

Report to the Waste Management Board by the Working Group on
Standards for Organics (including Compost) Applied to Land

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Acknowledgements

The Waste Management Board would like to thank the members of the Working Group on Organics (including Compost) Applied to Land. Members of the Working Group were:

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Disclaimer

This report is a record of the deliberations and findings of the Working Group on Organics (including Compost) Applied to Land. The views and opinions expressed in this report do not necessarily represent those of the WA Department of Environment or the Waste Management Board.

Executive Summary

The discussions held by the Working Group covered a wide range of topics relevant to recycling of organic waste. The outcomes of those discussions have been recorded in this report and underscore the potentially positive role of recycled organics, not simply in terms of waste management and industry development but also in relation to improved soil health, water retention, horticultural/agricultural productivity and public health and safety.

It is the intention of the Working Group that this document should provide input to the policy and business planning process of the Waste Management Board.

At the outset, the Group amended its brief in order to find a workable focus. This was achieved by looking beyond (but not overlooking) MSW-derived compost and considering, instead, standards in relation to all recycled organics applied to land in WA. Group members were very concerned with protecting the ongoing health of the soil as a productive resource and the majority considered that measurement of contaminants in the final product was the most effective way of exercising quality control.

The timing and type of regulation was considered, along with ways in which necessary change might best be managed, given that the existing situation is inequitable. For instance, by contrast to the standards that exist in relation to compost and biosolids, none exist for animal manures despite their propensity to cause a number of health, safety and environmental problems when not properly treated or managed. The Working Group considered that it was crucial to ensure that all recycled organics become subject to a pasteurisation process of some sort. A majority also considered that the production of guidelines for the application of recycled organics to land was not required as long as minimum standards for the product could be demonstrated to have been met by those involved in the production process.

Feedstock for compost can come from a number of sources, but the one that engenders the most community concern is municipal solid waste (MSW). The views of Working Group members diverged on the issue of MSW-derived compost and whether or not source-separation produced a better quality product. Neither was it possible to reach agreement on whether or not MSW-derived compost should be restricted in its marketability.

The discussions held by the Working Group have covered a wide range of topics relevant to recycling of organic waste. The outcomes of those discussions have been recorded in this report. It is the intention of the Working Group that this document should provide input to the policy and business planning process of the Waste Management Board.

Key Findings

The key findings of the Working Group on Standards for Organics (including Compost) Applied to Land are:

1. There is approximately 1.2 million tonnes of organic waste generated in WA each year. The majority of this waste is garden organics, food organics and manures/sludges.
2. There is a lack of reliable, accurate publicly-available data on the generation and processing of organic waste.
3. It is probable that the amount of recycled organic products available will increase substantially over the next 10-15 years as an increasing amount of Perth's municipal solid waste is processed by Mechanical Biological Treatment (MBT).
4. The application of recycled organic products to productive (ie agricultural / horticultural land) is highly beneficial to the long-term health and sustainability of the soil. Increasing Soil Organic Matter (SOM) assists in water and nutrient retention that has both agricultural and environmental benefits.
5. There are human and environmental health risks associated with the application of unprocessed organic wastes directly to land. These risks include propagation of diseases, pests and weeds. There are also potential issues of water pollution and odour.
6. In order for the recycled organics sector to grow, there is a need to ensure and maintain public confidence in the quality of product available. This can be achieved through encouragement of an open and transparent sector that proactively addresses issues of community concern, and through communication of positive benefits of the application of recycled organic products to productive land.
7. There is a need for a minimum Standard for all organics applied to land. This Standard should address chemical contaminant levels, pathogen levels and levels of physical contaminants. The Standard should require a minimum level of processing of organic waste prior to application to land. The Standard should be enforced by the government, with demonstration of compliance being a condition of producer licencing.
8. There were a number of existing Standards that could be adopted as a minimum Standard. The most commonly referred to Standard for compost is AS4454. This Standard is currently under review by a national committee.
9. There is a need for government to develop policies and programs that promote the recycling of organic materials and the application of recycled organic products to agricultural land.
10. There is a need for government to develop policies and programs that will remove potential contaminants from organic waste streams used to make recycled organic products.
11. There is a need for the industry to develop product labelling protocols that clearly state the source, content and quality of recycled organic products.
12. There is a need for continued research and development in the area of application of recycled organic products to land.

13. There is a need for the State government to explore opportunities to encourage investment and innovation in the recycled organics sector through the use of market-based instruments, including the landfill levy, rebate schemes and a carbon credit trading scheme.

Recommendations

The recommendations of the Working Group on Standards for Organics (including Compost) Applied to Land are:

- 1) That the WA Government should adopt minimum standards for all organics applied to land to address the potential health risk. *(Page 8)*
- 2) That pasteurisation be set as a minimum processing requirement for all organics prior to land application. *(Page 8)*
- 3) That, as a first step, all recycled organic products should conform to the heavy metal limits specified in Standards published by a recognised industry body, such as International Federation of Organic Agricultural Movements (IFOAM). *(Page 10)*
- 4) That appropriate Quality Assurance methods, including third party audits, should be used in the production of all recycled organic products. *(Page 10)*
- 5) That the WA State government should collaborate with and support national (and international) research programs aimed at improving information and knowledge about potential chemical contaminants in recycled organic products. *(Page 10)*
- 6) That the WA State government should commission a study based on literature, knowledge of WA soils and plant requirements, to develop maximum safe application limits and, if necessary, to define a higher level that can be applied subject to soil analysis levels. *(Page 10)*
- 7) That recycled organic products should conform to the current standards for organic chemical contaminants contained in AS 4454. *(Page 11)*
- 8) That the WA Government should influence chemical registration authorities, including the National Pesticide Registration processes, to ensure that all new chemicals are tested for their biodegradability within aerobic composting processes. *(Page 11)*
- 9) That the recycled organics sector (via ROWA) should input into the review of AS4454-2003 with respect to allowable levels of physical contaminants. *(Page 11)*
- 10) That the WA State government should provide policy and resources to support the collection of source separated organic wastes and the removal of contaminants that impact on compost quality. *(Page 11)*
- 11) That policy and regulations on the collection of Household Chemical Wastes (HCW) should be strengthened and supported. *(Page 11)*

- 12) That policy and resources should be provided to support the adoption of biodegradable plastics that will fully degrade in the composting process. *(Page 12)*
- 13) That the State government should develop a Soil Protection Policy, and a strategy for increasing the amount of soil organic matter in WA's productive soils. *(Page 12)*
- 14) That the WA government should clearly support the use of recycled organic products on productive land as a tool for conserving water and minimising nutrient leaching. *(Page 13)*
- 15) That, in the interests of maintaining biosecurity at all levels, recycled organic products must be demonstrably free from plant or human diseases and weed seeds before they can be applied to land. *(Page 14)*
- 16) That the WA government and industry should work together to develop a comprehensive communication package that highlights the benefits of recycling organic matter, while addressing community concerns. *(Page 15)*
- 17) That the WA government and the recycled organics industry should contribute to the review of the definitions in the current version of the Recycled Organics Dictionary & Thesaurus. *(Page 15)*
- 18) That the WA government should support national industry initiatives to develop product disclosure labelling and a compost quality grading system. *(Page 15)*
- 19) That the State government should support the recovery and re-use of organic materials and promotes policy that:
- Recognise the importance of Soil Organic Matter (SOM) and the potential role of recycled organics in its management and conservation;
 - Prioritise safe recycling of organics wastes through their land application; and
 - Support recycling organic wastes above energy recovery.
- (Page 17)*
- 20) That the WA government develop requirements for land application of all organic materials within the framework of best practice, with regard to:
- Disease, pest and weed contaminants, including associated biosecurity risks, as set out in AS4454;
 - Health concerns in line with Public Health requirements, including fly breeding; and
 - Contaminant levels.
- (Page 18)*
- 21) That the WA government provide policy and resources to support::
- the reduction of contaminants in recycled organic products; and
 - encourages the continuous improvement of compost quality management.

(Page 18)

- 22) That the State government should support the development of an open and accountable recycled organics sector. *(Page 20)*
- 23) That the Waste Management Board and DoE should update and implement existing draft policy documents on recycled organics and produce current strategic policy for waste management in this area. *(Page 21)*
- 24) That the WA government should support national collaboration on the development of uniform policy, guidelines, standards and regulation in the area of recycled organics. *(Page 22)*
- 25) That landfill levy funds should be utilised to provide a rebate incentive for compost use in approved situations. The rebate should be based on compost quality as well as quantity. *(Page 23)*
- 26) That the use of compost on irrigated agricultural/horticultural land should be eligible for water efficiency rebates. *(Page 23)*
- 27) That the provision of “Carbon Credits” or “Environmental Credits” for appropriate recycling of organic wastes should be promoted through the Department of Premier and Cabinet’s Greenhouse Unit. *(Page 23)*
- 28) That the State government should support ROWA’s existing Action Plan. *(Page 24)*
- 29) That the State government should encourage the highest environmental value end use of organic materials. *(Page 25)*

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1 Introduction

The reasons for zero waste targets are beyond dispute in the broader environmental context. This is reflected in the Western Australian government's Sustainability Statement and the Waste Management Board's Strategic Direction for Waste Management in WA. We are still failing to deal adequately with the organic fraction of wastes generated in our society and this is making the goal of zero waste by 2020 more difficult to meet. It is, therefore, necessary to develop and adopt a consistent, effective and staged approach to the secondary use of organics that can be implemented sensibly and soon.

To this end, the report presents the views of the Waste Management Board's stakeholder Working Group on Standards for Organics (including Compost) Applied to Land in Western Australia. It addresses how and why recycled organics (including compost) may be utilised beneficially, safely and sustainably. It includes consideration of various factors relating to the growth of the recycled organics industry in WA as well as to risk assessment methods, quality control issues and pasteurisation as an important treatment feature. It also highlights the potentially positive role of recycled organics not simply in terms of waste management and industry development, but also in relation to improved soil health, water retention, and horticultural/agricultural productivity. The Working Group was very aware of the importance of maintaining community confidence and spent a considerable amount of time addressing matters of perceived public interest and concern.

2 Background

In WA, a point has now been reached where a positive policy/action nexus appears possible on organics. In 2004, the Western Australian Greenhouse Strategy identified specific actions for improving the secondary use of organics and the Waste Management Board's "Strategic Directions" document considered organic products to be a waste focus area. There is also an abiding interest in the community around the recycling, recovery and re-use debate. Importantly, too, the Waste Management Association of Australia (WMAA) has fostered a State-based approach to its Compost Roadmap project, the aim of which is to develop a viable and sustainable recycled organics (RO) industry across the nation. This undertaking has stirred the industry to review itself and encouraged the development and consideration of proposals for improvements across a wide range of issues and practices. As with any other reform agenda, it is important to take advantage of the synergies that exist between and across social, economic and environmental sectors.

It is in this context, and in response to a request from the Western Australian Minister for the Environment (Hon. Dr Judy Edwards MLA), that the Waste Management Board (WMB) established a stakeholders' working group to consider some facets of the recycled organics issue on its behalf.

Organic material is a major component of waste that is currently disposed to landfill, comprising more than half of putrescible waste from households and businesses. It consists of all solid food and food processing wastes, paper wastes, green organics, wood waste, timber processing wastes, biosolids, manures and sludges.

