

Main Roads Technical Standard

MRTS16B

Vegetation Ground Works

June 09

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Ground Works

1 INTRODUCTION

This Technical Standard applies to the general requirements of ground works for road construction and associated works.

This Technical Standard shall be read in conjunction with MRTS01 *Introduction to Technical Standards*, MRTS50 *Specific Quality System Requirements* and other Technical Standards as appropriate.

This Standard forms part of the Main Roads Specifications and Technical Standards Manual.

2 DEFINITION OF TERMS

The terms used in this Standard shall be as defined in Clause 2 of MRTS01 *Introduction to Technical Standards*.

Landscape and revegetation related terms and abbreviations used in this Standard are defined in Table 2 of MRTS16 *General Requirements – Landscape and Revegetation Works*. Guidance on generic landscape and revegetation terms is contained in MRTS16 *User Guidelines Vegetation Ground Works*.

3 STANDARDS

3.1 Test Methods

Testing shall be in accordance with, but not limited to the tests listed in Table 3.1.

Table 3.1 – Standard Test Methods

Property to be Tested	Test	Standard Tests
Bulk density, organic matter, wettability, pH (H ₂ O, 1:5), electrical conductivity, extractable phosphorous content, permeability, texture and large particles	-	AS 4419* Soils for landscaping and garden use
Dispersion – Emerson class number and Atterberg limits – liquid limit % and plastic index % Soil clay % and soil silt and clay %	-	AS 1289 Methods of testing soils for engineering purposes
Construction moisture content	Q110A	
Exchangeable – calcium, magnesium, sodium, potassium and aluminium	-	Australian Laboratory Handbook of Soil and Water Methods (ALHS)

*Table Note: Amended in accordance with Clause 7

4 QUALITY SYSTEM REQUIREMENTS

4.1 Hold Points, Witness Points and Milestones

General requirements for Hold Points, Witness Points and Milestones are specified in Clause 5.2 of MRTS01 *Introduction to Technical Standards*.

The Hold Points, Witness Points and Milestones applicable to this Standard are summarised in Table 4.1.

Table 4.1 – Hold Points, Witness Points and Milestones

Clause	Hold Point	Witness Point	Milestone
5.1			Submission of samples
6.3.1	1 Submission of a Planting Media Management Plan (PMMP-C)		

Clause	Hold Point	Witness Point	Milestone
6.3.4.1		Inspection of unopened bags or containers of fertiliser	
6.3.4.2		Inspection of unopened bags, containers or stockpiles of soil amelioration agents	

4.2 Plans to be included in the Contract Plan

The plan applicable to this Standard is the PMMP-C which shall address the requirements of the landscape and revegetation Standard and be included as part of the EMP-C. General requirements of the EMP-C are specified in the Supplementary Conditions of Contract.

5 GENERAL REQUIREMENTS

5.1 Samples

The Contractor shall submit to the Administrator, samples of materials as specified in Clause 3.1 of Annexure MRTS16B.1 or where not specified as listed in Clause 5.4 of MRTS16 *General Requirements*. **Milestone**

6 PLANTING MEDIA

6.1 General

Planting media operations shall be carried out where shown on the Drawings, or as specified elsewhere in the Contract.

Planting media may be sourced from stripped site soil or imported material. Where practicable, stripped site soil shall be utilised for planting media. Where imported planting media is required, the imported material shall be treated as a moderate to high risk soil (refer to Clause 6.3.3).

Where soil has been tested by the Principal, the soil test data and / or soil assessment report may be provided. In such instances, the provided data and / or reports are provided on an information only basis. The Contractor may refer to such soil information when preparing the PMMP-C.

The Contractor shall allow sufficient time for testing to enable completion of the plan within the specified time (refer to Clause 6.3.1).

6.2 Material Requirements

6.2.1 General

Site or imported planting media and soil amelioration agents shall be free of any chemical contaminant.

Fertiliser, soil wetting agents and / or water holding agents shall be delivered to the site in unopened bags or containers bearing the manufacturer’s description, analysis of constituents and quantity.

