CHESAPEAKE BAY TMDL ACTION PLAN

MARINE CORPS BASE QUANTICO
QUANTICO, VIRGINIA

NOVEMBER 2015

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LIST OF ACRONYMS AND ABBREVIATIONS

BEQ	Bachelor Enlisted Quarters
Bldg	Building
BMP	Best Management Practice
CBAP	Chesapeake Bay Action Plan
CBP	Chesapeake Bay Program
DEA	Drug Enforcement Administration
DoD	Department of Defense (U.S.)
DOJ	Department of Justice
DON	Department of the Navy
E&SC	Erosion and Sediment Control
EISA	Energy Independence and Security Act
EOS	Edge of Stream
FBI	Federal Bureau of Investigation
FY	Fiscal Year
GCP	General Construction Permit
GIS	Geographic Information Systems
lbs	pounds
LID	Low Impact Development
LF	Linear Feet
MCBQ	Marine Corps Base Quantico
MCIA	Marine Corps Intelligence Activity
MCIOC	Marine Corps Information Operations Center
MCM	Minimum Control Measure
MCNOSC	Marine Corps Network Operations Security Center
MCU	Marine Corps University
MDIA	Military Department Investigation Agencies
MEP	Maximum Extent Practicable
MOU	Memorandum of Understanding
MS4	Municipal Separate Storm Sewer System
MSG	Marine Security Guard
NMP	Nutrient Management Plan
NREA	Natural Resources and Environmental Affairs
OCS	Officer Candidate School
OWS	Oil/Water Separator
P	Phosphorus
POC(s)	Pollutant(s) of Concern
PPV	Public/Private Venture
SNCO	Senior Non-Commissioned Officer
TBS	The Basic School
TECOM	Training and Education Command
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TP	Total Phosphorus
TSS	Total Suspended Solids

LIST OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

UFC	United Facilities Criteria
U.S.	United States
VA	Virginia
VAC	Virginia Administrative Code
VDEQ	Virginia Department of Environmental Quality
Veg.	Vegetation
VPDES	Virginia Pollutant Discharge Elimination System
w/	With
w/o	Without
WIP	Watershed Implementation Plan
WTBn	Weapons Training Battalion
WWTP	Wastewater Treatment Plant
Yr	year

EXECUTIVE SUMMARY

The Virginia Administrative Code (VAC) under 9VAC25-890 and General Permit Number VAR040069 provide the General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4s) (Virginia Small MS4 General Permit). Operators of small MS4s in urbanized areas as defined by the decennial Census, such as Marine Corps Base Quantico (MCBQ), are subject to the requirements of the Virginia Small MS4 General Permit. Due to MCBQ's location within the Chesapeake Bay Watershed, in accordance with Section I.C of the Virginia Small MS4 General Permit, MCBQ is required to develop a Chesapeake Bay Total Maximum Daily Load (TMDL) Action Plan (CBAP).

This document provides the CBAP for MCBQ. This document meets the CBAP requirements in the Virginia Small MS4 General Permit. This document also meets the requirements contained within the Virginia Department of Environmental Quality (VDEQ) Water Division Guidance Memo No. 15-2005 dated 18 May 2015 (2015 VDEQ Guidance Memo) that provides guidance on procedures to meet the Chesapeake Bay TMDL Special Condition requirements in the 2013-2018 Virginia Small MS4 General Permit. This CBAP is valid for the current permit cycle (1 July 2013 through 30 June 2018).

Based on the evaluation completed and documented in this plan, MCBQ meets the required reductions for the current permit cycle and no additional offsets are required based on a review of the CBAP requirements. This is because:

- MCBQ's existing best management practices (BMPs) treat sufficient Existing Sources[1] to meet the required reductions, and
- Post-development stormwater runoff quality from MCBQ's New Sources[2] is treated in accordance with the governing General Permit for Discharges of Stormwater from Construction Activities (General Construction Permit or GCP) and do not require additional offsets as a result.

Where offsets are required from future New Sources, surplus offsets from existing BMPs, BMPs planned for implementation this permit cycle, and/or Nutrient Trading from MCBQ's Mainside Wastewater Treatment Plant (WWTP) will provide the nutrient offsets needed. Surplus reduction credits may be applied toward the required reductions for Existing Sources for the next permit cycle (1 July 2018 to 30 June 2023).

After this plan is submitted to the VDEQ by MCBQ, unless specifically denied in writing by the VDEQ, this plan becomes effective and enforceable 90 days after the date received by the VDEQ.

[1] According to Section I.C of the Virginia Small MS4 General Permit, and the 2015 VDEQ Guidance Memo, "Existing Sources" means pervious and impervious urban land uses served by the MS4 as of 30 June 2009.

[2] According to Section I.C of the Virginia Small MS4 General Permit, and the 2015 VDEQ Guidance Memo, "New Sources" means pervious and impervious urban land uses served by the MS4 developed or redeveloped on or after 1 July 2009.

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1.0 INTRODUCTION

The Virginia Administrative Code (VAC) under 9VAC25-890 and Permit Number VAR040069 provide the General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4s) (Virginia Small MS4 General Permit). Operators of small MS4s in urbanized areas as defined by the decennial Census, such as Marine Corps Base Quantico (MCBQ), are subject to the requirements of the Virginia Small MS4 General Permit. MCBQ's location within the Chesapeake Bay Watershed and Section I.C of the Virginia Small MS4 General Permit require MCBQ to develop a Chesapeake Bay Total Maximum Daily Load (TMDL) Action Plan (CBAP).

This document provides the CBAP for MCBQ. This document meets the CBAP requirements in the Virginia Small MS4 General Permit and the provisions in the Virginia Department of Environmental Quality (VDEQ) Water Division Guidance Memo No. 15-2005 dated 18 May 2015 (2015 VDEQ Guidance Memo), which provides guidance on procedures to meet the Chesapeake Bay TMDL Special Condition requirements in the Virginia Small MS4 General Permit. This CBAP is valid for the current permit cycle (1 July 2013 through 30 June 2018).

The Virginia Small MS4 General Permit requires that MCBQ complete the CBAP within 24 months of permit coverage and submit it to the VDEQ with the Annual Report for the permit year during which the plan was developed. After this plan is submitted to the VDEQ by MCBQ, unless specifically denied in writing by the VDEQ, this plan becomes effective and enforceable 90 days after the date received by the VDEQ.

The format, organization and content of this document are consistent with the 2015 VDEQ Guidance Memo. The remainder of this CBAP is organized as follows:

- Section 2 provides a review of MCBQ's current MS4 Program and the legal authority that MCBQ possesses to implement its MS4 Program.
- Section 3 discusses any new or modified legal authorities that MCBQ plans to establish.
- Section 4 provides a narrative that discusses in general terms, the means and methods to address New Sources developed on or after 1 July 2009 at MCBQ.
- Section 5 presents, for the regulated MS4 boundary, the urban land uses (Existing Sources) at MCBQ, the Existing Source loads, and the required nutrient and sediment reductions from the Existing Sources.
- Section 6 provides the means and methods (i.e., stormwater best management practices) that MCBQ will utilize to meet the required reductions from Existing Sources. Methods for determining treatment areas and reduction efficiencies for stormwater best management practices (BMPs) are provided. Existing BMPs and

planned BMPs are described and their reduction credits presented. MCBQ's progress in evaluating additional potential BMPs is described.

- Section 7 provides the means and methods to offset increased loads from New Sources, for permittees that have adopted an average land cover condition >16% impervious cover for the design of post-development stormwater management facilities under the Chesapeake Bay Preservation Act.

- Section 8 provides the means and methods to offset increased loads from grandfathered projects, for permittees that have adopted an average land cover condition >16% impervious cover for the design of post-development stormwater management facilities under the Chesapeake Bay Preservation Act.

- Section 9 provides discussion of future projects and associated acreage that qualify as grandfathered.

- Section 10 addresses the costs to implement the necessary reductions in total nitrogen (TN), total phosphorus (TP), and total suspended solids (TSS).

- Section 11 describes the public comment process and period for advertising the CBAP to the public.

