



DISTRICT OF COLUMBIA WATER AND SEWER AUTHORITY

Board of Directors

*Meeting of the
Environmental Quality and Sewerage Services
Committee*

*5000 Overlook Avenue, SW, Room 407
Thursday, July 21, 2016
9:30 a.m.*

- | | | |
|-------------------|---|---------------------------|
| | I. Call to Order | Bo Menkiti
Chairperson |
| 9:30 a.m. | II. AWTP Status Updates
1. BPAWTP Performance | Aklile Tesfaye |
| 9:45 a.m. | III. GMU Executive MBA Class of 2016
Capstone Project: Microgrid Proposal for
Power Stability at the BP Wastewater Treatment Plant | Maureen Holman |
| 10:15 a.m. | IV. Action Items | |
| | Joint Use | Len Benson / Dan Bae |
| | 1. DCFA # 423 WSA – Enhanced Nitrogen Removal North & Filtrate Treatment Facilities, Black & Veatch Corporation | |
| | 2. DCFA # 474 WSA – Engineering Consultant for the Supervisory Control and Data Acquisition (SCADA) System, CDM Smith | |
| | 3. 14-PR-DFS-08 - Janitorial Services, M & N Contractors | |
| | Non-Joint Use | |
| | 1. IFB No. 150130 – Oregon Avenue NW Sewer Rehabilitation, Bradshaw Construction Corp. | |
| 10:45 a.m. | V. Other Business/Emerging Issues | |
| 10:50 a.m. | VI. Adjournment | Bo Menkiti
Chairperson |

* 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

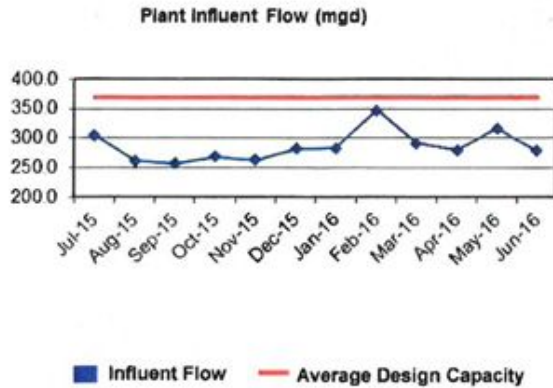
law under D.C. Official Code § 2-575(b)(1); contract negotiations under D.C. Official Code § 2-575(b)(1); legal, confidential or privileged matters under D.C. Official Code § 2-575(b)(4); collective bargaining negotiations under D.C. Official Code § 2-575(b)(5); facility security under D.C. Official 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:

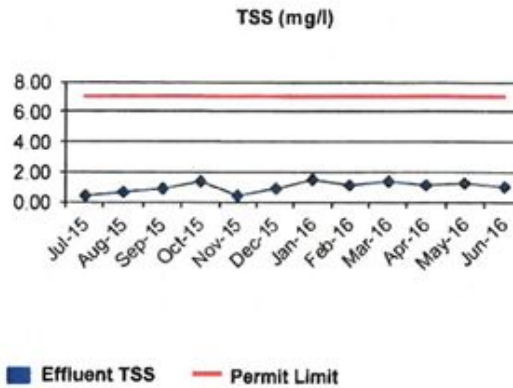
1. Assistant General Manager, Blue Plains: Update the Plant Influent Flow figure (Slide 4) to include a 5-year trend. **{Completed}**
2. Chief Engineer: When stating MBE/WBE goal commitments on future fact sheets, modify wording to indicate that the contractual commitment is restricted to the contractor sufficiently demonstrating that they have employed good faith efforts to achieve the stated MBE/WBE goals. **{To be addressed in future fact sheets}**
3. Director, Procurement: Provide an update to the Committee as collaboration with WSSC takes place regarding common commodities (ex: methanol) being purchased by the two utilities. **{To be scheduled at a future meeting}** }

DEPARTMENT OF WASTEWATER TREATMENT June 2016

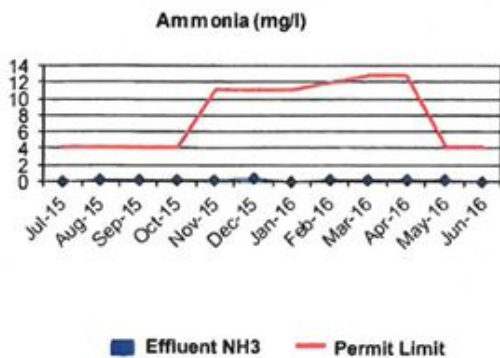
Average plant performance for the month was excellent with all effluent parameters well below the seven-day and monthly NPDES permit requirements. The monthly average influent flow was 279 MGD. There was no Excess Flow during this reporting period. The following Figures compare the plant performance with the corresponding NPDES permit



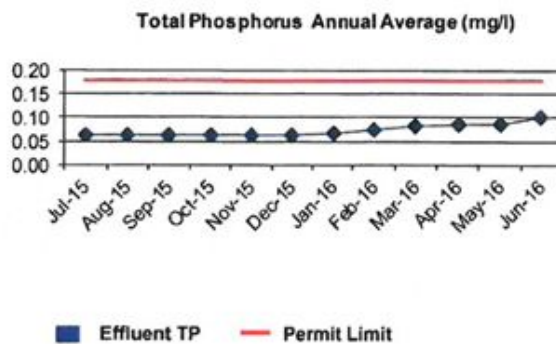
This graph illustrates the monthly average influent flow to the plant. The design average flow is 370 MGD. Blue Plains has a revised 4-hour peak flow capacity of 511 MGD through complete treatment. Flows up to 336 MGD in excess of the 511 MGD peak capacity receive primary treatment, disinfection and dechlorination.



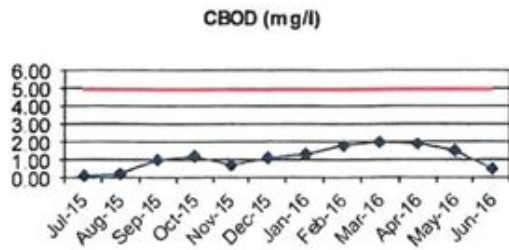
Effluent Total Suspended Solids (TSS) is a measure of the amount of solid material that remains suspended after treatment. The effluent TSS concentration for the month averaged 1.01 mg/L, which is below the 7.0 mg/L permit limit.



The Ammonia Nitrogen (NH₃-N) is a measure of the nitrogen found in ammonia. For the month, effluent NH₃-N concentration averaged 0.07 mg/L and is below the average 4.2 mg/L limit.

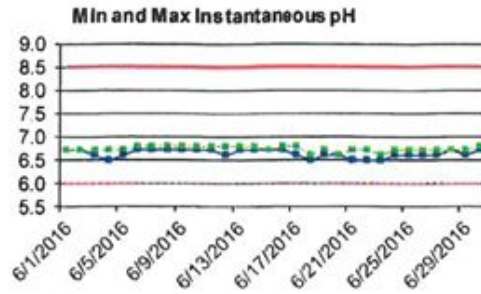


The Total Phosphorus (TP) is a measure of the particulate and dissolved phosphorus in the effluent. The annual average effluent TP concentration is 0.08 mg/L, which is below the 0.18 mg/L annual average limit.



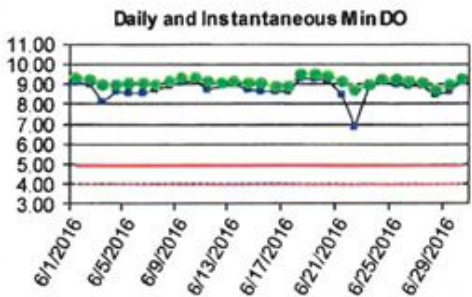
■ Effluent CBOD — Permit Limit

Carbonaceous Biochemical Oxygen Demand (CBOD) is a measure of the amount of dissolved oxygen required for the decomposition of organic materials. The effluent CBOD concentration averaged 0.51 mg/L (partial month), which is below the 5.0 mg/L limit.



● MAX pH ■ MIN pH — Upper Limit - - Lower Limit

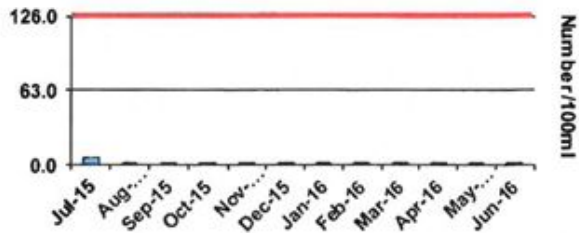
pH is a measure of the intensity of the alkalinity or acidity of the effluent. The minimum and maximum pH observed were 6.5 and 6.8 standard units, respectively. The pH was within the permit limits of 6.0 and 8.5 for minimum and maximum respectively.



● MIN Daily Average ■ Instant MIN DO
— MIN Daily Average Limit - - Instant MIN Limit

Dissolved Oxygen (DO) is a measure of the atmospheric oxygen dissolved in wastewater. The DO readings for the month are within the permit limits. The minimum daily average is 8.8 mg/L. The minimum instantaneous DO reading is 6.9 mg/L. The minimum permit limits are 5.0 mg/L and 4.0 mg/L respectively.

E. coli

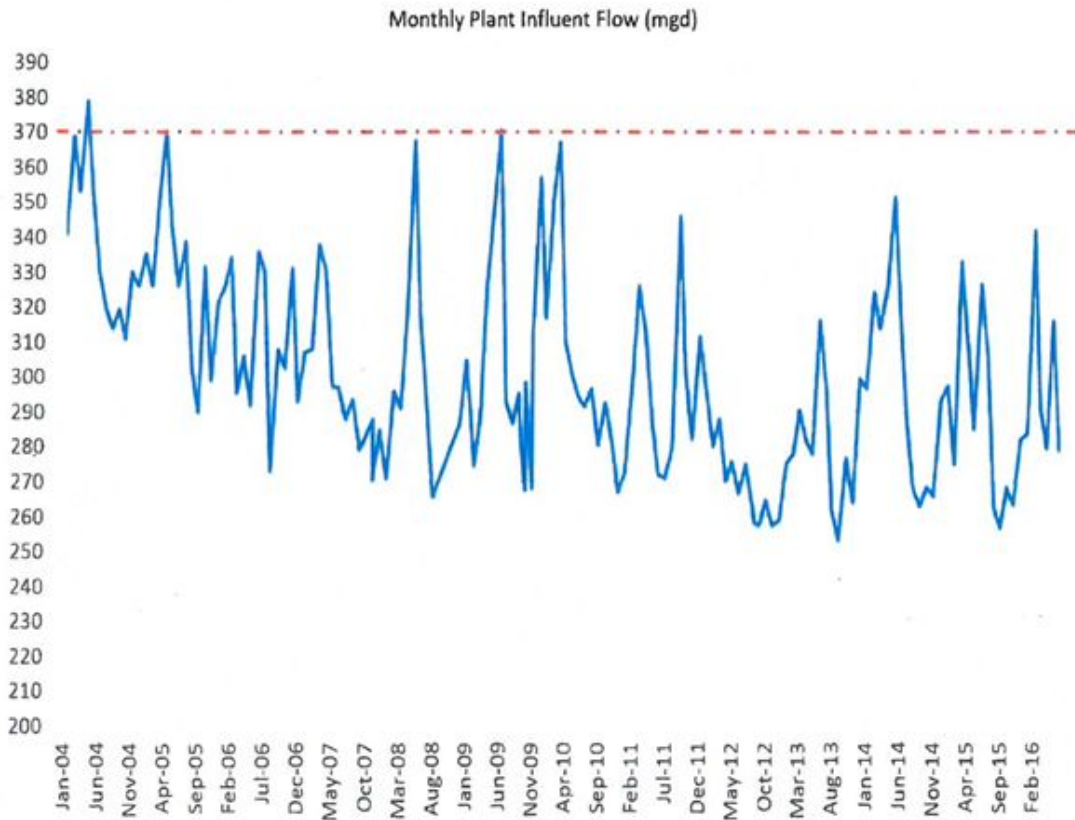


■ E. coli Geomean — Permit Limit

E.coli is an indicator of disease causing organisms (pathogens). The E.coli permit limit is 126/100mL. The E coli geometric mean is 1.8/100mL, and well below the permit limit.

