
TECHNICAL SPECIFICATION XXXX

Processed Solid Organic Waste for Road Infrastructure Applications

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1. SCOPE

1.1.1.1 This Technical Specification XXX sets out the requirements for the supply and use of processed solid organic waste and raw mulch in roadwork applications, including landscaping, erosion control and stormwater management systems.

Note: This specification is intended for use for recycled organic materials (i.e. material which would otherwise be classified as organic waste) and not for virgin organic materials.

1.1.1.2 This specification should be read in conjunction with Section 720 Landscape Works and other relevant jurisdictional specifications for landscaping, earthworks and/or stormwater treatment.

1.1.1.3 This specification:

- a) Lists the quality management systems to be used.
- b) Maps the materials which can be used (i.e. types of processed solid organic waste materials and raw mulch) for appropriate applications
- c) Lists the requirements for testing and compliance of materials.

2. DEFINITIONS

2.1.1.1 The following definitions apply to this specification.

Batter: is the shaping of the land between two different elevation levels and is used when there is adequate space available.

Biochar: is a charcoal produced through a process known as pyrolysis. Pyrolysis occurs by heating (burning) organic materials at high temperatures and in a low oxygen environment.

Biofiltration & Bioretention systems: are a low-energy treatment technology. Their main function is improving the stormwater quality and quantity through filtration of fine sediment, phosphorus, nitrogen, metals, and hydrocarbons. Biofiltration systems are similar to bioretention systems; however, while biofiltration systems remove stormwater via infiltration through the filter medium and into the surrounding soils, bioretention systems attenuate runoff with flow-regulating underdrains.

Biomass: a broad term that covers both biowaste (organic waste) and biosolids (refer to organic waste and biosolids). This incorporates all organic materials that can be converted into beneficial products, including fuel, power, or soil conditioners. These materials can be derived from animal waste, forest bedding, timber waste/woodchips and agricultural crop waste.

Biosecurity risk: is the risk of any adverse effect on human health, social amenity, the economy and the environment caused by weeds, pathogens, disease, contaminants and potential introduction of invasive non-native species.

Biosolid: is a stabilised solid, or slurry material that is derived from the outputs of wastewater or sewage treatment processes. Wastewater or sewage treatment involves microorganisms digesting the sewage and breaking down the organic solids that have been discharged into the system. The water content of the solids is then reduced through mechanical processes. The resultant products are biosolids.

Coarse mulch (CM): is mulch with a minimum of 70% of its particles at a size greater than 16 mm, by mass, and complies with the appropriate criteria (detailed in AS 4454).

Compost blanket: is a layer of loosely applied composted material placed on the soil to reduce

stormwater runoff and erosion and provide a seed bed to assist germination. The compost blanket fills in small voids to limit channelised flow, as well as providing a more permeable surface to facilitate stormwater infiltration, thus promoting revegetation.

Composted Product (CP): is an organic product that has undergone controlled aerobic and thermophilic biological transformation. This has been done through the composting process, to reduce phytotoxic compounds (refer to phytotoxic compounds), and to achieve the specified level of maturity required for the compost and complies with the appropriate criteria (detailed in AS 4454).

Composting: is a process where organic material is microbiologically transformed under controlled aerobic conditions, to achieve pasteurisation and a specified level of maturity and complies with the appropriate criteria (detailed in AS 4454).

Erosion control: is a set of measures that are aimed at reducing the soil erosion caused by the impact of rainfall and sheet flow.

Fertilisers: are organic or inorganic substances containing chemical elements that improve the growth of plants and the fertility of the soil (refer to organic fertiliser).

Filter berm: a trapezoidal (in cross-section) dike of compost, mulch or an organic product that is placed perpendicular to sheet flow runoff, to control erosion and retain sediment.

Filter media: the portion of a filtering (or biofiltration) system that separates out the unwanted particles from the stormwater and typically provides a rooting media for plants.

Filter sock: a type of contained compost filter berm (refer filter berm), where a tube is filled with composted (organic) material and is placed perpendicular to sheet flow runoff, to control erosion and retain sediment.

Fine mulch (FM): is mulch that has less than 20% by mass of its particles retained on the 16 mm sieve based on the shortest dimension and less than 20% by mass of its particles pass a 5 mm sieve. Further, it complies with the appropriate criteria (detailed in AS 4454).

