



Clouston associates



Darwin International Airport Landscape Treatments

FINAL REPORT - 29.06.09 ISSUE E

DARWIN INTERNATIONAL AIRPORT LANDSCAPE TREATMENTS



FINAL REPORT

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EXECUTIVE SUMMARY

The Darwin International Airport masterplan identifies a range of uses and functions that include airport operations, tourist development, environmental areas and commercial opportunities. These functions are supported by existing services and infrastructure. All this occurs within a landscape framework. It is recognised that the landscape development of the site is a significant factor in establishing a distinct character that reflects the overall development philosophy and objectives as described in the Masterplan.

The landscape masterplan prepared by Greening Australia in 2005 established a landscape approach 'that incorporates and builds on the strengths of the Rapid Creek catchment's unique plant communities that include riparian monsoon forest, eucalypt woodland, melaleuca swamps and wetlands'. The resultant landscape deliberately introduces international and national visitors to the beauty and diversity of the Top End environment and associated flora.

In order to provide clear direction to future works within the precinct, it has been recognised that a 'kit of part' comprising distinct landscape treatments is required. This document describes a range of treatments which are to be utilised. For each treatment, the following is provided:

- Landscape treatment title
- Description of landscape character
- Typical application (where used and how extensively used)
- Selected plant species
- Other materials and elements
- Indicative construction costs
- Indicative maintenance costs

Five distinct landscape treatments are proposed:

Highlight - dramatic landscape identifies key entrances

Showcase - high amenity to building surrounds

Structure - lush, shaded landscape to road corridors

Utility - robust, functional landscape to car parks and 'back of shop'

Habitat - great diversity in an evolving landscape to buffers and along Rapid Creek

This document is to be used as a guide only. All landscape plans must be prepared in accordance with this landscape hierarchy and all plans must be approved by DIA before planting occurs. A departure from the guidelines contained within this document requires the written approval of Darwin International Airport's CEO.

LANDSCAPE TREATMENTS - SUMMARY TABLE

Landscape Character	Typical Applications	Plant Species	Construction Cost	Annual Maintenance Cost	Irrigation Requirement
Highlight – dramatic landscape used to identify key areas	Key entries to airport & commercial precinct	Limited plant species: - Large shade trees - irrigated turf - feature groundcovers	\$70–100/m ²	\$10–15/m ² /annum	Yes
Showcase – high amenity planting that showcases the diversity, colour & texture of Top End natives	Building surrounds & airport terminal (land side)	Diversity of native plants, inclusive of monsoon forest species	\$60–90/m ²	\$5–12/m ² /annum	Establishment – Yes Planting that does not require irrigation will greatly reduce maintenance costs
Structure – highly ordered & simple landscape to road corridors	Internal road corridors	Limited plant species: - Large shade trees - mixed shrubs & groundcovers - limited irrigated grass	\$50 – 80/m ²	\$5–10/m ² /annum	Establishment – Yes Planting that does not require irrigation will greatly reduce maintenance costs
Utility – functional planting where space is limited & area has low profile	Car parks, service areas & 'back of shop'	Generally hardy natives with low maintenance requirement	\$40 – 70/m ²	\$3–8/m ² /annum	Generally only for establishment
Habitat – greatly diverse landscape that mimics natural habitat & offers significant environmental benefits	Landscape buffers & transition areas to Rapid Creek & other remnant bush areas	Great diversity of native plants selected to suit natural habitat & site conditions	\$10 – 15/m ²	> \$2/m ² /annum	Generally No Depends on planting techniques & timing of works

INTRODUCTION

BACKGROUND

As Darwin International Airport is developed in line with the Masterplan, it is important that there is a clear understanding of the landscape requirements associated with these developments. The landscape is important in the overall presentation of the precinct and is a critical component of the interface with the broader Darwin community.

The landscape masterplan prepared by Greening Australia in 2005 'focused on creating a landscape that incorporates and builds on the strengths of the Rapid Creek catchment's unique plant communities that include riparian monsoon forest, eucalypt woodland, melaleuca swamps and wetlands'. The masterplan recognised the distinct character of the Top End environment and the unique and beautiful flora typical of the region. In much the same way that public art and finishes have been utilised within the airport terminal, the landscape can establish a strong image that is distinctly of the Territory.

