0257 LANDSCAPE – ROADWAYS AND STREET TREES

1 GENERAL

1.1 RESPONSIBILITIES

Objectives

General: Provide vegetation as documented to the following areas:

- Cut and fill batters
- Pathway verges
- Median areas and open drains, and
- Street tree planting.

Requirement: Lake Macquarie City Council's Landscaping Guidelines and the industry standard Water by Design Guidelines over-ride the requirements outlined in this specification.

Performance

~~Requirements: [complete/delete]~~

Erosion control: To *1102 Control of erosion and sedimentation*.

Selections: Conform to the selections in **Annexure A**.

Design

Authority requirements: Conform to the following:

- Statutory requirements for Work Health and Safety.
- Individual State and Local Council planting lists.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following worksections:

- *0136 General requirements (Construction).*
- ~~*0152 Schedule of rates – supply projects.*~~
- *0161 Quality (Construction).*
- ~~*0167 Integrated management.*~~
- *1102 Control of erosion and sedimentation.*
- *1112 Earthworks (Roadways).*
- ~~*1424 Landscape - maintenance.*~~

1.3 REFERENCED DOCUMENTS

Standards

General: The following documents incorporated in this worksection by reference:

AS 1160-1996	Bituminous emulsions for the construction and maintenance of pavements
AS 2507-1998	The storage and handling of agricultural and veterinary chemicals
AS 4419-2003	Soils for landscaping and garden use
AS 4454-2012	Composts, soil conditioners and mulches
AS 4843-2001	Synthetic weed blocking fabric

Lake Macquarie City Council Landscaping Guidelines
Water by Design Guidelines

1.4 STANDARDS

General

Storage and handling of pesticides: To AS 2507.

1.5 INTERPRETATION

Abbreviations

General: For the purposes of this worksection the following abbreviations apply:
NPK ratio: Nitrogen:Phosphorous:Potassium ratio.

Definitions

General: For the purposes of this worksection the following definitions:
Ameliorant: Material used to make or improve soil.
Anionic bitumen: A type of bituminous emulsion where dispersed particles comprise a bituminous binder and are negatively charged.

1.6 SUBMISSIONS

Soil tests for imported topsoil

Report: Submit a certificate noting the:

- Suitability of each soil type for its specified use.
- Similarity to naturally occurring local soil.
- Suitability for establishment and on-going viability of the site specified vegetation.
- Absence of any weed propagules or contaminants.
- Maintenance schedule.

Ameliorants recommendation: If required to include ameliorants, recommend the source of ameliorant material, rates and methods of incorporation.

Samples

General: Submit representative samples of each material, packed to prevent contamination and labelled to indicate source and content.
Bulk materials: Submit a 5 kg sample of each type specified. Submit bulk material samples, with required test results, at least 10 working days before bulk deliveries.
~~Samples required: [complete/delete]~~

Seed

Supply: Submit the name/s of the proposed seed supplier/s.
Timing: Within 2 weeks of the acceptance of the tender.
Lead time for native seed: Notify the lead time that may be required to procure native seed species.

Plant provenance

Locality: Provide written certification that all plant material has been grown from locally provenanced stock. If this is not achievable give notice.
Species: Provide written certification that all plant material is true to the required species and type.

1.7 HOLD POINTS AND WITNESS POINTS

Notice

General: Give notice so that the documented inspection and submissions may be made to the **HOLD POINT table** and the **WITNESS POINT table**.

HOLD POINTS table

Clause/subclause	Requirement	Notice for inspection	Release by
PRE-CONSTRUCTION PLANNING			
Transportation	Inspect plants upon delivery to ensure no physical damage or drying out	3 working days prior to transporting	*Principal Certifying Authority*

WITNESS POINTS Table

Clause/subclause	Requirement	Notice for inspection by the Superintendent
EXECUTION		
Slopes and drains – Preparation	Maintain sprayed areas undisturbed for 2 weeks	2 weeks
Slopes and drains – Seed mixing	Notice prior to sowing	2 working days
Slopes and drains – Watering	Check for excessive rilling	Progressive
Transplanting street trees – General	Give notice for watering, fertilising root cutting	Progressive
Transplanting street trees – maintenance of on-site plant material	Program for regular fertiliser applications	Prior to completing works
Transplanting street trees – Above ground	Approval for pruning of branches	Prior to pruning

2 PRE-CONSTRUCTION PLANNING

2.1 SPECIMEN PLANTS

Properties

Source: From locations where these plant materials are growing in 'natural' ground conditions.
Non-containerised nursery stock: Required.
Presentation: Provide maximum initial impact at the time of project opening.
Properties: To the **Specimen plants schedule**.
Preparation: Program the preparation of specimen plants and preparation works to assure readiness of specimen plants for transplanting to site when required.

Transportation

Responsibility: Ensure plants are transported to the site without physical damage or drying out. This is a **HOLD POINT**.
~~Freight responsibility agreement: [complete/delete]~~

3 MATERIALS

3.1 SELECTIONS

General

Selections: To **Annexure A**.

