

Guidelines on resource recovery Orders and Exemptions

For the land application of waste materials as a fertiliser or soil amendment

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ISBN 978 1 925688 62 7
EPA 2017/ P0391
January 2018

Printed on environmentally sustainable paper

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Soils are an invaluable natural resource.

They play a pivotal role in maintaining a healthy environment and biodiversity, and are fundamental to the growth and prosperity of the New South Wales economy.

The EPA encourages the recovery of resources from waste to be used as a fertiliser and or soil amendment where this is beneficial and poses minimal risk of harm to the environment or human health.

Introduction

The regulation of the land application of waste materials as a fertiliser or soil amendment ensures soils in NSW are stable and healthy, maintain water quality, sustain food production and other primary industries, and support rural and urban development.

The recovery of waste materials for use as a fertiliser or soil amendment is a re-use pathway and must not be mistaken for disposal or landfilling activities.

The proper assessment and characterisation of wastes that are intended for land application are key to protecting not only the environment and human health, but also to protecting the current and potential future uses of land on which waste is applied.

Many waste materials are not appropriate for land application as they may contain contaminants that cause significant environmental and / or commercial liabilities. Preventing the degradation of soils physically, chemically and biologically is part of managing the potential risks of using waste materials as a fertiliser or soil amendment. This includes preventing the build-up of potentially harmful persistent chemicals, the contamination of soil, ground and surface water, an accumulation of excess nutrients or the disruption of soil biota and ecological functions.

Regulatory framework

The key legislative instruments for the regulation of waste in NSW are the *Protection of the Environment Operations Act 1997* (POEO Act) and the *Protection of the Environment Operations (Waste) Regulation 2014* (Waste Regulation). Both contain provisions for the management, storage, transport, processing, recovery and disposal of waste.

The land application of waste (as defined in the POEO Act) may trigger various regulatory requirements, such as the need to hold an environment protection licence and to pay a waste levy. In some cases, however, the EPA has the power to give exemptions from certain regulatory requirements that would otherwise apply to the land application of a material that is produced wholly or partly from waste.

The types of exemptions relating to resources recovered from waste (referred to as 'resource recovery wastes' in the Waste Regulations) are specified in clause 92 of the Waste Regulation. They include the re-use of wastes that are: applied to land; used as fuel; or are used in connection with a process of thermal treatment.

Several recovered waste materials are already approved to be re-used as fertiliser or soil amendment purposes. These existing exemptions are available on the [EPA website](#).

This guideline details the application process for the reuse of other waste types for the purpose of land application as a fertiliser or soil amendments.

PART A: Applying for a resource recovery Order and resource recovery Exemption

The regulatory framework for resources recovered from waste may apply in different ways depending on the circumstances of your case.

Applicants are strongly encouraged to discuss their proposal with the EPA prior to commencing work on an application.

Applicants are also advised to consult, where necessary, with other relevant consent authorities regarding the proposal prior to submitting an application.

For any queries or to discuss your proposal, please contact the EPA's Environment Line on 131 555 or email waste.exemptions@epa.nsw.gov.au

The resource recovery framework

Under the provisions of the Waste Regulation, the EPA issues two documents: resource recovery orders (Orders) and resource recovery exemptions (Exemptions). These documents focus on different parts of the waste re-use supply chain and are released as a package. The subject of an Order and Exemption is called a 'resource recovery waste' in the Waste Regulation and this refers to the specific resource recovered from waste.

Orders: for suppliers of the waste

Orders contain the conditions that *generators* and *processors* of waste must meet to legally supply the resource recovery waste material for land application. These conditions may include material specifications, processing specifications, record-keeping, reporting and other requirements. All Orders are made under clause 93 of the Waste Regulation.

Exemptions: for consumers of the waste

Exemptions contain the conditions that *consumers* must meet to use resource recovery waste for application to land as a fertiliser or a soil amendment. These conditions may include requirements regarding how to reuse or apply the waste, as well as record-keeping, reporting and other requirements. All Exemptions are made under clauses 91 and 92 of the Waste Regulation.

Your responsibilities

Orders and Exemptions provide both the significant responsibility and benefit of being 'excused' from some of the legal obligations relating to the application of waste to land. They may release the consumer of a specific waste from certain parts of the waste regulatory framework. Orders and Exemptions do not release those using them from any other relevant regulatory controls, such as the requirement to obtain planning consents or approvals from the appropriate regulatory authority.

The land application of a resource recovery waste remains subject to all other relevant environmental regulations, such as the special requirements relating to asbestos waste (Part 7 of the Waste Regulation) and pollution offences under the POEO Act. You need to exercise care to prevent pollution and risks to human health across all aspects of your activities. For example, if an offence is committed

under the POEO Act, such as the pollution of waters (section 120), complying with the conditions of an Exemption will not be a defence by itself.

The existence of an Order and Exemption is not an endorsement of the resource recovery waste or its performance. Generators or processors need to ensure that their waste material is produced to a specification, and that its use is limited to appropriate applications and application rates so as to ensure it does not cause harm to the environment or human health. Suppliers must also exercise due diligence to ensure that consumers of their waste material use it in accordance with the specified conditions of the Exemption.

