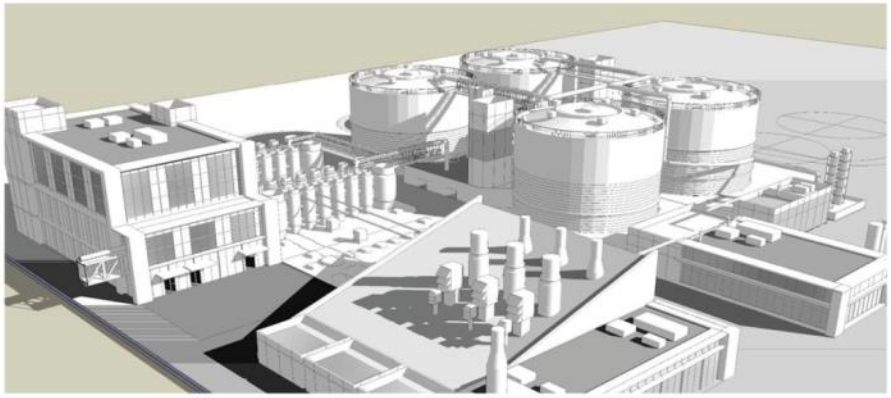
Resource Recovery

at DC Water

CWEA Plant O&M Committee

Chris Peot, P.E., BCEE
Director of Resource Recovery,
DC Water



dc water is life

DC Water Service Area

- Wastewater treatment for over 2.2 million population
- District of Columbia + portions of Maryland and Virginia
- CSO flows
- Excellent history of treatment performance

dc water is life

NUTRIENTS and CARBON RECYCLING

FARMING

Provides carbon and nutrients valued at $300.00 per acre.

SILVICULTURE

Increases yield and improves understory.

RECLAMATION

Restoring mines to their natural state and providing wildlife habitats.

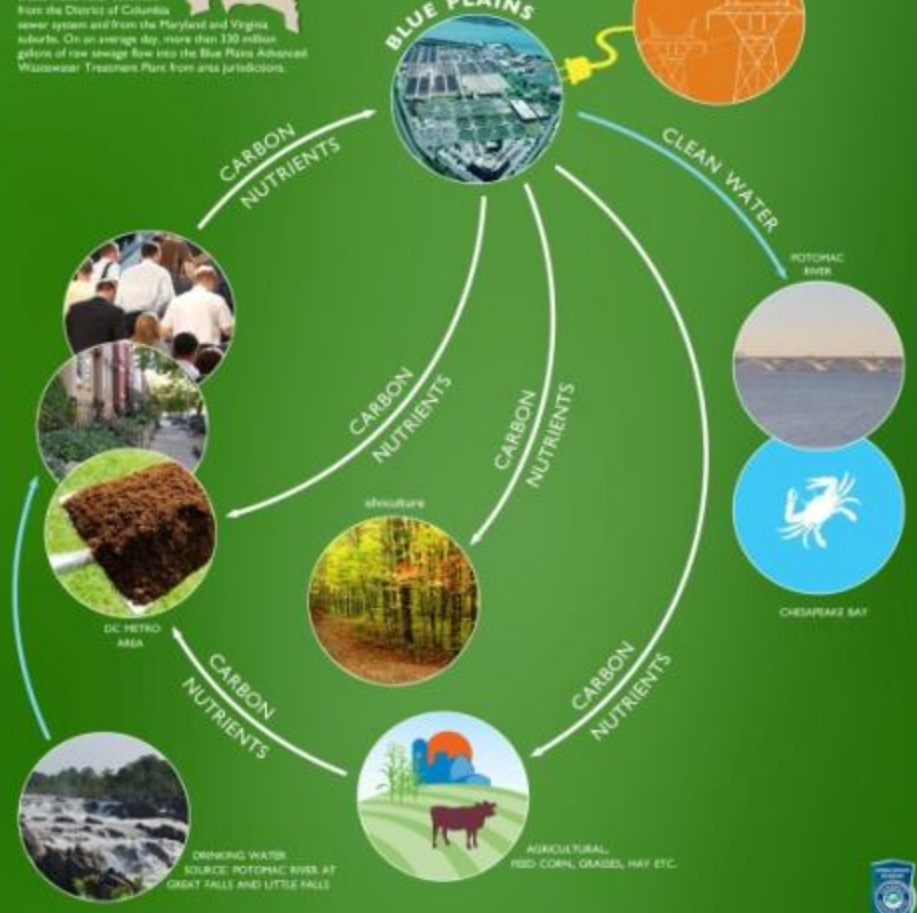
URBAN RESTORATION

Grow trees and reduce runoff.