3.2 TOPSOIL – MINOR WORKS

General

Source: Imported topsoil and/or topsoil won and stockpiled on site to *1112 Earthworks - Roadways*.
Standard: To AS 4419.
Topsoil description:

- Of a friable, porous nature.
- Free of weeds and weed seeds, bulbs, corms and vegetable propagules.
- Free of refuse or materials toxic to humans, animals or plants.
- Free of stumps, roots, clay lumps or stones larger than 50 mm in size.
- Minimum organic content: 3% by mass.

- pH range: 5.5 to 7.5.
- Maximum soluble salt content: 0.06% by mass.

Health warning: Provide a health warning to conform with AS 4419 on packaging or invoice for bulk supply.

3.3 FERTILISER AND MULCHES

Fertiliser

Type: Organic.

NPK ratio:

- Slopes and open drains: 8:3.6:2 nitrogen: phosphorus: potassium.
- Mass planting: 6.3:1.8:2.8 nitrogen: phosphorus: potassium.

Vegetable mulch

Hydromulch: Straw, chaff, wood fibre paper pulp finely shredded to a maximum dimension of 10 mm.

Prohibited material: Meadow hay and weeds.

Binder: Grade ASS slow setting anionic bitumen to AS 1160.

Straw mulching

Material: Straw matrix.

Prohibited material: Meadow hay and weeds.

Binder: Grade ASS slow setting anionic bitumen to AS 1160.

Straw mat finished thickness: > 20 mm.

Mulch types

Organic landscape mulch: To AS 4454.

- Composition:
  - Fines: < 5% by volume.
  - Woodchip: Maximum size < 50 mm.
  - Leaf mulch: < 25% by volume.

Quality: Free of weeds and allopathic organisms.

Synthetic weed blocking fabric: To AS 4843.

Hardwood stakes

Material: Sharpened at one end, as follows:

- Marker stakes (for tube stock): 15 x 15 x 800 mm.
- Stakes (for advanced stock): 2 stakes, 25 x 25 x 2000 mm.
- Stakes (for super advanced stock): 3 stakes, 50 x 50 x 3000 mm.

3.4 ACCESSORIES AND DRAINAGE

Street tree accessories

Tree guards:

~~Product: [complete/delete]~~

~~Size: [complete/delete]~~

~~Finish: [complete/delete]~~

Tree grates:

~~Product: [complete/delete]~~

~~Size: [complete/delete]~~

~~Size of openings: [complete/delete]~~

~~Material: [complete/delete]~~

~~Finish: [complete/delete]~~

Trunk collar guards: 200 mm length of 100 mm diameter agricultural pipe split lengthways.

Street tree subsoil drainage

Drainage cells:

~~Product: [complete/delete]~~

~~Size of cell panel: [complete/delete]~~

~~Filter fabric: [complete/delete]~~

Location: Planting excavations adjacent roadway kerbing.

~~Subsoil drainage disposal: [complete/delete]~~

Describe or refer to *0224 Stormwater – site*.

Root barrier:

~~Product: [complete/delete]~~

- Depth: 600 mm.

Location: Planting excavations adjacent to, and within 4 m, of roadway kerbing.

Porous bonded gravel

Tree surround surfacing:

~~Product: [complete/delete]~~

~~Filter fabric: [complete/delete]~~

~~Gravel: [complete/delete]~~

3.5 PLANT MATERIAL

Seed

Certification: Provide a Certificate of Authenticity for all seed as follows:

- Grass and clover: Pre-packed commercially with an accompanying certificate of germination.
- Native seed: Deliver to the site in separate lots for each species and variety, clearly labelled to show species, variety and weight.

Storage: Do not take possession of the seed more than seven days before sowing is to occur. Store seed in clean, air tight containers and keep away from direct sunlight. Do not expose seed to the elements at any stage during storage.

Seed batch not true to type: Replace.

Turf

Description: 25 mm depth of dense, well rooted, vigorous grass growth with 25 mm depth of topsoil and free of weeds, soil pests and diseases.

Species: To **Annexure A**.

Prohibited material: Kikuyu grass.

Supply: As rolls in long lengths of uniform width in sound unbroken condition.

Width of rolls: > 300 mm.

Plant material – minor works

Balance (small plants) assessment requirements:

- Tubes or plant cells: Height above soil level must be between 1.5 and 2.5 times the height of the tube or plant cell.
- Trees and shrubs in containers < 20 L (other than tubes or plant cells) or ex-ground trees of size index < 35 (e.g. 1.4 m high x 25 mm calliper); height must fall within the range indicated for the container size in the Small container-grown plant table.
- Containers/rootballs (other than tubes or plant cells) must remain flat on the ground when the stem, held at 80% of height above ground, is deflected 30º from the vertical, side to side.

Plant stock classification: To the **Small container-grown plant table.**

Plant description:

- Healthy, of good form and not soft or forced.
- Large robust root systems.
- Not rootbound.
- Free from disease and insect pests.

Tree description: Single leading shoot.

Hardening off: Deliver all plants to a site within the locality of the works at least four weeks before planting out.
Plant root systems: Maintain root moisture at all times with particular attention to watering during the on-site period before and during planting.
Planting hole depths: Equal to the depth of container soil.
Fertilising: Submit details of fertiliser to be used and application rate for approval.

