

4.4 BIOSOLIDS MANAGEMENT

Biosolids are the solids recovered during the wastewater treatment process that contains nutrient-rich organic matter and micronutrients. Research supported by the EPA has determined that the land application of biosolids in accordance with regulations and in appropriate rates enriches the soil and is beneficial to the environment. Biosolids improve agricultural yields while reducing the need for chemical fertilizers that can be harmful when carried by rainfall into streams, rivers and the Chesapeake Bay.

The EPA has established regulations for the use of biosolids to protect human health, plant life, livestock, wildlife, and water quality. The Clean Water Act required that these regulations protect human health and the environment from any reasonably anticipated adverse effects of pollutants and pathogens in the biosolids. Biosolids generated from municipal wastewater treatment plants are monitored for pollutants and cannot be applied to the land if they exceed the EPA limits.²

4.4.1 Biosolids Production

The Blue Plains Wastewater Treatment Plant is the largest advanced wastewater treatment facility of its type in the United States. Although other plants may have larger capacities, Blue Plains provides the highest level of treatment with its nitrification and filtration processes. Treatment consists of preliminary treatment, primary treatment, secondary treatment, nitrification, denitrification, effluent filtration, chlorination/dechlorination and post-aeration. The solids treatment processes are comprised of thickening and dewatering for primary sludge, secondary waste activated sludge, and nitrification/denitrification waste activated sludge.³ Plants operated in Prince George's County by the WSSC also use these methods for recovering and treating biosolids.

Once treated, biosolids becomes a viable product recycled in the form of natural fertilizers and land applied. It may also be disposed of by incineration and at landfills. **Table 4-4** reflects the production, reuse, and disposal methods for biosolids from the Blue Plains WWTP and treatment facilities located in Prince George's County.

4.4.2 Regulatory Requirements

MDE is the primary agency that regulates the application of biosolids. A biosolids contractor must file and be permitted by MDE in order to apply biosolids to any site approved by the County. The application and permitting process assures that all regulatory requirements are met, assuring that use on land is safe for humans and the environment.⁴ MDE, WSSC, and the

² District of Columbia Water and Sewer Authority, "Biosolids Recycling-Preserving Agriculture and Protecting the Chesapeake Bay"

³ District of Columbia Water and Sewer Authority, "Water and Sewer Facilities Master Plan," August 1998

⁴ Maryland Department of the Environment, Factsheet, Sewage Sludge, Website: www.mde.state.md.us, January, 2001.

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County's Health Department inspect the site both during and after biosolids applications. The following is a list of requirements and restrictions that relate to the land application of biosolids:

- Pathogen Control
- Heavy Metals
- Pretreatment
- Buffer Zones
- Slope Requirements
- Application Rates
- Frozen Ground Restrictions
- Nutrient Management Plans
- Time Restrictions
- Monitoring Records
- Site Inspections

The land application of biosolids is considered an acceptable and beneficial management method and is now considered the centerpiece of a diverse management plan that also includes incineration and landfilling. The County Executive and County Council, pursuant to Section 21-108 of the County Code, must approve sites that are selected for the land application of stabilized biosolids. Land application sites need not be included in the County's Comprehensive Water and Sewer Plan, since the actual application of biosolids on a particular site is of short duration. **Table 4-5** lists companies permitted to apply biosolids in Prince George's County, the originating source of the biosolids, and the sites for land application. The locations of the sites are found on **Map 4-2**.

The land application contract requires the contractors to provide storage facilities to manage the disposal of biosolids produced daily at the Wastewater Treatment Plants. The storage facilities are used during inclement weather or other conditions that may prevent land application. One biosolids storage lagoon is located in Prince George's County. The Cedarville lagoon is operated by Synagro, Inc. and has a capacity of 8,750 dry tons. The lagoon must be emptied once a year.

4.4.3 Land Application

Biosolids are applied to the land in amounts specific to the type of soil, crop to be grown and proximity to roads or streams. Subsurface soil injection involves injection, under pressure, of liquid biosolids beneath the soil surface. The second method, surface application with incorporation (tilling in), involves spreading the biosolids on the surface of the soil and tilling the soil to incorporate the biosolids with the soil.

The suitability of a site for biosolids land application is a function of potential crops, the physical, chemical and mineralogical characteristics of the soil as determined by laboratory analyses, and site considerations for each field. Nutrient level, texture, micro-nutrients and macro-nutrients, soil pH – the measure of the soil alkalinity – and any other soil properties that will influence application rates, are considered. Other factors considered are landscape features

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(e.g., slope), proximity to surface waters and groundwater, as well as soil parent materials, density and moisture holding capacity. Setback from these features are mandated by State law and strictly enforced by onsite inspection.

