

**DISTRICT OF COLUMBIA
WATER AND SEWER AUTHORITY
Board of Directors**

*Meeting of the
Environmental Quality and Operations Committee*

*HQO-125 O Street SE, Washington DC 20003
Thursday, October 17, 2019
9:30 a.m.*

	I.	Call to Order	Adam Ortiz Chair
9:30 a.m.	II.	AWTP Status Update	Aklile Tesfaye
		1. BPAWTP Performance	
9:45 a.m.	III.	Biosolids Management Performance Update	Aklile Tesfaye
10:00 a.m.	IV.	Clean Rivers Project Status Update	Carlton Ray
10:15 a.m.	V.	Overview of FY'19 – FY'28 CIP	Len Benson
10:35 a.m.	VI.	Other Business / Emerging Issues	
10:40 a.m.	VII.	Executive Session*	
10:45 a.m.	VIII.	Adjournment	Adam Ortiz Chair

* The DC Water Board of Directors may go into executive session at this meeting pursuant to the District of Columbia Open Meetings Act of 2010, if such action is approved by a majority vote of the Board members who constitute a quorum to discuss: matters prohibited from public disclosure pursuant to a court order or law under D.C. Official Code § 2-575(b)(1); contract negotiations under D.C. Official Code § 2-575(b)(1); legal, confidential or privileged matters under D.C. Official Code § 2-575(b)(4); collective bargaining negotiations under D.C. Official Code § 2-575(b)(5); facility security under D.C. Official Code § 2-575(b)(8); disciplinary matters under D.C. Official Code § 2-575(b)(9); personnel matters under D.C. Official Code § 2-575(b)(10); proprietary matters under D.C. Official Code § 2-575(b)(11); decision in an adjudication action under D.C. Official Code § 2-575(b)(13); civil or criminal matters where disclosure to the public may harm the investigation under D.C. Official Code § 2-575(b)(14), and other matters provided in the Act.

Follow-up Items from Prior Meetings:

1. EVP, Ops & Engr, DC Water: Provide a briefing to the Committee regarding preventative and corrective maintenance programs on water, storm and sanitary sewer pump stations also including performance of DC Water's SCADA system. **[Target: December 2019]**
2. Vice President, Wastewater Operations, DC Water: Provide an overall assessment of the CHP program with respect to its operating costs versus cost savings and revenue generated and present to the Committee during a future meeting. **[On Current Agenda]**
3. Vice President, Wastewater Operations, DC Water: Provide a presentation on the Advanced Wastewater Treatment Plant and Wet Weather Treatment Facility operating parameters and the flow split logic relative to the volume of CSO flow captured in the tunnels going through the AWWTP versus the WWTF. **[Target: November 2019]**
4. Manager, Green Infrastructure, DC Water: Conduct a robust discussion with the Committee regarding per/acre costs of developing, operating and maintaining grey vs. green infrastructure. **[The Committee requested DCCR to return in 6 months to address this item. Target: December 2019]**
5. Senior Director, Water Operations: Provide an update regarding the total number of Public Fire Hydrants in service. **[Target: November 2019]**
6. Manager, Program Controls: Conduct briefing on KPIs that have not met the 90-day threshold in FY2019. **[To be included in the CIP Quarterly Report, November 2019]**

* The DC Water Board of Directors may go into executive session at this meeting pursuant to the District of Columbia Open Meetings Act of 2010, if such action is approved by a majority vote of the Board members who constitute a quorum to discuss: matters prohibited from public disclosure pursuant to a court order or law under D.C. Official Code § 2-575(b)(1); contract negotiations under D.C. Official Code § 2-575(b)(1); legal, confidential or privileged matters under D.C. Official Code § 2-575(b)(4); collective bargaining negotiations under D.C. Official Code § 2-575(b)(5); facility security under D.C. Official Code § 2-575(b)(8); disciplinary matters under D.C. Official Code § 2-575(b)(9); personnel matters under D.C. Official Code § 2-575(b)(10); proprietary matters under D.C. Official Code § 2-575(b)(11); decision in an adjudication action under D.C. Official Code § 2-575(b)(13); civil or criminal matters where disclosure to the public may harm the investigation under D.C. Official Code § 2-575(b)(14), and other matters provided in the Act.



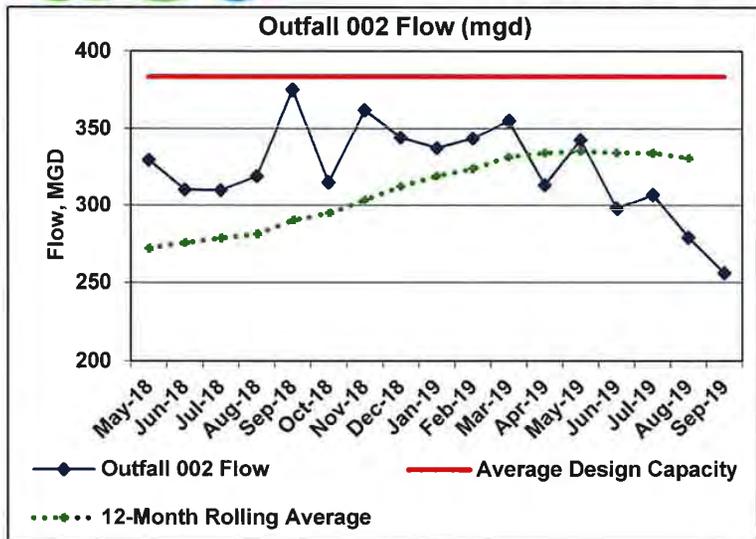
Blue Plains Advanced Wastewater Treatment Plant Performance Report

Environmental Quality and Operations Committee

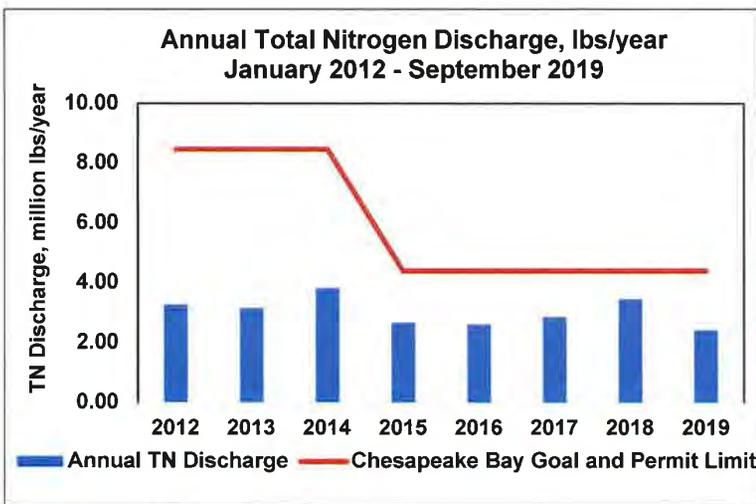
October 17, 2019



Complete Treatment Performance



- Annual Average flow remained above 300 MGD since November 2018
- Plant performance was excellent with all effluent quality requirements well below or within the NPDES permit requirements
- The total pounds of nitrogen discharged in the complete treatment effluent - during the current calendar year is on track to remain below the NPDES permit discharge limit of 4,377,580 lbs. /year.





Wet Weather Treatment Facility Performance

- September 2019: driest month since March 2006
- Total volume captured: 5 MG

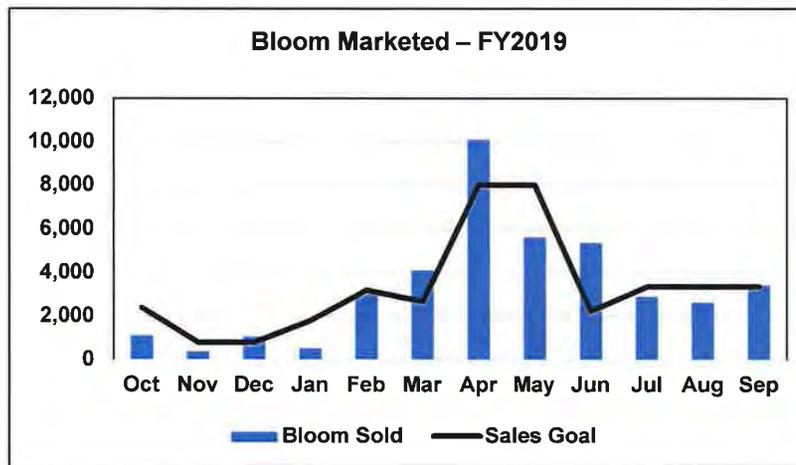
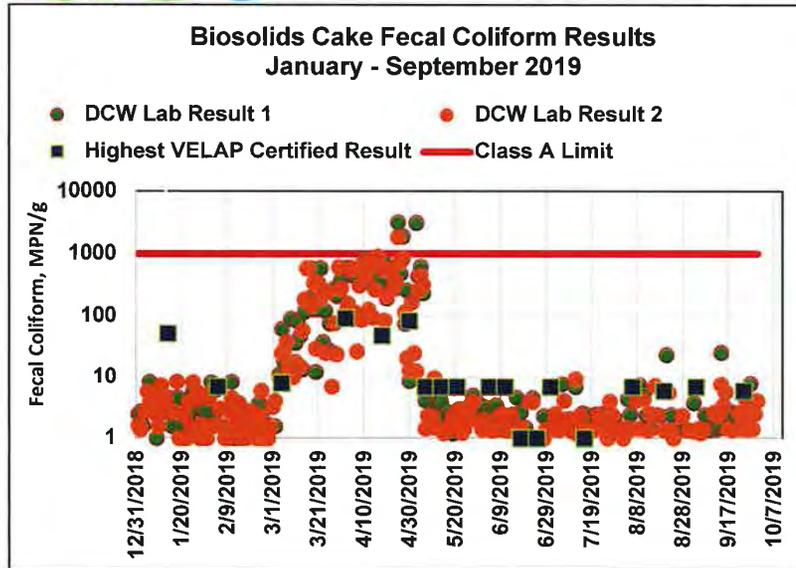
	September 2018	September 2019
Total Precipitation, inches	9.73	0.25
Total Volume Captured and Treated, MG*	784	18
➤ Directed to Complete Treatment, MG	447	18
➤ Discharged to Outfall 001, MG	337	0
Overflow, MG	116	0
Energy Used, MWH**	1,200	300

***MG = Million Gallons**

****MWH = Megawatt Hours**



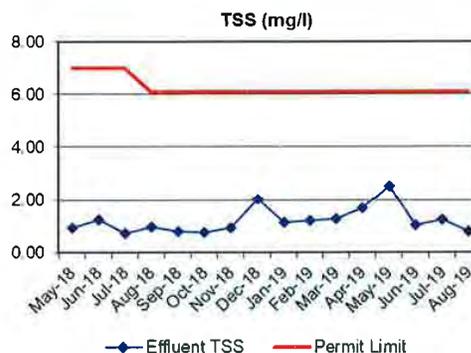
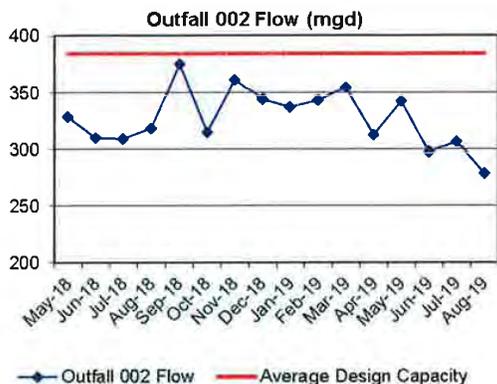
Class A Biosolids Quality & Bloom Marketing



- All biosolids produced met Class A Exceptional Quality (EQ) requirements required by EPA.
- Fecal Coliform values on daily process monitoring samples remained below the 1,000 MPN/gram required for Class A biosolids - consistent with the low levels measured historically
- Bloom: 40,658 (26% of total production) marketed during fiscal year 2019 exceeding the 40,000 goal
- Marketing goal during fiscal year 2020: 60,000 tons (~40% of production)

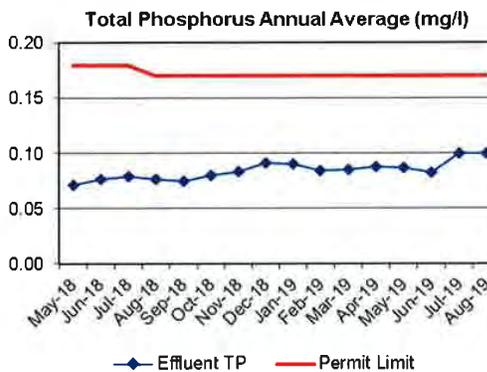
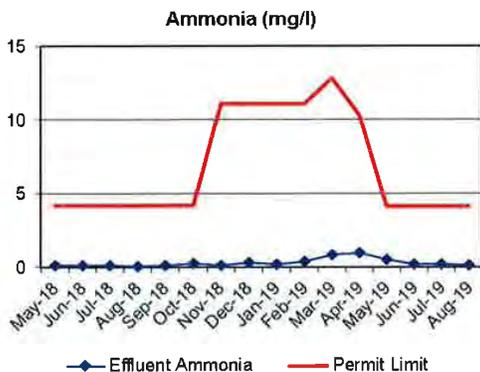
BLUE PLAINS ADVANCED WASTEWATER TREATMENT PLANT PERFORMANCE REPORT – AUGUST 2019

Average plant performance for the month of August 2019 was excellent with all effluent parameters well below the seven-day and monthly NPDES permit requirements. The monthly average flow through complete treatment and discharge to outfall 002 was 279 MGD. There was no treated captured combined flow directed to Outfall 001 during this period. The following figures compare the plant performance with the corresponding NPDES permit limits.



This graph illustrates the monthly average influent flow to the plant. The design average flow is 384 MGD. Blue Plains has a 4-hour peak capacity of 555 MGD through complete treatment. Once the plant is at capacity, up to 225 MGD of additional captured combined system flows from the tunnel can be treated through enhanced clarification, disinfection and dechlorination.

Effluent Total Suspended Solids (TSS) is a measurement of the amount of solid material that remains suspended after treatment. The effluent TSS concentration for the month averaged 0.80 mg/L, which is below the 6.1 mg/L permit limit.

