9.4 Landscape Maintenance Strategy

dem

Landscape Maintenance Strategy

Global Sydney Switch Expansion 2

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Issue Register

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Contents

1.0 General

1.1 Standards

Soils	AS 4419 (1998) Top dressing, landscape soils and garden mixes
General:	AS 3743 (1996) Potting mixes
	AS 4454 (1997) Composts, mulches and soil conditioners
	AS 4373 Pruning

1.2 Interpretation

Definitions

Site topsoil: Soil excavated from the site which has the following characteristics:

- Contains organic matter.
- Supports plant life.
- Free from unwanted matter.

Unwanted matter (in topsoil):

- Stones over 25-mm diameter.
- Clay lumps.
- Weeds and tree roots.
- Sticks and rubbish.
- Material toxic to plants.

Imported topsoil:

- Fine: Clay loam, fine sandy loam, sandy clay loam, silty loam, loam.
- Medium: Sandy loam, fine sandy loam.
- Coarse: Sand, loamy sand.

Topsoil mixture: Topsoil and compost or other additives, thoroughly mixed before placing.

2.0 Quality

2.1 Inspections

Give sufficient notice so that inspections may be made of the following

- pest and disease problems
- radical pruning of species not scheduled
- plants requiring transplanting
- plant replacements

2.2 Biological Controls

General: Preference shall be given to horticultural methods that utilise biological controls, including but not limited to, biological control agents, integrated pest management strategies, organic pest controls, manual and / or mechanical weed removal and trimming.

2.3 Chemical Controls

General: Chemical use shall conform to current Federal and State legislation and regulations under the following authorities: EPA, Worksafe Australia, the National Occupational Health and Medical Research Council and Australian Agricultural and Veterinary Chemical Council. Preference shall be given to the reduction or elimination of chemical use.

Minimum risk reduction shall include:

- personal protective equipment
- restricted hours of application to minimise the exposure to users
- environmentally acceptable and safe disposal of waste chemicals

2.4 Recycling / Disposal of Materials

General: Recycle and /or dispose of materials from site in an environmentally acceptable manner.

3.0 Soils

3.1 Soil Testing

Undertake soil testing and provide results and recommendations on the following basis:

> Complete chemical composition commencement of program

> PH soil test over range of landscape types annually

3.2 Compost

Preference is given to the use of composts, soil conditioners, potting mixes, topsoils; landscape soil mixes, garden mixes and mulches that contain a minimum percentage of recycled garden and wood waste. Supply material with the following minimum percentages of recycled-composted garden and wood waste:

Recycled / composted materials schedule

Composted material	**Percentage obtained from recycled material**
Mulches	100%
Composts and soil conditioners	80%
Landscaping, garden mixes and on slab soils	40%
Top dressing mixes	20%
Potting mixes	40%

3.3 Mulching

Maintain mulch levels.

Mulch Schedule

Location	**Depth**
Mass planted areas	75 mm
Trees in grass	75 mm

3.4 Soil Moisture Retention

Monitor soil moisture absorption and retention. Apply soil ameliorants to assist in moisture retention and absorption as required.

Minimum absorption and retention > 80%

4.0 Mass Planted Areas

4.1 Watering

General: Watering shall be carried out to maintain the best possible condition and growth rates of the plants. Undertake watering during the coolest part of the day

- early morning
- late afternoon

Deep water to saturate the root zone. Adjust watering according to soil moisture levels.

Fixed semi automatic irrigation system – programme to suit:

a) Precipitation requirement of individual types of plants.

b) Infiltration rates and soil moisture levels

c) Adjustment or shut down during and after periods of heavy rains.

4.2 Fertilising

General: Apply a regular fertilisation programme with proprietary balanced fertilisers selected according to soil testing results, physical soil structure and plant type.

Spreading: Distribute evenly without lumps by hand according to manufacturers recommendations. Avoid contact with foliage unless a folio feed. Take care to limit the spread of fertiliser beyond the area required.

4.3 Weeding

Remove all weed growth and re-occurring weed growth.

Method: Small areas of infestation - by hand

Large areas of infestation - spray with a none-translocating herbicide

Frequency: Fortnightly

4.4 Pest and Disease Control

General: Control pests and diseases which may affect the plants.

Method: Preference is to be given to organic methods of control.

If a problem occurs which can only be treated by chemical methods obtain approval prior to proceeding.