Hydro-compost: combines finely screened compost into the hydro-mulch slurry (refer to hydro-mulch).

Hydro-mulching: is the application of a slurry of water, seed, fertiliser, tackifier (refer to tackifier) and a growth medium (e.g. organic mulch). The application of mulch to this slurry provides a growth medium and a protective cover and moisture reservoir for the seeds to germinate. Hydro-mulching solutions can also be used for erosion control and stabilisation of roadside batters.

Imported Topsoil: Imported soil, required in the event that site topsoil is not available or is not adequate to achieve the specified depth of topsoil, Refer to Section 720 for supply details.

Maturation: is the second stage of the composting process (after pasteurisation) where the microbial activity slows, and the compost begins to stabilise to an extent that it can be safely used on land and come into direct contact with plants without any negative effects.

Mature compost (MC): is compost that has undergone the maturation process and has low levels of phytotoxicity, and a high degree of biological stability.

Mulch (organic): is any organic product, including chipped site vegetation and composted organic materials, that is suitable for placing on soil surfaces to improve moisture retention and reduce weed competition. This excludes polymers that do not degrade, such as plastics, rubber, and coatings.

Municipal solid waste (MSW): more commonly known as household rubbish, consists of everyday organic items such as food waste, product packaging, grass clippings, newspapers, etc.

Organic fertiliser: A fertiliser (refer to fertiliser) that is naturally produced and contains carbon.

Organic waste: otherwise known as biowaste, is any material that is biodegradable, coming from either a plant or an animal. This includes green waste, food waste, food-soiled paper, non-hazardous wood waste, timber, and pruning waste.

Pathogen: a bacterium, virus, or other microorganism that can cause disease (refer to pasteurised product).

Pasteurised product (PP): is an organic product that has been pasteurised or sanitised by subjection to high temperatures for a period to destroy pathogens (refer to pathogens), pests and weeds.

Pasteurisation: a process where organic material is treated to significantly reduce the number of plant and animal pathogens and plant propagules (refer to propagule). The EPA Determination No. S 723 and AS 4454 outline requirements for pasteurisation.

Phytotoxic compound: is a substance that is poisonous or toxic to the growth of plants. Phytotoxic compounds may result from human activity, as with herbicides, or they may be produced by plants, microorganisms, or naturally occurring chemical reactions.

Processed feedstock: is biomass that has gone through chemical processing (e.g. paper pulp sludge) or biological processing (e.g. digestion, such as manures and sludge from waste effluent treatment) beyond simple mechanical processing to modify physical properties.

Processed solid organic waste: refers to a pasteurised material from a processing site that does not include liquid organic waste, digestate from anaerobic digestion, or vermicast (refer to vermicast). In addition, it does not contain any chemical contaminant concentrations or non-organic physical contaminants exceeding the upper limits for that chemical contaminant parameters, as outlined in the EPA Determination No. S 723.

Propagule: is any material that assists with propagating an organism to the next stage in its life cycle. Propagules are produced by plants (in the form of seeds, spores or vegetation plant part capable of producing a new plant such as bulbs, corms, cutting and rhizomes), fungi (in the form of spores), and bacteria (for example endospores or microbial cysts).

Raw mulch (RM): Mulch (organic) that has not undergone the pasteurisation and composting processes, and embodies minimal risk of plant propagules, pathogens and other contaminants.

Recycled organics: is a general term, used by industry, for products that are 'recycled' from organic waste. This includes compost, soil conditioners, mulch and other products that can be applied to the land, for landscaping or soil treatment.

Note: In this specification, recycled organic material is referred to as processed solid organic waste (refer processed solid organic waste) to align with the EPA Determination No. S 723.

Site Topsoil: weathered surface layer of soils that includes organic matter. Refer to Section 720 for supply details.

Soil amelioration: is the process of modifying the physical and chemical properties of soils to improve the quality, primarily improving the air and water balance in the soil.

Soil conditioner (SC): is any composted or pasteurised organic product that is suitable for adding to soils, with no more than 20% by mass of particles with a size above 16 mm. This includes products termed 'soil amendment', 'soil additive', 'soil improver' and similar. This product excludes polymers that do not biodegrade. A soil conditioner must comply with appropriate criteria (detailed in AS 4454).