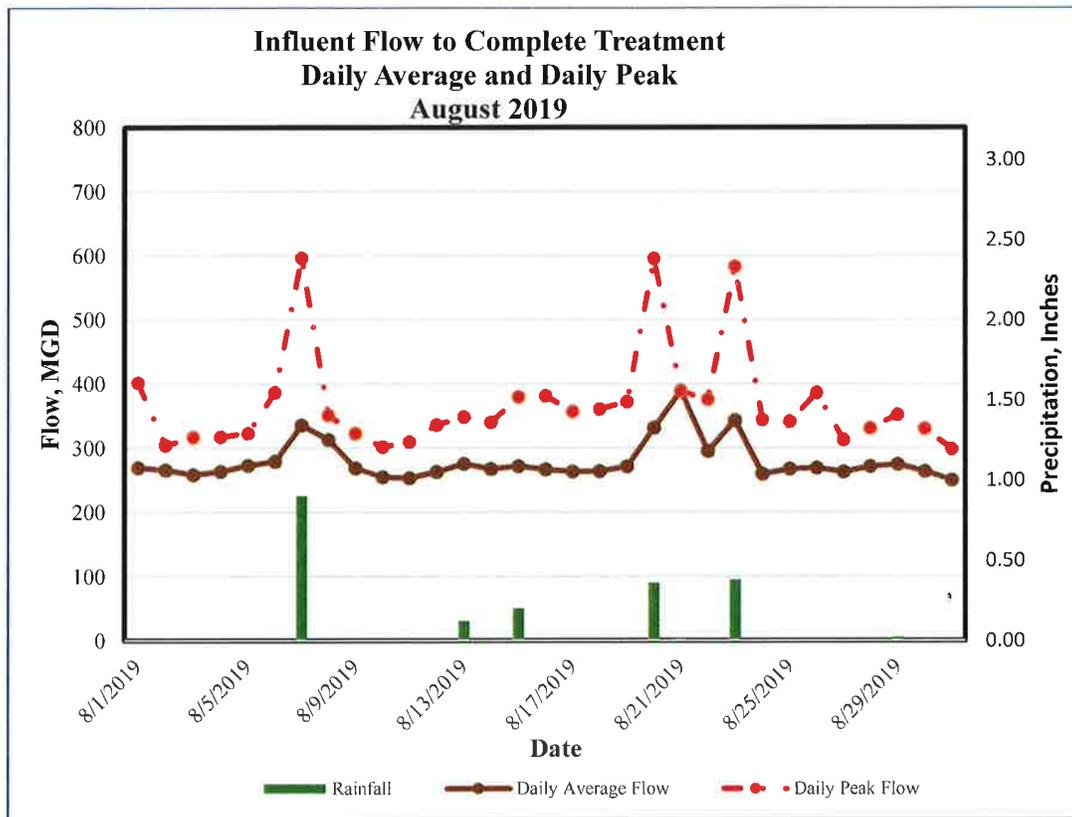


The Ammonia Nitrogen (NH₃-N) is a measurement of the nitrogen found in ammonia. For the month, effluent NH₃-N concentration averaged 0.15 mg/L and is below the 4.1 mg/L seasonal limit.

The Total Phosphorus (TP) is a measurement of the particulate and dissolved phosphorus in the effluent. The 12-month rolling average effluent TP concentration is 0.10 mg/L, which is below the 0.17 mg/L limit.

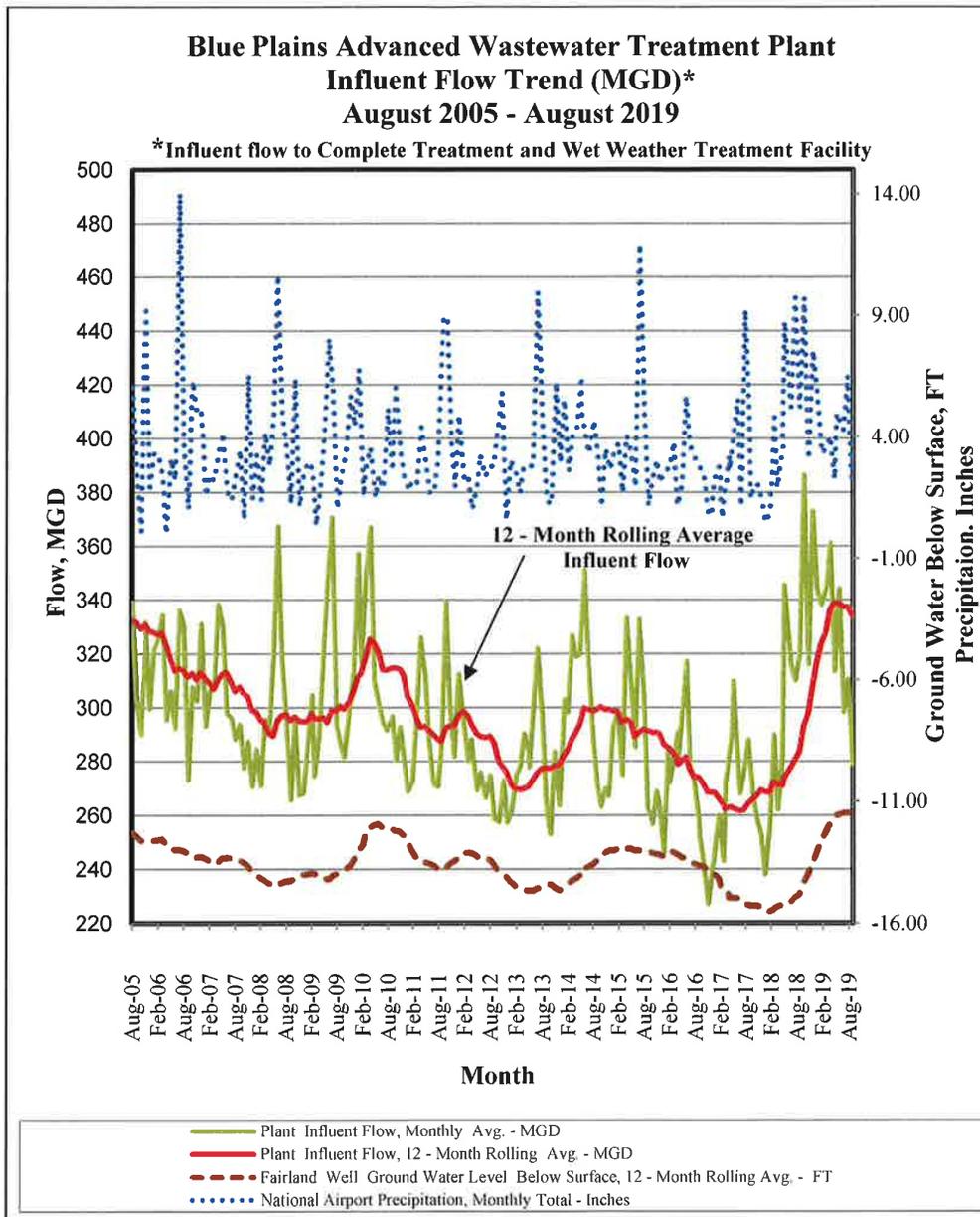
Wet Weather Impact on Plant Performance

During the month of August 2019, the Washington Metropolitan Region received below average precipitation (1.99 inches vs normal of 2.93 inches) as measured at the National Airport. The wet weather events that occurred during the first, third, and last week of the month resulted in peak flows through complete treatment close to 600 MGD. The plant's performance was excellent and the events had minimal impact on the quality of the effluent discharge through the complete treatment outfall 002. All effluent quality parameters were below the weekly and monthly average NPDES permit limits. There was no treated combined flow directed to Outfall 001 during this period.



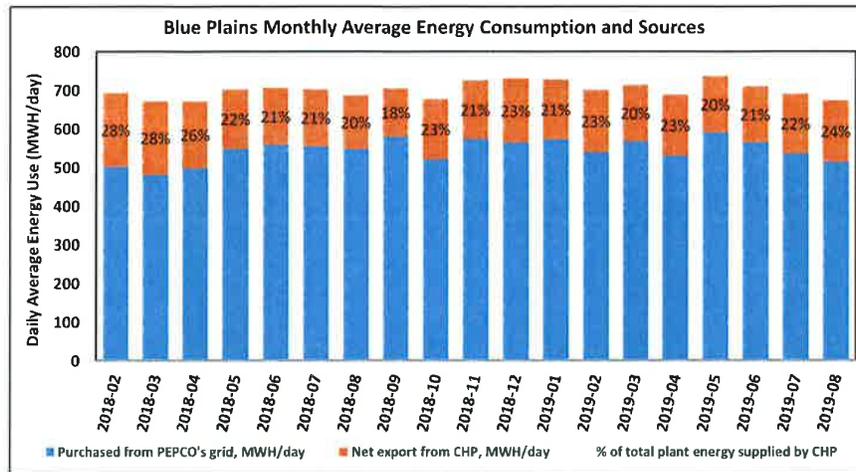
Plant Influent Flow Trend

The graph below shows a long-term influent flow trend to the plant ending August 2019. While for any given month the flow is weather dependent, the 12-month rolling average influent flow remained above 300 MGD since November 2018.



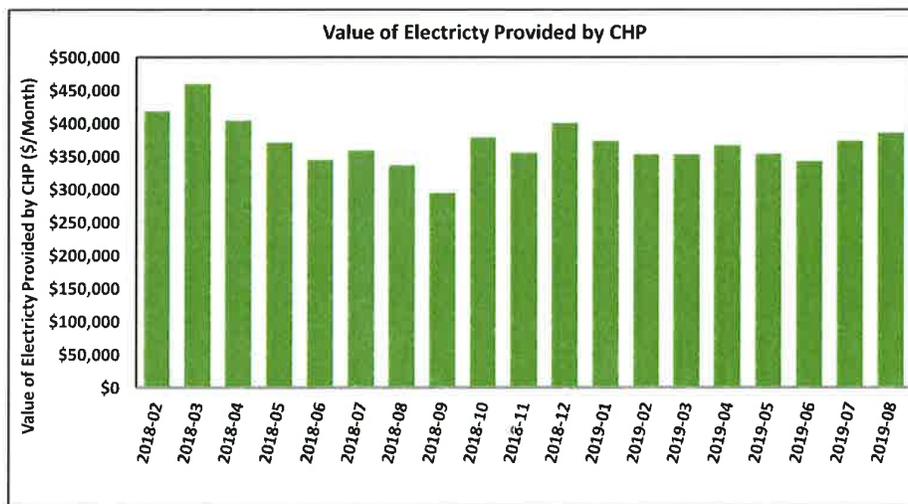
Blue Plains Electricity Generation and Usage

In August 2019 the average energy consumed at Blue Plains was 673 megawatt hours per day (MWH/day) or 2.41 MWH of electricity per million gallons of wastewater processed through complete treatment. The Combined Heat and Power (CHP) facility generated an average of 159 MWH/day, making up for 24% of total energy consumed at Blue Plains. The remaining 514 MWH/day was purchased from PEPCO.



The graph above is based on power monitors installed at the Main Substation and CHP, and reflects average energy consumed at Blue Plains in MWH/day. Of the total use, the energypurchased from PEPCO and net energy supplied by CHP are indicated by the blue and orange highlights, respectively.

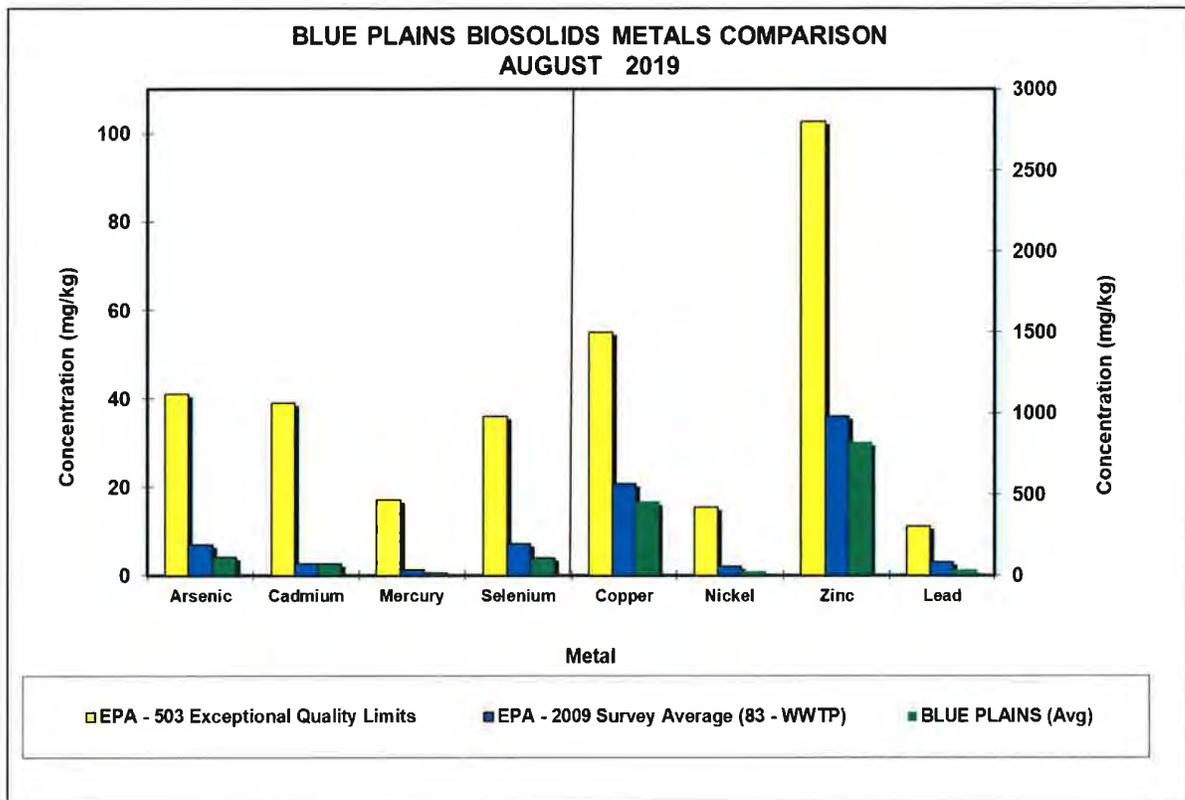
The graph below shows the monthly value of the net electricity generated by CHP by assuming unit price of \$78/MWH of electricity.



Product Quality

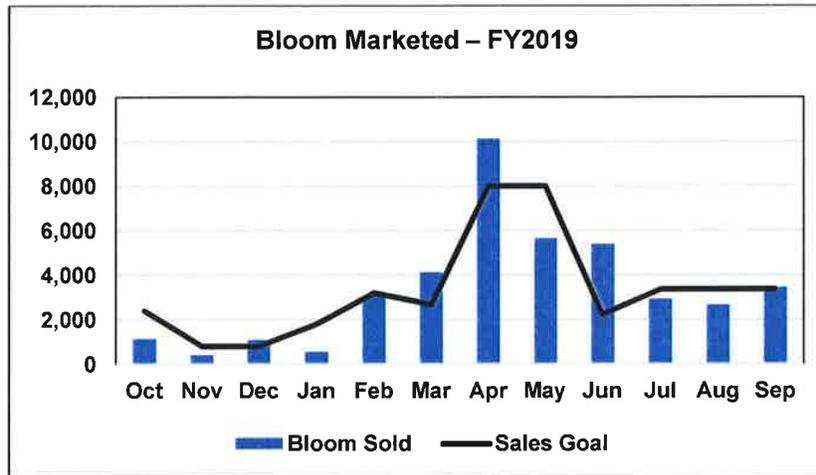
Metals

All biosolids produced during the month of August met Class A Exceptional Quality (EQ) requirements required by EPA. The graph below shows the EPA regulated heavy metals average concentrations in the Class A biosolids. The concentrations are considerably below the regulated exceptional quality limits (EPA-503 Exceptional Quality Limits) and the national average (EPA-2009 Survey Average).



Bloom Marketing

During the 2019 fiscal year the total tons of Bloom marketed was 40,658 and exceeded the 40,000 tons goal. The goal for the current fiscal year is 60,000 tons or approximately 40 percent of anticipated total Class A biosolids production.



