LASA $26.8 Million Biosolids Project
Frequently Asked Questions
December 29, 2015

What are biosolids?

Biosolids are the nutrient-rich treated organic materials generated from wastewater treatment. When treated and processed, they can be recycled and applied as fertilizer to improve and maintain productive soils and stimulate plant growth. Depending on the type of treatment received, biosolids can be from 2% to 95% solids, anywhere from a thick liquid to a dry pellet form. Biosolids are carefully monitored and must be used in accordance with regulatory requirements.

What is the difference between biosolids and sewage sludge?

The terms *biosolids* and *sewage sludge* are often used interchangeably. When properly treated and processed, sewage sludge becomes biosolids.

EPA defines sewage sludge as the solids separated during the treatment of municipal wastewater. The definition includes domestic septage (residuals from on-lot septic tanks). EPA defines biosolids as treated sewage sludge that meets the EPA pollutant and pathogen requirements for land application and surface disposal.

You will see the term *sewage sludge* used in the context of regulations, as EPA has established a protective regulatory framework to manage the use and disposal of sewage sludge. Biosolids can be recycled and applied as fertilizer to improve and maintain productive soils and stimulate plant growth. Effective sewage sludge and biosolids management options help ensure that useful materials are recycled on land and harmful materials are not released to water bodies or the environment.

Why do we have sewage sludge or biosolids – where do they come from?

Sewage sludge or biosolids are the result of conventional biological wastewater treatment processes. Wastewater treatment technology has made our water safer for recreation and re-use. Years ago, many American cities and towns dumped their sewage directly into the nation's rivers, lakes, and bays without significant treatment. Through regulation of this dumping, cities and towns are now required to treat wastewater, resulting in sewage sludge as a by-product, and must make the decision whether to further treat the sewage sludge into biosolids to be used as fertilizer, or to incinerate it, or bury it in a landfill.

How is sewage sludge processed and how are biosolids generated?

Sewage sludge is generated through the treatment of wastewater, and if properly treated will result in biosolids that can be recycled or beneficially re-used.

The treatment of biosolids actually begins before the wastewater reaches the wastewater treatment plant. At LASA, pre-treatment regulations require that industrial facilities pre-treat their wastewater to remove many hazardous contaminants before it is sent to a wastewater treatment plant. We monitor incoming wastewater streams to ensure their recyclability and compatibility with the treatment plant process.

Once the wastewater reaches the plant, it goes through physical, chemical and biological processes which clean the wastewater and remove the solids. The wastewater treatment processes treat wastewater solids to control pathogens (disease-causing organisms, such as certain bacteria, viruses and parasites) and other organisms capable of transporting disease.

Common methods used in processing or treating sewage sludge include thickening, digestion, stabilization, dewatering, storage, and disposal or re-use. Common options for each are as follows:

- Thickening: Gravity, belt, centrifuge
- Dewatering: Belt filter press, filter press, centrifuge
- Digestion: Aerobic, anaerobic
- Stabilization: Lime treatment, composting, incineration
- Storage: Pad (solid), tank (liquid)
- Disposal: Landfill, incineration
- Re-use: Agricultural utilization, landscaping, soil conditioning, mine reclamation, potting soil

How are biosolids re-used?

After treatment and processing, biosolids can be recycled and applied as fertilizer to improve and maintain productive soils and stimulate plant growth, or re-used in landscaping or turf grass production. The controlled application of biosolids to the land completes a natural cycle in the environment. By treating sewage sludge, it becomes biosolids which can be used as valuable fertilizer, instead of taking up space in a landfill or other disposal facility.

Where are biosolids re-used?

Farmers, gardeners, and landscapers have been recycling biosolids for years. Biosolids recycling is the process of beneficially using treated residuals from wastewater treatment to promote the growth of agricultural crops, fertilize gardens and parks and reclaim mining sites. Land application of biosolids takes place in all 50 states.

Why are biosolids used on farm land and lawns?

The application of biosolids reduces the need for chemical fertilizers. As more wastewater plants become capable of producing high quality biosolids, there is an even greater opportunity to make use of this valuable resource.

What portion of biosolids is recycled and how many farms use biosolids?

About 50% of all biosolids are being recycled to the land. These biosolids are used on less than one percent of the nation's agricultural land.

Are biosolids safe?

Yes. The National Academy of Sciences has reviewed current practices, public health concerns and regulatory standards, and has concluded that "the use of these materials in the production of crops for human consumption when practiced in accordance with existing federal guidelines and regulations, presents negligible risk to the consumer, to crop production and to the environment."

How did LASA manage its biosolids prior to this project?