Soil organic matter: is the component of soil, which is composed of organic compounds that have come from the remains of organisms, such as plants and animals, including their waste products which occur in the environment.

Tackifier: are chemical compounds that are used in formulating adhesives to create tackiness. A hydro-mulch tackifier is an adhesive for the seed and mulch in the slurry (refer hydro-mulch).

Unprocessed feedstock: is biomass from the plant kingdom (or other non-animal taxa such as fungi), grown in a clean, uncontaminated environment, that may have gone through mechanical processing to change its physical properties (e.g. particle size), but has not gone through chemical processing or treatment, or biological processing (e.g. digestion).

Vermicast: is the end-product of the breakdown of organic matter by earthworms (refer to processed solid organic waste).

3. REFERENCED DOCUMENTS

3.1.1.1 The following documents are referenced in this Specification:

Australian/New Zealand Standards

AS 1289.4.1.1:2019 *Methods of testing soils for engineering purposes: soil chemical tests: determination of the organic matter content of a soil: normal method.*

AS 4419:2018 *Soils for landscaping and garden use.*

AS 4454:2012 *Composts, soil conditioners and mulches.*

Environment Protection Authority (EPA) Victoria

EPA Victoria Gazette No. S 723:2021 *EPA determination: specifications acceptable to the Authority for receiving processed organics.*

EPA Victoria publication 1588.1:2015 *Designing, constructing and operating composting facilities.*

EPA Victoria publication IWRG701:2009 *Sampling and analysis of waters, wastewaters, soils and wastes.*

Department of Transport Victoria Specifications

Section 720 *Landscape works.*

Department of Economic Development, Jobs, Transport and Resources

Agriculture Victoria no. 108:2018 *Guide to Victorian fertiliser regulations.*

Department of Industry and Science

Water Sensitive Cities:2015 *Adoption guidelines for stormwater biofiltration systems (version 2).*

Commonwealth Scientific and Industrial Research Organisation

Leake S, Haege E:2014 *Soils for landscape development: selection, specification and validation.*

ASTM

ASTM D1762-84:2021 *Standard test method for chemical analysis of wood charcoal.*

United States Environmental Protection Agency

EPA SW 846 *Test methods for evaluating solid waste, physical/chemical methods.*

Method 8270E:2014 *Semivolatile organic compounds by gas chromatography/mass spectrometry (GC-MS).*

Method 8275A:1996 *Semivolatile organic compounds in soil/sludges and solid wastes using thermal extraction/gas chromatography/mass spectrometry (TE/GC/MS).*

Method 8082A:2007 *Polychlorinated Biphenyls (PCBs) by gas chromatography.*

Method 8290A:2007 *Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by high-resolution gas chromatography/high resolution mass spectrometry (HRGC/HRMS).*

4. QUALITY SYSTEM REQUIREMENTS

4.1.1.1 The Contractor must prepare and implement a Quality Management Plan that in addition to legislative requirements includes:

- a) All imported soils to be compliant with AS 4419 Soils for landscaping and garden use
- b) All composts, soil conditioners and mulches to be compliant with AS 4454 Composts, soil conditioners and mulches.
- c) Biochar to be compliant with AS 4454 Composts, soil conditioners and mulches and EPA determination No. S 723 Specifications acceptable to the Authority for receiving processed organics.

HOLD POINT 1	
Process held	Commencement of contract.
Submission details	Quality Management Plan.
Release of HOLD POINT	Review of Quality Management Plan by the Superintendent. Superintendent to authorise the release of the HOLD POINT.

4.1.1.2 The HOLD POINTS and Records applicable to this Technical Specification are summarised in Annexure A.

4.1.1.3 A summary of the supplementary information that is required to be submitted to the Superintendent is presented in Annexure B. Supplementary information shall be submitted in a summary document.

5. MATERIAL REQUIREMENTS AND APPLICATIONS

5.1 Material Requirements

5.1.1 General

5.1.1.1 The materials to be used shall meet the environmental, health, physical and chemical requirements, and reference shall be made to the statutory requirements, including those stated in EPA Determination – Specifications acceptable to the Authority for receiving processed organics, No. S 723 and AS 4454.

