



Biosolids solutions

Vermiculture is a natural, proven process for treating organic waste using earthworms. Large-scale vermiculture is a biosolids treatment process that offers:

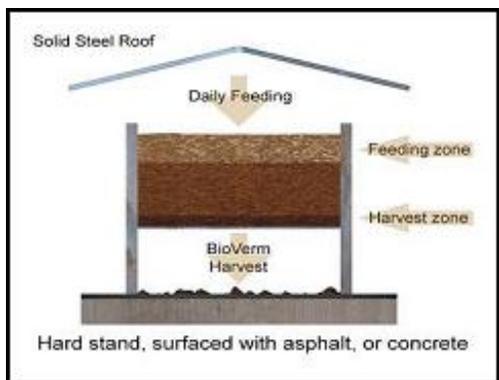
- High quality end product with proven success in agriculture
- Low usage of energy and manpower
- Minimal emissions of odour, noise and dust
- Public and community support

Vermitech’s system of vermiculture offers a simple and cost effective solution for medium sized municipalities looking to recycle biosolids.



Process-Controlled Vermiculture

The Vermitech system has been developed in Australia through 6 years of treating and enhancing over 50,000 tons of biosolids to the highest levels of hygiene and product safety prescribed by Government regulation (equivalent to Class A). Based on natural processes, it has low environmental impacts and a ‘green’ appeal that attracts broad public support.



The Process

Is a *continuous flow system* using raised-bed reactors with top-feed and bottom-harvest mechanisms. A pre-prepared quantity of material is fed to the top of the bed. The worms then rise to meet the incoming feed. Process conditions within the reactor are maintained during a controlled period of time. Harvesting equipment cuts and collects the treated material that is then screened, dried and tested ready for despatch to the customer.



Hazard Analysis Critical Control Point (HACCP) quality assurance processes are used to ensure a consistent and safe end product. Developed in the food industry, HACCP is now an international quality standard that puts focus on end product quality, particularly important in both the food and biosolids industries.

Granville – Pennsylvania

Commissioned in August 2004, the Vermitech facility in Granville, PA is the first full scale biosolids vermiculture facility in the USA. Vermitech supplied the process and equipment and Granville’s engineers (Glance Associates) designed the site and building works.

Granville successfully applied for funding assistance through grants from the *Growing Greener* program and through PennVest low interest loans.

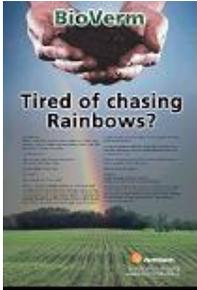
The facility is designed to produce vermicompost meeting Exceptional Quality criteria for biosolids, which the Township will call “GranVerm” and sell to local users for significant value. With sales of GranVerm, and the avoided costs of landfill transport and disposal, the facility will deliver a cost-effective solution for the Township’s long-term biosolids requirements.





The end-product: Vermicompost

Vermicompost is stable, rich in humus and loaded with beneficial soil microbes that are ideal as inoculants and for restoring life to soil depleted by chemical fertilizer usage and modern intensive farming methods. The proven benefits are:



- Earlier, stronger and increased flowering
- Reduced inorganic fertiliser requirement
- Greater uniformity in crop size and quality
- Better crop health and shelf life
- Increased root mass



Using trained staff, backed by research, Vermitech has built a strong market for the end product in Australia (called *BioVerm*). In high value agricultural markets such as Horticulture where the economics of organic amendments are most attractive, bulk *BioVerm* sells for a premium price (\$80 per ton). This assembled

knowledge and expertise is being used to support the development of markets for *GranVerm* material from Granville, Pennsylvania.

Environmental benefits

Vermitech's System is listed by the United Nations (Environment Program) as an *Environmentally Sound Technology* meaning that it has the "potential for significantly improved environmental performance relative to other technologies". For example:

- Very low noise, odour, leachate and dust
- Minimal handling and no extra heat reduces fuel, gas and power consumption
- 90% less truck movements than traditional amendment composting
- 45% reduction in greenhouse gas emission over traditional landfill techniques



Operability and Suitability

The costs of the System compare favourably with other technologies for the advanced treatment of biosolids, such as thermal drying and in-vessel composting. Sales of the end product can provide additional offsets to the running costs.

The System is easy to operate and uses relatively little manpower and resources. The process can be designed for operation with a variety of climates and biosolids types and is modular, so that treatment capacity can be increased simply by adding more beds. A mid-sized facility (50 wet tons per week) requires a footprint of about 1 acre. These features, and the fact that the end product is intended for use locally in agriculture, means the system is ideally suited to non-metro towns and municipal authorities who are looking for a reliable and attractive recycling option.

Summary of the System

Low impact	-	Low (virtually no) odour, dust or noise
Reduced trucking	-	Minimal amendment needed (versus composting)
Reduced greenhouse gases	-	Compared to landfill
Attractive end product	-	Proven soil health benefits, sells for value
Simple	-	Harnessed natural technology
Reliable	-	Quality assurance systems
Potential revenues	-	From sale of end product to offset costs
Cost competitive	-	With other biosolids technologies