LASA has handled and disposed of its sewage sludge and biosolids in a simple and cost effective manner since startup in 1972 –undigested sewage sludge was dewatered, treated with lime to "Class B" biosolids, stored uncovered and land applied or landfilled. Over the years there have been changes to the land application program (more stringent regulations, scarcity of farmland, no-till farming). Public officials have reacted to pressure to restrict land application, and state legislators began drafting laws to further restrict or outright ban land application. LASA's biosolids were not biologically digested, and as a result were subject to odors depending on length of storage time. This culminated with the loss of a prime disposal contractor in 2013.

What is included in this project?

The LASA project includes the construction of the following:

- Two mesophilic anaerobic digesters with a total capacity of 2.2 million gallons, each with a diameter of 85 feet and a depth of 29 feet. They are designed to store 143,000 cubic feet of gas, and will include safety equipment including pressure/vacuum relief, flame arrestors, and flame traps and checks. Each digester will be mixed with 2 linear motion mixers, and will be heated by biogas, fuel oil, or heat recovered from the new dryer.

- One sludge dewatering centrifuge (to be in addition to one existing centrifuge). The centrifuge will handle up to 3,400 pounds of biosolids per hour at 340 gallons per minute at 2% solids, and will produce a minimum 22% cake.
- One sludge dryer. The dryer will use digester biogas as its primary fuel, consumed at about 16,676 cubic feet per hour, with fuel oil as a secondary fuel. The dryer will include a 9,400,000 BTU per hour boiler and will handle 10,000 pounds of wet sludge cake per hour at 22% solids, producing a minimum 90% solids product meeting Class A.
- One biosolids storage pad cover. The cover will be made from pre-fabricated metal with a 20 foot high translucent roof and clear span (no internal posts). The cover will be 32,912 square feet, or about 187 feet by 176 feet, and will provide three months storage at 2028 peak production rate.
- One Operations building and laboratory. The building will be 5,814 square feet, or about 102 feet by 57 feet, and will house plant operations staff facilities and a new laboratory. The new building will be constructed using LEED Silver practices. The current operations and laboratory building will be re-purposed into maintenance garage and shop areas and provide storage of spare parts and equipment.

How and why did LASA select the components in this project?

There have been numerous studies conducted locally to identify and recommend alternatives to sludge handling and disposal.

1990- Lancaster County Solid Waste Management Authority (LCSWMA) commissioned CDM Engineers to create a regional "Sludge and Septage Management Plan" which recommended re-use of biosolids in the region.

1993- The LCSWMA Citizen's Advisory Committee conducted a "Biosolids Management Study", concluding that better public education and coordination with DEP was needed.

1997- LASA began studying biosolids management options by authorizing Acer Engineers to conduct a "Sludge Study", which recommended flexibility, reliability, and highlighted energy demands, environmental impact, and concerns about regulations on land application.

2010- LASA hired the team of Rettew, AECOM, and Material Matters to conduct a "Biosolids Management Report", which recommended mesophilic anaerobic digestion, and recommended against continuing current practices due to increasing cost of lime, the large amount of biosolids product produced, and odors associated with lime post treated biosolids.

2011- The LASA Board developed its current Vision - Driving Decisions Delivering Solutions – to be proactive and control risks.

2013- LASA hired KCI Engineers to conduct a "Biosolids Options Evaluation", which updated and affirmed the 2010 study, showing that the lowest life cycle cost was mesophilic anaerobic digestion, dewatering and heat drying, which also ranked high in expandability, energy risk impact, public acceptance, flexibility and sustainability. LASA followed up by hiring Buchart Horn to complete a "Basis of Design Report" which included a more detailed cost analysis, showing that the most effective and cost efficient option was single stage mesophilic anaerobic digestion, centrifuge dewatering, indirect heat drying and storage on pad with cover.

Since 1997, LASA has undertaken 4 different studies (using 6 different consulting firms) to evaluate all aspects of stabilization, dewatering, storage and disposal. The 3 most recent studies recommended some form of anaerobic digestion, and 2 of these studies recommended heat drying.

LASA carefully planned, studied and evaluated biosolids processing alternatives. In the end, we are confident our final selection of anaerobic digestion coupled with heat drying with biogas will provide a sound return on the Authority's investment dollars and will result in a financially sustainable and environmentally friendly method of handling and distributing our biosolids product – making what was in the past a nuisance into a resource to be recovered and re-used. The project also meets two of the LASA Board's strategic initiatives – to promote sustainability and encourage environmental stewardship.

<u>What are the benefits from this project?</u>

This project will result in Class A biosolids that are more marketable, easier to dispose of, and pose less environmental risk, than the current Class B method. Although the current biosolids meets EPA standards, LASA is undertaking this upgrade as a voluntary, proactive way to reduce its environmental footprint and mitigate future risk. The project will result in Class A biosolids which is EPA's highest standard.

<u>How do Class A biosolids differ from Class B biosolids?</u>

The US Environmental Protection Agency (EPA) issued 40 CFR 503 categorizing biosolids as Class A or Class B. The main difference between Class A and Class B relates to the level of pathogens and the ability of the material to meet/exceed vector attraction reduction (VAR) requirements.