Long Term Plant Flow Trend

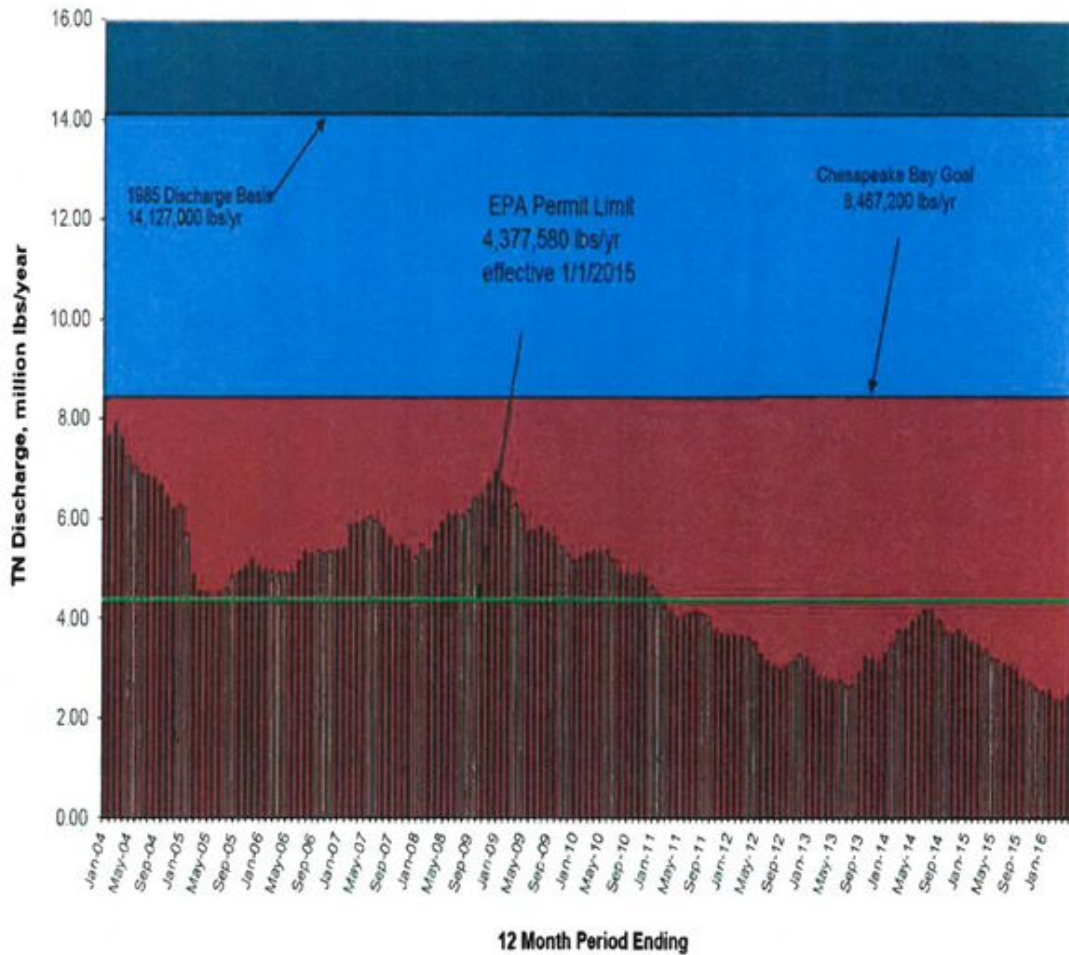
The graph below shows the influent flow trend to the plant over a period. Flow rate to the plant has been decreasing through 2012. While for any given month the flow is weather dependent, over time, the trend line shows that the averaged flows since 2013 have been relatively constant.



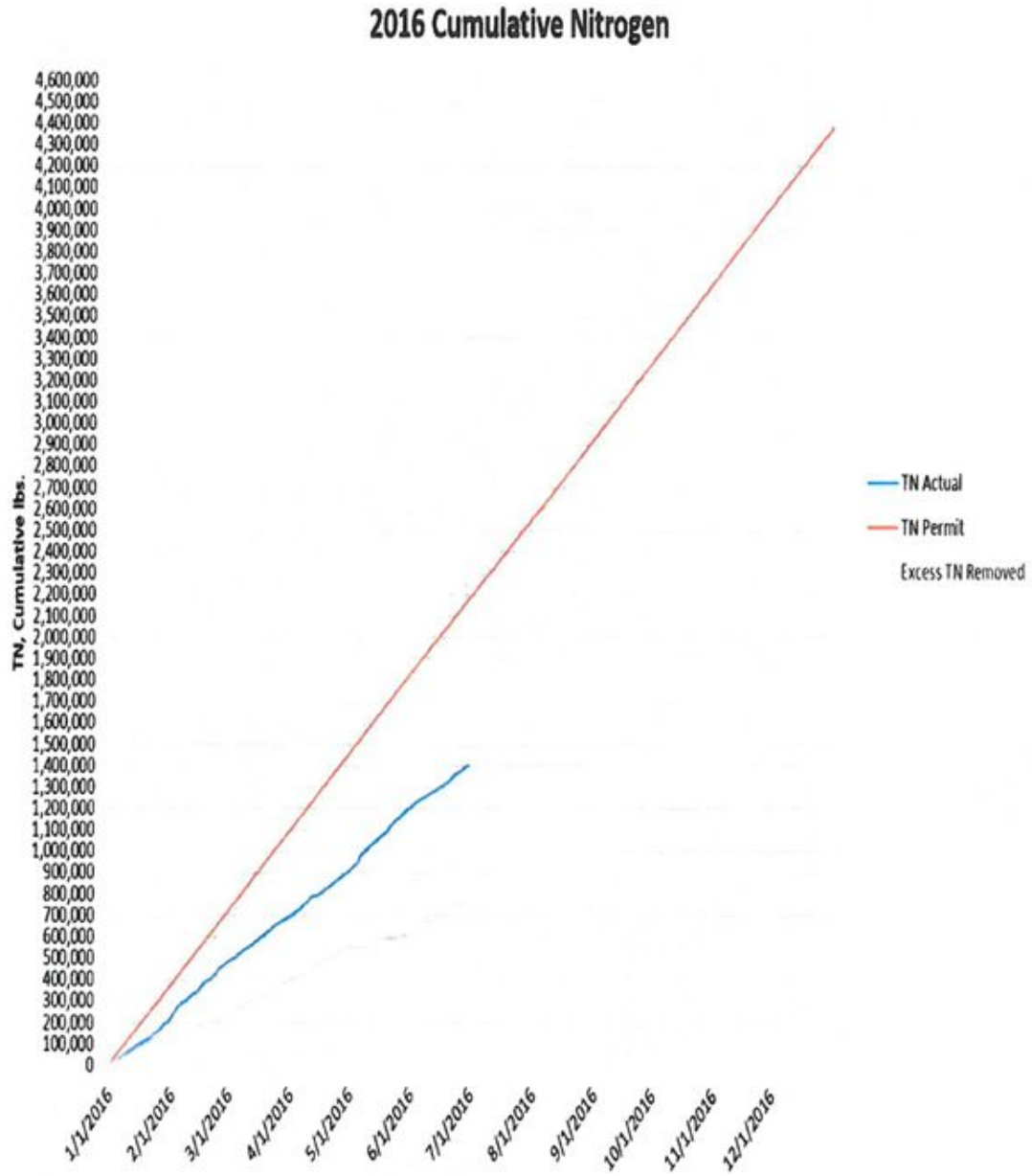
BIOLOGICAL NUTRIENT REMOVAL PERFORMANCE

During the month, the full-scale BNR process produced an effluent with average total nitrogen concentration of 2.90 mg/l. The figure below shows Blue Plains effluent total nitrogen (TN) since the implementation of full scale BNR.

Annual Total Nitrogen Load, lbs/yr

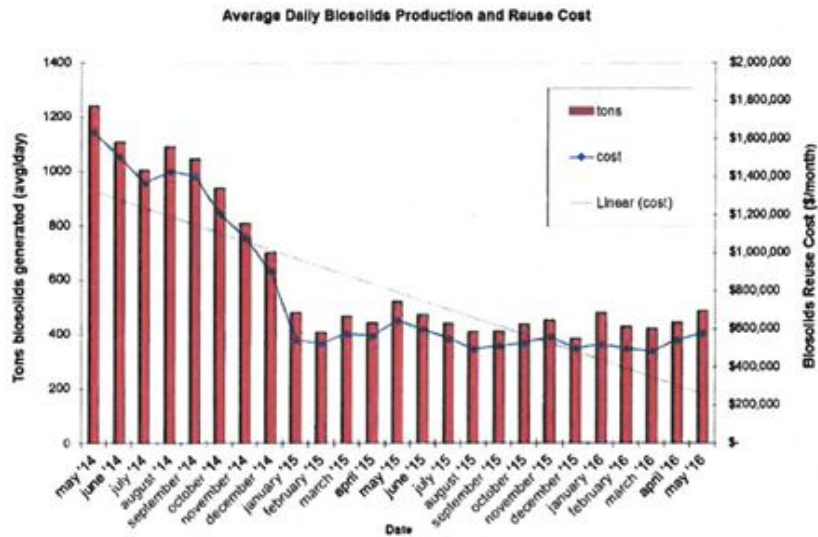
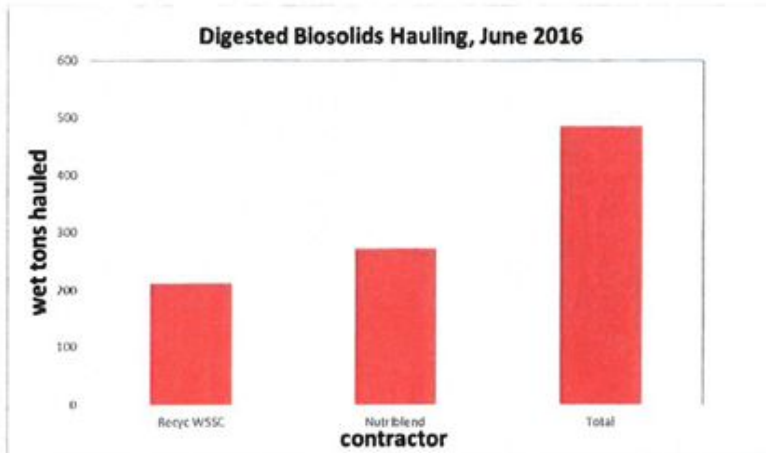


TN Removal at Blue Plains is on target to meet limits for 2016 as seen in the graph below.



BLUE PLAINS RESOURCE RECOVERY REPORT – JUNE 2016

In June, biosolids hauling averaged 486 wet tons per day (wtpd). The graph below shows the total hauling by contractor for the month of June. The average percent solids for the digested material was 30.9%. At the end of June the Cumberland County storage pad had approximately 8000 tons (~25,000 tons capacity), Cedarville lagoon had approximately zero tons of Blue Plains biosolids (~30,000 tons capacity), Goochland pad had zero tons, and Fauquier lagoon had 2700 tons (~15,000 tons capacity).

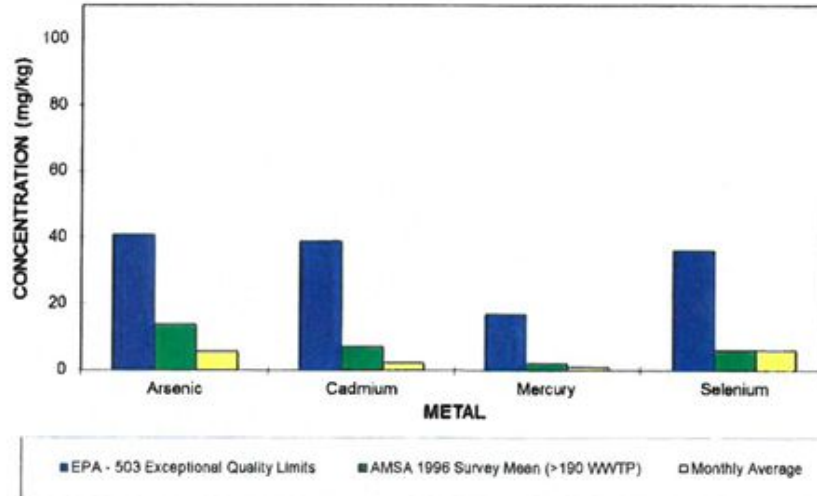


In June, diesel prices averaged \$2.53/gallon and with the contractual fuel surcharge the weighted average biosolids reuse cost was \$39.71/wet ton.