- Section 12 provides discussion and recommendations, including information regarding CBAP submittal and implementation, Annual Report development, and reapplication requirements pertaining to the CBAP for the next permit cycle.

- Section 13 contains the references used in this document.

2.0 CURRENT PROGRAM AND EXISTING LEGAL AUTHORITY

This section provides a review of MCBQ's current MS4 Program and the legal authority that MCBQ possesses to implement its MS4 Program which includes the operator's ability to ensure compliance with permit Section I.C requiring the permitted party to fulfill Section I.C.2.a(1) of the Virginia Small MS4 General Permit. This section also provides a summary of the other regulations and policies that require MCBQ to reduce pollutants in stormwater runoff, thereby facilitating compliance with the CBAP.

2.1 MS4 Program

MCBQ's MS4 Program Plan details its program to be implemented under the Virginia Small MS4 General Permit to reduce pollutants in the stormwater discharged from the MS4. The MS4 Program Plan includes discussion of how MCBQ plans to meet each of the six Minimum Control Measures (MCMs) identified in the Virginia Small MS4 General Permit.

According to Section I.C.3 of the Virginia Small MS4 General Permit, the implementation of the following MS4 Program components represents implementation of the CBAP to the maximum extent practicable (MEP) and demonstrates adequate progress.

- Implementation of Nutrient Management Plans (NMPs) in accordance with the schedule identified in the MCM in Section II of the Virginia Small MS4 General Permit related to pollution prevention/good housekeeping for municipal operations. MCBQ initiated a contract in September 2015 to develop an installation-wide NMP for all turf and landscape areas, greater than one acre in size, that receive regular fertilization. The NMP is expected to be submitted with the October 2016 Annual Report or earlier.

- Implementation of the MCM in Virginia Small MS4 General Permit Section II related to construction site stormwater runoff to address discharges from Transitional Sources.[3] MCBQ's plans for complying with this MCM are addressed in more detail in Section 9.0 of the MS4 Program Plan.

- Implementation of the means and methods to address discharges from New Sources[4] in accordance with the MCM in Virginia Small MS4 General Permit Section II related to post-construction stormwater management in new development and development of prior developed lands, in order to offset 5.0% of the total increase in pollutant of concern (POC) loads between 1 July 2009 and 30 June 2014, where applicable. Increases in the POC load from grandfathered projects initiating construction after 1 July 2014 must be offset prior to completion of the project; however, MCBQ does not have grandfathered projects. MCBQ's plans for complying with this MCM are addressed in more detail in Sections 4, 7, 8, and 9 of this CBAP.

- Implementation of the means and methods sufficient to meet the required reductions of POC loads from Existing Sources[5] in accordance with the CBAP are further addressed in Section 6 of this plan.

2.2 Legal Authorities

MCBQ has the appropriate legal authorities and ability to ensure compliance with Virginia Small MS4 General Permit Section I.C. MCBQ is a United States Marine Corps (USMC) installation and has direct legal authority over use and condition of the land and infrastructure it owns and operates within its legal boundaries, except for the following areas where the

[3] According to Section I.C of the Virginia Small MS4 General Permit, and the 2015 VDEQ Guidance Memo, "Transitional Sources" are regulated land disturbing activities that are temporary in nature and discharge through the MS4.

[4] According to Section I.C of the Virginia Small MS4 General Permit, and the 2015 VDEQ Guidance Memo, "New Sources" means pervious and impervious urban land uses served by the MS4 developed or redeveloped on or after 1 July 2009.

[5] According to Section I.C of the Virginia Small MS4 General Permit, and the 2015 VDEQ Guidance Memo, "Existing Sources" means pervious and impervious urban land uses served by the MS4 as of 30 June 2009.

USMC does not have stormwater compliance responsibilities. Therefore, certain excepted land and infrastructure is not covered by this CBAP.

- The historic Town of Quantico, located within the MCBQ fence line, is neither owned nor operated by MCBQ.

- Parcels leased to and operated by the Department of Justice (DOJ) for use by the Federal Bureau of Investigation (FBI) and the Drug Enforcement Administration (DEA). These parcels have separate coverage under the Virginia Small MS4 General Permit; therefore, stormwater activities are managed and permitted independent of MCBQ.

In addition, as a federal facility, MCBQ is responsible for managing stormwater and the MS4 system on its property. MCBQ understands that it is responsible, through its contractors, to obtain the appropriate Construction General Permits and follow the prescribed requirements as they pertain to construction projects. MCBQ is required to comply with the Construction General Permit for construction projects disturbing 2,500 square feet or greater as described in Section 9 of the MS4 Program Plan.

Lastly, enforcement language is included in contract documents which require the contractor to take immediate corrective action in the event of noncompliance. In addition, MCBQ requires the contractor to ensure their employees are aware of how these requirements affect the work performed under the contract.

Other Pertinent Regulations and Policies

MCBQ ensures compliance with the following regulations and policies for all projects on the installation.

- The Department of Defense (DoD) has published a United Facilities Criteria (UFC) entitled "Design: Low Impact Development" (UFC 3-210-10, 1 July 2015). The DoD requires that all facilities development projects use the UFC. The incorporation of Low Impact Development (LID) into the general construction requirements provides for increased stormwater management of both quantity and quality, thus protecting rivers, streams and water bodies of the country.

- On 16 November 2007, the Department of the Navy's (DON) policy for Storm Water Management, or LID policy letter, was issued. It sets a goal that major renovation and construction projects are to have no net increase in stormwater volume and sediment or nutrient loading, and to reduce reliance on traditional stormwater treatment options and collection systems. Major construction is defined by DON as any project exceeding $750,000.00. To meet this goal, the policy letter instructs the Navy and Marine Corps to incorporate LID practices in to all major renovation and construction projects starting in FY2011.

- On 19 December 2007, the Energy Independence and Security Act of 2007 (EISA) was signed into law. A provision located in Title IV ("Energy Savings in Building and Industry"), Subtitle C "(High Performance Federal Buildings") requires projects involving a Federal facility with a footprint that exceeds 5,000 square feet to "use site planning, design, construction, and maintenance strategies for the property to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow."

3.0 NEW OR MODIFIED LEGAL AUTHORITY

According to the Virginia Small MS4 General Permit Section I.C.2.a(2), MCBQ must identify any new or modified legal authorities such as ordinances, state and other permits, orders, specific contract language, and interjurisdictional agreements implemented or needing to be implemented to meet the requirements of Virginia Small MS4 General Permit Section I.C. It has been determined that no new legal authorities are required for permit compliance.

4.0 MEANS AND METHODS TO ADDRESS DISCHARGES FROM NEW SOURCES

Virginia Small MS4 General Permit Section I.C.2.a(3) requires a discussion on the means and methods that will be utilized to address discharges into the MS4 from New Sources. New Sources subject to Section I.C.2.a(3) include only construction initiated on or after 1 July 2009 that either disturbed one acre or less, or disturbed greater than one acre, but has a land use condition of 16% or less impervious cover used in design of post-development stormwater management facilities. The following means and methods are used by MCBQ to address discharges from these New Sources.

- For all construction projects disturbing greater than one acre, MCBQ adheres to the Virginia Stormwater Management Program regulations for the implementation of post-development stormwater management facilities. This includes acquiring the required General Construction Permit for projects disturbing greater than one acre, which must be designed to meet the phosphorus load that is equivalent to a land cover condition of 16% imperviousness; therefore, these projects would meet Virginia Small MS4 General Permit Section I.C and not require additional offsets.

- In addition, MCBQ requires that all construction sites greater than or equal to 10,000 square feet and less than one acre must have an Erosion and Sediment Control (E&SC) Plan approved by MCBQ's Natural Resources and Environmental Affairs (NREA) Branch.

- MCBQ has a program where they proactively demolish unused buildings and pavement and return them to grass. The activities under this program serve to offset any New Sources resulting from construction projects initiated on or after 1 July 2009

that disturb one acre or less. These offsets and other reduction credits are quantified in Section 6.

