeveloped	0.99
GPIN 14844101900000	Local Government	Proposed Development	17.4
GPIN 14844752050000	Local Government	Public/Semi Public	18.18
GPIN 14845030220000	Local Government	Undeveloped	2.16
GPIN 14845080550000	Local Government	Undeveloped	1.54
GPIN 14845175050000	Local Government	Undeveloped	25.2
GPIN 14845210230000	Local Government	Undeveloped	82.18
GPIN 14846037260000	Local Government	Undeveloped	23.85
GPIN 14846125060000	Local Government	Undeveloped	31.85
*GPIN 14847126330000	Local Government	Undeveloped	67.55
*GPIN 14848172960000	Local Government	Undeveloped	198.85
GPIN 14848718190000	Local Government	Public/Semi Public	2.8
GPIN 14848826920000	Local Government	Public/Semi Public	11.38
*GPIN 14849482430000	Local Government	Undeveloped	69
GPIN 14852100850000	Local Government	Single Family or Duplex	0.19
GPIN 14853466670000	Local Government	Undeveloped	3.19
GPIN 14853494140000	Local Government	Undeveloped	3.96
GPIN 14854421540000	Local Government	Undeveloped	2.51
*GPIN 14930800950000	Local Government	Undeveloped	2.1
*GPIN 14930820560000	Local Government	Undeveloped	2.25
GPIN 14931165710000	Local Government	Marsh	21.15
GPIN 14933545500000	Local Government	Single Family or Duplex	2.69
*GPIN 14940214760000	Local Government	Undeveloped	122.83
*GPIN 14940352370000	Local Government	Undeveloped	46.15
*GPIN 14941372020000	Local Government	Undeveloped	24.46
GPIN 14942668190000	Local Government	Public/Semi Public	13.03
GPIN 14942736290000	Local Government	Public/Semi Public	0.82
GPIN 14944125820000	Local Government	Undeveloped	0.51
GPIN 14750666170000	Local Government	Undeveloped	2.66

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City Properties Evaluated for Significant Phosphorus Contribution - North Landing River Watershed