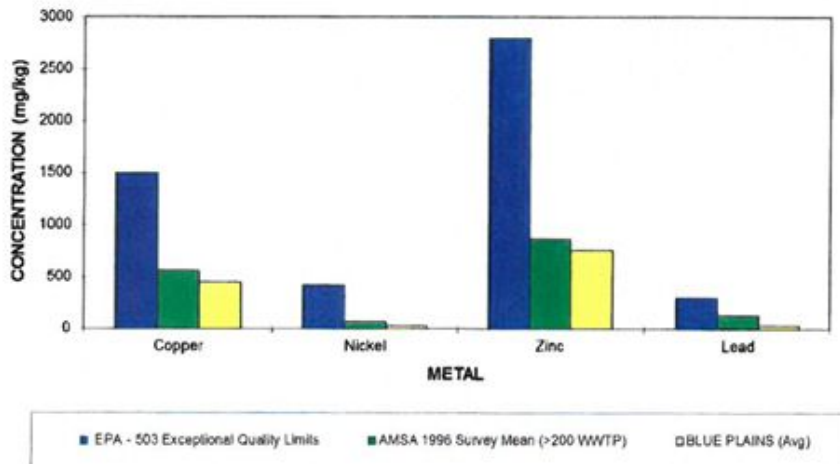
Product Quality

The graph below show the EPA regulated heavy metals in the Blue Plains biosolids for the month of May 2016. As can be seen in the graphs, the Blue Plains levels are considerably below the regulated exceptional quality limits and the national average.

**BLUE PLAINS BIOSOLIDS METALS COMPARISON
MAY 2016**



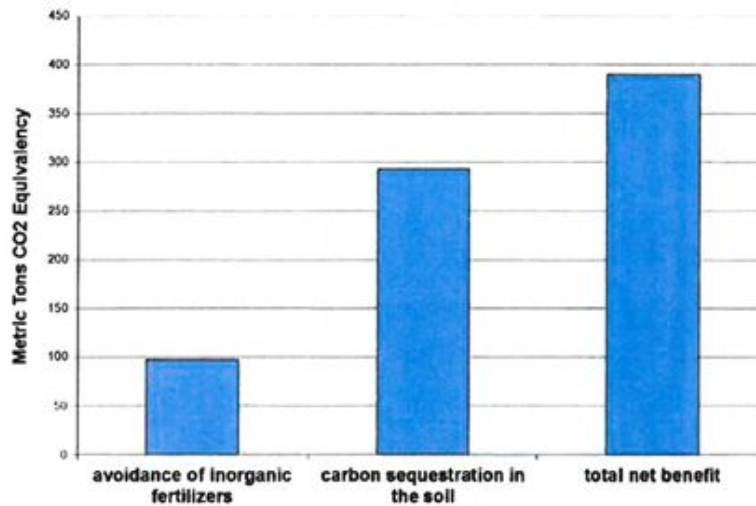
**BLUE PLAINS BIOSOLIDS METALS COMPARISON
MAY 2016**



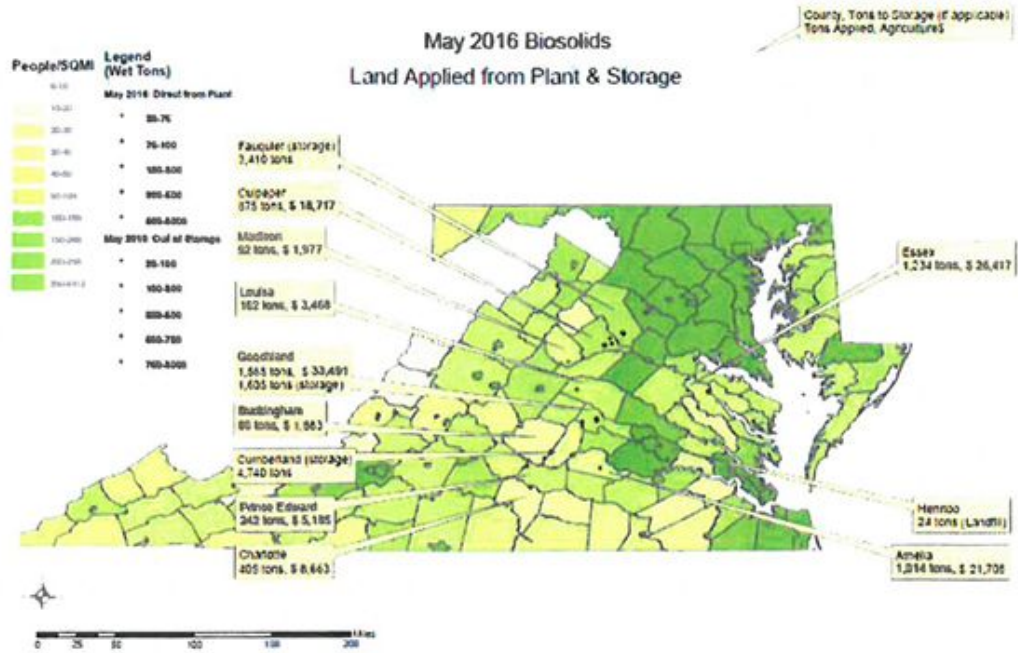
Environmental Benefits

The quantity land applied in May coming directly from the plant and from storage facilities equaled 5678 tons. Taking into account the fuel required to transport biosolids to the field, the net benefit of the land applied material is 390 metric tons CO₂ equivalent avoided emissions. This is equivalent to taking 794,589 car miles off the road in the month of May (assumes 20 mpg, 19.4 lb CO₂ equivalent emissions/gallon gas – EPA estimate). The cumulative total avoided carbon emission since, January 2006 is 146,389 metric tons CO₂ equivalent.

**DCWater Biosolids Recycling Program
Greenhouse Gas Balance Benefits
May 2016 Totals**

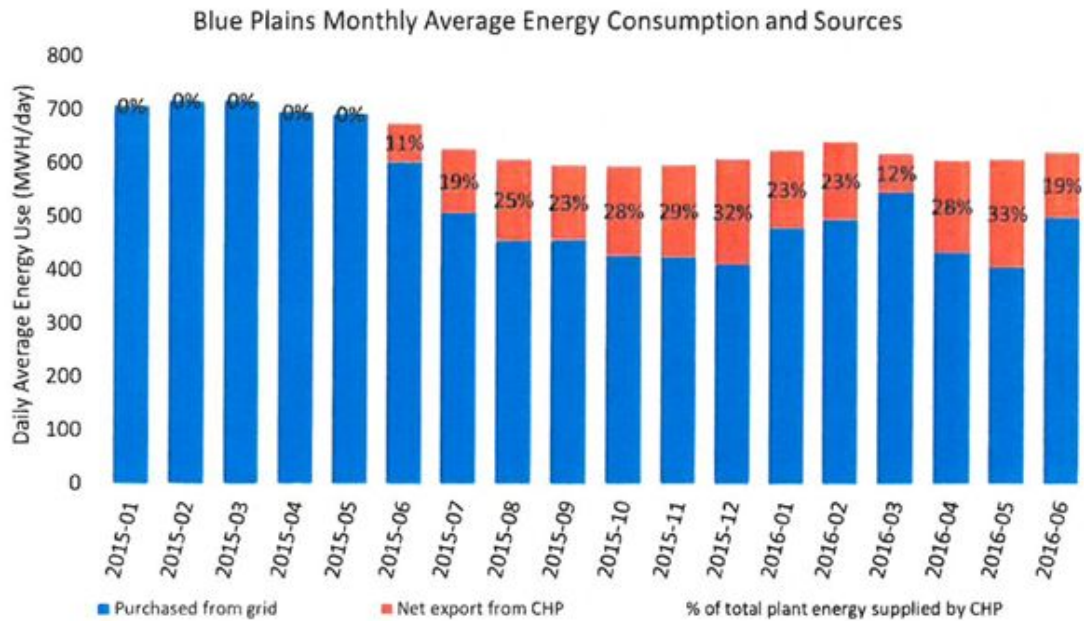


Biosolids Applications and Agricultural \$'s for May 2016



BLUE PLAINS ELECTRICITY GENERATION AND USAGE

The average energy consumed at Blue Plains was 620 MWH/day for the month of June, while the average energy purchased from PEPCO was 500MWH/day. 2.22 MWH of electricity was used per million gallon of wastewater that was fully treated. The CHP facility exported an average of 120 MWH/day, making up for 19% of total energy consumed at Blue Plains. The CHP production was lower this month because of performance testing.



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

CLEAN WATER QUALITY AND TECHNOLOGY

The Clean Water Quality and Technology department includes the research and development, pretreatment and laboratory programs. A summary of activities for each group is provided below.

Research and Development

Update on Research Focused on Application of Screens as a Selector Mechanism

The ability to "select" for more efficient properties and functions in our processes becomes a key requirement for success when seeking to intensify existing treatment processes. This selection process can be induced via physical means to achieve a selection pressure. For example, anammox bacteria grow in dense granules and hydrocyclones are applied in nitrogen removal processes involving anammox to separate these granules from the flocculant and fluffy bacteria growth conglomerate based on differential density selection pressure. This provides means of selectively retaining the anammox bacteria in the system.

The DC Water research team has developed and recently patented the use of a *screen* for the selective retention of anammox bacteria. This application was previously discussed in more detail in previous GM reports. Currently, full-scale demonstrations are being performed at Strass, Austria to understand the real potential of this approach for sidestream and mainstream deammonification processes. In addition, new application areas were conceptualized and a provisional patent application was submitted. Initial proof of concept for these applications has been obtained. The research objectives and a short update on the status of these applications are provided below:

1. Application 1: Anammox retention in sidestream filtrate treatment → Outcome: Increased Capacity.

A screen (with 50 µm openings) has been installed in the sidestream DEMON system at the Strass plant (Austria) to transform it from a batch system with hydrocyclones to continuous operation with screens for anammox retention (Figure 1). Converting from batch to continuous operation eliminates the need to use reactor volume for settling and decanting, allowing this time to be used for treatment of additional nitrogen. In addition, the screen showed a higher efficiency in anammox retention compared to the cyclones. This resulted in a net increase in nitrogen loading from 0.6 to 1.4 kg N/m³/d in one month while maintaining the same high levels of nitrogen removal (Figure 2).

Key outcomes from screen Application 1 (sidestream deammonification):

- *Improved efficiency of anammox retention through screen application increased capacity of the system by a net factor of 2.3.*

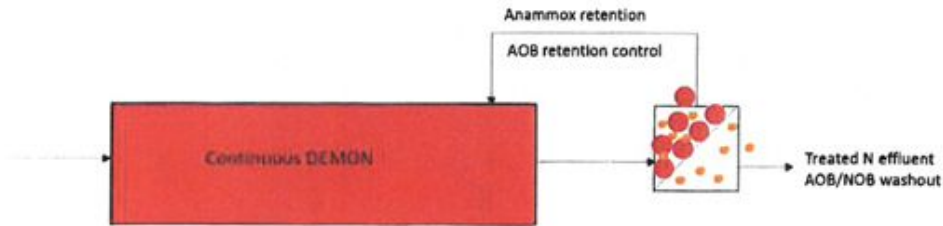


Figure 1: Schematic of Continuous DEMON using a Screen for Anammox Retention.