BLUE PLAINS ADVANCED WASTEWATER TREATMENT PLANT: A RESOURCE RECOVERY FACILITY

dc water is life

water • nutrients • carbon • energy



dcwater.com/biosolids

GREEN ENERGY BIORENEWABLES

THERMAL HYDROLYSIS PROCESS (THP) AND DIGESTION FACILITY

DC Water will be the first in North America to use thermal hydrolysis for wastewater treatment. When completed, this facility will be the largest plant of its kind in the world.

GREEN BENEFITS:

- Produce combined heat and power, generating 13 MW of electricity
- Save DC Water $10 million annually cutting grid demand by a third (DC Water is the largest consumer of electricity in the District)
- Reduce carbon emissions by approximately 50,000 metric tons of CO_2e per year.
- Reduce trucking by 1.7 million miles per year.
- Save $10 million in biosolids trucking costs
- Produce Class A biosolids to grow trees, sequester carbon and reduce runoff.

DC Water and Sewer Authority Biosolids Reuse Program

1200 wtpd lime stabilized Class B biosolids

Agriculture: 39 counties in 2 states

Silviculture: 40,000 acres permitted in 8 Virginia counties

Poplar plantation on gravel mine

Reclamation projects: 3 sites to date

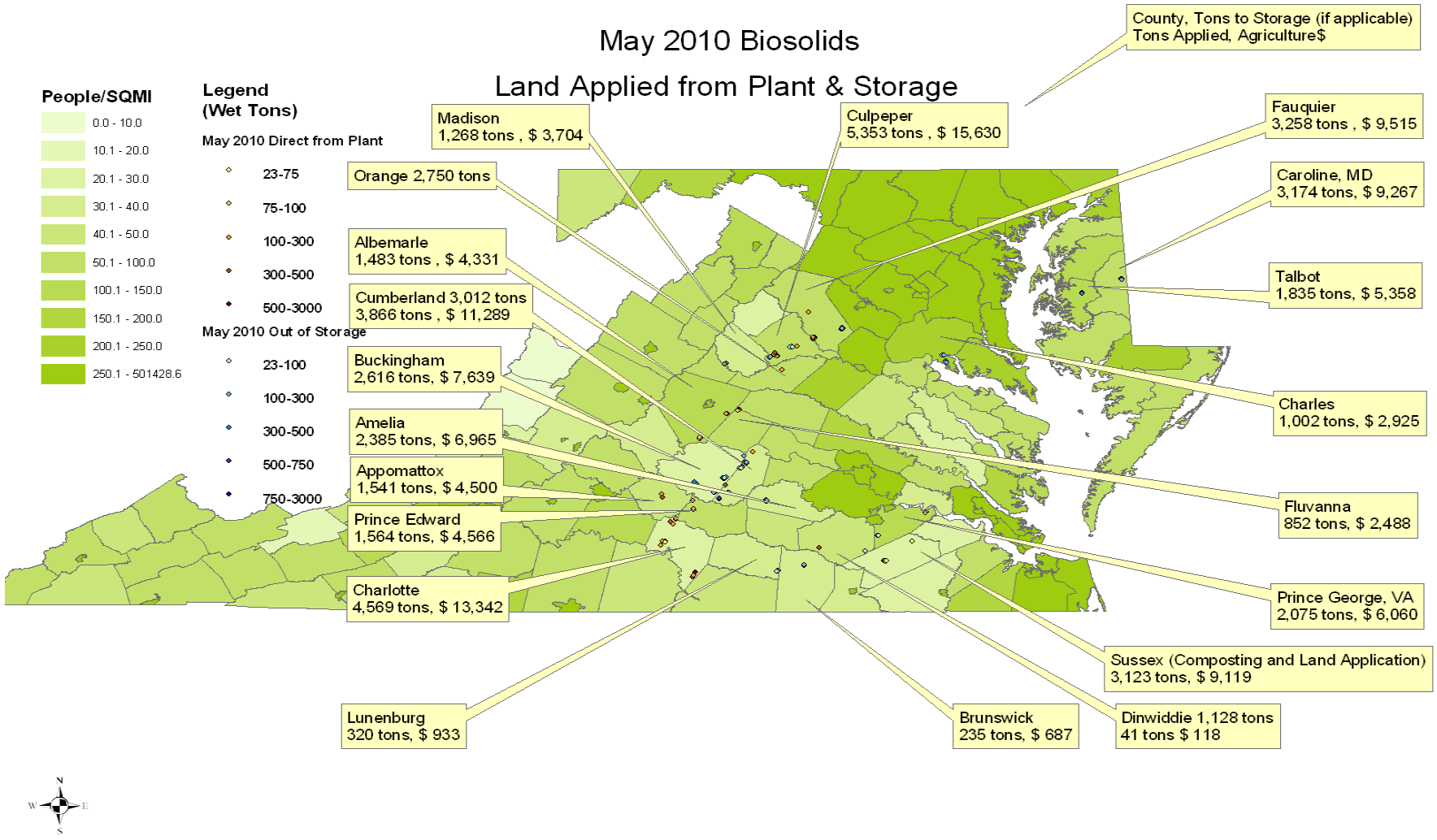
National Biosolids Partnership EMS certified agency