Consumers of the resource recovery waste must comply with the conditions of use set out in the Exemption. Penalties apply for the land application of non-compliant waste.

The information provided here regarding your responsibilities under the legislative framework in NSW is a simple overview to provide context. It should not be used as a substitute for legal advice.

Public information

The EPA can issue an Order and Exemption in two ways, either:

- i to a “specified person” or “specified class of persons”, by written notice; or
- ii to non-specified persons, by publication in the NSW Government gazette.

In cases that involve “specified persons”, the notices will not be publicly available. Examples of “specified persons” include cases where specific companies are identified as the sole generator or processor of a waste material; or where specific companies or receiving sites are identified as the sole consumer. This is largely to protect commercial-in-confidence process information. Reference to these approvals may, however, appear on the EPA website to inform the public of the existing approvals.

Where an Order and Exemption do not pertain to specified persons, the notices must be published in the NSW Government Gazette, and will also appear on the EPA’s website. In most other cases, a generated waste type will have a corresponding Order and Exemption on the EPA’s website. These are available for general use by anyone that can comply with the conditions of use. Existing Orders and Exemptions that are currently in force are available on the [EPA website](#).

Approval periods

Orders and Exemptions that are issued to a “specified person or class of persons” will be issued for a reasonable period during which the material must be used. Depending on the circumstance, Orders and Exemptions for an ongoing process will be typically issued for a period of 2 years. After this time, the applicant may apply to the EPA for a re-issue of the Order and Exemption. The EPA will subsequently review the conditions of the Order and Exemption (including compliance with the requirements) prior to re-issuing the Order and Exemption.

Orders and Exemptions issued for general use are valid until the EPA amends or revokes them.

Assessment criteria

Before you start your application, check if an Order and Exemption currently exists for your intended use of a waste material by visiting the EPA website.

If an Order and Exemption is not currently available for your intended use, you can apply to the EPA for one specific to your operations. We strongly recommend that you discuss your proposal with the EPA before you begin the application process by contacting the EPA’s Environment Line on 131 555 or by email to waste.exemptions@epa.nsw.gov.au

We also advise you to consult with other consent authorities before you submit your application, such as the local Council or Planning Authority.

Applicants that wish to apply for an Order and Exemption for the land application of a waste as a fertiliser or soil amendment must follow this guideline and demonstrate that the waste material:

- is fit for purpose in its proposed use (i.e. show that it provides a benefit);

- poses minimal risk of harm to the environment or human health; and
- is not intended to be land applied as a means of disposal (i.e. a landfilling activity).

Applicants must also ensure the waste material proposed for land application meets **all of the criteria** outlined below, prior to applying for an Order and Exemption.

Note: Exemptions will not be made retrospectively i.e. after the waste has already been applied to land.

The criteria against which the EPA will assess applications are:

a). Legitimacy of the proposed use for the waste material

A key consideration in assessing an application is whether, in light of the three criteria below, the proposed use of the waste is a genuine re-use opportunity rather than simply a method of opportunistic waste disposal.

b). Consistency with the waste management hierarchy

The recovery of resources via land application can benefit the environment, agriculture and the community by reducing reliance on virgin resources and increasing the return of materials to the economy that may otherwise end up in landfill.

Under the *Waste Avoidance and Resource Recovery Act 2001*, the appropriate management of waste is considered against the following priorities in descending order:

1. **Avoidance** – with the aim of reducing the amount of waste generated by households, industry and all levels of government
2. **Resource recovery** – with the aims of re-using, reprocessing, recycling and recovering energy from waste, consistent with the most efficient use of the recovered resources
3. **Disposal** – with the aim of managing all disposal options in the most environmentally responsible manner.

The EPA discourages the land application of a waste material where there is the potential to avoid the generation of that material in the first place, or where higher order re-use opportunities are available and practicable for that material (e.g. food could be suitable for donation rather than land application).

c). Minimisation of risks to the environment and human health

Many chemical, physical and biological contaminants may be present in waste materials that, when applied to land, could cause harm to the environment and human health.

The EPA will consider whether a waste material can be appropriately applied to land based on the type, concentration and nature of contaminants in the waste. As part of this assessment, it is necessary to identify any potentially harmful interactions between the contaminants in the waste material and the conditions of the proposed application site (for example, soil pH can influence the toxicity of some contaminants).

It is important to note that many waste materials are not suitable for land application. This is particularly the case where the land application of a recovered waste material will lead to the accumulation of potentially harmful persistent chemicals, salts or other potential corrosive components in a soil, that may adversely affect built structures or contaminate soils, ground and surface water.

Note: The EPA generally does not issue Orders and Exemptions for restricted solid or hazardous waste.

Using the right framework

Applicants should note that the objectives for the recovery and re-use of waste for land application are different to those for the management of contaminated sites. Several applicants have mistakenly overlooked this difference.