Traditionally, disposal of organic waste has been to landfill or land application. The nature and quantity of organic waste creates a range of potentially serious public health (disease, odours, pests), biosecurity, crop health and environmental issues such as greenhouse gases, particulate pollution from burning and leachate from landfill.

International and national acceptance of zero waste principles and the recognition of the adverse environmental impacts from landfilling have led to the development of strategies to

reduce and better manage organic waste. Among these strategies, and as a viable alternative to landfill, is the growth of composting and other processes that recycle this potentially valuable organic resource into a product that can be safely applied to land.

Unprocessed organic wastes present significant risks in terms of their potential to spread pests, diseases and weeds as well as to contaminate soil and water resources with nutrients and a range of other materials that are contained in these wastes.

Nationally and internationally, the importance of soil organic matter in contributing to soil and water quality as well as the quality of the air, is gaining far greater recognition (US Soil Society, EU Thematic Strategy on Soils).

Developing policies and regulations to enable the beneficial recycling of organic materials back to the land and to appropriate agricultural sectors has clear potential.

It is important to support procedures within industry that will encourage the production of quality recycled organic products. In addition to appropriate procedures for the development of recycled organic products, it is also essential to ensure the existence of appropriate management systems that will protect Western Australia's productive land and natural resources.

In addition to underpinning the safe recycling of organic materials, it will also be important to support the development of the recycling industry.

2.1.1 Sources of recycled organics

There is currently limited data available on recycled organics. WA is participating in a nationwide survey of organic waste processors, which should provide data on the amount and nature of organic waste being processed for beneficial re-use. The results of this survey are expected in November 2005.

A survey in 1994 on total organic waste generation in all sectors in Western Australia conducted by Dr Harrie Hofstede showed that total annual organic waste generation was 1.25 million tonnes in that year.

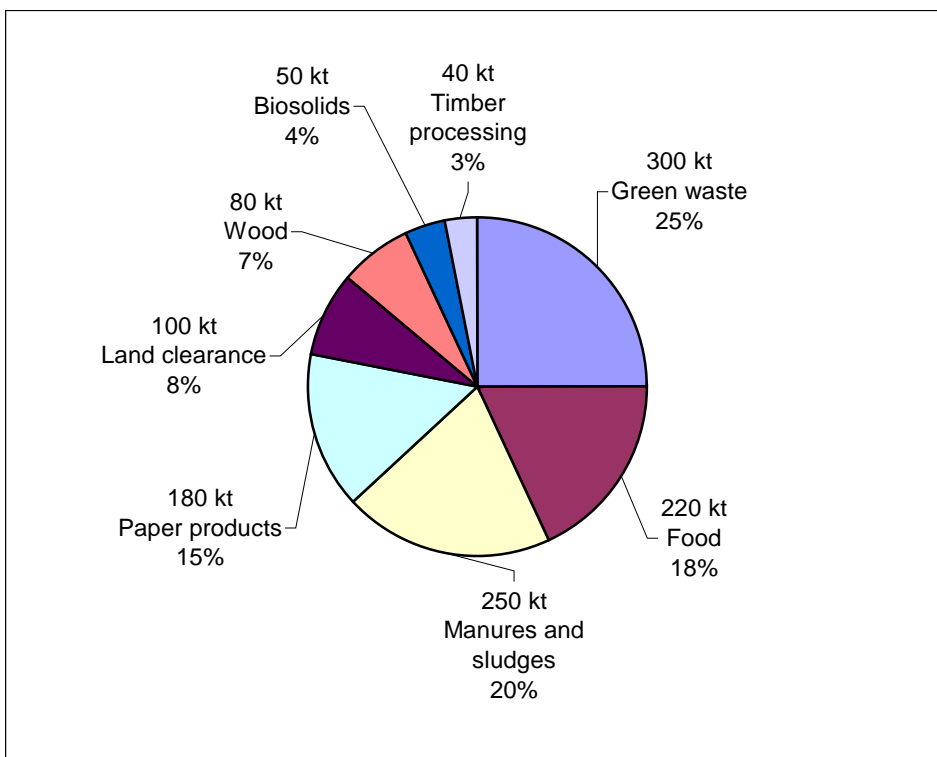


Figure 1: Organic waste generation in Western Australia in 1994¹

3 Purpose of this report

The purpose of this report is to provide considered input into the policy-making process and to advise the Minister and the Waste Management Board on whether and how recycled organics of all types can be safely applied to land. To this end, it comments on the adequacy and fit of existing standards with this broader range of organic products.

One outcome of the recommendations of this report would be to grow the recycled organics industry sustainably and safely and as part of any post-diversion strategy in relation to organic waste. There is a need to ensure that such growth occurs in the context of practices that adequately protect human health, the environment and agricultural systems.

4 Government Policy on Organic Waste

The Strategic Direction for Waste Management in Western Australia aims to achieve “zero waste” by 2020 and outlines a staged reduction in the amount of organic waste being disposed to landfill. Therefore, the State government will be looking to introduce a range of initiatives that will reduce the amount of organic waste generated and divert the remaining organic waste toward beneficial re-use.

The Health Act makes provision for the collection and disposal of refuse to sanitary landfill. Arrangements for re-use of food wastes would need to be with approval of the local Authority. With the introduction of the Health (Poultry Manure) Regulations 2001 there are requirements and restrictions on the sale, supply, transport and use of poultry manure (for application to land) in specified local districts. This regulation was introduced to control the breeding of stable flies and other nuisance flies.

¹ Hofstede H T, 1996, *Organic Waste Generation Survey in Western Australia*, Murdoch University

The storage and use of untreated organic materials (food waste or other manures) can be restricted or prohibited by provisions of the Health Act or Local Government Health Laws. This can relate to storage and use of materials causing fly breeding, other pest or nuisance problems. The Health Act also makes provision for certain noxious industries (manure works, piggeries) to be registered as Offensive Trades and be subject to annual licensing and monitoring. In some cases there is duplication of licensing with Department of Environment.

In 2004, the WA State government released *Hope for the future: The Western Australian State Sustainability Strategy*². This document outlines a vision of a sustainable future for Western Australia and provides direction and strategies for how this should be achieved. A suite of relevant links and Action items have been compiled from the State Sustainability Strategy and also the WA Greenhouse Strategy. These are attached as Appendix A.

5 Principles

In developing this policy document and in reaching its recommendations the Working Group was guided by six principles:

1. Sustainability;
2. Ensuring public support and confidence;
3. Protection and enhancement of WA soils as a productive resource;
4. Maximising resource recovery and re-use;
5. Performance-based outcomes and risk management;
6. Integration of other government and industry initiatives.

5.1 Sustainability

The State of Western Australia has a strong sustainability focus and has defined Sustainability as:

*Meeting the needs of current and future generations through an integration of environmental protection, social advancement, and economic prosperity.*³

Replenishment of organic matter of the soils in productive areas in Western Australia, will aid in the enhancement of biological, chemical and physical soil properties.

In recognition of the need to move towards a more sustainable society, the Western Australian government has developed strategies such as the Western Australian State Sustainability Strategy and the Western Australian Greenhouse Strategy (2004). There are also five Natural Resource Management regional Strategies that are currently being implemented (through matching State and Federal Government funding), with the Rangelands NRM Strategy being finalised this year. All of these strategies have included an identification of a 'Vision' (eg for the Strategy Outcome and Region), Objectives and Action targets that have been developed in association with broad community consultation.

² WA Department of Premier and Cabinet (2004) *Hope for the future: The Western Australian State Sustainability Strategy*

³ WA Department of Premier and Cabinet (2004) *Hope for the future: The Western Australian State Sustainability Strategy*

Re-directing organic wastes from landfill into composting and other appropriate means of treatment, followed by application of these products to WA soils, will enhance the sustainability of our society through re-use of organic resources, decrease in production of methane (as an extremely damaging greenhouse gas emitted from landfills) and a consequential decrease in the 'ecological footprint' of our urban and rural communities.

5.2 Ensuring public support and confidence

The Working Group recognises that there is strong public support for the concept of reusing organic materials, but understands that public support will only be maintained if the actual and perceived risks of reusing former waste materials, including wastes of human and animal origin, are fully and openly addressed.

Accordingly, the land application of organics (i.e. the use of recycled organics in horticulture, agriculture, domestic and public urban amenity, highway construction and maintenance, land rehabilitation and storm water management) must be subject to the effective implementation of minimum product standards that regulate handling and processing and that will ensure the protection and enhancement of public health as well as the environment and social amenity. These processes need to involve licensing and be applied uniformly to all commercial organic recycling operations, regardless of feedstock and source.

Specifically, the Working Group felt that to maintain public confidence it was important to encourage a responsible, open and accountable recycled organics industry that supports the community desire for recycling and waste minimisation and that provides safe products that do not pose unacceptable risks to public health or the environment.

This requires a range of actions, including community education and engagement, minimum standards, effective reporting, monitoring and regulation, effective labelling of recycled organic products, etc, which are addressed further in the report.

5.3 Protection and enhancement of WA soils as a productive resource

The WA agricultural sector produces approximately 60% of Australia's grain exports, which is of importance both economically and for sustainability.

Most WA soils are impoverished, highly weathered sands with low organic matter, low nutrient content and low nutrient retention capacity. Agricultural and horticultural production has traditionally relied on chemical fertilisers to supply nutrients, but this practice clearly does not replenish organic matter, which is crucial for improving soil fertility. Increased organic matter content in soil would result in better water-use efficiency, increased nutrient retention and supply, and therefore improved soil fertility and general soil health. This is a desirable outcome not just in agricultural, horticultural and other forms of commercial use of soil, but is absolutely indispensable in many land rehabilitation projects (eg. following bauxite mining in Darling Ranges). Hence, maintaining and where possible increasing organic matter content by the addition of organic products is a pre-requisite to protecting WA soils as a productive

In advocating the application of recycled organic products to WA soils to enhance soil fertility, this document in no way supports application of such organic sources to native ecosystems.

resource.

5.3.1 Benefits of applying organics to land

Material high in organic matter tends to be biologically active. This is one of the benefits of recycled organic products – they can revive microbial activity in the soil. Soil microbes break down organic matter and thus contribute to nutrient cycling. Supplying nutrients as organic matter and having microbes release them is advantageous because the process of nutrient release matches nutrient demand by plants during the growing season much better than supplying nutrients in the form of easily soluble chemical fertilisers.

Soil microbes also break down pesticides and other organic compounds that may be introduced into soil either as part of farming operations or inadvertently in large concentrations as contaminants. Hence, soils with strong microbial activity are healthier and more resilient than soils with poor microbial activity. Most WA soils would currently fall into the latter category and adding recycled organic products would help alleviate the problem.

Recycled organic products contain chemical elements and compounds, many of which are essential nutrients for plants and humans. The most notable examples are zinc and copper. These are micronutrients essential for normal growth and development of all living organisms on Earth. About 1.5 billion people in the world are considered deficient in zinc. Estimates for the Australian population are that about 33% of males and up to 85% of females consume less than the recommended amount of zinc in their diet. With an increasing proportion of the population steering away from meat and meat products toward vegetarian types of diet, the problems with zinc nutrition may be exacerbated. Therefore, ensuring that grain and other plant-based foods contain adequate concentrations of zinc is very important.