4.5 Staking and Tying

General: Stakes and ties shall be used to support plants requiring support. Use appropriately sized stakes and ties according to plant size. Position to avoid damage caused via movement or restriction.

Stake and tie plants that are:

- Exposed to severe wind conditions

- Newly planted plants

Remove stakes and ties when plant has achieved a stable condition.

4.6 Pruning and Trimming

General: Comply with the recommendations of AS 4373.

Prune in spring and summer according to standard horticultural practices. Spot prune as required through the remainder of the growing season.

Tip Pruning

Method: Remove the top 25mm or growing tip of each branch to encourage development of new shoots during their active growing season. Prune after flowering to reflect natural growth patterns.

Hedge Trimming

Trim plants to maintain the design intent.

Average Frequency: 2-3 times in the growing season.

Radical pruning

Radical pruning shall be undertaken as follows:

- Promote healthy and rigorous growth in plants that respond to radical pruning
- Attain a reduction in plant size or shape
- Removal of dead, damaged or diseased branches and or foliage

Obtain approval prior to radical pruning of plants not listed in this schedule.

4.7 Transplanting and Dividing

General: Transplant and divide overcrowded plants as follows:

Notice: Give sufficient notice before transplanting.

Conditions: Select a time for transplanting having regard to the appropriate season, time of actual operation, root ball diameter and depth, lifting methods, weather conditions and the like.

Lifting: Two days before transplanting of each specimen, thoroughly irrigate it to the full depth of the root ball. Minimise the cutting of roots. Cut roots with sharp tools. Do not fracture the ball of soil around the root system, but maintain it in firm condition during transplanting by wrapping in appropriate open weave material (eg hessian), securely tied.

Planting: Avoid disturbance to the root ball and plant. Remove the root ball wrapping and ties by cutting.

Pruning: Prune as directed where selective pruning of branches or canopy is necessary. Comply with the recommendations of AS 4373.

Watering: At the completion of transplanting, water the root ball thoroughly and continue to water until established.

Shrubs: Transplant shrubs that have become overcrowded.
Transplant shrubs where growing conditions have deteriorated eg. overshadowed by other plants.

4.8 Plant Replacements

All plants that have died or show significant loss of vigour (a loss of 50% of normal foliage cover) shall be replaced.

Generally replace plants with the same species, variety and size. Obtain approval prior to replacement.

Plants

General: Provide plants with the following characteristics:

- Large healthy root systems, with no evidence of root curl, restriction or damage.
- Vigorous, well established, free from disease and pests, of good form consistent with the species or variety.
- Hardened off, not soft or forced, and suitable for planting in the natural climatic conditions prevailing at the site.

Trees: Provide trees, which unless required to be multi-stemmed, have a single leading shoot.

Replacement: Replace damaged or failed plants with plants of the same type and size.

Plant containers

General: Supply plants in weed-free containers of the required size.

Open rooted stock: If trees are to be supplied as open rooted stock, ensure this is appropriate to the species, variety, size, and time of year for planting.

Potting-on: Do not carry out potting-on.

Labelling

Label at least one plant of each species or variety in a batch with a durable, readable tag.

Storage

Deliver plant material to the site on a day to day basis, and plant immediately after delivery.

Locations

If it appears necessary to vary plant locations and spacings to avoid service lines, or to cover the area uniformly, or for other reasons, give notice.

Planting conditions

Do not plant in unsuitable weather conditions such as extreme heat, cold, wind or rain. In other than sandy soils, suspend excavation when the soil is wet, or during frost periods.

Watering

Thoroughly water the plants before planting, immediately after planting, and as required to maintain growth rates free of stress.

Placing

Remove the plant from the container with minimum disturbance to the root ball, ensure that the root ball is moist and place it in its final position, in the centre of the hole and plumb, and with the top soil level of the plant root ball level with the finished surface of the surrounding soil.

Fertilising

Pellets: In planting beds and individual plantings, place fertiliser pellets around the plants at the time of planting.

Backfilling

Backfill with topsoil mixture. Lightly tamp and water to eliminate air pockets. Ensure that topsoil is not placed over the top of the root ball, so that the plant stem remains the same height above ground as it was in the container.

5.0 Trees

5.1 Watering

General: Watering shall be carried out to maintain the best possible condition and growth rates of the plants. Undertake watering during the coolest part of the day

- early morning
- late afternoon

Deep water to saturate the root zone. Adjust watering according to soil moisture levels.