6.2.2 Stripped Site Soil

Following the Contractor’s assessment, the stripped site soil shall be assessed as either a moderate to high risk soil or a low risk soil. The requirements for low risk soils are given in Clause 6.3.2. The requirements for moderate to high risk soils are given in Clause 6.3.3.

Where all soil test parameters are not required, those to be excluded shall be as specified in Clause 4.1 of Annexure MRTS16B.1.

Where additional soil test parameters are required, those to be included shall be specified in Clause 4.2 of Annexure MRTS16B.1.

6.2.3 Imported Planting Media

The Contractor shall ensure that the supplier of imported planting media provides certification that the delivered imported planting media complies with the soil test parameters listed in proforma C unless otherwise specified in Items 4.1 and / or 4.2 of Annexure MRTS16B.1.

6.3 Construction

6.3.1 Planting Media Management Plan – Construction (PMMP-C)

The Contractor shall prepare and submit a PMMP-C for determination by the Administrator as to the plan's suitability. **Hold Point 1** The PMMP-C shall be submitted five (5) days prior to beginning soil related operations.

The PMMP-C shall be prepared in accordance with the relevant proforma as shown in Table 6.3.1. Additional items may be required to be included in the PMMP-C. In such instances, additional requirements shall be given in Clause 4.3 of Annexure MRTS16B.1.

Table 6.3.1 includes options for low risk and moderate to high risk soils. It is the Contractor's responsibility to assess the soils and determine the approach used to manage the site soil(s).

Table 6.3.1 – PMMP-C General Requirements

Requirements to be Addressed in the PMMP-C	Support Information
Low Risk Soils	
In accordance with proforma A of the Appendix.	The minimal PMMP-C shall indicate the Contractor's proven knowledge of local, naturally occurring low risk soils that are representative (the same soil type) of the project site soils by providing documented evidence.
Moderate to High Risk Soils	
In accordance with proforma B of the Appendix.	Refer to the following project specific plans and prepare a PMMP-C demonstrating the integration with the following plans, where required: a) EMP (C); b) Fire Ant Management Plan (C); and c) Acid Sulfate Soil Management Plan (C).

6.3.2 Low Risk Soils

Low risk soils display non-dispersive characteristics and naturally support plant growth. Non-dispersive soils generally meet the requirements of proforma C in the Appendix. Minor amelioration to achieve compliance with proforma C may be required.

For low risk soils, the Contractor shall –

- a) for each representative soil type, carry out soil testing to be able to complete proforma C in the Appendix;
- b) prepare a *Soil Assessment Report* – proforma H in the Appendix based on the soil test results; and
- c) where the *Soil Assessment Report* confirms the representative site soils are low risk, prepare a PMMP-C – proforma A in the Appendix based on the *Assessment Report*.

The Contractor shall provide additional evidence (refer proforma A in the Appendix) setting out the justification for treating the project as having low risk soils.

Where the Administrator has deemed the Contractor's PMMP-C suitable, and it eventuates that the soil demonstrates moderate to high risk characteristics, the Contractor shall prepare an additional PMMP-C in accordance with proforma B in the Appendix. In this instance, neither the preparation of the additional PMMP-C, nor the management of the soil(s) in accordance with the additional PMMP-C, shall constitute a variation to the relevant tendered item(s).

6.3.3 Moderate to High Risk Soils

Moderate to high risk soils display dispersive characteristics and do not naturally support plant growth. Dispersive soils do not meet the requirements of proforma C in the Appendix. Major amelioration to achieve compliance with proforma C or replacement with imported planting media is required.

For moderate to high risk soils, the Contractor shall –

- a) for each representative soil type, carry out initial soil testing to be able to complete proforma C in the Appendix;
- b) prepare a *Soil Assessment Report* – proforma H in the Appendix based on the test results; and
- c) where the *Soil Assessment Report* confirms the representative site soils are moderate to high risk, prepare a PMMP-C – proforma B in the Appendix based on the *Assessment Report*.