Revenue Generation

The following billing (revenue) and receivables (cash) occurred this month for Groundwater/Retail Sewer (GWRS) billing for disposal fees in accordance with TDA permits issued under the Industrial Pretreatment Program, Industrial User (IU) billing for high strength waste, permitting fees, and annual compliance fees issued under the Industrial Pretreatment Program, and Waste Hauler (WH) billing for permitting and disposal fees issued under the Hauled Waste Program:

Cat. Code	FY (Oct-Aug) Revenue Posted	FY (Oct-Aug) Cash Received
GWRS	\$335,640.45	\$92,685.53
IU	\$132,514.11	\$95,666.94
WH	\$715,526.12	\$803,823.24
Total	\$1,183,680.68	\$992,175.71



Biosolids Management Program Performance Update

Presented to Environmental Quality and Operations
Committee

October 17, 2019



Update Objective

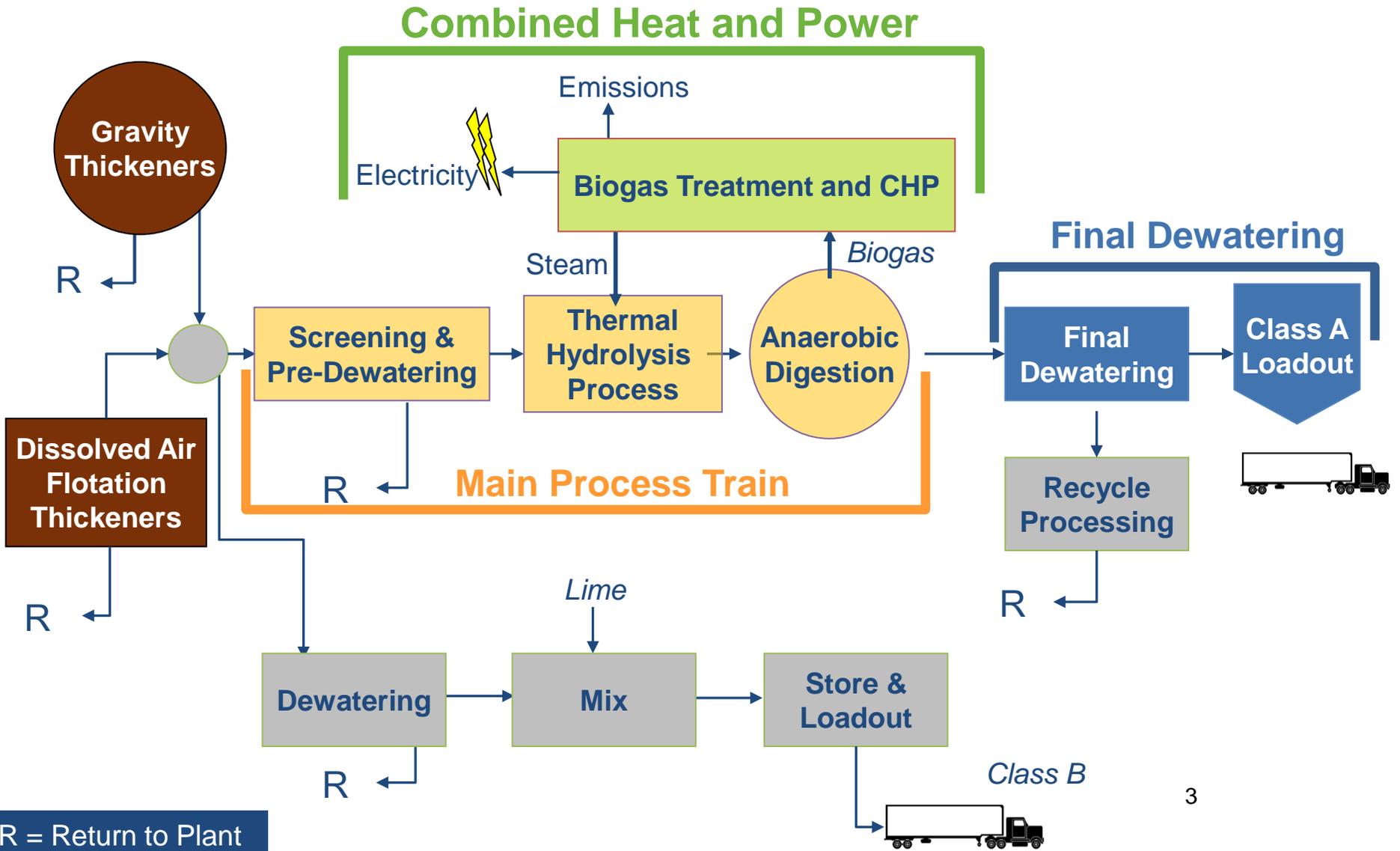
EQ&OPs Committee Request to:

“Provide an overall assessment of the CHP program, with respect to its operating cost versus cost savings and revenue generated ,to the Committee during a future meeting”

“Provide assessment as part of the Blue Plains Biosolids Management Program”



Biosolids Management Program Elements





Biosolids Program Objectives

1) Biosolids Quantity and Quality

- Generate Class A Biosolids to hedge against Class B risks
- Increase diversity of product to create and expand market

2) Energy Production

- Hedge against electricity cost uncertainty

3) Operations and Maintenance

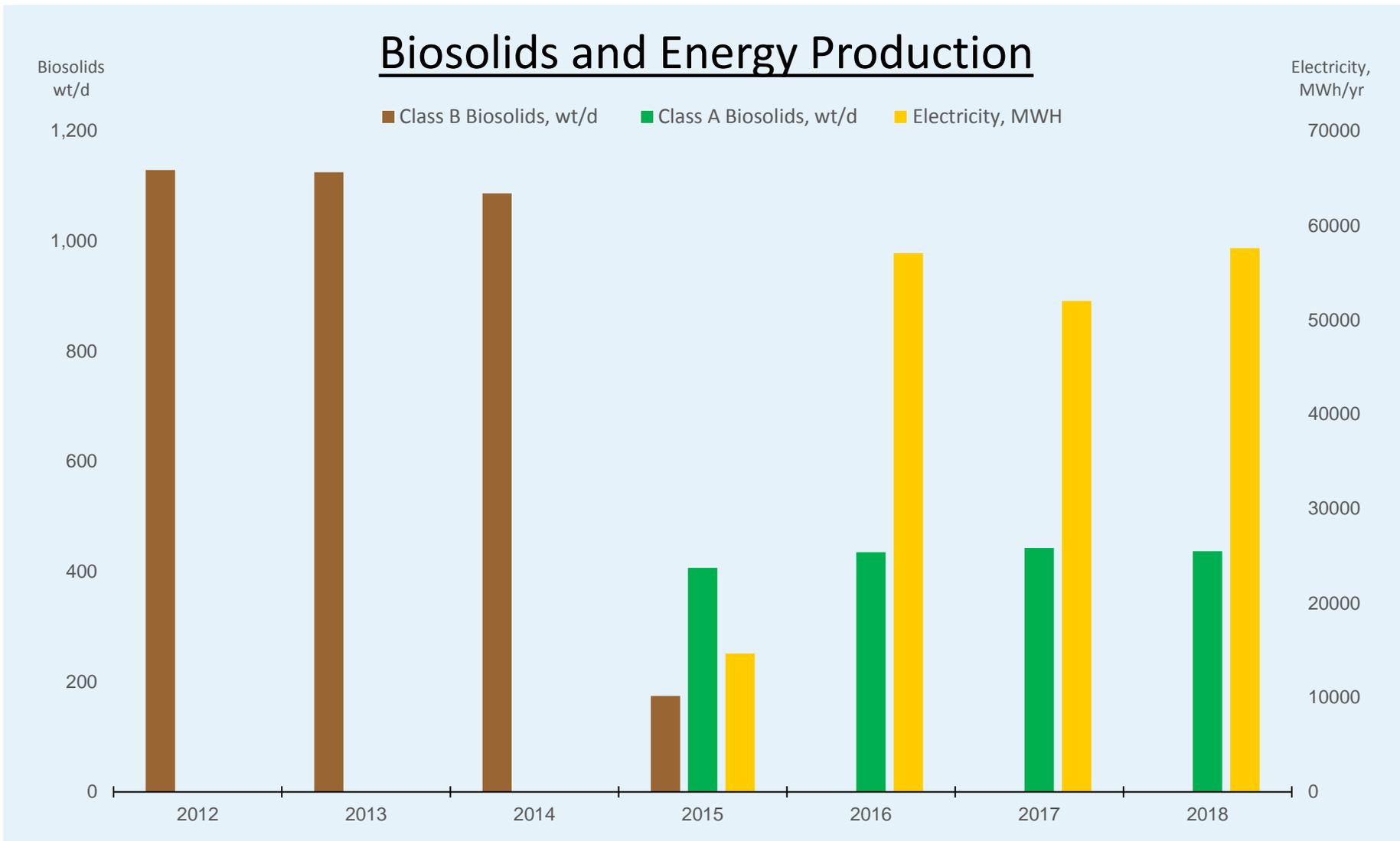
- **Cost Savings**

4) Environment

- Reduce carbon footprint



O&M Milestones





Biosolids Program Objective

O&M Cost Savings FY16

O&M Costs Estimates	O&M Cost for Class A Biosolids	O&M Costs for Lime Stabilization Option	O&M Costs Savings
	Actual FY 2016	Estimate FY 2016	Estimate FY 2016
Personnel	\$1,120,000	\$1,790,000	(\$670,000)
Chemicals	\$3,260,000	\$5,570,000	(\$2,310,000)
Electrical Energy Use	\$2,380,000	\$2,060,000	\$320,000
Electrical Energy Generation	(\$4,490,000)		(\$4,490,000)
CHP Operation	\$1,110,000		\$1,110,000
Land Application	\$6,530,000	\$16,300,000	(\$9,770,000)
Materials Other Contracts	\$1,050,000	\$1,520,000	(\$470,000)
Total O&M for Biosolids	\$10,960,000	\$27,240,000	(\$16,280,000)



Biosolids Program Objective

O&M Cost Savings FY17

O&M Costs Estimates	O&M Cost for Class A Biosolids	O&M Costs for Lime Stabilization Option	O&M Costs Savings
	Actual FY 2017	Estimate FY 2017	Estimate FY 2017
Personnel	\$1,550,000	\$1,892,000	(\$342,000)
Chemicals	\$2,970,000	\$5,546,000	(\$2,576,000)
Electrical Energy Use	\$1,950,000	\$1,900,000	\$50,000
Electrical Energy Generation	(\$4,160,000)		(\$4,160,000)
CHP Operation	\$4,570,000		\$4,570,000
Land Application	\$6,650,000	\$16,310,000	(\$9,660,000)
Materials Other Contracts	\$1,960,000	\$1,560,000	\$400,000
Total O&M for Biosolids	\$15,490,000	\$27,208,000	(\$11,718,000)



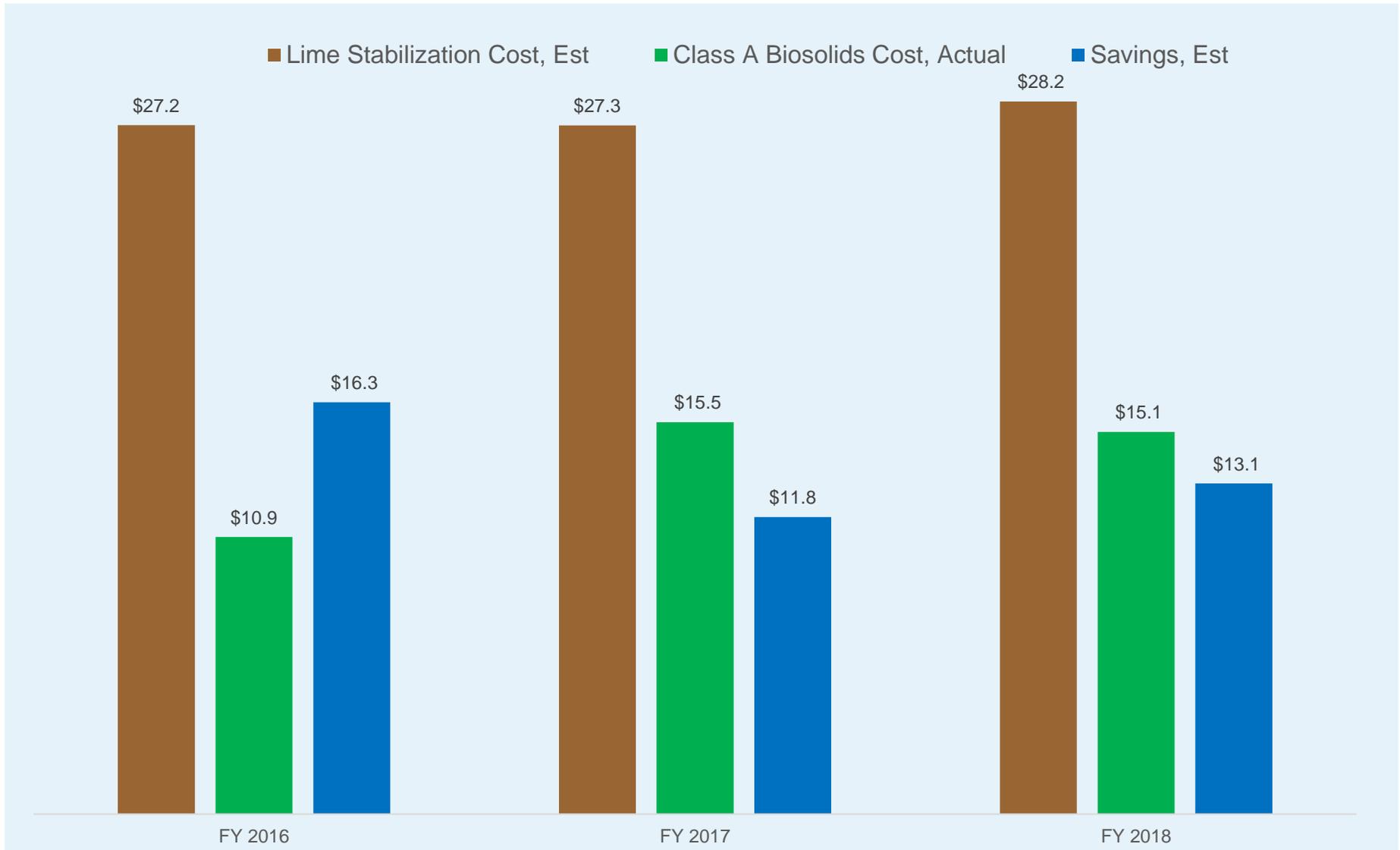
Biosolids Program Objective

O&M Cost Savings FY18

O&M Costs Estimates	O&M Cost for Class A Biosolids	O&M Costs for Lime Stabilization Option	O&M Costs Savings
	Actual FY 2018	Estimate FY 2018	Estimate FY 2018
Personnel	\$1,590,000	\$1,930,000	(\$340,000)
Chemicals	\$2,880,000	\$5,646,000	(\$2,766,000)
Electrical Energy Use	\$1,570,000	\$2,050,000	(\$480,000)
Electrical Energy Generation	(\$4,480,000)	\$0	(\$4,480,000)
CHP Operation	\$4,630,000	\$0	\$4,630,000
Land Application	\$6,830,000	\$16,970,000	(\$10,140,000)
Materials Other Contracts	\$2,090,000	\$1,610,000	\$480,000
Total O&M for Biosolids	\$15,110,000	\$28,206,000	(\$13,096,000)



O&M Cost Savings FY16-18





Program Value Adds Exceptional Quality (EQ) Class A Product

Bloom Marketing



Bloom program 3-year net value:
\$1.80 Million,
including \$236,000 in revenue

FY17

- Cured Bloom & Blending
- Cured Bloom to blenders
- Blending (on site)
- 7,806 tons sold (5%)
- \$250,000 in net savings
- \$22,000 in revenue

