water is life

District of Columbia
Department of Environment
Chesapeake Bay Watershed Implementation Plan (WIP)
Public Stakeholder Meeting

Nutrient Reduction at Blue Plains AWT Facility

DC Water Chesapeake Bay Restoration Activities

An Update

June 23, 2011

DCWATER.COM

Blue Plains in the Chesapeake Bay

- DC is located in the Chesapeake Bay watershed
- Blue Plains is the single largest wastewater treatment facility
- Treats wastewater from DC, Montgomery County, Prince George's County, Loudon County & Dulles airport
- Dry weather capacity: 370 MGD; Wet weather capacity 1076 MGD

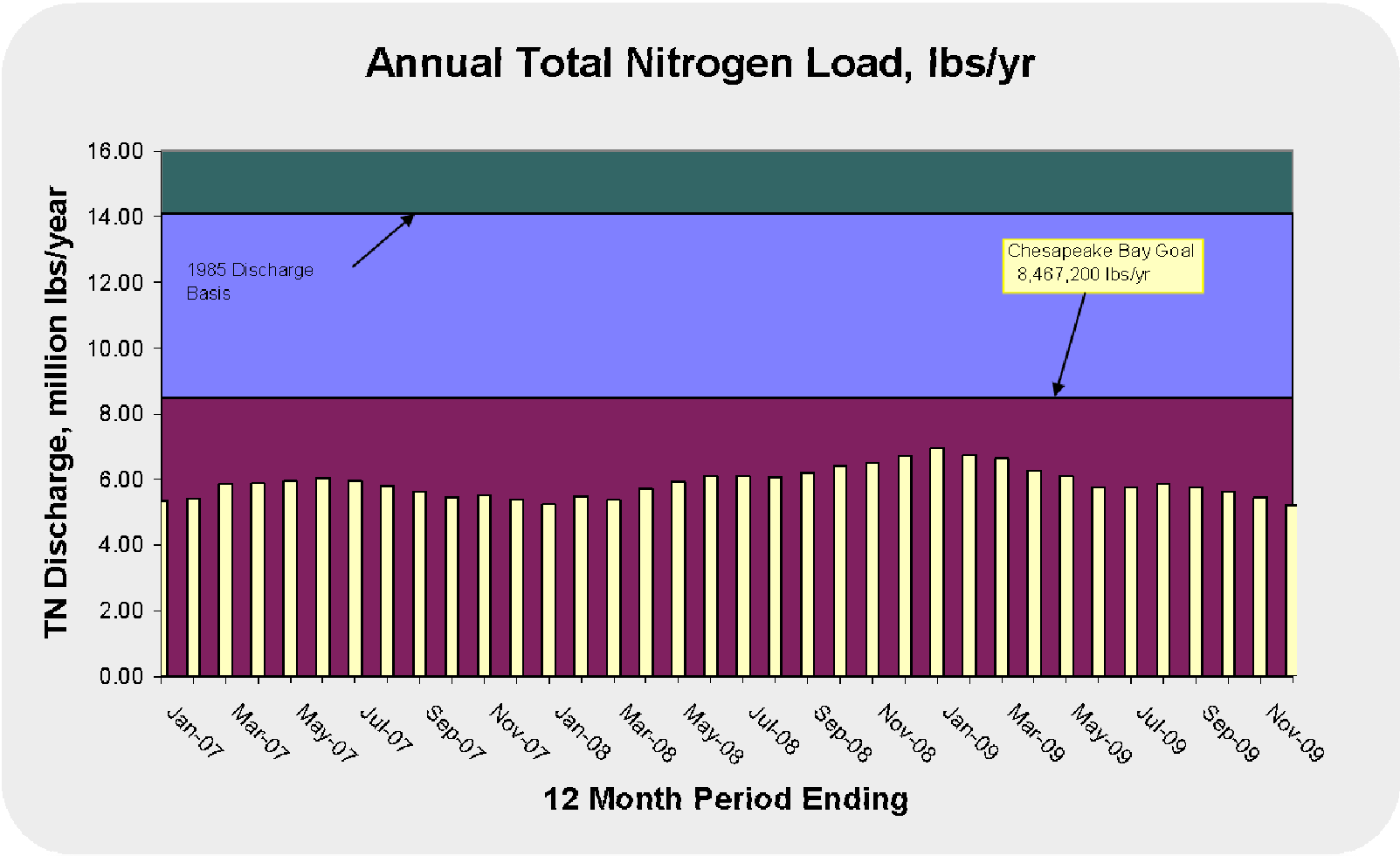
Nutrient Removal at Blue Plains

- In the 60s, algae bloom in the Potomac was frequent; depleted dissolved oxygen & caused fish-kill
- In the 80s, it was determined that phosphorous was the main problem
- Phosphorous removal implemented at Blue Plains in late 80s.
- Now phosphorous is removed to the limit of technology: effluent concentration of 0.18 mg/lit; it is regulated by the NPDES permit
- No significant algae bloom recently