dc water is life

DC Water and Sewer Authority Biosolids Reuse Program

- 1200 wtpd lime stabilized biosolids
- Agriculture – 39 counties in two states
- Silviculture – 40,000 acres permitted in 8 Virginia counties
- Poplar Plantation on Gravel Mine
- Reclamation Projects – three sites to date

dc water is life


May 2010 Biosolids
Land Applied from Plant & Storage
County, Tons to Storage (if applicable)
Tons Applied, Agriculture$
People/SQMI
0.0 - 10.0
10.1 - 20.0
20.1 - 30.0
30.1 - 40.0
40.1 - 50.0
50.1 - 100.0
100.1 - 150.0
150.1 - 200.0
200.1 - 250.0
250.1 - 501428.6
Legend
(Wet Tons)
May 2010 Direct from Plant
23-75
75-100
100-300
300-500
500-3000
May 2010 Out of Storage
23-100
100-300
300-500
500-750
750-3000
Madison
1,268 tons , $ 3,704
Culpeper
5,353 tons , $ 15,630
Fauquier
3,258 tons , $ 9,515
Orange 2,750 tons
Caroline, MD
3,174 tons, $ 9,267
Albemarle
1,483 tons , $ 4,331
Talbot
1,835 tons, $ 5,358
Cumberland 3,012 tons
3,866 tons , $ 11,289
Buckingham
2,616 tons, $ 7,639
Charles
1,002 tons, $ 2,925
Amelia
2,385 tons, $ 6,965
Appomattox
1,541 tons, $ 4,500
Fluvanna
852 tons, $ 2,488
Prince Edward
1,564 tons, $ 4,566
Charlotte
4,569 tons, $ 13,342
Prince George, VA
2,075 tons, $ 6,060
Sussex (Composting and Land Application)
3,123 tons, $ 9,119
Lunenburg
320 tons, $ 933
Brunswick
235 tons, $ 687
Dinwiddie 1,128 tons
41 tons $ 118
N
W
E
S

Agriculture

Storage Facility – 32,500 tons capacity, Cumberland County, VA

Spotsylvania County Composting Facility – Covered, Biofilter Odor Control

dc water is life


Bobcat

Blue Plains Garden & Compost Giveaway

dc water is life

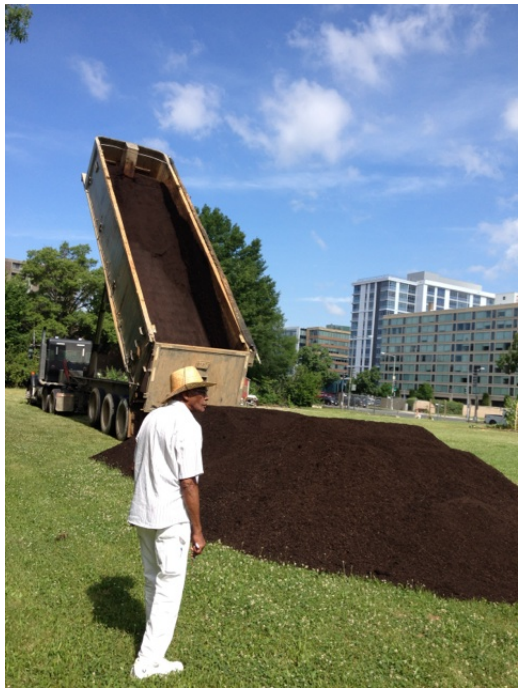
Connecting with the DC Gardening Community