FY18

- Onsite Blending Facility
- Homestead partnership
- Blending bulk sales (onsite)
- Cured Bloom to Blenders
- 9,250 tons sold (6%)
- \$278,000 in net savings
- \$67,000 in revenue

FY19

- Bags on the shelf
- Denison partnership
- Blending (onsite)
- 40,658 tons sold (26%)
- \$1,030,000 in net savings
- \$147,000 in revenue



Program Value Adds Energy Production

Renewable Energy Credits (REC)

- Biogas production generations RECs
- Eligible facilities: Turbines, Heat Recovery Steam Generators (HRSG), Heat Exchangers (HEX)
- Generation Attribute Tracking System (GATS) designation as Tier 1
- Annual generation, current prices per MWH: \$2.75(DC) to \$5.00(MD)



Year	RECs Generated	RECs Sold	Revenue	RECs to Sell
FY16	47,470	0	\$0	0
FY17	58,603	0	\$0	0
FY18	157,840	95,430	\$427,191	28,377
FY19 (as of 6/30)	133,319	166,923	\$528,572	106,502
Total	397,232	262,353	\$955,762	134,879



Program Value Adds Energy Production

Pepco Capacity Charge

- Component of power bill
- Charge based on grid draw during peak hours for PJM grid
- CHP production reduces grid draw
- Rate varies widely year-to-year, from \$50,000/MW annually at lowest to \$100,000/MW at highest
- Expected production >5.0 MW



Year	Mean Peak Production	Rate	Savings
06/2017 - 05/2018	6.8 MW	\$72,044/MW	\$490,000
06/2018 - 05/2019	5.2 MW	\$66,561/MW	\$343,000
06/2019 – 05/2020	5.0 MW	\$71,752/MW	\$359,000
Total	5,652 MW	-----	\$1,192,000



Program Value Adds Steam Production

Value of High Pressure Steam

- Primary objective is to meet steam needs for Thermal Hydrolysis Process (THP).
- At current 300 dry tons/day solids throughput rate; average steam requirement ~28,500 lbs./hour, average steam temperature and pressure requirement >374°F and 168 Pounds Per Square Inch Gauge (PSIG) respectively
- Value of high pressure steam = boiler fuel savings – power generation credit or \$0.5M - \$1.2M/year





Program Value Adds Risk Mitigation

Biosolids Risk Mitigation

- During Winter 2018, WWTPs were forced to store biosolids onsite or find alternative outlets due to excessive wet weather restricting access to farms
- With Class A, DC Water managed to market to farms and have off site storage
 - Marketing to farms in MD
 - Alternative storage with our contractors
- Without the Class A Biosolids Management Program, DC Water would have incurred additional cost to handle Class B biosolids
 - Daily production of 1100 wt/day Class B as compared to 435 wt/day Class A
 - Additional biosolids: 665 wt/day or 60,000 wt over 90 days
 - Emergency storage or hauling cost of \$100-200/wt
- Avoided cost ~ \$6-12M



Program Value Adds Future Opportunities

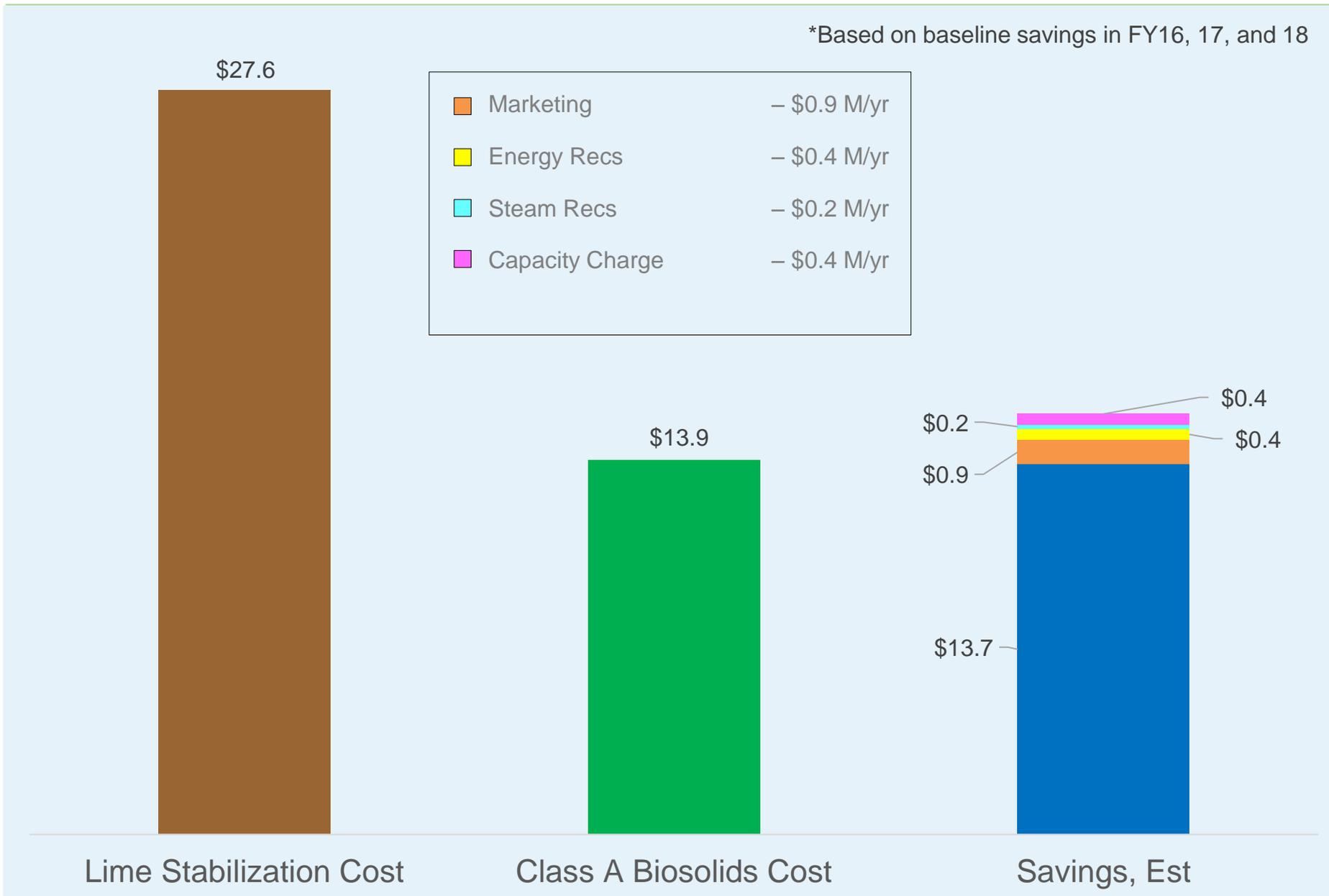
Pipeline Injection of Biogas

- Cleaned biogas can be sold to generate Renewable Natural Gas (RNG) and Renewable Identification Numbers (RINs)
- RINs are a Renewable Fuel Standard (RFS) incentive worth ~5x more than the biogas
- CHP would be fueled by natural gas instead of biogas
- Analysis of risk and financing methods underway
- Potential value \$7-8M/year



Average O&M Cost & Savings*

*Based on baseline savings in FY16, 17, and 18





District of Columbia Water and Sewer Authority
David L. Gadis, CEO and General Manager

Briefing on:

*DC Clean Rivers Project
Quarterly Update*

Briefing for:

Environmental Quality & Operations Committee Meeting

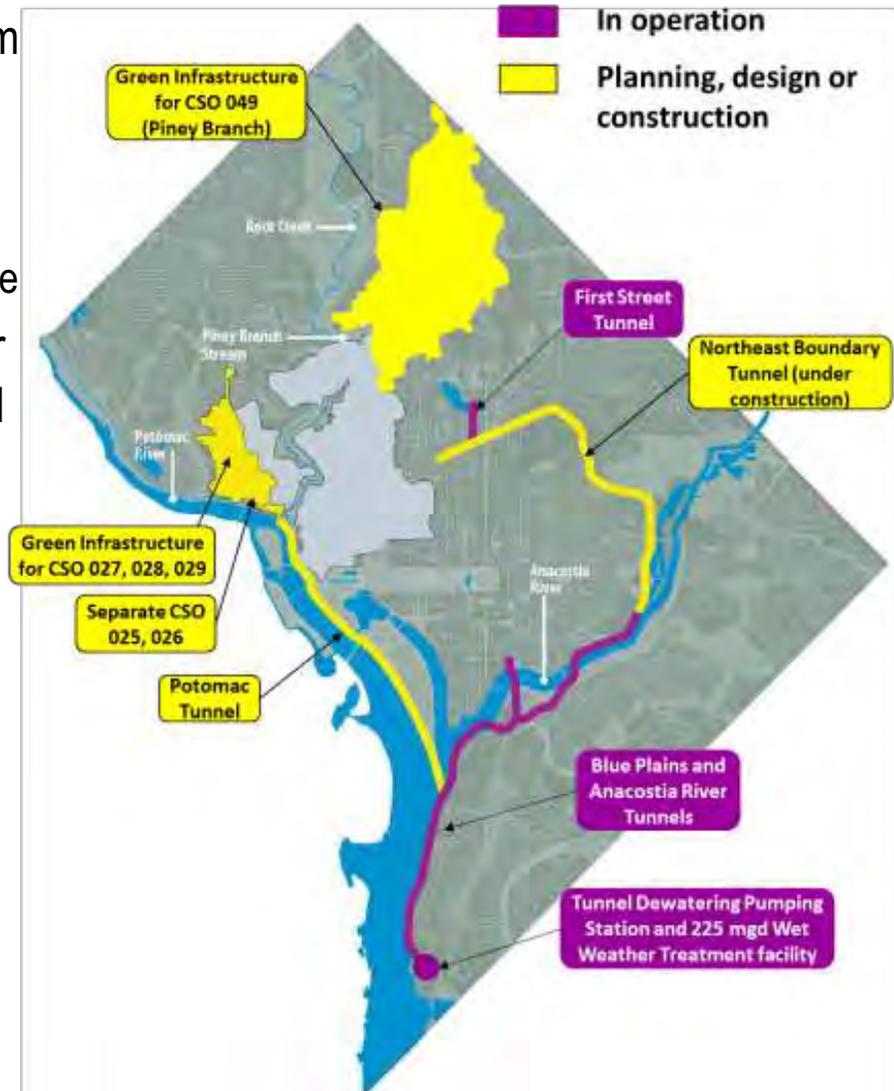
October 17, 2019



DCWATER.COM

Project Status

- First phase of Anacostia River tunnel system commissioned on March 20, 2018
 - Provides control for all CSOs along the Anacostia River
 - Provides about 100 million gallons of storage
- Northeast Boundary Tunnel, currently under construction, will increase CSO storage and flood risk mitigation
 - Adds about 90 million gallons of storage
- Green infrastructure (GI) projects in Rock Creek and Potomac River are completed and in post-construction monitoring
- CSO 025/026 Sewer Separation Project currently in design
- Potomac River Tunnel Facility Plan approved by EPA in March 2019



Anacostia Tunnel System Performance Since March 20, 2018

Month	Rainfall, (in)	Volume Captured by Tunnel (MG)	Measured Overflow (MG)	Total (captured + OF)	% captured
March 20 -31, 2018	1.48	20	0	20	100%
April 2018	3.59	249	10	259	96.0%
May 2018	8.73	860	13	873	98.5%
June 2018	5.21	265	47	311	85.0%
July 2018	9.73	679	260	939	72.3%
August 2018	5.19	334	14	349	95.9%
September 2018	9.73	784	116	900	87.1%
October 2018	3.06	164	0	164	100%
November 2018	7.57	777	5	782	99.3%
December 2018	5.82	468	100	568	82.3%
January 2019	3.30	259	0	259	100%
February 2019	3.52	74	0	74	100%
March 2019	4.00	337	46	384	87.9%
April 2019	2.24	77	0.1	77	99.9%
May 2019	5.36	311	1	312	99.7%
June 2019	4.27	134	0.1	134	100.0%
July 2019	6.49	339	77	416	81.4%
August 2019	2.10	183	18	201	91.1%
September 2019	0.12	5	0	5	100%
Total	91.40	6,317	709	7,027	90%

- Over **6.3 billion** gallons captured to date
- Over 2,500 tons of trash, debris, and other solids captured
- Exceeding predicted capture rate (90%>80%)
- First year in operation was the wettest year on record for the District of Columbia



April 2018



November 2018

Trash and Debris Removed from CSO Captured by Tunnel at ECF Fine Screens



Northeast Boundary Tunnel Community Day on September 14, 2019

“As a resident in a basement unit on T Street N.W. that experienced terrible flooding, it is great to learn reasons why and see the incredible effort underway to fix it. Today, as a resident impacted by work above ground it helps me to better understand as well. Thank you for hosting this Community Day” by Kevin Fisher



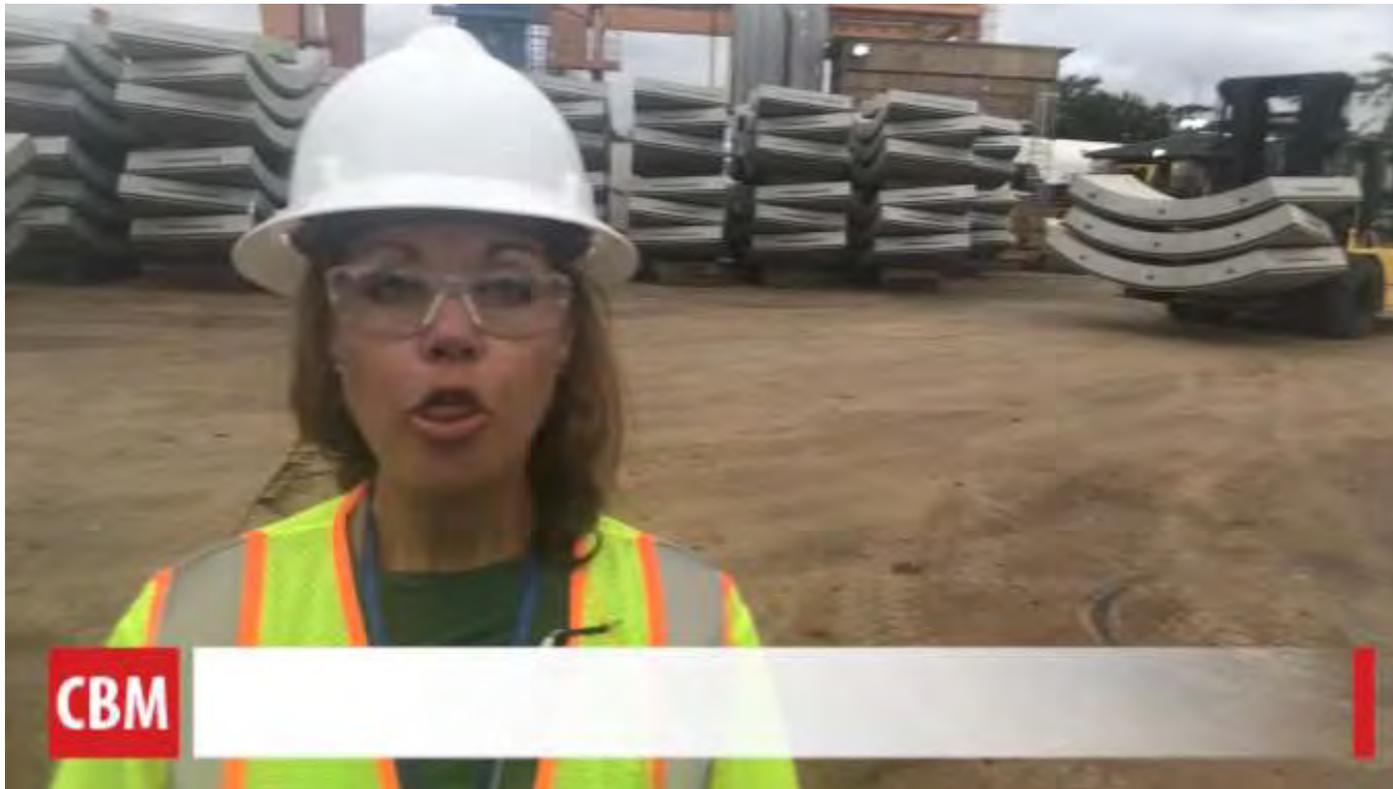
“This was awesome! I loved it, one of the coolest things I’ve ever done in D.C. Loved it!” By Tucker Cholvin