Small container-grown plant table

Minimum rootball diameter or container size	**Height range (m)**	
	Thin-stemmed species	**Thick-stemmed species**
Tubes or plant cells	Height between 1.5 and 2.5 x the height of the container	
150 mm (1.8 L)	0.4 – 0.6	0.3 – 0.5
170 mm (2.6 L)	0.5 – 0.7	0.4 – 0.6
200 mm pot (4 L)	0.7 – 0.9	0.6 – 0.8
200 mm bag (5 L)	0.8 – 1.0	0.7 – 0.9
250 mm (8 L)	1.0 – 1.2	0.8 – 1.0
300 mm (15 L)	1.2 – 1.5	1.0 – 1.2

Plant material – major works

3.6 STREET TREES

General

Labelling: Clearly label individual plants and batches.
- Label type: To withstand transit without erasure or misplacement.

~~Label frequency: [complete/delete]~~

Health

Foliage: Consistent with the size, texture and colour shown in healthy specimens of the nominated species.

Vigour

Extension growth: Consistent with vigorous specimens of the species nominated.

Damage

Supply: Free from damage and from restricted habit due to growth in nursery rows.

Stress

Supply: Free from stress resulting from inadequate watering, excessive shade or excessive sunlight.

Site environment

Grown and hardening off conditions: To suit the conditions that could be reasonably anticipated to exist on site at the time of delivery.

Root development

Final containers: Grow plants in their final containers for the following periods:
- Plants less than 25 L size: over 6 weeks.
- Plants greater than 25 L size: over 12 weeks.

Pests and disease

Supply: Foliage free from attack by pests or disease.

Native species susceptible to attack by native pests

Evidence of previous attack: To no more than 15% of the foliage. Ensure absence of actively feeding insects.

Large trees (Balance)

Conformance at inspection: To balance (large trees) assessment requirements.
Balance (large trees) assessment requirements:
- For trees grown in containers ≥ 20 L, the size index must lie within the range for the nominal container size shown in the **Common container volumes table.**

- Ex-ground trees with a size index ≥ 35 (e.g. 1.4 m high x 25 mm calliper) must have rootball diameters ≥ the minimum rootball diameters shown in the **Ex-ground trees table**.

Common container volumes table

Size index	Nominal container volume (L)	Size index	Nominal container volume (L)
26-33	20	371-480	450
32-41	25	412-518	500
45-58	35	453-587	550
57-74	45	495-640	600
77-99	60	533-716	700
83-107	75	632-818	800
111-143	100	711-921	900
154-200	150	791-1023	1000
194-251	200	842-1089	1100
227-314	250	918-1188	1200
273-353	300	1148-1485	1500
289-373	350	1530-1980	2000
330-427	400	1913-2475	2500

Ex-ground trees table

Size index	Minimum rootball diameter (mm)	Size index	Minimum rootball diameter (mm)
36–55	350	341–383	850
56–72	400	384–429	900
73–106	450	430–530	1000
107–131	500	531–642	1100
132–156	550	643–732	1200
157–173	600	733–859	1300
174–228	650	860–1144	1500
229–249	700	1145–1507	1750
250–299	750	1508–1968	2000
300–340	800	1969–3075	2500

Trees outside the ranges shown in the **Common container volumes table** and the **Ex-ground trees table**:

~~Height: [complete/delete]~~

~~Calliper: [complete/delete]~~

~~Rootball volume: [complete/delete]~~

Photographs: Provide current colour copies with date verification.

3.7 ABOVE-GROUND QUALITIES

Supply

General: Supply only trees that:

- Are free from injury.
- Are self-supporting.
- Have the calliper at any given point on the stem greater than the calliper at any higher point on the stem.

Pruning

~~Specific form: [complete/delete]~~

Clean stem height: less than 40% of total tree height.

Pruning wounds

Extent: Restrict fresh (i.e. recent, non-calloused pruning wounds) to < 20% of total tree height.

Type: Ensure a clean-cut at the branch collar.

Diameter of wound: less than 50% of the calliper immediately above the point of pruning.

Apical dominance

Species with an excurrent form: Defined central leader and intact apical bud.

Crown symmetry

Crown distribution: Difference on opposite sides of the stem axis < 20%.

Stem structure

Species with excurrent form: Single stem roughly in the centre of the tree with any deviation from vertical less than 15º.

Species with decurrent form: Central stem undivided below the clean stem height nominated with sound stem junction at the point of division.

All species: Branch diameter less than or equal to one-half of the calliper immediately above the branch junction.

Included bark

General: Convex branch/stem bark ridges at junctions between stems and branches and between co-dominant stems.

~~Exception: [complete/delete]~~

Trunk position

Variation in distance from the centre of the trunk to the extremity of the rootball: no more than 10%.

Compatibility of graft unions

Union between the scion and rootstock: Sound for the perimeter of the graft.

Diameter of the scion immediately above the graft: Equal to the diameter of the rootstock immediately below the graft (± 20%).

Indication of north

Trees in containers greater than 100 L or of size index greater than 140: Indicate the northerly aspect during growth in the nursery.

General: Indicator to withstand transit without erasure or misplacement.

3.8 STREET TREES – BELOW-GROUND QUALITIES

Root division

Trees in containers less than or equal to 45 L or ex-ground trees with a size index less than or equal to 70: Primary division of roots at less than 100 mm intervals.

