

**Virginia Pollutant Discharge Elimination System (VPDES)**

**General Permit for Discharge of Stormwater from  
Small Municipal Separate Storm Sewer Systems (MS4s)**

# **Third Phase Chesapeake Bay TMDL Action Plan**

**Virginia Department of Juvenile Justice**

**Agency 777**

**Bon Air Facility**

**VPDES General Permit Number: VAR040128**



**November 1, 2024**



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**Appendix A – 2010 U.S. Census Urbanized Areas**

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**1. SIGNED CERTIFICATION (PART IV K-2):**

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.



*10/15/24*

Responsible Official Signature

Date

**Bradley Wilcox**

DJJ Facilities Operations Director

VAR040128

Permit Number

Department of Juvenile Justice - Consolidated MS4s at Bon Air

MS4 Name

## 2. INTRODUCTION

The Virginia Department of Juvenile Justice (DJJ) was originally issued an MS4 general permit in 2014 by the Commonwealth of Virginia for Bon Air Juvenile Correctional Facility. This permit outlines minimum requirements for the operation of the Facility's storm sewer system, including storm water treatment systems (BMPs). DJJ Bon Air's current permit number is VAR040128, and the permit cycle duration is from November 1, 2023, to October 31, 2028.

As an MS4 community and as a condition of the permit, DJJ Bon Air Facility is required to complete a third phase Chesapeake Bay TMDL action plan by November 1, 2024 demonstrating that DJJ will be achieved a total reduction of nutrients (total nitrogen and total phosphorus) no later than October 31, 2028, of 100% of Level 2 (L2) scoping run from stormwater runoff based on existing developed land cover as of June 30, 2009, within the 2010 U.S. Census Urbanized Areas. DJJ has issued this plan for the previous two permit cycles and already achieved required second permit cycle 40% reduction of L2 and has issued a draft plan for the third permit cycle.

This third phase Chesapeake Bay TMDL Action Plan is a critical planning tool used to provide permit compliance in a fiscally responsible manner. This 3rd cycle Chesapeake Bay TMDL action plan is provided to meet reporting requirements per permit part II A 12 (b). The Chesapeake Bay TMDL Action Plan will outline the DJJ's compliance path for the third permit cycle (2023-2028) of the Chesapeake Bay TMDL. This document is a comprehensive revision of the draft 3<sup>rd</sup> permit cycle Action Plan that examines all of the previous calculations against the latest MS4 permit, DEQ guidance, and available record documents. This effort included:

- Compilation of all properties currently owned by DJJ Bon Air within the 2010 US Census Urbanized Areas.
- Re-calculation of the regulated urban impervious and pervious areas as of June 30, 2009 using the land cover definitions in DEQ Guidance Memo 20-2003 *Chesapeake Bay TMDL Special Condition Guidance* (Guidance Memo). Forested areas are excluded from the urban pervious area.

- Identification of additional nutrient removal credits in accordance with the Guidance Memo.

### **3. DJJ BON AIR – MS4 REGULATED SERVICE AREA DELINEATION**

The relation of the Bon Air Juvenile Correctional Facility to the 2010 U.S. Census Urbanized Areas is shown in Appendix A. As indicated, the entire Bon Air campus is located within the 2010 U.S. Census Urbanized Area. However, the MS4 Permit and GM20-2003 direct permittees to define the MS4 Service Area as the portion of the 2010 U.S. Census Urbanized Area that drains to the storm sewer system operated by the permittee. The permittee should not include conveyances and drainage areas regulated by a separate MS4 permit within its service area.

Permittees should also exclude the following from their regulated urban impervious and regulated urban pervious cover calculations:

- Lands regulated under any General or Individual VPDES permit for industrial stormwater discharges;
- Lands regulated under a General VPDES permit for Concrete Product Facilities;
- Forested lands, which are defined as undeveloped areas with a minimum tree density (based on tree caliper) and a contiguous area of at least 900 square meters (30m x 30m);
- Agricultural lands, wetlands, and open waters.

