District of Columbia

DC Water

Fairfax County

Montgomery County

Prince George's County

Washington Suburban Sanitary Commission

BLUE PLAINS IMA REGIONAL COMMITTEE

777 North Capitol Street, NE, Suite 300 • Washington, D.C. 20002-4239 • (202) 962-3200 • FAX (202) 962-3203

MEMORANDUM

DATE: April 29, 2014

TO: IMA Leadership Committee

FROM: Larry S. Coffman, IMA Regional Committee Chair ***LSC***

RE: Transmittal of Blue Plains Service Area (BPSA) Long-term Planning Study – 2013 Update

On behalf of the Blue Plains IMA Regional Committee (IMA-RC), I am pleased to transmit a copy of the recently completed Blue Plains Service Area (BPSA) Long-term Planning Study – 2013 Update. This 2013 update of the Blue Plains Service Area (BPSA) Long-term Planning Study has been reviewed and approved by the IMA-RC after being developed by staff of the Metropolitan Washington Council of Governments. This study was prepared under the terms of the 2012 Blue Plains Intermunicipal Agreement (2012 IMA), and to fulfill the requirements of Section 7.C of the 2012 IMA, which states that:

> *"the Regional Committee shall …at least every five (5) years, assess and determine the individual and collective Projected Flow Capacity Needs of the Parties, and Non-Party Users, through a Jointly Managed Study…A Jointly Managed Study for determining Projected Flow Capacity Needs will project both short-term (approximately 5-15 years) and long-term (approximately 20-30 years) flow capacity and loading requirements."*

The information and analysis developed in this report is intended to identify the flow projections for the Blue Plains Wastewater Treatment Plant and associated Potomac Interceptor. It is also intended to aid the IMA-RC in identifying those actions needed to ensure that the long-term (Year 2040) wastewater management plans continue to address their individual and collective wastewater capacity and transmission needs in the BPSA, and to comply with the 2012 IMA capacity allocations.

This 2013 Study presents the analysis that was conducted in March – December, 2013, the various planning assumptions used, the key changes that have occurred since the last formal study was completed, and the resulting flow projections for the BPSA and expected flows at Blue Plains. The 2013 Study also outlines several issues that the IMA-RC will be monitoring and evaluating over the next few years.

Key Findings

Blue Plains Capacity & Permit Compliance

- Blue Plains' annual average flow is projected to reach only 347 Million Gallons per Day (MGD) (of its annual average capacity of 370 MGD) by the Year 2040; and
- As a result there is still approximately 20 MGD of additional capacity available beyond the current planning horizon of 2040.
- It has been determined that Blue Plains will be able to meet its current permit requirements as well as the Combined Sewer Overflow Long-Term Control Plan obligations well into the Year 2040.

Potomac Interceptor Capacity

- It has been determined that the peak flow transmission capacity in the Potomac Interceptor is adequate to meet or exceed all IMA flow allocations;

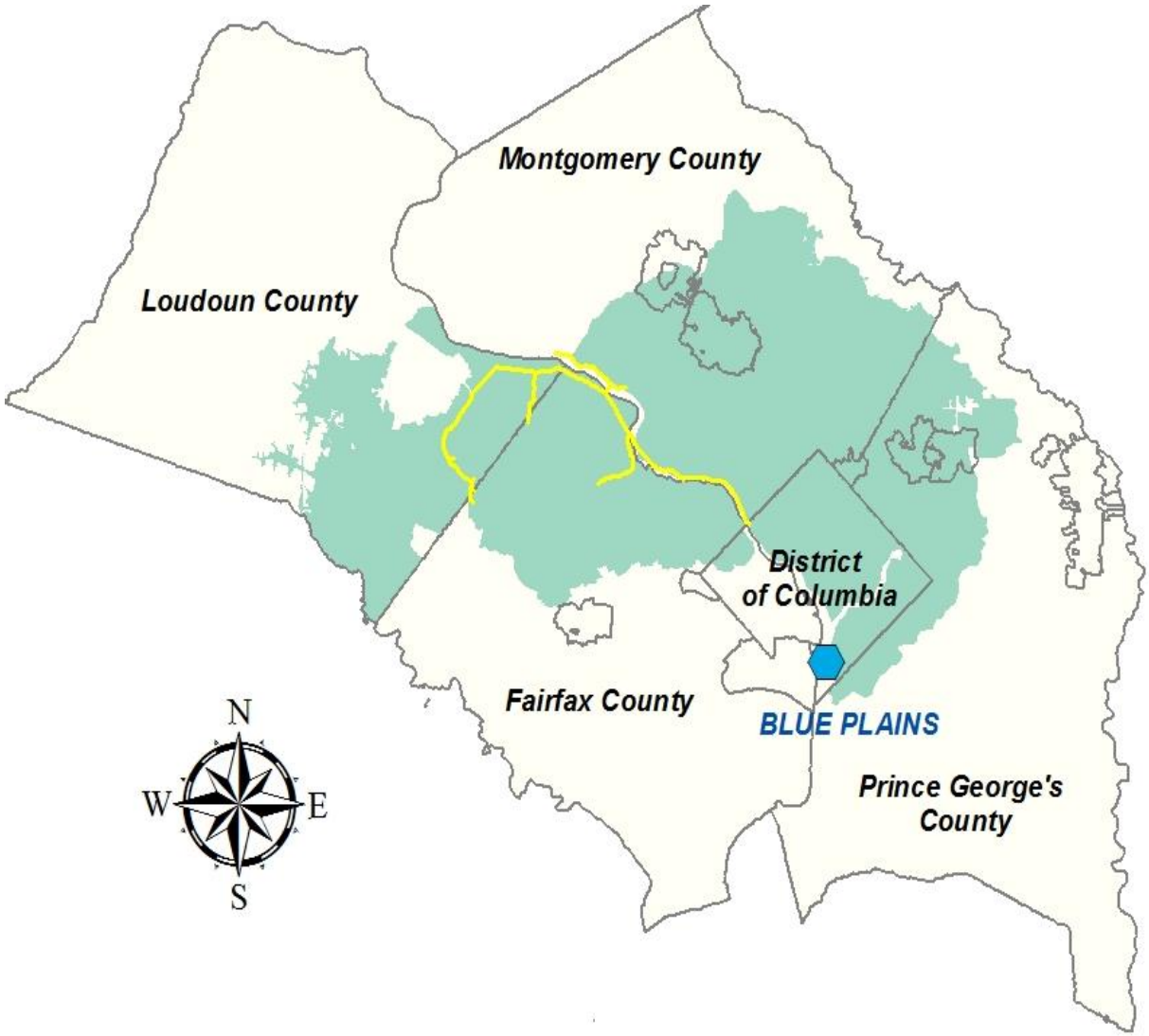
If you have any questions about this 2103 Study, or need any additional information, please contact your IMA-RC members, or Tanya Spano (COG staff), at (202) 962-3776 / tspano@mwcog.org.