Trees in containers greater than 45 L or ex-ground trees with a size index greater than 70: Primary division of roots within the outer 50% of the rootball at less than 100 mm intervals.

Root direction

General: Ensure that roots generally grow in an outwards (radial) or downwards direction from the point of initiation and that any deviation from the established direction is less than 45º.

Trees with a calliper at ground level less than 40 mm: Ensure the diameter of any nonconforming roots at the extremity of the rootball is less than 25% of the calliper.

Trees with a calliper at ground level of 40 mm or larger: Ensure the diameter of any nonconforming roots at the extremity of the rootball is less than 10 mm.

Rootball occupancy

Soil retention: On shaking or handling the unsupported rootball, at least 90% of the soil volume to remain intact.

Rootball depth

Rootball depth assessment for containers/rootballs 45 L or larger:

- Depth: no greater than maximum depth documented.
- Maximum depth (regardless of size): 550 mm.
- Diameter: Greater than or equal to depth.

Height of root crown

General: Ensure that root crown is at the surface of the rootball.

Non-suckering rootstock

Grafted cultivars/varieties: Supply trees grafted onto non-suckering rootstock.

4 EXECUTION

4.1 SLOPES AND DRAINS

Program

Between September and May: Vegetate exposed surfaces before the area exceeds 1 ha.
Between June and August: Do not carry out landscape work to exposed surfaces without approval.

Preparation

Herbicide treatment:

- Spray application
- Rate: To **Annexure A.**
- Program: Maintain sprayed areas undisturbed for 2 weeks. This is a **WITNESS POINT**.

Soil conditioning:

- Material and rate: To **Annexure A.**
- Gypsum application: Acceptable methods:

Spread evenly over the subsoil by a mechanical spreader and topsoil on the same day.
Thoroughly mixed into the topsoil whilst the topsoil is being removed from stockpiles.

- Apply conditioners other than gypsum to the supplier's recommendations and as approved by the Superintendent.

Seed mixing:

- Notice prior to sowing: 2 days. This is a **WITNESS POINT**.
- Mix, pre-treat and place seed in the sowing equipment for each operation on site.
- Sow seed on the day of mixing with pesticide.

Watering

Application:

- Initial watering: To a uniform moisture condition without run-off.
- After turfing: Re-water to a uniform moisture condition without run-off.
- After sowing: Re-water to a uniform moisture condition without causing rills in the surface, daily for 15 days or as directed.

Excessive rilling: If excessive rilling has occurred, as determined by the Superintendent, re-prepare and re-sow the affected area. This is a **WITNESS POINT**.

4.2 SLOPES 3H TO 1V OR FLATTER

Preparation of the surface

Cultivation: Before topsoiling, tyne to a depth of 200 mm to produce a loose surface and remove all large stones, rubbish and other materials that may hinder germination.

Topsoil

Approval from the Superintendent: Required.
Application: Apply uniformly to provide an average compacted thickness of 50 mm with a minimum compacted thickness of 30 mm at any location.

Cultivation depth: 50 mm, to provide a roughened surface with soil lumps not exceeding 50 mm.

Incorporation of pesticide

Timing: Immediately before sowing.

Pesticide type: Powder form.

Application: Mix thoroughly with the seed at the rate specified in **Annexure A**, to the equivalent mass of seed to be spread on 1 hectare of the surface in accordance with **Annexure A**.

Grassing

Sowing:

- Application: Distribute evenly by a mechanical seeder following the finished contours wherever possible.
- Depth: 5 mm as sown or 5 mm cover by raking or harrowing.
- Fertiliser: Apply concurrently with seeding to **Annexure A**.

Turfing:

- Laying: On the prepared topsoiled surface.
- Runs of turf: Butt hard against each other and be place perpendicular to the direction of water flow.
- Slopes 5:1 to 3:1: Peg turfs and remove pegs when established.

Seams: Topdress with topsoil.

Topdressing:

- Timing: 4 to 6 weeks after laying turf.
- Requirement: Correct any undulations or unevenness in the established turf.

Maximum slope for areas to be maintained by a ride-on mower with a 2 m wide deck: 4:1.

4.3 SLOPES STEEPER THAN 3H TO 1V

Methods

Vegetate slopes by one of the following methods:

- Topsoiling and hydromulching.
- Topsoiling, hydroseeding and straw mulching.
- Hydroseeding.

Determination of method: If not shown on drawings, by the Superintendent.

Preparation of the surface

General: Remove all loose material from fill batters and cut batters.

Timing: No more than seven days before seeding.

Method:

- If batters are not stepped: By dragging a steel chain of 30 kg/m minimum weight.
- Elsewhere: As approved by the Superintendent.

Topsoil

Application:

- Stepped batters: Loosely fill with topsoil.
- Elsewhere: Apply uniformly to provide an average thickness of 50 mm with a minimum compacted thickness of 30 mm.

Hydromulching or hydroseeding

Application rate: To the **Hydromulching or hydroseeding table.**

Watering: Water dry surfaces by a fine spray before the application of the hydromulch.

Pesticide:

- Timing: Apply during preparation of the hydromulch or hydroseed slurry.
- Pesticide type: Liquid, added to the slurry storage tank.