In their natural state, WA soils are low in zinc and copper. In many situations, adding recycled organics that contain zinc and copper will improve plant growth and result in products that will be healthier for consumers to eat.

The climatic trends in WA (especially in the last 50 years) show convincingly that the climate is getting drier. Lower rainfall clearly has numerous ramifications for our society and our way of life. One factor that is important within the context of this document is the need to increase water-use efficiency of crops, pastures and other economically-useful plants (producing more grain, fodder, etc. per millimetre of rain). In WA soils with low organic matter content, adding recycled organics can increase soil water-holding capacity, thus allowing more water to be available to plants, resulting in a greater amount of agricultural commodity to be produced per unit of rainfall.

5.4 Maximising resource recovery and re-use

Consistent with the Strategic Direction for Waste Management in WA and the waste hierarchy, the Working Group fully supports the principle of maximising resource re-use and recovery that is embodied within the waste hierarchy and considers this to be the basis for the development of policy and strategy in the recycled organics area.

The Working Group also considers that the importance of recycling over energy recovery, embodied in the Strategic Directions for Waste Management in WA needs to be strengthened and more clearly spelt out in the development of organic recycling policy and strategy development.

A high degree of public confidence and acceptance in the land application of recycled organic products is crucial to providing long term viable alternatives to the hierarchically less desirable alternatives of incineration and continued landfilling of waste organic materials.

5.5 Performance-based outcomes and risk management.

The Working Group felt that a performance-based approach, utilising risk management in conjunction with minimum standards, would allow flexibility and site-specific management to ensure sustainability. It also considered that community issues need to be addressed in a scientifically justifiable manner.

5.6 Integration of other government and industry initiatives

Integration is a key aspect of developing policy and intersections with other government and industry initiatives is imperative.

The Working Group recognises that there is increasing interest in, and attention being given to, reusing organic wastes by Governments (national and state), industry (the waste management industry and the recycled organics industry) and the community.

It considers that working in collaboration with these stakeholders nationally will achieve consistent approaches across jurisdictions. Recognising Western Australia's isolation, this is more efficient and likely to lead to better outcomes for the public and the industry. It is important however that WA's specific needs and circumstances are respected in any collaborative efforts.

More specifically, this means taking advantage of existing synergies and ensuring that prospective policy is capable of meshing with current industry action, community impetus and/or ongoing reviews, such as the Resource Recovery Rebate Scheme, Biosolids Guidelines, Compost Roadmap, Health Department review, Guidelines developed by other jurisdictions, and ROWA Action Plan.

6 Issues to be managed in recycling Organics

There was considerable discussion by the Working Group on the potential public health and environmental impacts of the use of recycled organics in various settings. While there were divergent views on the level of risk that recycled organics posed to both people and the environment, all Group members agreed that there was a level of concern within the community regarding these issues that deserved to be respected and addressed through open debate. As such, the industry, as individual operators and as a whole, needed to address these issues.

6.1 Protecting public and environmental health

There is a number of potential issues associated with the use of recycled organics. These mainly relate to the use of unprocessed organic materials, such as raw manures. There is also contamination, especially in recycled organic products made from mixed waste streams.

There was considerable discussion by the Group around what were the real risks and what were perceived risks, and how these should best be addressed. There was agreement that organic wastes pose potential risks and that their management is best achieved by the application of minimum standards that address all organic materials and not just composts.

6.1.1 Human pathogens

Raw organic wastes potentially contain pathogenic bacteria, viruses, and other potentially harmful micro-organisms, such as protozoa and Helminths (worms). Biosolids are regulated to minimise the risks to human health. However raw manures, widely used as a soil fertiliser and soil amendment in horticulture, have a high potential for containing pathogens.

Concerns were raised by the Working Group on the gaps that currently exist within the regulatory and policy framework between different types of organic wastes. For instance, there are few regulatory restrictions on the application of raw manure to land.

Ultimately, pasteurisation is a minimum requirement (Millar 2000)⁴ for effectively managing pests, diseases and weeds and should be required before any organic material, including biosolids, is land applied.

The Working Group considered the pasteurisation of recycled organic products before they are applied to land to be the best option to ensure that any risk is managed. AS4454 provides a proven set of minimum protocols for achieving pasteurisation within a composting process.

Recommendation:

- 1) That the WA Government should adopt minimum standards for all organics applied to land to address the potential health risk of pathogens.
- 2) That pasteurisation be set as a minimum processing requirement for all organics prior to land application.

6.1.2 Vectors

A vector is an animal or insect that could potentially play a role in transmitting pathogens and/or pests. Vectors can include flies, cockroaches, rodents, birds and a range of other animals. Vectors are attracted by odours associated with poorly stabilised organic material.

A good example of a nuisance (over recent years) is the use of poultry litter for irrigated horticulture and the problems this practice has caused with breeding of stable flies, etc. Infestations of stable fly have been causing major disruption to livestock industries and landowners in areas such as Gingin. The Department of Health introduced legislation (Health Poultry Manure Regulations 2001) to restrict and regulate the sale, supply and storage of poultry manure. The use of raw poultry manure is restricted (in 13 local government districts) to winter months (May-August). This is currently under review and there are likely to be further restrictions.

The view of the Working Group was that properly composted organic material does not attract vectors. Therefore, potential problems would be prevented by requiring composting of all organics prior to application to land.

Recommendation:

Refer to recommendation 2.

⁴ Millar, P, D. (2002). Composting: A durable technology for disinfestation of manure, sewage sludge and organic residuals in an era of emerging and re-emerging pathogens. *Composting and compost utilisation. 2002 International symposium, Columbus, Ohio USA*

6.1.3 Chemical contaminants

Many chemicals are essential for healthy people and healthy ecosystems. Other chemicals are not essential and can have damaging effects, even at low concentrations. Even essential chemicals can be damaging at excessive concentrations.

6.1.3.1 Inorganic Chemicals

Recycled organic materials contain a wide range of nutrients and chemical elements that are beneficial for productive soils. High quality organic matter based soil products, such as high nutrient compost, contain high concentrations of essential plant nutrients, including macro nutrients (ie. nitrogen, phosphorus, potassium, calcium, magnesium and sulphur) and trace metal nutrients (ie. boron, copper, iron, manganese, molybdenum and zinc). The use of quality high nutrient products can significantly reduce or eliminate the need for chemical fertilisers in productive agricultural systems.

As recycled organic products contain plant nutrients in a bio-available form, there is a risk that some of these nutrients can lead to environmental contamination if not used correctly. For example, nitrate pollution of groundwater may arise if high concentrations of organics are applied to highly porous sands under irrigation, though in perspective this risk is lower with recycled organics compared to chemical fertilisers. Also, the concentrations of nutrients are not always "balanced". For example, some recycled organic products contain excessive amounts of copper and zinc. If the rate of application is calculated to satisfy the crop's requirement for nitrogen, the amounts of copper and zinc applied will be excess to the crop's requirement and may reach toxic concentrations in some circumstances or lead to soil accumulation of these metals.

As metals do not decompose, the pathways following application are removal through plant uptake, soil fixation and leaching. The objective of metal standards is to avoid long term accumulation of metals in soils while providing sufficient beneficial trace elements for soil and plant health.

Recycled organics also contain a number of other elements that are not essential for either animal or plant growth. These are often referred to as "heavy metals", some of which can be toxic to human or plant health. The elements of most concern are cadmium, lead, mercury, nickel, and arsenic. Chromium, cobalt and selenium are often regarded as heavy metals. They are essential for human health at very low concentrations, but can be toxic if present in higher concentrations.

The presence of measurable concentrations of either essential plant nutrients or toxic heavy metals in recycled organic materials does not always mean that they can be taken up by the plant or pose a threat to environmental or human health. There is evidence to indicate that organic materials can "sequester" many toxic heavy metals, thereby rendering them in a form that reduces their bioavailability. CSIRO is currently managing a National Program to measure the bioavailability of copper, zinc and cadmium in biosolids.

The majority of the Working Group considered that the best approach to dealing with heavy metals was for the government to develop and enforce minimum standards for all organics applied to agricultural land that set maximum concentration limits for heavy metals. Suppliers of recycled organic products would need to demonstrate that their products comply with the minimum standards.

Another approach suggested by some members of the Working Group is to standardise soil loading of metals rather than strictly relying on total metal concentrations in compost. By setting a maximum permissible soil metal loading based on sustainable metal removal from soils the monitoring of soils is simplified and it also provides the recycled organic industry with a market based incentive to reduce metal concentration in the products.

A compromise view was reached that, as an interim step, all recycled organic products should conform to a recognised Standard of some kind, such as AS4454, International Federation of Organic Agriculture Movements (IFOAM) or US Department of Agriculture.

Recommendation:

- 3) That, as a first step, all recycled organic products should conform to the heavy metal limits specified in Standards published by a recognised industry body, such as International Federation of Organic Agricultural Movements (IFOAM).
- 4) That appropriate Quality Assurance methods, including third party audits, should be used in the production of all recycled organic products.
- 5) That the WA State government should collaborate with and support national (and international) research programs aimed at improving information and knowledge about potential chemical contaminants in recycled organic products.
- 6) That the WA State government should commission a study based on literature, knowledge of WA soils and plant requirements, to develop maximum safe application limits and, if necessary, to define a higher level that can be applied subject to soil analysis levels.

6.1.3.2 Organic Chemicals

There are several groups of organic chemicals that could be considered in the recycling of organic waste materials. The extent of our concern may change in the future as information and knowledge improves. Ongoing research and monitoring will be needed and this will require widespread cooperation both nationally and internationally.

Organic chemicals include pesticides, PCB's (polychlorinated biphenyls), dioxins and furans, pharmaceuticals and endocrine disruptive chemicals (EDC's).

Pesticides are widely used in agriculture, horticulture and home gardens. Chlorinated compounds (PCB's, dioxins, furans) are widespread in the environment. They result from manufacturing, industrial and various combustion processes (including incineration and bushfires). Current standards for recycled organic products address levels of a range of common pesticide types and PCBs.

Generally, organic compounds can be degraded by the biological activity and other conditions found within a well-controlled composting process. This method of treatment is well documented and used successfully around the world.

Pharmaceuticals are widely used in human health and animal husbandry. EDCs include a range of compounds that affect the endocrine (hormone) system. The presence of pharmaceuticals and EDCs in waste streams is of increasing interest internationally. The national biosolids management guidelines address this issue thus:

Knowledge is limited in relation to the quantities of these compounds in Australian biosolids, however, monitoring undertaken to date indicates that the levels are generally lower than in other countries. The small quantities of these chemical found in biosolids and the management guidelines presented in this Guideline means that the risks they pose are expected to

be low. However, further work and research is presently being undertaken in this area in Australia and overseas to confirm this.⁵

Recommendation:

- 7) That recycled organic products should conform to the current standards for organic chemical contaminants contained in AS 4454.
- 8) That the WA Government should influence chemical registration authorities, including the National Pesticide Registration processes, to ensure that all new chemicals are tested for their biodegradability within aerobic composting processes.

6.1.4 Physical Contaminants

Recycled organic products can contain physical contaminants. The main physical contaminants identified as an issue are glass, plastic and other non-biodegradable materials. The impact of these contaminants was felt to depend largely on the end use of the product. For instance, if it was to be handled, then sharp contaminants could be a problem.