Note: Any product other than those stated in AS 4454 shall comply with AS 4454 and EPA Determination No. S 723. This includes:

1. Treated non-compliant materials (by mixing additives).
2. Biochar and other identified types of processed solid organic waste that are fit for purpose.
3. Biochar may have beneficial properties, such as increased water holding capacity, and can be used in soil amelioration. The requirements for biochar to be used are detailed in Appendix A.

5.1.1.2 The requirements for processed solid organic waste products and raw mulch are detailed in AS 4454. AS 4454 classifies these products:

- a) based on the maturity level (product stability), into 4 categories stated below:
 - i) Raw mulch (RM)
 - ii) Pasteurised product (PP)
 - iii) Composted product (CP)
 - iv) Mature compost (MC).
- b) based on the particle size gradation, into 3 categories stated below:
 - i) Soil conditioner (SC)
 - ii) Fine mulch (FM)
 - iii) Coarse mulch (CM).
- c) These categories will be used for the applications stated in this specification.

5.2 Applications

5.2.1 General

5.2.1.1 Table 5.1 presents the applications for which various products, with different maturity levels (product stability) and particles sizes stated in Clause 5.1.1.2, can be used.

Table 5.1 Products and applications

Application			Product ⁽¹⁾		Requirements	
			Stability	Particle size		
Landscaping (Clause 5.2.2)	Soil amelioration for planting ^(2, 3)	Soil conditioning	MC CP ⁽⁴⁾	SC FM ⁽⁴⁾ CM ⁽⁴⁾	AS 4454 AS 4419 (if tested as a soil blend or organic soil) EPA S 723 Clause 5.2.2.1 a) - c)	
		Fertilising	MC	SC	Agriculture Victoria No. 108 AS 4454 (including Table 3.1B for soluble nitrogen levels and nitrogen drawdown Index) EPA S 723 Clause 5.2.2.1 d)	
		Soil compaction mitigation	MC	SC FM CM	AS 4454 EPA S 723 Clause 5.2.2.1 e)	
	Hydro-compost (Seeding)		MC	SC	AS 4454 EPA S 723 Clause 5.2.2.2 a)	
	Turfing	Top dressing	CP MC	SC	AS 4454 EPA S 723 Clause 5.2.2.3 a)	
		Fertilising	MC	SC	Agriculture Victoria No. 108 AS 4454 (including Table 3.1B for soluble nitrogen levels and nitrogen drawdown Index) EPA S 723 Clause 5.2.2.3 b)	
	Mulching		RM PP	CM	AS 4454 EPA S 723 Clauses 5.2.2.4 a)	
	Temporary Erosion and Sediment Control (Clause 5.2.3) ⁽⁵⁾	Erosion Control		RM ⁽⁶⁾	FM CM	AS 4454 EPA S 723 Clause 5.2.3.1 a)
		Hydro-mulch		RM ⁽⁶⁾ PP	FM CM	AS 4454 EPA S 723 Clause 5.2.3.2 a)
		Compost blankets		MC	SC FM CM	AS 4454 EPA S 723 Clause 5.2.3.3 a) - e)
Mulch berm		RM ⁽⁶⁾ PP CP	FM CM	AS 4454 EPA S 723 Clauses 5.2.3.4 a)		

Application			Product ⁽¹⁾		Requirements
			Stability	Particle size	
	Filter berms/filter socks	Filter berms	RM ⁽⁶⁾ PP CP	SC FM CM	AS 4454 EPA S 723 Clause 5.2.3.5 a)
		Filter socks	MC		AS 4454 EPA S 723 Clauses 5.2.3.5 a) and b)
Biofiltration (Stormwater management) (Clause 5.2.4)	Filter media		CP MC	SC	AS 4454 EPA S 723 Clauses 5.2.4.1 a) and b) Water Sensitive Cities (2015) Leake and Haege (2014)

- 1 Refer to Clause 5.1.1.2.
- 2 Refer to the Note in Clause 5.2.2.1.
- 3 When biochar is used for soil amelioration, the requirements in Appendix A shall be met.
- 4 Prior to planting and to improve the water holding capacity, composted soil conditioners and mulch (fine and coarse) can be incorporated into the topsoil.
- 5 The establishment of proper erosion control techniques must be done in accordance with specialist technical advice and EPA best practice management requirements.
- 6 Only if the mulch is site-won. There are concerns regarding the use of unpasteurised garden organics which potentially lead to a biosecurity risk (e.g. spread of weeds and plant diseases). Raw mulches that have not been subject to temperature-based pasteurisation may be used if they are verified as being free of plant propagules and pathogens as specified by AS 4454 and EPA No. S 723.