Enclosure: BPSA Long-term Planning Study – 2013 Update

BLUE PLAINS SERVICE AREA (BPSA)
LONG-TERM PLANNING STUDY
2013 Update

A Strategic Wastewater Transmission and Treatment Capacity Evaluation for the BPSA Through the Year 2040

Final (3/24/14)



Prepared by staff of the Metropolitan Washington Council of Governments
On behalf of the Blue Plains IMA Regional Committee

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EXECUTIVE SUMMARY

Purpose & Scope

This 2013 update of the Blue Plains Service Area (BPSA) Long-term Planning Study was prepared by staff of the Metropolitan Washington Council of Governments (MWCOG) on behalf of the Blue Plains Regional Committee (IMA-RC), under the terms of the 2012 Blue Plains Intermunicipal Agreement (2012 IMA), and to fulfill the requirements of Section 7.C of the 2012 IMA, which states that:

> "*the Regional Committee shall …at least every five (5) years, assess and determine the individual and collective Projected Flow Capacity Needs of the Parties, and Non-Party Users, through a Jointly Managed Study…A Jointly Managed Study for determining Projected Flow Capacity Needs will project both short-term (approximately 5-15 years) and long-term (approximately 20-30 years) flow capacity and loading requirements."*

The BPSA is comprised of those sewersheds that contribute wastewater flows to the Blue Plains Advanced Wastewater Treatment Plant (Blue Plains). The entities represented in this long-term planning process for the BPSA are the parties to the 2012 IMA, i.e., the District of Columbia and DC Water; Fairfax County, Virginia; and Montgomery County, Prince George's County, and the Washington Suburban Sanitary Commission (WSSC), Maryland.

This 2013 BPSA Study includes and addresses the following data and analysis:

1. **Projected future wastewater flows in the BPSA** for a 30-year planning horizon;
2. **Flow management programs and actions** that each agency/jurisdiction has planned to address their needs and meet their obligations;
3. **Review of water quality regulations** and related activities that could impact the capacity, conveyance and/or treatment requirements for the BPSA; and
4. **Inventory of additional work and analysis** needed to ensure that the necessary facilities and plans are in place to address projected wastewater needs.

The information and analysis is intended to aid the IMA-RC in identifying those actions needed to ensure that the long-term (Year 2040) wastewater management plans continue to address their individual and collective wastewater capacity and transmission needs in the BPSA.

Key Findings

The MWCOG Round 8.2 Cooperative Forecast demographic projections, which included the Census 2010 data, were used to project annual average flows (in million gallons per day, MGD) for Blue Plains up to the Year 2040. In addition, several technical refinements were made to how flows were calculated. Based on the results of that

analysis it has been determined that if all of the identified flow management actions are successfully implemented as planned and when scheduled, that:

- **Blue Plains' annual average flow is projected to reach only 347 MGD by the Year 2040; and**
- **As a result there is still approximately 20 MGD of additional capacity available beyond the current planning horizon of 2040.**

Based on additional modeling that was done to reanalyze the flow transmission constraints of the Potomac Interceptor (PI), it has been determined that:

- **The peak flow transmission capacity in the PI is:**
  - **Adequate to meet all IMA limitations; and**
  - **Actually greater than current design and modeling values.**

In addition, based on current process assumptions and analysis, it has also been determined that:

- **Blue Plains will be able to meet its current permit requirements as well as the Combined Sewer Overflow (CSO) Long-Term Control Plan (LTCP) obligations well into the Year 2040.** These key finding are based on the following assumptions:
  - That the parties implement a wide variety of major projects, upgrades, and flow management programs consistent with Blue Plains' capacity requirements; and;
  - That the parties ensure that there is a nitrogen load allocation consistent with the Blue Plains permit.

Future Analysis & Challenges

The IMA-RC will need to continuously monitor flows and nutrient loads, assess the effectiveness and implementation of flow management programs and actions, and determine if regulatory or other changes are likely to impact the BPSA and its long-term planning assumptions. The ability to meet permit requirements and capacity as well as load constraints will require continued evaluation and assessment over the next five years as regulations evolve and growth continues in the BPSA over the next thirty years.

Two known regulatory actions are scheduled for the next five-year period:

1) Reissuance of the National Pollutant Discharge Elimination System (NPDES) Permit for Blue Plains in 2015, and
2) The mid-term evaluation of the Chesapeake Bay Total Maximum Daily Load (TMDL) in 2017.

The impact of these actions on Blue Plains' permit and/or its operations is unknown at this time.

I. Purpose, Scope and Background

This 2013 update of the BPSA Long-term Planning Study was prepared by staff of MWCOG on behalf of the IMA-RC, under the terms of the 2012 IMA, and to fulfill the requirements of Section 7.C of the 2012 IMA, which states that:

> "*the Regional Committee shall …at least every five (5) years, assess and determine the individual and collective Projected Flow Capacity Needs of the Parties, and Non-Party Users, through a Jointly Managed Study…A Jointly Managed Study for determining Projected Flow Capacity Needs will project both short-term (approximately 5-15 years) and long-term (approximately 20-30 years) flow capacity and loading requirements."*

The BPSA is comprised of those sewersheds that contribute wastewater flows to Blue Plains. The entities represented in this long-term planning process for the BPSA are the parties to the 2012 IMA, i.e., the District of Columbia and DC Water; Fairfax County, Virginia; and Montgomery County, Prince George's County, and the WSSC, Maryland.

This *BPSA Long-term Planning Study – 2013 Update* outlines the Blue Plains long-term planning assumptions, actions and recommended actions from 2013 to the Year 2040. In comparison, the original BPSA – Phase I Facility Planning Study was completed in 2003 under the terms of the 1985 IMA and addressed the period from 2003 to the Year 2030. The 2003 Study was the first comprehensive study done of the BPSA since the 1984 Blue Plains Feasibility Study had been conducted.

The 2013 BPSA Study, like the original 2003 BPSA Study, includes and addresses the following data and analysis:

1. **Projected future wastewater flows in the BPSA** for a 30 year planning horizon;
2. **Flow Management Programs & Actions** that each agency/jurisdiction has planned to address their needs and meet their obligations;
3. **Review of Water quality regulations** and related activities that could impact the capacity, conveyance and/or treatment requirements for the BPSA;
4. **Inventory of additional work and analysis** needed to ensure that the necessary facilities and plans are in place to address projected wastewater needs.

The information and analysis within this 2013 Study is intended to aid the IMA-RC in identifying those actions needed to ensure that the long-term (Year 2040) wastewater management plans continue to address their individual and collective wastewater capacity and transmission needs in the BPSA.

The Blue Plains Users have been provided with annual wastewater flow projections for the BPSA and addressed all of these issues over course of the IMA negotiations; however, the BPSA Long-term Planning Study – 2013 Update is the first formal

update since the 2003 Study was completed. As outlined in the 2012 IMA, the next Study update is expected to be completed in the next five years or by 2018.

II. Significant Changes Between 2003 and 2013

Since 2003 many significant changes have occurred that have affected the long-term planning assumptions for the BPSA. These changes include the adoption of the 2012 Blue Plains IMA, as well as various regulatory, physical and operational changes. Table 1 below describes those changes and provides a comparison of the key features and assumptions between the 2003 and 2013 BPSA Studies. Additional details (i.e., assumptions and inputs) about the Regional Wastewater Flow Forecast Model (RWFFM) that was used to project wastewater flows for the BPSA in both the 2003 and 2013 Studies are outlined in Appendix A. The text that follows provides additional information about each of those key assumptions.