The Working Group considered that this issue could be dealt with by the appropriate classification of recycled organic products and proper designation of end use for different grades.

However, there was disagreement within the Working Group as to the most appropriate method of reducing the level of physical contaminants in recycled organic products. Some members of the group favoured source separation at collection (eg adding an additional green bin for greenwaste/kitchen waste collection). Other Group members believed that source-separation actually led to increased contamination levels and that high levels of processing with appropriate technology was the best way to achieve low contamination rates.

There were also some within the Group who believed that the physical contamination limits allowed in AS4454-2003 were too lenient, and that this could lead to recycled organic products containing relatively large pieces of glass and plastic being sold under the Australian Standard logo. It was feared that this could incur health and insurance risks. However, there was no consensus on this view.

It was noted that the AS4454-2003 is currently being reviewed by a national committee.

Recommendation:

- 9) That the recycled organics sector (via ROWA) should input into the review of AS4454-2003 with respect to allowable levels of physical contaminants.
- 10) That the WA State government should provide policy and resources to support the collection of source separated organic wastes and the removal of contaminants that impact on compost quality.
- 11) That policy and regulations on the collection of Household Chemical Wastes (HCW) should be strengthened and supported.

⁵ CSIRO (2005) *Background and scope for establishing a list of prohibited substances and guideline limits for levels of contaminants in fertilizers.*

- 12) That policy and resources should be provided to support the adoption of biodegradable plastics that will fully degrade in the composting process.

6.1.5 Public Amenity/Nuisance Issues

The Working Group felt that issues of dust, odour and noise were minor relative to the need to replenish valuable organic material in productive soils. The Group also noted the existence of other regulations governing such nuisance and the view was expressed that any additional Guideline or regulation that sought to control these types of emissions during the application of recycled organics to land would inhibit the growth of the compost market, and hence should not be considered.

Nevertheless, some Working Group members considered that guidance recommending that recycled organic products should be brought to a moisture content above 35% prior to spreading, would be useful for controlling dust.

6.1.6 Soil Protection

Soil fertility (with its three inter-related components: biological, chemical and physical properties) is crucial for sustainable use of soils and, as such, needs to be managed and maintained.

Soil supports over 90 per cent of the world's food production and humans and all other land based organisms ultimately live on it. Maintaining good soil health is, therefore, essential to our existence. Nutrients are constantly being 'exported' from farms in the form of plant and animal products and farming practices are also contributing to the decline in soil quality.

Most soils in WA that have been used in agriculture, horticulture, viticulture and plantation forestry have low fertility, in a large part due to low organic matter content. An increase in soil organic matter content is of utmost importance in ensuring the sustainable use of such soils.

Soil is an important environmental, economic and social resource and hence needs to be protected. Applying recycled organics may result in many desirable changes in soil properties (eg. an increase in organic matter content, addition of nutrients, higher water-holding capacity, enhanced soil health, etc.). Regular monitoring (the frequency of which would be dependent on at least land use and the amount, characteristics and frequency of recycled organics application) needs to be encouraged to monitor ongoing soil health.

The adoption of a Soil Protection Policy should complement the development of the recycled organics industry and the increased use and application of organics being applied to land. This Policy should incorporate relevant visions, objectives and actions from the Western Australian State Sustainability Strategy, the Western Australian Greenhouse Strategy, and the relevant resource condition targets and management action targets from the various Natural Resource Management Regional Strategies.

Recommendation:

- 13) That the State government should develop a Soil Protection Policy, and a strategy for increasing the amount of soil organic matter in WA's productive soils.

6.1.7 Protecting Water Resources

There was some discussion regarding the potential for pollution of water resources by organics applied to land. While it was generally agreed that inappropriate application of unprocessed organics, particularly raw manures, could pose a risk to nearby surface waters, the view was strongly expressed that properly composted organics posed little pollution threat to water resources.

Compost is a useful tool for controlling soil erosion and immobilising nutrients. As such, it can be used to assist in water resource protection, but must be used in accordance with best environmental management practice.

Recommendation:

- 14) That the WA government should clearly support the use of recycled organic products on productive land as a tool for conserving water and minimising nutrient leaching.

6.1.8 Biosecurity Management

Biosecurity in agricultural production has emerged as a major challenge. Biosecurity risks associated with insufficiently processed recycled organics application include the presence of human and/or plant pathogens, crop pests and weed seeds. These contaminants can result in losses in crops and quality.

Other threats include food safety and chemical residue issues both of which have the potential to impact on the viability of agricultural/horticultural industries through consumer concern (both real and perceived) over how food is produced.

The proposed Food Act in Western Australia will ultimately impose a responsibility on *all* sectors of the food production chain (from producers to processors) to control food production hazards when producing food for human consumption. For example, in the poultry industries this means that meat and eggs must be produced under stringent food quality standards to ensure that any chemical residues detected do not exceed Maximum Residue Limits and that microbiological contamination is controlled.

Biosecurity risks are also closely linked to issues of biodiversity. Proliferation of diseases, pests and weeds are a threat to native ecosystems as much as to agricultural systems. Therefore, control of these risks is important for sustainability on both an economic and environmental front.

6.1.8.1 Waste disposal

The uncontrolled distribution of 'raw' mulched plant material contributes to the spread of diseases, pests and weeds and presents an unacceptable risk to commercial agriculture. It should also be unacceptable to the community because this practice poses a significant risk to biosecurity when unavoidable delays between a biosecurity incursion and its detection result in its significant spread, as was the recent case in California with Sudden Oak Decline.⁶

Greenwastes, while generally considered to be safe, can contain human pathogens from contamination with food and animal waste during collection and contain a range of plant

⁶ R. Paulin and P. O'Malley (2005) *The Role and Importance of Agriculture to Organic Recycling and Sustainable Community*, Waste and Recycle Conference 2005, Perth.

pests and diseases as well as weeds that present as serious contaminants to agriculture. The composting process provides a mechanism for managing all of the risks associated with recycling organics because it is amongst the best and most adaptable technologies for pasteurising organic materials (Millar 2002). Further, as composting usually involves blending a range of feedstocks, dilution can also be used to manage contaminant levels.

There is a need to consider the reuse of many organic wastes in situations where they are reapplied to the land from which they were derived. This is important for the agro-forestry industry. However, it also needs to be acknowledged that with respect to raw manures, attention to the capacity of the land and the potential for exotic contaminants to have been brought in through animal movement must be addressed.

Recommendation:

- 15) That, in the interest of maintaining biosecurity at all levels, recycled organic products must be demonstrably free from plant or human diseases and weed seeds before they can be applied to land.

6.2 Social Issues

There is a need for a whole of community – government, industry and individuals – to be involved in policy processes. In keeping with this view, the recycled organics industry leaders support full engagement with government and the community. While, past practice has focused on economic factors alone, the new paradigm requires that the recycled organics sector meets its social and environmental obligations.

6.2.1 Community concerns

A considerable part of the Group's deliberations centred around community perceptions of recycled organic products. The Group was presented with a summary of community concerns that had been compiled from letters received by the Minister for the Environment.

Government policy encourages increased recycling of wastes. The community strongly supports such a policy and the recycled organics sector provides one of the best opportunities to achieve this objective.

However, it is important that the recycling of organic wastes also meets community expectations in terms of public health and environmental protection.

As increasing quantities and sources of recycled organic products are successfully recycled we will need to ensure that public confidence is maintained. A case in point is the composting of MSW waste, about which concern has been expressed. Some members of the Working Group felt that many of the concerns arose from a lack of awareness or understanding of the processes and scientific basis for the production of recycled organic products. But this was not a consensus view.

It was agreed that government and industry work together to develop a comprehensive communication package that highlights the benefits of recycling organic matter while addressing community concerns.

A number of communication/information initiatives that should be undertaken were identified by the Working Group, namely community education, standardisation of terminology and product disclosure. It was suggested that any communication initiatives on recycled organics need to be integrated with water conservation programs and support the clean and green image of WA's horticultural and agricultural products.

It was also suggested that the State government should conduct a review of past and current education and awareness-raising Waste-Wise type programs (eg in line with the Department of Environment's Environmental Education Survey program and State Sustainability Strategy recommendations and Actions) to streamline programs and to enable further capacity-building of the wider community for improved sustainability outcomes as a society. The need to leverage off existing programs, such as water conservation and nutrient run-off control messages, was also identified by the Group.

An attempt has been made by the Recycled Organics Unit (ROU) at the University of New South Wales to develop a standard terminology for use across the recycled organics industry. While the first ROU Dictionary is comprehensive and extremely useful, the Working Group considered that some of the definitions required review..

The concept of full product disclosure is becoming increasingly prevalent in Europe and North America. This entails labelling products so that consumers can see what the product contains and the source of the feedstock. This practice highlights to consumers that not all recycled organic products are the same, and that they should consider products that are "fit for purpose" for their specific use.

Recommendation:

- 16) That the WA government and industry should work together to develop a comprehensive communication package that highlights the benefits of recycling organic matter, while addressing community concerns.
- 17) That the WA government and the recycled organics industry should contribute to the review of the definitions in the current version of the Recycled Organics Dictionary & Thesaurus.
- 18) That the WA government should support national industry initiatives to develop product disclosure labelling and a compost quality grading system.

6.2.2 Other Issues raised by the Community

A number of concerns had been raised with the Department of Environment that the Working Group needed to address. These included:

- AS4454-2003 was not intended to be used for compost derived from unsorted municipal waste.
- Need for State based adaptations of AS4454-2003 to address local soil conditions.
- Introduction of source separation of organic wastes to minimise levels of contamination within compost.
- Developing quality controls for the production of recycled organic products.
- The build up of physical contaminants (eg: glass, plastic, etc) in soils from the ongoing use of compost
- Adequacy of the current regulatory framework
- Need for more rigorous Standards for testing
- Need for regulations to control pesticide application in gardens

- Need for a Soil Protection Policy
- Ban organic waste going to landfill
- Encourage source separation the organic fraction of household waste, ie garden and food waste.

The Working Group debated these community concerns but could not resolve a unified position of response. However, it was felt by a number of members of the Group that some of the concerns stemmed from misconceptions. For instance, both AS4454-1999 and AS4454-2003 make reference to unseparated municipal solid waste and a few Working Group members were in a position to confirm that this material was not outside AS 4454 parameters. The other concerns listed are dealt with through the body of the report.

7 Encouraging the Recycled Organics Sector

7.1 Trends in the generation of recycled organics

As with WAste 2020, it is necessary to look at trends over the next 15 year time horizon – clearly the main difference will be the increasing amounts of MSW compost and recycled organic products coming on stream.

The quantities of waste water treatment sludge (biosolids) is expected to rise to 110 000 tonnes WS/a by 2010, to 140 000 tonnes WS/a by 2020 and to 160 000 tonnes WS/a by 2040 as a result of Perth's predicted population growth and likely refinement of wastewater treatment (to further improve treated wastewater quality), which will inevitably increase the volumes of sludge produced.

The current amount of poultry litter (meat bird) produced annually is 100 000 tonnes. For layer birds (egg production) the figure is 15 000 tonnes annually.

