ACT Government

GRASSING 09B

MUNICIPAL INFRASTRUCTURE TECHNICAL SPECIFICATION

09 - LANDSCAPE

Transport Canberra and City Services

July 2019

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1 GRASSING

1.1 General

General: This Specification comprises the supply and installation of natural grass surfaces, excluding improvements by topdressing/oversowing and playing fields surfacing and native grass seeding.

1.1.1 Cross references

General: The following documents are related to this Specification:

1.1.1.1 ACT Legislation

Environmental Protection Act

Work Health and Safety Act

Waste Minimisation Act1

1.1.1.2 Specifications

Requirement: Conform to the following:

MITS 00	Preliminaries
MITS 02	Bulk earthworks
MITS 08	Incidental works
MITS 09	Landscape

1.1.1.3 Design Standards

General: The following Design Standards are related to this Specification:

MIS 24	Soft landscape design

Attachment B Design acceptance requirements

1.1.1.4 TCCS Reference Documents

General: The following TCCS reference documents are related to this Specification:

Reference document 04	Protection of public landscape assets
Reference document 07	Operational acceptance submissions
Reference document 08	Works as executed quality records
Reference document 09	Final acceptance submissions
Reference document 10	Landscape consolidation
Reference document 11	Drafting Standard for Civil and Landscape works

1.1.2 Referenced documents

1.1.2.1 Standards

General: The following documents are incorporated into this Specification by reference:

AS 4454	Composts, soil conditioners and mulches

1.1.2.2 Other publications

Proprietary products: To *TCCS Products previously considered for use list*

1.1.3 Interpretation

1.1.3.1 Abbreviations

General: For the purposes of this Specification the following abbreviations apply:

ITP: Inspection and Test plan.

NATA: National Association of Testing Authorities.

TCCS: Transport Canberra and City Services

1.1.3.2 Definitions

General: For the purposes of this Specification the definitions given below apply:

Hydroseeding: process that uses water as a carrier to spray seed and fertiliser onto the seedbed. The hydroseeding mix is applied with specially designed hydroseeding equipment which agitates the mixture to ensure even and constant mixing of ingredients.

Hydromulching: process that adds a fibre-mulch to a mixture of seed, fertiliser and water. The mulch acts as a cover for the seed and assists in the retention of moisture while protecting the soil from erosion. The hydromulching mix is applied with specially designed hydromulching equipment. Typically the mix consists of a slurry of seed, fertiliser, water, tackifiers, biologically active soil conditioners, an optional colour dye, and organic mulch fibres which will degrade over several months.

Topsoil: the surface soil free from subsoil, refuse, clay lumps, stones and timber fragments and capable of growing and supporting vegetation.

Site Material: material which is not imported

Floor: the lowest point, such as the base of the excavation.

Madagascan Fireweed: A declared Pest Plant and a notifiable Pest Plant in the ACT under the Pest Plants and Animals Act 2005 (the Act). Due to these declarations, a number of offences apply to the introduction of fireweed into the ACT.

1.1.4 Hold points

1.1.4.1 Notice

General: Give notice so that the documented inspection and submissions may be made to the **Hold point table**.

Table 9B-1 Hold point table

Item	Clause title	Requirement	Notice for inspection	Release by
Execution				
9B.1	Supplier information for turf supply	Submit information to meet the requirements of the specification	A minimum of four (4) weeks prior to ordering of turf	Authorised Person
9B.2	Surface preparation before spreading of topsoil	Notify that surface has been prepared and ready for inspection prior to spreading of topsoil	A minimum of (2) two days prior to spreading of topsoil	Authorised Person
9B.3	Placement on consolidation	Notify that the works are sufficiently established for Placement on Consolidation	A minimum of two (2) weeks prior to inspection	Authorised Person
9B.4	End of consolidation	Notify that the works are sufficiently established for Placement on Consolidation	A minimum of two (2) weeks prior to inspection	Authorised Person
9B.5	Seed mix	Submit representative samples	A minimum of 2 weeks prior to commencement of works	Authorised Person
9B.6	Maintenance Manuals	Submit maintenance manual demonstrating the care and maintenance tasks during the consolidation (maintenance period)	One (1) week prior to Placement on Consolidation	Authorised Person

1.2 Products

1.2.1 Grass

1.2.1.1 Seed mixtures:

Description: Clean, uncoated new seed, thoroughly pre-mixed with a bulking material such as safflower meal

Unacceptable seed: Wet, mouldy, or otherwise impaired.