Table 1
Comparison of Key Planning Assumptions

Elements	2003 Study	2013 Study
Planning Horizon	2003 through 2030	2013 through 2040
Annual Average Flow Projection & Flow Management Assumptions	Used RWFFM for BPSA Basis for Flow Projections: • Round 6.3 Cooperative Forecast (Census 2000 data) • Calculated Year 2000 Base Year Flow (BYF) • Unit Flow Factors (UFF) & Inflow/Infiltration (I/I) values adopted in 2001 • Stormwater flows from Combined Sewer System were included in District's projected flows Flow Mgmt: reflected plans as of 2003	Used RWFFM for BPSA Basis for Flow Projections: • Round 8.2 Cooperative Forecast (Census 2010 data) • Actual Year 2009 as BYF • 2009 BYF reflects 18.52 MGD of flow reductions already in place • Same I/I & updated UFF values adopted in 2010 • Captured Stormwater Flows (CSF) to meet the CSO LTCP[1] requirements have been modeled & are not included in District's projected flows Flow Mgmt: reflects plans as of 2013
	Seneca basin flows not included in any BPSA flow projections (as basin was completely separated from BPSA in early 2004)	

[1] Combined Sewer Overflow Long-term Control Plan (now DC Waters' Clean Rivers Project)

Elements	2003 Study	2013 Study
Flow & Capacity Allocation Assumptions	District stormwater flows were: • Assessed against the District's allocation • Counted against Blue Plains' overall 370 MGD capacity 4.5 MGD of the PI Reserve were held in reserve by DC for the use of the PI Users[2]	District CSF are: • Differentiated from District sewage flows • Not counted against District's allocation or Blue Plains' 370 MGD capacity 4.5 MGD of the PI Reserve was reallocated to the District
Peak Flow Transmission & Limitation Assumptions	Capacity in the PI was modeled & deemed to be: • Adequate to transmit peak flows through Year 2025 for a 5-year/24-hour storm; • Not adequate for a 10-year/24-hour storm. Peak flows were predicted to exceed IMA limitations in select basins	PI flows were re-assessed using updated/linked PI & Mike Urban models Capacity in PI has been determined to be: • Adequate to meet all IMA limitation; • Actually greater than design & modeling values, based on observed data
Water Quality - Nutrient Load Requirements	Blue Plains had permit requirements for Phosphorus, and a Nitrogen reduction goal	Blue Plains has Phosphorus & Nitrogen load caps in its permit, as well as overall and State' allocations in the Chesapeake Bay TMDL (2010)

A. Blue Plains IMA and Long-term Planning Elements

The original 1985 IMA addressed the Blue Plains' expanded flow capacity of 370 MGD, defined flow allocations for all the parties, and outlined other long-term planning assumptions and processes for the projected time horizon out to Year 2010. Therefore, when the 2003 BPSA Study was prepared, it evaluated future wastewater flows against the capacity allocations that were in the 1985 IMA. When the Blue Plains Annotated IMA was produced in 2005, it acknowledged the creation of the District of Columbia Water and Sewer Authority (now DC Water) as the operator for Blue Plains, and identified several significant process and program changes (e.g., biosolids management, the implementation of denitrification, the need to assess peak flows, the pending Chesapeake Bay Program nutrient load caps, and other issues) that had long-term planning implications for the BPSA and Blue Plains itself. Many of these issues had not been considered when the 1985 IMA had been written – but it was clear that they would need to be further analyzed as part of ongoing planning as well as to be part of the IMA negotiations.

When the IMA negotiations were completed in 2012, all of the critical long-term planning issues that had previously been identified had either been resolved or addressed. As a result, the 2012 IMA and its associated Operating Agreements (OA) formalized the following critical long-term planning assumptions and

[2] Per 1985 IMA

decisions that were utilized in the development of this BPSA Long-term Planning Study – 2013 Update:

- **Section 4/OA #1 - Blue Plains Flow Capacity, Loads and Peak Flows – Allocations and Limitations**
  - Revised the District's flow allocation to add 4.5 MGD of capacity that had previously been held in reserve by the District for use by the PI Users ;
  - Eliminated the Captured Stormwater Flows (CSF) from being included in the District's future flow projections;
  - Documented/updated the capacity allocations and peak flow limitation to reflect those changes (see Table 2 below);

TABLE 2 BLUE PLAINS ALLOCATED FLOW CAPACITY	
ENTITIES	**ALLOCATIONS (MGD)**[3]
District of Columbia	152.50
Non-Party Users:	
Loudoun County Sanitation Authority, Virginia	13.80
Dulles Airport, Virginia	1.50
Town of Vienna, Virginia	1.50
Naval Ship Research & Development Center, Maryland	0.07
National Park Service, Maryland	0.03
Sub-total	16.90
District of Columbia – Total	**169.40**
WSSC[4] (for Prince George's County & Montgomery County), **Maryland – Total**	**169.60**
Fairfax County, Virginia[5] **- Total**	**31.00**
Grand Total – Blue Plains Design Capacity	**370.00**

  - Reflected the latest analysis of the Potomac Interceptor that determined that future peak flows could be successfully transmitted beyond the limitations currently defined in the IMA; and
  - Addressed the existence of the Bay TMDL, the associated nutrient load allocations, the need to monitor and manage those loads to protect Blue

[3] Flows represent Annual Average Hydrologic Conditions.
[4] The Allocated Flow Capacity for WSSC is on behalf of Prince George's and Montgomery; with any sub-allocations determined by separate agreements between those entities. The WSSC allocation also includes wastewater from other political jurisdictions with which WSSC has separate agreements.
[5] The Allocated Flow Capacity for Fairfax also includes wastewater from other political jurisdictions with which Fairfax has separate agreements.

Plains' permit requirement, and the obligations of the parties to address this new operational and permit constraint at Blue Plains.

- **Section 6/OA #3 – Flow and Load Measurement and Management**
  - Confirmed terms under which CSF flows were to be managed;
  - Reinforced the parties' obligations to manage their peak and annual average flows;
  - Defined procedures for ensuring that flow management actions would be monitored and assessed to meet flow allocations and peak flow limitations;

- **Section 7 /OA #4 – Wastewater Projected Flow Capacity Needs and Future Options**
  - Defined a formal and jointly managed process for :
    - Conducting the BPSA long-term planning studies every five years;
    - Assessing capacity needs; and
    - Evaluating flow diversion options rather than the previous unilateral off-loading provisions.

- **Section 9/OA #6 – Biosolids Management Commitments**
  - Reflected the continued regional responsibility for managing biosolids, and adding the flexibility to accommodate new technologies and programs for managing those biosolids.

B. Physical Changes in BPSA

The BPSA includes the District of Columbia, portions of Fairfax and Loudoun Counties in Virginia, and portions of Prince George's and Montgomery Counties in Maryland. The Potomac Interceptor (PI) is a major transmission line that was built to convey wastewater flows from the Dulles Airport, Virginia as well suburban Virginia and Maryland flows to Blue Plains. The major change in the BPSA since 2003 happened when the Seneca Creek sewershed (located in Montgomery County) was disconnected from the BPSA in 2004.

Approximately 5 MGD of wastewater produced in the Seneca Creek sewershed had been treated at the Seneca Creek wastewater treatment plant (which is operated by WSSC). The remainder of the flow from that sewershed was transmitted through the PI and treated at Blue Plains. When the 2003 Study was done, it was already known that the Seneca Creek plant would be expanded while the Seneca Creek sewershed would be disconnected from the BPSA the following year. Therefore, the results of the 2003 Study assumed that the Seneca Creek sewershed would no longer be considered part of the BPSA and therefore was not projected to contribute any future flows to Blue Plains. So this 2013 Study formalized the decision to permanently disconnect the Seneca sewershed

from the BPSA and eliminate any of its flows from being contributed to Blue Plains.

C. Regulatory Changes – Managing Nutrients & CSOs

When the 2003 Study was issued, Blue Plains had been operating a state-of-the-art process for many years to meet strict permit limits for Phosphorus to protect local Potomac River water quality. By 2003, the plant also had a voluntary nitrogen goal for the Chesapeake Bay reflected in its NPDES permit. The goal was an 8,467,000 pounds per year load associated with a 7.5 milligram/liter (mg/l) annual average nitrogen concentration. Blue Plains met this goal using a treatment technology called Biological Nutrient Removal (BNR).