The annual rate of application for biosolids application is carefully determined and is usually based on meeting the nitrogen requirement of the crop to be grown. This avoids leaching of nitrate-nitrogen into groundwater and surface waters since the crop will quickly absorb the needed nitrogen contained in the biosolids. Silviculture is used in the County where biosolids are land applied. Fast-growing trees are planted above the biosolids, utilizing the nutrient to grow. The following biosolids parameters are required to develop recommendations for application rates on agricultural soils: percent solids, total nitrogen (N), ammonia (NH₃), nitrate (NO₃), phosphorus (P), potassium (K), copper (Cu), zinc (Zn), nickel (Ni), lead (Pb) and cadmium (Cd). With all nutrients (with the exception of phosphorus), specific upper level limits of soil accumulation is avoided to protect both the environment and public health. Recent legislation by the State will implement phosphorus limits.

Generally, biosolids produced in Prince George's County are extremely low in metals. As an extra precaution, however, MDE restricts the number of applications that can be made on agricultural land for any biosolids that contain heavy metals such as copper, zinc, nickel, lead or cadmium.

4.4.4 Innovative Approaches to Land Application

Since 1983, Prince George's County has been the home of one innovative reuse of biosolids, the ERCO Tree Farm. The tree farm is located on 284 acres of a former gravel mine in Brandywine. Annually, the site uses up to 2,000 dry tons of biosolids from the Blue Plains WWTP on 122 acres, and harvests 10 acres of poplar trees for forest products to include mulch biomass. Poplars thrive on high-nitrogen soils, and ground water monitoring for over 20 years shows no negative impact on local aquifers.

The District of Columbia Water and Sewer Authority (WASA) is planning a pilot project for small scale composting technology. This pilot project currently operating at Blue Plains is a portable system that fills long silage bags with biosolids, and aerates these fully enclosed bags. The technology will produce Class A compost in smaller scale – the same high-quality pathogen-free biosolids as will be the product from the egg-shaped digesters scheduled to be built at the Blue Plains WWTP.

4.4.5 Incineration

Land application is the preferred method of recycling of biosolids in Prince George's County. As the agency primarily responsible for handling biosolids, the WSSC has also constructed incinerators to augment its land management methods. In accordance with Federal and State approvals, incineration is currently in operation at the Western Branch Wastewater Treatment Plant. The Western Branch disposes of 12.4 dry tons per day by incineration. Residue from the incinerated biosolids is then disposed of in landfills.

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Table 4-4 Biosolids Production and Reuse

Treatment Plant Name (Existing or Planned)	Sludge Generation (Dry tons/Day)		1995	2000	2005	Chemical Solids	Solids Contents	Biosolids Facility Planned Expansion and/or Upgrading: Dates and Processes	Present Utilization Method(s) and Site(s)	Site Life Expect- ancy	Future Plans for Sludge Management
	1985	1990									
Blue Plains (Wash. D.C.) ⁵	380	380	380	380	380	Ferric Cl. Polymer Lime	28%		Prince George's County Share - Land Application	5 Year Contract Beginning in 2007	Land Application and Composting
Prince George's County Pro-rata Share ⁶	82.9	82.9	82.9	82.9							
Parkway	8.2	8.4	8.3	8.4	9.7	Polymer Aluminum Lime	27%		Off-site Land Application	5 Year Contract Beginning in 2005	
Western	10.5	12.6	15.8	17.5	12.4	Polymer	23%		Incineration	N/A	
Piscataway	29.6	30.0	27.5	27.6	23.9	Ferric Cl. Lime	26%		Off-site Land Application	5 Year Contract Beginning In 2005	
Mattawoman (Charles Co., MD) ⁷						Ferric Cl. Lime	20% 25%	201 Facilities Plan Study in	No biosolids have been received	N/A	Under Study

⁵ The District of Columbia Government has completed a feasibility study for the attainment of effluent limitations continued in NPDES Permit No. DC0021199 and a long-range Blue Plains biosolids management plan.

⁶ The Prince George's County pro-rata share is managed pursuant to the 1985 Blue Plains Intermunicipal Agreement.

⁷ The operation of the Mattawoman Sewage Treatment Plant (STP) is the responsibility of the Charles County Government. The agreement between the WSSC and the Charles County Government governing the Mattawoman STP provides that the WSSC shall dispose of its proportionate share of the total sludge generated by the Plant outside the geographical boundaries of Charles County. The projection of the amount of sludge for the forecast period is under study by the WSSC. The results of this study will be incorporated at a later date.