dc water is life

Urban gardening community outreach

dc water is life

Community Gardens



dc water is life

Casey Trees Donations

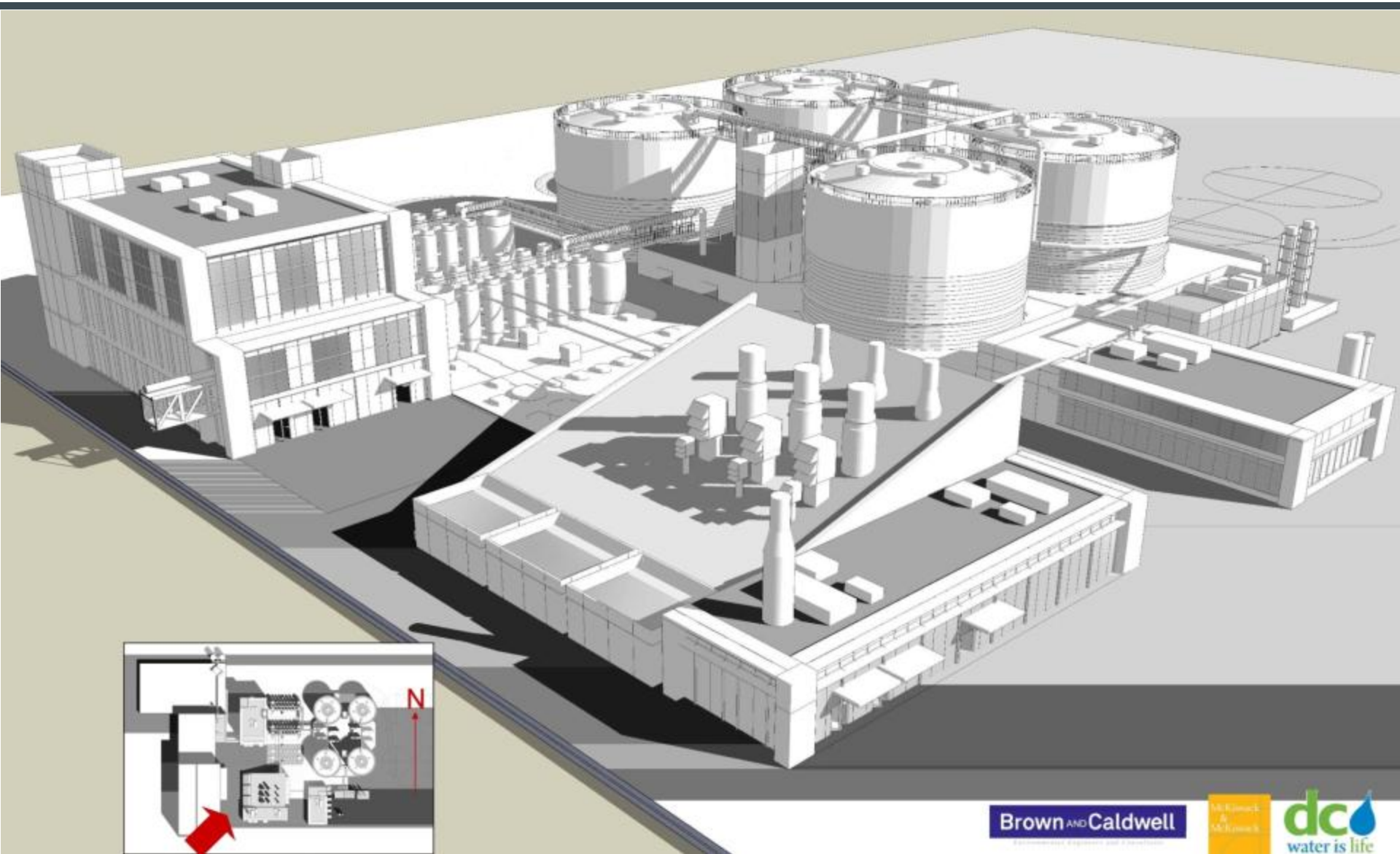
dc water is life

Economics of Current DC Water Biosolids Recycling Program

- Pay a third party ~$43/wt for full service contract (transport, land app, reporting)
- $19M/yr program cost =21% of the Blue Plains operating budget
- Delivered free to farmers
- Farmers value product at $300/acre (nutrients, lime, etc.), approximately $15/wt
- Nutrient rebate back to DC Water ($2/wt), $500K/yr designated for research and outreach.
- Value to farmers @ $15/wt, 1200 wtpd = $6,570,000/yr
- We do not extract this value