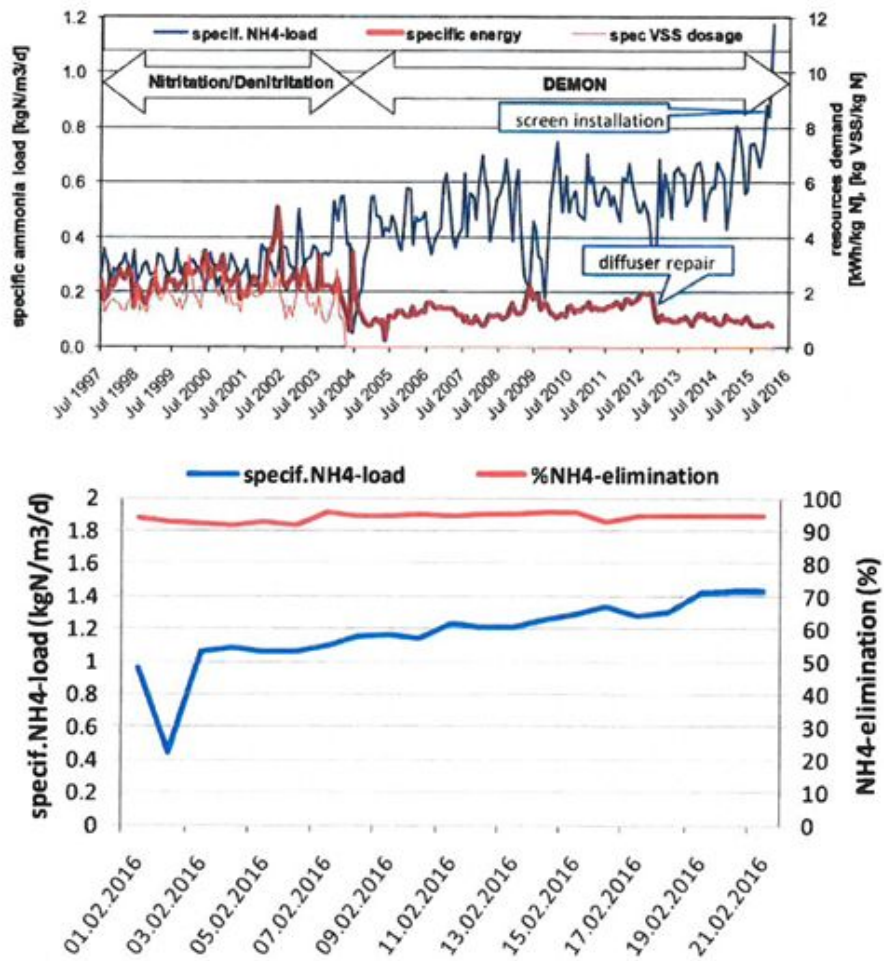


Figure 2: Increase in nitrogen loading obtained in the DEMON system at Strass after replacing the cyclones by a screen (50 um) while low energy demand was maintained (top). Detail of increased nitrogen loading after screen implementation (bottom).

Due to increased capacity of the sidestream DEMON in Strass (Austria) and higher retention of anammox granules, more anammox seed is now available to bio-augment the mainstream system to enhance nitrogen removal potential. The mainstream treatment system has been operating with screens (212 μm openings) since April 2016. Full-scale performance of the screens in combination with AvN control are being assessed over the coming months.

2. Application 2: Anammox retention in mainstream nitrogen removal → Outcome: Methanol savings

Research at Blue Plains focused on using a screen to physically separate NOB from anammox as a means of out-selecting nitrite oxidizing bacteria (NOB) in mainstream nitrogen removal processes. This separation relied on the principle that the NOB prefer to grow in flocs, while anammox bacteria (AnAOB) reside in granule (refer to Figure 3, top). Two types of screens; vacuum and vibrating, were tested. The vibrating screen was preferred due to more moderate normal forces and additional tangential forces parallel to the screen surface, which resulted in a better balance between the retention efficiency of AnAOB granules (41% of the AnAOB activity) and washout efficiency of NOB (92% activity washout). Operation with the screen in this mode improved NOB out-selection and a total nitrogen removal efficiency of 70% in the mainstream deammonification process was achieved without methanol dosing. An effluent total nitrogen concentration <10 mg N/L was achieved using this novel approach combining biological selection with physical separation. This will be combined with final polishing step using denitrification and anammox bacteria to achieve lower effluent nitrogen concentrations and will open up the path towards more sustainable sewage treatment.

Key outcomes for screen "Application 2" in mainstream deammonification:

- *Washout of at least 80% NOB activity through the screens is needed to achieve NOB outselection and methanol savings.*
- *Larger screen sizes (> 100 μm) are needed in mainstream treatment versus sidestream treatment to allow for floc-granule separation.*
- *When efficient separation is achieved, 70% total nitrogen removal can be achieved without any methanol dosing.*

3. Application 3: Selection for improved settleability → Outcome: Increased capacity for secondary treatment

The success of using screens as external selectors in sidestream and mainstream deammonification (Figure 3, top) led us to think about extending this concept to more general applications such as enhancing settleability in wastewater treatment systems. For example, the capacity of secondary treatment systems are typically limited by solids settleability characteristics and clarifier performance. Increased treatment capacity could be achieved by enhancing sludge settleability. In this case, the external selector would select the portion of sludge that has superior settling properties (i.e. flocculates fast, granules, etc.) and wash out poorly settling solids (Figure 3, bottom).

Initial results from applying screens to improve settling characteristics of biological sludge have shown that collision efficiency of flocs retained by the screen was higher than those that passed through it, which showed potential for selection (Table 1). The collision efficiency is expressed through the **Threshold Of Flocculation (TOF)**, which describes the minimum amount of sludge concentration needed (# collisions) to form flocs at settling velocity of 1.5 m/h. The lower the TOF, the more efficient the collisions and thus the better the flocculation properties. A long term experiment in the secondary treatment pilot is planned to assess the potential capacity increase through application of external selectors.

Key outcomes for screen "Application 3" in secondary treatment:

- *Screens can select for flocs with superior flocculation kinetics (efficient collisions), potentially allowing for capacity increase in flocculation limited systems such as secondary treatment.*

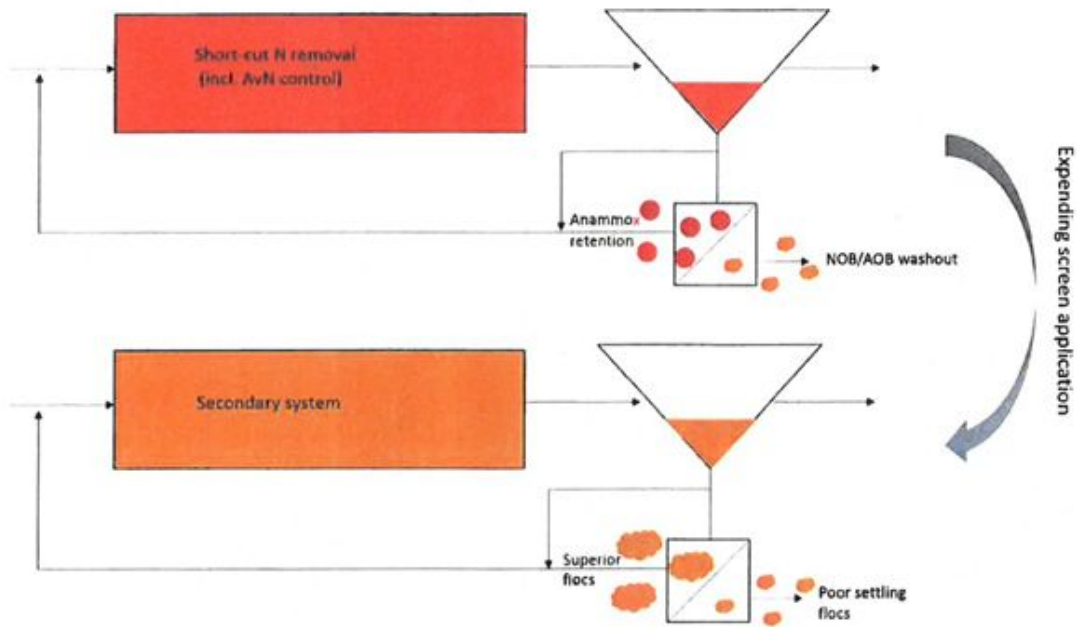


Figure 3: Extending the screen application from anammox retention for mainstream short cut nitrogen removal (top) to selection for superior flocs in secondary treatment system (superior settleability, bottom).

Table 1: Flocculation properties of secondary sludge from Blue plains in comparison with the selected fraction (retained) using a 125 um screen.

Sludge type	Initial Sample	Solids Retained on Screen (selected fraction)
Secondary @ Gt of 24,000	TOF = 1545 mg TSS/L	TOF = 520 mg TSS/L

4. Application 4: NOB out-selection by contacting screen filtrate with specific inhibitor for NOB → Outcome: Methanol savings

Filtrate generated from dewatering CAMBI-AD sludge has shown to inhibit nitrifiers (AOB and NOB) as well as anammox bacteria in our DEMON pilot. This was anticipated in the design of the full scale DEMON process at Blue Plains where the capability to dilute the filtrate was provided as a mitigation tool. Although we have operated the DEMON pilots at more favorable conditions for NOB (i.e. high DO), NOB bacteria were never observed in systems fed with CAMBI-AD filtrate. This led to the hypothesis that the organic compounds present in Blue Plains filtrate may inhibit NOB to a greater extent than AOB [For more details refer to previous GM reports]. Based on this hypothesis a fourth application of the screens, related to the mainstream deammonification (refer to application 2) was conceptualized.

In mainstream deammonification processes, NOB out-selection is the main challenge for achieving short-cut nitrogen removal and reduced methanol consumption. The higher the AOB/NOB ratio in the system, the better the performance and the higher the operational savings will be. To enhance this ratio, a contactor tank is proposed where solids that pass through the screen can be exposed to the filtrate coming from Cambi-AD process with the aim of inhibiting NOB to a higher degree than AOB (Figure 4). The role of the screen would be to retain and protect anammox bacteria by separating it from the AOB/NOB fraction and then selectively exposing the AOB/NOB fraction to the inhibitory filtrate material. Preliminary research is under way.

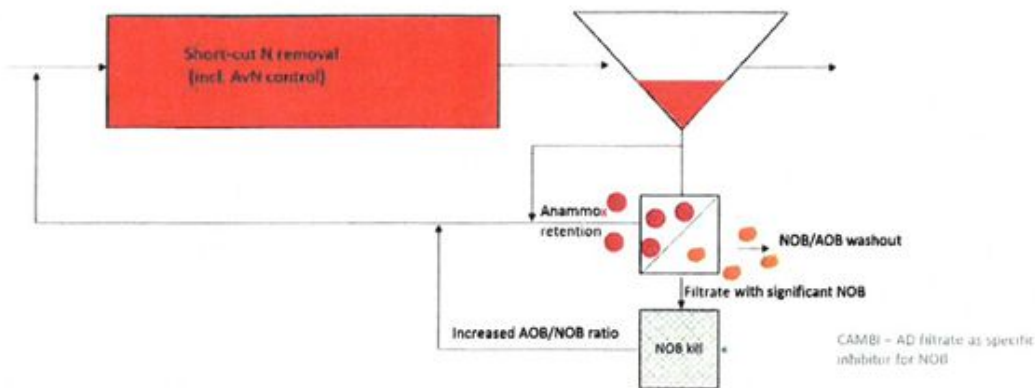


Figure 4: Mainstream deammonification Process with Selector Screen and Contactor Tank to Expose NOB to Dewatering Filtrate as a Means of Improving NOB Out-selection.

Blue Plains Main Laboratory

The Main Laboratory staff conducts analyses on Blue Plains AWTP effluent for NPDES Permit requirements, as well as on biosolids, pretreatment samples, storm water runoff, and process samples, on a daily basis, 365 days a year. The laboratory currently analyzes approximately 2,800 samples each month and conducts approximately 8,000 analyses, including Total Suspended Solids; Volatile Suspended Solids; Total and Volatile Solids; Ammonia Nitrogen; Nitrite and Nitrate Nitrogen; Total, Soluble, and Ortho Phosphorus; Total and Soluble Kjeldahl Nitrogen; Carbonaceous Biochemical Oxygen Demand; Chemical Oxygen Demand; Total Alkalinity and Hardness; and Fecal Coliform and E. Coli microbiological testing.

The laboratory also performs analysis of Belt Filter Press cake samples for fecal coliform bacteria for DCWater's Class A Biosolids reporting, as well as digester samples from the new Cambi Thermal Hydrolysis and Anaerobic Digestion facility, including Total and Volatile Solids, Total and Volatile Suspended Solids, Ammonia Nitrogen, and pH. Fecal coliform in the BFP dewatered cake and TS and VS upstream and downstream of the digestion process are monitored to show compliance with 40 CFR 503 Pathogen and Vector Attraction Reduction requirements. The laboratory also analyzes digester samples for carbonate and total alkalinity.

The Main Lab completed analysis of blind samples for the USEPA's DMR-QA Study 36 as required under the Clean Water Act (CWA) Section 308. This study took place from March 18, 2016 through July 1, 2016 and results will be submitted to the USEPA.

The laboratory also assists the Department of Sewer Services on a regular basis conducting microbiological analysis of water samples for E. Coli bacteria. Laboratory staff also participates in the WWOA Executive Board.