5.2.1.2 The Contractor shall provide quality assurance documentation from the supplier to demonstrate material is in accordance with the requirements of the following Clauses, 7 business days prior to delivery to Site.

HOLD POINT 2	
Process held	Commencement of works involving recycled organic material.
Submission details	Certificate of conformance. To be provided by Contractor to the Superintendent 7 business days prior to the intended commencement of works involving recycled organic material.
Release of HOLD POINT	Review of submission and quality records by the Superintendent. Superintendent to authorise the release of the HOLD POINT.

5.2.1.3 For the applications stated in Table 5.1, the specific requirements are detailed in the following Clauses.

HOLD POINT 3	
Process	Visual inspection of material prior, during and after application to ensure the materials do not contain physical contaminations that would be detrimental to the environment or amenity of the site.
Submission details	Inspection report from the contractor, signed off by the Superintendent.
Release of HOLD POINT	Superintendent to authorise the release of the HOLD POINT upon signatory.

HOLD POINT 4	
Process	Inspection of the application of recycled organic material, after the completion of relevant activities.
Submission details	Inspection report from the contractor, signed off by the Superintendent.
Release of HOLD POINT	Superintendent to authorise the release of the HOLD POINT upon signatory.

5.2.2 Landscaping

5.2.2.1 Soil amelioration

Note: Soil amelioration refers to the process of modifying the physical and chemical properties of soils to improve the quality, primarily improving the air and water balance in the soil. This may or may not be required, based on the vegetation being used for landscaping. Specialist technical advice should be sought.

- a) Soil conditioners to be used for soil amelioration shall be compliant with AS 4454 and EPA S 723.
- b) The carbon to nitrogen ratio of the product should be understood and mitigation measures taken to minimise the likelihood of nitrogen deficiency. If the plant foliage appearance or growth rates shows signs of nitrogen deficiency due to immobilisation, the Contractor shall undertake measures to ensure healthy plant growth.
- c) The organic matter of topsoil:
 - i) Shall have a content (percent by mass) in accordance with AS4419, based on the type of soil selected for the application.
 - ii) Can be CP or MC soil conditioner.
- d) When used as organic fertiliser, the processed solid organic waste shall:
 - i) have an N:P:K analysis (stated in elemental form) within the following range:
 - N: 5.0% – 9.0%
 - P: 1.0% – 4.0%
 - K: 2.0% – 4.0%
 - ii) comply with Agriculture Victoria no. 108 - *Guide to Victorian fertiliser regulations*.
- e) For soil compaction mitigation:
 - i) In severely compacted soils, up to 25% compost (by weight) for sandy loam soil types can be used and as much as 50% for clay soils.
 - ii) A qualified horticulturist or soil scientist must verify that there is no risk to plant health as a result of deep incorporation of organic matter for soil compaction mitigation. Compost shall be spread evenly over the site and tilled to a depth of 450 mm.
 - iii) Coarse mulch, fine mulch and soil conditioner shall be used for soil compaction mitigation.

5.2.2.2 Hydro-compost (Seeding)

- a) Organic material (MC) used for hydro-compost shall be a minimum 60% of the total product.

5.2.2.3 Turfing

- a) Topdressing: The organic matter of topdressing:
 - i) Shall be maximum 25% (w/w).
 - ii) Can be CP or MC soil conditioner.

- iii) Shall have particles smaller than 8 mm.

Note: Turf topdressing is not relevant for broadscale roadsides and will only be undertaken in higher-profile landscapes.

b) Fertilisers:

- i) Shall comply with Agriculture Victoria no. 108 - *Guide to Victorian fertiliser regulations*.
- ii) For newly grassed areas shall have an N:P:K ratio of 10:4:6 with trace elements.
- iii) For exotic grass seed mixes fertiliser with an N:P:K ratio of 18:10:10 shall be used (for Hydroseeding).