dc water is life

Digestion and Thermal Hydrolysis Project

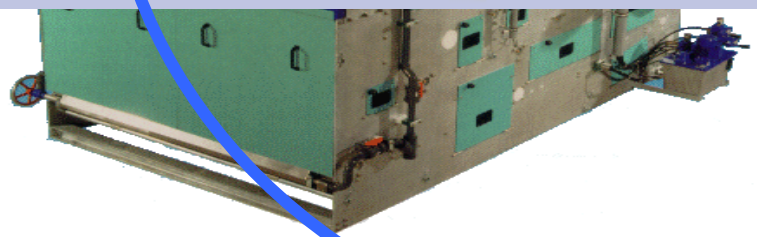


dc water is life

4 Anaerobic Digesters

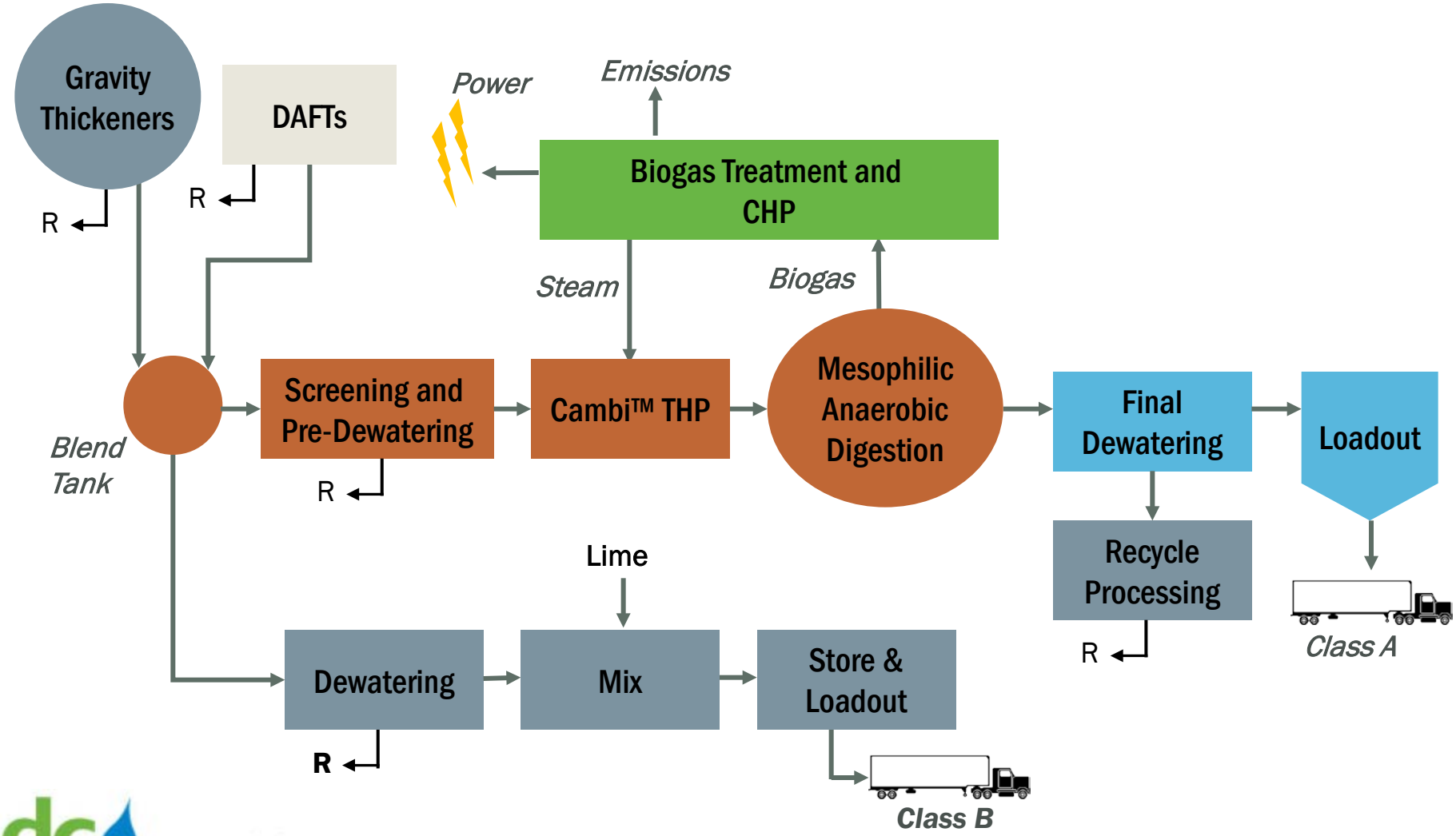
12 Pressurized Solids Screens

10 Pre-Dewatering Centrifuges



Gas Handling and CHP

Process Schematic of DC Water's New Biosolids Program



dc water is life

Pulper

- Influent solids 15 to 18.5 %TS
- Preheated to 140-210°F with recycle steam
- Mixing pumps