When assessing the suitability of waste materials for land application in the context of resource recovery, the EPA cautions against relying solely on health-based investigation levels (HILs), health-screening levels (HSLs), ecological investigation levels (EILs), ecological screening levels (ESLs), and site-specific risk assessments to demonstrate a waste is suitable for reuse in the context of resource recovery. In NSW, these investigation and screening levels, and site-specific risk assessments are supported by the contaminated land framework and the *Contaminated Land Management Act 1997*. They are used to assess if a site presents a risk to human health and the environment in relation to land use.

The *National Environment Protection Measure (Assessment of site contamination) 1999* (Amended in 2013) (NEPM) states (section 2.1.2 in Schedule B1) that:

“investigation and screening levels are not... desirable soil quality criteria. The use of these levels in regulating emissions and application of wastes to soil is inappropriate.”

It also states:

“The inclusion of an investigation and screening level in this guidance should not be interpreted as condoning discharges of waste up to these levels.”

Relying solely on investigation and screening levels to assess whether a waste can be reused for resource recovery purposes may result in spreading contaminated waste and contaminating land.

The policy objectives and considerations for the recovery and re-use of waste are very different to those used for the management of contaminated sites. The management of a contaminated site by its very nature is always reactive because the contamination has typically already occurred. The landowner, company, or person responsible for the contamination reacts to clean-up the site. On the other hand, the re-use of waste materials is proactive, precautionary and focussed on preventing land from being contaminated by the waste. It also focusses on ensuring the waste is viewed as a resource rather than a contaminated waste.

For these reasons, investigation and screening levels, and site-specific risk assessments should be used with care. Applicants should note the context of the framework that supports these tools and consider the objectives of the resource recovery framework.

d). Physical and chemical homogeneity of the waste material

The risk profile of a waste material is related to its chemical, physical and biological characteristics. Wastes that are inconsistent in composition, heterogeneous or obtained from a variety of sources are more difficult to characterise and potentially present greater risks.

The EPA does not support the land application of irregular, one-off batches of wastes, or of wastes that are blended to reduce the concentration of harmful contaminants. The consistency of waste streams needs to be considered in order to ensure potential contaminants will not vary over time. In practice, wastes are only likely to satisfy this criterion if they are produced in large quantities from a well-defined and consistent feedstock.

To ensure that potential contaminants are known, manageable and will not exceed appropriate concentrations over time, the applicant must be confident that the material is homogeneous with regard to its chemical and physical composition when considering the suitability of a waste material for land application.

Part B: Application format and information required

Before you start an application check the EPA website for existing Orders and Exemptions on the [EPA website](#).

There may already be one that fits your proposed re-use of a waste as a fertiliser or soil amendment.

If you cannot meet all of the conditions of an existing Order and Exemption, then you may apply for your own exemption particular to your circumstances.

Please contact the EPA's Resource Recovery Innovation team to discuss your application by calling the EPA Environment Line on 131 555 or by emailing waste.exemptions@epa.nsw.gov.au

Applicants seeking an Order and Exemption for the application of waste materials to land must apply in the format required by the EPA, as described in this document. The application format needs to be structured in the **eight sections** outlined below. An accompanying explanatory question is provided for each section to describe the information required.

Each section must be addressed. If any of the sections below are not applicable, the applicant must outline the reasons why this is the case.

The EPA may request further information from the applicant to inform its decision.

1. Contact details

Who is submitting the application?

2. Background information about the waste

What is the waste and what processes has it undergone?

3. Characterisation of the waste

What is the physical and chemical composition of the waste?

4. Mixing or blending of the waste

Is the waste to be mixed or blended with other materials?

5. Proposed use or application

What is the waste to be used for?

6. Information on the receiving environment

Where is the waste material to be applied?

7. Quality assurance and controls

What controls are in place to manage risks?

8. Specifications and standards

To what specification will the waste material be produced?

All applications **must be signed and dated** by the applicant and must be submitted electronically to:

Manager Waste Strategy and Innovation
NSW Environment Protection Authority
waste.exemptions@epa.nsw.gov.au

Applications submitted without a signature will not be considered. (**Note:** electronic signatures are acceptable).

Applicants should also be aware that in some cases the EPA may charge a fee for service to cover the costs related to the administration and assessment of an application for an Order and Exemption. The EPA will discuss any fee for service with the applicant prior to incurring the costs associated with this work.

The EPA aims to complete a preliminary assessment of each application within four weeks of its receipt. However, proponents should note that some applications may take more time to consider. For example, the EPA may need to consult with different areas within the agency, local government, other government agencies and external experts to make an informed decision on an application. Proponents should also note that final approval may require further criteria to be addressed, and should not be expected within the four-week preliminary assessment period.

1. Contact details

General administrative information is required by the EPA for an application to be considered. The required administrative information includes:

1. the applicant's details including, if relevant, the ACN and/or ABN
2. the representative or consultant's details, if relevant.

If the application is being made on behalf of another person, please provide the contact details of that person, including their ACN and/or ABN where applicable.