5.0 ESTIMATED EXISTING SOURCE LOADS AND CALCULATED TOTAL POLLUTANT OF CONCERN REQUIRED REDUCTIONS

Virginia Small MS4 General Permit Section I.C.2.a(4) requires an estimate of the annual POC loads discharged from the Existing Sources as of 30 June 2009, based on the 2009 Progress Run.[6] Section 5.1 of this plan provides discussion on defining MCBQ's regulated MS4 boundary. Section 5.2 provides the estimate of the annual POC loads discharged from the Existing Sources as of 30 June 2009. Virginia Small MS4 General Permit Section I.C.2.a(5) requires a determination of the total pollutant load reductions necessary to reduce the annual POC loads from Existing Sources. Section 5.3 of this plan provides this determination.

5.1 Regulated MS4 Boundary

The section presents the methodologies for development of the regulated MS4 boundary. The defined urbanized areas are based on the 2000 United States Census and identified by the United States Census Bureau[7]. Based on geospatial analysis, the urbanized area that intersects with the MCBQ property boundary includes only portions of MCBQ's Mainside parcel. The lands within this urbanized area are considered regulated by VDEQ (Bauer, 2015).

The 2015 VDEQ Guidance Memo allows for several land areas to be excluded from the regulated land acreages, as listed below:

1. Land regulated under any General Virginia Pollutant Discharge Elimination System (VPDES) permit that addresses industrial stormwater, including the General VPDES Permit for Stormwater Associated with Industrial Activity (VAR05), the General VPDES Permit for Concrete Products Facilities (VAG11), and the Nonmetallic Mineral Processing General Permit (VAR84);
2. Lands regulated under an individual VPDES permit for industrial stormwater discharges;
3. Forested Lands;
4. Agricultural Lands;
5. Wetlands; and
6. Open Waters.

MCBQ includes the following lands from the list above along with a description of how those lands were evaluated for the purposes of defining MCBQ's regulated MS4.

[6] Progress Runs refer to iterative calibrations of the Chesapeake Bay TMDL Community Model performed by the Chesapeake Bay Program using input from jurisdictions within the Chesapeake Bay Watershed to evaluate progress toward meeting the goals of the Chesapeake Bay TMDL.
[7] Available at: https://www.census.gov/geo/maps-data/maps/ua2kmaps.html

- Lands regulated under an individual VPDES permit for industrial stormwater discharges: MCBQ holds individual VPDES permit number VA0002151 for industrial stormwater discharges, which expires on 1 August 2016. The areas that discharge to regulated outfalls listed in permit VA0002151, which are sampled regularly for permit compliance, were excluded from MCBQ's regulated MS4.
- Forested Lands, Wetlands, and Open Waters: For completeness, these areas on MCBQ were included within the boundary of the regulated MS4; however, their acreages were excluded from the regulated MS4 total acreage calculation as permitted per the 2015 VDEQ Guidance Memo and detailed further in Section 5.2.

Figures 1 and 2 provide maps of MCBQ's regulated MS4 resulting from the analyses described above. It is important to note that the boundaries of the 2000 United States Census urbanized areas as shown in these figures are generalized representations for cartographic purposes. As indicated by the authoritative data provider (United States Census Bureau), these data are generalized for representations at smaller scales and not intended for accuracy in delineation. Multiple data products from the United States Census Bureau were referenced and utilized for the most accurate depiction of the urbanized area boundaries shown in Figures 1 and 2.