Reactors

- Batch process
- Heated to 302-356°F
- 54-138 psi
- 22-30 minute detention time

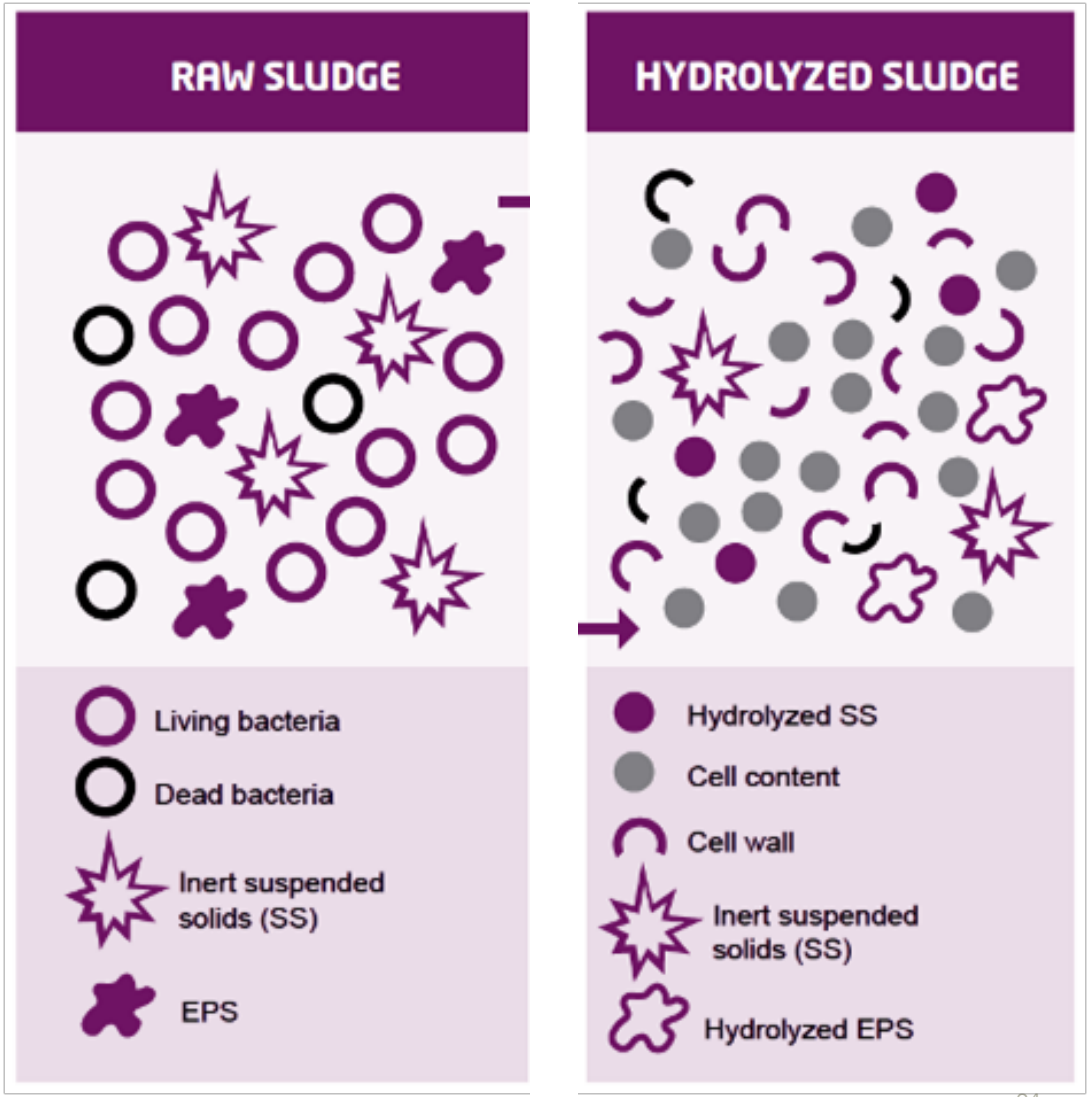
Flash Tank

- Depressurization
- Cools down to 158-239°F
- 8-12 %TS to digesters

Why Thermal Hydrolysis?

Reinventing **Biosolids**

1. Easier to pump and mix
2. Smaller digester space
3. Class A Biosolids



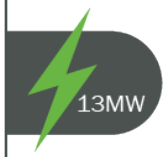
dc water is life

Effects of Thermal Hydrolysis

Program Benefits

Reduce biosolids quantities by more than 50%

Improve product quality (Class A and more)



Generate 13 MW of clean, renewable power

Cut GHG emissions dramatically