6.3.3.1 Testing of Site Soil for use as Planting Media

Where the Contractor has assessed the site soil as a moderate to high risk soil or where imported planting media is proposed to be used, the Contractor shall continue to carry out soil testing in accordance with Clause 6.3.3.3. When soil samples are submitted to the laboratory for testing, the appropriate soil testing schedule (proforma C or D of the Appendix of MRTS16B) shall be submitted with each sample (refer to Clause 6.3.3.2 to determine when proforma D may be used). The schedule shall be completed by adding the test results.

6.3.3.2 Reduced Level of Testing

Where the Administrator considers that the ameliorated site soil or imported planting material has consistently conformed with all parameters contained in proforma C (the full-suite) of the Appendix, the Contractor shall be permitted to reduce the amount of testing to that required by proforma D (the sub-suite) of the Appendix. Shall a non-conformance occur in the sub-suite test results, the Contractor shall revert to testing in accordance with the full-suite until such time that the Administrator considers that consistency in the full-suite results has been re-established.

6.3.3.3 Planting Media Lot Size and Sampling

Unless specified otherwise in Clause 2 of Annexure MRTS16B.1, the maximum lot size for stripped site soil shall be 500 m³ with a minimum of 1 test per soil type.

Where imported material is proposed for planting media, testing shall be 1 test per 250 m³.

Each soil test shall be representative of the soil type or imported material. To ensure the testing is representative, sampling for each test shall comply with the following requirements –

- a) be composed of 10 sub-samples representative of the test area or stockpile;
- b) be representative of the full depth recorded including the taking of a sample from the centre (core) of the stockpile;
- c) be approximately 3.0 kg per bagged sample for testing using the full-suite and 0.5 kg when using the sub-suite; and
- d) be placed in clean, durable plastic bags.

A composite soil sample shall not include different soils or soil layers.

Soil samples shall be clearly labelled in accordance with proforma G – *Soil Sample Label* of the Appendix.

6.3.3.4 Assessment of Site Soil

Assessment and interpretation of the planting media tests shall only be carried out by a soil scientist with accreditation under the Certified Professional Soil Scientist (CPSS) Scheme and / or a soil scientist eligible for accreditation and membership of the Australian Society of Soil Science Incorporated (ASSSI).

6.3.3.5 Soil Assessment Report

The soil assessment report shall be prepared by the Contractor in accordance with proforma H – *Soil Assessment Report* of the Appendix.

6.3.4 Amelioration of Stripped Site Soil

Soil amelioration agents such as fertilisers, lime, dolomite, gypsum, organic soil conditioner and wetting agents shall be thoroughly incorporated into the soil during stripping, stockpiling or screening operations. Soils and / or subsoils in broadacre areas, beyond embankments, may be ameliorated in situ.

Planting media amelioration, other than the use of fertilisers, shall not occur after placement of planting media unless approved in the PMMP-C.

Ameliorated soils shall be re-tested in accordance with Clause 6.3.3.3 to ensure compliance with the relevant proforma.

6.3.4.1 Application of Fertilisers

As part of the PMMP-C, the Contractor shall submit a fertilising program, based on the assessment of the soil test results, that addresses methods rates and specific requirements for the fertilising treatment of the landscape and revegetation works.

The Contractor shall advise the Administrator at least 3 days before applying fertiliser to allow the Administrator the opportunity to inspect unopened bags or containers of fertiliser. **Witness Point**

6.3.4.2 Application of Additional Soil Amelioration Agents

As part of the PMMP-C, the Contractor shall submit an amelioration program, based on the assessment of the soil test results that addresses methods, rates and specific requirements to ensure compliance of the ameliorated stripped site soil. The program shall address amelioration issues where the existing stripped site soil displays non-compliance in any or all of the following –

- a) hydrophobicity;
- b) wettability and / or moisture retention;
- c) soil acidity and / or alkalinity;
- d) exchangeable sodium percentage (ESP);
- e) calcium magnesium ratio (Ca:Mg); and / or
- f) organic matter content.