In the case of DJJ Bon Air, the MS4 Service Area, as defined since the first phase TMDL Action Plan, includes the area of the parcel owned by DJJ, minus all the above-excluded lands. Additionally, some areas of the Bon Air Facility do not drain to the DJJ-operated storm sewer system and are therefore excluded from the Service Area. See Appendix B for the regulated MS4 Service Area boundaries.

DJJ Bon Air Facility houses approximately 290 juvenile inmates. Facilities include buildings for housing, education, dining, administration, and facility maintenance. The entire parcel is 407.05 acres and was obtained from the Chesterfield County property website (figure 1) and verified using GIS. The majority of the parcel is wooded and is bounded by Old Bon Air Road to the west, Powhite Creek (a tributary of James River) to the north and east, and residential subdivisions to the south. Chatsworth Avenue

traverses the facility, and DJJ Bon Air maintains the culverts under this road. See figure 2 below for an aerial photo of DJJ Bon Air Facility.

<b>Property Info</b> Parcel ID: 752713101100000 Owner Account ID: 187067001 Tax Account ID: Property Class: EXEMPT Magisterial District: MIDLOTHIAN Deeded Acreage: 407.047 acre(s) <a href="#">Open in Parcel Viewer</a>  <b>Legal Description</b> BON AIR	<b>Owner</b> <b>COMMONWEALTH OF VIRGINIA</b> Care Of: YOUTH & FAMILY SERVICES Mailing Address P O BOX 3AG RICHMOND VA 23208  Ownership Type: EXEMPT	
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**Figure 1 – Bon Air Facility Parcel from Chesterfield County GIS website**

The regulated urban pervious and impervious acres served by the MS4 as of June 30, 2009, were estimated using available GIS resources, previous studies, and historical aerial photography from Google Earth Pro. In some cases, record plans for projects were also available.

Based on the information above, the following are the estimated regulated urban impervious and regulated urban pervious areas as of June 30, 2009 within the MS4 Service Area:

**Table 1. DJJ – Bon Air MS4 Service Areas as of June 30, 2009 (existing sources)**

Bon Air Juvenile Correctional Center	Regulated Urban Impervious Acres	Regulated Urban Pervious Acres
	17.21	32.68



**Figure 2 – Aerial Photo – DJJ Bon Air Facility**

#### **4. EXISTING STORMWATER MANAGEMENT FACILITIES AND STORM SEWER SYSTEM WITHIN MS4 SERVICE AREA AS OF JUNE 30, 2009**

The existing storm sewer system was mapped as shown in Appendix B. The storm sewer system consists mainly of a mixture of ditches, culverts, and connected storm sewer segments with inlet structures.

There are two structural stormwater BMPs that were installed for regulatory compliance as part of past building projects. Locations are shown on the map in Appendix B.

**Table 2. Existing Stormwater Management Facilities as of June 30, 2009 (existing sources)**

<b>BMP Name</b>	<b>Type</b>	<b>Year Constructed</b>	<b>Drainage Area (Ac.)</b>
<b>Medium Security Facility Basin</b>	Detention – Quantity Only	1995	10.6
<b>Parking Lot Basin</b>	Extended Detention (dry)	1996	1.4

#### **5. MS4 SYSTEM INTERCONNECTS**

The existing storm sewer culverts under Chatsworth Avenue collect drainage from DJJ property and discharge to DJJ property. Any road drainage is by sheet flow. The DEQ guidance memo specifically states that in these cases, where the areas drain by sheet flow instead of piped systems, the downstream MS4 (DJJ) is responsible for the WLA.

There are two DJJ outfalls on the west side of the property which convey drainage that is ultimately conveyed by the VDOT ditch system along Old Bon Air Road. The DEQ guidance specifically states that where the areas drain by interconnected storm sewer or other conveyance system, the upstream MS4 (DJJ) is responsible. However, in this case there is no manmade system such as a ditch or pipe connecting the two systems, so there is no interconnect.