Germination viability (minimum) 86%

Age (maximum) from date of harvest: 2 years

Handling: deliver to site in bags marked to show weight, seed species and supplier's name.

1.2.1.2 Hydroseeding mixture:

Description: A slurry of seed mixture, fertiliser, binder and water from a specialist supplier.

1.2.1.3 Hydromulching mixture

Description: A slurry of seed mixture, fertiliser, binder, mulch and water from a specialist supplier.

1.2.1.4 Turf

Description: Cultivated turf (washed or unwashed) of even thickness, free from weeds and other foreign matter from a specialist grower.

1.2.1.5 Bitumen and Straw Mulch

Description: Straw bound with bitumen emulsion

Straw: Seed free cereal straw

Bitumen: Bituminous emulsion complying with *AS1160* for designation A88/170 and shall contain no petroleum solvents or other components toxic to plant life. The emulsion shall be suitable for cold spray application.

1.2.2 Fertiliser

1.2.2.1 General

Description: Proprietary fertilisers, delivered to the site in sealed bags marked to show manufacturer or vendor, weight, fertiliser type, N:P:K ratio, recommended uses and application rates.

1.2.2.2 Fertiliser schedule

Fertiliser shall be proprietary product and shall be applied at rates in accordance with the manufacturer's guidelines at the following times:

Grass Type	Time of application
Grass seeding (dryland or irrigated)	At time of sowing (lawn starter) After germination During establishment
Turfing	Prior to laying of turf (lawn starter)
Temporary grass seeding	At time of sowing
Hydroseeding	At time of hydroseed application

1.3 Execution

1.3.1 Preparation

1.3.1.1 Clearing and Grubbing

Clearing and grubbing: to *MITS 02A Clearing and grubbing*

Temporary erosion and sedimentation control measures: To *MITS 00C Control of erosion and sedimentation*

1.3.1.2 Bulk Earthworks and detailed trim

Bulk Earthworks: To *MITS 02B Bulk earthworks*

Detailed excavation, filling and trimming and finishing: Carry out detailed cut and fill and trim and finish to achieve design levels as shown on drawings. Finish to tolerances specified below unless otherwise directed by the Authorised Person

Tolerance: +/- 20mm

Compaction: Subgrade in grass areas shall not be compacted to greater than 90% MMDD.

1.3.1.3 Subgrade (Pre Topsoil) Preparation – All Grass Types

Requirement: Do not work soils when they are wet or plastic.

Ripping: Rip parallel to the final contours to 200mm depth:

Cultivation: Cultivate ripped area, across the direction of slope, to a fine tilth for an even depth of 150mm in preparation for topsoil placement. Remove / break up rocks/clods/debris greater than 50mm

Requirement: Unless stated elsewhere in the design drawings, there is to be no ripping or cultivation within the dripline of trees to be retained. Where supplied, adhere to requirements of the Tree Management Plans.

Levelling: Level and shape the sub surface to achieve smooth even design grades free from mounds and hollows in preparation for topsoiling.

Requirement: Do not allow heavy machinery to traverse across prepared areas. Route of light vehicles over prepared areas shall be varied to avoid developing areas of over compaction. Subgrade in grass areas shall not be compacted to greater than 90%MMDD.

1.3.1.4 Topsoil Placement

Depth: Unless otherwise indicated in the design drawings, minimum topsoil depths shall be as follows:

- Dryland grass areas – 100mm
- Irrigated grass or turf areas – 150mm

Topsoil type: as per design drawings

Placement: Spread topsoil on prepared surface to a consistent and even depth.

Trimming and levelling: Trim surfaces to specified shape to achieve smooth and even finished design grades free from mounds and hollows.

Requirement: Topsoil surface shall be lightly compacted so as to avoid uneven settling. Do not allow the surface to become excessively compacted.