The Contractor shall advise the Administrator at least 3 days before applying the amelioration agents to allow the Administrator the opportunity to inspect unopened bags, containers or stockpiled materials. **Witness Point**

6.3.5 Management of Stockpiles of Site and Imported Planting Media

In addition to the requirements for Stockpiling of Topsoil in MRTS04 *General Earthworks*, the following shall apply –

- a) leave the stockpiles with roughened surfaces to promote infiltration of air and water;
- b) locate stockpiles away from overland flow paths, drip line of trees to be retained, or any other environmentally sensitive areas;
- c) include the proposed location of the stockpiles in the PMMP-C;
- d) minimise the compaction of soils throughout the stockpiling process;
- e) treat stockpiles that are to remain for longer than four weeks with a cover crop;
- f) where weed seeds are in sufficient concentration, allow to grow but slash and / or apply herbicide to prevent new weed seed from forming; and
- g) control weeds in the stockpiles prior to use.

6.3.6 Placement of Planting Media

Planting media shall be placed in the areas and to the depths shown on the Drawings or where not shown, as specified in Table 6.3.6.

Table 6.3.6 – Placement of Planting Media

Location	Soil Depth	Planting Activity
Batters steeper than 1:3	50 mm	Seeding
Batters equal to or flatter than 1:3	75 mm	Seeding and / or laying turf
Contained areas	300 mm	Container stock planting

Planting media shall be placed within 5 days of completion of landscape and revegetation ground preparation works.

Planting media shall be spread evenly over the surface of the prepared subsoil. The depths as specified or shown on the Drawings are minimum depths after settlement has occurred. Allowance shall be made for settlement during placement.

After placement to the specified depths, planting media shall be finished as follows –

- a) planting media to be turfed shall be raked to remove any stones or debris, with smooth transitions between adjacent grades and / or the existing surface. The planting media finished surface shall be free draining and compacted lightly and uniformly to promote even settlement;
- b) planting media to be hydromulched shall be spread evenly over the batter generally following the profile of the roughened embankment material;
- c) planting media in medians, roundabouts and other contained areas to be planted with container stock and mulched, shall be placed in accordance with Standard Drawing 1643; and
- d) planting media to be seeded in broadacre areas shall be spread and incorporated into the existing ground surface prior to seeding.

After finishing, no compaction of the prepared surface is to occur apart from compaction resulting from mulching or other planting operations.

Placing of planting media adjacent to hardstand areas shall be installed in accordance with Standard Drawing 1644.

No work which would result in degradation of the soil structure (for example, work when soil has a moisture content greater than field capacity) shall take place after placement of planting media.

Turfing, hydromulching, seeding and / or mulching shall take place as soon as practicable following placement of the planting media. Where the Contractor's operations have caused a significant delay before these treatments have taken place, and the planting media has formed a crust and / or is no longer wettable as defined in proforma C in the Appendix, the Contractor shall remove and replace or treat the planting media to achieve compliance with all planting media requirements in particular, the wettability requirement.

7 GROUND PREPARATION

7.1 General

Ground preparation operations shall be carried out where shown on the Drawings, or as specified elsewhere in the Contract.

7.2 Construction

7.2.1 Prior to Ground Preparation Works – Amelioration of In Situ Material

Amelioration of the in situ material may be required immediately prior to ground preparation works in specific areas of the project. Where shown on the Drawings or specified elsewhere in the contract, the Contractor shall spread and incorporate soil amelioration agents to ensure the ameliorated soil meets the requirements of proforma C in the Appendix.

The ground preparation operations are to fully incorporate the agent to the depth specified for the relevant ground preparation operation.

7.2.2 Ground Preparation General

The Contractor shall confirm the location of services prior to commencement of work.

Ground preparation including ploughing, ripping, cultivation, raking and roughening of embankments and broad acre areas shall be carried out parallel to the surface contours.

