Compost in the Construction Industry
If you stopped the average citizen on the street and asked them, "what is compost, and what are its uses," they'd probably tell you that it's something made from grass, leaves or old food, and that it's used in landscaping and gardening. While the use of compost as a soil amendment in the landscaping and nursery industries may be the largest and most recognized market for compost products today, other end-uses are slowly gaining recognition. One such market for compost is its use in engineered erosion and sedimentation control Best Management Practices (BMPs). Stormwater management BMPs refer to structural/ engineered control devices and systems that are used to detain and improve the quality of polluted stormwater, as well as operational practices that provide similar benefits. In the pollution control industry, BMPs are equated with proven or commonly accepted practices (i.e. ones that commonly achieve a high level of desired results).

The Rise of Awareness
As the understanding of the impacts of sediment in our country's waterways and related ecosystems increase, the level of erosion and sedimentation (E&S) control regulation from construction activities has also increased. Traditionally, the most common methods of controlling soil erosion during earth moving operations at a construction site have been silt fence, erosion control blankets, sediment traps and basins, and rip rap armor (i.e. large rocks covering earthen slopes). While these BMPs are still very common, the use of new alternatives has slowly begun to gain attention in recent years. Some of these alternatives utilize compost as a filtering or growing media. The most common forms of these compost-utilizing BMPs are probably compost berms and blankets.

A Natural Filter
Compost berms take the place of more traditional silt fence applications, filtering sediments out of stormwater runoff from construction sites before the water leaves the site or enters waterways. Compost berms provide "three-dimensional" filtering of sediments, providing more opportunity to filter/ trap sediment than with the two-dimensional silt fence. PADEP recommends that compost berms be trapezoidal in shape; 1 ½ to 2 feet high, 4 feet wide at the base and 3 feet wide at the top for maximum stormwater filtering ability[1]. While the trapezoidal berm shape is listed in the Pennsylvania Department of Environmental Protection's (PADEP) manual, the use of Filtrexx's SiltSoxx™ product (as one example of an industry alternative) has also been approved in E&S control plans across the Commonwealth.

The SiltSoxx™ product is a compost berm, encased in a mesh net in the shape of a tube. The tube diameter, and the type of compost media filling the tube, can vary depending on the application. The compost-filled tube, or sock, is commonly installed by blowing compost into the sock and then staking the sock in place, much like silt fence. However, the tube is not trenched into the ground like silt fence; rather, it lays on the top of the ground surface. Filtrexx utilizes a network of certified installers throughout the U.S., and certifies the "Filter media" (or compost) used in the tubes, to ensure a uniform final product. This uniformity standard may provide some additional benefit over a typical compost berm.

Some may point to the unit cost of these berms or the Soxx™ product as a deterrent to their use as a substitute for silt fence. However, while the material cost per linear foot of compost berms may be higher than standard silt fence, the total installed cost may be very competitive, as there is significantly less time required to install compost berms in comparison to properly trenching and staking the silt fence in place. Another time-saving advantage in the use of compost berms is that once they have served their intended purpose (e.g. have provided site sedimentation control until the soil surface of the disturbed construction site is stabilized with vegetation), they can be easily spread out onto the landscaped surface at the end of the project; they do not need to be removed and disposed of, as is the case with silt fence. Environmental benefits of berms include better stormwater filtration (three-dimensional), the ability to biologically decompose some hydrocarbons, and the ability to treat or capture nutrients within stormwater runoff; none of which can be accomplished with conventional silt fence.

A Blanket of Protection
A second common compost-based E&S control BMP application is its use in compost blankets. Compost blankets can replace traditional mulching or E&S blankets. Mulching typically consists of spreading straw

[1] Erosion and Sedimentation Pollution Control Manual, Pennsylvania Department of Environmental Project, April 15, 2000, pg. 136a.

or hay on a site, sometimes sprayed with a tackifier to hold it in place. E&S blankets can vary in material, dimensions, and weight, but are typically comprised of straw, wood slivers, or coconut fibers, woven into sheets and held in place by plastic netting. The blanket is unrolled down a slope and then "stapled" into place. E&S blankets are typically used on more steeply sloped areas where standard mulch material would wash away. Compost blankets can be use as an alternative to these BMPs by spreading or blowing 270 – 540 cubic yards per acre of compost onto the bare soil[1]. This application rate equates to a 2 to 4 inch layer of compost evenly applied across a site.

The compost blanket alternative offers some advantages over the typical BMPs, in that the compost 1) can be installed on slopes up to 2:1, 2) can provide a better growing media for grass seeding or other plantings, 3) provides intimate contact with the soil which has been shown to be very important in erosion control (by resisting the development of rills and gullies under the blanket), and 4) can provide a smooth and level surface, grading out imperfections and providing a more esthetically pleasing finished landscape. One disadvantage of the compost blanket is that its final installed cost may be higher than that with some of the more basic mulching or netting BMPs.