“Great tour! Thank you for making this available to the public. And thank you for all your work cleaning up the CSO’s” by David Pinney



“This was awesome to see. I grew up in DC and had no idea the infrastructure needed to support everyday life. If more residents understood how things like this worked we would be able to make life and business more beneficial to all” by Angela Gray

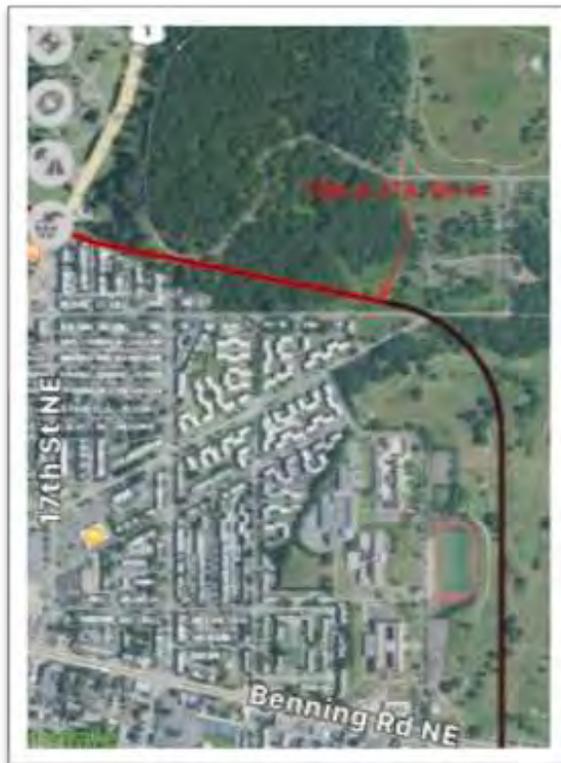
Chesapeake Bay Magazine features a segment on the Northeast Boundary Tunnel



Division J – Northeast Boundary Tunnel Construction Progress - Tunnel



- TBM excavated 8,600+ LF (32%)
- Successfully crossed under RFK WMATA Bridge
- Installed conveyor belt booster and transformer
- 15,800 LF of tunnel segments fabricated (56%)
- Currently mining beneath Arboretum



Division J – Northeast Boundary Tunnel Construction Progress – Mt. Olivet Road



- Completed dewatering well installation
- Completed drawdown of water to design elevation
- Completed shaft flood wall construction
- Currently excavating shaft (62.5% Complete)



Division J – Northeast Boundary Tunnel Construction Progress – W Street



- Completed Ventilation Control Facility cement bentonite walls for support of excavation system (SOE)
- Completed roadway restoration
- Continued retaining wall construction
- Shaft excavation (65% Complete) – on hold pending designer verification of SOE
- Continued installation of shaft groundwater dewatering system



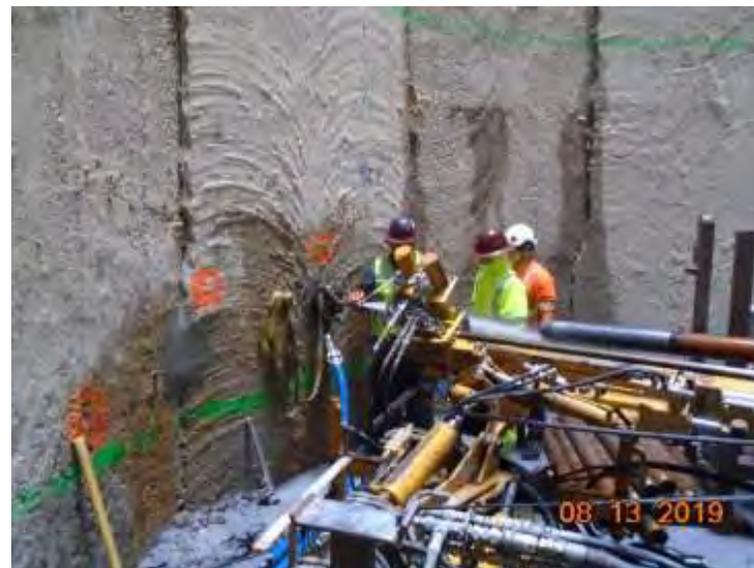
Division J – Northeast Boundary Tunnel Construction Progress – Rhode Island Ave



- Completed installation of shaft slurry wall support of excavation system
- Completed jet grouting for shaft base plug
- Completed median removal at Rhode Island Ave.



Division J – Northeast Boundary Tunnel Construction Progress – 4th Street



- Completed installation of near surface structures cement bentonite walls for support of excavation system
- Completed shaft excavation to EL +6.00
- Started installation of horizontal freeze pipes (14 out of 39 complete) for adit support of excavation system
- Continued jet grouting for near surface structures base plug (104 out of 162 columns completed)



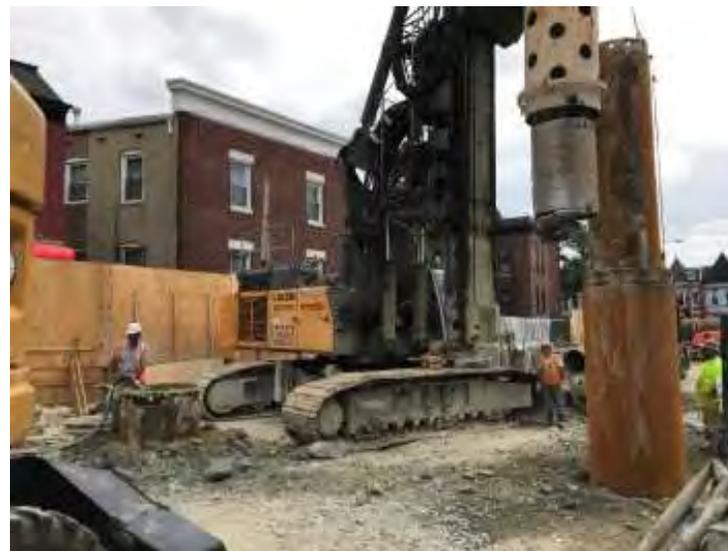
Division J – Northeast Boundary Tunnel Construction Progress – Pumping Station



- Completed site mobilization and setup
- Completed jet grout plant mobilization
- Completed median removal and repaving on Rhode Island Ave NW to allow for lane shifts
- Completed mobilization to intersection of First St NW and Rhode Island Ave NW



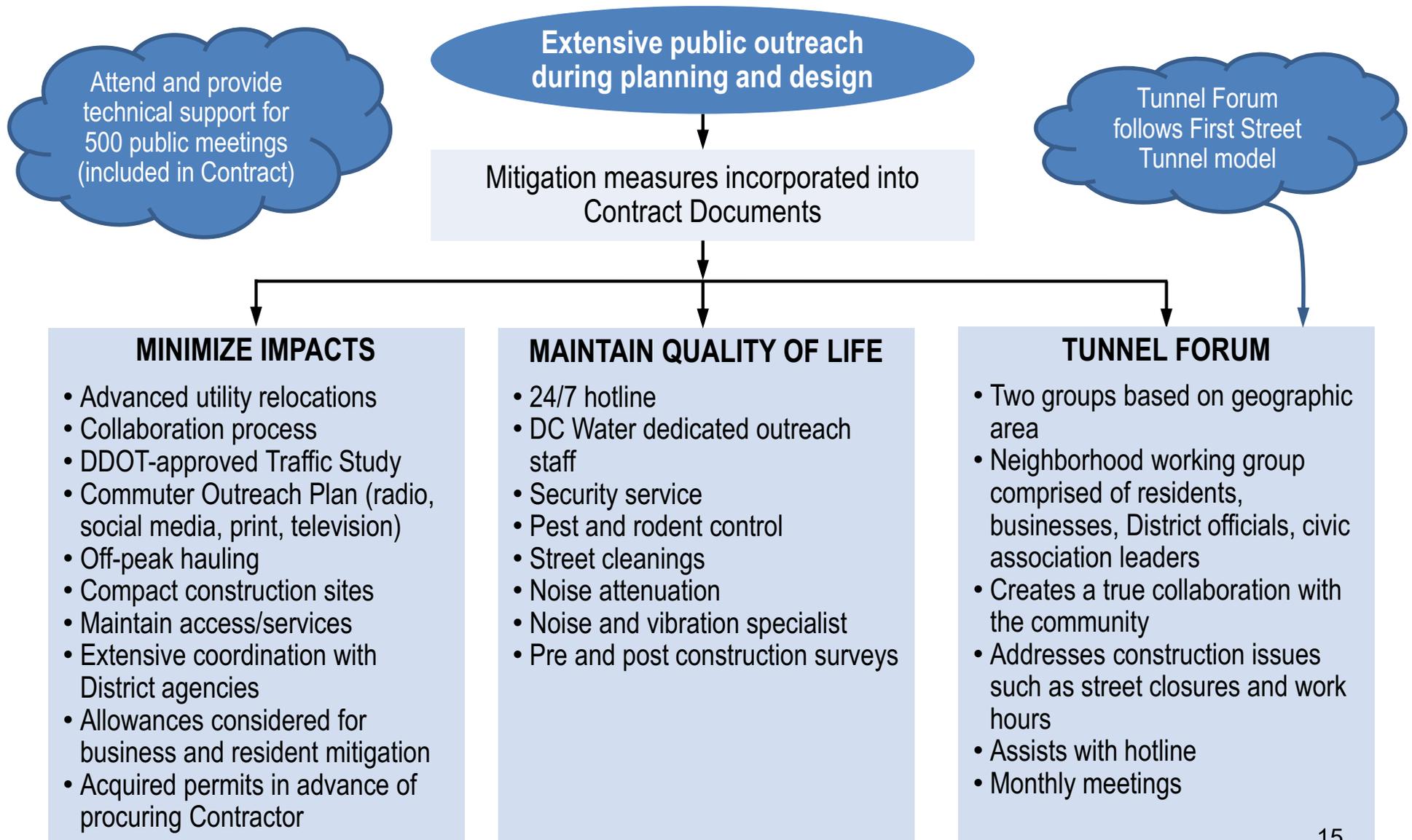
Division J – Northeast Boundary Tunnel Construction Progress – Florida Ave



- Completed installation of geotechnical instrumentation
- Completed lining of tier 1A sewer
- Mobilized for secant piles installation for shaft and near surface structures
- Completed 27 of 34 secant piles for FLA-DS for support of excavation system
- Started hydrant relocation and sidewalk narrowing on Florida Ave



Community Impact Mitigation



DC Water Partnering Activities with 3 Main Street Organizations to Enhance Patronage of Local Businesses during Construction

Main Street Organizations

- 510(c)(3) non profits
- Goal is to support patronage of local business during construction

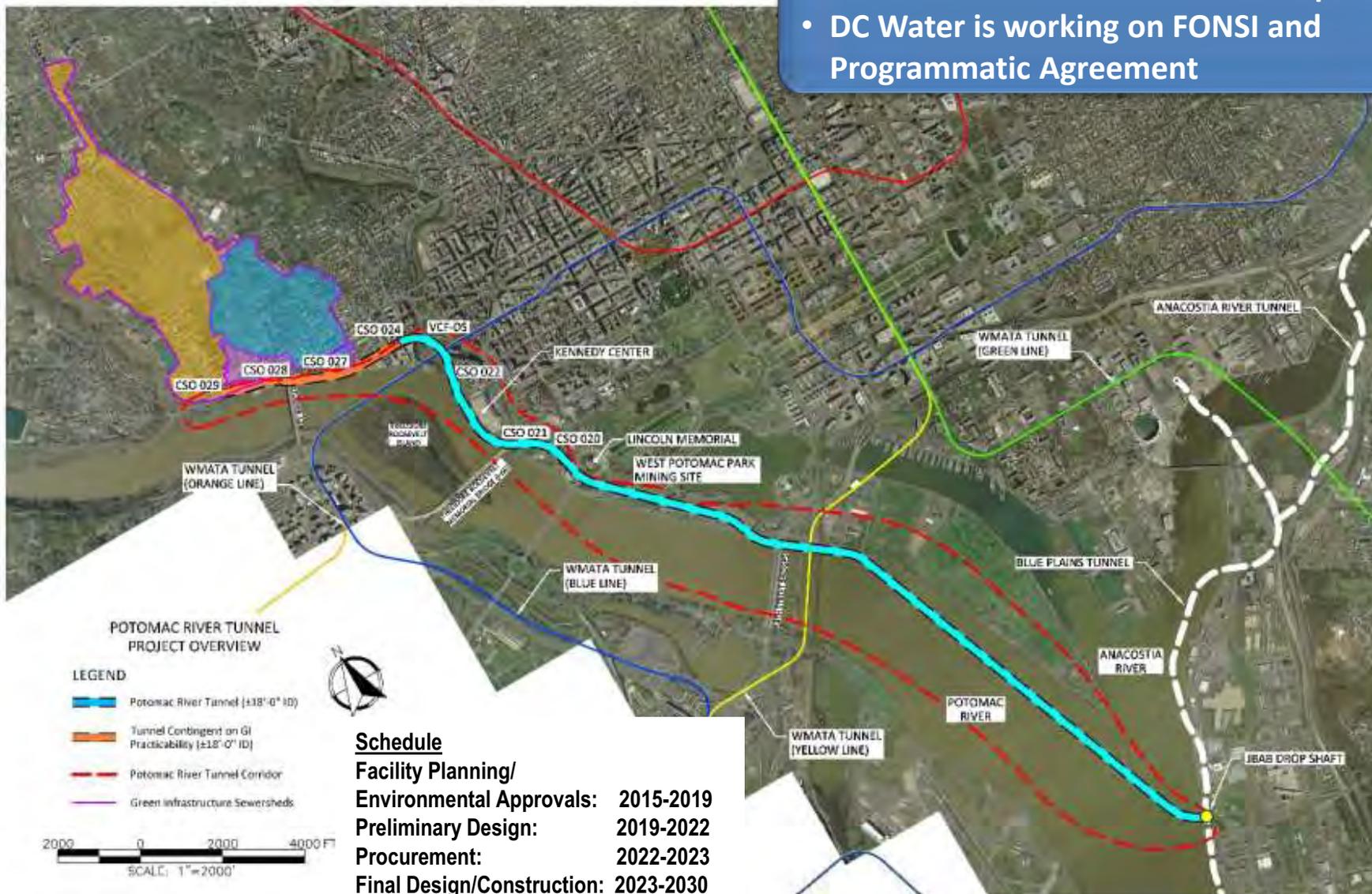


- **Traffic Advisories and Newsletters:** Distributed to media, residents, and businesses with updates of construction site activity impacts such as lane and street closures, parking restrictions, pedestrian and bicycle detours, and work schedules and durations.
- **Media Buy:** Extended delivery through December 2019 of on-air project messages on WTOP and WHUR radio stations reaching over 1.5 million listeners in 6 months and an interview of Carlton Ray on the WHUR radio program The Daily Drum with over 400,000 listeners..
- **24/7 hotline:** Callers to the hotline are able to access information without leaving a message. Received 5 messages from callers and responded directly to each to answer questions about the project and construction.