Identify the person who will be able to provide answers to any enquiries for further general or technical information. This person may be a consultant or representative of the applicant. In this case, the applicant should provide a letter authorising a representative or consultant to act on their behalf. It is the applicant's responsibility to make sure their representative has the necessary skills, knowledge and authority to discuss the matters listed in this guideline with the EPA.

In addition, if a specific generator or processor will be involved in the process of generating a recovered waste for supply to a consumer or where a specific consumer will take the recovered waste, the following information must also be included:

3. the generator and/or processor details, if relevant, including the ACN and/or ABN
4. the consumer details, if relevant, including the ACN and/or ABN.

Note: Applicants are strongly encouraged to discuss their proposal with the EPA prior to commencing work on an application. Applicants are also advised to consult, where necessary, with other relevant consent authorities regarding the proposal prior to submitting their application.

For any queries or to discuss your proposal, please contact the EPA's Environment Line on 131 555 or email waste.exemptions@epa.nsw.gov.au

2. Background information about the waste

Background information about the waste material is required to assist the EPA's understanding of the potential risks associated with the proposed use.

2.1 What is the waste?

The applicant is required to provide the following information about the waste:

1. a description of the waste
2. photos of the waste, including close-ups, with a scale for size
3. the total amount of waste proposed for exemption
4. how the waste material was/will be generated (including information about the type of activity that generated the waste)
5. the sources of the waste (including whether the waste has come from one or multiple sources, and what those individual sources are)
6. a trade or common name for the waste material.

The applicant may wish to submit a systematic soil classification if relevant.

2.2 What processes has the waste undergone?

The applicant is required to provide detailed information about:

1. any physical processing the waste has already undergone or will undergo (including specific details on the processing steps, such as crushing, size reduction, separation)
2. any treatment the waste has been subject to or will be subjected to, whether chemical, biological or thermal.

It is often helpful to include schematic diagrams or flowcharts to show the sequence of processing or treatment stages and materials.

2.3 What are the current disposal practices or uses of the waste?

The applicant must provide details about the current uses or disposal practices of the waste, if any.

2.4 Are there any higher order resource recovery opportunities for the waste material?

The EPA discourages the land application of any waste where avoidance or a higher order re-use or recycling opportunity is available and practicable. Before an application can be considered, the applicant must demonstrate that such opportunities either do not exist or are not viable for the waste, indicating that land application is the most sustainable solution.

Applicants should be aware that the application process requires the submission of information on any measures being taken to avoid the need to generate the waste in the first place such as using appropriate design or operational approaches to minimise the waste.

3. Characterisation of the waste

A detailed chemical and physical characterisation of the waste is necessary to provide an understanding of the potential risks associated with its proposed use.

If the waste is to be blended, mixed or incorporated with any other material prior to being applied to land, the characterisation required under this section must be undertaken **before** the waste is mixed with any other substance.

Note: If you are applying for a waste material that has more than one waste input, the EPA may require characterisation for each individual waste input. The applicant should consult with the EPA on the details of the characterisation requirements before submitting an application.

3.1 What are the physical and chemical properties of the waste?

The minimum requirements for the initial characterisation of the waste material are detailed in Appendix I. The chemical contaminants required to be tested for in Appendix I are limited to those that occur most commonly or are most likely to have an adverse impact on the environment or human health. The sampling plan and copies of the laboratory test results must be provided with the application as separate attachments.

If additional chemicals and/or physical properties that are not included in Appendix I are relevant to the characterisation of the waste, it is the responsibility of the applicant to report them as part of the characterisation. Where appropriate, the EPA may request additional testing to determine the likelihood of other contaminants being present in the waste. The waste must not be blended or diluted to reduce the concentration of harmful contaminants prior to characterisation.

All analytical data must be presented in two spreadsheets (examples are provided in Tables 2 and 3 of Appendix II) **including unprotected versions of the spreadsheets**, and must include:

1. a minimum of 20 samples for all the chemicals/attributes listed in Table 1 of Appendix I
2. the minimum, average, maximum and standard deviation calculated using all 20 samples
3. the test methods used for the characterisation, their detection limits and estimated uncertainty of measurement where this is applicable.

The applicant must provide details of the production process of the waste material. It must be stated if the waste material is a once-off batch or an ongoing supply. For on-going supplies, applicants must specify if this will be in batch or continuous form.

3.2 What, if any, is the level or concentration of specific contaminants in the waste?

In addition to the chemical characterisation requirements specified in Appendix I, the applicant will need to outline whether the waste contains any of the specific physical, biological, and/or other contaminants listed below:

1. asbestos
2. micro-organisms, pathogens and fungi (if these are relevant to your case, contact the EPA before sampling begins to discuss the range of organisms being considered for testing)
3. weed seeds
4. plastics, glass, metal or other physical contaminants
5. pesticides
6. radioactive substances.

If the waste contains, or is likely to contain any of these contaminants, the applicant must, specify the quantities present, provide characterisation data and address the risks to the environment and human health for the proposed use.