There will also be increasing amounts of MSW compost and other recycled organic products coming on stream. Recycled organics products derived from mechanical biological treatment (MBT) of mixed municipal solid waste (MSW) are already produced in large volumes, and are anticipated to be an increasing feature of the WA compost market in future years. By 2010, for instance, the Southern Metropolitan Regional Council, the Western Metropolitan Regional Council and Mindarie Regional Council are all expected to be operating MBT plants to process municipal solid waste from their catchment areas. It is possible that the Eastern Metropolitan Regional Council will install an MBT plant as well.

Extrapolating data from the Southern Metropolitan Regional Council indicates that using wet / dry MGB and bundled garden waste kerbside collection system will result in approximately 150 000 tpa of MSW derived compost and 60 000 tpa green waste compost being produced across Perth.

There are various estimates of potential growth in the compost market, with 200 000 tpa being a commonly quoted figure. Estimates of potential growth in the market for soil conditioners vary from 700 000 tpa to 1 000 000 tpa.

There is some concern that, with the increasing number of composting facilities coming on stream in the near future, there will be more recycled organics product available than the established market in Perth has demand for, or is likely to be able to increase to, without significant changes in government policy and within the recycled organics market. However,

there is also a competing view among members of the Working Group that MSW-derived compost should be restricted in its use.

7.2 Growing the Industry

The Working Group recognises that over the next decade, the volume of organic 'waste' materials generated will increase substantially due to growth in the agricultural livestock sector, timber industry by-products, and Government policies preventing landfilling and other forms of disposal of domestic putrescible wastes and green wastes.

In this context it is crucial that the recycled organics industry takes up the challenge to grow the sector in order to productively use the volumes coming on stream. The Working Group considered that developing a wide range of diversified products to meet a wide variety of applications will be important both for the future viability and growth of the sector, and for the government and Western Australian community to achieve the aim of recycling, not disposing of organic materials.

The Working Group considers that attention needs to be given to creating new products that are formulated as "fit for purpose" for specific applications. It is thought that such products will be in high demand by customers. It was suggested that the Government should set performance standards for products to be met by processors and that processors ought be free to adopt technologies and treatment processes to meet those standards/requirements.

To be truly sustainable, there is a need to minimise transport distances, so products need to be used close to the source of generation of organic waste streams. This suggests that attention should be given to products specifically for the intensive horticultural industries around major population centres including vegetable, fruit and vine / wine grape production, as well as urban (domestic, amenity commercial landscaping), landscape rehabilitation / highway construction, bioremediation and potentially storm water management.

The Working Group recognises that these considerations will not prevent broadacre agricultural uses for certain recycled organic products some distance from Perth providing their use is economically viable.

Recommendation:

19) That the State government should support the recovery and re-use of organic materials and promote policy that:

- Recognises the importance of Soil Organic Matter (SOM) and the potential role of recycled organics in its management and conservation;
- Prioritises safe recycling of organics wastes through their land application; and
- Supports recycling of organic wastes above energy recovery.

7.2.1 Focusing on products and applications

The Working Group considered that any Standards produced by the Department of Environment should focus on setting a minimum quality of the product, rather than focusing on feedstocks and processes.

The principles are to provide guidance, to implement uniform standards and encourage the development of quality 'fit for purpose' products.

Applying compost to WA's soils adds organic matter and nutrients, enhancing soil health. This will in turn enhance sustainability of agricultural and other land uses.

Developing specific products for specific applications will require research in targeted agro-ecosystems around Perth. Such research will need to be based on sound scientific principles to result in outcomes that go beyond site-and season-specific effects.

Accordingly, the industry needs to be encouraged to focus on developing a range of recycled organic products that are fit for a variety of beneficial uses, eg market gardening on the Swan Coastal Plain north to Gingin, and south to Bunbury, viticulture in the Swan Valley, orchards in the Perth Hills and Dwellingup, the domestic market, and urban amenity applications. This is in addition to providing recycled organic products for broad acre agriculture within, say, 100 km of Perth.

Recommendation:

20) That the WA government develop requirements for land application of all organic materials within the framework of best practice, with regard to:

- Disease, pest and weed contaminants, including associated biosecurity risks, as set out in AS4454;
- Health concerns in line with Public Health requirements, including fly breeding; and
- Contaminant levels.

21) That the WA government provide policy and resources to support:

- The reduction of contaminants in recycled organic products; and
- The continuous improvement of compost quality management.

7.2.2 Compost Derived from Municipal Solid Waste

Conversion of putrescible organic materials from municipal (domestic) mixed solid wastes and green wastes into beneficial recycled organic products is a key challenge for cities like Perth. The large volumes of compost likely to come on stream in the next 10 years, gives further impetus to the need to develop a greater range of differentiated products to generate greater demand for recycled organics.

It was in response to community, industry and customer concern regarding the use of compost derived from waste in Western Australia, that the Minister for the Environment requested the formation of this Working Group to examine the issue. Some members of the Working Group have not been convinced that MSW-derived compost ought be unrestricted in its marketability and application. There is also a desire on the part of some group members for greater separation of waste at source as a way of improving the feedstock associated with MSW-derived compost in the future. Actions of this kind would complement policies designed to reduce/recover/reuse packaging and will eventually lead to the eradication of a number of current pollutants (e.g. plastic and glass).

The Working Group has assessed the two processes operating in Perth (Atlas and Southern Metropolitan Regional Council) and their resultant compost products. Both products meet the relevant Australian Standard for Compost, and are suitable for a variety of uses, although there are some minor issues with specific contaminants. A majority of the Working Group members considered that quality compost products could be produced from mixed municipal solid wastes. There was, however, no consensus that use of such product should be unrestricted.

There was a majority view that MSW composting does provide a mechanism for reusing a significant component of our waste streams that would otherwise be lost to landfill disposal and that new technologies to manage physical contaminants will continue to emerge. From the perspective of these Group members, support for MSW composting could, therefore, continue providing that:

- Efforts to increase source separation are not reduced;
- Minimum safety standards are met for protecting the soil and water resources as well as human and crop health; and
- Consideration is given to the public funding of public waste treatments (MSW and biosolids) versus privately funded operations in the recycled organics sector.

However, a view was expressed that, due to the wide range and amount of potential contaminants in MSW and the increasing concern about these contaminants by end users and the community, only recycled organic products from source-separated organics should be eligible for un-restricted use. This view was based on overseas experience that indicates that MSW-compost is consistently of a lower grade than products made from source-separated streams (provided the source-separation is supported by adequate collection systems and education programs). Promotion of lower grade MSW-compost has the potential to undermine the market's confidence in recycled organics products as a whole, as well as potentially putting contaminants onto agricultural land. Reference was made to research from the USA and Europe that support this point of view.^{7 8 9 10}

A challenge also lies in ensuring that products of a lower grade are not seen as substitutes for higher grade products in a compost market that is still in its early stages of development. Accordingly, opportunities to create a market distinction and differentiate between products that meet the minimum requirements of AS4454-2003, need to be considered. This could involve embedding the 'disclosure' approach with an industry managed quality management 'Seal of Approval' program for which a number of models exist.

⁷ Professor Harry A. J. Hoitink, Quality Requirements for Value added Marketing of Composts, 2005. <http://plantpath.osu.edu/faculty/Hoitink2005USCOMPOSTINGCOUNCILTALKfinal.pdf>

⁸ E. Favoino, *Composting across Europe*. Leading experiences and developing situations: ways to success, 2002. <http://www.hua.gr/compost.net/Favoino%20,%20composting%20across%20Europe.pdf>

⁹ <http://compost.css.cornell.edu/MSWFactSheets/msw.fs3.html>

¹⁰ WRAP, *Comparison of Compost Standards in the EU, North America and Australasia*, June 2002, Section 1, p. 37.

In the interests of improving compost quality from both MSW and source separated feedstock, efforts are needed to remove contaminants from the organic waste stream that potentially reduce compost quality. In addition to household chemicals and other biologically toxic substances and chemicals, consideration also needs to be directed at other relatively inert contaminants and in particular, plastic films and bags.

Strategies are also needed to minimise the potential for unexpected contaminants to disrupt the Recycled Organics Industry. This is highlighted by recent issues, principally in the USA and New Zealand, with feedstock contaminated with the herbicide (clopyralid) actually forcing the closure of some large composting plants. Approaches to registration authorities such as the National Pesticide Registration Authority are therefore needed to ensure that future pesticide and other chemical products are tested for their biodegradability within aerobic composting processes.

Replacing plastic 'shopping bags' with biodegradable bags made from 'compostable' plastics derived from starch and cellulose rather than hydrocarbons from the petroleum industry would significantly improve the quality of most composts. The use of biodegradable plastic film/bags (and potentially other plastic products) will be more expensive. Their introduction, therefore, needs to be managed in conjunction with regulatory compliance rather than through voluntary process in order to ensure that additional costs are applied equally to all parties. This approach is likely to significantly benefit the composting of food wastes that invariably have high levels of plastic contamination.

Recommendation:

Refer recommendation 1.

7.2.3 Maintaining public confidence

Maintaining public confidence was considered to be of prime importance to the long term sustainability of the recycled organics industry. The Working Group felt that there were a number of initiatives that the industry could undertake that would bolster community support for the use of recycled organic products. These include:

- Review and standardisation of terminology;
- Product disclosure and labelling;
- More widespread use of risk analysis and risk management techniques; and
- The development of minimum Standards that address community health and environmental concerns.

Recommendation:

- 22) That the State government should support the development of an open and accountable recycled organics sector.

7.2.4 Impacts of Government Policy

A number of areas were identified where government policy impacts on the demand for recycled organic products. For instance, the landfill levy, has the potential to act as an economic driver to divert organic material away from landfill toward reprocessors.

There is a need to ensure that policy through to guidelines, standards, licensing and regulatory requirements will help to generate demand for recycled organic products, not drive other forms of waste disposal.

The State government should develop a whole of Government strategy to achieve high levels of use of recycled organic products. These could include: requirements for government agencies to use recycled organic products in their landscaping; developing policies that address planning issues; and promoting the importance of soil organic matter.

Currently, there is a lack of policy “post-diversion”. We have policy that “pushes” organics out of landfill but no policy to “pull” the recycled organics products through the supply chain. Most of our policy and regulation is focussed at the supply end of the chain. For example, several States have guidelines related to processing of recycled organics, but there are no guidelines related to end uses. We need policy that encourages end users of recycled organic products.

Implementation of relevant Action items from the Western Australian State Sustainability Strategy and the Western Australian Greenhouse Strategy will ensure that government policy provides a positive impact rather than a negative impact on the development of the recycled organics industry and the increased application of organics to productive lands.

Recommendation:

- 23) That the Waste Management Board and the Department of the Environment should update and implement existing draft policy documents on recycled organics as well as produce current strategic policy for waste management in this area.

7.2.5 Effective and Efficient Regulation

The Working Group raised a number of issues in relation to legislation and regulation.

The main outcome of the Working Group’s deliberations was that the same regulatory standards must be enforced for all organics applied to land.

It was also felt that the regulatory environment should encourage the highest resource use of organic waste. There is concern that burdensome environmental controls or requirements will discourage the use of recycled organic products and direct the organic waste stream toward disposal options, such as incineration or landfill.