- Rate: 5 litres of pesticide to the equivalent volume of hydromulch or hydroseed slurry to be spread on 1 hectare of surface.

Equipment: Clean and free of contamination from previous operations.
Mix: The addition of the specified materials in the tank and agitated to maintain a uniform consistency during application.
Application: Uniformly over the whole surface.
Weather Conditions: Do not apply Hydromulch or hydroseed under the following weather conditions at the site:

- When temperature is higher than 35°C.
- When winds exceed 15 km/hr.
- Where, in the opinion of the Superintendent, the surface is too wet.
- During rain periods or when rain appears imminent.

Hydromulching or hydroseeding table

Material	**Application rate per hectare**	
	Hydromulching	**Hydroseeding**
Vegetable mulch (kg)	1500	Nil
Water (L)	35,000	20,000
Binder (L)	1200	Nil
Fertiliser	**See Annexure A**	
Seed	**See Annexure A**	
Wetting agent (L)	35	20
Pesticide (L)	5	5

Straw mulching

Application: Apply uniformly by a suitable blower.
Rate: 250 bales (each of 20 kg) of straw per hectare of surface.
Bitumen emulsion: Incorporate as a spray into the air stream of the mulch blower at ≥ 2500 litres per hectare of surface.
Straw mat thickness: ≥ 20 mm at any location.

4.4 OPEN DRAINS

Preparation of the surface

Topsoil: Spread to provide an average compacted thickness of 50 mm with a minimum compacted thickness of 30 mm at any location.
Timing: Complete vegetation within 7 days of the completion of open drain excavation.

Sowing

Rate: To **Annexure A**.
Application: Apply uniformly by one of the following procedures as directed by the Superintendent:

- Mechanical sowing.
- Hydromulching or hydroseeding.
- By hand.

Surface protection

Provide protection to all or part of the sown surface by one of the following methods:

- Bitumen emulsion: Spray the surface with an anionic slow setting bitumen emulsion to Grade ASS of AS 1160 at a rate of 1 litre of bitumen emulsion per square metre of surface.
- Organic fibre mat: Line the channel with an organic fibre mat listed in **Annexure A**. Lay the runs of matting along the direction of water flow loosely on the soil surface and not stretched. Slot the upstream end of the matting into a trench 150 mm wide by 150 mm deep and pinned to the base of the trench at 200 mm centres. Backfill the trench with soil and compact by foot. Provide 'U' shaped pins of 4 mm gauge wire, 50 mm wide and 150 mm long legs. Overlap

adjacent runs of matting 100 mm with the higher run lapped over the lower run. Pin the matting along the sides of each run at 500 mm centres and along the middle of each run at 1000 mm centres. Provide end overlaps 150 mm wide with the higher run end lapped over the start of the lower run and pinned at 200 mm centres.

- Turfing: Butt runs of turf hard against each other and placed perpendicular to the direction of water flow in the drain. Pin into position at 500 mm centres. Topdress seams of turf with topsoil.

Determination of method: If not shown on drawings, by the Superintendent.

4.5 LANDSCAPE PLANTING

Conditions

Timing: Give minimum 2 days notice of commencement of planting.

Conditions: Do not carry out landscape planting in extreme weather conditions (above 35°C or below 10°C), unless otherwise approved by the Superintendent.

Preparation generally

Weed management by herbicide spray:

- Rate: To **Annexure A.**
- Program: Maintain sprayed areas undisturbed for 2 weeks.
- Spray drift: Ensure there is no contact with planted material.

Alternative weed management by synthetic weed blocking fabric:

- Extent: 800 mm surrounding each proposed planting.
- Approval: Required.

Soil conditioning:

- Material and rate: To **Annexure A.**
- Gypsum application: Acceptable methods:

Spread evenly over the subsoil by a mechanical spreader and topsoiled on the same day.
Thoroughly mixed into the topsoil whilst the topsoil is being removed from stockpiles.

- Other conditioners: Apply to the supplier's recommendations and as approved.

Mass planting in mulched bed

Surface preparation: Rip the surface at 500 mm centres to a depth of 300 mm and break up the top 200 mm of the planting bed by cultivation to a maximum size of 50 mm.

Mulch: Spread 75 mm thick.

Individual planting

Preparation: Loosen a planting area 600 mm diameter to a depth of 400 mm.

Mulch: Spread 75 mm thick to 600 mm radius around the plant.

Planting – minor works

This clause is for minor works such as mass planted areas associated with cut and fill batters, pathway verges, median areas and open drains.

Method: Remove the localised mulch. Root prune to ensure all circling roots have been either severed or aligned radially into the surrounding soil. Place the plant, backfill the planting hole with topsoil and compact lightly so as to minimise subsidence without compacting the backfill. Avoid mixing mulch with topsoil.

Stakes and ties: 'Advanced' and 'super advanced' stock:

- Drive stakes 300 mm deep and 200 mm clear of the plant.
- Ties: 50 mm wide hessian webbing strips, attached loosely.

Watering: 10 litres of water per hole before the mulch is respread over the disturbed area.

Mulching: Replace, and leave the plant stem clear.

Landscape planting - major works

If the project is of a major scope the following procedure should be followed:

Care of landscape planting – minor works

This clause is for minor works such as mass planted areas associated with cut and fill batters, pathway verges, median areas and open drains.