## **6. PART II TMDL SPECIAL CONDITIONS**

### **A. CHESAPEAKE BAY TMDL SPECIAL CONDITION.**

In Part II A 12 of the MS4 general permit, the permit lists specific items to be addressed in the third phase Chesapeake Bay TMDL Action Plan. The following are the items listed in the permit in italic typeface followed by responses in bold typeface:

*Part II A 12. Chesapeake Bay TMDL action plan requirements.*

*a. Permittees applying for initial coverage under this general permit shall submit a draft first phase Chesapeake Bay TMDL action plan to the department no later than October 31, 2028, unless the department grants a later date. The required reduction shall be calculated using Tables 3a, 3b, 3c, and 3d as applicable. The first phase action plan shall achieve a minimum reduction of at least 40% of the L2 Scoping Run based on lands within the 2000 and 2010 expanded Census urbanized areas no later than October 31, 2033. The action plan shall include the following information:*

*(1) The load and cumulative reduction calculations for each river basin calculated in accordance with Part II A 3, A 4, and A 5;*

*(2) The BMPs to be implemented by the permittee to achieve 40% of the reductions calculated in Part II A 13 a:*

*(a) Type of BMP;*

*(b) Project name;*

*(c) Location;*

*(d) Percent removal efficiency for each pollutant of concern; and*

*(e) Calculation of the reduction expected to be achieved by the BMP calculated and reported in accordance with the methodologies established in Part II A 9 for each pollutant of concern;*

*(3) A preliminary schedule for implementation of the BMPs included in the Chesapeake Bay TMDL action plan; and*

*(4) A summary of any comments received as a result of public participation required in Part II A 14, the permittee's response, identification of any public meetings to address public concerns, and any revisions made to Chesapeake Bay TMDL action plan as a result of public participation.*

**Response: Not applicable. DJJ was previously covered under the General VPDES Permit (VAR040128) for the Discharge of Stormwater from the MS4, effective November 1, 2018. DJJ Bon Air falls under Part II A 12 b below. DJJ is submitting this final third-phase Chesapeake Bay TMDL Action Plan to address the reductions required in Part II A 3, A 4, and A 5.**

*b. For permittees previously covered under the General VPDES Permit for the Discharge of Stormwater from MS4 effective November 1, 2018, no later than 12 months after the permit effective date, the permittee shall submit a third phase Chesapeake Bay TMDL action plan for the reductions required in Part II A 3, A 4, and A 5 that includes the following information:*

**Response: As a permittee previously covered under the General VPDES Permit for the Discharge of Stormwater from MS4, effective November 1, 2018, DJJ Bon Air submits this third-phase Chesapeake Bay TMDL Action Plan in compliance with the required 12-month deadline from the current permit's effective date (November 1, 2023). This plan outlines the specific reductions required in Part II A 3, A 4, and A 5.**

*1) Any new or modified legal authorities, such as ordinances, permits, policy, specific contract language, orders, and interjurisdictional agreements, implemented or needing to be implemented to meet the requirements of Part II A 3, A 4, and A 5.*

**Response: No new or modified legal authorities—such as ordinances, permits, policies, specific contract language, orders, or interjurisdictional agreements—have been implemented or need to be implemented to meet the requirements of Part II A 3, A 4, and A 5. Additionally, no new legal authorities are required for permit compliance at this time. Existing legal**

**authorities will be used to meet the Special Condition and DJJ fully controls all the property it owns within the Chesapeake Bay TMDL watershed.**

*2) The load and cumulative reduction calculations for each river basin calculated in accordance with Part II A 3, A 4, and A 5.*

**Response: The VDEQ requires that previously MS4 permittees covered under the General VPDES Permit for Discharges of Stormwater from MS4 effective November 1, 2018 shall reduce the load of total nitrogen and total phosphorus from existing developed lands served by the MS4 as of June 30, 2009, within 2010 Census urbanized areas by at least 100% of the Level 2 (L2) Scoping Run Reductions during the current permit cycle (November 1, 2023-October 31, 2028). Chesapeake Bay TMDL existing source loads and cumulative required reduction calculations for James River basin calculated below using Table 3a from the General Permit and in accordance with Part II A3, A4, and A5. Please note that DJJ MS4 service area is located within the James River basin.**