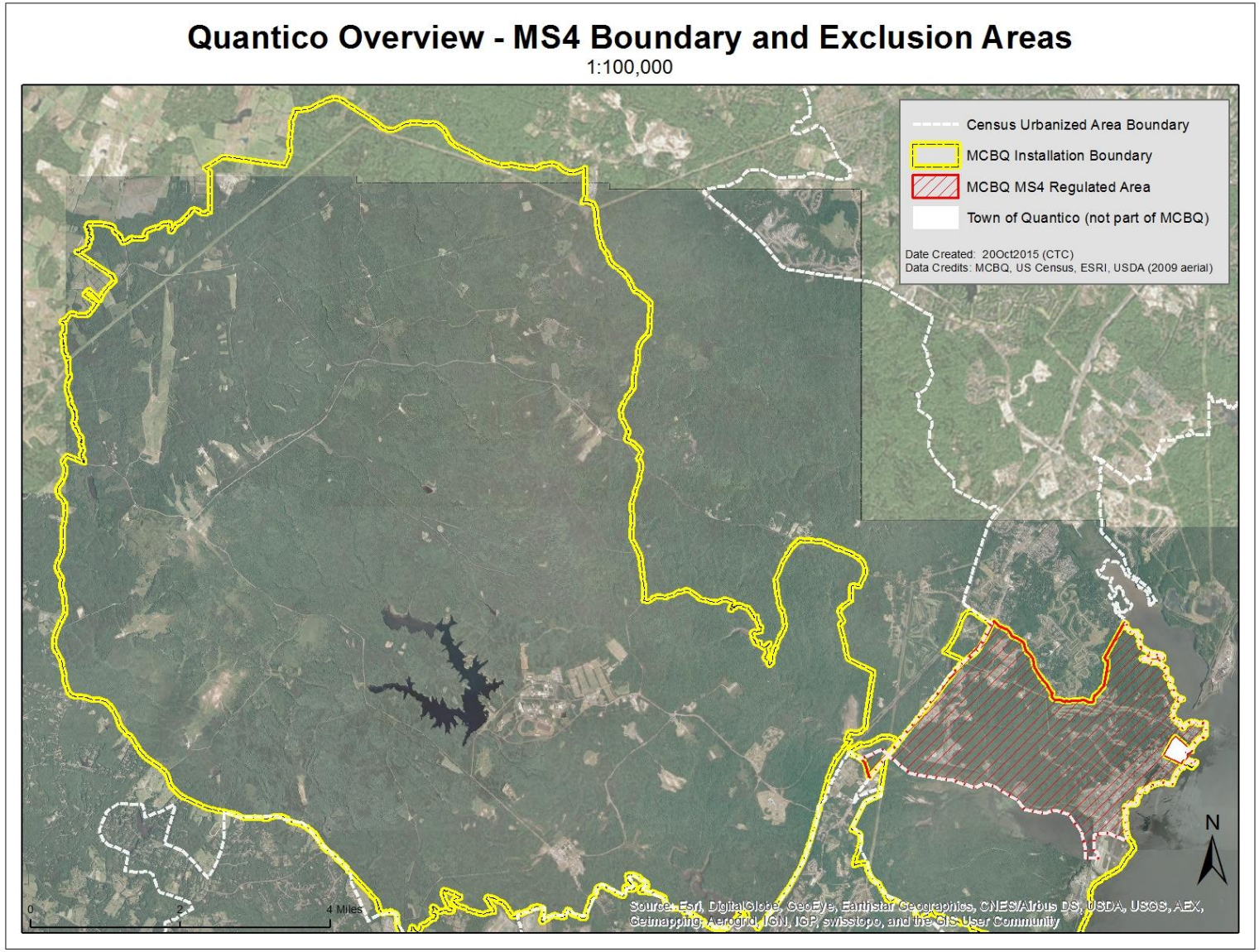

Figure 1. Overlap of MCBQ Property and United States Census Urbanized Area

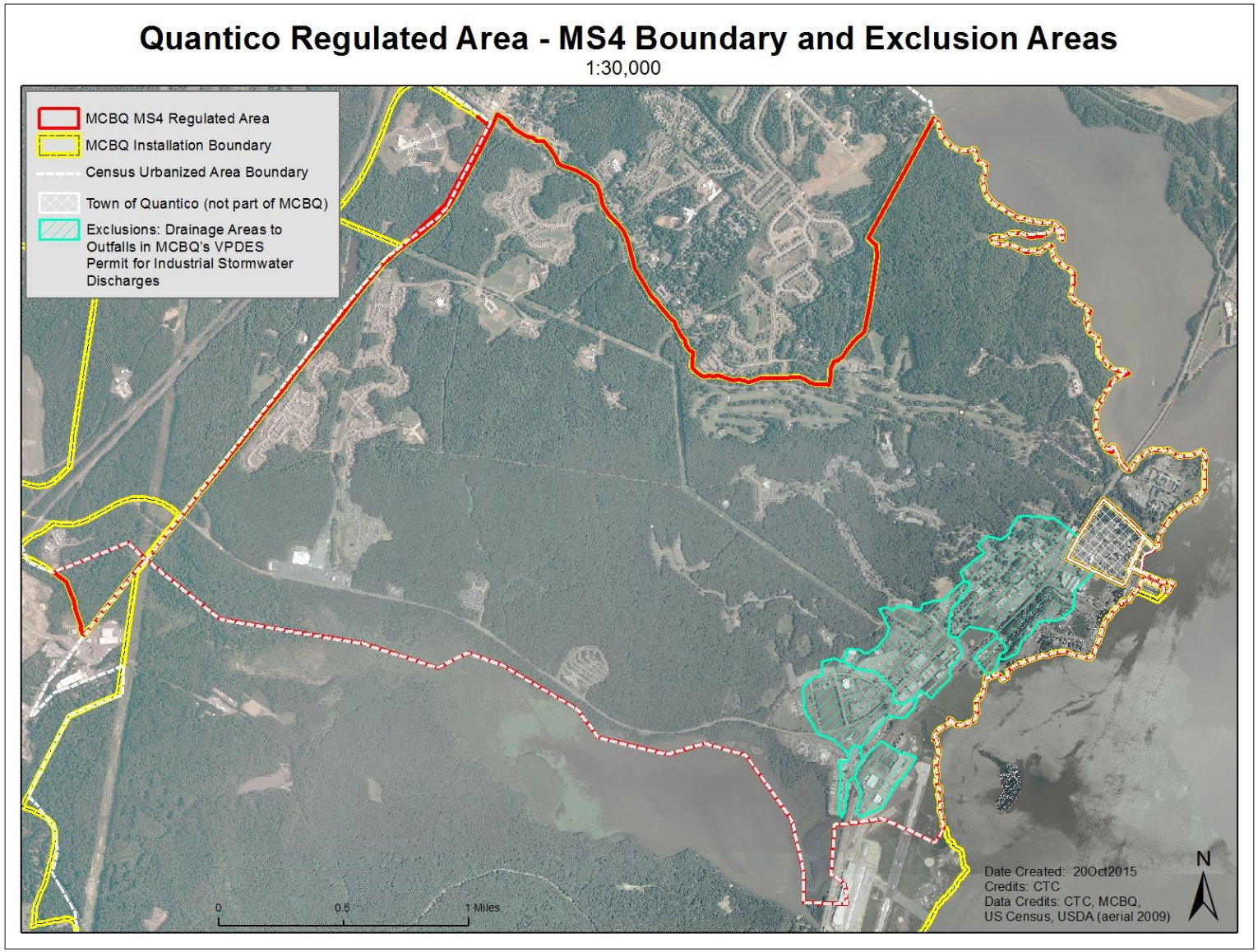

Figure 2. MCBQ's Regulated MS4 Boundary and Exclusions

5.2 Annual POC Loads from Existing Sources as of 30 June 2009

This section presents the urban land uses (Existing Sources) at MCBQ and the Existing Source loads.

Using MCBQ's Geographic Information Systems (GIS) data and available aerial photography from June 2009, the land uses within MCBQ's regulated MS4 boundary were analyzed and quantified. The lands regulated under MCBQ's individual VPDES permit for industrial stormwater discharges, which were excluded from MCBQ's regulated MS4 as discussed in Section 5.1, were also excluded from this land use evaluation per the 2015 VDEQ Guidance Memo. The resulting land use acreages were combined as shown in Table 1 to determine the total regulated impervious urban and regulated pervious urban acreages constituting Existing Sources and served by the MCBQ regulated MS4 as of 30 June 2009.

Table 1. 30 June 2009 Land Use Acreage Comprising Existing Sources at MCBQ

Land Use	Acreage	Urban Categorization	Total Acreage
Building	72	**Regulated Impervious Urban**	**324**
Pavement	232		
Gravel	20		
Dirt	30	**Regulated Pervious Urban**	**923**
Grass	893		
Forest	2,390	**Non-urban Lands**	**2,642**
Water	166		
Wetlands	86		
Total	**3,889**	**N/A**	**3,889**

Note: (1) The non-urban lands (forest, wetlands, and water) are not included for purposes of calculating Existing Source loads as well as land that is regulated by MCBQ's Individual industrial stormwater permits. (2) Expanded areas identified in the 2010 United States Census do not need to be accounted for during this permit cycle, but permittees should begin to plan for those areas and they must be included in an updated CBAP for Virginia Small MS4 General Permit reapplication.

In accordance with Virginia Small MS4 General Permit Section I.C.2.a(4) and due to MCBQ's location within the Potomac River Basin, the regulated impervious urban and regulated pervious urban acres and estimated total POC loads are shown in Table 2. The 2009 Edge of Stream (EOS) loading rates were provided in the Table 2b Calculation Sheet from Virginia Small MS4 General Permit Section I.C.2.a(4).

Table 2. Calculation of Estimated Existing Source Loads for MCBQ

Subsource	Pollutant	Total Existing Acres Served by MCBQ (6/30/09)	2009 EOS Loading Rate (lbs/acre/yr)	Estimated Total POC Load for MCBQ/ Based on 2009 Progress Run (lbs/yr)
Regulated Urban Impervious	Nitrogen	324	16.86	5,463
Regulated Urban Pervious		923	10.07	9,295
			Nitrogen Total:	**14,758**
Regulated Urban Impervious	Phosphorus	324	1.62	525
Regulated Urban Pervious		923	0.41	378
			Phosphorus Total:	**903**
Regulated Urban Impervious	Total Suspended Solids	324	1,171.32	379,508
Regulated Urban Pervious		923	175.80	162,263
			Total Suspended Solids Total:	**541,771**

5.3 Total POC Load Reductions Required from Existing Sources

In accordance with Virginia Small MS4 General Permit Section I.C.2.a(5) and due to MCBQ's location within the Potomac River Basin, the regulated impervious urban and regulated pervious urban acres and total POC reductions required in the this permit cycle for Existing Sources are shown in Table 3. The reductions for this permit cycle were determined using information from the 2015 VDEQ Guidance Memo instead of the Virginia Small MS4 General Permit Section I.C.2.a(5) as recommended in the 2015 VDEQ Guidance Memo.

The Virginia Small MS4 General Permit is consistent with the Chesapeake Bay TMDL and the Virginia Phase I and II Watershed Implementation Plans (WIPs). For Existing Sources, 5% of the full POC reductions required by 2025, based on the Virginia Phase II WIP, are required during this permit cycle. This may be calculated from Table 3b in the Virginia Small MS4 General Permit for the Potomac River Basin, by multiplying the urban acreage served by the MS4 by a loading rate that represents this 5% decrease in loading rate. However, the 2015 VDEQ Guidance Memo explains that it was determined that insufficient significant figures are included in Table 3b, and permittees are encouraged to use replacement values from the 2015 VDEQ Guidance Memo instead to obtain more accurate results, which are included in the calculations in Table 3.

Table 3. POC Reductions Required During this Permit Cycle for MCBQ from Existing Sources

Subsource	Pollutant	Total Existing Acres Served by MCBQ (6/30/09)	This Permit Cycle Required Reduction in Loading Rate (lbs/acre)	Total Reduction Required for MCBQ: This Permit Cycle (lbs)
Regulated Urban Impervious	Nitrogen	324	0.07587	24.58
Regulated Urban Pervious		923	0.03021	27.88
			Nitrogen Total:	**52.46**
Regulated Urban Impervious	Phosphorus	324	0.01296	4.20
Regulated Urban Pervious		923	0.00148625	1.37
			Phosphorus Total:	**5.57**
Regulated Urban Impervious	Total Suspended Solids	324	11.7132	3,795.08
Regulated Urban Pervious		923	0.769125	709.90
			Total Suspended Solids Total:	**4,504.98**

6.0 MEANS AND METHODS TO MEET THE REQUIRED REDUCTIONS FROM EXISTING SOURCES AND SCHEDULE

The Virginia Small MS4 General Permit Section I.C.2.a(6) refers to the means and methods, such as management practices and retrofit programs (i.e., installing BMPs to treat land uses existing as of 30 June 2009) that will be utilized to meet the required reductions included in Virginia Small MS4 General Permit Section I.C.2.a(5) (as shown in Table 4). This section provides the means and methods (i.e., stormwater BMPs) that MCBQ will utilize to meet the required reductions from Existing Sources. Methods for determining treatment areas and reduction efficiencies for stormwater BMPs are provided. Existing BMPs and planned BMPs are described and their reduction credits presented.