Market Impact

How might the expansion of the use of compost in the construction industry impact the demand for compost in Pennsylvania? If compost filter berms replaced silt fence as the most commonly utilized E&S control BMP, a significant quantity of compost material would be used by the construction industry each year. A typical construction site might utilize over 100 feet of silt fence. This could equate to 25 to 100 cubic yards of compost per project, just for compost filter berm construction alone, if compost berms replaced traditional silt fence installations.

If a uniform layer of 2 inches of compost blanket were applied over a 2 acre disturbed construction area, the project would use over 500 cubic yards of compost to construct the blanket. Multiply this single project use by the thousand of construction projects going to construction each year and the potential sustained use of compost by the construction industry in the future is significant.

The Key Players

If this potential market is to be expanded, the uses and benefits of compost products for E&S control BMPs need to be disseminated to regulators, engineers and construction estimators that work for contractors, so that everyone feels comfortable with the products and recognizes their inherent advantages. Even with an awareness of the product, engineers will be hesitant to specify compost products if they cannot get competitive prices from earthwork contractors for their use.

The pressure by clients (i.e. the ones having the projects constructed) to control costs often is an overriding factor in the design of construction projects. Public construction projects are typically awarded to the lowest bidder, so contractors feel the same pressure to be cost-competitive, in order to win the job. Contractor estimators often need to add contingencies to their bid prices if there is any uncertainty about using an unfamiliar product, or if there is a question of availability. This is contrary to the expansion of compost-based BMP use in the construction industry, until the benefits and uses are well-established, and the overall costs can be shown as competitive to conventional methods.

Regulators can have a significant impact on the expansion of use of compost in these BMPs by strongly encouraging the use of compost material, via inclusion and expansion of compost products in approved BMP lists, or by requiring its use by regulation. PennDOT's inclusion of compost products in their standard "408" specifications is an example of a government agency showing acceptance of compost products, and is a good first step. In addition to regulation and specification, quality, price, and availability will likely be the other elements that control the rate of expansion of this segment of the compost market.

The Three Key Elements

There are a number of **quality** standards within the industry, from the AASHTO specifications to PennDOT's composting material specifications. Even private companies such as Filtrexx have their own material specifications to ensure a uniform quality final product. PADEP's material requirements for use

[1] Erosion and Sedimentation Pollution Control Manual, Pennsylvania Department of Environmental Project, April 15, 2000, pg. 136a.

of compost as an E&S control BMP require that "*Compost shall be a well decomposed, weed free organic matter derived from agricultural, food, and yard or wood/bark organic matter source. The compost must be aerobically composted at a Pennsylvania Department of Environmental Protection (DEP), Bureau of Waste Management permitted site. The compost shall possess no objectionable odors and will be reasonably free (<1% by dry weight) of man-made foreign matter. The compost product shall not resemble the raw material from which it was derived.*"[1]

DEP also provides the following physical parameters for this organic material:

pH	*5.5 – 8.0*
Moisture Content	*35% - 55%*
Particle Size	*98% pass through 1" screen*
Soluble Salt Concentration	*5.0 dS Maximum*

While there are differences between various material specifications, in general, producers should work to ensure their products meet some accepted standard in order to prevent a poor experience by someone new to the use of compost products. It is common knowledge that it is much easier to upset a user of poor quality compost products than it is to win them back as a user again in the future. This goes for all stakeholders in the industry, from regulators, engineers, contractors and project owners, to the general public.

Price is also an important factor. Even with its inherent advantages, the compost alternatives to be utilized by the construction industry must be relatively price-competitive with traditional E&S control options. This may require educating new costumers about the comparison of total costs (i.e. full life-cycle costs) of traditional options verses compost alternatives, rather than only initial installed unit costs.

On the other hand, perhaps cost should not be the primary driving factor in the use of these materials. Today, we see a growing perceived value in green technologies throughout our entire communities and lifestyle. Compost producers and marketers can work to embrace and join this trend, to include these compost products as new green technology. Compost-based BMPs are eligible for LEED green building credits, and project accolades such as LEED accreditation may provide added project value, further encouraging the use of compost products.

Finally, **availability** is also important. While products like silt fence can be stored in a relatively small area by a contractor, bulky compost will likely need to be stored by the producers, and brought to the construction site before construction commences. As construction schedules shift, waiting on long lead times for compost materials will not work if traditional options are readily available.

Availability, price, and quality are all tied together, and all will affect how well compost products will be accepted in the construction industry as the "new standard" in E&S control.

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[1] Erosion and Sedimentation Pollution Control Manual, Pennsylvania Department of Environmental Project, April 15, 2000, pg. 136a