**Table 3a**

**Calculation Sheet for Estimating Existing Source Loads and Reduction Requirements for the James River, Lynnhaven, and Creek Basins**

Pollutant	Subsource	A	B	C	D	E	F
		Loading rate (lbs/ac/yr) <sup>1</sup>	Existing Developed Lands as of 6/30/09 served by the MS4 within the 2010 CUA (acres) <sup>2</sup>	Load (lbs/yr) <sup>3</sup>	Percentage of MS4 required Chesapeake Bay total L2 loading reduction	100% cumulative reduction required by 10/31/2028 (lbs/yr) <sup>4</sup>	Sum of 100% cumulative reduction (lb/yr) <sup>5</sup>
Nitrogen	Regulated Urban Impervious	9.39	17.21	162	9%	15	<b>28</b>
	Regulated Urban Pervious	6.99	32.68	228	6%	14	
Phosphorus	Regulated Urban Impervious	1.76	17.21	30	16%	4.85	<b>6.03</b>
	Regulated Urban Pervious	0.5	32.68	16	7.25%	1.18	

<sup>1</sup>Edge of stream loading rate based on the Chesapeake Bay Watershed Model Progress Run 5.3.2.

<sup>2</sup>To determine the existing developed acres required in Column B, permittees should first determine the extent of their regulated service area based on the 2010 Census urbanized area (CUA). Next, permittees will need to delineate the lands within the 2010 CUA served by the MS4 as pervious or impervious as of the baseline date of June 30, 2009.

<sup>3</sup>Column C = Column A x Column B.

<sup>4</sup>Column E = Column C x Column D.

<sup>5</sup>Column F = The sum of the subsource cumulative reduction required by 10/31/2028 (lbs/yr) as calculated in Column E.

- 3) *The total reductions achieved as of November 1, 2023, for each pollutant of concern in each river basin.*
- 4) *A list of BMPs implemented prior to November 1, 2023, to achieve reductions associated with the Chesapeake Bay TMDL, including:*
  - a. *The date of implementation; and*
  - b. *The reductions achieved.*

**Response to 3 & 4: The Guidance Memo 20-2003 outlines various types of projects that can be credited towards compliance. Each appendix in the memo details the specific requirements for meeting the criteria of each project type. Below are the compliance projects that have implemented between July 1, 2009 and November 1, 2023 by DJJ, the applicable appendix from GM20-2003, and the total reductions achieved for each pollutant of concern (POC) in the James River basin as of November 1, 2023: Refer to Appendix C for detailed calculations.**

**Table 3. Appendix V. B – Chesapeake Bay Program, Retrofit Curves/Equations**

<b>Project Location</b>	<b>BMP Type</b>	<b>Year Implemented</b>	<b>Impervious Area Treated (Ac)</b>	<b>Pervious Area Treated (Ac)</b>	<b>TN Removal Reduction (lbs/ac/yr)</b>	<b>TP Removal Reduction (lbs/ac/yr)</b>
Downstream of existing BMP  Lat: N037°31'00.97"  Long: W077°34'08.09"	Manufactured Treatment Manhole (Hydrodynamic Separator)	2020	3.56	5.66	26	5

**Table 4. Appendix V.H – Land Use Change**

<b>Project Location</b>	<b>BMP Type</b>	<b>Year Implemented</b>	<b>Impervious Area Treated (Ac)</b>	<b>Pervious Area Treated (Ac)</b>	<b>TN Removal Reduction (lbs/ac/yr)</b>	<b>TP Removal Reduction (lbs/ac/yr)</b>
North and East of existing parking lot  Lat: N037°31'00.98"  Long: W077°34'03.18"	Land Use Change - Pervious (turf) to Forest	2016	0	2.25	14	3.13