The U.S. Environmental Protection Agency (EPA), Region 3, issued the Blue Plains NPDES permit in August, 2010. That permit was issued with new nitrogen requirements that were expected to be in compliance with the soon to be issued Chesapeake Bay TMDL load cap. Under the terms of that permit, DC Water must operate the plant with a nitrogen limit of *'4,377,580 lbs. annually for Outfall 002'*.

On December 29, 2010, EPA established the Chesapeake Bay TMDL. The Bay TMDL defined pollution load caps for nitrogen, phosphorus and sediment that were needed to meet water quality standards in the Chesapeake Bay and its tidal waters - such as the Potomac River. The Bay TMDL also defined load allocations for those pollutants for all major sources of nitrogen, phosphorus and sediment across the District of Columbia and large sections of Maryland, Virginia, as well as Delaware, New York, Pennsylvania and West Virginia. And while Bay Program nutrient goals did exist when the 2003 BPSA Planning Study was developed, the establishment of the Bay TMDL included not only load caps for stormwater, agriculture, and air sources; it also established new much lower nutrient load caps for all significant wastewater plants in the Bay watershed, including Blue Plains. And those load caps are now regulatory in nature and may not be exceeded even if flows increase beyond the current design capacity of those plants.

The 2012 IMA recognized the new Blue Plains load cap and load allocations, assumption, and constraints in Operating Agreement #2 (specifically Table # OA 1-A). The Blue Plains load cap and allocations (for Outfalls #001 and #002) are defined in Table 3 below.

Table 3 *(direct from OA #1 – Table OA 1-A)*		
BLUE PLAINS EFFLUENT LOADS [6], [7]		
ENTITIES WITH ALLOCATIONS	**LOAD ALLOCATIONS (LBS/YR)**	
	Total Nitrogen	**Total Phosphorus**
District of Columbia's Blue Plains Load Allocation[8] - Total	**2,114,542.00**	**87,993.54**
WSSC	*Not specified*	*Not specified*
Naval Ship Research & Development Center	*Not specified*	*Not specified*
National Park Service	*Not specified*	*Not specified*
Maryland's Blue Plains Load Allocation-Total[9]	**1,993,000.00**	**89,694.91**
Fairfax County	*Not specified*	*Not specified*
Loudoun County Sanitation Authority	*Not specified*	*Not specified*
Dulles Airport	*Not specified*	*Not specified*
Town of Vienna	*Not specified*	*Not specified*
Virginia's Blue Plains Load Allocation-Total	**581,458.00**	**26,166.00**
Blue Plains Effluent Loads (Grand Total)[6]	**4,689,000.00**	**203,854.45**

D. Changes in Operations

In order to comply with the Bay TMDL, meet Blue Plains' NPDES permit, adequately treat incoming wastewater, manage the biosolids that are generated, satisfy the CSO LTCP requirements, ensure that flow allocations under the 2012 IMA can be met, and to meet other operational and process requirements, DC Water has implemented or is in process of implementing several major projects, upgrades, and flow management programs that affect long-term planning. The cumulative effect of all of these projects is to ensure that Blue Plains will be able to operate under its load cap and meet its permit requirements over the next 30 years.

Table 4 below summarizes the new process/projects that have now been defined since the original 2003 Study was done.

[6] Loads for Blue Plains and sub-allocations are as documented in EPA's Final TMDL (December 29, 2010), Section Q.
[7] Use of Allocated Flow Capacity is contingent on providing an allocation equivalent to at least 4.0 mg/L for TN and 0.18 mg/L for TP for Allocated Flow Capacity plus Captured Stormwater Flow, i.e. all flow out of Outfall 002. The District must also provide an allocation for flow discharged to Outfall 001.
[8] The load allocations shown for the District only address that portion associated with District flows to Blue Plains. Allocations for other Non-Party Users are reflected in the respective state allocations.
[9] WSSC use of allocated flow capacity is limited to 163.6 mgd due to diversion of nitrogen and phosphorus load allocations to the Seneca WWTP (i.e., loads associated with 6 mgd).

Table 4 – Summary of New Processes/Projects		
Entity	**Program or Action**	**Implementation**
DC Water	New digesters to be on-line	2014
	Enhanced Nutrient Reduction (ENR) facilities to be on-line to meet & maintain Bay TMDL nitrogen limits even at design capacity	2015
	Total Nitrogen / Wet Weather Controls in place	2018
	100% implementation of CSO LTCP	2025

E. Changes in Flow & Load Management Obligations

In addition to implementing various projects and process changes, the parties that contribute flows to Blue Plains have broad obligations for doing their part to protect Blue Plains and making sure that their flows do not contribute to violations of Blue Plains' permit. They also continue to have specific obligations to manage their flows to ensure that they do not exceed their peak flow limitations or their annual average capacity allocations during this planning period.

Table 5 below highlights the key differences in the flow and load management obligations as compared to the original 2003 Study. The 2003 Study only projected to the Year 2030, while this 2013 Study projects to the Year 2040; so only major changes in the order-of-magnitude or timing of issues are noted here.

Table 5 – Summary of New or Modified Flow & Load Management Obligations		
Entity	**Program or Action**	**Key Difference**
DC Water	Wastewater Reductions	Expect 22.5 MGD in reductions (vs. original 9 MGD) – 18.5 MGD which were already achieved by 2009
	Water Conservation Efforts	Still expect 6 MGD in reductions (now by 2040)
	Sewer System Assessments	Expect 6 MGD in reductions (vs. 5 MGD by 2030)
	100% Implementation of CSO LTCP	Estimate 21 MGD in additional flows to be contributed to Blue Plains by 2040 (on an annual average basis); but not counted against 370 MGD IMA allocations

Entity	Program or Action	Key Difference
District	Manage Loads	Must identify additional load for Outfall #001 to satisfy District's share of TMDL allocation
Fairfax County	Mange Flows to not Exceed IMA Allocation	Need to divert 10 MGD by 2030 and up to 15 MGD by 2040 (vs. originally only 4 MGD by 2030)
	Manage Loads	Must not exceed loading assumptions
Loudoun Water	Mange Flows to not Exceed IMA Allocation	Need to divert 9 MGD by 2040 (no change)
	Manage Loads	Must not exceed loading assumptions
WSSC	Mange Flows to not Exceed IMA Allocation	Not an issue, although current 'excess' capacity is nominally only 6 MGD (vs. original 20 MGD) – see below
	Manage Loads	Must limit flows by 6 MGD or find additional nutrient allocation to accommodate transfer of 6 MGD of nutrient allocation from Blue Plains to Seneca

F. Evaluation of Potomac Interceptor Limitations

The flows in the PI were re-assessed using updated hydrodynamic PI model and linking it with the Mike Urban (CSO LTCP) model. This allowed flows to be routed from the far reaches of the BPSA to Blue Plains, and to evaluate all aspects of the transmission of peak flows in the PI and produced a more robust analysis of the true capacity in the PI. The results of this analysis were supported by observation of flows in the PI during high flow events.

III. Key Findings

This section provides an overview of the results of the:

A. Wastewater Flow Projections for the BPSA;
B. Flow Management Actions and Programs; and
C. Peak Flow Transmission Analysis for the PI.