Note: Applicants are strongly encouraged to contact the EPA to discuss characterisation requirements prior to commencing any sampling and testing as part of the application. Please contact the EPA's Environment Line on 131 555.

4. Mixing or blending of the waste

Information must be provided under this section where the waste is to be mixed, blended or incorporated with any other materials prior to land application.

If the waste, as detailed in Sections 2 and 3, is to be directly applied to land without mixing or blending, it is not necessary to complete this section and you may proceed to Section 5: Proposed use or application.

4.1 What is the composition of the final blended material proposed for land application?

Where the waste is to be blended, mixed or incorporated with other materials prior to land application, the applicant must provide the following information:

1. a description of all other materials blended or mixed with the waste including chemical and biological characteristics
2. the proportions of all materials in the final blended product (including the waste)
3. the quantity of waste intended to be produced per year (or other appropriate frequency)
4. a common or trade name for the final blended material (where relevant).

Where the materials being blended with the recovered waste are well known and have consistent, reproducible characteristics the EPA may accept the data on the recovered waste stream only to assess an application. However, if a blend includes materials that are not well understood, the EPA may require the applicant to repeat the characterisation outlined in Section 3 for the final blended material. The applicant should consult with the EPA prior to submission regarding the details of characterisation requirements.

4.2 What processes are involved in the incorporation of the waste into the material?

The applicant is required to detail the processes involved in blending or mixing the waste with the other materials. This section should include flowcharts and/or diagrams where appropriate.

5. Proposed use or application

5.1 What will the waste material be used for?

The applicant is required to detail the proposed use or range of uses for the waste material.

5.2 What are the properties of the waste material that make it suitable for the proposed application?

The applicant needs to provide information on how the proposed use of the waste material is fit for purpose, and how the use of the waste material will provide a benefit. Applicants should note that the application of a waste material to land is not considered fit for purpose simply because it diverts waste from landfill without delivering other beneficial outcomes.

Where waste has been blended, mixed or incorporated with another material, the applicant should also provide details on how the blended waste provides additional benefits compared to the waste on its own.

Exemptions will only be provided where the proposed land application is a bona-fide re-use and does not represent opportunistic waste disposal. In providing information on the suitability of applying the waste material to land, it may be of value to refer to information presented in previous sections.

5.3 What, if any, virgin material is the waste replacing?

Where applicable, the applicant should provide information on any virgin material the waste is replacing, including its chemical, physical and/or biological properties.

6. Information on the receiving environment

6.1 What is the type of land use where the waste material will be applied?

Applicants should provide information on the current and proposed activities in the area where the waste material is to be applied. This information is necessary to identify any potential adverse impacts on the environment or human health. This will ensure that the EPA is sufficiently informed when considering appropriate contaminant thresholds or other risk management controls, and in understanding current and future exposure pathways. Activity types may include:

- agriculture
- commercial or industrial development
- recreation areas/gardens/parks
- residential.

Applicants should contact the EPA before preparing an application where the waste is proposed to be used at a site that is being managed under the *Contaminated Land Management Act 1997* or a site that requires remediation.

6.2 Where is the proposed location for application?

In cases where it is proposed to limit the land application of the waste material to a specific location or region, geographical information about the proposed application site is required to ensure that the properties of the receiving environment are assessed appropriately. This should include the full address of the site, Lot and Development Plan (DP), a map and a photo of the location. Where applicable, provide a copy of the development consent for the site that demonstrates the waste can be used at the site.

Note: the EPA cannot issue an Order and Exemption where the site does not possess the appropriate development consent for the activity.

Where the application is not limited to a specific location, general details must be provided on the type of sites that would be appropriate to receive the waste.

6.3 What are the characteristics of the proposed location?

Information on the characteristics of the proposed application site is necessary to ensure that the properties of the receiving environment and the associated chemical and physical interactions are fully understood and assessed appropriately. This may include, but is not limited to:

- past, current and future land use
- ground slope
- depth to bedrock
- depth to groundwater
- groundwater bore data
- relevant available soil data
- proximity of the site to a surface water body
- presence of drinking water aquifers
- proximity to residential areas
- proximity to environmentally sensitive areas (those areas which have ecological, natural, cultural or heritage values worthy of protection, such as drinking water catchments areas, national parks and world heritage areas)
- any other potential restrictions in the receiving environment.

The level of detail required is dependent on the activity being undertaken and the sensitivity of the land use, the nature of the waste material and its proposed use. Where appropriate, this information may be used to inform the inclusion of appropriate conditions within an Order and Exemption.

6.4 What are the characteristics of the surrounding land use?

The applicant should provide information on the characteristics of the land surrounding the proposed application site including the activity being undertaken. This should include any information on the future land use of the surrounding land.

6.5 What is the proposed rate and frequency of application to land?

The applicant should provide information on the proposed frequency and rate of application of the waste material, including details on how these calculations were made. Calculations of rate and frequency must include the capacity of the soil at the site to receive the recovered waste and consideration of other inputs used. It may also include information on varying soil types and conditions across the receiving site.