**Table 5. Total Reductions Achieved as of November 1, 2023**

<b>Pollutants of Concern</b>	<b>Reductions Achieved (lbs/ac/yr)</b>
Total Nitrogen (TN)	40
Total Phosphorus (TP)	8.13

5) *The BMPs to be implemented by the permittee within 60 months of the effective date of this permit to meet the cumulative reductions calculated in Part II A 3, A 4, and A 5, including as applicable:*

- a. *Type of BMP;*
- b. *Project name;*
- c. *Location;*
- d. *Percent removal efficiency for each pollutant of concern;*
- e. *Calculation of the reduction expected to be achieved by the BMP calculated and reported in accordance with the methodologies established in Part II A 9 for each pollutant of concern; and*

f. A preliminary schedule for implementation of the BMPs included in the Chesapeake Bay TMDL action plan.

**Response: DJJ has already achieved compliance for the third permit cycle, and 100% of the Level 2 (L2) required reductions have been achieved during first and second permit cycles. As a result, no additional BMPs need to be implemented during this permit cycle. The table 6 below shows the comparison between the required and achieved reductions for total nitrogen and total phosphorus.**

**Table 6. Required & Achieved Nitrogen & Phosphorus Removals**

<b>Pollutants</b>	<b>Required Reduction (lbs/ac/yr)</b>	<b>Achieved Reduction (lbs/ac/yr)</b>	<b>Excess Removal (lbs/ac/yr)</b>
Total Nitrogen (TN)	28	40	12
Total Phosphorus (TP)	6.03	8.13	2.10

6) A summary of any comments received as a result of public participation required in Part II A 13, the permittee's response, identification of any public meetings to address public concerns, and any revisions made to Chesapeake Bay TMDL action plan as a result of public participation.

**Response: This Chesapeake Bay TMDL action plan was posted on the following website from October 16-31, 2024 for public comments/concerns as required in Part II A 13. No public comments have been received. [Capital Outlay \(virginia.gov\)](https://www.virginia.gov)**

Part II A 13.

13. Prior to submittal of the action plan required in Part II A 12 a and b, permittees shall provide an opportunity for public comment for no fewer than 15 days on the additional BMPs proposed in the third phase Chesapeake Bay TMDL action plan.