Ground preparation activities shall be carried out while the subsoil moisture content is between 80 – 100% of the FC of the soil.

Ground preparation by mechanical means shall not be carried out within the dripline of vegetation to be retained or within 300 mm of paths, kerbs or structures in accordance with Standard Drawing 1645. Surface preparation in these areas shall be done manually.

Ground preparation operations shall be carried out such that all weeds are removed.

Non-conforming stone, rubble and other deleterious material that is brought to the surface during ground preparation activities, shall be removed.

Work areas shall be protected from over land flow and construction activities.

Where erosion causes damage to existing or prepared surfaces, the Contractor shall carry out remedial works to reinstate the area to its pre-existing condition.

Where landscape and revegetation works require excavation to be carried out the Contractor shall perform such operations in accordance with the requirements of MRTS04.

Ground preparation shall be carried out in the areas shown on the Drawings and to the depths as specified in Table 7.2.2 and in accordance with Standard Drawing 1646.

Table 7.2.2 – Ground Preparation Operations and Depths

Location	Operation	Function	Planting Activity	Depth
Road embankment batters	Roughening of batters	Break up surface of embankment to form keys for planting media and / or seed	Container stock planting or seeding	50 mm
Areas beyond embankments	Ripping	Form planting rip line	Tree planting	300 mm (min)
		Break up deeply compacted ground prior to cultivation	Seeding or turfing	
Broadacre areas	Ploughing	Break up surface compaction, large clods and disturb weeds (mechanical weed control)	Native seeding	50 mm
Medians and other contained areas	Cultivation	Prepare finely tilled planting bed and / or incorporate soil amelioration agents	Container stock planting, seeding or turfing	150 mm
Broadacre areas				

7.2.3 Roughening of Batters

Mechanical roughening and loosening of fill or cut batters prior to placement of planting media or mulch cover shall be carried out in a manner that minimises planting media and mulch cover from slipping down the face of batters.

Indentations made by roughening machinery are to run parallel with the batter surface contours.

7.2.4 Ripping

The ripping operation shall break and shatter compacted soil layers sufficiently to allow subsequent landscape and revegetation operations, for example ploughing.

7.2.5 Ploughing

The ploughing operation shall break up large clods sufficiently to allow subsequent landscape and revegetation operations, for example cultivation.

7.2.6 Cultivation

The cultivation of contained areas shall break the surface of the compacted subgrade sufficiently to allow subsequent landscape and revegetation operations, for example spreading of planting media.

7.2.7 Earth Mounding

Earth mounds shall be formed in the locations and to the levels and profiles shown on the Drawings.

Earth mounds shall be finished with planting media to a minimum depth of 300 mm. For each mound exceeding 300 mm the mound shall be core filled with suitable on-site subsoil materials capable of supporting plant growth.

The interface between the core fill subsoil and the planting media shall be roughened so that mixing of the two layers occurs to a depth of at least 100 mm.

The mound shall have smooth and rounded profiles and be free of rubble, roots and lumps. The perimeter of mounds shall be graded evenly to existing surface levels. Slopes of mounds shall be no steeper than 1 in 3 unless otherwise shown on the Drawings.

Earth mounds shall not be placed within the dripline of plants that are to be retained.

8 MULCHING

8.1 General

Mulching operations shall be carried out where shown on the Drawings, or as specified elsewhere in the Contract.

8.2 Material Requirements

8.2.1 General

Mulch shall be free from soil, plant propagules (unless otherwise specified), rubbish, pests, diseases, and other deleterious material. It shall be free from matter toxic to plant growth.

8.2.2 Organic Mulches

Organic mulches shall contain only vegetative material, free from plant propagules, and may comprise one or more of the following –

- a) imported organic mulch; or
- b) site organic mulch which may be –
 - tub ground site mulch produced by tub grinding vegetation removed during clearing and grubbing;
 - chipped site mulch produced by the chipping of vegetation removed during clearing and grubbing; or
 - other material, where specified in Clause 5.1 of Annexure MRTS16B.1.