As identified in the earlier Landscape Masterplan, Darwin is located in the dry tropics - it is a Savannah landscape that is distinguished by dry season between May and October, when very little rain falls, and the wet season between November and April when 95% of the average annual rainfall of approximately 1500mm falls. This has resulted in a range of vegetation types that have developed in response to water availability.

The proposed landscape treatments have been a direct response to these environmental parameters. The widespread use of Top End native plants assures the plants are well adapted to the soils and climate. This can lead to significant maintenance cost savings. In addition, since the airport falls within the catchment of Rapid Creek, widespread planting of Top End natives provides valuable habitat and water quality benefits.

This document is to be used as a guide only. All landscape plans must be prepared in accordance with this landscape hierarchy and all plans must be approved by DIA before planting occurs. A departure from the guidelines contained within this document requires the written approval of Darwin International Airport's CEO.

LANDSCAPE TREATMENTS

HIGHLIGHT LANDSCAPE TREATMENT

Description of Landscape Character

The highlight landscape treatment is a dramatic landscape that is used to clearly identify key areas. The landscape will use a limited number of plants, but uses them in a bold, sculptural manner that provides a strong visual image. Massed planting of single species of native grasses, shrubs or cycads are used in combination with distinctive feature trees. Where grass is used, this would be a quality turf grass and would be fully irrigated.

Other elements such as lighting, signage and public art are utilised to further emphasise the locality.

Typical Applications

The highlight landscape treatment is used sparingly within the precinct. The proposed treatments described below deliberately differentiates between the airport entrance and the commercial precinct entrances.

Airport Entrance - Henry Wrigley Drive

The major entry to the airport is along Henry Wrigley Drive between Rapid Creek and the intersection with Sir Norman Brearley Drive. This entrance is part of a sequence of landscape that commences at the McMillans Road intersection and includes the riparian corridor of Rapid Creek itself.

The recommended species for this treatment are selected on the basis of providing a dramatic highlight.

Trees

- Terminalia sericocarpa (to verges)
- Maranthes corymbosa (to median)

Shrubs and Groundcovers

- Chrysopogon elongatus (native grass)
- Cycas revoluta
- Hymenocallis littoralis
- Zamia integrifolia

Commercial Precinct Entrances

The highlight landscape is also used to all entrances to the commercial precinct - Osgood Drive, Neale Street and Charles Eaton Drive.

The recommended species for this treatment are selected on the basis of providing a dramatic highlight.



Terminalia sericocarpa



Chrysopogon

Trees

- Syzygium nervosum

Shrubs and Groundcovers

- Chrysopogon elongatus (native grass)
- Cycas armstrongii (cycad)

Other Materials and Elements

The Highlight landscape treatment also comprises a number of supporting elements that will be critical in these high profile areas:

- Feature lighting, in addition to street lighting, may include uplighting, and selected spot lights. All lighting to be in accordance with CASA standards.
- Signage, large scale public art and banner poles.



Syzygium nervosum with Stenochlaena palustris under

Indicative Construction Costs

The highlight landscape treatment will be the most costly landscape treatment. The high costs are primarily associated with the additional landscape elements. Such as public art, feature lighting and banner poles. Planting costs are not high, except where there may be a need to install mature plant stock in order to achieve an immediate impact. A permanent, high quality, high performance irrigation system is also required and this adds significantly to the overall costs.

Planting, irrigation and associated softworks - \$70-100/m²

Additional landscape elements, including lighting, signage, footpaths and artworks will add substantially to these costs.

Indicative Maintenance Costs

The ongoing maintenance costs for the highlight landscapes will be the most costly. In addition to water costs, the type of planting and the requirement to maintain the highest quality appearance will require regular pruning and fertilizing. Areas of irrigated grass will also require regular mowing as well as long term grass management to ensure best appearance and overall health. Rapid response to pests and diseases and replacement of failed plants is critical. Litter and rubbish removal will require minimum weekly effort in these areas as part of the regular maintenance.