Nutrient Removal at Blue Plains

- In 1985, Chesapeake Bay Program determined that nitrogen was causing Bay water quality degradation
- Recommended a voluntary reduction of nitrogen by 40%
- Blue Plains started with a pilot project and then expanded it to the rest of the facility
- Since 2007 the 40% reduction goal has been exceeded consistently

Nutrient Removal at Blue Plains



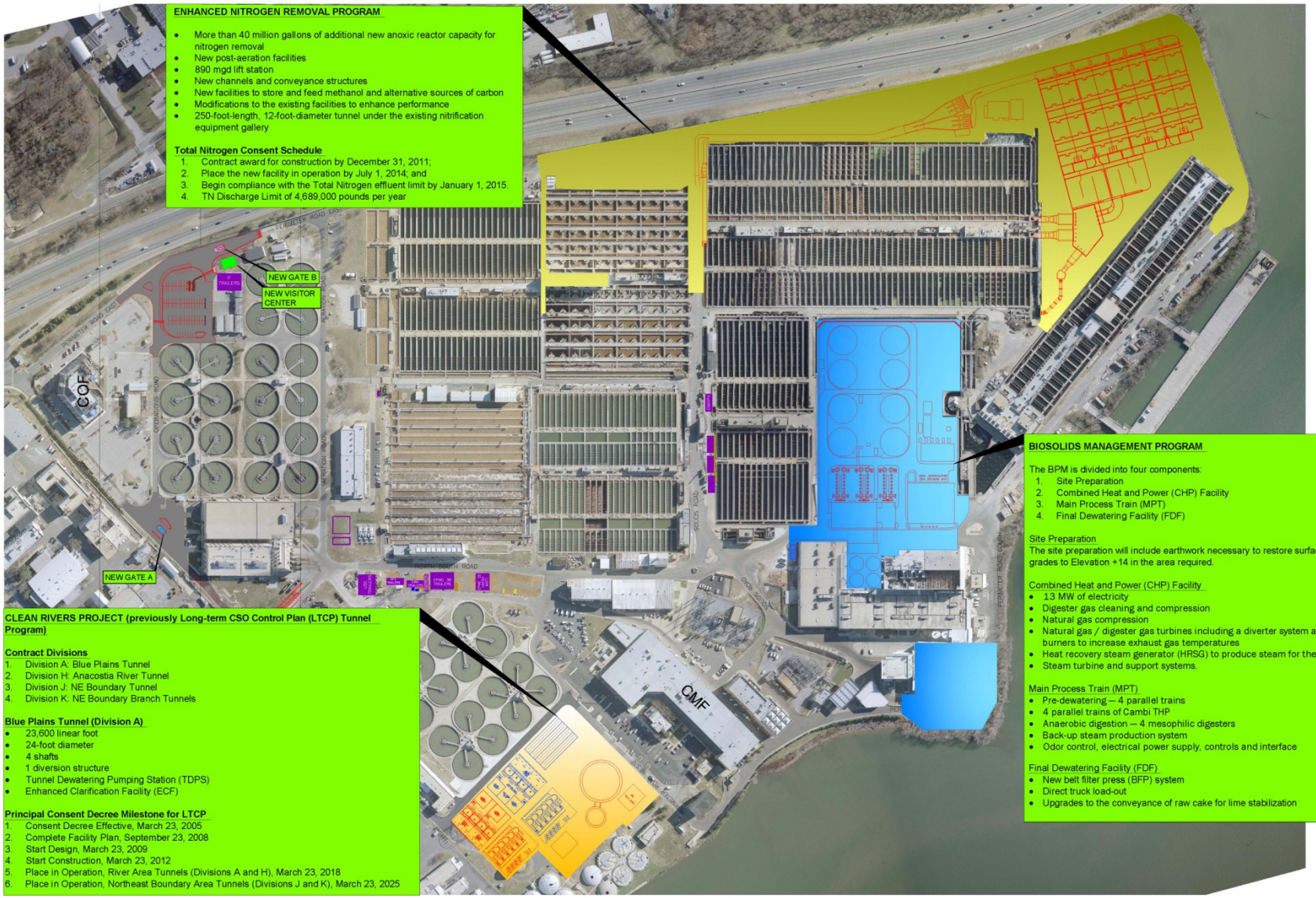
Nutrient Removal at Blue Plains

- Since 2007, DC Water has been planning for next phase of nitrogen removal
- DC DOE & CBP have established additional nitrogen load reduction requirement for Blue Plains
- Removal of additional 4.689 million lbs/year is planned (required by the NPDES permit, DC WIP, Bay TMDL)
- This would be achieved by implementing Enhanced Nitrogen Removal (ENR) technology
- Requires major upgrade of existing facilities as well as construction of new facilities
- Estimated cost: $950 million

Nutrient Removal at Blue Plains

- Nitrogen removal is a bio-chemical process: uses a naturally occurring bacteria; requires 'food'
- Will involve use of additional 30,000 gal of methanol/day (current use: 12,000 gal/day)
- Requires construction of an additional tunnel segment to accommodate wet weather flow to be generated by the combined sewer system (CSS) long term control plan (LTCP)
- Captured combined sewage will be treated for TN
- After completion of this project, there will be no vacant space for any additional treatment.

Blue Plains Footprint



ENHANCED NITROGEN REMOVAL PROGRAM

- More than 40 million gallons of additional new anoxic reactor capacity for nitrogen removal
- New post-aeration facilities
- 890 mgd lift station
- New channels and conveyance structures
- New facilities to store and feed methanol and alternative sources of carbon
- Modifications to the existing facilities to enhance performance
- 250-foot-length, 12-foot-diameter tunnel under the existing nitrification equipment gallery

Total Nitrogen Consent Schedule

1. Contract award for construction by December 31, 2011;
2. Place the new facility in operation by July 1, 2014; and
3. Begin compliance with the Total Nitrogen effluent limit by January 1, 2015.
4. TN Discharge Limit of 4,689,000 pounds per year

CLEAN RIVERS PROJECT (previously Long-term CSO Control Plan (LTCP) Tunnel Program)