Where applicable a nutrient balance must be provided to demonstrate that the nutrients in the applied waste do not exceed the ability of the soil/plant system to utilise those nutrients without adverse effects occurring.

Where the waste applied is a substitute for agricultural lime, minimum information requirements of the EPA include lime requirement calculations and the calcium carbonate equivalent of the waste.

Where the waste is applied for other soil amendment purposes a similar approach must be followed to demonstrate the suitability of the waste for its intended purpose.

6.6 What is the proposed method of application?

The applicant should detail the specific method of land application for the proposed waste material, such as by spraying, spreading, depositing, ploughing, injecting, mixing or other mechanical means.

7. Quality assurance and controls

The EPA strongly encourages the development of quality assurance/quality control (QA/QC) programs to ensure that environmental and human health outcomes from the land application of the waste materials are consistently maintained over time.

Quality assurance is a system of procedures designed to increase the reliability of the results of a process. The procedures require specific standards to be met throughout the process of planning, control, evaluation, correction and documentation to help ensure that the quality of the process is maintained. Generally, quality assurance in manufacturing products means that the end-product meets the requirements of specifications, standards or users.

7.1 What procedures are in place to manage the input and output quality of the waste material over time?

The extent of procedures designed to appropriately manage any identified risks – QA/QC procedures – will vary for each proposal, depending on the individual risk posed by the type, source and quantity of waste material; the processes that it undergoes; and the end-use of the waste material.

Applicants should provide a QA/QC plan for the waste material and its application processes, including proposed frequencies of sampling and testing of inputs and outputs.

8. Specifications and standards

Specifications for the end-use of waste materials help ensure that proposed environmental outcomes or standards are achieved and maintained over time. Specifications refer to set physical, chemical and additional requirements in published literature or standards that make materials acceptable for the proposed re-use.

8.1 Does the waste material comply with or compare closely to any existing specifications or standards?

Any existing product specifications or standards should be included as a separate attachment in the application.

It may also be useful to check against any specifications for existing Orders and Exemptions that may be similar to your waste material.

8.2 Has a specification for the waste material been developed?

The EPA encourages applicants to submit their own specification for the waste material if one does not exist. Where the applicant has done so, the proposed specification should be included with the application as a separate attachment. The applicant should ensure that the specification addresses all potential contaminants, not just those commonly thought to be present.

8.3 Is there any agreement between the supplier and the consumer of the waste material to ensure the material is 'fit for purpose'?

In addition to material specifications detailing the quality and consistency of a waste material, agreements between the supplier (the generator or processor) and consumer may be useful if they include additional information in support of a waste material being 'fit for purpose'. For example, these could include requirements specified by the consumer that demonstrate the waste material fulfils a specific function for which it is used. Where applicable, applicants should include copies of any agreements as a separate attachment in the application.

Appendix I: Characterisation

Samples must be analysed at a laboratory **accredited for the relevant tests** by the National Association of Testing Authorities Australia (NATA) or an equivalent accreditation body. The test methods used to obtain all data should be specified as part of the chemical characterisation.

Note: Applicants are strongly encouraged to contact the EPA if a NATA accredited laboratory cannot be engaged for relevant tests by calling the EPA's Environment Line on 131 555.

The applicant must ensure that the waste material being proposed for an Order and Exemption has undergone testing for the chemical contaminants in Table 1 for a **minimum of 20 composite samples**. This is the minimum suite of chemical testing required by the EPA for an application for Order and Exemption to be considered. Table 1 is not an exhaustive list and is limited to those chemicals most commonly associated with potential environmental contaminants.

If additional attributes not included in Table 1 are relevant to the characterisation of the waste, it is the responsibility of the applicant to report them as part of the characterisation. Where relevant, this includes, but is not limited to, testing for particle size distribution, exchangeable sodium (where there is a likelihood of the waste increasing the sodicity of the soil), nitrogen, phosphorus, pesticides, herbicides, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), total recoverable hydrocarbons (TRHs), BTEX (benzene, toluene, ethyl benzene and xylene) volatile and semi-volatile organic compounds and cyanide.

In addition to the analytes listed in Table 1, the applicant must outline whether the waste contains any acid sulfate soils, potential acid sulfate soils or specific physical and/or biological contaminants such as asbestos, micro-organisms, pathogens and fungi, weed seeds, pesticides, radioactive substances, plastics, glass, metal or any other physical contaminants. If these materials are (or are likely to) be present, they should be reported with appropriate management protocols or testing results.

Where wastes are likely to be high in sodium salts such as post-consumer food wastes (e.g. restaurant plate scrapings) testing results must include soluble anions (Cl^- and NO_3^-) and cations (Na^+ , Ca^{2+} , Mg^{2+} and K^+). This is to assess where electrical conductivity is dominated by sodium salts and to what degree.