Watering: Water all plants, from the time of planting, at the rate of 10 litres per plant every third day for the first twelve weeks.
Replacement: Replace missing plants, dead plants and plants nominated by the Superintendent as unhealthy with plants of similar size and quality and of identical species and variety to the plant being replaced.
Weed and grass growth in mulched areas: Control with herbicide, in accordance with the manufacturer's instructions at monthly intervals during the construction period and contract maintenance period. Replace plants damaged by herbicide application.

Landscape planting – major works

If the project is of a major scope the following procedure should be followed:

4.6 STREET TREES

Unpaved areas

Excavation:

- Containers < 75 litre: Twice the diameter of the root ball.
- Containers ≥ 75 litre: three times the diameter of the root ball.
- Depth: Root ball plus 100 mm. Loosen the compacted sides, and the bottom a further 100 mm.

Planting: If clay is present add 1 kg of agricultural gypsum soil conditioning.
Accessories and drainage: Fit trunk collar guard, root barrier and subsoil drainage measures prior to backfilling.
Backfill: Topsoil.
Mulch: 75 mm thick and 50 mm clear of plant stem.
Initial watering: 50 litres per tree applied in stages during backfilling.

Paved areas

~~Excavation for structural soil: [complete/delete]~~

Select a cubic capacity to suit the size and species of the tree. A potentially large tree may need 12 m^3.
Accessories and drainage: Fit trunk collar guard, root barrier and subsoil drainage measures prior to backfilling.
Backfill: Provide structural soil to the **Structural soil table.**

Structural soil table

Type	Description	Fertiliser	Depth
Structural soil 20 mm	75% 20 mm crushed river gravel 25% filler soil of 1 part screeded dolomite to 1 part screeded sandy loam	Trace element mix: 300 g/m^3 Potassium nitrate: 500 g/m^3 Ammonium nitrate: 500 g/m^3 Superphosphate: 500 g/m^3 Ion sulphate: 1.5 kg/m^3 8/9 month Controlled Release: 2 kg/m^3 Gypsum: 500 g/m^3 Magnesium sulphate: 400 g/m^3 Magrilime: 600 g/m^3	100 mm
Structural soil 40 mm	80% 40 mm basalt aggregate 20% filler soil of 1 part screeded dolomite to 1 part screeded sandy loam	Trace element mix: 300 g/m^3 Potassium nitrate: 500 g/m^3 Ammonium nitrate: 500 g/m^3 Superphosphate: 500 g/m^3 Ion sulphate: 1.5 kg/m^3 8/9 month Controlled Release: 2 kg/m^3 Gypsum: 500 g/m^3 Magnesium sulphate: 400 g/m^3 Magrilime: 600 g/m^3	Varies

~~Structural soil type: [complete/delete]~~

Mulch: 10 mm screenings 75 mm thick.
Initial watering: 50 litres per tree applied gradually.

Porous bonded gravel

Backfill: Allow for base aggregate and gravel.
Filter fabric: Lay over growing medium pre cut to size.
Base aggregate: 5 to 7 mm crushed blue metal laid 70 mm deep and hand consolidated.
Porous paving: Mix and place to the manufacturers published directions.
~~Thickness: [complete/delete]~~

4.7 TRANSPLANTING STREET TREES

General

General: Conform to the **Transplanting schedule**.
Notice: Give notice prior to:
~~Watering: [complete/delete]~~
~~Fertilising: [complete/delete]~~
~~Root cutting: [complete/delete]~~
This is a **WITNESS POINT**.
Conditions: Select a time for transplanting having regard to the appropriate season, time of actual operation, rootball diameter and depth, lifting methods, weather conditions and the like.

Preparation

Watering: Establish a temporary trickle irrigation system, or manually water the intended trees for a period of two weeks prior to ball excavation work.
Fertilising: Apply one application of liquid fertiliser mix to the foliage and root as appropriate to the species. Apply sufficient liquid fertiliser mix to allow the spray to drip from foliage and soak into the rootball. Do not spray the fertiliser mix on excessively hot, dry or windy days.

Rootball

General: Minimise the cutting of roots. Use only sharp tools, water blasting or water cutting.
Initial cut:

- Manually or by chain trenching machine. Trees whose rootballs have been excavated by backhoe or excavator are not acceptable.
- Located 250 mm beyond the required finished rootball dimensions of each side to allow any damaged roots to be trimmed back to final dimensions and sealed.

Hand trimming:

- To 100 mm less than the required finished rootball dimension. Cut back and seal with an approved horticultural sealer on and all roots greater than 25 mm diameter.

Outcome: Cut rootball to be:

- Symmetrical about the trunk and in proportion to the overall size of the tree except where the limitations of individual tree planter openings requires specific tailoring of the rootball dimension.
- Cut to a size designed to maximise the rootball in the best interests of each specimen.

Trench: Backfill and lightly compact with clean sand, free of any foreign matter, pathogens or any substances likely to be deleterious to future root growth. Apply sufficient root inducing formulation, at the manufacturer's recommended concentration, to effectively saturate the backfill in the trench.