Permittees are required to describe the means and methods that will be implemented to meet the POC reductions consistent with a 5% reduction of the loading rate required for existing development (i.e., as of 30 June 2009), and provide a schedule to achieve these reductions, including annual benchmarks to demonstrate ongoing progress. However, as described in Part IV of the 2015 VDEQ Guidance Memo, to receive credit under the CBAP for BMPs installed on or after 1 January 2006 and prior to 1 July 2009 (historical BMPs), the historical

data must have been submitted using the spreadsheet provided on VDEQ's MS4 website[8] by 1 September 2015, so that these data can be included in the Phase 6 Chesapeake Bay Model. MCBQ did not meet this 1 September 2015 deadline, and therefore, cannot receive credit for its historical BMPs installed on or after 1 January 2006 and prior to 1 July 2009. The VDEQ encourages permittees to still submit the historical BMP information using the VDEQ spreadsheet for future model iterations. At this time, MCBQ can only receive CBAP credit for BMPs installed on or after 1 July 2009. It is unknown whether MCBQ can receive CBAP credit for BMPs installed prior to 1 July 2009 at any point in the future (Bauer, 2015).

Permittees have the option of considering techniques suggested in Section I.C.2.b of the Virginia Small MS4 General Permit, which include the following and which are described in further detail in the 2015 VDEQ Guidance Memo.

- Implementing BMPs on unregulated lands.[9] This option is available to MCBQ for BMPs installed on or after 1 July 2009, since it has unregulated lands outside the urbanized area; however, only partial credit can be obtained for BMPs on unregulated lands.
- Utilizing stream restoration projects provided credit applied is prorated based on the ratio of regulated urban acres to total drainage acres upstream of restored area. MCBQ is planning to conduct a stream restoration project, which is detailed further in this section.
- Establishment of Memorandums of Understanding (MOUs) with other MS4 operators discharging to the same or adjacent eight digit hydrologic unit within the same basin to implement BMPs collectively (MOU to include mechanism to divide POC reductions). It is unlikely that MCBQ will pursue this option other than perhaps with other DON facilities, if applicable.
- Utilization of any pollutant trading or offset program in accordance with 10.1-603.15:1 et seq. of the Code of Virginia, governing trading and offsetting. This may be an option for MCBQ to consider, which is detailed further in this section.
- A more stringent average land cover condition based on <16% impervious cover for New Sources initiating construction between 1 July 2009, and 30 June 2014 and all grandfathered projects where allowed by law. It is unlikely that MCBQ will pursue this option.
- Any BMPs installed after 30 June 2009, as part of a retrofit program, may be applied towards meeting the required load reductions, provided any baseline reductions are not included. MCBQ has installed and implemented a number of BMPs after 30 June 2009, some of which are eligible for credit, and are detailed further in this section.

Based on the 2015 VDEQ Guidance Memo and additional discussions with VDEQ, the following MCBQ BMPs can provide reduction credits to Existing Sources in the CBAP as described below.

[8] Available at: http://www.deq.virginia.gov/Programs/Water/StormwaterManagement/VSMPPermits/MS4Permits.aspx

[9] According to Bauer (2015), "unregulated lands" are defined as lands that do not drain to the permittee's system or lands that drain to the permittee's system that are outside of the urbanized area as defined by the 2000 United States Census.

- Existing BMPs installed on or after 1 July 2009 that treat only Existing Sources may have 100% of their reduction credits applied.
- Existing BMPs installed on or after 1 July 2009 that treat unregulated land, baseline reductions must first be determined for unregulated land, and then excess credits can be applied to the CBAP required reductions.
- Existing BMPs installed on or after 1 July 2009 that treat New Sources may have excess reductions applied to Existing Sources. These excess reductions may result from either:

    1) Post-development BMPs installed as part of a project initiating construction after 30 June 2009 that treat land uses outside of the area of disturbance. There are numerous BMPs at MCBQ that meet these criteria, which are detailed further in the Appendices
    2) Reductions above those required to achieve the baseline phosphorus load applicable to the New Source. MCBQ has installed oversized BMPs, but it is often in anticipation of future development, so these oversized BMPs are not eligible for credits except where they are treating Existing Sources.

- MCBQ operates the Mainside Wastewater Treatment Plant (WWTP) and participates in the Virginia Nutrient Trading Program. The VPDES permit for the WWTP includes effluent limits for TN and TP; however, the monitored end-of-year, cumulative TN and TP loads in the discharged effluent is well below the annual permit limits. Every year, the WWTP discharges TN and TP loads that are significantly less than its VPDES permit allocations. The difference between the permitted effluent TN and TP limits and actual effluent quality discharged are, therefore, eligible credits for MCBQ to apply to its CBAP. MCBQ's eligible TN and TP credits are summarized in Table 4. Application of these credits will require MCBQ to notify the Virginia Nutrient Trading Program.

Table 4. TN and TP Credits Available to MCBQ in CY2014

Variable	TN (lbs)	TP (lbs)
VPDES Annual Permit Limit for Mainside WWTP	20,101	1,206
Total Loads Discharged from Mainside WWTP in 2014	8,326	158
Credits Available	**11,775**	**1,048**

6.1 Existing BMP Inventory and Treatment Areas

A comprehensive BMP inventory for the 177 existing BMPs at MCBQ is provided in Appendices A and B of this plan. Part IV of the 2015 VDEQ Guidance Memo specifies the type of information permittees should report for all BMPs implemented to meet the CBAP requirements, which is included for each of the BMPs in the appendices. One data point included in the BMP inventories is the number of acres treated by the BMPs for Existing Sources only (land uses existing as of 30 June 2009). If the BMP treats only New Sources, then they are not elgible for credit and are given zero credit in the inventories. If the BMP

treats both Existing and New Sources (construction initiated after 1 July 2009), then only the acreage of the Existing Sources treated are provided in the appendices.

The appendices are organized by BMP installation dates that reflect whether the BMP may be eligible to receive CBAP credit, as listed below.

- **Appendix A includes 60 BMPs installed 1985 through 30 June 2009:** These 60 BMPs are not currently eligible for CBAP credit; therefore, they provide zero credits for inclusion into the CBAP. However, credits have been calculated for VDEQ consideration using the methodologies detailed in the 2015 VDEQ Guidance Memo. (It is important to note that of the 60 historical BMPs, only 33 BMPs were installed from 1 January 2006 through 30 June 2009 and would have been eligible for credit if they had been submitted to VDEQ by 1 September 2015).

- **Appendix B includes 117 BMPs installed on 1 July 2009 and later**: Some of the 117 BMPs are eligible for full or partial CBAP credit only if they provide treatment for Existing Sources. A number of these BMPs treat only New Sources and are therefore, not eligible for credit, which is detailed in the appendix. Many of these BMPs treat both Existing and New Sources and are therefore, eligible for partial credit, which is calculated in the appendix.

Construction plans and drawings were not available for the majority of BMPs evaluated. Therefore, the treatment areas were defined for each existing BMP during an evaluation of storm sewer infrastructure and topography conducted both geospatially and in the field. For BMPs that treat both New and Existing Sources, 2009 and 2014 aerial photography were compared and the treatment areas were then revised to capture only the Existing Source land uses (existing as of 30 June 2009) to exclude the areas that were developed or redeveloped following 30 June 2009. Then, all treatment areas that represented Existing Sources treated were compared against the GIS data that were used to establish 2009 land uses to determine Existing Source impervious and pervious urban acreage and forest acreage currently receiving treatment within each treatment area.