Blue Plains Pretreatment Program

The Blue Plains Pretreatment Program manages the Industrial Pretreatment Program, including temporary dewatering dischargers from construction and other activities, as well as the Hauled Waste Program. Additional responsibilities include providing specialized sampling and program management support for the Blue Plains NPDES permit and facilitating the Blue Plains Storm Water Committee meetings. Pretreatment staff participated in IT's third party portal work group for grease trap/food service establishments this month.

Industrial Pretreatment Program

DC Water currently manages fourteen (14) Significant Industrial User (SIU) permits and sixteen (16) Non-Significant Industrial User (NSIU) wastewater discharge permits. An annual inspection was conducted at one SIU facility, Amtrak, this month. No significant issues were identified. Compliance monitoring was conducted at three SIU facilities including Amtrak and two WMATA facilities (Brentwood and Shepherd Parkway). No violations were identified. DC Water received monthly self-compliance monitoring reports for six (6) SIUs and one NSIU. All SIUs and NSIUs are in compliance with discharge standards for the current month.

DC Water currently manages 88 Temporary Discharge Authorization (TDA) permits, primarily for construction site discharges of groundwater and/or surface runoff in the combined sewer area. Ten new TDA permits were issued this month. All TDA discharges are currently in compliance with pretreatment standards.

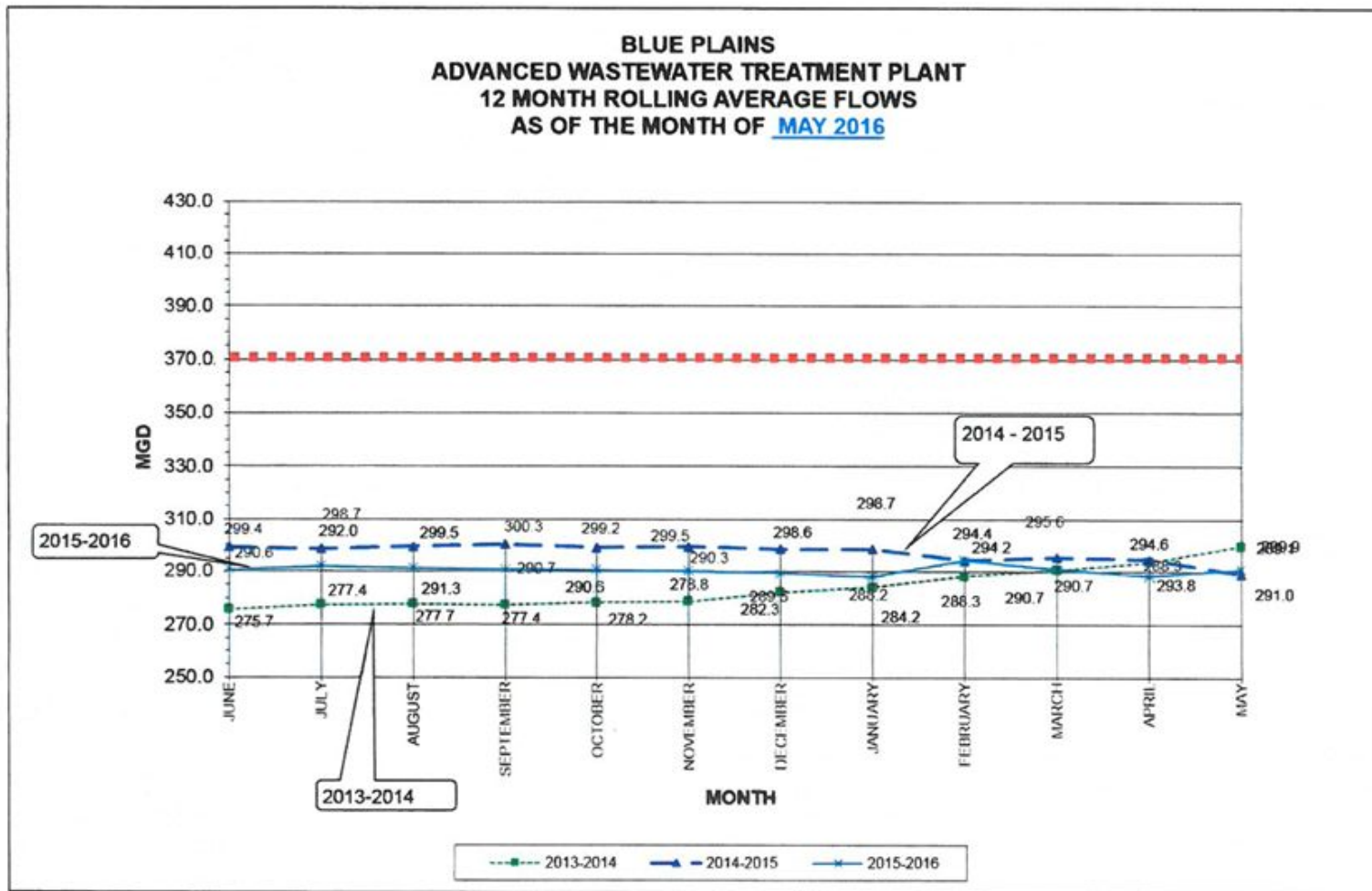
Hauled Waste Program

As of the end of the current month, the hauled waste program had 29 permitted haulers authorized to discharge domestic septage, portable toilet waste, grease trap waste, groundwater or surface runoff, and other types of waste, if approved in advance and have been characterized and meet pretreatment standards. Five new waste hauler permits were issued this month, in large part, due to the upcoming temporary closure of the Colvin Run disposal site managed by Fairfax County. One waste hauler permit was renewed this month and two have expired and have not been renewed yet. DC Water collected fees from eleven waste haulers this month, including those on a monthly payment plan option.

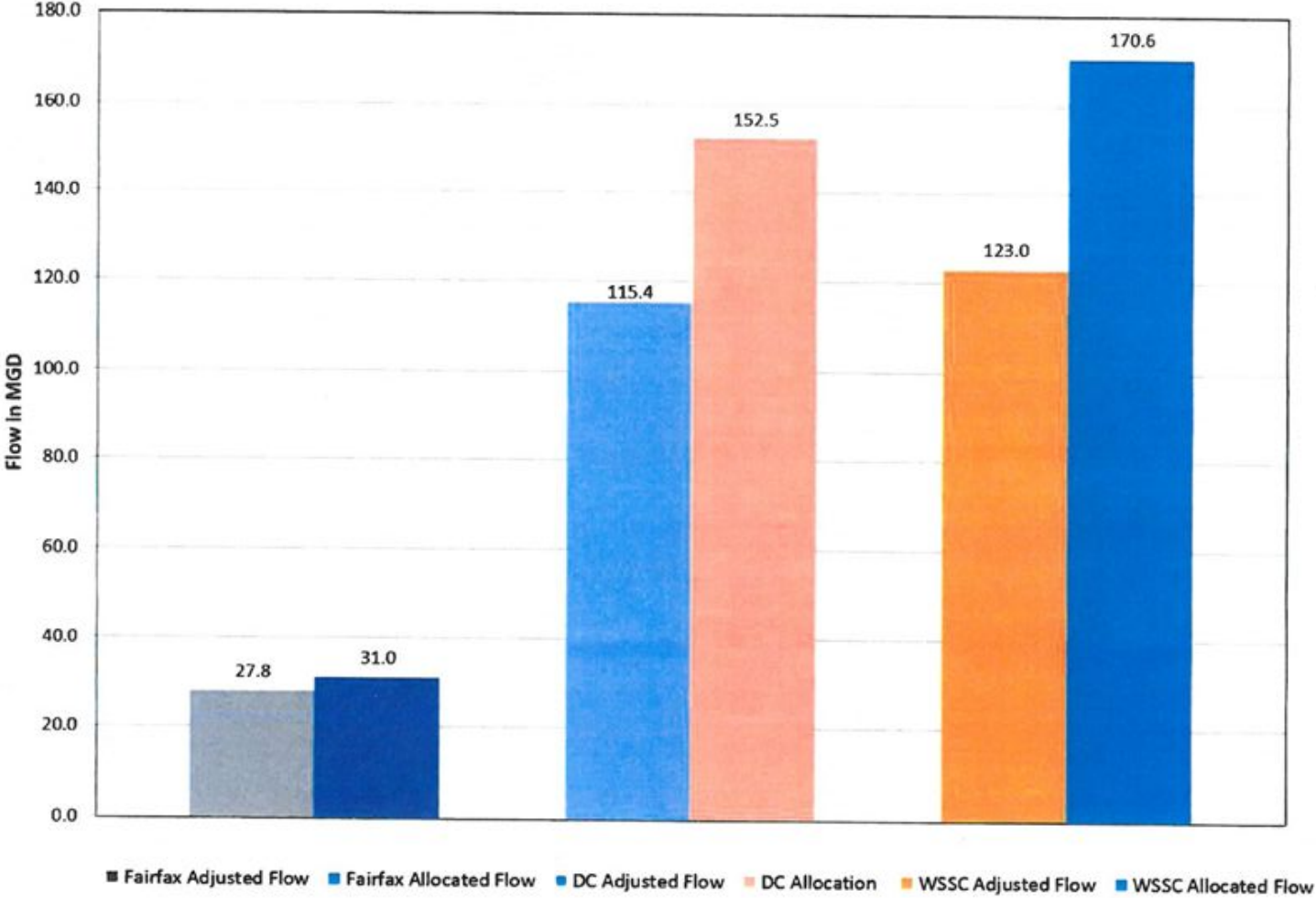
DC Water received 728 hauled waste loads (1,861,650 gallons) from permitted haulers this month. Manifest forms from each truck entering the plant are collected by the security guards and picked up daily by Pretreatment staff. Data is entered into an Excel spreadsheet to track the volume and type of loads being discharged daily and the results of sampling. Two hauled waste samples were collected this month, a grease trap load from Magnolia Plumbing, and a sewage load from JPG Plumbing. The sample collected from Magnolia Plumbing on May 3, 2016, was in violation of the pH limit at 4.90 (limit is 5.0 to 10.0). A Notice of Violation (NOV) was issued on May 17, 2016. The sample collected from JPG Plumbing on May 23, 2016, was in violation of the discharge standard for copper at 3.9 mg/L (limit is 2.3 mg/L) and zinc at 7.7 mg/L (limit is 3.4 mg/L). Furthermore, the source of this waste was from the City of Alexandria, which is not allowed, since it is not in the Blue Plains Service Area. A Notice of Violation (NOV) was issued on June 9, 2016, banning this source. No impact to the treatment plant was observed due to these exceedances.

NPDES Permit Sampling

Pretreatment staff collected the quarterly plant influent, effluent, and biosolids samples, including the annual priority pollutant analyses for the influent and biosolids. In addition, staff collected the bimonthly metals at outfall 002 for low-level mercury and dissolved metals. Staff also collected one wet weather 24-hour composite sample at outfall 002 and one grab sample at outfall 001 for low level PCB analysis using EPA Method 1668 this month.



Adjusted Flows vs Allocated Flows - MAY 2016





Presentation to the DC Water Board of Directors:

**Microgrid Proposal for Power Stability at the
Blue Plains Wastewater Treatment Plant**

July 21, 2016

**Bob Cross
Luke Robertson
Andy Rovnak
Kim Schubin**

7/14/2016



1

Overview

- Problem Statement – Power Reliability
- Blue Plains Wastewater Treatment Facility
- Power Instability and Impacts
- Microgrid Solution
- Disruption Cost and Financial Analysis
- Areas for Further Study
- Recommendations



7/14/2016



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Problem Statement – Power Reliability

- Power Loss is real and recurring
- When the power goes out, it costs money
- Can't quantify the costs



When the Power Goes Out.....