Maintenance of on-site plant material

Watering: Maintain a trickle irrigation system around each tree, located within the trenched rootball perimeter. Program the system to supply water at an optimum rate to encourage healthy growth and avoid desecration through excessive transpiration

following the pruning of the roots. Monitor the system until the tree is lifted and transplanted.
Fertilising: Submit a program for regular fertiliser applications continued over this period. This is a **WITNESS POINT**.
Responsibility: Take precautions to safeguard the health and well being of all on site plant material prior to the lifting and transplanting.

Above ground

Pruning: If selected pruning of branches appears necessary to balance root loss obtain prior approval. This is a **WITNESS POINT**.
Lifting: Thoroughly irrigate to the full depth of the rootball two days prior to transplanting of each specimen. Do not fracture the ball of soil around the root system. Maintain ball in firm condition during transplanting by wrapping in hessian or other appropriate open weave material, securely tied.
Storage: Transport transplanted trees to a designated nursery site. Store and maintain until ready for planting.
Planting: Avoid disturbance to the rootball during moving and planting. After placement, remove the rootball wrapping and ties by cutting.
Watering: At the completion of transplanting, water the rootball thoroughly and continue to water until established.

4.8 LIMITS AND TOLERANCES

Application

Summary: The limits and tolerances applicable to this worksection are summarised in **Summary of limits and tolerances table**.

Limits and tolerances table

Activity	Limits/tolerances	Worksection reference Clause/subclause
Topsoil - Organic content - pH - Soluble Salt	 > 3% by mass > 5.5 < 7.5 < 0.06% by mass	MATERIALS/Topsoil – minor works
Turf - Width of rolls	 > 300 mm	MATERIALS/Plant material (Turf)
Vegetable Mulch - Hydromulch - Paper pulp	 Maximum size < 10 mm < 50% by mass of total mulch	MATERIALS/Fertiliser and mulches
Straw mulching - Straw mat	 Finished thickness > 20 mm	MATERIALS
Mulch composition - Fines - Woodchip - Leaf mulch	 < 5% by volume Maximum size < 50 mm < 25% by volume	MATERIALS/Fertiliser and mulches (Mulch types)
Plant material - Container soil mix	Contain 20% to 25% by volume of clay	Plant materials
Topsoil (Execution)	Minimum compacted thickness at any location of 30 mm	EXECUTION/Slopes 3:1 or flatter, Slopes steeper than 3:1
Landscape planting - Temperature	Planting not to be undertaken when temperatures > 35°C or < 10°C.	EXECUTION/Landscape planting (Conditions)

Location of planting

General: Do not obstruct access to services or sightlines to signage. Do not obstruct pedestrian or vehicular traffic.

Street trees

Ground clearance:

- Clearance height at maturity: 2.4 m.
- Clearance height at time of planting: 1.5 m.

Setbacks:

- Mature canopy clearance: Locate trees to achieve clearances from the following:

Electricity or telecommunications poles or pillars: > 4 m.
Streetlights: > 7.5 m.
High voltage transmission lines: > 4 m radius.
Stormwater drainage pits: > 2 m.
Kerbs: 750 mm to 1000 mm measured to the back of the kerb.
Driveways: > 3 m.
Intersections: > 10 m measured from the face of the kerb of the adjoining street.
Existing trees: The combined mature canopy width.

Roundabouts

Setback: From the inside edge of the kerb as follows:

- 0 – 1 m: Appropriate pavement material.
- 1 – 3 m: Shrubs/groundcovers with a maximum mature unpruned height of 600 mm above the road pavement.
- 3 m and over: Trees and shrubs/groundcovers.

Median Islands

Setback: From the inside edge of the kerb as follows:
0 m – 0.3 m: Appropriate pavement material.
0.3 m – 1 m: Appropriate groundcovers, 200 mm high with minimal pruning requirements.

5 MEASUREMENT AND PAYMENT

5.1 MEASUREMENT

General

Payment to the schedule of rates: To *0152* Schedule of rates – projects, worksection 0257 Landscape. – roadways and street trees, the drawings and *Pay items 0257.1* to *0257.5*.
Lump Sum prices: Not acceptable.
Unpriced items: For each unpriced item listed in the Schedule of Rates, make due allowance in the prices of other items.

Methodology

The following methodology will be applied for measurement and payment:

- All areas of landscape works: In the plane of the surface.
- Thickness: Applied perpendicular to the surface.
- Erosion and sedimentation control measures: To *1102 Control of erosion and sedimentation*.
- Topsoil stockpiling: To *1112 Earthworks (Roadways)*.

5.2 PAY ITEMS

This clause assumes the contract is tendered on the basis of a Schedule of Rates as appropriate for minimal documentation of landscaped areas.