**Response: Please see the response above.**

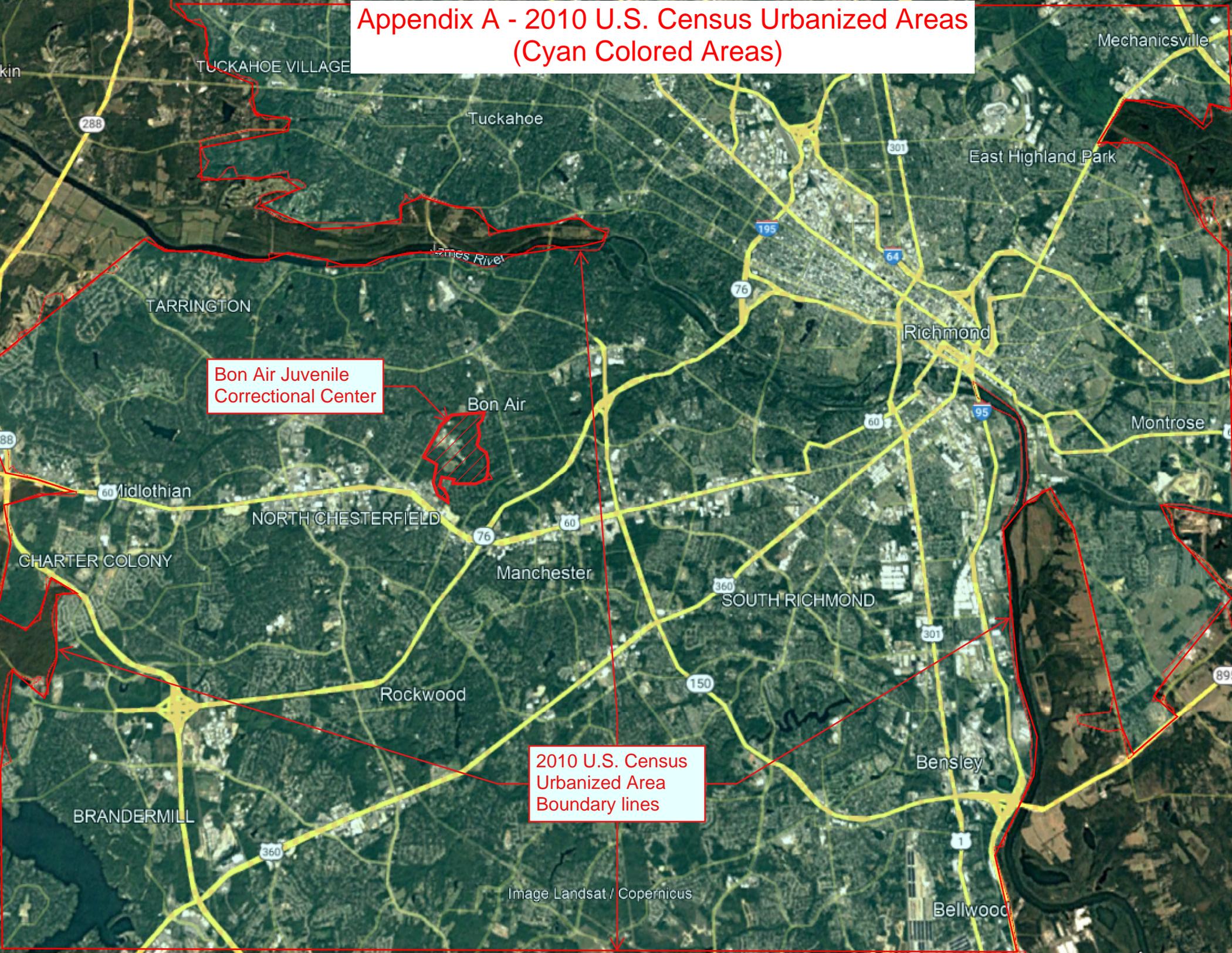
**7. DISCHARGES FROM NEW SOURCES (PARTH II A 4)**

Discharges into DJJ's MS4 from new sources that initiated construction between July 1, 2009, and October 31, 2023, and disturbed one acre or more, were addressed by adhering to the VSMP regulations for the implementation of post-development stormwater management facilities. An average impervious land cover condition of 16% was utilized for the design of these post-development stormwater management facilities; therefore, no offsets of increased load are required.

**8. DISCHARGES FROM GRANDFATHERED PROJECTS (PARTH II A 5)**

DJJ has no grandfathered projects that began construction after July 1, 2014; therefore, no offsets of increased load are required.