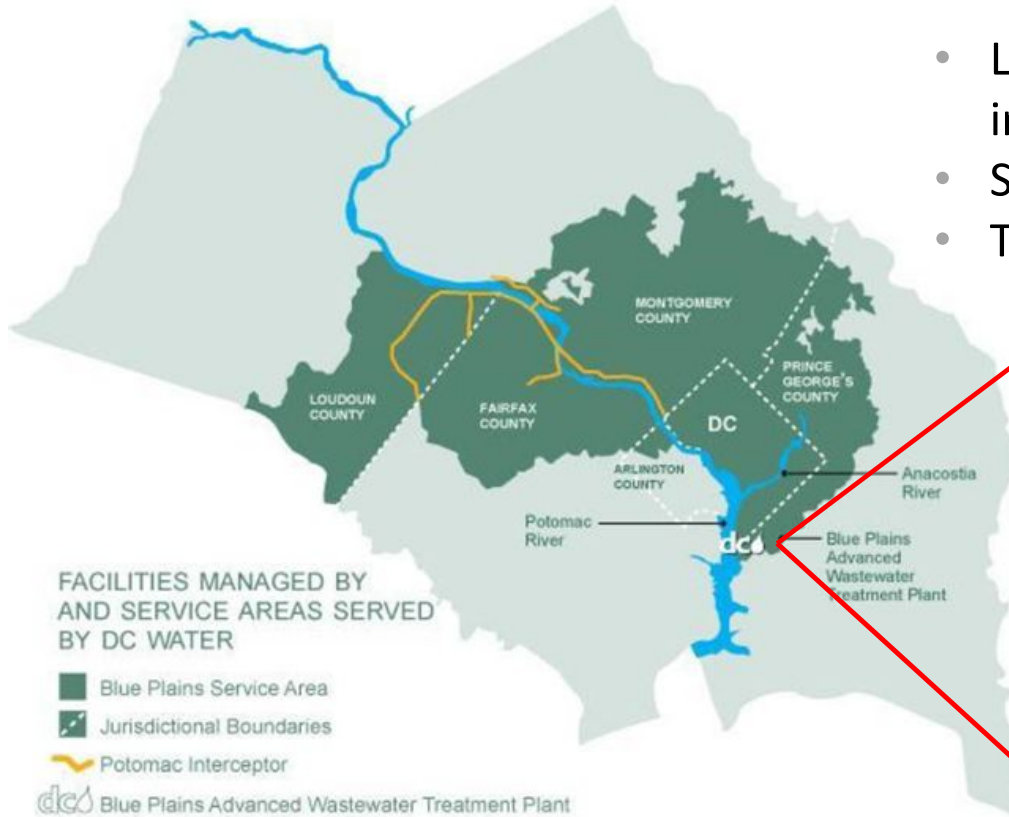
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Blue Plains Wastewater Treatment Facility

- Largest advanced wastewater treatment plant in the world
- Serves 2.1 million customers
- Treats on average 384M gallons per day



7/14/2016

Power is Critical



- Every process depends on power
- 30-40 MW per day
 - Equivalent to 10,000 homes
- Largest single point power consumer in DC



News

“Steep Cuts in Wastewater Pollution Leading Way in Chesapeake Bay Restoration”

- \$1 billion Blue Plains investment in wastewater treatment moves Chesapeake Bay restoration ahead of schedule

7/14/2016



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News

“Steep Cuts in Wastewater Pollution Leading Way in Chesapeake Bay Restoration”

- \$1 billion Blue Plains investment in wastewater treatment moves Chesapeake Bay restoration ahead of schedule

“DC Water Earns Second Credit Rating Upgrade from Moody’s Investors Service”

- Bond rating upgrade reduces debt service costs

7/14/2016



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News

“Steep Cuts in Wastewater Pollution Leading Way in Chesapeake Bay Restoration”

- \$1 billion Blue Plains investment in wastewater treatment moves Chesapeake Bay restoration ahead of schedule

“DC Water Earns Second Credit Rating Upgrade from Moody’s Investors Service”

- Bond rating upgrade reduces debt service costs

“DC Water wins U.S. Water Prize, honored for innovative resource recovery facilities that turn wastewater into electricity”

- 2016 U.S. Water Prize goes to Blue Plains Bioenergy Facility

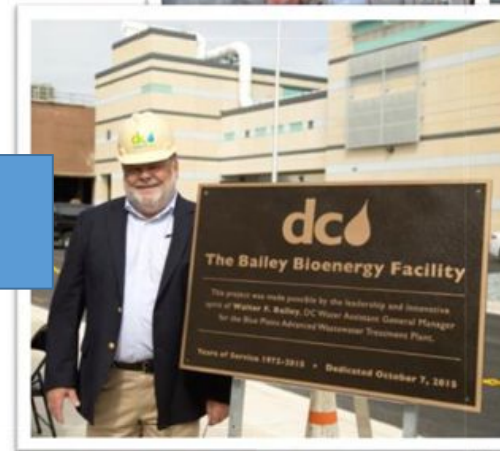
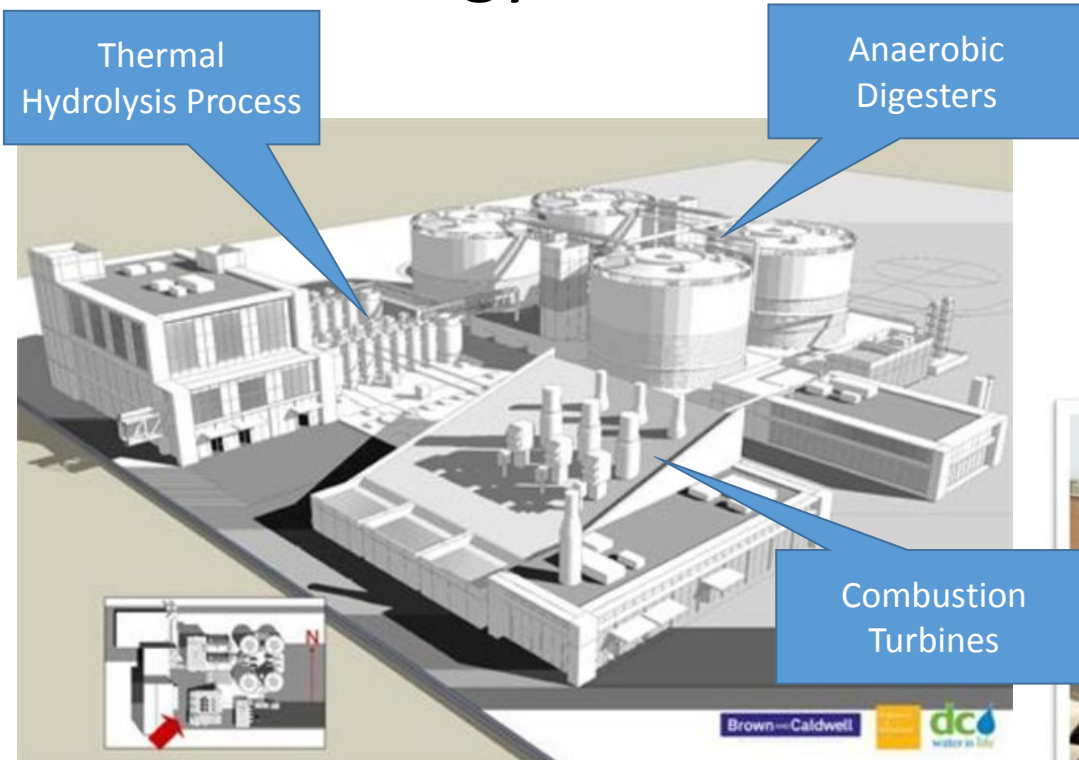
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Bio-energy Power Generation



7/14/2016



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When the Power Goes Out

The Washington Post

NEWS | LOCAL | POLITICS | SPORTS | OPINIONS | BUSINESS | ARTS & LIVING |

Power Outage Unleashes Raw Sewage

- Costs incurred to reconstitute chemical and biologic processes
- Fines for exceeding discharge permit limits
- Potential Bond rating downgrade
- Environmental and Economic externalities

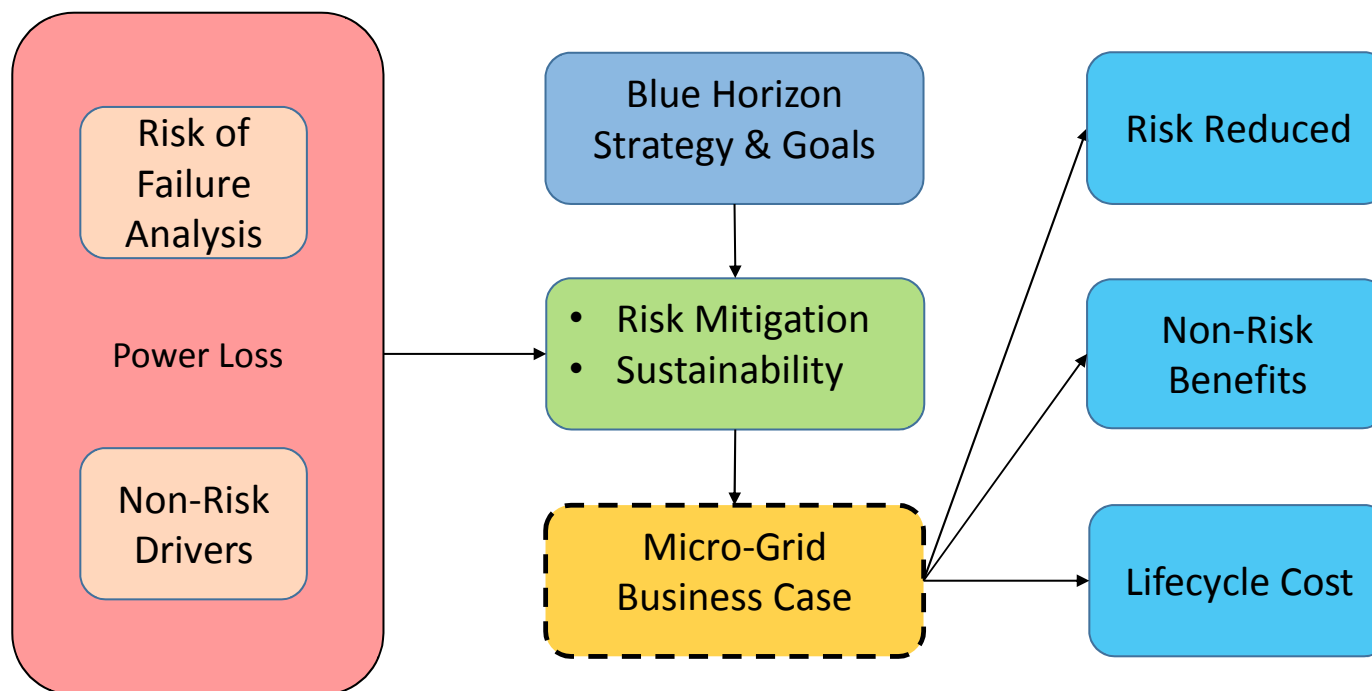
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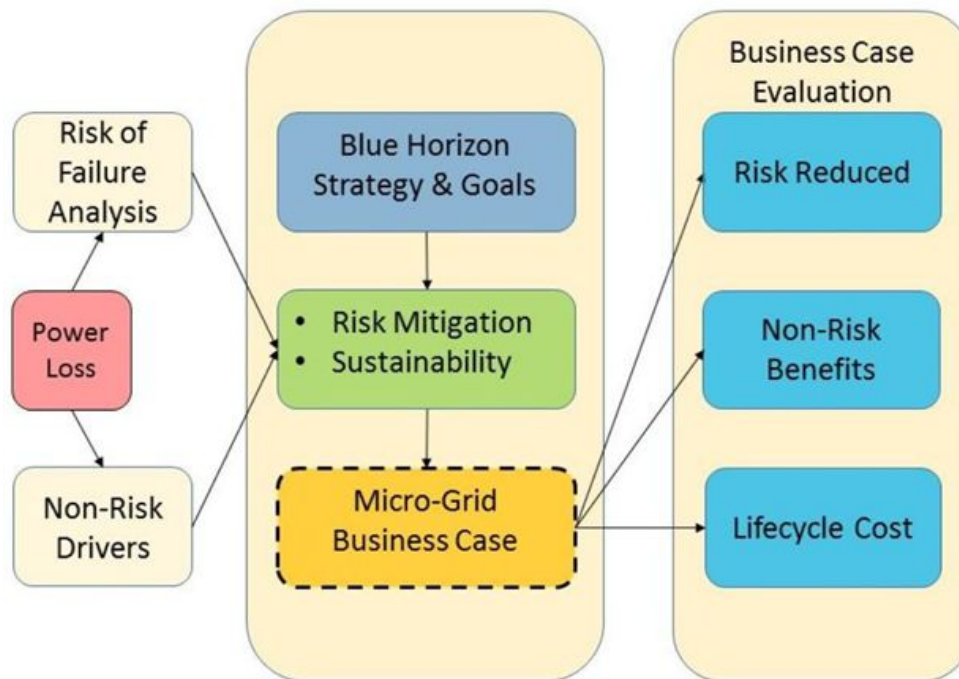
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Our Approach