Maintenance costs, averaged over 10 years and inclusive of a single program of shrub planting replacement would be \$10-15/m²/annum. Irrigation accounts for minimum 50% of maintenance costs.



Cycas armstrongii

SHOWCASE LANDSCAPE TREATMENT

Description of Landscape Character

The showcase landscape treatment is a high amenity landscape that showcases the diversity, colour, texture and form of native plants. The landscape will use a wide combination of trees, shrubs, groundcovers and grasses in both formal and naturalistic layout to suit the actual situation. Massed planted garden beds and canopy trees are the key features of the showcase landscape treatment. Irrigated grass would not generally be used in these areas, but may be used in small areas associated with picnic and recreation areas.

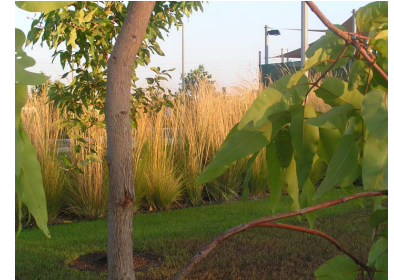
Other elements such as lighting, signage and public art are inserted subtly into the landscape primarily to aid identification as required.

Typical Applications

The showcase landscape treatment is primarily used to building surrounds throughout the precinct. It is also used adjacent to the airport terminal on the land side.

Selected Plant Species

The recommended species for this treatment is indicative only. There are many species that would be suitable for use as part of the showcase landscape treatment. In all cases, plants would be Northern Territory natives that are matched to the proposed level of irrigation and maintenance. Plant species are selected for particular features such as flower, form, texture, colour. Colour includes subtle variations in foliage and also show displays of flowering natives. The nominated species include woodland species (generally requiring very low irrigation requirements) and riparian and rainforest species (marked with an * and requiring permanent irrigation).



Corymbia ptychocarpa with Chrysopogon elongatus behind



Diverse textures of native plants

Trees	
Acacia torulosa	Acacia aulococarpa
Acacia latescens	Acacia leptocarpa
Acacia mimula	Acacia plectocarpa
Adansonia gregorii	Aidia racemosa *
Allosyncarpia ternata *	Alphitonia excelsa *
Alstonia actinophylla	Brachychiton diversifolius
Buchanania arborescens *	Corymbia bella *
Corymbia bleeseri	Corymbia confertifolia
Corymbia disjuncta	Corymbia polycarpa
Corymbia polysciada	Corymbia ptychocarpa *
Corymbia setosa	Cupaniopsis anacardioides
Denhamia obscura	Diospyros maritima *



Acacia leptocarpa

<i>Eucalyptus alba</i>	<i>Diospyros maritima</i> *
<i>Eucalyptus clavigera</i>	<i>Eucalyptus bigalerita</i>
<i>Eucalyptus tectifica</i>	<i>Eucalyptus herbertiana</i>
<i>Ganophyllum falcatum</i>	<i>Eucalyptus phoenicea</i>
<i>Grevillea pteridifolia</i>	<i>Grevillea heliosperma</i>
<i>Hibiscus tiliaceus</i>	<i>Melaleuca argentea</i> *
<i>Leptospermum madidum</i> *	<i>Melicope elleryana</i> *
<i>Melaleuca leucadendra</i> *	<i>Myristica insipida</i> *
<i>Millettia pinnata</i> *	<i>Peltophorum pterocarpum</i> *
<i>Pandanus spiralis</i>	<i>Sterculia quadrifida</i> *
<i>Polyalthia australis</i>	<i>Syzygium fibrosum</i> *
<i>Syzygium armstrongii</i> *	<i>Timonius timon</i> *
<i>Terminalia microcarpa</i> *	<i>Wrightia pubescens</i> *



Native plant mix

Cycads	
<i>Cycas armstrongii</i>	<i>Cycas calcicola</i>



Leptospermum madidum, *Acacia gonocarpa*, *Grevillea dryandri*, *Cycas armstrongii*