# Appendix A - 2010 U.S. Census Urbanized Areas (Cyan Colored Areas)



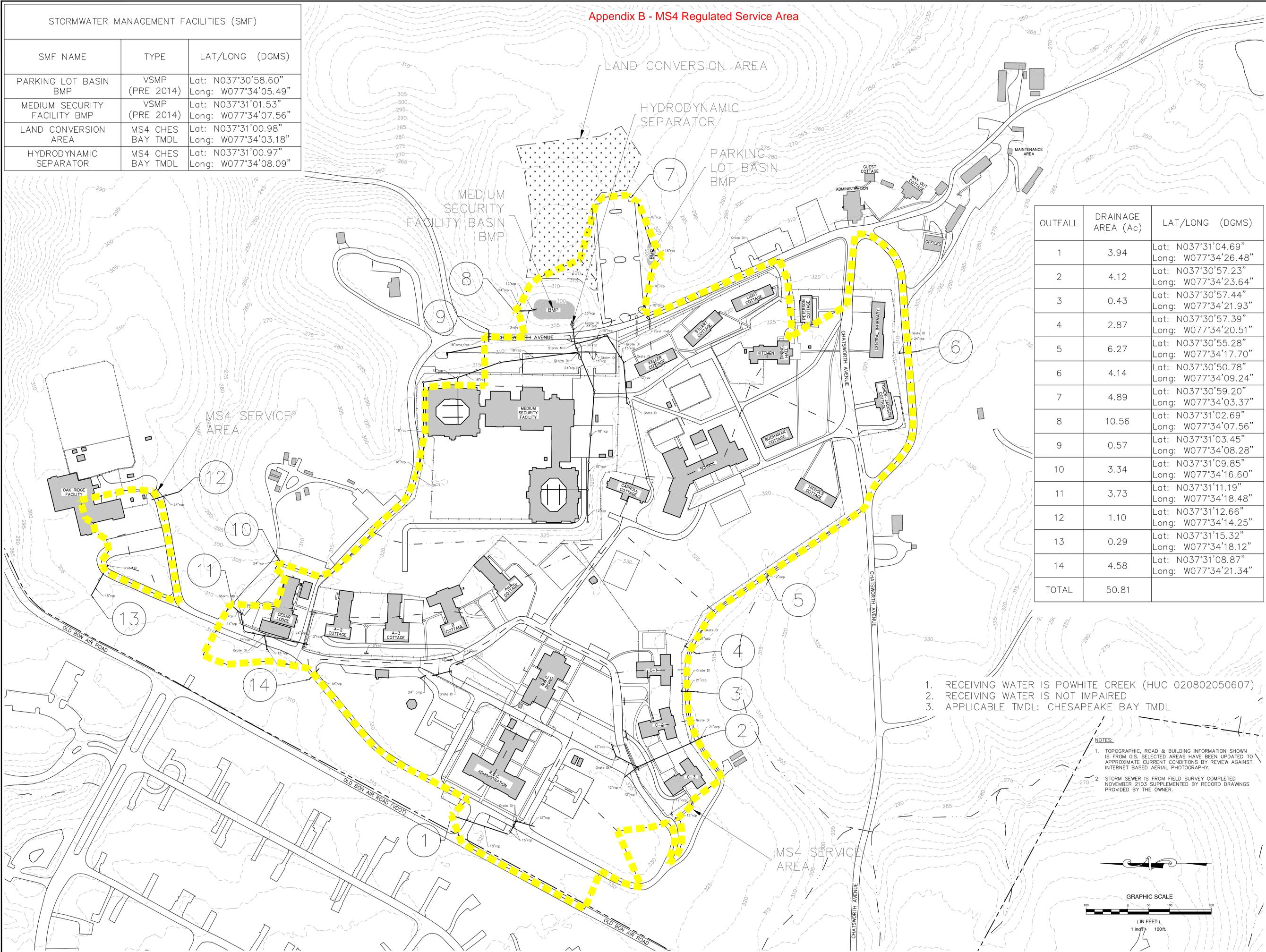
Bon Air Juvenile  
Correctional Center

2010 U.S. Census  
Urbanized Area  
Boundary lines

Image Landsat / Copernicus

Appendix B - MS4 Regulated Service Area

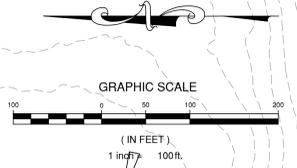
STORMWATER MANAGEMENT FACILITIES (SMF)		
SMF NAME	TYPE	LAT/LONG (DGMS)
PARKING LOT BASIN BMP	VSMP (PRE 2014)	Lat: N037°30'58.60" Long: W077°34'05.49"
MEDIUM SECURITY FACILITY BMP	VSMP (PRE 2014)	Lat: N037°31'01.53" Long: W077°34'07.56"
LAND CONVERSION AREA	MS4 CHES BAY TMDL	Lat: N037°31'00.98" Long: W077°34'03.18"
HYDRODYNAMIC SEPARATOR	MS4 CHES BAY TMDL	Lat: N037°31'00.97" Long: W077°34'08.09"