Potomac River Tunnel Facility Plan and Environmental Assessment



- Environmental Assessment is complete.
- DC Water is working on FONSI and Programmatic Agreement



CSO 025/026 Sewer Separation Project

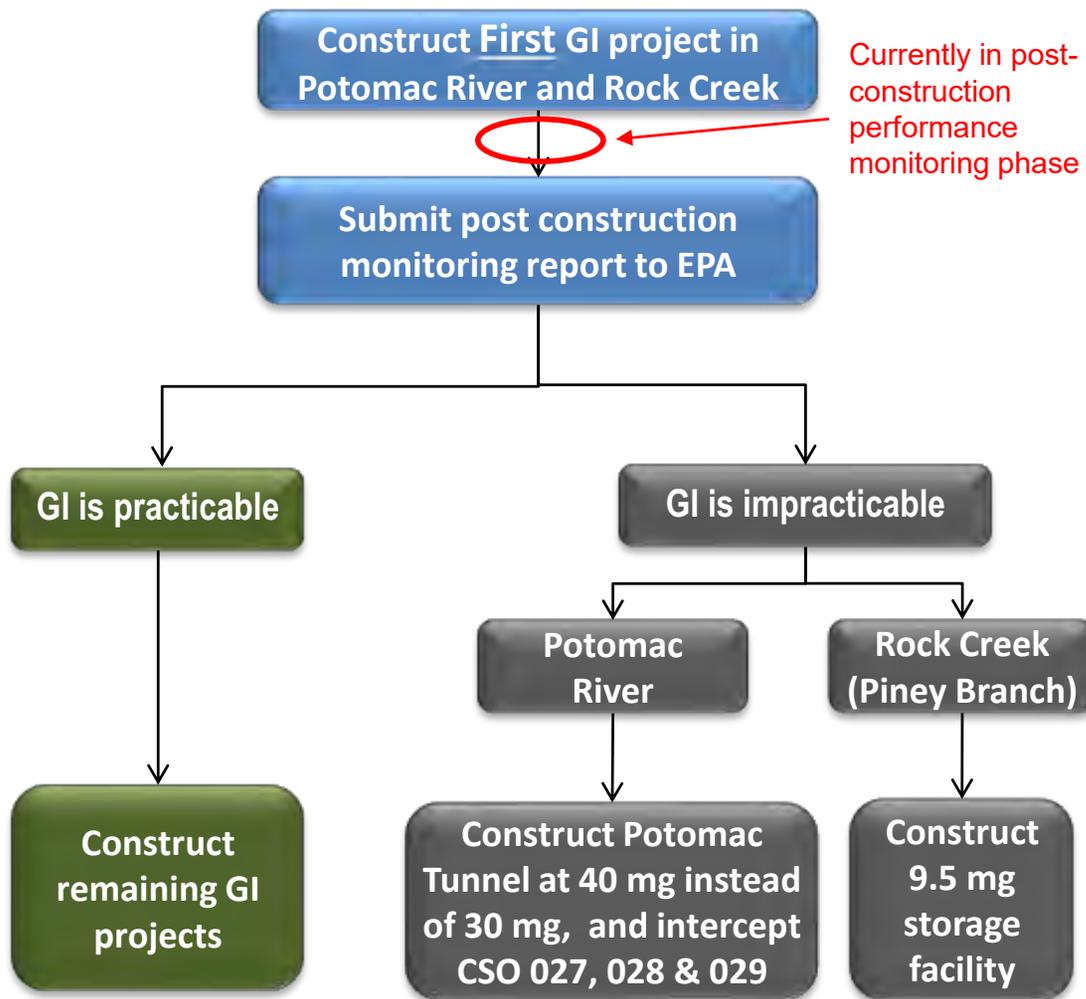
- Follow up meeting to brief ANC 2E Chair Mr. Rick Murphy, Vice-Chair Ms. Lisa Palmer, and Georgetown BID on project scope and approach scheduled in October
- Project procurement approach confirmed to be two step design-bid-build with best value per DC Water Procurement Manual. Coordination with DC Water Procurement is ongoing.
- Contract documents are to be finalized to submit 90% RFP for agency review.
- Second phase of field investigations, including additional utility test pit investigation and identifying rock elevation.
- Ongoing coordination with DDOT on 31st St Bridge Replacement Project and continued attendance at DDOT utility coordination meetings.



Green Infrastructure Post Construction Monitoring and Practicability Assessment

Project	Imp acres managed @ 1.2"	Place in operation deadline
Potomac River Project 1	44	Complete
Practicability assessment →		
Potomac River Project 2	46	2024
Potomac River Project 3	43	2027
Subtotal	133	
Rock Creek Project 1	20	Complete
Practicability assessment →		
Rock Creek Project 2	75	2024
Rock Creek Project 3	90	2027
Rock Creek Project 4	90	2029
Rock Creek Project 5	90	2030
Subtotal	365	
Grand Total	498	

- GI Team will return to EQ&OPS in December 2019 (per committee's request in June 2019) to present progress on GI cost reduction

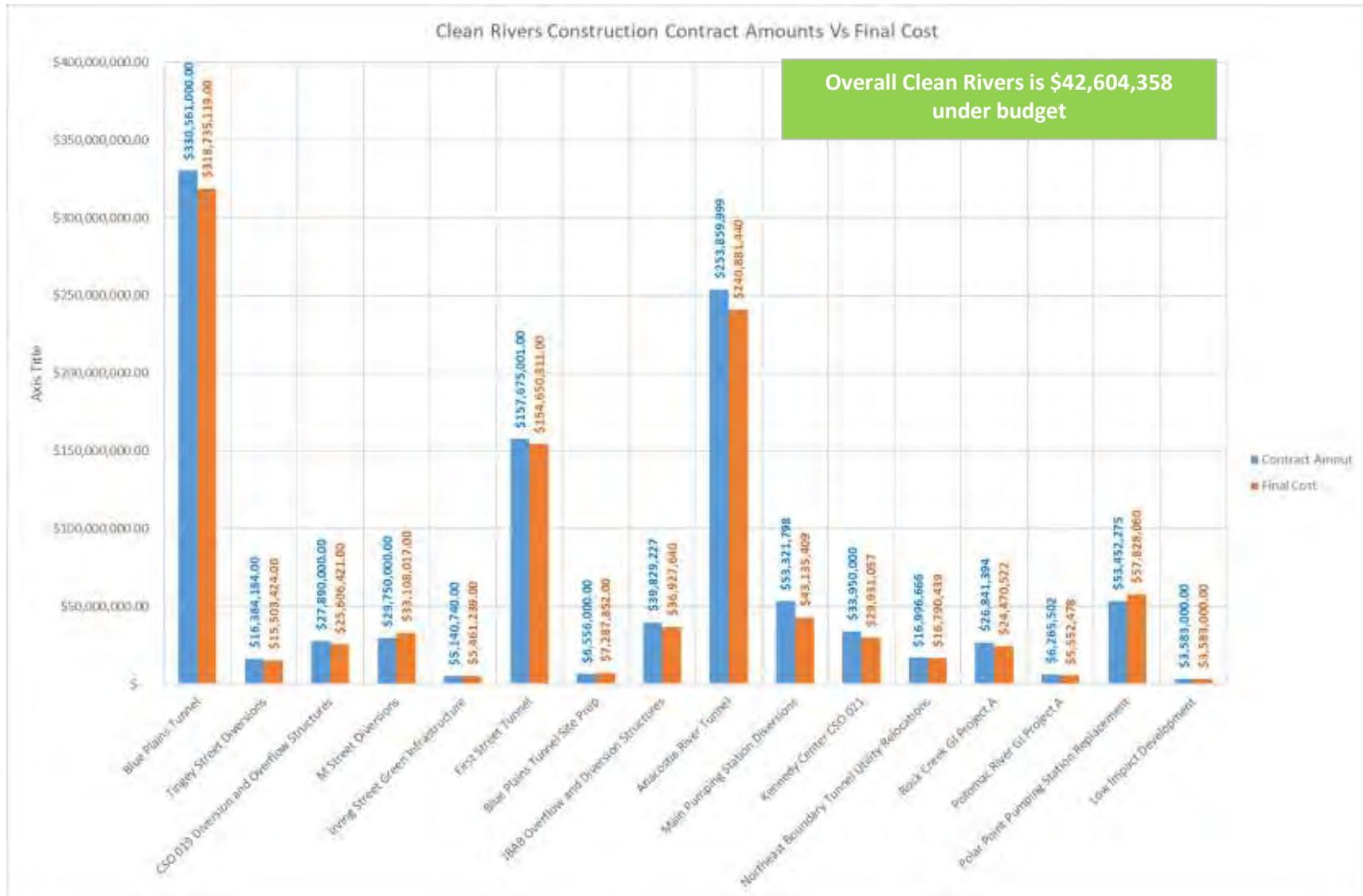


DC Clean Rivers Schedule

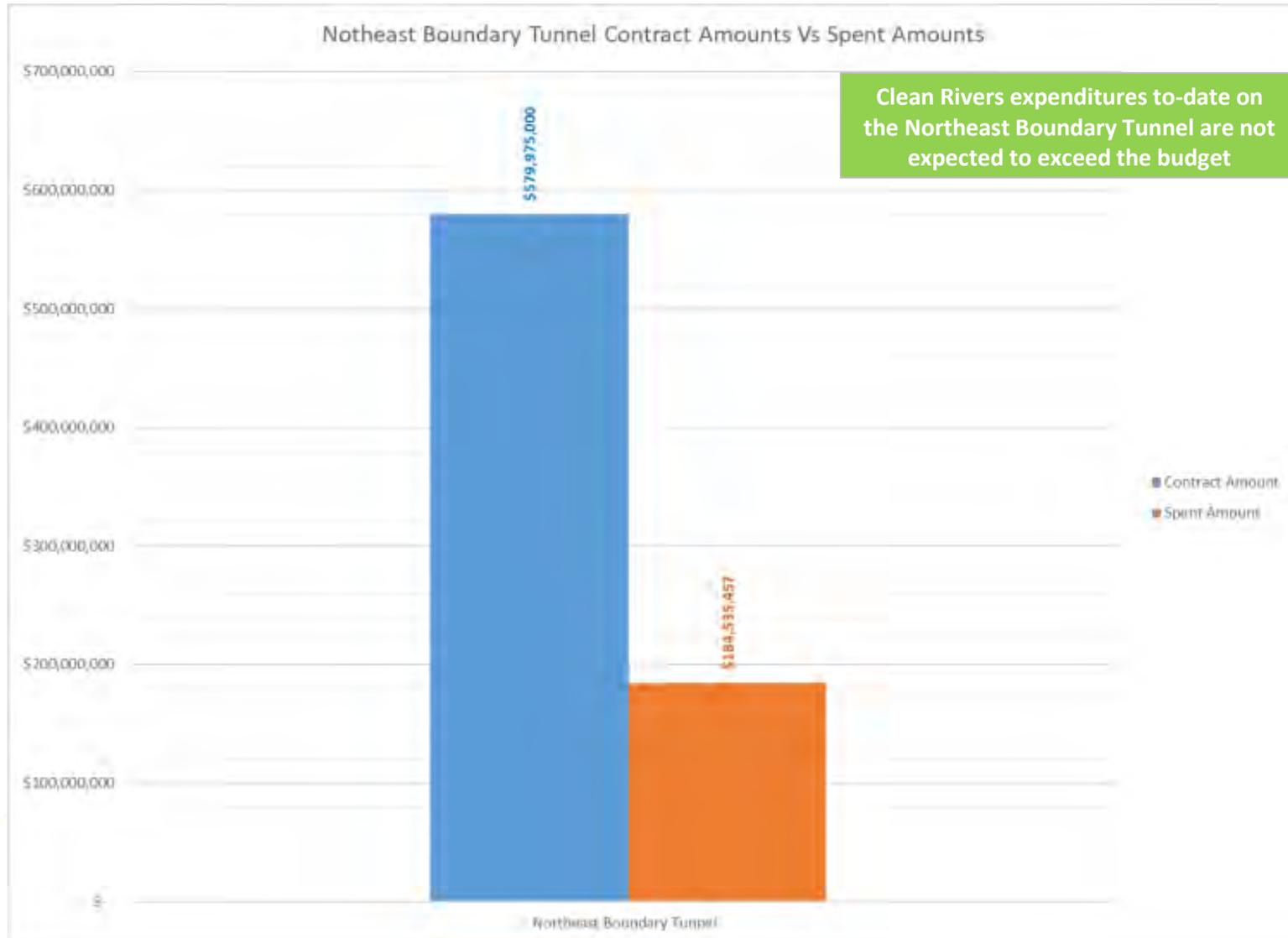
Div	Description	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Anacostia				CD Deadline 3/23/2018													
W	Blue Plains Site Prep	Complete															
A	Blue Plains Tunnel	Complete															
C	CSO 019 OF & Diversion	Complete															
B	Tingey St Diversions	Complete															
D	JBAB OF & Diversions	Complete															
E	M St Diversion Sewer	Complete															
G	CSO 007	Complete															
H	Anacostia River Tunnel	Complete															
N	LID @ DCW Facilities	Complete															
P	First St Tunnel	Complete															
I	Main PS Diversions	Complete															
S	Irving St GI	Complete															
Y	TDPS and ECF	Complete															
Z	Poplar Point PS	Complete															
U	NEBT Utility Reloc	Complete									CD Deadline 3/23/2025						
J	Northeast Boundary Tun.																
Potomac																	
PR-B	CSO 021	Complete															
PR-A	Potomac GI Project 1																
TBD	Potomac GI Project 2																
TBD	Potomac GI Project 3																
PR-C	CSO 025/026 Separation																
TBD	Potomac Tunnel	EA	Fac Plan (24)														
Rock Creek																	
TBD	Piney Banch Div. Str. Imp.																
RC-A	Rock Creek GI Project 1																
TBD	Rock Creek GI Project 2																
TBD	Rock Creek GI Project 3																
TBD	Rock Creek GI Project 4																
TBD	Rock Creek GI Project 5																