A. Wastewater Flow Projections for the BPSA

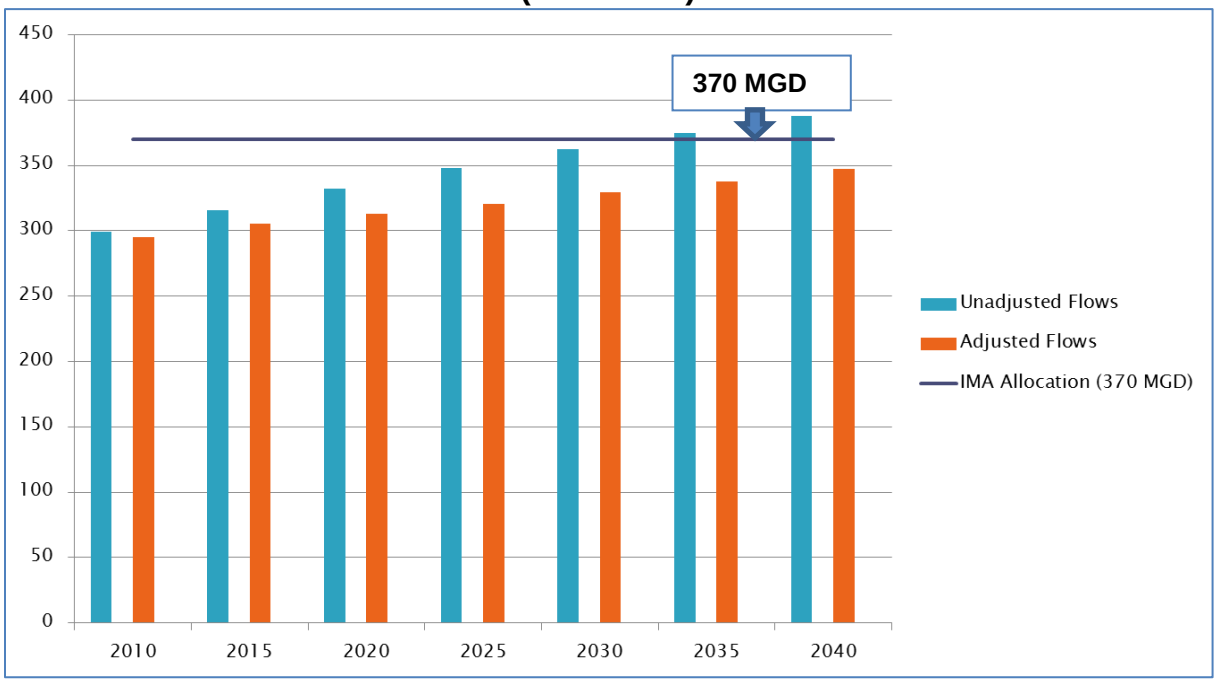
Based on Round 8.2 Cooperative Forecast demographic projections which included the Census 2010 data, the Blue Plains annual average flows were projected up to Year 2040. Based on the results of that analysis it has been determined that if all of the identified flow management actions are successfully implemented as planned and when scheduled, that:

- **Blue Plains' annual average flow is projected to reach only 347 MGD by the Year 2040; and**
- **As a result there is still approximately 20 MGD of additional capacity available beyond the current planning horizon of 2040.**

The cumulative impact of the changes in how the IMA capacity allocations were defined, the jurisdiction/agency flow management actions that were taken, and the updated wastewater flow project projections is that Blue Plains' 370 MGD capacity is anticipated to be available for 10 to 20 years beyond what the 2003 BPSA Study anticipated.

Chart 1 below graphically shows the impact of those flow management actions (i.e., flow reduction and flow diversion efforts) on the projected flows to Blue Plains. Flow projections that reflect only changes in demographic elements over time are defined as 'Unadjusted' BPSA flows (see Table 6). Once the impact of various flow management actions have been incorporated (see Table 8) then 'Adjusted' BPSA flows are generated (see Table 7).

Chart 1 – Comparison of "Adjusted" vs. "Unadjusted" Flow projections (Round 8.2)



B. Flow Management Actions and Programs

The following section reflects programs, projects and a variety of activities that each major jurisdiction/agency within the BPSA has implemented or intends to implement as part of its own long-term planning for the flows it generates within the BPSA in order to meet and not exceed its IMA capacity allocations. The key flow

management findings (i.e., amount and timing) for each jurisdiction/agency are also noted.

DISTRICT & DC WATER PROGRAMS

In addition to aforementioned decisions and actions, DC Water's technical work, and an outcome of the 2012 IMA renegotiations, DC Water planned and implemented flow management programs that reduced the District's flow projections. Table 8 outlines those programs and projects, as well as the expected flow reductions and deadlines for achieving them. As a result of these programs, **the District's flow is projected to be 14.8 MGD below its allocation in Year 2040.**

WASHINGTON SUBURBAN SANITARY COMMISSION (WSSC) PROGRAMS

All flows generated within the Seneca basin are now treated at the Seneca WWTP. Therefore the Seneca basin is no longer considered as part of the Blue Plains Service Area. There are no facilities capable of transmitting Seneca flow to the Blue Plains Service Area. The two pumping stations that used to do this have been abandoned and demolished.

Based on current flow projections, WSSC is not expected to reach its IMA flow capacity (169.6 MGD) by 2040 and will have approximately 7 MGD of additional (e.g., 'excess') IMA capacity by then (see Table 5 for reference for WSSC's flows & loads).

FAIRFAX COUNTY PROGRAMS

Based on current flow projections, Fairfax County is expected to need to divert approximately 10 MGD by Year 2030 and up to 15 MGD by Year 2040.

Fairfax County has several options for handling any 'excess' flows to Blue Plains. It can route the flows from downstream basins over to the existing Noman Cole plant, a 67 MGD advanced treatment facility.

Fairfax County has purchased 1 MGD capacity at Loudoun Water's Broad Run plant. Based on the purchase agreement, Loudoun Water will send 1 MGD less flow to Blue Plains allowing Fairfax County to send 1 MGD more to Blue Plains for a total of 32 MGD.

In addition, the balance of 'excess' flows can be treated at the plant owned by the Alexandria Renew Enterprises through a service agreement Fairfax County has with that utility.

LOUDOUN WATER (LOUDOUN COUNTY SANITATION AUTHORITY) PROGRAMS

Based on current flow projections, Loudoun Water is expected to need to divert approximately 9 MGD by Year 2040.

Loudoun Water plans to regularly maximize its flows to Blue Plains up to its annual average allocation (13.8 MGD) and will treat excess flow at the Broad Run Water Reclamation Facility (BRWRF). There is an agreement between Fairfax County (see a reference in Fairfax County Programs) and Loudoun Water to potentially swap up to 1 MGD in flows between those entities without affecting their IMA allocations. To manage future flows and stay within their IMA allocation, Loudoun Water will build additional interceptor sewers to divert flows from other sewer sheds to the BRWRF and expand the treatment capacity at the BRWRF as needed.

Loudoun Water's current planning forecasts estimate that the second phase of the BRWRF will be needed by approximately 2023. The second phase is planned to be additional 11 MGD of treatment capacity and will double the BRWRF capacity to 22 MGD. With the second phase of the BRWRF in service, Loudoun Water will have total treatment capacity of approximately 35.8 MGD (22 MGD + 13.8 MGD) which appears sufficient to meet their capacity needs out to Year 2040.