This is a **HOLD POINT**

Finish against adjacent surfaces for seeded areas: Flush

Setdown for turfing: Allow maximum 30mm setdown against hard surfaces (following settlement) for unwashed turf.

1.3.2 Grass seed

Seed mixes for various applications are specified in the **Seed mixes for various applications table**

Table 9B-2 Seed mixes for various applications table

(a) Grass mixtures to be used in irrigated areas			
Seed Mixture	Grass Species in Mixture	Percentage by Weight	Sowing rate kg/ha
Irrigated parks and general turf areas	Turf type tall fescue	71	180
	Kentucky Blue Grass	24	60
	O'Connor's Strawberry Clover	5	15
			Total: 255

(b) Grass mixtures to be used in dryland areas			
Seed Mixture	Grass Species	Percent by Weight	Sowing rate kg/ha
Mown Areas **Mix A.** 'Dwarf' type tall fescue Summer dryland grass mixture (sowing period from September to February)	Dwarf' type tall fescue	55	155
	Fine leaf perennial ryegrass	15	40
	Creeping red fescue	15	40
	White clover	5	15
	Couchgrass (hulled)	10	30
			280
Mix B. 'Dwarf' type tall fescue Winter dryland grass mixture (sowing period from March to August)	'Dwarf' type tall fescue	62	155
	Fine leaf perennial ryegrass	16	40
	Creeping red fescue	16	40
	White clover	6	15
			Total: 250
Unmown Areas **Mix C.** Fine fescue Summer dryland grass mixture (sowing period from September to February)	Hard fescue	48	135
	Creeping red fescue	22	60
	White clover	5	15
	Couchgrass (hulled)	10	30
	Fine leaf perennial ryegrass	15	40
			Total: 280
Mix D. Fine fescue Winter dryland grass mixture (sowing period from March to August)	Hard fescue	54	135
	Fine leaf perennial ryegrass	16	40
	Creeping red fescue	24	60
	White clover	6	15
			Total: 250
Temporary Grass	Cereal Rye (Secale cerele)	16	3
	Perennial Rye Grass (Lolium perenne)	26	5
	Currie Cocksfoot (Dactylis glomerata)	16	3
	Subterranean Clover (Trifolium subterraneum)	26	5
	Crimson Clover (Trifolium incarnatum)	16	3
			Total: 196

1.3.3 Grass seed application

1.3.3.1 Dryland and Irrigated Seed

General: if a topsoiled area has become compacted before sowing, cultivate the ground surface before sowing to achieve a lightly friable surface.

Ambient Conditions: Do not sow in periods of extreme heat, cold or wet or when wind velocities exceed 8km/hr or if frost is likely before the grass is established.

Method: Evenly distribute the seed using purpose made sowing machinery in two equal sowings in transverse directions. Lightly rake the surface to cover the seed.

Seed density: refer to **Seed mixes for various applications** for sowing rate.

Requirement: Agricultural direct drop seed drill machines will not be approved for seeding operations.

Rolling: Roll the seed bed immediately after sowing.

Roller weight (maximum):

- Clay and heavy soils : 90kg/m width
- Sandy and light soils: 300kg/m width

Watering before germination: Water the seeded area with a fine spray until the topsoil is moistened to its full depth and keep the surface damp and the topsoil moist but not waterlogged.

Watering After germination: Water to maintain a healthy condition, progressively hardened off to the ambient climatic conditions.

1.3.3.2 Temporary Grass Seed

Seeding: Evenly distribute the seed using purpose made sowing machinery. Lightly rake the surface to cover the seed.

1.3.3.3 Fertiliser

Rate: Apply a prepared mix of lawn starter fertilizer.

Application: Spread evenly over the prepared seed bed.

Timing: Apply at the time of sowing or not more than forty-eight (48) hours before the seed is sown and raked lightly into the surface of the seed bed.

1.3.3.4 Establishment – Dryland and Irrigated Grass

Requirement: Care for germinated seed to obtain the required densities and coverage required for Placement on Consolidation.

Protection: Protect the newly sown areas against traffic until established. Method of protection shall be temporary fencing.

Watering: The seed bed shall be watered as necessary to keep it moist from time of germination until placement of grassing on Consolidation. Adjust watering to seasonal conditions and to gradually harden off the grass to natural climatic conditions.