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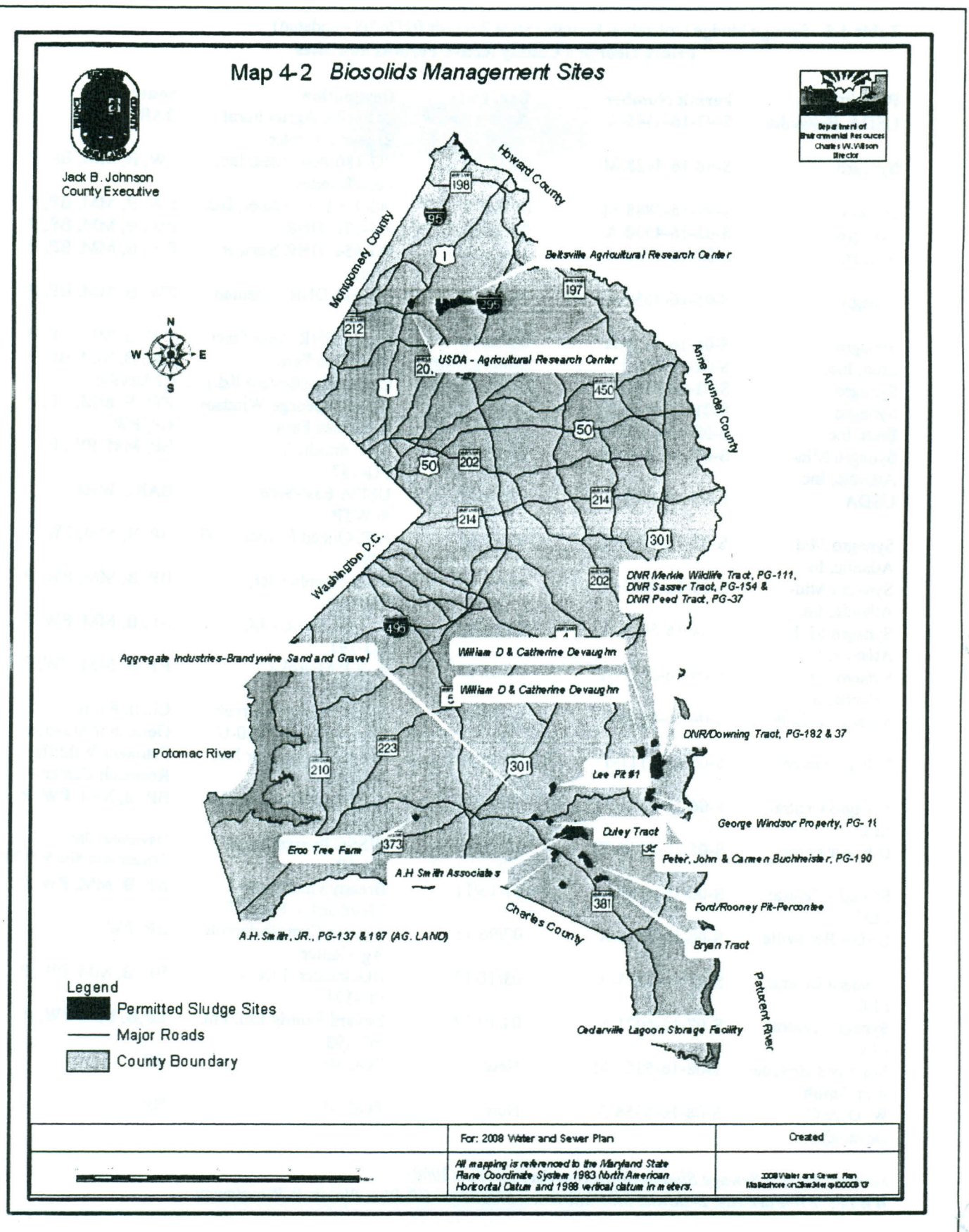
Table 4-5 Sewage Sludge Utilization Permits (State Records 02/26/08 –updated)
Prince George's County Active Permits and Sites