Imposing minimum quality standards for the application of all organic materials to the land will protect land and water resources, environmental and social values, and aid biosecurity. It will also provide a market that better allows compost and other recycled organic products to compete on the basis of performance rather than least cost as is currently the case with a range of organic materials.

Using regulations to impose minimum standards on the manufacture of these and imposing compliance with them will make a significant contribution towards building market and community confidence in their use. However, regulatory processes should not be used to manage the quality of recycled organic products, including compost quality.

It was suggested that a model for implementing minimum standards for land application of organic materials could be the Californian approach that licenses compost producers and requires them to demonstrate compliance with a set of standards that protect health and natural resource quality.

Processing more than 1000 tonnes per annum of organic wastes in Western Australia requires a license and compliance with proposed minimum standards could be made part of that licence and or the license renewal process. An important element of this would be to implement a compliance auditing process.

These minimum standards for all recycled organic products, including manures, liquids and sludges, grease and food waste, as well as shredded/ground plant material, could be based largely on existing standards and regulations that apply to various materials and industry sectors.

The Working Group recognised that there is insufficient scientific research available to confidently set minimum standards for all chemicals and or contaminants of interest that might be found in recycled organic products. However, rather than adopt a purely precautionary approach, the Group believes that the principles of risk analysis based on an assessment of the potential hazard should be adopted to enable this broad 'minimum standard' approach to be implemented with minimal delay.

In the interim, the Group considered that the minimum standards should be based on the following Acts, standards and recommendations, and acknowledged that the levels of some of the relatively inert contaminants, including glass and plastics, also need to be reviewed and updated.

The proposed minimum standards would ensure that recycled organic products:

- Are adequately pasteurised to manage disease, pest and weeds and address biosecurity concerns – AS 4454;
- Comply with heavy metal standards – IFOAM standards and the Californian standards developed by the US Department of Agriculture should be considered because of their derivation from plant health/soil science considerations;
- Comply with or develop standards for chemical, biotoxins and other contaminants based on risk assessment based on the use of Hazard Critical Control Point (HCCP) analysis;
- Comply with human health standards – Health Act;
- Address Occupational Health and Safety concerns associated with contaminants such as glass and possibly plastics;
- Comply with other appropriate regulations such as those applying to fly breeding under the Health Act

Consideration should also be given to allowing the reuse of organic wastes that are generated and reused on the same site without the application of the proposed minimum standards. The definition of same site would need to be accurately defined and the reapplication would need to be within the environmental receiving capacity of the site. This would assist industries such as agro-forestry where current practice is to reuse harvesting wastes for the next on-site tree crop.

Recommendation:

- 24) That the WA government should support national collaboration on the development of uniform policy, guidelines, standards and regulation in the area of recycled organics.

7.2.6 Addressing other distortions and inequities in the marketplace

The Group identified a number of inequities in the recycled organics market that act as barriers to the growth of the compost market. The main concern was the difference in the cost of producing high quality compost versus distribution of unprocessed organics. Currently, there is little to distinguish different quality products to the consumer.

Another major potential market distortion is the cost structure of producing compost from kerbside collections. Councils can recover the cost of collection and processing household waste from their rate-base. The result is that MSW-derived compost can be sold at a price much lower than other compost products. There is concern that, in a marketplace where the customer is unable to distinguish between products of different origins, subsidised lower grade composts will displace fully costed higher grade products.

There is a need for the community to recognise that there is a cost associated with the production, testing and quality assurance of high grade recycled organic products.

7.2.7 Incentives to generate demand for recycled organics.

A key issue identified by the Working Group was that most of the government effort was focussed on the supply side of the recycled organics industry. There was a real need to address demand and incentives for the use of recycled organic products. One mechanism could be to amend the Resource Recovery Rebate Scheme (during the current review of its operation) to provide rebates to users of recycled organics and generate demand for quality products. Another possible mechanism for increasing demand would be to stipulate the use of recycled content products through a government purchasing policy.

The introduction of the proposed uniform quality standards will increase costs for many players in the recycled organics industry, especially those associated with managing manure wastes from the intensive animal industries. Acknowledging that most of these industries will have limited capacity to absorb these added costs, considerations will need to be given to managing their introduction and allowing them to adjust. Support mechanisms such as the proposed 'Environmental credits' or a trading scheme for Carbon Credits could be developed to offset these costs.

If WA is to achieve its community objectives in relation to sustainability, then it needs a dynamic and progressive recycled organics sector. Government policy should encourage innovation and investment, and support policies that will rebalance costs throughout the recycled organics supply chain.

Recommendation:

- 25) That landfill levy funds should be utilised to provide a rebate incentive for compost use in approved situations. The rebate should be based on compost quality as well as quantity.
- 26) That the use of compost on irrigated agricultural/horticultural land should be eligible for water efficiency rebates.
- 27) That the provision of "Carbon Credits" or "Environmental Credits" for appropriate recycling of organic wastes should be promoted through the Department of Premier and Cabinet's Greenhouse Unit.

7.2.8 Research and Development

Government policy and actions need to facilitate and encourage research and development, It should provide access to appropriate financial support that is guided by priorities for developing markets for recycled organic products.

One area would be to focus efforts on developing appropriate heavy metal limits for the application of recycled organic products to land and as a matter of priority, to develop maximum copper and zinc levels that are currently the concern of much debate.

Further research is required in developing markets for recycled organics by creating specific products for specific uses. Monitoring of performance of products applied in specific farming systems and/or home gardens will be required to ensure beneficial effects and the absence of harmful ones, thus honouring the basic principle for sustainable use of recycled organics: protecting soil as an environmental, economic and social resource.

Bioavailability of inorganic and organic substances in recycled organics in WA soils is poorly characterised at present. Research is required to understand the fate and behaviour in soil of these substances to be able to assess the risk of them entering the food chain, causing groundwater pollution or having other undesirable effects.

Social research geared toward understanding community attitudes toward resource recycling, and especially using recycled organics on land, is also required to ensure sustainability of our metropolitan and rural communities.

ROWA has a number of research and development projects listed in its Action Plan. The State government should support ROWA to conduct these projects on behalf of the recycled organics sector.

Recommendation:

28) That the State government should support ROWA's existing Action Plan.

7.2.9 Encouraging Highest Environmental Value Use of Products

Organic materials should be used to produce the highest value product possible from the original feedstock and utilised in the highest value end use. Highest value in terms of land use are urban and domestic uses and market gardening, through to lower value uses (mine site rehabilitation and forestry/broadacre agriculture). The final end use should be set according to the quality of the recycled organic product, i.e. its ability to meet various requirements within the Australian Standard 4454.

The Working Group agreed that energy recovery from organic materials should be considered a lower environmental end use than recycling and composting. The waste management hierarchy usefully defines relative preferences between options for managing wastes. In respect to organic waste, it has in the past at least, clearly identified composting as a more beneficial reuse than energy recovery.

Assigning a 'greater best use' value to composting recognises that it allows for the safe reuse of organic waste and acknowledges that compost provides a number of additional advantages that are associated with its contribution to increased soil quality and performance

More recently, the 'Strategic Directions for Waste Management in Western Australia (August 2003) described the hierarchy as Avoid, Minimise, Recycle, Treat and Dispose/landfill. The text clearly stated that composting, but not energy recovery is considered to be recycling. It is acknowledged that the term Treat(ment) covers the entire waste stream. However when discussing the waste hierarchy in relation to organic materials, it would be preferable to use

the term 'Energy Recovery' instead of 'Treat' because of the possibility that composting could be regarded as a treatment. Any concern about the positioning of hybrid composting energy recovery systems would be better served by this approach as well, as it is clearly positioned between the two options.

This approach will better support the development of composting and other equivalent processes as the preferred methods for managing organic wastes.

Recommendation:

- 29) That the State government should encourage the highest environmental value end use of organic materials.

8 Integration of other government and industry initiatives

The compost industry across Australia is becoming increasingly well organised. The WMAA nationally has formed a division (Compost Australia) that is the peak body for the recycled organics sector. Compost Australia is compiling an "industry roadmap", which consists of a range of initiatives that the industry will undertake. The WMAA (WA Branch) has formed a special interest group - Recycled Organics WA (ROWA) - which is a broad stakeholder group interested in the safe and efficient development of the recycled organics sector and is the peak body for the recycled organics sector in WA.

The Compost Roadmap process will deliver a comprehensive strategy for progressing the interests of the compost industry and promoting the production and use of recycled organic products. At a local level, ROWA is currently developing an Action Plan to address the key issues of interest to the local industry.

The State government should seek to align itself, where appropriate, with industry initiatives, and provide support where needed. State government policies and programs should complement industry initiatives, so that a strong and independent industry body can develop. The eventual outcome of this will be that industry becomes the driver for innovation and reform.

The development of over-arching policy on Standards for Organics (including composts) Applied to Land must encompass and reflect the relevant Visions, Objectives, and Action items identified in the Western Australian State Sustainability Strategy, the Western Australian Greenhouse Strategy (September 2004), and the relevant Resource Condition Targets (RCTs) / Management Action Targets (MATs) from the various Natural Resource Management Regional Strategies.

There is a need to identify, prioritise and implement the relevant programs and actions from strategies such as Extended Producer Responsibility (EPR), State Sustainability Strategy and Greenhouse Strategy Actions and Targets that support and assist the demand for organics being applied to land and the development of the recycled organics industry.

There is a strong support from the agri-foods industry sector and State and Federal government to incorporate sustainability principles and practices such as the development and implementation of Environmental Management Systems (EMS) for production systems throughout Australia.

9 Key Findings and Recommendations

The discussions held by the Working Group have covered a wide range of topics relevant to recycling of organic waste. The outcomes of those discussions have been recorded in this report. It is the intention of the Working Group that this document should provide input to the policy and business planning process of the Waste Management Board.

9.1 Key findings

The key findings of the Working Group on Standards for Organics (including Compost) Applied to Land are:

- 1) There is approximately 1.2 million tonnes of organic waste generated in WA each year. The majority of this waste is garden organics, food organics and manures/sludges.
- 2) There is a lack of reliable, accurate publicly-available data on the generation and processing of organic waste.
- 3) It is probable that the amount of recycled organic products available will increase substantially over the next 10-15 years as an increasing amount of Perth's municipal solid waste is processed by Mechanical Biological Treatment (MBT).
- 4) The application of recycled organic products to productive (ie agricultural / horticultural land) is highly beneficial to the long-term health and sustainability of the soil. Increasing Soil Organic Matter (SOM) assists in water and nutrient retention that has both agricultural and environmental benefits.
- 5) There are human and environmental health risks associated with the application of unprocessed organic wastes directly to land. These risks include propagation of diseases, pests and weeds. There are also potential issues of water pollution and odour.
- 6) In order for the recycled organics sector to grow, there is a need to ensure and maintain public confidence in the quality of product available. This can be achieved through encouragement of an open and transparent sector that proactively addresses issues of community concern, and through communication of positive benefits of the application of recycled organic products to productive land.
- 7) There is a need for a minimum Standard for all organics applied to land. This Standard should address chemical contaminant levels, pathogen levels and levels of physical contaminants. The Standard should require a minimum level of processing of organic waste prior to application to land. The Standard should be enforced by the government, with demonstration of compliance being a condition of producer licencing.
- 8) There were a number of existing Standards that could be adopted as a minimum Standard. The most commonly referred to Standard for compost is AS4454. This Standard is currently under review by a national committee.
- 9) There is a need for government to develop policies and programs that promote the recycling of organic materials and the application of recycled organic products to agricultural land.