Clean Rivers Budget for Completed Contracts

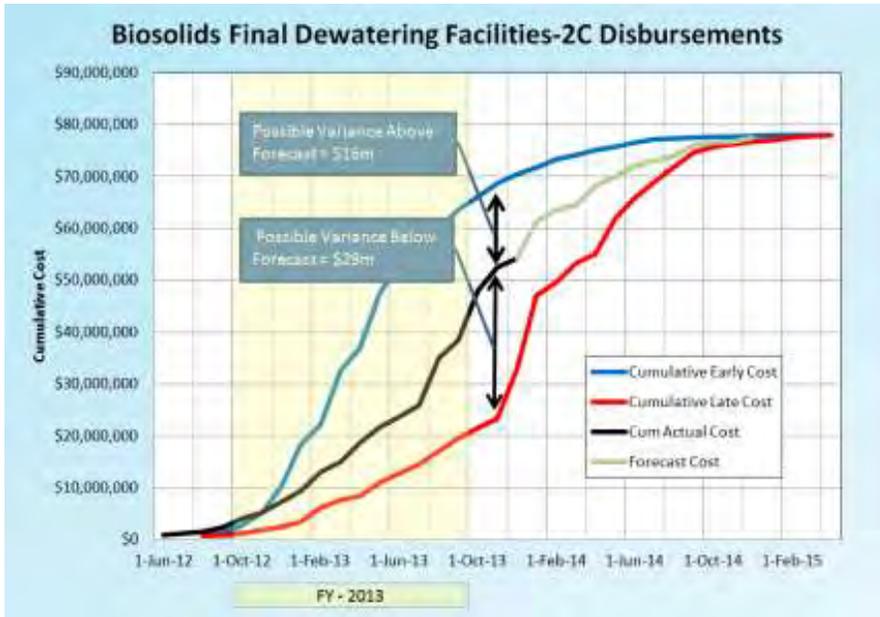


Clean Rivers Budget for Northeast Boundary Tunnel

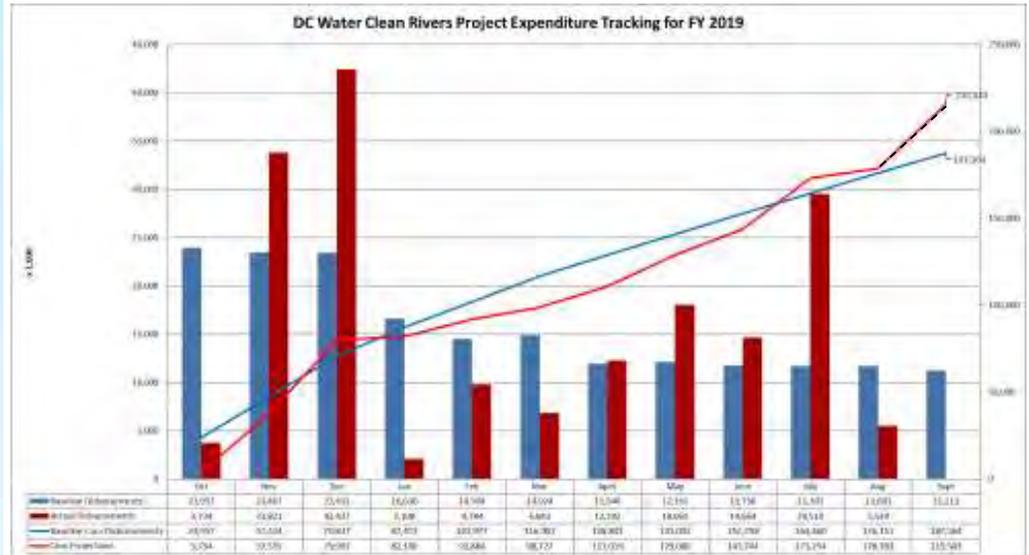


Clean Rivers Disbursements

Contractor can complete non critical work early or late and still be on time; two different curves.



Clean Rivers is projected to exceed its planned disbursements for fiscal year 2019



“A comparison of actual disbursements with projected disbursements is not an accurate indicator of project, program, service area or CIP health !”

Source: Dave McLaughlin March 2014 presentation to EQ&SS and Finance & Budget Committees

Reasons for exceeding the planned disbursements are mainly attributed to: 1) actual construction progress at the Northeast Boundary Tunnel, 2) Settlement payment for the Poplar Point Pump Station



Overview of FY2019 – FY2028 CIP

Environmental Quality and Operations Committee

November 17, 2019

Adam Ortiz, Committee Chair

District of Columbia Water and Sewer Authority

Leonard Benson, Senior Vice President and Chief Engineer



Small Diameter Water Main unlined Cast Iron pipe



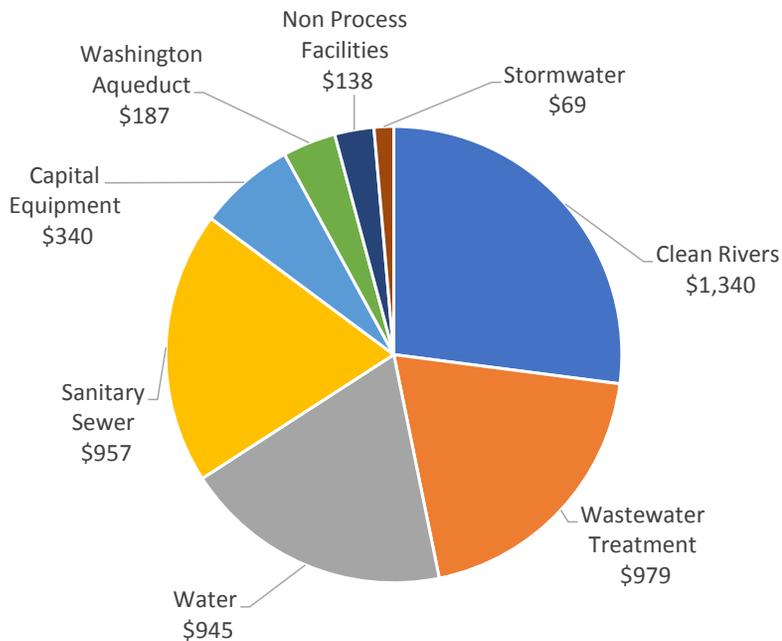
10th St at Otis St, NE (10" VCP, deformed, broken

Budget Theme: Stewardship, Accountability & Sustainability



FY19-28 CIP Overview

Capital = \$4,956 Million



- Build remaining tunnels to continue to dramatically improve the health of the District waterways, meet the consent decree requirements and reduce the flooding risk in Northeast DC
- Rehabilitate wastewater treatment facilities to ensure we continue to meet our permit requirements and protect the Potomac River and Chesapeake Bay.
- Achieve 1% replacement of water lines per year, to improve water quality, maintain fire protection and help reduce the number of water main breaks
- Ramp up to 1% rehabilitation of sewer pipes per year, and upgrade pump stations to prevent failures and service disruptions
- Maintain equipment reliability for operational facilities, large vehicles, renovations, and technology software/hardware projects to ensure delivery of critical water and sewer services
- Address critical infrastructure needs at the Washington Aqueduct to continue to meet EPA safe drinking water requirements
- Replace HVACs & Roofs, and upgrades to Main & O Seawall, historic restoration work and other non-process facilities
- Rehabilitate the stormwater pump stations that protect low lying roadway from flooding.



FY19-28 CIP Overview

Modified Baseline CIP

- 1) FY19 & FY20 Total spending for each year has been kept at FY18-27 board approved baseline levels to remain congruent with previously approved 5% rate increases
- 2) Ramp-up to modified Baseline CIP beginning in FY21

Service Area (\$000's)	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	10-Yr Total	Last Year's CIP	(Increase) /Decrease
Non-Process Facilities	15,309	36,002	26,793	20,665	6,831	11,058	10,396	3,901	3,553	3,560	138,067	108,032	(30,036)
Wastewater Treatment	69,979	66,620	76,510	97,635	110,047	82,434	81,249	133,338	137,575	123,351	978,738	855,948	(122,790)
Clean Rivers	187,859	147,208	139,786	191,573	151,411	64,415	55,689	144,295	97,067	83,286	1,262,589	1,313,196	50,607
Combined Sewer	7,491	4,219	9,444	8,015	8,646	13,520	8,852	5,800	5,593	7,598	79,178	119,151	39,973
Stormwater	4,220	8,571	8,118	8,586	3,725	4,987	7,564	7,494	5,239	10,102	68,608	24,452	(44,156)
Sanitary Sewer	44,927	43,646	57,249	85,588	97,220	98,194	115,011	140,020	134,664	140,615	957,135	532,490	(424,645)
Water	61,884	71,720	96,300	101,039	84,395	96,491	103,325	106,145	105,338	118,378	945,015	730,672	(214,343)
CAPITAL PROJECTS	391,669	377,987	414,200	513,102	462,275	371,098	382,087	540,993	489,029	486,890	4,429,330	3,683,941	(745,389)
Capital Equipment	34,518	26,823	36,907	33,086	32,725	36,680	35,540	35,426	34,339	34,279	340,324	198,133	(142,191)
Washington Aqueduct	12,930	15,532	15,909	15,536	35,006	14,830	32,731	9,034	12,298	23,321	187,127	120,052	(67,075)
ADDITIONAL CAPITAL PROGRAMS	47,448	42,355	52,816	48,622	67,731	51,509	68,272	44,461	46,637	57,600	527,450	318,185	(209,265)
TOTAL CIP	439,117	420,342	467,016	561,724	530,006	422,608	450,358	585,454	535,665	544,490	4,956,780	4,002,126	(954,655)
Last Years CIP	439,118	420,342	402,681	445,647	385,312	326,284	318,360	439,427	375,004		4,002,126		
(Increase)/Decrease	1	(0)	(64,335)	(116,077)	(144,694)	(96,324)	(131,998)	(146,027)	(160,661)	(544,490)	(954,655)		



FY19-28 CIP Overview

Asset Management Based Investment Needs

Service Area	Replacement Value (\$M) ¹	Min. Annual Investment (%)	Min. Annual Investment (\$M)	Average Annual Asset Management Based Investment (\$M) ²	Average Annual BOD Approved Modified AM Investment (\$M) ³
Wastewater	\$4,786	2.0%	\$96	\$120	\$107
Water	\$5,599	1.5%	\$84	\$134	\$83
Sewer	\$9,967	1.5%	\$149	\$180	\$98
Facilities	\$229	2.0%	\$5	\$7	\$7

Does not include all CIP programs such as DC Clean Rivers

1 – 2019 dollars

2 – Includes Minimum Investment as well as asset management recommended investment required due to age of the system

3 – Approved by DC Water BOD on April 4, 2019



FY19-28 CIP Overview

Service Area	Current Baseline \$3.8B	Modified Baseline \$4.4B	Asset Management \$5.4B
Clean Rivers	Fully funded to meet Consent Decree	Fully funded to meet Consent Decree	Fully funded to meet Consent Decree
Wastewater	Generally funded to meet NPDES Permit and established levels of service	Fully funded to meet NPDES Permit and established levels of service	Fully funded to meet NPDES Permit and established levels of service
Stormwater	Underfunded	Fully funded	Fully funded
Water			
Pump Stations & Storage Facilities	Generally funded to current service levels	Generally funded	Fully funded
Small Diameter WMs	Underfunded; (Funded to meet 1% replacement/rehab goal [11 mi/year]), but only 0.7% a year at full replacement	Underfunded; (Funded to meet 1% per year replacement level - increased cost is due to switch to full replacement [11 mi/year])	Fully funded to ramp up to 2% replacement level [22 mi/year]
Large Diameter WMs	Generally funded	Generally funded	Generally funded
Sewer			
Pump Stations	Underfunded	Fully funded	Fully funded
Sewer Lines < 60" dia.	Substantially underfunded [0.35%; 6.2 mi/year]	Underfunded (Funded to ramp up to 1.0% per year rehabilitation level [17.5 mi/year] by FY23)	Fully funded to ramp up to 2.3% rehabilitation level [40 mi/year]
Sewer Lines ≥ 60"	Generally Funded	Generally Funded	Generally Funded
Non Process	Fully funded for HQ, Fleet and Sewer Operations Facilities, Otherwise Underfunded	Fully funded	Fully funded

'Generally Funded' = What we know or expect to find can be rehabilitated
 'Underfunded' = What we know or expect to find is not all funded
 'Fully Funded' = All needs known or expected are met

5

5



What we achieve with the Modified Baseline Plan in FY21 and beyond? *Striking a Balance*

- The Modified Baseline CIP balances financial and affordability concerns with additional investment in our assets that begin to address aging water and sewer infrastructure during this 10 year period
 - Non Process Facilities - \$58 million increase
 - Additional facilities needs including HVAC and roof rehabilitation
 - Wastewater - \$95 million increase
 - Upgrades to Effluent Filters, Secondary and Nitrification treatment processes
 - Stormwater - \$35 million increase
 - Upgrading of storm water pump stations, increasing from \$1M/year to an average of \$5M/year from FY20 onwards



What we achieve with the Modified Baseline Plan in FY21 and beyond? *Striking a Balance (cont.)*

💧 Sanitary Sewers - \$314 million increase

- Condition Assessment:
 - Local Sewers (<60-in), from 35 mi/year to 69 mi/year (50-year cycle to 25-year cycle)
 - Major Sewers (≥60-in), from 7 mi/year to 11 mi/year (25-year cycle to 15-year cycle)
- Rehabilitation:
 - Local Sewers (<60-in), 6 mi/year to 17.5 mi/year
 - Major Sewers (≥60-in), funds address what we know or expect to find
 - Sewer On-going (funding for emergency repairs), increased by 32% (from \$11M/year to \$14.5M/year)

💧 Water - \$154 million increase

- Rehabilitation:
 - Small Dia. Water Mains (<16-in), from 8 mi/year to 11 mi/year
 - Lead Service Lines Replacement, from 150 to 1,000 in public space
 - Water On-going (funding for emergency repairs), increased by 45% (from \$11M/year to \$16M/year)



Risk Based Approach

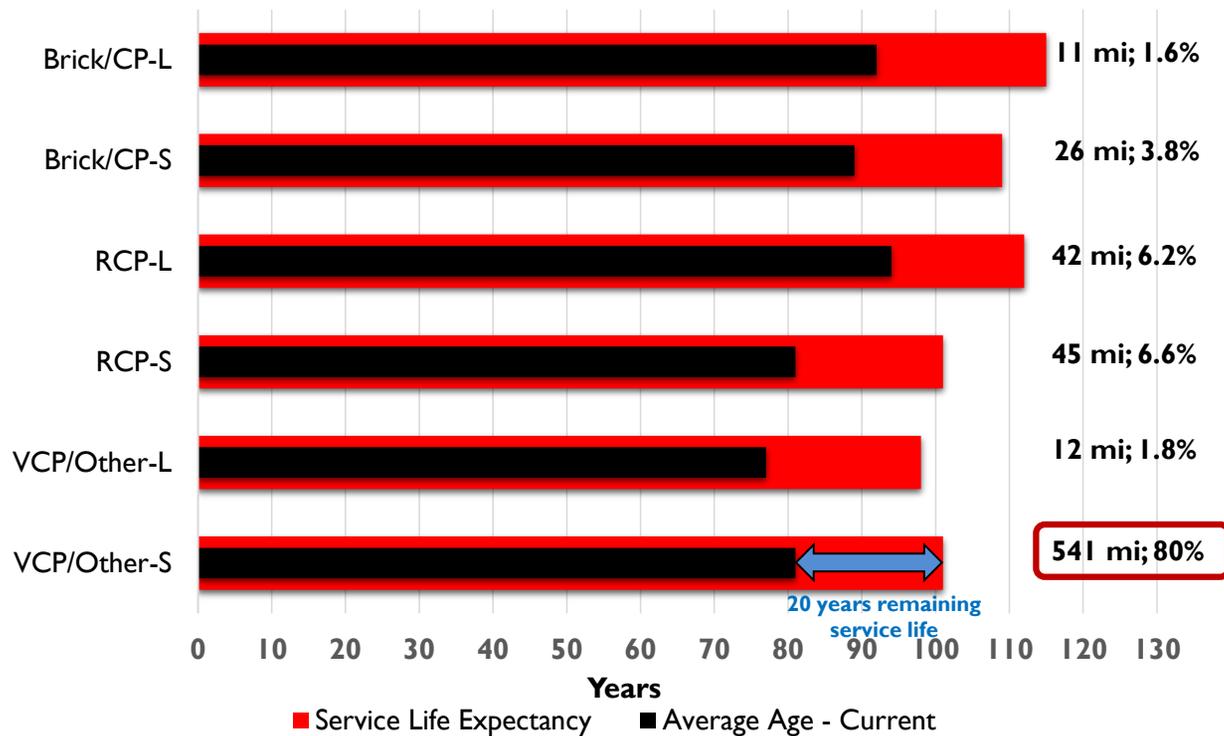
- Vertical assets (pump stations and treatment processes)
 - Use a Reliability Centered Maintenance to extend asset life
 - Focus dollars on critical assets using analytical techniques
- Water Distribution system (pipes) Inspections and replacements
 - Based on calculated Consequence and Likelihood of Failure
 - Small diameter water mains based on water quality complaints and break history
 - Large diameter water mains based on condition assessment results
- Sewer Collection system (pipes) Inspections and rehabilitation
 - Based on calculated Consequence and Likelihood of Failure
 - Based on condition assessment results
- Facilities rehabilitation based on condition assessment results