Reseeding: Reseed areas where the seed fails to germinate within three weeks of the date of original sowing, and within 3 months where required densities have not been met. Continue to reseed at minimum monthly intervals with additional soil preparation as required to achieve minimum coverage.

Weeding: Remove weeds from the sown areas.

Fertilising after germination: Spread fertiliser evenly over the sown area and water in as follows:

- Six weeks after germination
- Ten weeks after germination
- Do not apply to wet grass

Mowing: Maintain irrigated and dryland grass height in the range of 40-75mm height. Do not remove more than one third of the grass height at any one time. Carry out the last mowing not more than 7 days prior to inspection for Placement on Consolidation.

Irrigated grass: Trim and edge as appropriate to the areas involved.

1.3.3.5 Establishment – Temporary Grass

Requirement: Care for germinated seed to obtain the required densities and coverage required.

Reseeding: Reseed areas where the seed fails to germinate within three weeks of the date of original sowing, and within 3 months where required densities have not been met. Continue to reseed at minimum monthly intervals with additional soil preparation as required to achieve minimum coverage.

1.3.4 Turfing

1.3.4.1 Supply Source

Requirement: Provide certification from the Turf Grower that the turf is free from Madagascan Fireweed or any other noxious weeds listed on the *ACT Invasive Plants Register.*

Source: due to the declaration of Madagascan Fireweed as a declared and notifiable Pest Plant in the ACT, supply source must be approved by the Authorised Person prior to ordering.

Submission: Prior to ordering turf, submit proposed supplier information including certification that the turf is Fire Weed Free and provide accurate details of the location of turf farm.

This is a **HOLD POINT**

1.3.4.2 Delivery to Site

Timing: Deliver turf to site within 48 hours of being cut and install within 36 hours after being lifted from Nursery.

Storing: When turf is stored prior to laying, it shall be placed in a cool shaded location or covered with wet hessian. When there is a delay of more than 36 hours after lifting, roll out turf on a flat surface with grass up and water as necessary to maintain good condition.

Requirement: Turf shall not be allowed to dry out at any stage from lifting to laying.

1.3.4.3 Laying

General: Cultivation and surface preparation shall be as per **Execution**.

Requirement: Soil surface to be firm underfoot to leave a light footprint and not too soft to sink into the soil, and not too hard that there is no footprint.

Fertiliser: Apply a starter fertiliser.

Before laying: Moisten soil profile.

Laying: Lay turf in a “stretcher” pattern with joints staggered. Butt turf closely, cut to size and shape to match the area being turfed, cutting around pits and lids, and to eliminate gaps between rolls. On slopes, turf shall be laid parallel to contours.

Topdressing: Topdressing with soil to correct levels at time of laying is not approved.

Finishing: Roll to an even surface immediately after laying. The finished surface shall be flush with the surrounding edges or any obligatory or controlling levels. Remove all turf off cuts and wastage from the finished surface. The spreading of topsoil to fill gaps in the turf or to top up the levels is not allowed.

Watering: Water immediately after laying until topsoil is moistened to its full depth.

1.3.4.4 Establishment

General: Maintain turfed areas until there is a dense continuous sward evenly green and of a consistent height that is well knitted to the soil beneath and until acceptance for Placement on Consolidation.

Protection: Protect the newly laid areas against trespass and traffic with protective fencing until the grass is well established.

Failed turf: Lift failed turf ≥150mm diameter, and replace with new turf.

Levels: If levels have deviated from the design levels after placing and watering, lift turf and regrade topsoil to achieve design levels. Topdressing may be carried to depressions less than 200mm diameter if less than 20mm depth of soil can be applied to correct the levels.

Fertiliser: Apply lawn fertiliser at the completion of the first and last mowing, and at other times as required to maintain healthy grass cover.

Mowing: Maintain the grass height between 40-75mm height. Do not remove more than one third of the grass height at any one time. Carry out the last mowing not more than 7 days before the inspection for Placement on Consolidation. Remove grass clippings from the site after each mowing.