Table 6 - BPSA Annual Average Flow Projections
Unadjusted[10] Flows (MGD)
(Based on Round 8.2)

Jurisdiction/Agency (BPSA Flow Contributions)	Base Year 2009	Year 2010	Year 2015	Year 2020	Year 2025	Year 2030	Year 2035	Year 2040	IMA Allocations
DISTRICT OF COLUMBIA - TOTAL FLOWS	**127.73**	**128.63**	**134.79**	**139.26**	**143.49**	**146.49**	**149.42**	**153.68**	**152.50**
NON-PARTY USERS:									
LOUDOUN COUNTY SANITATION AUTHORITY, VA	11.91	12.55	14.75	17.1	19.22	21.07	22.3	22.89	13.80
DULLES AIRPORT, VA	0.85	0.85	0.91	0.99	1.04	1.06	1.08	1.09	1.50
TOWN OF VIENNA	0.83	0.84	0.84	0.85	0.86	0.87	0.88	0.89	1.50
NAVAL SHIP RESEARCH & DEVELOPMENT (R&D), MD	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.07
NATIONAL PARK SERVICE (NPS), MD	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.03
DISTRICT OF COLUMBIA + NON-PARTY USERS - TOTAL FLOWS	**141.38**	**142.93**	**151.35**	**158.26**	**164.67**	**169.55**	**173.74**	**178.61**	**169.40**
WSSC - TOTAL FLOWS	**125.97**	**126.61**	**132.99**	**140.05**	**145.90**	**151.95**	**157.48**	**162.71**	**169.60**
FAIRFAX CO. - TOTAL FLOWS	**29.20**	**29.40**	**31.20**	**33.85**	**37.48**	**40.78**	**43.77**	**46.75**	**31.00**
BLUE PLAINS - GRAND TOTAL FLOWS	**296.55**	**298.94**	**315.54**	**332.16**	**348.05**	**362.28**	**374.99**	**388.07**	**370.00**

NOTE: Projected flow exceedances of the IMA allocations (prior to application of flow management actions) are noted in red font.

[10] Unadjusted Flows reflect only those flows that would result from the projected demographic changes in the BPSA over the planning period.

Table 7 - BPSA Annual Average Flow Projections
Adjusted[11] Flows (MGD)

(Based on Round 8.2)

Jurisdiction/Agency (BPSA Flow Contributions)	Base Year 2009	Year 2010	Year 2015	Year 2020	Year 2025	Year 2030	Year 2035	Year 2040	IMA Allocations
DISTRICT OF COLUMBIA - TOTAL FLOWS	**127.73**	**124.63**	**125.49**	**126.30**	**127.53**	**130.53**	**133.46**	**137.72**	**152.50**
NON-PARTY USERS:									
LOUDOUN COUNTY SANITATION AUTHORITY, VA	11.91	12.55	13.80	13.80	13.80	13.80	13.80	13.80	13.80
DULLES AIRPORT, VA	0.85	0.85	0.91	0.99	1.04	1.06	1.08	1.09	1.50
TOWN OF VIENNA	0.83	0.84	0.84	0.85	0.86	0.87	0.88	0.89	1.50
NAVAL SHIP RESEARCH & DEVELOPMENT (R&D), MD	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.07
NATIONAL PARK SERVICE (NPS), MD	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.03
DISTRICT OF COLUMBIA + NON-PARTY USERS - TOTAL FLOWS	**141.38**	**138.93**	**141.10**	**142.00**	**143.29**	**146.32**	**149.28**	**153.56**	**169.40**
WSSC - TOTAL FLOWS	**125.97**	**126.61**	**132.99**	**140.05**	**145.90**	**151.95**	**157.48**	**162.71**	**169.60**
FAIRFAX CO. - TOTAL FLOWS	**29.20**	**29.40**	**31.00**	**31.00**	**31.00**	**31.00**	**31.00**	**31.00**	**31.00**
BLUE PLAINS - GRAND TOTAL FLOWS	**296.55**	**294.94**	**305.09**	**313.05**	**320.19**	**329.27**	**337.76**	**347.27**	**370.00**

[11] Flow Management Actions (see Table 8) are applied to Unadjusted Flows (see Table 6) to in order to calculate these Adjusted Flows.

Table 8 - Adjustments[12] to BPSA Projected Flows (MGD)

(Based on 2013 Planning Assumptions)

Jurisdiction/Agency & Flow Management Plans/Timing	Base Year 2009	Year 2010	Year 2015	Year 2020	Year 2025	Year 2030	Year 2035	Year 2040
DC WATER Wastewater Reduction Program *[Additional 1.3 MGD reduction by 2010] Note: Base Year 2009 Flow already reflects approx. 18.52 MGD of flow reductions due to Tide Gate 1 & City-wide I/I and in addition due to Tide Gate 2 & Luzon Valley & WMATA projects (NEW) reductions achieved as of 2009*	0.00	0.00	-0.30	-3.96	-3.96	-3.96	-3.96	-3.96
DC WATER Water Conservation Program *[4 MGD reduction by 2010 & 6 MGD by 2015]*	0.00	-4.00	-6.00	-6.00	-6.00	-6.00	-6.00	-6.00
DC WATER Sewer System Assessment Program *[3 MGD reduction by 2015 & 6 MGD by 2025]*	0.00	0.00	-3.00	-3.00	-6.00	-6.00	-6.00	-6.00
DISTRICT OF COLUMBIA - TOTAL FLOW ADJUSTMENTS	**0.00**	**-4.00**	**-9.30**	**-12.96**	**-15.96**	**-15.96**	**-15.96**	**-15.96**
LOUDOUN COUNTY SANITATION AUTHORITY - TOTAL FLOW ADJUSTMENTS *[LW'S 10 MGD Broad run plant on-line by 2008; Presumes flows over 13.8 MGD are diverted to Broad Run; 1st expansion by 2018 if required]*	**0.00**	**0.00**	**-0.95**	**-3.30**	**-5.42**	**-7.27**	**-8.50**	**-9.09**
FAIRFAX CO. - TOTAL FLOW ADJUSTMENTS *[Presumes combined flows of over 31.00 MGD are diverted to either Norman Cole, Broad Run or Alexandria Renew plants]*	**0.00**	**0.00**	**-0.20**	**-2.85**	**-6.48**	**-9.78**	**-12.77**	**-15.75**
BPSA - GRAND TOTAL FLOW ADJUSTMENTS	**0.00**	**-4.00**	**-10.45**	**-19.11**	**-27.86**	**-33.01**	**-37.23**	**-40.81**

[12] These Flow Adjustments are applied to the Unadjusted Flows (see Table 6) and used to generate the Adjusted Flows for the BPSA (see Table 7).

C. Peak Flow Transmission Analysis for the PI

The flows in the PI were re-assessed using the hydrodynamic PI model and linking it with the Mike Urban (CSO LTCP) model. This allowed flows to be routed from the far reaches of the BPSA to Blue Plains, and to evaluate all aspects of the transmission of peak flows in the PI and produced a more robust analysis of the true capacity in the PI.

Based on the updates to as well as additional modeling that was done to re-analyze the transmission constraints of the Potomac Interceptor (PI), it has been determined that **the peak flow transmission capacity in the PI is:**

- **Adequate to meet all IMA limitations; and**
- **Actually greater than current design and modeling values.**

IV. Future Analysis and Challenges

The following section describes several additional issues that are anticipated to be discussed by the IMA-RC over the next two to five years, and the analysis that is anticipated to be done leading up to the next update of this report in 2018. A timeline (Table 9) for the BPSA facility planning study also notes key milestones for various activities that will impact planning efforts. The timeline identifies anticipated activities through the Year 2040. This 30-year period reflects the same planning horizon as used for the BPSA Planning Study. Also, this section identifies future projects that might impact the BPSA projections (i.e. flows or loads) in the next 5-year period before the next update of the BPSA Planning Study is completed in 2018.

1. Flow Versus Load Trends & Sensitivity Analysis

Due to years of aggressive water conservation and I/I rehabilitation efforts, wastewater treatment plants nationwide have noticed a steady increase in inflow loadings even as flows trend downward and/or remain steady in spite of growth. The IMA-RC has started to work together on a multi-year effort to research this issue and to work with DC Water staff to determine the sensitivity of various processes at Blue Plains to this issue; and to determine if loading constraints might become a capacity issue before flow capacity does. This work will also be important when determining how Blue Plains will fare in the face of future growth under the stringent nutrient load caps.

