

MELBOURNE WATER BIOSOLIDS APPLICATION TO FARM LAND – THE VALUE PROPOSITION

Biosolids Agronomic Value

The biosolids material from municipal sewage treatment plants around the world is commonly used as a soil improver on agricultural land, subject to statutory regulations. Melbourne Water produces biosolids that can be applied sustainably to selected farm land and can contribute nutrients, carbon and trace elements that are often scarce in Australian soils. See Case Study below on Sydney Water's successful biosolids program.

Melbourne Water (MW) produces sufficient biosolids each year to provide a useful soil supplement for approximately 30,000Ha of farm land, based on a re-application every 5 years in accordance with Environmental Protection Authority Victoria (EPAV) Guidelines.

A comparison of the beneficial content of biosolids with other commercially available supplements shows that the approximate dollar value of the Nitrogen, Phosphorus, Potassium, Zinc and copper components within an average sample of Western Treatment Plant biosolids is equal to approximately \$80/tonne. As an example, biosolids has a comparable amount of Nitrogen as chicken litter and cattle feedlot manure, but only 1/6th the amount of Phosphorous and Potassium. In addition, biosolids add a significant amount of beneficial carbon to the soil.

Regulations

In Victoria, the EPAV has established guidelines for the safe application of biosolids to farm land (Publication 943 released in 2004).

The EPAV guidelines require both the producer of the biosolids (MW) and the land holder receiving the biosolids (farmer) to follow strict practices that ensure that the environment is protected in the short and long term from nutrient overloading as well as the potential build-up of contaminants.

Through ongoing testing and research, EPAV has identified some contaminants of concern in biosolids and is working with industry to identify these emerging contaminants that may end up in sewage and subsequently, biosolids. From time to time the EPAV will update the Guidelines to take into account any significant new information.

The contaminants that are regulated in land application of biosolids are:

- Pathogens: well understood and risks are comprehensively managed.
- Inorganic compounds: Includes metals e.g. Cadmium, Copper and Zinc, that are non-biodegradable and usually are the controlling factor on the amount of biosolids that can be applied to land to eliminate short term or long term cumulative impacts.
- Organic compounds: Soil concentration limits imposed by regulations on inorganic compounds mean that concentrations of contaminants in biosolids, such as pesticides, components of detergents and pharmaceuticals are considerably lower and provide adequate practices to ensure safety against potential impacts.

Melbourne Water is limiting the amount of biosolids applied to farm land to ensure strict compliance with EPAV's publication 943.

Melbourne Water's obligations and processes

EPAV and Melbourne Water are signatories to a specific "Regional Environment Improvement Plan" which describes Melbourne Water's obligations in relation to use of biosolids for land application. Melbourne Water can be fined significantly if it does not follow this plan.

In the first instance, Melbourne Water must have a detailed understanding of the properties of the biosolids it is proposing to offer for application to farm land. It must also make sure that only biosolids that have met the EPAV's stringent guidelines are dispatched for the purpose of land application.

Similarly, both Melbourne Water and the land owner must understand the properties of the soil where biosolids material is to be applied. Melbourne Water will take representative soil samples for independent testing and analysis, and will use this data to arrive at a biosolids application rate that maintains EPAV contaminant limits as well as providing a suitable nutrient loading for the cereal crops or pasture proposed by the land owner.

Sydney Water doing a solid for farmers

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The program, which has now been running for 20 years, is known to increase crop yields by 20-30%.

Sydney Water produces upwards of 180,000t of biosolids each year, with 70% applied across 20 broadacre cropping and livestock farms in the Central West and South West of NSW. The rest is either composted or used for mine rehabilitation.

"We're converting what has traditionally been seen as a waste product and turning it into a valuable resource," said Gavin Landers, Operations Contracts Manager at Sydney Water.

Landers said the program has also benefitted Sydney's waterways and surrounding oceans, which were the previous destination of huge volumes of human waste. "We're closing the organic and nutrient loop between city and farm," he said.

Where synthetic fertilisers applied on paddocks will give soil a quick fertility boost, biosolids "enable large quantities of nutrients to be placed safely into the soil and utilised as the plants need them over a number of years," said Roger Crisp, an Agronomist for ANL – one of three biosolids contractors for Sydney Water.

Treated crops are also "more resilient in colder conditions, respond quicker and for longer after rain and are less prone to disease," said Crisp.

Although the initial layout cost may be steep for some properties, biosolids are a cheaper alternative to conventional fertiliser after a four-year period. Some croppers have eliminated the need to apply synthetic fertiliser for up to three years, and reduced the need for the three years following.

Crisp said that, on average, croppers using biosolids have reduced input costs by between \$200 and \$300 per hectare per year for up to five years.

Alongside the benefits for farms and waterways, Sydney Water has also reduced its pressure on the grid, with the energy by-product from biosolid processing powering 21% of related operations.

The wattage is enough to power 11,000 homes and cut greenhouse gas emissions by over 70,000t per year.

Beginning as 'sludge', human waste is collected at Sydney Water's 23 wastewater treatment plants, where it is screened, settled and baked in digesters for a minimum of 20 days.

Over 30 years of research has shown no adverse environmental or human health impacts stemming from the use of biosolids.

The source of biosolids "may be perceived as dark and mysterious," said Crisp, "but its final destination is certainly brightening the outlook for those farmers fortunate enough to receive it".

Next time they flush, Sydney residents should take heart knowing they are sending Sydney Water a package that could benefit farmers, the environment and themselves.

Melbourne Water must provide to the EPAV a detailed description of the annual biosolids application programme including the locations of land and calculated "safe" quantity of biosolids that can be applied and must also keep an updated inventory of paddocks where biosolids have been applied year on year.

The land owner and Melbourne Water are required to enter into an agreement in which the terms of the supply of biosolids and the terms for the use of the biosolids are clearly defined. EPAV requires Melbourne Water to draft this agreement and to overview the land owner's agreed activities.

Land owner's obligations

On request for the supply of biosolids, the land owner must agree to work co-operatively with Melbourne water to ensure that the requirements of EPAV are achieved. The relationship is formalised in a signed "Supply Agreement" prior to the delivery of biosolids to the land owner.

The land owner must ensure that the biosolids are applied to the nominated land at the agreed tonnage per hectare rate and must incorporate the biosolids into the soil as soon as possible following delivery.

Audit of compliance:

At suitable times during the year, Melbourne Water arranges for an audit of activities to confirm that both Melbourne Water and each land owner has complied with the terms of the Supply Agreement and the EPAV Guidelines.

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