5.2.2.4 Mulching

a) Mulch (RM or PP):

- i) The carbon to nitrogen ratio of the product should be understood and mitigation measures taken to minimise the likelihood of nitrogen deficiency. If the plant foliage appearance or growth rates shows signs of nitrogen deficiency due to immobilisation, the Contractor shall undertake measures to ensure healthy plant growth.
- ii) Refer to Section 720 Landscape Works for application requirements, including sizing requirements related to site context.

Note: Site mulch produced from the chipping of on-site indigenous or non-weed vegetation can be used provided the requirements in AS 4454 and EPA Determination No. S 723 are met.

5.2.3 Temporary Erosion and Sediment Control

5.2.3.1 Erosion Control

- a) Where applicable on mild batters, i.e. batters with vertical to horizontal ratios of 1:10 to 1:4, or in flat areas, RM can be used as a temporary erosion control measure. Temporary erosion and sediment control is generally implemented to prevent or reduce the movement of sediment from a site during construction.

5.2.3.2 Hydro-mulch

a) Mulch for hydro-mulch shall:

- i) be free from matter toxic to plant growth, prohibited or restricted biosecurity matter, plant propagules, soil, rubbish, seed germination inhibitors and other deleterious materials.
- ii) disperse into a uniform slurry when mixed with water.
- iii) have a mixture of fine material and longer fibres to promote interlocking and erosion control.

5.2.3.3 Compost blankets

- a) Compost (MC) shall be uniformly applied using an approved spreader unit. Accompanying by thorough watering may be used to improve settling of the compost.
- b) On a slope, compost (MC) shall be applied in a layer of approximately 900 mm over the top of the slope or overlap onto existing vegetation for stability.
- c) For surfaces to be vegetated, the minimum organic matter content of the compost blanket shall be 25% – 65%, on a dry weight basis
- d) For surfaces to be left unvegetated the minimum organic matter content of the compost blanket shall be 25% – 100%, on a dry-weight basis.
- e) The MC can be fine mulch and/or soil conditioner.

5.2.3.4 Mulch berms

- a) Mulch (RM) used for mulch berms shall:
 - i) be compliant with AS 4454
 - ii) have maximum soluble salt concentration of 5 dS/m
 - iii) have moisture content of 30% – 50% prior to application
 - iv) be generated through either horizontal or tub grinder, not chipping.

Note: Mulch (RM) containing 90% by mass of material with a maximum size of 150 mm is recommended

5.2.3.5 Filter berms and filter socks

- a) The organic matter (PP, CP, or MC) used for filter berms and filter socks shall meet the following requirements:
 - i) Well decomposed 100% organic matter produced by controlled aerobic (biological) decomposition shall be used.
 - ii) The soluble salt concentration shall be a maximum of 5 dS/m.
 - iii) pH shall be between 5.0 – 8.5.
 - iv) The material shall have moisture content of 30% – 50% prior to application.
- b) For filter socks, compost (PP, CP, or MC) shall fill the sock. The sock shall be made from a specified woven into a tubular mesh netting material, such as:
 - i) 5 mm thick continuous high-density polyethylene (HDPE) filament, with openings in the knitted mesh of 9.5 mm, or
 - ii) a multifilament polypropylene tubular mesh netting material with 3 mm openings.

5.2.4 Biofiltration & Bioretention (Stormwater Management)

Note: This specification sets the requirements for the use of processed solid organic waste in filter media.

5.2.4.1 Filter media

- a) Organic material to be used in filter media shall:
 - i) be CP or MC soil conditioner
- b) The blended soil shall meet the requirements in Specification F2 Raingardens and stormwater filtration soils from Soils for Landscape Development (Leake and Haege 2014) for suggested components to achieve this.

Note: Although some organic matter helps to retain moisture for vegetation and can benefit pollutant removal, higher levels will lead to nutrient leaching. For more information, refer to the Water Sensitive Cities, adoption guidelines for stormwater biofiltration systems (2015).