A related matter is that the Chesapeake Bay TMDL will be reevaluated at mid-term in 2017. It is not known whether that reevaluation will result in changes to load allocations for wastewater treatment plants in the Bay watershed.

2. **Monitor Effectiveness and Timing of Implementing Flow Management Actions**
   Between now and the next update of this study in 2018, the IMA-RC will be reviewing Adjusted Flow figures on a monthly basis, and informally assessing flow projections on an annual basis to ensure that actions are being taken consistent with the long-term planning assumptions in this report.

3. **Reevaluation of Flow Factors (UFFs) & I/I and Related Planning Assumptions**
   As part of its ongoing technical work, the IMA-RC will continue to periodically evaluate whether additional work might be needed to update or verify the various inputs and assumptions used to develop the BPSA flow projections (e.g., unit flow factors and/or Inflow/Infiltration (I/I) values).

   Renewal of the Blue Plains NPDES Permit is also scheduled for 2015. It is unknown at this time whether this regulatory action will result in any changes that will impact the capacity of Blue Plains or have any other operational impacts.

Table 9 – BPSA Timeline and Major Milestones	
Year	**Current and Projected Implementation of Blue Plains Users' Wastewater Management Programs & Other Activities/Regulatory Actions**
2003	**First BPSA Long-term Planning Study issued** Blue Plains 370 MGD capacity projected to be available until Year 2030 (based on Adjusted Flow calculations)
2004	**BPSA – Physical change** Seneca basin was completely separated from BPSA and its nitrogen and phosphorus allocation was diverted from Blue Plains
2009	**2009 Base Year flow for Blue Plains was established** which accounted for a flow reduction of **18.52 MGD** due to I/I reduction projects, Sewer System Separation project and Groundwater Diversions projects
2010	**Blue Plain's NPDES** permit was issued **Chesapeake Bay TMDL** was issued **DC Water Conservation Project - 4 MGD flow reductions achieved**
2011	**DC Water Sewer System Separation - 0.046 MGD flow reductions achieved**
2013	**2012 IMA** 2012 Blue Plains Intermunicipal Agreement formally adopted (March, 2013) - 4.5 MGD of the PI Reserve reallocated to the District - Blue Plains CSF are not counted against District's allocation **Round 8.2** adopted by MWCOG Board in July, 2013 - includes Census 2010 data
2014	**DC Water I/I reduction - 0.2 MGD** - UPI
2015	**Fairfax Co.** - Divert **0.2 MGD** **Loudoun Water** - Divert **0.9 MGD** **DC Water:** **I/I reduction - 0.058 MGD**- Popes Brunch **Sewer System Assessment - 3 MGD** achieved **Water Conservation Project -** Additional **2 MGD** achieved (total of 6 MGD)
2016	**DC Water - I/I reduction 1.5 MGD** – UAMI (new project) & **0.12 MGD** - PI (various)
2017	**Chesapeake Bay TMDL** – midpoint assessment (60% implementation deadline) **DC Water - I/I reduction - 2.0 MGD** - Oxon Run
2018	**Broad Run 1st expansion** on-line
2019	**DC Water - I/I reduction - 0.04 MGD** - B Street / NJ Ave
2020	**Loudoun Water** - Divert **3.3 MGD** **Fairfax Co**. Divert **2.85 MGD**.
2025	**Chesapeake Bay TMDL** – 100 % implementation deadline **DC Water - Clean Rivers Project** – To be Completed
2025	**Loudoun Water** - Divert - **5.43 MGD** **Fairfax Co.** - Divert - **6.48 MGD**
2030	**Loudoun Water** - Divert - **7.27 MGD** **Fairfax. Co.** - Divert - **9.78 MGD**
2035	**Loudoun Water** - Divert - **8.50 MGD** **Fairfax Co.** - Divert - **12.77 MGD**
2040	**Loudoun Co.** - Divert - **9.09 MGD** **Fairfax Co.** - Divert - **15.75 MGD**

APPENDIX A

BPSA WASTEWATER FLOW PROJECTIONS METHODOLOGY

This is an overview of a modeling tool used in this study to develop wastewater projections for the BPSA. The Regional Wastewater Flow Forecast Model (RWFFM) is used to project wastewater flows in response to demographic projections. This methodology has been approved by the IMA-Regional Committee consistent with the requirements of the 2012 IMA – Section 7. Wastewater Projected Flow Capacity Needs and Future Options, C.2. & 3.; and Operating Agreement #4, A.

A. REGIONAL WASTEWATER FLOW FORECAST MODEL (RWFFM)

The RWFFM is a demographically driven model that utilizes data from the Metropolitan Washington Council of Governments' (MWCOG) Cooperative Forecast process to project wastewater flows.

Wastewater projections are derived from the demographic projections for employment and households from COG's Cooperative Forecast Model – which is linked to the appropriate flow factors to derive wastewater flows. Population data is not used in this process as the other demographic parameters have been determined to be more effective for projecting wastewater flows.

These demographic projections are aggregated into Transportation Analysis Zones (TAZs), which form the basis for further allocating employment and household demographic data to the appropriate sewersheds and sub-sewersheds in the BPSA.

MWCOG's Cooperative Forecast is a multi-stage, 'top-down/bottom up" process and employs: 1) a regional econometric model; and 2) local jurisdictional forecasts of employment, population, and households for the metropolitan Washington region. The demographical data derived from the MWCOG Cooperative Forecast process is the driver behind the RWFFM, which is the modeling tool used to project wastewater flows in the BPSA.

The Cooperative Forecast Model projects employment, population, and household data for the metropolitan Washington region based on national economic trends and local demographic factors. Concurrently, local jurisdictions, while taking into account the preliminary regional projections, develop their own projections based on pipeline development, market conditions, planned transportation improvements, and adopted land use plans and zoning. Both projections are reviewed by COG's Cooperative Forecasting and Data Subcommittee and must be within three percent of each other for the new set of Cooperative Forecasts to be reconciled. Each of these forecasts is identified as a 'Round'. Significant changes to the projections are done periodically and are designated as say Round 8.0, with generally annual updates being designated as, for example, Round 8.2. There were approximately twenty-four Cooperative Forecasts (Rounds and Sub-rounds) adapted from 1976 to 2013.

B. RWFFM INPUTS

Base Year Flow

In 2010, DC-WASA contracted the engineering firm of Black and Veatch to evaluate and update, as needed, the 2000 Base Year Flow, Unit Flow Factors (UFFs) and Inflow/Infiltration (I/I) assumptions for each jurisdiction that had been used in the 2003 BPSA Study. In May 2010, the Blue Plains Operating Agency Work Group (OAWG) agreed on the recommendation to use a 2009 Base Year Flow, and the recommended UFFs and I/I values (see Table ES-1 below).

The Base Year 2009 flow for each jurisdiction was selected as a conservative Base Year in consideration of rainfall and groundwater impacts to the wastewater flows. Base Year 2009 flows are actual, not calculated, and already reflect previous flow management actions that have been evaluated by the BPSA parties.

Table ES-1 – Base Year 2009 Actual Flows*	
Jurisdiction	**Flow (MGD)**
Fairfax County	29.201
WSSC	125.966
Loudoun Water	11.913
District**	127.730
Vienna	0.827
Dulles	0.846
Navy	0.050
National Park Service	0.013

*Flows correspond to Table ES-1 on p. 5 of the Final Report (August 2010).
** District Flow does not include estimated 15 MGD Captured Combined Sewage in Base Year.