Class B Biosolids are treated, but contain higher levels of detectable pathogens than Class A biosolids. Class B biosolids undergo a "Process to Significantly Reduce Pathogens (PSRP)". The most common type of treatment associated with Class B biosolids involves the addition of lime to raise the pH in order to reduce pathogens and vectors. The use of Class B biosolids requires a permit from the EPA/DEP with conditions on land application, crop harvesting and public access.

Class A Biosolids, on the other hand, are further treated so that pathogens are reduced to non-detectable levels and the material must also comply with strict standards regarding vector attraction reduction. Class A biosolids must undergo a "Process to Further Reduce Pathogens (PFRP)". A common combination of treatment techniques to meet Class A designation couples anaerobic digestion with heat drying. Class A meets EPA guidelines for land application with no restrictions. Class A biosolids may be used as fertilizer on farms, parks, golf courses, vegetable gardens, and can be sold or given to home owners as compost or fertilizer.

Are there regulations for the land application of biosolids?

Yes. The federal biosolids rule is contained in 40 CFR Part 503. Biosolids that are to be land applied must meet these strict regulations and quality standards. The Part 503 rule governing the use and disposal of biosolids contain numerical limits, for metals in biosolids, pathogen reduction standards, site restriction, crop harvesting restrictions and monitoring, record keeping and reporting requirements for land applied biosolids as well as similar requirements for biosolids that are surface disposed or incinerated. Most recently, standards have been proposed to include requirements in the Part 503 Rule that limit the concentration of dioxin and dioxin like compounds in biosolids to ensure safe land application.

Where can I find out more about the regulations?

The biosolids rule is described in the EPA publication, A Plain English Guide to the EPA Part 503 Biosolids Rule. This guide states and interprets the Part 503 rule for the general reader. This guide is also available in hard copy. In addition to the Plain English Guide, EPA has prepared A Guide to the Biosolids Risk Assessments for the EPA Part 503 Rule which shows the many steps followed to develop the scientifically defensible, safe set of rules (also available from EPA in hard copy).

What does LASA plan to do with its Class A biosolids?

LASA is currently evaluating how it will re-use its Class A dried biosolids. The most likely option will be to market the material on a wholesale basis to firms who provide such material to landscapers, farmers, and others for its organic content and nutrient/fertilizer value. Class A biosolids may be used as fertilizer on farms, parks, golf courses, vegetable gardens, and can be sold or given to home owners as compost or fertilizer.

How much will this project cost?

Construction contracts were recently awarded for a total cost of $26.8 Million. Total project costs including all engineering and legal are approximately $28.3 Million.

Will this project affect my sewer rate?

We do not expect this construction project to raise sewer rates beyond those rates currently projected in the LASA 5-year comprehensive plan.

In planning for this project we projected total costs (both capital and operating) for various options studied, including "status quo – Class B to the landfill" over a 20-year period. The cost of the selected option (the current capital project - anaerobic digestion and heat drying) was comparable to status quo, and did not contribute to a rate increase.

What is the timeline for this project?

Total construction is estimated to take 18 months. Construction began in January 2016, and the system should be up and operating by June 2017.

Who are the engineers designing and managing the project and the contractors building the project?

- Project design, construction management and resident inspection: Buchart Horn, Inc.
- General Construction: Michael F. Ronca & Sons, Inc.
- Electrical Construction: Garden Spot Electric, Inc.
- Mechanical Construction: Myco Mechanical, Inc.

About LASA

LASA currently owns, operates and maintains a sanitary sewer system that serves approximately 37,000 customers representing about 100,000 citizens and 1,300 businesses located in eight Lancaster County municipalities including East Hempfield Township, West Hempfield Township, Lancaster Township, Manor Township, Manheim Township, East Petersburg Borough, Mountville Borough, and Columbia Borough. The LASA system includes approximately 560 miles of pipeline, 38 pumping stations and a treatment facility designed to treat 15 million gallons of wastewater per day. The guiding principal of the Authority is to provide quality service and apply technology to process wastewater so as to protect and enhance the environment, health and well-being of the community at a reasonable cost. If you would like more information about the Authority, visit LASA's website at www.lasa.org.

About Buchart Horn

Buchart Horn, Inc. is a full-service, international engineering and architectural firm with 15 offices throughout the Eastern United States and Western Europe. As one of the first professional consulting companies to combine engineering and architecture under one roof, Buchart Horn's professional services focus on three crucial areas essential to every community: Water Resources (water and wastewater treatment systems, and strategies to protect and improve our natural environment); Architecture (designing the buildings where we live, work, learn, and play); and Transportation (highways, bridges and airports). Celebrating its 70th year in business in 2015, clients range from local, county, state, and federal governments to large and small private sector clients. For more information about Buchart Horn, Inc., visit their website at http://www.bucharthorn.comor on Facebook at www.facebook.com/BuchartHorn.