Pay items	Unit of measurement	Schedule Rate scope
0257.1 Vegetation of slopes 3 to 1 or flatter		
0257.1(1) Vegetation—Seeding	m^2	All costs associated with the vegetation of slopes by seeding other than the cost of watering, and supply of imported topsoil.
0257.1(2) Vegetation—Turfing	m^2	All costs associated with the vegetation of such slopes by turfing other than the cost of watering, and supply of imported topsoil.
0257.1(3) Watering Determination of volume: By calibrated dipstick readings or other method approved by the Superintendent.	Kilolitre	All costs associated with supply and delivery of the water and the watering of the seeded and/or turfed areas.
0257.2 Vegetation of slopes steeper than 3 to 1		
0257.2(1) Preparation of surface other than stepped batters	m^2	All costs associated with the preparation of the surface for vegetation other than the cost of supply of imported topsoil
0257.2(2) Preparation of surface of stepped batters	m^2 on the batter slope	All costs associated with the preparation of the batter slope for vegetation other than the cost of supply of imported topsoil
0257.2(3) Hydromulching	m^2	All costs associated with hydromulching other than the watering of dry surfaces.
0257.2(4) Hydroseeding	m^2	All costs associated with hydroseeding other than the watering of dry surfaces.
0257.2(5) Straw Mulching	m^2	All costs associated with straw mulching.
0257.2(6) Watering Determination of volume: By calibrated dipstick readings or other method approved by the Superintendent.	Kilolitre	All costs associated with supply and delivery of the water and the watering of dry surfaces.
0257.3 Vegetation of open drains		
0257.3(1) Preparation and Topsoiling of Drains	m^2	All costs associated with preparation of the surface for sowing.
0257.3(2) Mechanical Sowing	m^2	All costs associated with sowing and fertilizing.
0257.3(3) Hydromulching	m^2	All costs associated with hydromulching other than the watering of dry surfaces.
0257.3(4) Hydroseeding	m^2	All costs associated with hydroseeding other than the watering of dry surfaces.
0257.3(5) Hand Sowing	m^2	All costs associated with sowing by hand.
0257.3(6) Spray with bitumen	m^2	All costs associated with the

Pay items	Unit of measurement	Schedule Rate scope
emulsion		supply and spraying of bitumen emulsion.
0257.3(7) Lining with organic fibre mat	m^2	All costs associated with the supply and placement of organic fibre mat.
0257.3(8) Turfing	m^2	All costs associated with the supply and placement of turf.
0257.3(9) Watering Determination of volume: By calibrated dipstick readings or other method approved by the Superintendent	Kilolitre	All costs associated with supply and delivery of the water and the watering of dry surfaces and all treated drain areas.
0257.4 Landscape planting		
0257.4(1) Provision of mulched bed for mass planting	m^2	All costs associated with the preparatory work of the mulched bed before planting.
0257.4(2) Mass planting	Each plant	All costs associated with the planting in the mulched bed and subsequent care of each plant.
0257.4(3) Individual Landscape Planting of Stock	Each plant	All costs associated with the preparatory work, planting and subsequent care of each plant.
0257.5 Supply of imported topsoil		
General	The cubic metre measured loose in the truck as delivered	All costs associated with the supply and delivery of the topsoil to the site as directed by the Superintendent. Placing and spreading of the topsoil is excluded from this pay item and is included in the specific activity pay items for vegetation or planting as appropriate.

6 ANNEXURE A

6.1 LANDSCAPING MATERIALS

~~Edit with additions or deletions to suit the project.~~

Landscaping materials

	Material	Type	Minimum application rate
1.	Herbicide*	Glyphosate e.g. Roundup	9 litres/200 litres water/ha
2.	Seed		
	- Grass	Rye Corn (April-August) or	60 kg/ha
		Japanese Millet (September-March)	60 kg/ha
		Hulled Couch	5 kg/ha
		Red Clover (Inoculated)	5 kg/ha
		White Clover (Inoculated)	5 kg/ha
		'Elka' Perennial Rye	5 kg/ha
	- Native	Acacia dealbata	4 kg/ha
		Acacia buxifolia	1 kg/ha
		Acacia decurrens	1 kg/ha
		Acacia pravissima	1 kg/ha
		Leptospermum lanigerum	1 kg/ha
		Hardenbergia violacea	500 g/ha
		Kennedia prostrata	500 g/ha
		Acacia implexa	200 g/ha
		Banksia marginata	200 g/ha
		Bursaria spinosa	200 g/ha
		Callistemon pallidus	200 g/ha
		Dodonaea viscoca	200 g/ha
3.	Turf grass		
	- Medians - Verges/Footpaths - Other Areas	Couch Buffalo Couch	Refer to Drawings ' '
4.	Fertiliser *		
	Vegetation of Slopes/Drains	Dynamic Lifter 'Nitro'	1000 kg/ha
5.	WETTING AGENT *	'Aquasoil'	1 litre/1000 litres of mix water
6.	PESTICIDE *		
	Liquid Powder	'Lorsban 500 EC' 'Lorsban 250 W'	5 litres 10 kg
7.	SOIL CONDITIONER*		
	Vegetation of Slopes/Drains Landscape Planting	Gypsum N:P:K ratio 6.3:1.8:2.8	400 g/m^2 5k g/m^2
8.	ORGANIC FIBRE MAT*	'Sta-firma' (light grade)	—
9.	MULCH	Composted/Pasteurized	75 mm thick

* Provide the material as listed or as approved by the local authority.

6.2 PLANT MATERIAL

Plant material supply schedule

Botanical name	Common name	Size	Quantity (+10%)

Plant selection: Consult the Local Authority for the list of recommended (or proscribed) species.

Transplanting schedule

Species	Description

Specimen plants schedule

Species	Description