- 10) There is a need for government to develop policies and programs that will remove potential contaminants from organic waste streams used to make recycled organic products.
- 11) There is a need for the industry to develop product labelling protocols that clearly state the source, content and quality of recycled organic products.
- 12) There is a need for continued research and development in the area of application of recycled organic products to land.
- 13) There is a need for the State government to explore opportunities to encourage investment and innovation in the recycled organics sector through the use of market-based instruments, including the landfill levy, rebate schemes and a carbon credit trading scheme.

9.2 List of Recommendations

- i. That the WA Government should adopt minimum standards for all organics applied to land to address the potential health risk. *(Page 8)*
- ii. That pasteurisation be set as a minimum processing requirement for all organics prior to land application. *(Page 8)*
- iii. That, as a first step, all recycled organic products should conform to the heavy metal limits specified in Standards published by a recognised industry body, such as International Federation of Organic Agricultural Movements (IFOAM). *(Page 10)*
- iv. That appropriate Quality Assurance methods, including third party audits, should be used in the production of all recycled organic products. *(Page 10)*
- v. That the WA State government should collaborate with and support national (and international) research programs aimed at improving information and knowledge about potential chemical contaminants in recycled organic products. *(Page 10)*
- vi. That the WA State government should commission a study based on literature, knowledge of WA soils and plant requirements, to develop maximum safe application limits and, if necessary, to define a higher level that can be applied subject to soil analysis levels. *(Page 10)*
- vii. That recycled organic products should conform to the current standards for organic chemical contaminants contained in AS 4454. *(Page 11)*
- viii. That the WA Government should influence chemical registration authorities, including the National Pesticide Registration processes, to ensure that all new chemicals are tested for their biodegradability within aerobic composting processes. *(Page 11)*
- ix. That the recycled organics sector (via ROWA) should input into the review of AS4454-2003 with respect to allowable levels of physical contaminants. *(Page 11)*
- x. That the WA State government should provide policy and resources to support the collection of source separated organic wastes and the removal of contaminants that impact on compost quality. *(Page 11)*
- xi. That policy and regulations on the collection of Household Chemical Wastes (HCW) should be strengthened and supported. *(Page 11)*

- xii. That policy and resources should be provided to support the adoption of biodegradable plastics that will fully degrade in the composting process. *(Page 12)*
- xiii. That the State government should develop a Soil Protection Policy, and a strategy for increasing the amount of soil organic matter in WA's productive soils. *(Page 12)*
- xiv. That the WA government should clearly support the use of recycled organic products on productive land as a tool for conserving water and minimising nutrient leaching. *(Page 13)*
- xv. That, in the interests of maintaining biosecurity at all levels, recycled organic products must be demonstrably free from plant or human diseases and weed seeds before they can be applied to land. *(Page 14)*
- xvi. That the WA government and industry should work together to develop a comprehensive communication package that highlights the benefits of recycling organic matter, while addressing community concerns. *(Page 15)*
- xvii. That the WA government and the recycled organics industry should contribute to the review of the definitions in the current version of the Recycled Organics Dictionary & Thesaurus. *(Page 15)*
- xviii. That the WA government should support national industry initiatives to develop product disclosure labelling and a compost quality grading system. *(Page 15)*
- xix. That the State government should support the recovery and re-use of organic materials and promotes policy that:
 - xx. Recognise the importance of Soil Organic Matter (SOM) and the potential role of recycled organics in its management and conservation;
 - xxi. Prioritise safe recycling of organics wastes through their land application; and
 - xxii. Support recycling organic wastes above energy recovery.
 - a. *(Page 17)*
- xxiii. That the WA government develop requirements for land application of all organic materials within the framework of best practice, with regard to:
 - xxiv. Disease, pest and weed contaminants, including associated biosecurity risks, as set out in AS4454;
 - xxv. Health concerns in line with Public Health requirements, including fly breeding; and
 - xxvi. Contaminant levels.
 - i. *(Page 18)*
- xxvii. That the WA government provide policy and resources to support::
 - xxviii. the reduction of contaminants in recycled organic products; and
 - xxix. encourages the continuous improvement of compost quality management.
 - i. *(Page 18)*

- xxx. That the State government should support the development of an open and accountable recycled organics sector. *(Page 20)*
- xxxi. That the Waste Management Board and DoE should update and implement existing draft policy documents on recycled organics and produce current strategic policy for waste management in this area. *(Page 21)*
- xxxii. That the WA government should support national collaboration on the development of uniform policy, guidelines, standards and regulation in the area of recycled organics. *(Page 22)*
- xxxiii. That landfill levy funds should be utilised to provide a rebate incentive for compost use in approved situations. The rebate should be based on compost quality as well as quantity. *(Page 23)*
- xxxiv. That the use of compost on irrigated agricultural/horticultural land should be eligible for water efficiency rebates. *(Page 23)*
- xxxv. That the provision of “Carbon Credits” or “Environmental Credits” for appropriate recycling of organic wastes should be promoted through the Department of Premier and Cabinet’s Greenhouse Unit. *(Page 23)*
- xxxvi. That the State government should support ROWA’s existing Action Plan. *(Page 24)*
- xxxvii. That the State government should encourage the highest environmental value end use of organic materials. *(Page 25)*

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11 Glossary

Outlined below are some of the more common terms used within this document. These definitions have been derived from the work of the Recycled Organics Unit at the University of New South Wales and have been adopted to provide national consistency in understanding and use of terms. Unless otherwise stated, the definitions of any terms used in this document are as defined by the *Recycled Organics Dictionary & Thesaurus: Standard Terminology for the Recycled Organics Sector* (Recycled Organics Unit, 2003 DRAFT).

It should be noted that the Working Group has not adopted these definitions uncritically, but has done so wherever possible in order to advance the development of a nationally accepted terminology in the area of organics.

- ***Biosolids***

Organic solids or semi-solids produced by municipal sewage treatment processes. Solids become biosolids when they come out of an anaerobic digester or other treatment process and can be beneficially used. Until such solids are suitable for beneficial use they are defined as waste-water solids. The solids content in biosolids should be equal to or greater than 0.5% weight by volume (w/v). Biosolids are commonly co-composted with garden organics and/or residual wood and timber to produce a range of recycled organics products.

- ***Compost***

An organic product that has undergone controlled aerobic and thermophilic biological transformation to achieve pasteurisation and a specified level of maturity. Compost is suitable for use as soil conditioner or mulch and can improve soil structure, water retention, aeration, erosion control, and other soil properties.

- ***Composting***

The process whereby organic materials are pasteurised and microbially transformed under aerobic and thermophilic conditions for a period of not less than 6 weeks. By definition, it is a process that must be carried out under controlled conditions yielding mature products that do not contain any weed seeds or pathogens.

- ***Compostable Organics***

Compostable organics is a generic term for all organic materials that are appropriate for collection and use as feedstocks for composting or in related biological treatment systems (e.g. anaerobic digestion). Compostable organic matter is defined by its components, e.g. residual food organics; garden organics; wood and timber; biosolids, and agricultural organics.

- ***Heavy Metals***

A group of metallic elements that include lead, cadmium, zinc, copper, mercury, and nickel can be found in considerable concentrations in sewage sludge and several other waste materials. High concentrations in the soil can lead to toxic effects in plants and animals ingesting the plants and soil particles.

- ***Maturity (of Compost)***

Is related to the level of composting feedstock material receives. A mature product is stable and does not cause toxicity to plants.

- ***Recycled Organics***

The term 'recycled organics' has been adopted by NSW DEC and EcoRecycle Victoria as a generic term for a range of products manufactured from compostable organic materials (garden organics, food organics, residual wood and timber, biosolids and agricultural organics)¹¹. Specific recycled organic (RO) products are defined in the following Australian Standards:

- AS 4454 (2003) Composts, mulches and soil conditioners.
- AS 3743 (1996) Potting mixes.
- AS 4419 (1998) Soils for landscaping and garden use.
- AS/NZS 4422 (1998) Playground surfacing: specifications, requirements and test methods.

Appendices

A: Links with other State Government strategies

State Sustainability Strategy – identified links and relevant Action Items

- Box 10 Roles and Responsibilities for Sustainability – numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 15, 16, 17, 18, 19. *(page 28)*
- Foundation Principles – Settlement efficiency and quality of life *(page 30)*
- Box 12 Resource Use and Sustainability -In general terms, the same could also apply to agriculture. The viability of Western Australian agriculture has been under consideration for some time as terms of trade for agriculture have been declining for decades. ...the need to constantly demonstrate th sustainability of our primary production. Around the world increasingly knowledgeable purchasers tuned into sustainability will look for products thar are clean and green and add social criteria to their consumption choices. etc *(page 31)*
- Goals - Goal 1, Goal 3, Goal 4, Goal 6. *(page 33)*
- Box 13 Tools for Sustainability. Eco-efficiency, industrial ecology and waste minimisation – Reducing resource requirements in industrial processes, exchanging wastes for resource needs in industrial estates, minimising waste through recycling and re-use, and seeking zero waste discharge. Ecological Economics – Seeking economic valuation of environmental and social assets and services, the 'polluter pays' principle, the need for full life cycle costing of goods and services (including asset replacement and waste disposal) and inventive mechanisms for achieving sustainability goals. *(page 34)*
- Box 17 Waste reduction and recycling. The government requires its agencies to meet the Waste 2020 target towards zero waste by 2020. *(page 51)*

Relevant Actions:

1. 1.6 Require the Sustainability Policy Unit to:support community awareness and education programs on sustainability. *(page 46)*
2. 1.24 Through the NRMC, the Sustainability Roundtable and the Sustainability and Development Assessment Committee of the Western Australian Planning Commission, support the increased involvement of local government in planning for natural resource management, including issues of agricultural sustainability, particularly regional drainage, biodiversity conservation, regional revegetation programs, water quality and soil acidity. *(page 63)*
3. 1.12 Review the annual reporting framework for government agencies and incorporate sustainability reporting, including through key performance indicators. *(page 54)*
4. 1.18 Through the Sustainability Roundtable implement the State-Local Government Sustainability Partnership Agreement and create further State-Local Government partnerships to promote sustainability at community and regional levels. *(page 58)*

5. 1.19 Through the Sustainability Roundtable examine the appropriate scale for sustainability actions including the role of Regional Councils of local government in supporting sustainability, the implementation by individual local governments and the role of the State government in enabling local governments to fulfil these roles. (page 58)
6. Regional Sustainability Strategies will (page 66):
 - Provide an integrated application of the State Sustainability Strategy as it applies to the region
 - Build on the regional plans and natural resource management strategies (*NB: these NRM Strategies were in preparation at the time of the finalisation of the State Sustainability Strategy, but these are all now finalised and in the process of being implemented*)
 - Link to broad, non-government organisation processes in the regions to pursue regional visions, for example the Southwest Australian Ecoregion initiative and CSIRO Healthy Country, as well as a community visioning process where appropriate
 - Provide a broad set of goals for the future from this process.
 - CSIRO Healthy Country initiative:
<http://www.csiro.au/index.asp?type=mediaRelease&id=PrWFHCwa>
7. 1.36 – 1.39 Action items associated with miscellaneous research (eg global and commonwealth research expenditure) (page 77)
8. 1.40 Establish an agricultural research institute to coordinate work currently undertaken by the Dept of Agriculture, Curtin University of Technology, Murdoch University, and the University of Western Australia, to increase economies of scale and better address agricultural sustainability issues. (page 77)
9. 1.41 Through the Sustainability Roundtable develop headline sustainability indicators for Western Australia and regularly review and report this information. (page 83)
10. 1.42 Establish an on-going State of Sustainability reporting framework to measure and report on the goals and objectives of the State Sustainability Strategy together with headline sustainability indicators and environmental, economic and social 'bottom lines'. (page 83)
11. 2.25 Finalise and implement the Western Australian Greenhouse Strategy after consultation. (*NB: this action has been completed.*) (page 103)

Sustainable Agriculture section pp 114 – 124

12. Natural Resource Management Standing Committee's guiding principles for sustainable agriculture (page 114) eg:
 - Farm productivity is sustained or enhanced over the long-term
 - Adverse impacts on the natural resource base of agricultural and associated ecosystems are ameliorated, minimised or avoided
 - Residues resulting from the use of chemicals in agriculture are minimised

- Farming systems are sufficiently flexible to manage risks associated with the vagaries of climate and markets

13. Dept of Agriculture's definition of sustainable agriculture (page 115):

"Ensuring profitable agricultural systems that conserve our environment whilst contributing to the economic and social well being of rural Western Australia."