6.2 Determination of Reduction Efficiencies for Existing BMPs at MCBQ

Each existing BMP at MCBQ must be assigned reduction efficiencies to be applied to the stormwater runoff from the impervious urban, pervious, and forest acreage draining to the respective BMP in order to determine the TN, TP and TSS pollutant reductions. VDEQ requires definitions of forest acreage to be consistent with Virginia Department of Forestry guidance, which is based on tree size and density. MCBQ confirmed that they use similar density requirements when defining their forest acreage.

The efficiencies assigned to a BMP depend on the type of design data available for that BMP. The 2015 VDEQ Guidance Memo explains the appropriate methods for determining BMP efficiencies. When available, construction plans typically provide BMP design data on treatment area size, treatment volumes, and runoff depth as well as other data needed to confirm that the BMP meets all design requirements and technical specifications required by

the Virginia Stormwater Clearinghouse. This information could then be used to identify less conservative BMP reduction efficiencies established in the 2015 VDEQ Guidance Memo. Construction plans and drawings were not available for many of the BMPs evaluated for this CBAP; therefore, this CBAP utilizes the most conservative reduction efficiencies from the established Chesapeake Bay Program (CBP) BMP reduction efficiencies. Table 5 lists the CBP reduction efficiencies applicable to BMPs at MCBQ.

Table 5. Established Efficiencies for Chesapeake Bay Program BMPs Applicable to MCBQ

Chesapeake Bay Program BMPs	Efficiencies		
	TN	TP	TSS
Wet Ponds and Wetlands	20%	45%	60%
Dry Detention Ponds and Hydrodynamic Structures	5%	10%	10%
Dry Extended Detention Ponds	20%	20%	60%
Filtering Practices	40%	60%	80%
Bioretention C/D soils, underdrain	25%	45%	55%
Bioretention A/B soils, underdrain	70%	75%	80%
Bioretention A/B soils, no underdrain	80%	85%	90%
Vegetated Open Channels C/D soils, no underdrain	10%	10%	50%
Vegetated Open Channels A/B soils, no underdrain	45%	45%	70%
Bioswale	70%	75%	80%
Permeable Pavement w/ Sand, Veg. C/D soils, underdrain	20%	20%	55%

CBP BMP reduction efficiencies were not available for all BMPs types. In those instances, BMP reduction efficiencies from the Virginia Stormwater BMP Clearinghouse were used. The Virginia Stormwater BMP Clearinghouse[10] is jointly administered by the VDEQ and the Virginia Water Resources Research Center. The Clearinghouse provides documents for design standards and specifications of all stormwater BMPs approved for use in Virginia. The performance criteria in the design standards are based on the 90th percentile rainfall event. The rational for using the 90th percentile event is that it represents the majority of runoff volume on an annual basis.

In addition to the 11 structural BMP types listed in Table 5 where CBP established efficiencies were used to determine BMP reduction credits, additional credits were calculated for street sweeping and stream restoration (planned project), using the methods in the 2015 VDEQ Guidance Memo.

- The reduction efficiencies for street sweeping at MCBQ for the Qualifying Lanes Method, are based on the regenerative vacuum technology in use, and are given as 0.05 lbs/yr TN; 0.06 lbs/yr TP, and 0.25 lbs/yr TSS. A required frequency of street sweeping is not indicated in the 2015 VDEQ Guidance Memo.
- For urban stream restoration, nutrient and sediment removal rates per linear foot (LF) of project apply. Because MCBQ is located in the Coastal Plain Physiographic

[10] Available at: http://vwrrc.vt.edu/swc/

Province, the applicable removal rates for stream restoration are given as 0.075 lbs/LF TN; 0.068 lbs/LF TP; and 15.13 lbs/LF TSS.

Tree planting is an activity that is routinely performed by MCBQ's Forestry Department, but is typically conducted in response to a timber harvest, and therefore, does not result in a net increase in forest land. MCBQ forestry does not harvest timber within 100 feet of any streams on the installation but does utilize forestry practices to protect surface water quality. These practices have been consistent since approximately 2009. Therefore, tree planting, forest buffers and forest practices are not considered to be BMP-eligible for the CBAP.

MCBQ will be developing a NMP in the near future to formalize its nutrient management approach. The NMP is expected to address the MCBQ Golf Course, and select lawn areas. It is understood that the NMP on the golf course or on regulated lands will not be eligible for credit under the CBAP, but NMPs on unregulated lands may be eligible for credit. If NMPs are developed for unregulated lands, then MCBQ will include that information in the 2015-2016 Annual Report.

6.2.1 Calculating Reduction Credits for Existing Sources from Existing BMPs at MCBQ

Section III of the 2015 VDEQ Guidance Memo specifies methods to estimate POC reductions that will be credited for various BMPs. These methods were used to calculate reduction credits and are quantified in the appendices. The appendices also include important data for calculating pollutant reductions, such as the:

- Applicable EOS loading rates for TN, TP, and TSS for impervious urban, pervious urban, and forest land uses at MCBQ;
- EOS loads that the land uses treated by the BMP generate based on the treatment areas;
- Reduction efficiencies for each BMP; and
- Calculated reductions applied to Existing Sources by land use for each of MCBQ's existing BMPs.

The BMP reduction credits were calculated for treatment of Existing Sources, in the form of load reductions from BMPs, for all existing structural BMPs at MCBQ. In order to do so, the treatment areas determined for Existing Sources were used. For urban land uses treated by the BMPs, the worksheets indicate whether the urban lands treated are regulated or unregulated impervious urban or pervious urban. In addition, forest lands that drain to BMPs are indicated. As previously described, regulated urban impervious land, regulated urban pervious land, and forest land are eligible for full reduction credit, although forest land use must utilize the correct loading rate for forest land. Unregulated urban impervious land and unregulated urban pervious land treated by the BMP is eligible for partial credit for reductions in excess of that required to meet baseline reductions that are equiavalent to 16% impervious cover.

BMPs on Regulated Lands

Regulated lands and forest lands treated by an existing BMP installed on or after 1 July 2009 and treating Existing Sources from 30 June 2009 land use are eligible for full credit in the CBAP. To determine these reduction credits, the acreage for each land use type within each treatment area was multiplied by the TN, TP, and TSS EOS loading rates from the Virginia Small MS4 General Permit for the Potomac River Basin, as appropriate for impervious urban, pervious urban, and forest land (or the appropriate subset of land use treated). Forest land use is eligible for reduction credits even though forest land use is not included in the original calculation of the loads from the permittee's regulated MS4.

The product of that calculation was then multiplied by the reduction efficiency for the appropriate type of BMP for the POC. The result was the load reduction in pounds for a particular land use within a particular BMP treatment area for that POC. This calculation was conducted for all land use types within a BMP treatment area, and the sum of these results represents the total load reduction for a BMP. The formula provided below illustrates the calculation of the TN load reduction for a single BMP that treats impervious and pervious land use and forest land use. Load reductions for TP and TSS were calculated similarly, using the appropriate loading rates and reduction efficiencies.

$$Tr_N = -((Area_{LI} * LR_{N,LI} * RE_N) + (Area_{LP} * LR_{N,LP} * RE_N) + (Area_F * LR_{N,F} * RE_N))$$

Where:

Tr_N = *Total Load Reduction for nitrogen for a BMP (pounds).*
$Area_{LI}$ = *Area of impervious land use (acres) within the BMP treatment area.*
$Area_{LP}$ = *Area of pervious land use (acres) within the BMP treatment area.*
$Area_F$ = *Area of forest land use (acres) within the BMP treatment area.*
$LR_{N,LI}$ = *Loading rate (pounds/acre) of nitrogen for the Potomac River Basin, for impervious land use.*
$LR_{N,LP}$ = *Loading rate (pounds/acre) of nitrogen for the Potomac River Basin, for pervious land use.*
$LR_{N,F}$ = *Loading rate (pounds/acre) of nitrogen for the Potomac River Basin, for forest land use.*
RE_N = *Reduction Efficiency (%) of nitrogen by BMP.*

BMPs on Unregulated Lands

Where unregulated land is included in the treatment area of a BMP, the calculation of load reduction is initially performed in a similar manner as for regulated lands, but a separate calculation of baseline reductions must be performed and subtracted from this load reduction to determine reduction credits eligible for the CBAP associated with these unregulated lands. This baseline reduction variable is termed "Unregulated Land Correction Factor" in the appendices. The formula provided below illustrates the calculation of the Unregulated Land Correction Factor for a TN load reduction on unregulated impervious land for a single BMP.