Save millions of dollars annually when the facility begins operating in 2014

Anaerobic Digestion

dc water is life

Thermal Hydrolysis Reactors

dc water is life

Thermal Hydrolysis Digested Dewatered Products from the UK

dc water is life

Class B vs. Class A Product

dc water is life

Future Plans for Class A Biosolids

- Continue land application of remaining Class A dewatered biosolids
- Produce a blended soil product (similar to compost)
- Use product in service area for tree planting, restoration, green infrastructure, etc.

dc water is life

Blending of up to 12 feedstocks

dc water is life

Biosolids Blending Trials

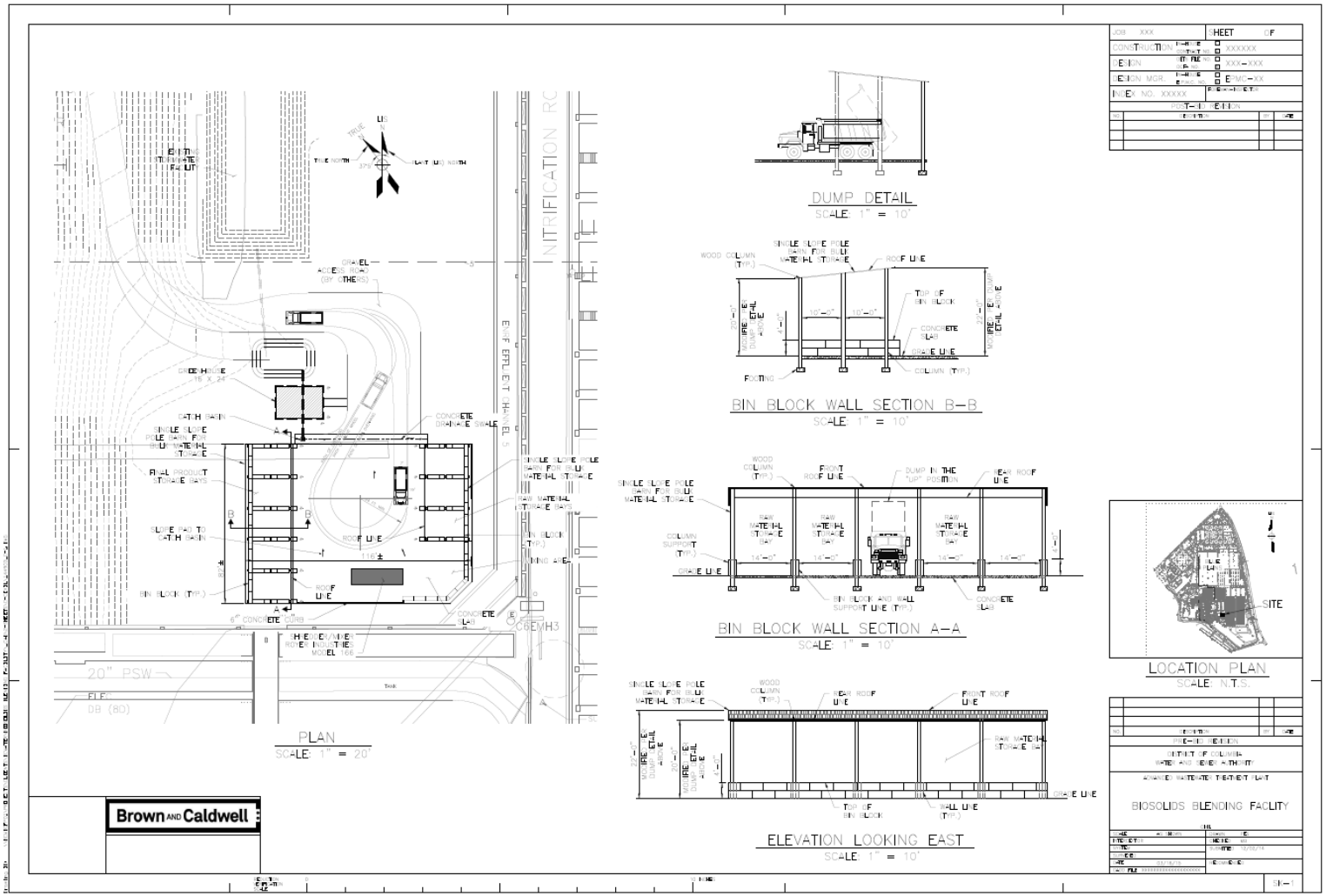
Ingredients:

1. Biosolids
2. Soil (DC soil from Clean River project)
3. Sand – from Harvest Garden Pro
4. Sawdust – River End Sawmill
5. Hardwood bark fines (composted) - from Harvest Garden Pro
6. Pine bark fines - from Harvest Garden Pro
7. Ground money

Blends:

1. TM hardwood – 2 biosolids : 1 hardwood bark fines : 1 sand (TAGRO Mix)
2. TM sawdust - 2 biosolids : 1 sawdust : 1 sand (TAGRO Mix)
3. TPS hardwood – 1 biosolids : 1 sawdust : 3 hardwood bark fines (TAGRO potting soil)
4. TPS pine bark – 1 biosolids : 1 sawdust : 3 pine bark fines (TAGRO potting soil)
5. AC – 1 biosolids : 1.5 sand : 1 hardwood bark fines (Abbottsford Classic)
6. AC Topsoil - 1 biosolids : 1.5 soil : 1 hardwood bark fines (Abbottsford Classic)
7. 3TP : 1B – 3 soil : 1 biosolids
8. 2TP : 1B - 2 soil : 1 biosolids
9. 2TP/S/B – 2 soil : 1 sawdust : 1 biosolids
10. Money 1 – 1 biosolids : 1 soil : 1 money
11. Money 2 - 2 biosolids : 1 sand : 1 money : 1 hardwood bark

Designing a small onsite mixing facility



NUTRIENTS and CARBON RECYCLING

FARMING

Provides carbon and nutrients valued at $300.00 per acre.

SILVICULTURE

Increases yield and improves understory.

RECLAMATION

Restoring mines to their natural state and providing wildlife habitats.

URBAN RESTORATION

Grow trees and reduce runoff.

BLUE PLAINS ADVANCED WASTEWATER TREATMENT PLANT: A RESOURCE RECOVERY FACILITY

dc water is life

water • nutrients • carbon • energy

dcwater.com/biosolids

GREEN ENERGY BIORENEWABLES

THERMAL HYDROLYSIS PROCESS (THP) AND DIGESTION FACILITY

DC Water will be the first in North America to use thermal hydrolysis for wastewater treatment. When completed, this facility will be the largest plant of its kind in the world.

GREEN BENEFITS:

- Produce combined heat and power, generating 13 MW of electricity
- Save DC Water $10 million annually cutting grid demand by a third (DC Water is the largest consumer of electricity in the District)
- Reduce carbon emissions by approximately 50,000 metric tons of CO_2e per year.
- Reduce trucking by 1.7 million miles per year.
- Save $10 million in biosolids trucking costs
- Produce Class A biosolids to grow trees, sequester carbon and reduce runoff.

There is no such thing as waste, only wasted resources.

Chris Peot
cpeot@dcwater.com