Sampling plan

Applicants must initially chemically characterise each source of waste by taking a minimum of 20 composite samples. A sampling plan must be prepared for each source of waste where this applies. The sampling plan must have a clear, defensible rationale and should address all of the following criteria (unless otherwise advised by the EPA):

1. homogeneity
2. sampling representativeness
3. diagram of the location of each discrete sampling point (for example, on a conveyor belt or stockpile)
4. sampling method, particularly the method used to extract the sample
5. sample storage and transport (e.g. chain of custody)
6. size reduction, splitting and sub-sampling before the sample is analysed
7. appropriate holding times (e.g. for microbiological testing)
8. laboratory reports (see Requesting reports from laboratories on page 17)

Note: Composite sampling is required, using five sub-samples, that is each sample is made up of five smaller samples of the same size. Composite sampling refers to waste that is stockpiled. However, discrete sampling must be employed where the analyte is a volatile or semi-volatile contaminant, or where sampling is conducted in situ.

Common chemicals to be tested

The following chemicals/characteristics must be measured and assessed (dry mass means that the samples are dried to a constant weight at ~ 100°C).

Table 1: Chemical concentrations/material characteristics to be tested

No.	Chemical/attributes	Detection limit	Units for reporting
1	Antimony	~ 2	mg/kg on a dry mass basis
2	Arsenic	~ 2	mg/kg on a dry mass basis
3	Beryllium	~ 0.1	mg/kg on a dry mass basis
4	Boron	~ 5	mg/kg on a dry mass basis
5	Cadmium	~ 0.5	mg/kg on a dry mass basis
6	Cobalt	~ 2	mg/kg on a dry mass basis
7	Copper	~ 2	mg/kg on a dry mass basis
8	Chromium	~ 2	mg/kg on a dry mass basis
9	Lead	~ 2	mg/kg on a dry mass basis
10	Manganese	~ 2	mg/kg on a dry mass basis
11	Molybdenum	~ 1	mg/kg on a dry mass basis
12	Nickel	~ 2	mg/kg on a dry mass basis
13	Selenium	~ 3	mg/kg on a dry mass basis
14	Tin	~ 2	mg/kg on a dry mass basis
15	Vanadium	~ 1	mg/kg on a dry mass basis
16	Zinc	~ 2	mg/kg on a dry mass basis
17	Total organic carbon	~ 0.1	% on a dry mass basis
18	Total nitrogen	~ 100	mg/kg on a dry mass basis
19	Total sulfur	~ 0.1	% on a dry mass basis
20	Total phosphorus	~ 0.1	% on a dry mass basis
21	Moisture content	~ 0.1	% by weight
22	Mercury	~ 0.1	mg/kg on a dry mass basis
23	Electrical conductivity	~ 0.1	dS/m as received
24	pH	~ 0.1	pH
25	Soluble cations (Na ⁺ , Ca ²⁺ , Mg ²⁺ , K ⁺)	~1	mg/kg on an air-dry basis
26	Soluble anions (Cl ⁻ , NO ₃ ⁻)	~0.5 (Cl ⁻) ~1.0 (NO ₃ ⁻)	mg/kg on an air-dry basis

Test methods

The following test methods should be used for characterising the waste:

1. Test methods for measuring **chemicals 1–16** in Table 1 require:
 - a. sample preparation, such as size reduction and splitting techniques
 - b. sample digestion using USEPA 3051A (or an equivalent method)
 - c. analysis using USEPA 6010D (or an equivalent method)
 - d. reporting as mg/kg dry weight.
2. Test methods for measuring **total organic carbon** (17 in Table 1) require analysis using methods 6B2 or 6B3 in Rayment & Lyons (2011), *Soil Chemical Methods - Australasia* (or an equivalent method).
3. Test methods for measuring **total nitrogen** (18 in Table 1) require analysis using semi-micro Kjeldahl method 7A2 in Rayment & Lyons (2011), *Soil Chemical Methods - Australasia* (or an equivalent method).
4. Test methods for measuring **total sulfur** (19 in Table 1) require analysis using method 10A1 in Rayment & Lyons (2011), *Soil Chemical Methods - Australasia* (or an equivalent method).
5. Test methods for measuring **total phosphorus** (20 in Table 1) require analysis using method 9A1 in Rayment & Lyons (2011), *Soil Chemical Methods - Australasia* or USEPA 6010C (or an equivalent method).
6. Test methods for measuring **moisture content** (21 in Table 1) require analysis using USEPA 9001 (or an equivalent method).
7. Test methods for measuring **mercury** (22 in Table 1) require:
 - a. sample pre-treatment (if required) using a separate moisture test so a calculated dry weight can be determined
 - b. cold-vapour atomic absorption spectroscopy (sample preparation and analytical method) using USEPA 7471B (or an equivalent method)
 - c. reporting as mg/kg dry weight.
8. Test methods for measuring **electrical conductivity** (23 in Table 1) require:
 - a. analysis using method 3A1 in Rayment & Lyons (2011), *Soil Chemical Methods - Australasia* (or an equivalent method)
 - b. Reporting as dS/m.
9. Test methods for measuring **pH** (24 in Table 1) require:
 - a. analysis using either (1) method 4A1 or (2) where the waste is likely to contain high concentrations of soluble salts method 4B1 in Rayment & Lyons (2011), *Soil Chemical Methods - Australasia* (or an equivalent method)
 - b. Report as pH.
10. Test method for measuring **attributes 25-26** in Table 1 requires:
 - a. **Soluble cations and anions** should be extracted with a 1:5 waste: water extract as described in method 3A1 of Rayment and Lyons 2011, *Soil Chemical Methods – Australasia* (or an equivalent method). Before analysis, the suspension must be clarified through a 0.2µm filter, a centrifugation step may also assist.¹
 - b. analysis for soluble cations (Na⁺, Ca²⁺, Mg²⁺ and K⁺) using method USEPA 6010D (or an equivalent method)
 - c. analysis for Cl⁻ anion using any of the methods from 5A1 to 5A4 of Rayment and Lyons 2011, *Soil Chemical Methods – Australasia* (or an equivalent method)
 - d. analysis for NO₃⁻ anion using method 5A3 of Rayment and Lyons 2011, *Soil Chemical Methods – Australasia* (or an equivalent method).
 - e. Reporting as mg/kg on an air-dry basis.