14. Opportunities that exist to support a transition to more sustainable agriculture (5 dot points on page 120 + Box 36 on page 121)

15. Vision and objectives (page 122)

Relevant Actions

16. 3.2 In collaboration with regional natural resource management groups conduct resource risk assessments and develop regional targets for natural resource condition, for incorporation into regional natural resource management plans. (page 123)

17. 3.3 Carry out strategic land use analyses in relation to resource condition targets and support diversification and landscape scale change towards sustainable land use. (page 123)

18. 3.5 Research and extend the productive use and rehabilitation of saline lands including management of the Western Australian component of the Sustainable Grazing on Saline Lands program involving participative research by up to sixty farmer groups in agricultural areas. (page 123)

19. 3.6 Develop with industry participation, standards and best practice for agricultural systems at regional and enterprise scale to provide the basis for accreditation of sustainable agricultural practices and to support regulatory processes. (page 123)

20. 3.7 Investigate economic incentives and innovative instruments such as biodiversity offsets, integrated economic services trading, tax incentives and environmental stewardship rebates as well as land purchase, as drivers of land use change towards more sustainable use. (page 123)

21. 3.8 Support the sustainability of farming enterprises and improved self-management of price, climate and other risks associated with agriculture through (page 123):

- Research into improved risk prediction mechanisms, eg seasonal weather forecasting
- Promoting a better understanding, and use of risk management strategies such as enterprise diversification, Farm Management Deposits, price risk management and off-farm investment, and
- Reforms to support schemes such as Exceptional Circumstances to ensure they meet broader sustainability needs.

22. 3.10 Work with grower groups to implement Water Wise on the Farm, a training program for irrigators to improve irrigation skills and conduct research and extension programs to improve the productivity, efficiency and sustainable use of water. (page 123)

23. 3.13 Promote industry development opportunities such as bio-energy production and 'carbon farming'. (*page 124*)

Aquatic Systems section (*page 152–153*)

24. 3.51 Ensure that activities in catchments are actively managed and sustainable, and that environmental values are not compromised, degraded or destroyed, through:

- Management
- Community partnerships and education
- Development and implementation of best management practice guidelines,
- Legislation
- Transferable rights, incentives that encourage and aid landowners to protect and manage aquatic systems on their properties, and pollution offset schemes
- Integrated property management plans for accredited water cycle management
- Investigation of the impact of active catchment management strategies that enhance water quality and quantity outcomes, and
- A whole of government review of irrigation activities throughout the state that may also lead to better management of off-site discharges.

Settlements – Reducing Waste and Managing it as a Resource (*pages 198-202*)

25. Objectives (*page 200*)

- Manufacturing and other industrial processes are operated in a sustainable manner that minimises the quantity of wastes produced.
- All wastes are segregated and sorted close to source in a manner that optimises resource recovery for higher end-users.
- Products and services are designed and/or packaged to minimise waste and facilitate re-use and resource recovery.
- Information and data on waste generation are continuously collected, analysed and reported.
- A community that understands the impact of purchasing choices and actively participates in waste reduction and recycling activities.

Actions:

26. 4.49 Finalise the Strategic Framework for Waste Management to guide the management of waste in Western Australia towards zero waste by 2020 and liaise with stakeholders and the community on the implementation of the Framework. (*page 201*)

27. 4.50 – 4.66 points (*page 201*)

Community section (*page 231*)

28. 5.1 Develop an integrated community service policy framework that sets out the core principles and processes for providing more holistic service to help achieve sustainability goals.

Community and Environmental hazards (*Pages 238-243, particularly page 239 last paragraph*)

29. No specific actions relevant in this section however there are very broad linkages.

Business Section & Economic Policy Section

Box 80 Sustainability through the Market – Seven Keys to Success (*page 266*)

30. Key 1 Innovate

31. Key 2 Practice eco-efficiency

32. Key 5 Improve market framework conditions – Market aspects which hinder sustainability include monopolies, perverse subsidies, and prices which do not reflect real economic, social and environmental costs. Legislation and regulations to address these market failures are required for business to help achieve sustainability.

33. 6.13 Examine the ways in which subsidies and other financial mechanisms are having positive or negative effects on the health of the environment, society and economy and how they can contribute to the desired changes in business behaviour and investment patterns. (*page 273*)

34. 6.14 Require all business recipients of significant government grant funding to demonstrate the potential contribution to sustainability in the event that funding is provided. (*page 273*)

35. 6.15 Work progressively to better articulate the triple bottom line in State government reporting. (*page 273*)

36. 6.21 Explore the development of a Sustainable Industries Section within the Department of Environment. (*page 277*)

37. 6.22 Expand the promotion and adoption of the successful Industrial Waste Exchange program, and investigate its use as part of the environmental assessment and licensing system. (*page 277*)

38. 6.23 Encourage the establishment of sustainability business and research cluster in Western Australia, primarily based around resource recovery precincts and industrial parks. (*page 277*)

39. 6.24 Provide a central information hub with information on sustainable technologies and business solutions on the Sustainability Online website, in conjunction with the Western Australian Sustainable Industry Group Centre of Excellence in Cleaner Production at Curtin University and Environmental Technology Centre at Murdoch University. (*page 277*)

40. 6.25 Ensure tha Western Australia implements and actively participates in national eco-labelling programs, such as the standards set by the Australian Environmental Labelling Association. (*page 277*)

41.6.27 Through the Sustainability Roundtable, develop a sustainability covenant program and associated implementation framework to give support to partnerships with industry innovators in sustainability. Sustainability covenants will:

- Be non-binding agreements entered into between government and progressive companies or industry associations
- Be developed in partnership with local communities and relevant public interest organisations
- Cover all aspects of a company or industry's economic, social and environmental performance and will commit the government and company/industry sector to use their best endeavours to create net benefits in each of these areas, and
- Bind the company to reporting regularly on the outcomes to which they are committed.

Action Plan (*pages 285-303*)

Western Australian Greenhouse Strategy, September 2004

Section 2.2, Waste Management (*pages 50 – 53*)

Action items

- 2.2.1 Encourage voluntary waste management plans to include greenhouse considerations, based on world best practice and continuous improvement principles – responsible department = DoE, action timetable = ongoing. (*page 53*)
- 2.2.2 Increase the use of compost and secondary use organics through research and development and programs on standards, performance and pricing – responsible department = DoE, action timetable = ongoing. (*page 53*)
- 2.2.3 Research the range of mechanics available to encourage organic waste separation. Responsible department = DoE, action timetable = ongoing. (*page 53*)

Section 2.5, Reducing agricultural emissions using good agricultural practice (*pages 68 – 73*)

There are a number of links to sustainable agricultural practices that are aimed at reducing greenhouse emissions that are supported by the use of composted organic wastes such as green wastes and manures. As identified in other sections of this report, the addition of composts to productive soils greatly enhances the ability of the soils to bind nutrients and improve soil condition. The relevant sustainable agricultural practices identified in the WA Greenhouse Strategy include using nitrogen fertiliser more efficiently, improved drainage in water logged soils, minimise and reduce soil sodicity and compaction and reduced fuel use. (*page 70*)

Action items (*page 72*)

- 2.5.2 Review national agricultural emission accounting methods for estimating agricultural emissions to ensure they correctly represent Western Australian circumstances.

- 2.5.3 Improve nitrous oxide emission baseline information and knowledge.
- 2.5.4 Investigate options to contribute to national projects using modelling techniques to determine baseline emissions.
- 2.5.6 Promote research findings to producers and industry and integrate with extension and training activities.
- Encourage producers and industry to participate in research and adopt findings leading to reduced emissions.
- 2.5.8 Develop a set of good agricultural practice guidelines for minimising greenhouse emissions and to encourage implementation of guidelines.
- 2.5.9 Develop and promote practical decision support tools that allow producers to assess emission risk and reduction strategies for their property.
- 2.5.11 Investigate incentive programs to encourage the early adoption of greenhouse emission abatement practices.

NRM Regional Strategies - various

There is potential and a multitude of possibilities for strong Industry and Government links (eg funding sources, partnerships, focus projects etc) could also be made in association with the NRM Regional Strategies (eg SCC, Avon, SWCC, NAAC, SCRIPT) Recourse Condition Targets (RCTs) and Management Action Targets (MATs) – eg soil condition targets etc.

Whilst it appears that these NRM Strategies have neglected the actual issue of Waste Management as an NRM issue, I have spoken to Tony Setouri (Sustainable Land Management officer at the Swan Catchment Centre), the SCC is aware that this issue has been overlooked and they have attempted to address this gap by identify this as a gap and commencing to take action to incorporate waste management actions in their planning and activities currently being implemented – eg the SCC has received funding from the Waste Management Board for a project focussed on a solid waste industry in the Bellview area targeting light industry (SME's).

For example

Swan Land Resource Condition target (soil condition):

- LR2 = Maintain and improve soil condition, as measured at representative sites, including extent of water erosion, waterlogging and acid sulphate soils by 2020 (with quantified targets set by December 2005).

SWCC Land Resource Condition targets:

- LRCT4 = (No net increase in area of soils on agricultural land with low organic carbon (< 1%) by 2020.);
- LT4 = A system of soil condition targets and indicators developed and published by March 2006;

- LT8 = Agricultural effluent discharge sites implementing and evaluating effluent management plans according to industry Code of Practice (50% adoption) by 2008;
- LT15 = All catchment-based local NRM plans include soil condition actions and monitoring by 2008;
- LT20 = EMS framework for major farming systems developed and published by 2008;
- LT21 = A system of effective industry and community based incentives for improved land management developed, tested and implemented by 2008;
- LT37 = Demonstration projects to improve soil health and condition conducted by 75% of community based NRM groups by 2007; etc.