Fixed semi automatic irrigation system – programme to suit:

a) Precipitation requirement of individual types of plants.

b) Infiltration rates and soil moisture levels

c) Adjustment or shut down during and after periods of heavy rains.

5.2 Fertilising

General: Apply a regular fertilisation programme with proprietary balanced fertilisers selected according to soil testing results, physical soil structure and plant type.

Application for trees in grass: Distribute evenly around the full circumference of the trees canopy under the drip line. Verti-cut turf to a depth of 200-300mm prior to spreading to enable infiltration of fertiliser. Avoid over fertilisation by the application of grass fertilisers and tree fertilisers at the same time.

5.3 Weeding

Remove weed growth and re-occurring weed growth from around the base of trees.

Trees in grass: Maintain a 1200mm grass free zone around the base of trees.

5.4 Pest and Disease Control

General: Control pests and diseases that may affect the plants.

Method: Preference is to be given to organic methods of control.

If a problem occurs which can only be treated by chemical methods obtain approval prior to proceeding.

5.5 Stake and Tying

General: Stakes and ties shall be used to support plants requiring support. Use appropriately sized stakes and ties according to plant size. Position so as to avoid damage caused via movement or restriction.

Stake and tie plants that are:

- Exposed to severe wind conditions
- Newly planted plants

Remove stakes and ties when plant has achieved a stable condition.

5.6 Tree Surgery

Notice

Give sufficient notice before commencing tree surgery.

Qualifications

Employ suitably qualified persons to carry out tree surgery work in a safe and progressive manner.

Pruning

General: Comply with the recommendations of AS 4373.

Operations

Remove dead and decayed wood or limbs that have been broken. Make cuts into live wood. If the trees show signs of deterioration after the work has been done, carry out a program of feeding or soil amelioration such as soil aeration, irrigation or incorporation of organic material. Continue this program until the tree has recovered.

Precautions

Avoid damage to trees being treated or to nearby trees and surroundings. Do not use trees as anchors for winching operations or bracing. Provide bracing as necessary before cutting to prevent uncontrolled breakages and damage to surroundings.

Dressing

Prevent incursion of rot or disease after cutting.

Root pruning

Do not unduly disturb the remaining root system.

5.7 Tree Replacements

General: Replace trees that have died with the same species and variety. Obtain approval prior to replacement.

True to type

Type: Supply trees which are true to type.

Health and vigour

Health: Supply trees with foliage size, texture and colour consistent with that shown in healthy specimens of the species.

Vigour: Supply trees with extension growth consistent with that shown in vigorous specimens of the species.

Freedom from pests and disease

Foliage: Restrict attack by pests and disease to < 10% of the foliage, such that potential for long term success of the trees is not affected.

Balance of crown

Maximum variation in crown bulk on opposite sides of stem axis: ± 20%.

Uniformity of growth

Longest internode: Maximum 1.2 x shortest internode.

Stem taper

Support: Supply trees which are self-supporting unstaked.

Other than tubestock or small trees:

- Calliper: At least 1.2 x calliper at 1 m above ground.

Pruning history

General: Comply with the recommendations of AS 4373.

Pruning wounds: Confine fresh pruning wounds to < 25% of the clean stem height.

Wound diameter: < 50% of stem diameter immediately above point of pruning.

Pruning location: Clean cut at branch collar.

Included bark

Bark ridge: Convex (outwardly pointing) at junctions between co-dominant stems, and stems and branches.

Grafted varieties or cultivars

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

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

Apical dominance

Apical bud: If appropriate for the species, supply trees that have a defined central leader and intact apical bud.

Indication of north

Trees grown in containers ≥ 100 L and balled and burlapped or RCB grown trees of size index ≥ 130: Indicate northerly aspect in the nursery using a permanent peg embedded in the rootball 150 mm north of the centre of the stem.

Root division

Root systems: Fibrous with repeated and sequential division, complying with the **Root division table**.

Root direction

Roots growing out or down: > 90% of roots within rootball at every stage of development.

Non-suckering rootstock

Grafting: If appropriate for variety or cultivar, graft trees onto non-suckering rootstock.