*Unregulated Land Correction Factor = RR_N * EF * $Area_{LI}$*

Where:

RR=First Permit Cycle Required Reduction in Loading Rate (lbs/acre) from Tables 3a-d (lbs/acre) and corrected in the 2015 VDEQ Guidance Memo
RR_N = 0.07587 lbs/acre
EF = Estimating Factor of 20 in order to estimate the entire baseline reductions needed to comply with the Chesapeake Bay TMDL by the end of the third MS4 permit cycle
$Area_{LI}$ = Area of impervious land use (acres) within the BMP treatment area.

Lastly, the total credit attributable to the BMP on unregulated land is calculated using the following formula.

*UTr_{NI} = ($Area_{LI}$ * $LR_{N, LI}$ * RE_N) - Unregulated Land Correction Factor*

Where:

UTr_{NI} = Total Load Reduction for nitrogen for unregulated impervious area within a BMP treatment area (pounds).
$Area_{LI}$ = Area of impervious land use (acres) within the BMP treatment area.
$LR_{N, LI}$ = Loading rate (pounds/acre) of nitrogen for the Potomac River Basin, for impervious land use.
RE_N = Reduction Efficiency (%) of nitrogen by BMP.

If the result of this calculation is negative, then the result should be changed to zero credit, which has been done in the appendices.

6.2.2 Total Reduction Credits Eligible to MCBQ

Table 6 summarizes the total reduction credits eligible for application to the CBAP by existing BMPs and the progress toward MCBQ's required reductions for this permit cycle. As seen in the summary at the bottom of Table 6, MCBQ has already met and exceeded its required reductions this permit cycle, and also has additional reduction credits that may be applied toward the requirements of the next permit cycle.

Table 6. Progress Toward MCBQ's Required Reductions for this Permit Cycle

Variable	BMP Load Reductions for Existing Sources (lbs)		
	TN	TP	TSS
Total Allowable Existing Source Reductions from Existing BMPs	258	27	41,498
Total Allowable Existing Source Reductions from Nutrient Trading	11,775	1,048	0
Total Reductions Required for this Permit Cycle	**52.46**	**5.57**	**4,504.98**
Remaining Reductions Needed	**0**	**0**	**0**
Surplus Reductions to Apply Toward next Permit Cycle	11,981	1,069	36,993

6.3 Planned Future BMPs

MCBQ is planning to implement several planned BMPs in the future that will be eligible for credits to further reduce the loads from Existing Sources, in addition to the existing BMPs already described. Appendix C provides detailed information on the acreage to be treated, EOS loading rates and loads from the impervious and pervious lands in the treatment area, reduction efficiencies, and the reduction credits for these BMPs. Table 7 provides a summary of the planned BMPs reductions as given in Appendix C. Credits for these BMPs should be verified with VDEQ prior to or after installation. The final credits, in addition to the surplus credits from existing BMPs, can be applied toward the required reductions during the next permit cycle.

Table 7. Total Projected Reductions for Planned BMPs at MCBQ

Variable	BMP Load Reductions for Existing Sources (lbs)		
	TN	TP	TSS
Total Allowable Existing Source Reductions from Planned BMPs	1,350	1,158	259,896

MCBQ will also be implementing NMPs during this permit cycle. VDEQ does not currently allow NMPs on regulated lands or on golf courses to receive reduction credit under the CBAP, so the NMPs are not included for evaluating reductions at this time.[11]

[11] Implementation of NMPs is required by the Virginia Small MS4 General Permit to demonstrate implementation of the Chesapeake Bay TMDL Action Plan to the MEP and to demonstrate adequate progress. NMPs are also required as a MCM under Section II of the Virginia Small MS4 General Permit. NMPs developed for MCBQ are presented in separate documents. However, permittees cannot currently receive credit for NMP implementation on regulated lands for the Special Condition Chesapeake Bay TMDL Action Plan based on the 2015 VDEQ Guidance Memo. (Only NMPs applied to unregulated, private lands that are not golf courses may receive credit).

6.4 Proposed Future BMPs

In the event that additional reductions are necessary in future permit cycles, MCB Quantico has evaluated some proposed BMPs for future implementation, which are detailed in Appendix D, including acreage to be treated, EOS loading rates and loads from the impervious and pervious lands in the treatment area, reduction efficiencies, the projected reduction credits for these BMPs, and the estimated costs to implement. Table 8 provides a summary of the proposed BMPs reductions as given in Appendix D. Credits for these BMPs should be verified with VDEQ prior to installation. The total cost to install all proposed future BMPs is approximately $890,000.

Table 8. Total Projected Reductions for Proposed Future BMPs at MCBQ

Variable	BMP Load Reductions for Existing Sources (lbs)		
	TN	TP	TSS
Total Allowable Existing Source Reductions from Proposed Future BMPs	104	10	6,362

6.5 Implementation Schedule

The BMPs listed in Appendices A and B are already in place at MCBQ and treating Existing Sources. Appendix C provides the total expected reductions for planned future BMPs and includes an estimated implementation schedule. Because the reductions required under this permit cycle are already being met, no additional BMP implementation is necessary to treat Existing Sources during this permit cycle.

7.0 MEANS AND METHODS TO OFFSET INCREASED LOADS FROM NEW SOURCES INITIATING CONSTRUCTION BETWEEN 1 JULY 2009 AND 30 JUNE 2014

Virginia Small MS4 General Permit Section I.C.2.a(7) requires the CBAP to include the means and methods to offset increased loads from New Sources initiating construction between 1 July 2009 and 30 June 2014 that disturb one acre or greater as a result of the utilization of an average land cover condition of >16 % impervious cover for the design of post-development stormwater management facilities. The MS4 operator must offset 5% of the calculated increased load from these New Sources during the permit cycle. This section provides a discussion of MCBQ's compliance status with this requirement.

MCBQ has not adopted an average land cover condition of >16 % impervious cover under the Chesapeake Bay Preservation Act. MCBQ obtained and complied with the appropriate Construction General Permits for all New Sources initiating construction between 1 July 2009 and 30 June 2014 that disturb one acre or greater. The post-development stormwater runoff quality requirements for the Construction General Permits ensure that these New Sources are treated by stormwater BMPs to achieve equivalent 16 % impervious cover

baseline loads for New Sources (0.45 lbs TP/ac/yr), and therefore, no additional offsets are required under the CBAP.

Appendix B provides a list of New Sources that have been constructed or are under construction at MCBQ since 1 July 2009, all of which fall under Permit Requirement 3 and obtained coverage under the appropriate Construction General Permits.

In addition, the following is a list of MCBQ construction projects and year of construction initiation (past or anticipated). The following projects fall under Permit Requirement 3, and do not require additional offsets as a result.

- Weapons Battalion Dining Hall, late 2014
- Embassy Security Group at Weapons Battalion, 2015
- National Marine Corps Museum (Phase 2), 2015
- The Basic School Barracks (Phase 5/6), 2015
- Additional Fuller Road Widening, 2016
- New Middle/High School, 2016

8.0 MEANS AND METHODS TO OFFSET INCREASED LOADS FROM GRANDFATHERED PROJECTS THAT BEGIN CONSTRUCTION AFTER 1 JULY 2014

Virginia Small MS4 General Permit Section I.C.2.a(8) requires the CBAP to include the means and methods to offset increased loads from projects grandfathered in accordance with 9VAC25-870-48, that disturb one acre or greater that begin construction after 1 July 2014, where the project utilizes an average land cover condition of >16 % impervious cover in the design of post-development stormwater management facilities. The operator must offset increases in the POC load prior to completion of the project in accordance with Section I.C.3.c of the Virginia Small MS4 General Permit. This section provides a discussion of MCBQ's compliance status with this requirement.