The locations and types of organic mulch are shown in the Drawings.

8.2.3 Rock Mulches

The various types of rock mulches are specified as follows –

- a) site rock mulch;
- b) imported quarried rock mulch; and
- c) other material, where specified in Clause 5.2 of Annexure MRTS16B.1.

The locations and types of rock mulch are shown in the Drawings.

8.2.4 Organics Blanket

The locations where an organics blanket is to be used are shown in the Drawings.

An organics blanket may consist of an organic soil conditioner or a blend of organic soil conditioner and planting media. Where blending is required, the blend proportion is specified in Clause 5.3 of Annexure MRTS16B.1.

An organics blanket shall be manufactured from the following –

- a) complying organic soil conditioner (refer to the Appendix to MRTS16 *General Requirements*);
- b) complying planting media, where required by Clause 5.3 of Annexure MRTS16B.1;
- c) a tackifier polymer based soil stabiliser or a natural (non-cross linked) co-polymer guar binder which complies with the requirements as specified in MRTS16C *Vegetation Works* and shall be free from any matter toxic to plant germination or growth; and
- d) a complying seed mix where required.

The blended material shall comply with each test parameter listed in proforma F of the Appendix.

8.2.5 Filter Sock

Filter sock shall comply with the following requirements –

- a) be a high density polyethylene filament woven into a continuous tubular open mesh netting material capable of containing filter media; and
- b) shall be maintained in an effective condition for at least 6 months from the time of installation.

Sock diameters shall be as shown in the Drawings.

Filter media shall meet the following parameter requirements –

- a) be a coarse organic material, capable of filtering flows and retaining silt / pollutants; and
- b) shall not impede flow through the sock to a greater degree than that of a traditional silt fence.

Filter socks are to be secured using hardwood stakes, 50 mm x 50 mm cross section driven a minimum of 200 mm into the ground at a maximum of 3 m intervals.

8.3 Construction

8.3.1 General

Mulch shall be placed as soon as practicable after the completion of ground preparation works and before planting in mass mulched areas. Where planting is proposed that requires plants to be individually mulched, mulch shall be placed as soon as practicable after the completion of the planting operations.

Mulch shall be spread evenly in the locations and to the depths and profiles shown in the Drawings or as otherwise specified. The depths specified or shown on the Drawings are minimum depths after settlement. Allowance shall be made for initial settlement in the amount of mulch placed.

The finished level of mulch shall be within 25 mm of the surface levels of abutting structures and hardstand areas, or as shown on the Drawings. Mulch shall be raked to maintain the minimum specified depth and to achieve a smooth, even surface.

Mulch shall not be placed closer than 25 mm, nor further than 50 mm from the stem of any plant. Trees in grassed areas shall be mulched to a minimum of 150 mm depth and 1000 mm diameter. Where a water retention basin is required at the base of a tree, mulch shall cover the basin berm and inner area.

8.3.2 Manufacture of Site Organic Mulch

Vegetative material, set aside during clearing and grubbing operations, may be processed to produce organic mulch.

Vegetative material to be processed may include trees, bark, shrubs, branches and any other vegetative material that is considered suitable by the Administrator for use as organic mulch. Weed species may be included, provided no part of the weed is a propagule.

Processing of vegetative material may be achieved by using either a tub grinder or chipper.

Where leachate, resulting from decomposing mulch, may affect the surrounding environment, lime shall be spread across flow path of the leachate at a rate of 1 kg / m².

Stockpiles shall not be located on overland flow paths, near water bodies or within the dripline of retained trees.

Stockpiles shall be maintained to minimise weed growth. Any weeds which appear shall be treated or removed prior to setting of seed.

Prior to use, mulch produced on the site shall be aged and leached in an open stockpile for at least 1 month after milling. Mulch stockpiles shall be turned at least once every 2 weeks. Allowance shall be made in the works program for this ageing process.