Sewer Collection System Age

Sewer Linear - Sanitary Average Age and Service Life Expectancies by Sanitary Sewer Material Type - FY2018

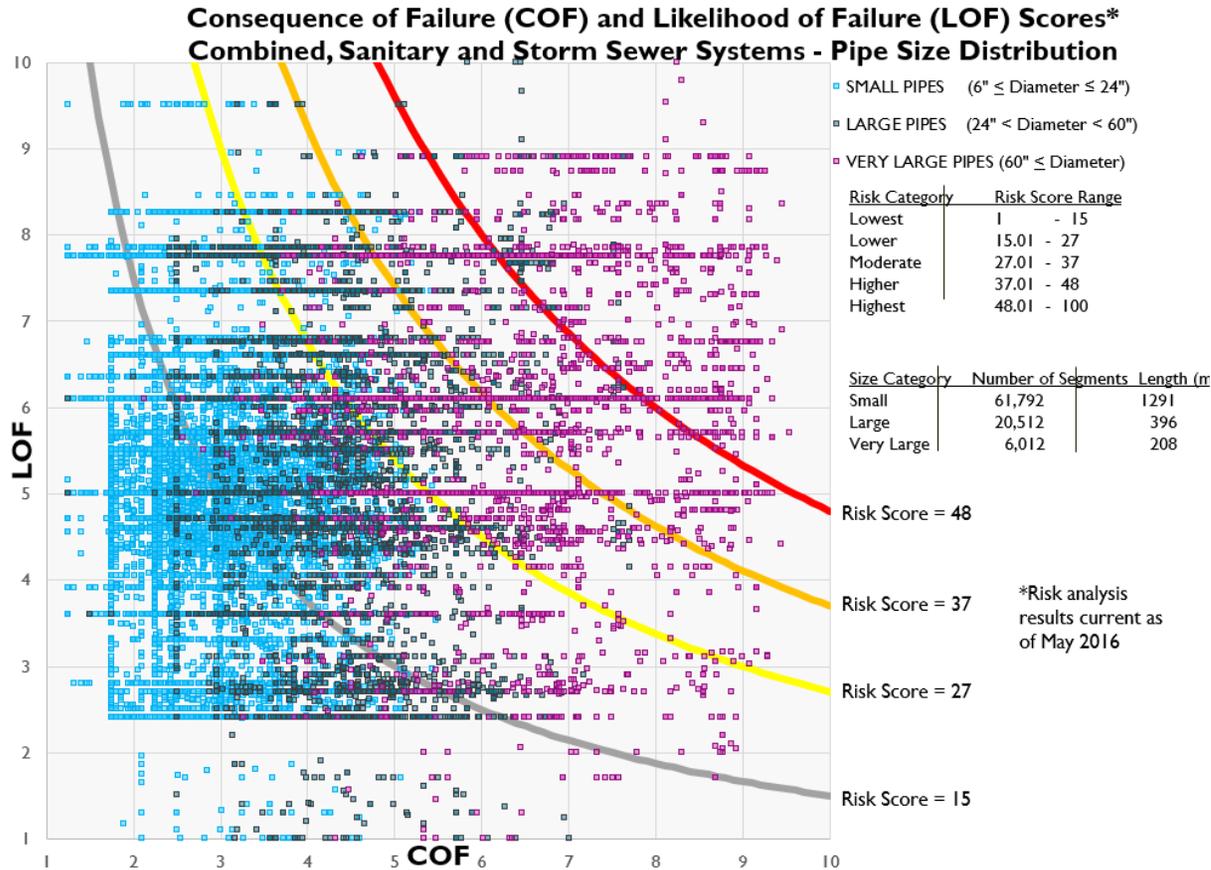
Average Age: 82 years



20 years remaining service life

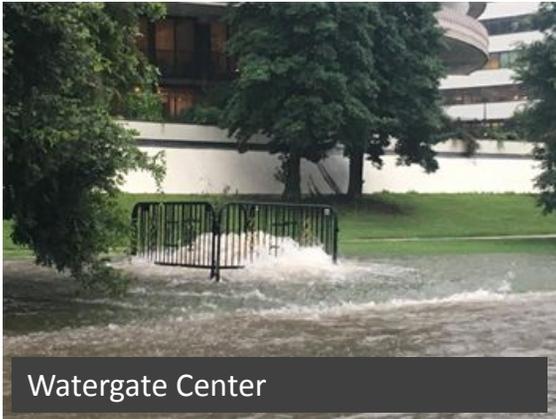


Sewer Collection System Analysis





Sewer Collection System Failures



Watergate Center



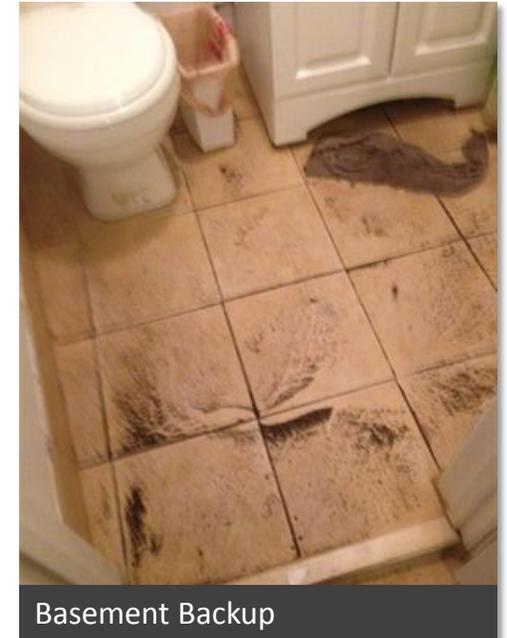
Overflow



MH 36870 Firth Stirling



Basement Backup

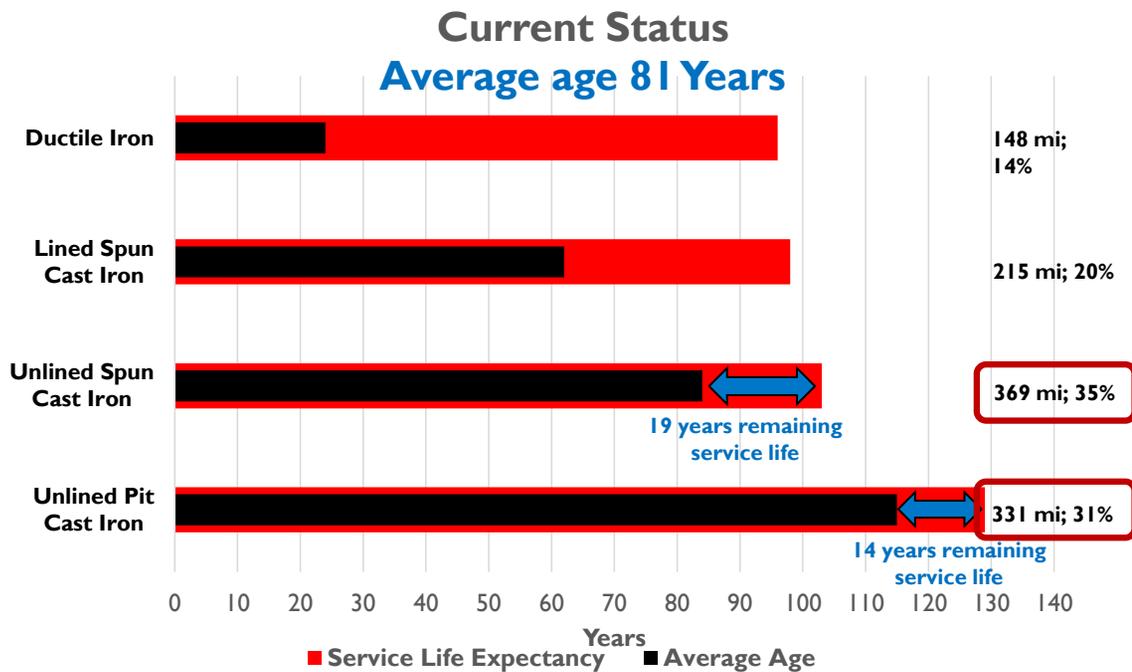


Basement Backup



Water Distribution System Age

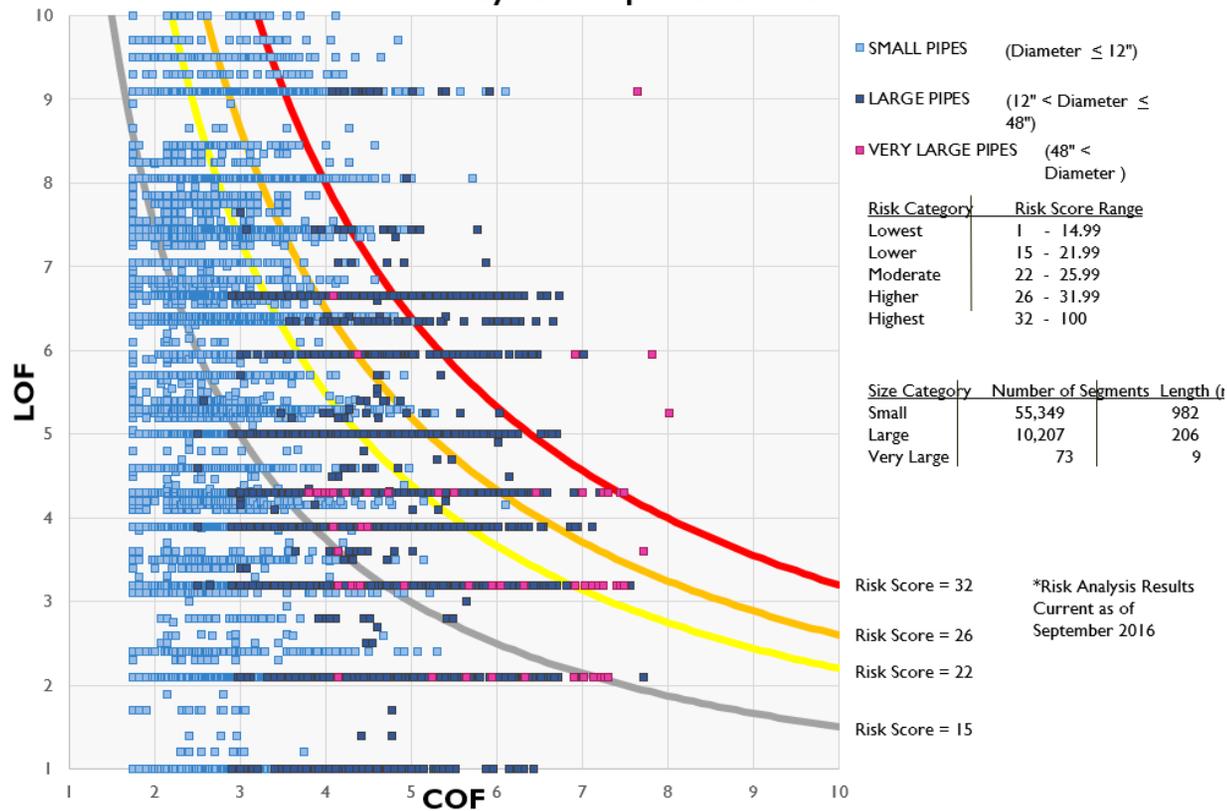
Small Diameter Water Mains Average Age and Service Life Expectancies by SDWM Cohort type - FY2018





Water Distribution System Analysis

Consequence of Failure (COF) and Likelihood of Failure (LOF) Scores*
Water System - Pipe Size Distribution





Water Distribution System Failures



Q St. NW



Q St. NW



Q St. NW



6th St SW



6th St SW



Infrastructure Repairs Before and After



Potomac Pump Station



Potomac Pump Station



1st and Canal Stormwater Pump Station



Low Area Trunk Sewer



Potomac Pump Station



Potomac Pump Station



1st and Canal Stormwater Pump Station



Low Area Trunk Sewer



Benefits of Proactive Investment

- Proactive investment strategy minimizes direct (DC Water) cost and social & environmental (community impact) costs:
 - Reactive approach has about a 1.5-fold to over 15-fold increase in direct costs to DC Water when compared to a proactive (planned) approach
 - Reactive approach has about a 5-fold to 19-fold increase in socioeconomic costs to the community, when compared to a proactive (planned) approach
- Emergency repairs on linear assets do not extend the service life of the repaired asset
 - Generally does not address the root problem or cause
 - Is wasted money when more comprehensive proactive project is done
- Repeated emergency repairs and associated impacts can negatively impact DC Water's reputation and customer confidence



CIP Risks/Sensitivities (Unfunded)

💧 Washington Aqueduct –

- FY2019-2030 Proposed CIP (\$291M, DC Water share = \$218M)
- Federally Owned Water Main Repairs (\$86M, all DC Water)
- Travilah Quarry Acquisition & Outfitting (\$284M, cost sharing unknown)
- Advanced Treatment Facilities (\$540M, DC Water share = \$405M)

💧 Blue Plains Process Optimization & Revenue Opportunities

- Full Plant Deammonification (>\$60M)
- Resource Recovery (Hot Water Heating Loop; Sludge Drying)

💧 Water and Sewer

- Lead Service Replacement Program
- Second Water Source
- Pepco DC Power Line Undergrounding (DC PLUG) – (\$57M, DC Water Share is 50% = \$28M)
- Condition assessment of large sewers could lead to additional CIP needs



CIP Risks/Sensitivities (Unfunded)

Regulatory/Consent Decree/Permitting:

- E. Coli Total Maximum Daily Load (TMDL) – lawsuit by environmental groups seeking more restrictive TMDL
- MS4 permit - repair of Stormwater Outfalls, total scope and cost unknown (currently \$5M approved)
- National Parks Service permitting requirements for sewer projects
- Anacostia River Sediment Clean-up
- Chesapeake Bay TMDL – Phase 3 Watershed Implementation Plans being prepared, possible TMDL reassessment in the future
- Green Infrastructure (GI) Practicability Assessment - Clean Rivers practicability assessment of GI to be performed in 2020. Currently, construction of GI in the District is more expensive than originally estimated
- SSOs – risk of SSO Consent Decree
- Blue Plains Odor Control