OUTFALL	DRAINAGE AREA (Ac)	LAT/LONG (DGMS)
1	3.94	Lat: N037°31'04.69" Long: W077°34'26.48"
2	4.12	Lat: N037°30'57.23" Long: W077°34'23.64"
3	0.43	Lat: N037°30'57.44" Long: W077°34'21.93"
4	2.87	Lat: N037°30'57.39" Long: W077°34'20.51"
5	6.27	Lat: N037°30'55.28" Long: W077°34'17.70"
6	4.14	Lat: N037°30'50.78" Long: W077°34'09.24"
7	4.89	Lat: N037°30'59.20" Long: W077°34'03.37"
8	10.56	Lat: N037°31'02.69" Long: W077°34'07.56"
9	0.57	Lat: N037°31'03.45" Long: W077°34'08.28"
10	3.34	Lat: N037°31'09.85" Long: W077°34'16.60"
11	3.73	Lat: N037°31'11.19" Long: W077°34'18.48"
12	1.10	Lat: N037°31'12.66" Long: W077°34'14.25"
13	0.29	Lat: N037°31'15.32" Long: W077°34'18.12"
14	4.58	Lat: N037°31'08.87" Long: W077°34'21.34"
TOTAL	50.81	

- RECEIVING WATER IS POWHITE CREEK (HUC 020802050607)
- RECEIVING WATER IS NOT IMPAIRED
- APPLICABLE TMDL: CHESAPEAKE BAY TMDL

- NOTES:
- TOPOGRAPHIC, ROAD & BUILDING INFORMATION SHOWN IS FROM GIS. SELECTED AREAS HAVE BEEN UPDATED TO APPROXIMATE CURRENT CONDITIONS BY REVIEW AGAINST INTERNET BASED AERIAL PHOTOGRAPHY.
  - STORM SEWER IS FROM FIELD SURVEY COMPLETED NOVEMBER 2103 SUPPLEMENTED BY RECORD DRAWINGS PROVIDED BY THE OWNER.



## Appendix C - Required and Achieved Reduction Calculations

Department of Juvenile Justice - Bon Air Facility  
 Third Phase Chesapeake Bay TMDL Action Plan  
 November 1, 2024

### WLA & Compliance Calculations

### Waste Load Allocation (WLA) (Reductions Required)

Land Cover		
Land Cover Date	Impervious	Pervious
6/30/2009	17.21	32.68

Table 3 a: Calculation Sheet for Determining Total POC Reductions Required During the Permit Cycle for the James River, Lynnhaven, and Creek Bay

Pollutant	Subsource	Loading rate (lbs/ac/yr)	Existing Developed Lands as of 6/30/09 served by the MS4 within the 2010 CUA (acres)	Load (lbs/yr)	Percentage of MS4 required Chesapeake Bay total L2 loading reduction	100% cumulative reduction required by 10/31/2028	Sum of 100% cumulative reduction (lb/yr)
Nitrogen	Regulated Urban	9.39	17.21	162	9%	15	28
	Regulated Urban Pervious	6.99	32.68	228	6%	14	
Phosphorus	Regulated Urban	1.76	17.21	30	16%	4.85	6.03
	Regulated Urban Pervious	0.5	32.68	16	7.25%	1.18	

**WLA & Compliance Calculations**

**Compliance BMPs (Reductions Achieved)**

Proposed Projects	BMP Type	Area Treated (Acres)		Efficiencies		TN lbs/ac/yr	TP lbs/ac/yr	Calculation Methodology	Remarks
		Imp.	Perv.	N	P				
Land Conversion	Previous (turf) to Forest	0	2.25	6.37	1.4	14	3.13	Bay Appendix V.H - Land Use	Table V.H.1 - Land Use Change Conversion Efficiency Table (James River, Turf to Forest Conversions), Conversion efficiency for TN =
Manufactured Treatment Marsh	Hydrodynamic Separation	3.56	5.66	35%	55%	26	5.00	Chesapeake Bay Program (Adjustor Curve)	Retrofit ST Curve - RD = 1"
<b>CUMULATIVE TOTALS</b>						<b>40</b>	<b>8.13</b>		