Shrubs	
<i>Acacia dimidiata</i>	<i>Acacia dunnii</i>
<i>Acacia gonocarpa</i>	<i>Acacia hemignosta</i>
<i>Acacia lamprocarpa</i>	<i>Acacia latescens</i>
<i>Acacia moutfordiae</i>	<i>Acacia nuperrima</i>
<i>Acacia producta</i>	<i>Acacia stigmatophylla</i>
<i>Acacia wickhamii</i>	<i>Bossiaea bossiaeooides</i>
<i>Brachychiton paradoxum</i>	<i>Breynia cernua</i> *
<i>Chlerodendron floribundum</i>	<i>Cochlospermum fraseri</i>
<i>Crotalaria novae-hollandiae</i>	<i>Dodonaea platyptera</i>
<i>Exocarpus latifolius</i>	<i>Flueggea virosa</i> *
<i>Grevillea aurea</i>	<i>Grevillea angulata</i>
<i>Grevillea decurrens</i>	<i>Grevillea dryandri</i>
<i>Grevillea pungens</i>	<i>Grevillea wickhamii</i>
<i>Helicteres isora</i> *	<i>Ixora timorensis</i>
<i>Jacksonia dilitata</i>	<i>Leea rubra</i> *
<i>Melastoma malabathricum</i> *	<i>Micromelum minutum</i> *
<i>Pachynema dilatatum</i>	<i>Premna acuminata</i> *



Acacia gonocarpa

Tabernaemontana orientalis *	Templetonia hookeri
Verticordia cunninghamii	Vitex trifolia

Groundcovers	
Canavalia rosea	Crinum angustifolia
Curcuma australasica	Grevillea formosa
Grevillea goodii	Haemodorum coccineum
Hoya australis	Ipomoea pes-caprae
Vitex rotundifolia*	

Native Grasses	
Chrysopogon elongatus	Cymbopogon bombycinus
Heteropogon contortus	Ectrosia leporina
Themeda triandri	

Other Materials and Elements

The showcase landscape treatment also comprises a number of supporting elements that will need to be carefully co-ordinated with the planting to provide:

- Feature lighting, in addition to street lighting, may include uplighting, and selected spot lights. All lighting to be in accordance with CASA standards.
- Signage, large scale public art and banner poles.



Grevillea formosa and Chrysopogon elongatus

Indicative Construction Costs

The showcase landscape treatment is a moderate cost landscape treatment. Additional landscape elements are limited, so the costs are primarily determined by the 'soft' landscape elements. An efficient, high performance irrigation system is usually required to at least establish the planting and would remain as a permanent part of the landscape in some instances. Where permanent irrigation is required, this adds significantly to the overall costs, and hence use of species that require permanent irrigation should be grouped together and numbers limited.

Planting, irrigation and associated softworks - \$60-90/m²

Additional landscape elements, including lighting, signage, footpaths and artworks will add to these costs.



Grevillea formosa flower - detail

Indicative Maintenance Costs

The ongoing maintenance costs for the showcase landscapes will be moderately costly. The key variables will be the extent of landscape requiring permanent irrigation. In addition to water costs, the type of planting and the requirement to maintain a high quality appearance will require regular pruning and fertilizing. Rapid response to pests and diseases and replacement of failed plants is critical.

Maintenance costs, averaged over 10 years and inclusive of a single program of shrub planting replacement would be \$5-12/m²/annum. Irrigation accounts for minimum 50% of maintenance costs. The lower range assumes limited irrigation and no irrigated turf grass.

STRUCTURE LANDSCAPE TREATMENT

Description of Landscape Character

The structure landscape treatment is a highly ordered landscape utilised along the road corridors. There is a simple order associated with this landscape that recognises the primary traffic function of the roads while providing a distinct, avenue of native shade trees within a landscaped verge. Typically, a single tree species is used for each road for its entire length. In some instances, a second species would be utilised in central medians where they occur. The arrangement of trees varies to reflect the road character and function, and may include formal or informal arrangements in single or multiple rows. Tree planting will also consider location of footpaths and need to shade these areas.

In all cases, tree species that provide good shade and have other features such as excellent flower displays or dramatic trunks or form are preferred. Placement of trees will also consider traffic sight lines by providing adequate setbacks (minimum 15 metres) from intersections. Pedestrian sight lines are to be considered at crossings by ensuring trees are not placed directly adjacent (minimum 4 metres setback), blocking views of on coming traffic.