1.3.5 Hydroseeding and hydromulching

1.3.5.1 Preparation

Preparation: Refer **Execution**

1.3.5.2 Mix Application Rates

Seed mixture: The rate shall be applicable to the mix type.

Mulch: At least 2.5 t/ha with seed, or 5 t/ha without seed.

Fertiliser: Apply a starter fertiliser

Binder:

- Bitumen emulsion: 2000 L/ha of residual bitumen.
- Polymer: 250 L/ha.

Water: Suitable for the site conditions, and sufficient to assist in the distribution of the seed, fertiliser and mulch.

1.3.5.3 Application

Method: Apply as follows:

- Moisten the topsoil to full depth before applying the slurry.
- Spray the slurry mixture under pressure, using high pressure pumping equipment.
- Maintain a thoroughly mixed supply.
- Evenly distribute the slurry mixture along the operating front.
- Complete each front before starting the next.

1.3.5.4 Watering

General: Water the seeded area with a fine spray until the topsoil is moistened to its full depth at time of application and keep the surface damp and the topsoil moist but not waterlogged until germination.

After germination: Water to establish a dense grass sward in healthy condition, gradually reducing watering frequency to harden off to climatic conditions.

1.3.5.5 Establishment

General: Care for germinated areas to establish the grassing to obtain the required densities and coverage required for Placement on Consolidation.

Reseeding: Reseed areas where the seed fails to germinate within three weeks of the date of original sowing, and at monthly intervals where required densities have not been met. Undertake additional soil preparation as required.

Weeding: Remove weeds that emerge in newly established areas.

1.3.6 Bitumen and straw mulching

1.3.6.1 General

General: Bitumen and straw mulch shall be applied to seeded areas as noted in design documents.

Requirement: Grass seeding and bitumen and straw mulching shall be carried out as a separate operation. Bitumen and straw mulching shall be carried out on a front over a restricted area. Commence only those areas that can be completed within one hour.

1.3.6.2 Materials

Straw: Seed free cereal straw. Vegetative material, free of noxious and other weeds and their seeds.

Requirement: Meadow hay is not acceptable.

Bitumen: Bituminous emulsion suitable for cold spray application complying with the requirements of AS 1160 for Designation A88/170. Emulsion shall contain no petroleum solvents or other components toxic to plant life.

1.3.6.3 Application

Application rates:

- Straw: 250 bales/Ha (approx. 5 tonnes/Ha). – even coverage over entire area
- Bitumen: 2,000 litres/Ha of residual bitumen – even coverage over entire area

Method: Bitumen and straw mulch shall be applied in either of the following methods:

a. Single application of bitumen and straw mixed together.
   Thoroughly loosen straw from the bale and feed into a hammermill or similar threshing/shredding machine that ejects straw through a cannon like barrel by a fan forced air blast. The bitumen shall be added to the straw before the straw leaves the barrel. Sufficient bitumen shall be applied to the straw so that it becomes “tacky” and sticks together on the ground.

b. Independent applications of straw and bitumen. The straw shall be treated and applied as in (a) the bitumen shall be applied by hosing or similar using high volume low pressure method.

Method: Spread straw evenly over prepared seeded areas. The spreading of straw shall be carried out on a calm day. Spray bitumen within one hour of spreading straw.

Bitumen Spray: Avoid overspray and staining of pavements, footpaths or any structures within the area to be treated with bitumen.

Finishing: Clean off all bitumen overspray. Remove all straw bale twine. Remove all wind blown straw from adjacent surfaces within two working days of the application of the straw.

1.4 Consolidation

1.4.1 General

Duration: The duration of the Consolidation period shall be a minimum of twenty-six (26) weeks from date of issue of certificate for Placement on Consolidation until date of issue of certificate for Final Acceptance or as otherwise nominated in the design documents.

1.4.2 Requirements for placement on consolidation

Work as Executed Records: To *MITS 00B Quality Requirements*.

Requirement: Grass areas shall demonstrate germination that is a dense continuous sward of healthy grass over the whole of the seeded area, evenly green and of a consistent height with the following minimum coverage:

- Irrigated grass (seeded areas): No bare areas to 100% of the area.
- Dryland grass (seeded, hydroseeded/ hydromulched areas): No bare areas greater than 100mm in diameter to minimum 80% of the area, and no bare areas greater than 200 mm diameter to 100% of the area.
- Temporary grass: 80% coverage to areas not subject to soil erosion, 100% coverage to areas subject to soil erosion
- Turf: Well knitted to the soil beneath.