Permittee	Permit Number	Exp. Date	Destination	Source(s)
USDA, Beltsville	S-97-16-4345-A	Pending Renew	Beltsville Agricultural Research Center	BARC East
Synagro	S-98-16-4428-M	04/16/08	PG-180 Percontee, Inc. Ford/Rooney	PW, B, MM, BP, P
Synagro	S-99-16-2888-M	05/20/09	PG-7 E.L. Gardiner, Inc.	PW, B, MM, BP, P
Synagro	S-05-16-4550-A	05/11/10	PG-182 DNR	PW, B, MM, BP, P
Synagro	S-05-16-4552-A	11/12/11	PG-154 DNR Sasscer Tract	PW, B, MM, BP, P
Synagro	S-05-16-4554-A	03/21/10	PG-111 DNR Trueman Tract	PW, B, MM, BP, P
Synagro	S-05-16-4555-A	05/10/10	PG-37 DNR Peed Tract	PW, B, MM, BP, P
Erco, Inc.	S-01-16-809-I	Pending Renew	Erco Tree Farm	PW, B, MM, BP, P
Synagro	S-01-16-959-S	Pending Renew	Cedarville (Bevard Rd.)	Cedarville
Synagro	S-01-16-4755-A	08/01/11	PG-185 George Windsor	PW, B, MM, BP, P
Erco, Inc.	S-02-16-4863-R1	Pending Renew	Erco Tree Farm	BP, PW
Synagro Mid-Atlantic, Inc.	S-02-16-4876-M	07/16/12	A.H. Smith, Jr., PG-187	BP, MM, PW, P
USDA	S-03-16-4488-T	03/10/08	USDA East-Side WWTP	BARC West
Synagro Mid Atlantic, Inc.	S-03-16-4962-M	05/11/08	H.P. Queen Estates – PG 189	BP, B, MM, PW, P
Synagro Mid-Atlantic, Inc.	S-03-16-4987-A	08/17/08	Peter/Buchheister, PG-190	BP, B, MM, PW, P
Synagro Mid-Atlantic, Inc.	S-04-16-5013-A	05/18/09	At Last Farm, LLC PG-191	BP, B, MM, PW, P
Synagro Mid-Atlantic, Inc.	S-04-16-5031-A	01/07/09	A & P Metroka PG-192	BP, B, MM, PW, P
Mirant Chalk Point	S-04-16-5040-T	01/29/09	WSSC Tinker's Creek Interceptor No. 010-U	Chalk Point Generator Staation
USDI/Patuxent	S-05-16-5111-T	04/14/10	WSSC Interceptor No. WH017	Patuxent Wildlife Research Center
Synagro Central, LLC	S-06-16-5131-M	04/06/11	A.H. Smith – PG-124R	BP, B, MM, PW, P
U.S. Air Force	S-05-16-5146-T	11/16/10	WSSC Interceptor at AAFB	Davidsonville Transmitter Site WWTP
Synagro Central, LLC	S-06-16-5156-M	07/13/11	Brandywine/Henry L. Meinhardt – PG-147	BP, B, MM, PW, P
USDA Beltsville	S-06-16-5210-R	07/06/11	Hayden Farm/Beltsville Ag. Center	BP, PW
Synagro Central, LLC	S-07-16-5213-A	03/18/12	Blackwater, LLC – PG-194	BP, B, MM, PW, P
Synagro Central, LLC	S-07-16-5071-M	04/19/12	Bevard Family Ltd. Ptn. PG-193	BP,B, MM, PW, P
Mumford-Briscoe/ A.H. Smith	S-08-16-5357-M	New	PGC-03	BP
W. D. & C. Devaughn	S-08-16-5358-A	New	PGC-01	BP

Source: MDE – Sewage Sludge Utilization Section (Feb 2008)

WWTP: PW-Parkway, B-Bowie, MM-Marlboro Meadows, BP-Blue Plains, P-Piscataway

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4.5 FINANCIAL PLANNING

Financing of all WSSC CIP is reviewed by the two County Executives and approved annually by the Prince George's and Montgomery County Councils. Each CIP covers a six-year period. The Prince George's County Council adopts the CIP as part of the County's Comprehensive Water and Sewer Plan. The CIP is divided into three categories for both water and sewer projects: Prince George's County projects, Montgomery County projects, and bi-county projects. **Appendix 4-2** of this chapter lists the current sewer projects for the bi-county area and for Prince George's County.

System improvement projects under the CIP are financed with funds from the Water Supply and Sewage Disposal Bond Funds. The funds are repaid to bond holders over a period of 20 years by annual principal and interest payments known as debt service. System improvement projects related to State environmental regulations are funded through grants from the regulatory agency. The State may fund up to 50% of the project cost. Growth-related projects are usually paid through System Development Charges and developer contributions.

WASA also submits a budget for review by Prince George's County as a signatory to the 1985 IMA. The WASA budget includes costs related to the County's share of its allocated flow at the Blue Plains WWTP through WSSC. The WASA Board of Directors is comprised of 11 members; two of the members are from Prince George's County. The Board sets policy, oversees bond issues, and approves the operating and capital budgets.

The City of Bowie is required to prepare and adopt a formal budget appropriating funds for the operation, including plant improvements, of the Water and Sewer system. The City Council formally adopts the budget each year. Rates are established based upon the "Cash Needs Approach." The rate structure must provide not only funds for operation and maintenance, but principal and interest payments on long-term debt, plant additions, and renewals and replacements.

In recent years, the City of Bowie has utilized the Water Quality State Revolving Loan Fund Program to finance its Wastewater Plant improvements. It has also used a pay as you go system to finance some of its improvements, as well as issuing general obligation bonds. Additional information concerning the financial management plan for the City of Bowie's Water and Sewer system may be obtained by contacting the Finance Director.