Contract Divisions

1. Division A: Blue Plains Tunnel
2. Division H: Anacostia River Tunnel
3. Division J: NE Boundary Tunnel
4. Division K: NE Boundary Branch Tunnels

Blue Plains Tunnel (Division A)

- 23,600 linear foot
- 24-foot diameter
- 4 shafts
- 1 diversion structure
- Tunnel Dewatering Pumping Station (TDPS)
- Enhanced Clarification Facility (ECF)

Principal Consent Decree Milestone for LTCP

1. Consent Decree Effective, March 23, 2005
2. Complete Facility Plan, September 23, 2008
3. Start Design, March 23, 2009
4. Start Construction, March 23, 2012
5. Place in Operation, River Area Tunnels (Divisions A and H), March 23, 2018
6. Place in Operation, Northeast Boundary Area Tunnels (Divisions J and K), March 23, 2025

BIOSOLIDS MANAGEMENT PROGRAM

The BPM is divided into four components:

1. Site Preparation
2. Combined Heat and Power (CHP) Facility
3. Main Process Train (MPT)
4. Final Dewatering Facility (FDF)

Site Preparation

The site preparation will include earthwork necessary to restore surface grades to Elevation +14 in the area required.

Combined Heat and Power (CHP) Facility

- 13 MW of electricity
- Digester gas cleaning and compression
- Natural gas compression
- Natural gas / digester gas turbines including a diverter system and duct burners to increase exhaust gas temperatures
- Heat recovery steam generator (HRSG) to produce steam for the Cambi
- Steam turbine and support systems.

Main Process Train (MPT)

- Pre-dewatering – 4 parallel trains
- 4 parallel trains of Cambi THP
- Anaerobic digestion – 4 mesophilic digesters
- Back-up steam production system
- Odor control, electrical power supply, controls and interface

Final Dewatering Facility (FDF)

- New belt filter press (BFP) system
- Direct truck load-out
- Upgrades to the conveyance of raw cake for lime stabilization

ENR Project Schedule

The following four dates are written into the new NPDES permit

June 1, 2009

- **Award contract for detailed design**
- Actual: March 25, 2009;
- Status: Design complete;

Dec 31, 2011

- **Award contract for construction**
- Phase I Site Preparation contract awarded January 31, 2011
- Phase II MEP contract awarded April 4, 2011

July 14, 2014

- **Place facility in operation**

Jan 1, 2015

- **Begin annual compliance with new TN limits**