Root division table

Tree sizes		**Root division**
Container volume (L)	**Size index (balled and burlapped or RCB grown trees)**	
< 20	< 35	Major divisions at maximum 50 mm intervals
≥ 20, < 100	≥ 35, < 130	Major division by 15 L container, or 250 mm diameter x 300 mm deep rootball, and at maximum 100 mm intervals beyond this size
≥ 100, < 200	≥ 130, < 230	Major division by 75 L container, or 450 mm diameter x 450 mm deep rootball, and at maximum 100 mm intervals beyond this size
≥ 200	≥ 230	Major division by 150 L container, or 650 mm diameter x 450 mm deep rootball, and at maximum 100 mm intervals beyond this size

Balance

Rootball:shoot ratio (tubestock and small trees)

Tubestock height above soil level: 2 x height of tube ± 25%.

Rootball:shoot ratio (other than tubestock or small trees)

Rootball:shoot ratio equations:

- Container grown trees: Size index = Conversion factor (CF) Container volume (L)(± 10%).
- Balled and burlapped or RCB grown trees: Rootball volume (L) (±10%) = Size index/CF.

CF values table

Container grown trees		**Balled and burlapped or RCB grown trees**	
Container volume (L)	**CF**	**Size index**	**CF**
≥ 20, < 60	1.5	≥ 35, < 90	1.8
≥ 60, < 100	1.3	≥ 90, < 130	1.56
≥ 100, < 150	1.21	≥ 130, < 180	1.45
≥ 150, < 200	1.14	≥ 180, < 230	1.37
≥ 200, < 300	1.07	≥ 230, < 320	1.28
≥ 300, < 600	0.97	≥ 320, < 580	1.16
≥ 600, < 1000	0.93	≥ 580, < 930	1.12
≥ 1000	0.9	≥ 930	1.08

6.0 Irrigation

6.1 Inspection and Checking

General: Inspect and check irrigation system on a regular basis. Any components requiring servicing and repair shall be reported and approval obtained prior to undertaking any work. When the irrigation system is inoperative alternative watering methods shall be used until the system is restored.

Irrigation Inspection and Checking Schedule

Component	**Inspection Period**	**Action**
General		
Performance and upgrading	Annually	
Filters – Mainline	Monthly	
Electrical Source Output (Auto Syst.)	Monthly	
Controller (Automatic Systems)		
Operation – Progression – Sta to Sta.	Weekly	
Proper Activation and Valves	Monthly	
Proper Timing of Stations	Quarterly	
Proper Time & Day Readings	Weekly	
Exterior Appearance	Annually	
Valve Operation		
Open, Close Completely (Weeping)	Weekly	
Sprinkler Operation		
Rotaries – Clogged Nozzles	Bi-monthly	

Plant Obstructed Pattern	Bi-monthly	
Arc Coverage	Bi-monthly	
Radius Adjustment	Bi-monthly	
Pop-up Action	Bi-monthly	
Riser Seal Leaks	Bi-monthly	
Set to Grade	Bi-monthly	
Coverage Pressure	Bi-monthly	
Rotational Speed	Bi-monthly	
Clogged Screens	Bi-monthly	
Head Damage	Bi-monthly	
Piping		
Leaks – Broken or Cracked Pipe	As Needed	
Bad Solvent Welds, Bad Threaded	As Needed	
Connection	As Needed	
Clogged Pipe	As Needed	

6.2 Programming

General: Automatic system to coincide with optimum periods of water pressure and water absorption.

Operating time

Summer before sunrise

Winter after sunrise

6.3 Seasonal Variations

Adjust irrigation system to take into account seasonal variations in plant requirements. Seasonal adjustments to be as follows:

- March
- June
- September
- December

6.4 Irrigation Efficiency

Monitor soil moisture levels and regulate the irrigation system to obtain optimum water efficiency.

Soil moisture levels shall be obtained using a soil probe. Assess soil moisture levels in the following areas to obtain an overall result:

- grass areas
- trees in grass
- mass planted areas in full sun
- mass planted areas in shade

Programme each irrigation control station to apply an even distribution of water to achieve the required soil moister levels to each landscape area.

6.5 Water Distribution

Ensure an even distribution of water.

Turf areas to receive an overall uniform infiltration rate.

Mass planted areas to receive even application to each plant.

Adjust the position of sprinkler heads, micro sprays, etc. to ensure even distribution as planting develops.

6.6 Irrigation System Upgrading

Review and monitor the irrigation system and maintain optimum performance.

Report on performance and upgrading – annually.