DC Water Capital Improvement

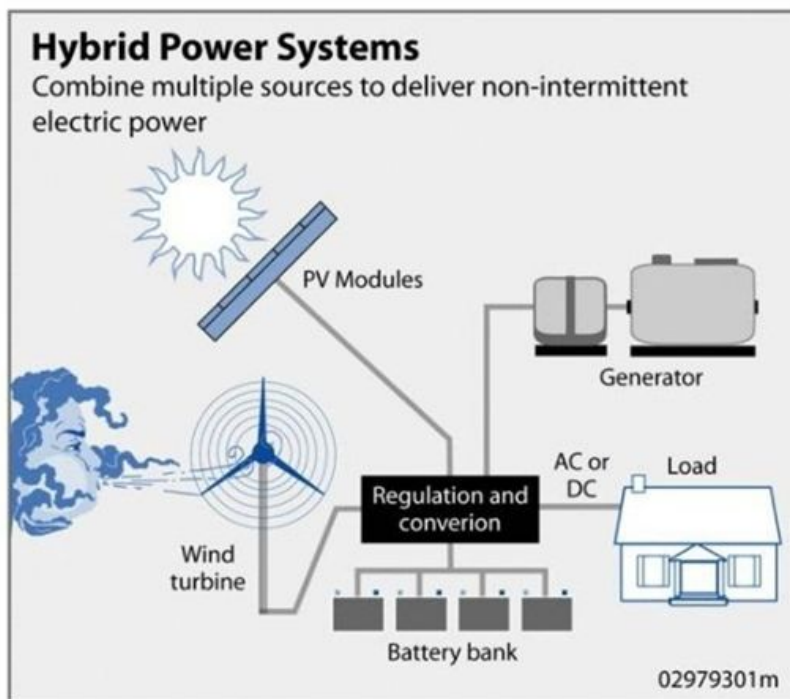
Asset Management Program



DC Water Funding Priorities

- 1 - Regulatory/Consent Decrees
- 2 - Health and Safety Concerns
- 4 - Potential failure/ ability to continue meeting permit requirements
- 6 - Good engineering, high pay back, mission/function.

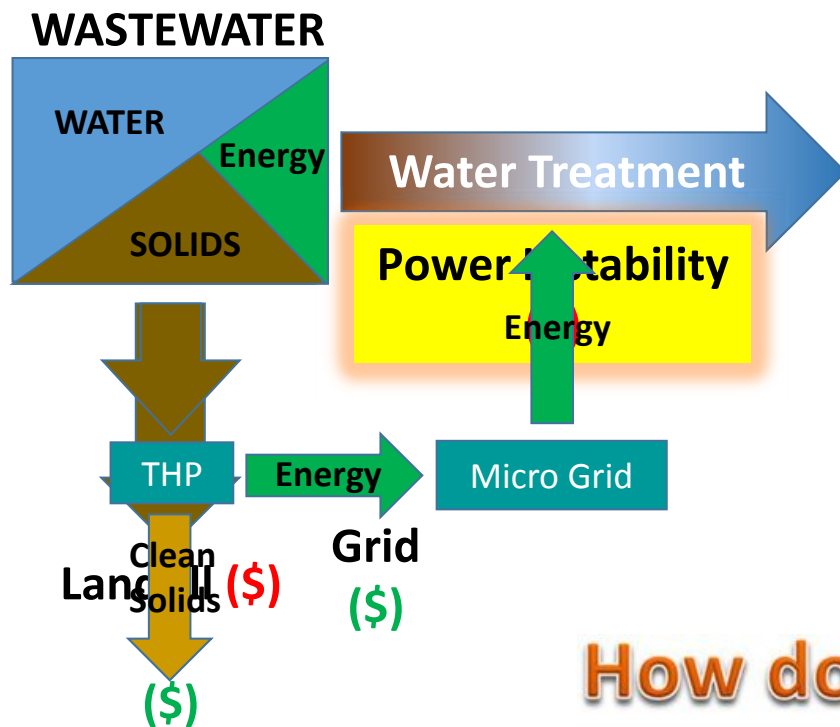
What is a Microgrid?



<http://energy.gov/energysaver/hybrid-wind-and-solar-electric-systems>

- Balances power loads and distributed generation sources
- Enables Blue Plains to connect and manage their own hybrid power system
- Provides resiliency from main power grid failures

Microgrid Solution



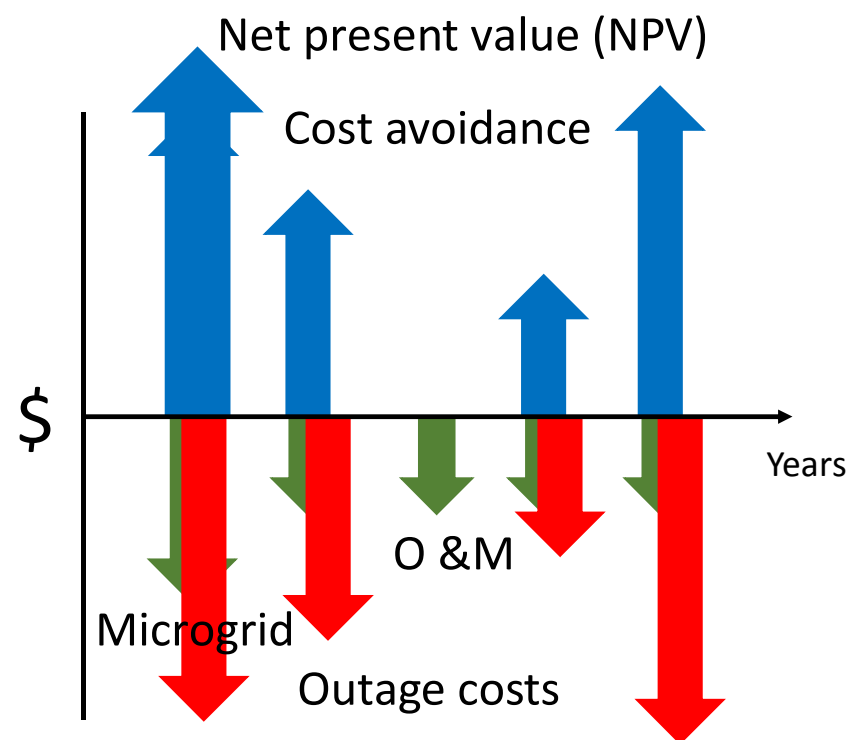
- THP improves process and sustainability
- Power instability remains an issue
- Microgrid solution provides:
 - Cost avoidance
 - Access to future on-plant power
 - Improved sustainability
 - Increased investor confidence

How do we quantify the benefit?

Financial Analysis of Microgrid Solution

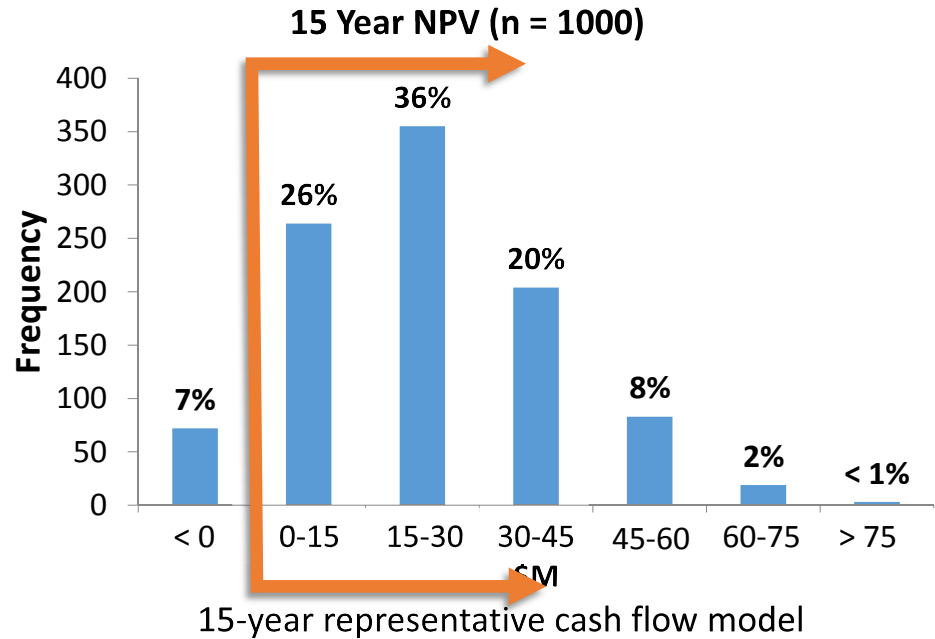
Initial Investment	\$2,757,000
Annual O&M	\$ 288,000

- Cost and number of outages is uncertain
- Ranges of uncertainty:
 - 20% yearly chance of outage
 - \$5M - \$25M per outage
 - 6.5% cost of capital ($\pm 2\%$)



Financial Analysis of Microgrid Solution

- Probabilistic financial model
- NPVs reported for 15, 20 and 30 years
- Histogram represents number of outcomes within a given NPV range
- The bottom line:



NPV Term (Years)	Average NPV (\$M)	Standard Deviation (\$M)
15	\$ 22.2	\$ 16.9
20	\$ 26.6	\$ 18.0
30	\$ 32.3	\$ 18.6

93% of outcomes result in positive NPV

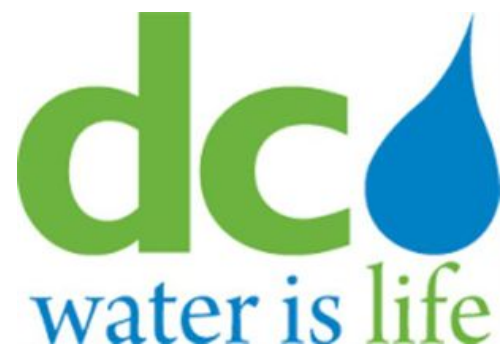
Areas for Further Study

- Site specific cost and engineering analysis required
- Validation and refinement of assumptions and findings
- Develop a long term strategy for power resiliency
 - Mapping of current power needs
 - Determine contingency power needs
 - Options for additional power generation

Recommendations

- A Microgrid solution makes sense
- Advance this solution to the Asset Management Board
 - A Microgrid internalizes the risk of power failure
 - Strategic alignment of sustainability and resiliency
 - Our business case demonstrates a favorable return

Questions



7/14/2016



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**DISTRICT OF COLUMBIA WATER AND SEWER AUTHORITY
BOARD OF DIRECTORS CONTRACTOR FACT SHEET**

ACTION REQUESTED

**ENGINEERING SERVICES SUPPLEMENTAL AGREEMENT:
Enhanced Nitrogen Removal North & Filtrate Treatment Facilities
(Joint Use)**

Approval to execute Supplemental Agreement No.6 for \$765,000. The modification exceeds the General Manager's approval authority.

CONTRACTOR/SUB/VENDOR INFORMATION

PRIME:	SUBS:	PARTICIPATION:
Black & Veatch Corporation 18310 Montgomery Village Avenue Suite 500 Gaithersburg, MD 20879	McKissack & McKissack Washington, DC	WBE 30.9%
	HDR, Inc. Alexandria, VA	1.8%
	Milhouse Eng. & Const. Inc. Washington, DC	MBE 2.0%
	Diversified Engineering, Inc. Silver Spring, MD	MBE 3.3%
	Mercado Consultants, Inc. Ashton, MD	MBE 1.6%

DESCRIPTION AND PURPOSE

Original Contract Value:	\$ 2,319,000
Value of this Supplemental Agreement:	\$ 765,000
Cumulative SA Value, including this SA:	\$ 21,394,596
Current Contract Value, Including this SA:	\$ 23,713,596
Original Contract Time:	365 Days (1 Year, 0 Months)
Time extension, this SA:	0 Days
Total SA contract time extension:	2,641 Days (7 Years, 3 Months)
Contract Start Date:	08-11-2009
Contract Completion Date:	11-03-2017

Purpose of the Contract:

To provide Basis of Design Report, design services, bid phase services and engineering services during construction for the upgrade of Secondary Treatment Facilities for Enhanced Nitrogen Removal North (ENR-North) and for Filtrate Treatment Facilities (FTF) necessary for nitrogen removal.