RWFFM Input Parameters

Black and Veatch recommended updated flow factors based on flow contributors communications, recent wastewater flow experience, current trending of gallons per capita per day water demand, COG demographic data, and current flow contributors design guidance and standards. The incremental I/I rate of 44% of incremental sanitary flow remained the same. These flow factors and I/I rate recommendations were reviewed and approved by the Blue Plains Regional Committee (BPRC) members.
*

Table ES-2 – 2009 Recommended Flow Factors*						
Category	Fairfax County	WSSC	Loudoun Water	District	Dulles VA	Vienna VA
Household (gpd/unit)	150	180	185	170	NA	170
Employment (gpd/employee)	30	28	25	25	48	21-50

P. 5 of the Final Report

C. BPSA SEWERSHEDS USED IN RWFFM

The Blue Plains Service Area (BPSA) is the same as in the 2003 BPSA Planning Study. Although the Seneca Basin was completely separated from the BPSA in early 2004, the Basin was no longer considered part of the BPSA in the 2003 BPSA Planning Study. All flows generated within the Seneca Basin are now treated only at the Seneca WWTP.

D. BPSA FLOW PROJECTIONS – ROUND 8.2

Round 8.2

In 2013, COG staff issued the Round 8.2 Cooperative Forecast, which was approved by the COG Board on July 10, 2013. Key features of Round 8.2 are: it used a new base year of 2010, and it integrated Census 2010 data.

BPSA Flow Projections

As part of developing the BPSA flow projections, flows are generated using the latest demographic projections and agreed upon 2009 Base Year Flows, Flow Factors, and I/I values. The results are the 'Unadjusted' BPSA flows that reflect just the impact of demographic changes. Then various flow management assumptions are incorporated and the 'Adjusted' BPSA flows are generated.

Flow management assumptions for the District include wastewater reduction, water conservation, and sewer system assessment programs which will reduce the District wastewater flow by approximately 16 MGD by Year 2040. For the suburban jurisdictions (Loudoun and Fairfax), flow diversions out of the BPSA are assumed to be that portion of flow that exceeds their current IMA allocation. As a result of Loudoun Water and Fairfax's flow management assumptions, their total flow adjustment (i.e. flow diversions from the BPSA area) will be more than 20 MGD by Year 2040.

Based on the IMA renegotiations, it was agreed to reallocate 4.5 MGD of what had been the Potomac Interceptor Reserve (under the terms of the 1985 IMA) to the District. The BPSA Flow Projection tables were updated to reflect this change in allocations.

Round 8.2 BPSA wastewater flow projections show that:

- **Blue Plains' annual average flow (i.e. ' Adjusted' BPSA flow) is anticipated to reach only 347 MGD by the Year 2040;**
- **There is still approximately 20 MGD of additional capacity available beyond the current planning horizon of 2040.**

APPENDIX B

BPSA PEAK FLOW TRANSMISSION ANALYSIS

This Appendix reflects the results of technical work that was done by Blue Plains and their consultant in 2009-2010 to address peak flow management during the IMA negotiation process, and is consistent with 2012 IMA Section 4 – Blue Plains Flow Capacity, Loads & Peak Flows – Allocations & Limitations.

That analysis also links peak flow management and overall flow capacity and allocation issues that are also addressed in this 2013 BPSA Study. According to the 2012 IMA Section 4.1.b, "The Allocated Flow Capacity is based on Blue Plains current Design Flow Capacity and reflects the ability of Blue Plains to provide treatment of the incoming wastewater under Annual Average Hydrologic Conditions."

The Peak Flow Limitations have been developed consistent with their Flow Capacity allocations, and *"reflect the maximum flows that have been determined (through modeling and historical observation of system performance) that the BPSA collection systems can convey without exceeding the capacity of the sewer system during wet weather conditions (e.g., rainfall or snowmelt events)."*

In the Section 4 of the 2012 IMA, Blue Plains Service Area (BPSA) Peak Flow Limitations are identified "for metered points of connection between the collection systems of two (2) or more Parties within the BPSA" for:

1. Potomac Interceptor and other interceptors for WSSC, Fairfax and Non-Party Users' flows to collection systems operated by DC Water (see Table 1 below);
2. Interceptors for WSSC flows to collection systems operated by DC Water (see Table 2 below);
3. Interceptors for District flow to collection systems operated by WSSC (see Table 3 below).

Based on modeling that was done in 2009-2010 to reanalyze the flow transmission constraints of the Potomac Interceptor (PI), it has been determined that:

- **The peak flow transmission capacity in the PI is:**
  - **Adequate to meet all IMA limitations; and**
  - **Actually greater than current design and modeling values.**

Table 1 - PEAK FLOW LIMITATIONS[1] FOR WSSC, FAIRFAX COUNTY, & NON-PARTY USERS FOR POTOMAC INTERCEPTOR & OTHER INTERCEPTORS

Jurisdiction / Agency Points of Connection	Flow Capacity (Annual Average in MGD)	Peak Flow Limitation (MGD)	Peak/ Average Ratio
WSSC			
Cabin John (to MUPI)	**10.3**	**23.3**	**2.3**
Cabin John (to PI)	6.1	37.0	6.1
Muddy Branch	8.4	28.3	3.4
Watts Branch	5.8	16.5	2.8
Rock Run	1.3	5.6	4.3
Subtotal to PI	**21.6**	**87.4**	
WSSC Total to PI & UPI	**31.9**	**110.7**	**3.5**
Fairfax County			
Sully Road #1	4.0	14.0	3.5
Sully Road #2	1.1	3.0	2.7
Rock Hill Road	0.9	2.4	2.7
Sugarland Run	4.0	14.0	3.5
Great Falls[2]	8.7	30.0	3.4
Scotts Run	2.9	10.2	3.5
Subtotal to PI	**21.6**	**73.6**	
Pimmit Run	9.4	35.0	3.7
Fairfax Total to PI & Pimmit Run	**31.0**	**108.6**	**3.5**
Loudoun County Sanitation Authority	**13.8**	**31.9**	
Other Non-Party Users	**1.5**	**3.5**	
Grand Total	**67.9**	**231.4**	

[1] The Peak Flow Limitations and peak flow ratios for the Potomac Interceptor are acknowledged to be greater than design and modeling values.

[2] This excludes the flow from the Town of Vienna, Virginia.

**TABLE 2 – PEAK FLOW LIMITATIONS
FOR WSSC
FOR OTHER INTERCEPTORS**

Jurisdiction / Agency Points of Connection	Flow Capacity (Annual Average in MGD)	Peak Flow Limitation (MGD)
WSSC		
Little Falls Trunk Sewer	7.6	20.8
Rock Creek Main Interceptor[3] and Relief	33.5	56.6
Anacostia Forcemain & Project 89	83.2	185.0
Watts Branch Interceptor (Prince George's County)	1.3	5.9
Upper Oxon Run Trunk Sewer	6.1	15.6
Barnaby Branch	2.8	8.4
Owens Road	1.7	5.5
Indian Head Highway	1.5	5.3
TOTAL	**137.7**	**N/A**

**TABLE 3 – PEAK FLOW LIMITATIONS
FOR THE DISTRIC
FOR OTHER INTERCEPTORS**

Jurisdiction / Agency Points of Connection	Flow Capacity (Annual Average in MGD)	Peak Flow Limitation (MGD)
DISTRICT		
Point M-Kennedy St.	0.7	4.4
Point S-Fort Dupont St.	0.4	3.0
Point W-30th St.	0.7	4.8

[3] This includes that portion of Silver Spring Maryland which enters the Rock Creek Main Interceptor Sewer within the District.