7.0 Site Maintenance

7.1 Rubbish Removal

Maintain the site in a neat and tidy condition.

Litter: remove by hand weekly

7.2 Leaf Litter

Collect leaf litter and use suitable material as mulch in mass planted areas.

7.3 Paving

Remove weeds and grass from paved areas using the following methods:

Light infestation: by hand

Heavy infestation: herbicide

7.4 Drains

Remove debris, including mulch and litter on a regular basis from all external drains.

8.0 Staffing & Equipment

8.1 Staffing

Staffing levels should reflect the amount of work and scheduling requirements. Seasonal fluctuations of work load and staff requirements should be allowed for in average staffing numbers.

8.2 Equipment

The following equipment will be required:

a Lawn mowers (including push and ride on type).

b Catchers or vacuum for lawn clipping collection.

c Edge trimmers (nylon line and blade).

d Dethatching or verticutting equipment.

e Vehicles to transport materials to and from site.

f Hand tools such as spades, forks, rakes, hoes etc.

g Wheelbarrows and collection bags.

h Pruning implements (clean and sharp).

i Spray units.

j Protective clothing/masks etc.

k Ladders.

Any other tool or equipment necessary to execute the efficient correct maintenance of the contract area.

Note: All safety equipment recommended for the use of/or handling of any equipment of materials should be provided to each employee involved in these procedures.

9.0 Incidentals

9.1 Rubbish Removal

Any bottles, paper, cigarette butts, etc shall be removed by hand from the site. This work shall be executed regularly so that all areas are free from rubbish when observed at fortnightly intervals.

Leaf litter shall be removed from all paved areas and removed from site. The removal of leaf litter shall be executed fortnightly during leaf fall.

9.2 Paving

Remove weeds and grass from paved areas using the following methods:

Light infestation: by hand

Heavy infestation: herbicide

Unit and concrete paving may require repair from time to time which the contractor may be asked to submit a priced variation for such works.

9.3 Drains

Remove debris, including mulch and litter on a regular basis from all external drains

10.0 Maintenance Programme and Reporting

10.1 Maintenance Programme

General : Prepare a maintenance programme indicating the full scope of works intended to complete the work specified.

Format : Follow the format indicated as a minimum requirement for the maintenance programme (Refer Maintenance Programme schedule).

Submit for approval :

> at the commencement of the maintenance period

> annually thereafter.

10.2 Reporting

General : Complete a report indicating all work undertaken during the specified period. Report on hours spent, areas worked, methods, types of materials and approx quantities, include chemicals use and how applied, note irrigation condition and items checked.

Record incidence of inclement weather to verify inability to undertake work as set out in the maintenance programme.

Submit reports end of each month.

Formal : Follow the format indicated as a minimum requirement for reporting.

Special circumstances : In the event of an incident or circumstances that cause disturbance or is affected by the work notify the Superintendent within the specified period.

> 24 hours

Verbal notification shall be confirmed in writing with the specified period.

> 48 hours

Landscape Maintenance Programme for Global Sydney Switch 2 Expansion

Autumn

Month	Grass	Mass Planted Areas	Trees	Irrigation	General
March					
1					
2					
3					
4					
April					
1					
2					
3					
4					
May					
1					
2					
3					
4					

Landscape Maintenance Programme for Global Sydney Switch 2 Expansion

Winter

Month	Grass	Mass Planted Areas	Trees	Irrigation	General
June					
1					
2					
3					
4					
July					
1					
2					
3					
4					
August					
1					
2					
3					
4					

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Spring

Month	Grass	Mass Planted Areas	Trees	Irrigation	General
September					
1					
2					
3					
4					
October					
1					
2					
3					
4					
November					
1					
2					
3					
4					

Landscape Maintenance Programme for Global Sydney Switch 2 Expansion

Summer

Month	Grass	Mass Planted Areas	Trees	Irrigation	General
December					
1					
2					
3					
4					
January					
1					
2					
3					
4					
February					
1					
2					
3					
4					

Landscape Maintenance Report for Global Sydney Switch 2 Expansion

Year

Report for week ending _____

Areas worked _____

Site supervisor reporting _____

Total no of hours worked _____

General weather conditions _____

Key plan

Work carried out

Description of work	Method/materials	Qty	Hours

Irrigation System Check

Description of work	Condition		
	Good	Average	Poor

Comments