Grandfathered projects are generally projects that are: 1) approved by a locality; 2) had submitted a layout or plan to a locality; 3) had funding obligated prior to 1 July 2012, but did not have coverage under the Construction General Permit issued before 1 July 2014; 4) did not have land disturbance started before 1 July 2014; and 5) where no changes have occurred to the project plan.[12]

No portions of any of MCBQ's construction projects that have initiated or will initiate construction after 1 July 2014 are grandfathered. Therefore, the Virginia Small MS4 General Permit provisions for grandfathered projects for the CBAP do not apply to MCBQ and no additional offsets are required as a result.

[12] 9VAC25-870-48. Available at http://register.dls.virginia.gov/details.aspx?id=

9.0 LIST OF FUTURE PROJECTS, AND ASSOCIATED ACREAGE THAT QUALIFY AS GRANDFATHERED

This section provides discussion of future projects and associated acreage that qualify as grandfathered. Virginia Small MS4 General Permit Section I.C.2.a(10) requires a list of future projects and associated acreage that qualify as grandfathered in accordance with 9VAC25-870-48. Table 9 lists future construction projects MCBQ is planning at the time this CBAP was written, although the exact acreages of land disturbance associated with these projects is not yet known. None of these projects will have associated acreage that is grandfathered.

Table 9. Future Construction Projects at MCBQ

Construction Project	Status as of October 2015	Grandfathered Acreage
Weapons Battalion Dining Hall	Construction initiated late 2014. BMPs planned include vegetated swale and extended dry pond.	None
Embassy Security Group at Weapons Battalion	Bioretention BMP planned.	None
National Marine Corps Museum (Phase II)	BMPs planned include upgrades to existing green roof, installation of additional green roof, and bioretention.	None
The Basic School Barracks (Phase 5/6)	Plans are for existing wet pond to provide treatment	None
Additional Fuller Road Widening	BMPs planned include vegetated swale and bioretention	None
New Middle/High School	BMPs planned include vegetated swale and bioretention	None

Note: Additional projects are currently under design for construction in 2016 and later.

10.0 ESTIMATE OF THE EXPECTED COST TO IMPLEMENT THE NECESSARY REDUCTIONS

Virginia Small MS4 General Permit Section I.C.2.a(11) requires cost estimates for BMPs and management practices needed to implement the requirements of the Special Condition for the Chesapeake Bay TMDL during this permit cycle. This section provides MCBQ's response to that requirement. Because the reductions required under this permit cycle are already being met, no additional BMP implementation is necessary and therefore, no additional costs are anticipated to treat Existing Sources during this permit cycle. As stated in Section 6.4, MCB Quantico has evaluated some proposed BMPs for future implementation in the event that

additional reductions are needed in future permit cycles. These proposed BMPs are detailed in Appendix D. The total cost to install all proposed future BMPs is approximately $890,000.

11.0 PUBLIC COMMENTS ON DRAFT ACTION PLAN (GENERAL PERMIT REQUIREMENTS)

In accordance with Virginia Small MS4 General Permit requirements, MCBQ must provide an opportunity for receipt and consideration of public comment on the CBAP. The public comment process and period must be described in this section of the CBAP, including how the process was advertised to the public. This section describes the public comment process and period that will be used to advertise the CBAP to the public.

The "public" for MCBQ is defined as the employee and resident population. MCBQ will solicit feedback from the public on its CBAP. Feedback mechanisms may consist of feedback from employees via email to the appropriate MCBQ staff and from residents via a feedback form on the website and/or comments via social media.

12.0 DISCUSSION AND RECOMMENDATIONS

This section is not specifically required to be submitted as part of the CBAP according to the 2015 VDEQ Guidance Memo, but instead provides useful information regarding implementation of the CBAP, Annual Report development, and reapplication requirements for the next permit cycle.

12.1 Chesapeake Bay TMDL Action Plan Implementation

Section I.C.3 of the Virginia Small MS4 General Permit describes implementation of the CBAP, and requires implementation to be consistent with the schedule provided in the CBAP. Compliance with this requirement will represent adequate progress for this permit cycle towards achieving the TMDL wasteload allocations consistent with the assumptions and requirements of the TMDL. Implementation of the following represents implementation to the MEP and demonstrates adequate progress.

- Implementation of NMPs.
- Implementation of MCMs related to construction site stormwater runoff control.
- Implementation of the means and methods to address discharges from New Sources.
- Implementation of the means and methods sufficient to meet the required reductions of POC loads from Existing Sources.

12.2 Annual Reporting Requirements

After submittal of the CBAP, each subsequent Annual Report will include the following information related to the CBAP, where and when applicable.

- A list of control measures implemented during the reporting period and the cumulative progress toward meeting the compliance targets for TN, TP, and TSS;

- A list of control measures, in an electronic format provided by VDEQ, that were implemented during the reporting period and the estimated reduction achieved by the control measure. For stormwater management controls, the report will include the information required in Section II.B.5.e of the Virginia Small MS4 General Permit and will include whether an existing stormwater management control was retrofitted, and if so, the existing stormwater management control type retrofit used; and

- A list of control measures that are expected to be implemented during the next reporting period and the expected progress toward meeting the compliance targets for TN, TP, and TSS.

12.3 Reapplication Requirements

During reapplication for the next Virginia Small MS4 General Permit cycle (1 July 2018 through 30 June 2023), MCBQ will address any modifications to the CBAP or WIP developed during the term of their most recent permit coverage. MCBQ will provide:

- Documentation that sufficient control measures were implemented to meet the identified compliance target. A list of all temporary credits or offsets that were purchased to meet compliance must be provided during reapplication, and a schedule of implementation to ensure permanent reduction, if applicable.

- A Draft Second Phase CBAP designed to reduce the existing POC loads as follows:

  - Existing POC loads (identified by the 2000 United States Census as urbanized areas) must be reduced an additional seven times the required reductions in loading rates using Table 3b in the Virginia Small MS4 General Permit;
  - Existing expanded sources (identified by the 2010 United States Census as urbanized areas) must be reduced by an additional eight times the required reductions in loading rates using Table 3b in Virginia Small MS4 General Permit;
  - An additional 35 % reduction in New Sources developed between 2009 and 2014 and for which the land use cover condition was > 16 %; and,
  - Accounts for any modifications to the applicable loading rates as a result of any TMDL modification.

Permittees are required to reduce POC loads by a 40 % reduction in pollutant loading rate during the next permit cycle for both Existing Sources and expanded areas. MCBQ will need to confirm whether it will or will not have expanded regulated MS4 areas based on any changes between the urbanized areas as identified in the 2000 and 2010 United States Census.

Importantly, it must be noted that MCBQ obtains and complies with the Virginia Construction General Permits for its construction projects, and has not adopted an average land use cover of >16 % impervious cover under the Chesapeake Bay Preservation Act. Therefore, MCBQ will not be required to make additional offsets for New Sources under the CBAP for compliance with the Virginia Small MS4 General Permit for New Sources initiating construction between 30 June 2009 and 1 July 2014, or for New Sources initiating construction on or after 1 July 2014.

13.0 REFERENCES

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APPENDIX A

Comprehensive BMP Inventory of Historical BMPs (Installed 1985 - 30 June 2009)

Appendix A.pdf

APPENDIX B

Comprehensive BMP Inventory of New BMPs
(Installed 1 July 2009 and later)

Appendix B.pdf

APPENDIX C

Comprehensive BMP Inventory of Planned BMPs
(For Installation November 2015 and later)

Appendix C.pdf

APPENDIX D

Comprehensive BMP Inventory of Proposed BMPs
(For Installation November 2015 and later)

Appendix D.pdf