8.3.3 Placement of Organic Mulch

Organic mulch shall be placed to the depths shown in the Drawings, or where not shown, to a minimum depth of 100 mm.

8.3.4 Placement of Rock Mulch

Rock mulch shall be placed to the depths shown in the Drawings, or where not shown, to a minimum depth of 150 mm. Geofabric shall be placed on the prepared surface prior to spreading of rock mulch and shall comply with Clause 5 of MRTS27 *Geotextiles (Separation and Filtration)*.

8.3.5 Placement of Organics Blanket

The organics blanket shall be applied to the depths shown in the Drawings, or where not shown, as specified in Table 8.3.5.

Table 8.3.5 – Depth of Organics Blanket Relevant to the Slope Gradient

Maximum Slope Gradient	Minimum Depth of Organics Blanket
1:2 & less	50 mm

Pneumatically applied organics blanket, including tackifier, shall be applied to ensure the minimum specified depth and a smooth, even surface is achieved.

Organics blanket shall be installed at least 3 m over and beyond the top of a cut batter or base of a fill batter.

Tackifier shall be applied at a rate of 8 – 20 g / m³ of organic / soil blend being applied at 3 – 8 kg / ha.

Organic blanket berms shall be placed at regular intervals to minimise erosion and divert sheet flows as required.

8.3.6 Filter Sock

Size of filter sock shall be as specified on the Drawings.

Filter socks shall be installed perpendicular to sheet flow or as directed by the Administrator.

The Contractor shall maintain the filter sock in a functional condition at all times. Inspections shall be made at monthly intervals or within 24 hours of a runoff event whichever is the sooner. The Contractor shall remove sediment when accumulation has reached a maximum of half of the effective height of the filter sock.

Inspections shall continue until the area has been stabilised and construction activity has ceased whichever is the sooner.

9 ENVIRONMENTAL MATTING

9.1 General

Environmental matting operations shall be carried out where shown on the Drawings, or as specified elsewhere in the Contract.

9.2 Material Requirements

9.2.1 Environmental Matting

Environmental matting is a biodegradable material used in lieu of or in conjunction with organic mulch which shall comply with the following properties –

- a) made from organic, 100% biodegradable fabric;
- b) allows vegetation penetration;
- c) minimises soil moisture loss;
- d) allows the exchange of air and water; and
- e) does not contain any matter toxic to plant growth.

9.2.2 Plant Mats

The type and size of plant mats shall be as specified in Clause 6.1 of Annexure MRTS16B.1.

Plant mats shall consist of 100% biodegradable pre-cut fabric which shall comply with the following properties –

- a) made from organic, 100% biodegradable fabric;
- b) minimises vegetation penetration;
- c) minimises soil moisture loss;
- d) allows the exchange of air and water; and
- e) does not contain any matter toxic to plant growth.

9.2.3 Fixing Pins

Fixing pins used to secure environmental matting and plant mats shall be 'U' shaped mild steel and of a size and strength to ensure matting maintains direct contact with the ground.

9.3 Construction

9.3.1 General

Any material which protrudes more than 50 mm above the surface to be treated with environmental matting shall be removed prior to placement of the environmental matting.

9.3.2 Installation of Environmental Matting and Plant Mats

Environmental matting shall be installed as soon as practicable after the completion of ground preparation works. Plant mats shall be installed after the completion of planting works.

Environmental matting shall be placed with a minimum lap between sheets of 150 mm. Where matting is to be installed on batters, the upper, outer edge of the matting area shall extend over the catch bank and be buried and pinned in a trench to a depth of at least 300 mm in accordance with Standard Drawing 1647. Where a catch bank has been installed, the matting shall extend over the bank and be secured with pins.

The placement of plant mats shall allow the temporary concentration and percolation of water into the plant's root system and installed in accordance with Standard Drawing 1648.

10 SUPPLEMENTARY REQUIREMENTS

The requirements of MRTS16B *Vegetation Ground Works* are varied by the supplementary requirements given in Clause 7 of Annexure MRTS16B.1.