6. TESTING AND CONFORMANCE

6.1.1.1 All materials shall be tested and be compliant with the physical and chemical requirements for composts and mulches (detailed in AS 4454). Each compliance certification for all the product specifications used on site must be identified by date, quantity to be supplied and a copy of the formulation used (if relevant) for compliance.

6.1.1.2 For imported products if:

- i) It is an off-the-shelf product, not a custom mix,
- ii) A recent (within 6 months) representative test certificate is provided,
- iii) All the performance specification criteria are covered by the testing, and

- iv) The manufacturer has a quality assurance system that is externally certified, a compliance certification may be accepted in the form of a product representation document, provided by the supplier.

Note: Refer to Specification G1 Quality assurance and control from Soils for Landscape Development (Leake and Haege 2014) for more information.

7. WASTE MANAGEMENT

7.1.1.1 If supplied processed solid organic material is not fit for purpose and deemed a waste, the material must be managed or disposed of according to the supplier agreement or in accordance with EPA waste management policies and Regulations.

7.1.1.2 If a surplus of material is supplied at the site, the removal of this material is the responsibility of the Contractor, who must safely dispose of this material. This must be done in accordance with EPA waste management policies and Regulations.

HOLD POINT 5	
Process held	Final acceptance of construction and payment.
Submission details	Documentation of assurance of waste management procedures provided by the Contractor.
Release of HOLD POINT	Review of submission by the Superintendent. Superintendent to authorise the release of the HOLD POINT.

APPENDIX A: BIOCHAR REQUIREMENTS

A.1 The requirements for biochar are:

- a) Feedstock to produce biochar may be a combination of biomass and diluents and may not contain more than 2% by dry weight of contaminants. Any diluents that constitute 10% or more by dry weight of the feedstock material must be reported as a feedstock component.
- b) Feedstock can be unprocessed feedstock or processed feedstock.
- c) Municipal solid waste (MSW) containing hazardous materials or wastes may not be included as eligible feedstock. It is the manufacturer’s responsibility to ensure that biochar feedstock materials are free of hazardous materials.
- d) Feedstock that may have been grown on contaminated soils shall be considered as processed feedstock and meet the Toxicant Assessment as per Test category B (Clause A.2 b)).
- e) Biochar can be used as RM, PP, CP, MC categorised in Clause 5.1.1.2.

A.2 Two sets of required test categories, being Basic Utility Properties and Toxicant Assessment, to measure biochar characteristics that impact soil functions are given below. Both sets of testing are required for all biochar.

- a) Test Category A – Basic Properties: This set of tests measures the most basic properties required to assess the utility of a biochar material for use in soil.
- b) Test Category B – Toxicant Assessment: Biochar made from processed feedstocks must be tested more frequently than biochar made from unprocessed feedstocks.
- c) Test categories A and B listed in Table A.1 shall comply with AS 4454 unless other standards are specified and approved by the Superintendent.

Table A.1: Test Category A and B requirements

Test Category A	Test Category B
Moisture	Polycyclic Aromatic Hydrocarbons (PAHs) ⁽²⁾
Organic carbon	Dioxin/Furans ⁽³⁾
H:C organic	Polychlorinated Biphenyls ⁽⁴⁾
Total ash ⁽¹⁾	Arsenic
Total Nitrogen	Cadmium
pH	Chromium
Electrical conductivity	Copper
Liming (% CaCO ₃) if pH is above 7	Lead
Particle size distribution	Mercury
	Nickel
	Selenium
	Zinc
	Boron

1 ASTM D1762-84, ‘Standard Test Method for Chemical Analysis of Wood Charcoal, ASTM International, West Conshohocken, PA.

2 Test method: U.S. EPA. ‘Method 8270E (SW-846): Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS),’ Washington, DC. using Soxhlet extraction and 100% toluene as the extracting solvent

- 3 Test method: U.S. EPA. 'Method 8290A (SW-846): Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by High-Resolution Gas Chromatography/High Resolution Mass Spectrometry (HRGC/HRMS),' Washington, DC.
- 4 Test method: U.S. EPA. 'Method 8082A (SW-846): Polychlorinated Biphenyls (PCBs) by Gas Chromatography,' Washington, DC. or U.S. EPA.:1996. 'Method 8275A (SW-846): Semivolatile Organic Compounds in Soil/Sludges and Solid Wastes Using Thermal Extraction/Gas Chromatography/Mass Spectrometry (TE/GC/MS).