General: Grass should be sufficiently established to not require extensive reseeding during the Consolidation Period with the anticipation of 100% coverage at the completion of the consolidation period:

Mowing: Mow within 7 days of inspection for placement on consolidation.

Weeds: No weeds present or show evidence that weeds have been sprayed.

Spade Edges: formed to detail and minimum 200mm wide weed/grass free zone – sprayed with herbicide.

Turf areas: Trim all edges abutting hard surfaces.

This is a **HOLD POINT**

Rectification: Following inspection, all defects or deficiencies shall be rectified within seven (7) days of date of inspection.

1.4.3 Works during consolidation

Requirement: Provide continuous care and maintenance of the contract area utilising best practice horticultural standards in accordance with the submitted consolidation program.

Minimum Works during consolidation: Refer to **Establishment** for relevant grass type:

- Watering
- Weeding
- Fertilising
- Mowing

1.4.4 Completion of consolidation period

Document submission requirements: To meet *TCCS Reference Documents*.

Requirement: Grass areas shall be fully established t dense continuous sward of healthy grass over the whole of the seeded area, and of a consistent height with the following minimum coverage:

- Irrigated grass (seeded areas): No bare areas to 100% of the area.
- Dryland grass: 100% coverage with no bare areas greater than 200mm in diameter.
- Temporary grass: 100% coverage with no bare areas greater than 200mm in diameter.
- Turf: Fully knitted to the soil beneath.

Mowing: Mow within 7 days of inspection.

Weeds: No weeds present or show evidence that weeds have been sprayed.

Spade Edges: Formed to detail and minimum 200mm wide weed/grass free zone – sprayed with herbicide.

Turf areas: Trim all edges abutting hard surfaces.

This is a **HOLD POINT**

Rectification: Following inspection, all defects or deficiencies shall be rectified as per contract requirements.

2 MEASUREMENT AND PAYMENT

2.1 Measurement

2.1.1.1 General

Payments made to the Schedule of Rates: To *MITS 00 Preliminaries*, this Specification, the drawings and **Pay items** inclusive.

2.1.1.2 Methodology

The following methodology will be applied for measurement and payment:

- Allow for all work, materials, testing and quality assurance requirements in each Pay Item.
- Temporary erosion and sedimentation control: To *MITS 00C Control of erosion and sedimentation.*
- Bulk Earthworks: To *MITS 02B Bulk earthworks.*
- Detailed excavation, filling and trimming, finishing of surfaces: To this Specification.
- Removal of unsuitable material: to *MITS 02B Bulk earthworks.*

2.2 Pay items

Table 9B-3 Pay items table

Item No	Pay Item	Unit of measurement	Schedule of rates scope
9B.1	Detailed excavation, filling and trimming, finishing of surfaces	m^2	All activities associated with detailed trim in all surfaces following bulk earthworks to achieve design levels.
9B.2	Grassing – seeding	m^2	All activities associated with the preparation of the seed bed, removal of stones/ rubbish, fertilising, sowing of seed, mowing, watering, weed control for the establishment of grass areas until the commencement of the Consolidation period.
9B.3	Turfing	m^2	All activities associated with the preparation of surface to receive turf, supply and laying of turf, watering, fertilising, finishing, mowing until commencement of the Consolidation period.
9B.4	Grassing – Hydroseeding / Hydroturfing	m^2	All activities associated with the preparation of the seed bed, removal of stones/ rubbish, supply and spreading of fertiliser, application of hyrdoseed/hydromulch, weed control, mowing for the establishment of grass areas until the commencement of the Consolidation period.
9B.5	Bitumen and Straw Mulching	m^2	All activities associated with the supply and application of all materials, protection and finishing.
9B.6	Consolidation	Per week	All activities associated with continual care and maintenance in accordance with submitted consolidation plan and to meet requirements of this specification.

ACT Government

Transport Canberra and City Services

July 2019