Original Contract Scope:

- Concept planning and preliminary design of upgrades to the Secondary Treatment Facilities ("ENR-North")

Previous Supplemental Agreement Scope:

- Provide additional (continued) Construction Phase Services for ENR-North and FTF.

Current Supplemental Agreement Scope:

- Provide additional Construction Phase Services for ENR-North and FTF as a result of the following:
 - Addition of out of scope items including: Secondary effluent pump station slide gate condition assessment, filtrate blower room roof evaluation, new access road design, Process Control System workshop attendance and subgrade soil & foundation evaluation.
 - Complications arising from the repair, commissioning & startup of the secondary blowers.
 - Extended construction duration

Future Supplemental Agreement Scope:

- Future Supplemental Agreements are not anticipated at this time, but may be necessary due to unforeseen occurrences during the remaining construction.

PROCUREMENT INFORMATION

Contract Type:	Cost Plus Fixed Fee	Award Based On:	Highest Ranking Score
Commodity:	Engineering Design Services	Contract Number:	DCFA #423
Contractor Market:	Open Market		

BUDGET INFORMATION

Funding:	Capital	Department:	Engineering and Technical Services
Service Area:	Wastewater Treatment	Department Head:	Liliana Maldonado
Project:	BI, BG, EE		

ESTIMATED USER SHARE INFORMATION

User	Share %	Dollar Amount
District of Columbia	41.22%	\$ 315,333.00
Washington Suburban Sanitary Commission	45.84%	\$ 350,676.00
Fairfax County	8.38%	\$ 64,107.00
Loudoun County & Potomac Interceptor	4.56%	\$ 34,884.00
Total Estimated Dollar Amount	100.00%	\$ 765,000.00




 Gail Alexander-Reeves Date
 Director of Finance & Budget

 George S. Hawkins Date
 General Manager



 Dan Bae Date
 Director of Procurement



 Leonard R. Benson Date
 Chief Engineer

**DISTRICT OF COLUMBIA WATER AND SEWER AUTHORITY
BOARD OF DIRECTORS CONTRACTOR FACT SHEET**

ACTION REQUESTED

ENGINEERING SERVICES:

**Engineering Consultant for the Supervisory Control and Data Acquisition (SCADA) System
(Joint Use)**

Approval to execute an architectural and engineering services contract not to exceed \$2,500,000.

CONTRACTOR/SUB/VENDOR INFORMATION

PRIME:	SUBS:	PARTICIPATION:
CDM Smith 3201 Jermantown Road Suite 400 Fairfax, Virginia 22030	Sigma Associates Washington, DC MBE	28.0%
	JDos Internationalé Washington, DC WBE	4.0%

DESCRIPTION AND PURPOSE

Contract Value, Not-To-Exceed: \$2,500,000
 Contract Time: 1095 Days (3 Years, 0 Months)
 Anticipated Contract Start Date: 09-30-2016
 Anticipated Contract Completion Date: 09-30-2019

Other firms submitting proposals/qualification statements:

- Brown and Caldwell *
- EMA, Inc. *
- Hatch Mott MacDonald *
- MC Dean, Inc.

* Asterisk indicates short listed firms.

Purpose of the Contract:

Provide professional engineering and related services pertaining to the expansion and upgrades of the existing Water and Sewer SCADA system.

Contract Scope:

- Services will include updating the Water and Sewer SCADA Master Plan, prioritizing recommendations, developing a migration plan and providing assistance in matters requiring engineering or technical expertise pertaining to existing, proposed, or newly constructed instrumentation and control systems.
- The work will be performed in two phases. Phase I includes preparation of updated Water and Sewer SCADA Master Plan, Design Guidelines and critical instrument and control related services. Phase II services will be performed on an as-needed basis through individually negotiated Task Orders based on recommendations from the updated Water and Sewer SCADA Master Plan Report.

PROCUREMENT INFORMATION

Contract Type:	Lump Sum and Cost Plus Fixed Fee	Award Based On:	Highest Ranking Score
Commodity:	Engineering Design Services	Contract Number:	DCFA #474
Contractor Market:	Open Market		

BUDGET INFORMATION

Funding:	Capital	Department:	Engineering and Technical Services
Service Area:	Water and Sanitary Sewer	Department Head:	Liliana Maldonado
Project:	MC, LT, GZ		

ESTIMATED USER SHARE INFORMATION

User	*Share %	Dollar Amount
District of Columbia	100.00%	\$2,500,000
Federal Funds	0.00%	\$
Washington Suburban Sanitary Commission	0.00%	\$
Fairfax County	0.00%	\$
Loudoun County & Potomac Interceptor	0.00%	\$
Total Estimated Dollar Amount	100.00%	\$2,500,000

* Under the terms of the IMA, the capital costs associated with each joint use facility are to be split among the users in proportion to the peak flow each user is allocated. It is not possible, at this time, to allocate costs by individual facility. It is anticipated that as projects are developed for work associated with specific facilities and costs are developed, the individual users will be notified and billed accordingly.

 7-13-16
 Gail Alexander-Reeves Date
 Director of Budget

 7/13/16
 Dan Bae Date
 Director of Procurement

 7-13-16
 Leonard R. Benson Date
 Chief Engineer

_____/_____
 George S. Hawkins Date
 General Manager

**DISTRICT OF COLUMBIA WATER AND SEWER AUTHORITY
BOARD OF DIRECTORS CONTRACTOR FACT SHEET**

ACTION REQUESTED

GOODS AND SERVICES CONTRACT OPTION YEAR

**Janitorial Services
(Joint Use)**

Approval to exercise option year two (2) for Janitorial Services contract in the amount of \$737,000.00.

CONTRACTOR/SUB/VENDOR INFORMATION

PRIME: M & N Contractors, LLC 77 Randolph Road Silver Spring, MD 20904 LSBE	SUBS: N/A	PARTICIPATION: N/A
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DESCRIPTION AND PURPOSE

Original Contract Value:	\$673,640.52
Original Contract Dates:	10-21-2014—10-20-2015
No. of Option Years in Contract:	4
Modification Value:	\$16,119.98
Modification Dates:	01-15-2015—10-20-2015
Option Year 1 Value:	\$714,445.56
Option Year 1 Dates:	10-21-2015—10-20-2016
Modification Value:	\$15,722.80
Modification Dates:	12-21-2015—10-20-2016
Option Year 2 Value:	\$737,000.00
Option Year 2 Dates:	10-21-2016—10-20-2017

Purpose of the Contract:

To provide the District of Columbia Water and Sewer Authority (DC Water) with janitorial services at DC Water office space and facilities.

Contract Scope:

The contract provides for full and complete janitorial services to include labor, equipment, consumables and supervision for Blue Plains, Bryant Street, Fort Reno and 125 "O" Street.

Spending Previous Year:

Cumulative Contract Value:	10-21-2014 to 10-20-2016	\$1,419,928.86
Cumulative Contract Spending:	10-21-2014 to 06-30-2016	\$1,155,032.63

Contractor's Past Performance:

According to the COTR, the Contractor's quality of workmanship; timeliness of deliverables; conformance to DC Water's policies, procedures and contract terms; and invoicing all meet expectations.

PROCUREMENT INFORMATION

Contract Type:	Fixed Price	Award Based On:	Highest Rated Offeror
Commodity:	Services	Contract Number:	14-PR-DFS-08
Contractor Market:	Open Market with Preference Points for LBE and LSBE Participation		

BUDGET INFORMATION

Funding:	Operating	Department:	Facilities
Project Area:	DC Water Wide	Department Head:	Johnnie Walker

ESTIMATED USER SHARE INFORMATION

User - Operating	Share %	Dollar Amount
District of Columbia	82.36%	\$606,993.20
Washington Suburban Sanitary Commission	12.98%	\$95,662.60
Fairfax County	3.21%	\$23,657.70
Loudoun Water	1.25%	\$9,212.50
Other (PI)	0.20%	\$1,474.00
TOTAL ESTIMATED DOLLAR AMOUNT	100.00%	\$737,000.00


 Gail Alexander-Reeves Date
 Director of Budget


 Dan Bae Date
 Director of Procurement

 7.15.16 STEVE CAIDWELL CORR. INCE
 Rosalind R. Inge Date
 Assistant General Manager,
 Support Services

 George S. Hawkins Date
 General Manager

**DISTRICT OF COLUMBIA WATER AND SEWER AUTHORITY
BOARD OF DIRECTORS CONTRACTOR FACT SHEET**

ACTION REQUESTED

**CONSTRUCTION CONTRACT:
Oregon Avenue NW Sewer Rehabilitation
(Non-Joint Use)**

Approval to execute a construction contract for \$ 16,824,115.00.

CONTRACTOR/SUB/VENDOR INFORMATION

PRIME:	SUBS:	PARTICIPATION:
Bradshaw Construction Corp. 175 West Liberty Road Eldersburg, MD 21784	GE Frisco Co. Inc. Upper Marlboro, MD	MBE 13.0%
	Total Civil Construction Lanham, MD	MBE 9.2%
	Elite Hauling Group Gaithersburg, MD	MBE 4.2%
	Metro Paving Corp. Hyattsville, MD	MBE 1.8%
	Pioneer Contracting Co. Inc. Odenton, MD	MBE 0.9%
	Global Construction Washington, DC	MBE 0.9%
	Traffic Engineering Services Burtonsville, MD	MBE 0.8%
	Apro Enterprises Inc. Laurel, MD	MBE 0.7%
	Apex Petroleum Corp. Upper Marlboro, MD	MBE 0.7%
	Aultec Inc. Gaithersburg, MD	MBE 0.3%
	EBA Engineering Washington, DC	MBE 0.2%
	Seed and Site Solutions Germantown, MD	MBE 0.1%
	Utility Imaging Mount Airy, MD	MBE 0.04%
	A-Plus Contracting Charlotte, NC	WBE 5.6%
Empire Landscape Silver Spring, MD	WBE 0.4%	

DESCRIPTION AND PURPOSE

Contract Value, Not-To-Exceed:	\$ 16,824,115.00
Contract Time:	780 Day (2 Years, 2 Months)
Anticipated Contract Start Date:	10-20-2016
Anticipated Contract Completion Date:	12-09-2018
Bid Opening Date:	05-26-2016
Bids Received:	4
Other Bids Received	
Northeast Remsco Construction Corporation.	\$ 17,735,420.00
Midwest Mole, Inc.	\$ 18,319,480.00
Fort Myer Construction Corporation	\$ 22,992,040.00

Purpose of the Contract:

A sanitary sewer will be relocated under Oregon Avenue NW and Bingham Drive NW, in order to eliminate the necessary rehabilitation of the existing creek bed sanitary sewer in the environmentally sensitive and difficult to access Pinehurst Branch East in Rock Creek Park.

Contract Scope:

- Construction of approximately 4,400 LF of 24" diameter gravity sewers by open cut and trenchless methods.
- Construction of 17 new manholes and installation of Geo-polymer lining for existing and new sewer manholes.
- Abandonment of existing sewers in-place using flowable fill.

Federal Grant Status:

- Construction Contract is not eligible for Federal grant funding assistance.

PROCUREMENT INFORMATION

Contract Type:	Fixed Price	Award Based On:	Lowest responsive, responsible bidder
Commodity:	Construction	Contract Number:	150130
Contractor Market:	Open Market		

BUDGET INFORMATION

Funding:	Capital	Department:	Engineering and Technical Services
Service Area:	Sanitary	Department Head:	Liliana Maldonado
Project:	IL		

ESTIMATED USER SHARE INFORMATION

User	Share %	Dollar Amount
District of Columbia	100.00%	\$ 16,824,115.00
Federal Funds	0.00%	\$ 0.00
Washington Suburban Sanitary Commission	0.00%	\$ 0.00
Fairfax County	0.00%	\$ 0.00
Loudoun County & Potomac Interceptor	0.00%	\$ 0.00
Total Estimated Dollar Amount	100.00%	\$ 16,824,115.00

 7/13/16
 Gail Alexander-Reeves Date
 Director of Budget

 7/13/16
 Dan Bae Date
 Director of Procurement

 7-12-16
 Leonard R. Benson Date
 Chief Engineer

_____/_____
 George S. Hawkins Date
 General Manager