DRAFT

ANNEXURE A: SUMMARY OF HOLD POINTS AND RECORDS

The following is a summary of the Hold Points that apply to this specification and the Records that the Contractor must submit to the Superintendent to demonstrate compliance with this specification.

Clause	Hold point	Record
4.1.1.1	1. Submission of Quality Management Plan for commencement of contract.	Review of Quality Management Plan by the Superintendent.
5.2.1.2	2. Commencement of works using recycled organic material, material conformance to be ensured.	Certificate of conformance. Review of submission and Quality records by the Superintendent. The test certificate will be accompanied by a statement of compliance from a competent person (e.g. qualified horticulturist or soil scientist).
5.2.1.3	3. Visual inspection of material prior, during and after application	Inspection report from the contractor, signed off by the Superintendent.
5.2.1.3	4. Inspection of the construction, using recycled organic material, after the completion relevant activities.	Inspection report from the contractor, signed off by the Superintendent.
7.1.1.2	5. Completion of contract until waste management is ensured.	Documentation of assurance of waste management procedures.

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ANNEXURE B: HOLD POINT 1 SUBMISSION

Property	Results
<p>Composition of all processed solid organic waste material, including:</p> <p><i>1. Material type (by maturity level/stability and particle size) as per the AS 4454 categories.</i></p> <p><i>Percentage (by weight) of organic material to be utilised on project.</i></p> <p><i>Note: The Australian Standard for Environmental labels and declarations - Self-declared environmental claims (Type II environmental labelling) definitions shall be used;</i></p>	
<p>Proportion of recycled and recovered materials (if applicable)</p>	
<p>The source of the component materials including state of origin:</p> <p><i>Note: Refer to feedstock and risk levels listed in EPA Determination No. S 723 Appendix 1.</i></p>	
<p><i>Description of the process of recycling and combination of the materials (where applicable) including machinery, source, type, and an estimation of quantity of energy required by weight to produce the finished product;</i></p>	
<p>Demonstration of compliance with relevant EPA regulations:</p> <p><i>EPA Determination – Specifications acceptable to the Authority for receiving processed organics, No. S 723.</i></p> <p><i>EPA Victoria Designing, constructing and operating composting facilities, Publication 1588.1.</i></p> <p><i>Compliance achieved by delivering sampling and test program, with comparison to the results required by the EPA Determination No. S 723.</i></p> <p><i>Note: Test and sampling protocol should justify how many samples required to provide conclusive evidence of consistent compliance.</i></p> <p><i>EPA Victoria Industrial Waste Resource Guideline Sampling and Analysis of waters, wastewaters, soils and wastes, Publication IWRG701, could be used to develop the protocol.</i></p> <p><i>Demonstration of compliance in summary document.</i></p>	
<p>Demonstration of compliance with relevant Australian Standards:</p> <p><i>AS 4419 Soils for landscaping and garden use. Test results to be supplied.</i></p> <p><i>AS 4454 Composts, soil conditioners and mulches. Test results to be supplied.</i></p> <p><i>Demonstration of compliance in summary document.</i></p>	

Property	Results
<p>Quality Management Plan</p> <p><i>Information on how the product was transported and handled to ensure quality.</i></p> <p><i>Compliance with the requirements as presented in the EPA Determination No. S 723.</i></p> <p><i>Evidence that the site is authorised to receive the waste.</i></p> <p><i>Compliance of product maturity level (product stability) as detailed in AS 4454.</i></p> <p><i>Compliance of product particle size as detailed in AS 4454.</i></p> <p><i>Demonstration of compliance in summary document.</i></p>	
<p>Intended Application</p> <p><i>Information the intended application for the product, and the appropriateness of this material for that application.</i></p> <p><i>To be supplied in the summary document.</i></p>	

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AMENDMENT RECORD

Amendment no.	Clauses amended	Action	Date
-	New specification	New	XXX

Key

- Format Change in format
- Substitution Old clause removed and replaced with new clause
- New Insertion of new clause
- Removed Old clauses removed

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