¹ Where a laboratory experiences difficulties in obtaining a clear solution or analytical interferences, contact the EPA by emailing to waste.exemptions@epa.nsw.gov.au.

Requesting reports from laboratories

Reports from laboratories should be consistent with the Australian Standard *General requirements for the competence of testing and calibration* (AS ISO/IEC 17025-2005), or with its updated equivalent when this occurs.

Applicants must request that the results of testing include quality control data. This should include the estimated uncertainty of measurement where applicable, and information regarding laboratory receipt of samples. The analysis results and quality control data must both be submitted to the EPA as part of an application.

Appendix II: Characterisation tables

Table 2: Example characterisation summary table

Chemical/ attributes	Units	Test method	Detection limit	Min.	Av.	Max.	Std. deviation
Antimony	mg/kg 'dry weight'						
Arsenic	mg/kg 'dry weight'						
Beryllium	mg/kg 'dry weight'						
Boron	mg/kg 'dry weight'						
Cadmium	mg/kg 'dry weight'						
Cobalt	mg/kg 'dry weight'						
Copper	mg/kg 'dry weight'						
Chromium	mg/kg 'dry weight'						
Lead	mg/kg 'dry weight'						
Manganese	mg/kg 'dry weight'						
Molybdenum	mg/kg 'dry weight'						
Nickel	mg/kg 'dry weight'						
Selenium	mg/kg 'dry weight'						
Tin	mg/kg 'dry weight'						
Vanadium	mg/kg 'dry weight'						
Zinc	mg/kg 'dry weight'						
Total organic carbon	% by 'dry weight'						
Total nitrogen	mg/kg 'dry weight'						
Total sulfur	% by 'dry weight'						
Total phosphorus	% by 'dry weight'						
Moisture content	% by weight						
Mercury	mg/kg 'dry weight'						
Electrical conductivity	dS/m						
pH	–						

Soluble cations	mg/kg on air-dry basis						
Na ⁺							
Ca ²⁺							
Mg ²⁺							
K ⁺							
Soluble anions	mg/kg on air-dry basis						
Cl ⁻							
NO ₃ ⁻							

Table 3: Example characterisation sample table

Samples (20 samples for characterisation)																						
Chemical/attributes	Units	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Test methods
Date sampled																						
Antimony																						
Arsenic																						
Beryllium																						
Boron																						
Cadmium																						
Cobalt																						
Copper																						
Chromium																						
Lead																						
Manganese																						
Molybdenum																						
Nickel																						
Selenium																						
Tin																						
Vanadium																						
Zinc																						
Total organic carbon																						
Total nitrogen																						
Total sulfur																						
Total phosphorus																						
Moisture content																						
Mercury																						
Electrical conductivity																						
pH																						

Glossary

Application to land	As specified in clause 92 (a) of the Waste Regulation, application to land means: (i) spraying, spreading or depositing on the land, or (ii) ploughing, injecting or mixing into the land, or (iii) filling, raising, reclaiming or contouring the land.
Consumer	The person who applies, or intends to apply, resource recovery waste to land under an Exemption.
EPA	NSW Environment Protection Authority.
Exemption	A resource recovery Exemption as specified under clauses 91 and 92 of the Waste Regulation. It contains the approved conditions for the use of a resource recovery waste by consumers.
Generator	A person who generates waste for supply to a processor or consumer.
Order	A resource recovery Order as specified under clause 93 of the Waste Regulation. It contains the conditions for the supply of a resource recovery waste by generators or processors.
POEO Act	<i>Protection of the Environment Operations Act 1997.</i>
Processor	A person who processes, mixes, blends, or otherwise incorporates resource recovery waste into a material in its final form for supply to a consumer.
Resource recovery waste	Waste to which a resource recovery Order and Exemption applies.
Supplier	Same meaning as generator or processor.
Waste Regulation	<i>Protection of the Environment (Waste) Regulation 2014.</i>