The road verges themselves would be planted with a mix of grass in some areas and low native ground covers and shrubs. Plants directly adjacent to intersections, pedestrian cross overs and in medians are to be no taller than 600mm high to maintain sight lines. These are guidelines only and all landscape design must be in accordance with NT/Australian roadway standards and approved by DIA. To maintain healthy growth and quality appearance, limited irrigation through the dry will be required, dependant on species. Limiting irrigated grass verges would result in significant maintenance cost savings due to reduced irrigation cost and no mowing requirement. Maintenance cost must be considered when deciding on appropriate ground cover and/or grass for road verges.

Lighting would be limited to street lighting only. Other landscape elements would be restricted to dual use paths and limited direction signs and occasional seating along paths.

Typical Applications

The structure landscape treatment is used within the road corridors throughout the precinct.

Selected Plant Species and other Materials and Elements

Final species selection will use a limited number of plants to simple identify each road corridor and create a strong image for each.

Trees

- *Maranthes corymbosa* (Henry Wrigley Drive)
- *Eucalyptus bigalerita* (Osgood Drive)
- *Millettia pinnata* (Charles Eaton Drive)



Large shade trees in road corridors



Eucalyptus bigalerita - Osgood Drive



Tabebuia argentea

- Other trees, selected for dramatic trunk or flower display - *Corymbia bella*, *Corymbia ptychocarpa*, *Eucalyptus phoenicea*, *Tabebuia argentea*

Turf Grass (Irrigated)

- *Paspalum* mix (low quality)
- *Zoysia* sp (high quality)

Shrubs and Groundcovers

- *Acacia gonocarpa*
- *Acacia nuperrima*
- *Crotalaria novae-hollandia*
- *Grevillea dryandri*
- *Grevillea formosa*
- *Grevillea goodii*
- *Grevillea wickhamii*
- *Ipomoea pes-caprae*
- *Jacksonia dilatata*
- *Vitex rotundifolia*

Native grasses

- *Chrysopogon elongatus*
- *Cymbopogon bombycinus*
- *Heteropogon contortus*
- *Ectrosia leporina*

Indicative Construction Costs

The structure landscape treatment is a moderate cost landscape treatment. Additional landscape elements are limited, so the costs are primarily determined by the 'soft' landscape elements. An efficient, high performance irrigation system is required to establish the planting and would remain as a permanent part of the landscape.

Planting, irrigation and associated softworks - \$50-80/m²

Additional landscape elements, including footpaths, signage and furniture would fall within the upper limit of this range.

Indicative Maintenance Costs

The ongoing maintenance costs for the structure landscapes will be the moderately costly. Ongoing irrigation requirement is reduced and is carefully managed to conserve water while providing for healthy growth. Tree management in the first 5 years is also important to ensure the establishment of stable, well formed trees that will continue to increase in value as they mature.

Maintenance costs, averaged over 10 years and inclusive of a tree management would be \$5-10/m²/annum. Irrigation accounts for minimum 50% of maintenance costs.

UTILITY LANDSCAPE TREATMENT

Description of Landscape Character

The utility landscape treatment is a functional landscape treatment utilised where planting opportunities are restricted by space and functional requirements. Typically this includes car parks, service areas and 'back of shop'. Where space permits, tree planting is the key element. The trees provide shade within areas that tend to be dominated by hard pavements. As appropriate, screen planting of native shrubs and groundcovers for surface treatments are utilised. These areas are generally not highly visible to the public so they need to be functional and easy to maintain.

No other landscape elements are included in this treatment.

Typical Applications

The utility landscape treatment is utilised throughout car park areas, service areas and 'back of shop'.

Selected Plant Species and other Materials and Elements

A diverse selection of native species are suitable for this treatment. Generally they would be hardy plants well suited to car parks and not prone to dropping limbs or other debris.

Trees	
Acacia latescens	Acacia leptocarpa
Alstonia actinophylla	Brachychiton diversifolius
Corymbia confertifolia	Corymbia disjuncta
Corymbia polycarpa	Corymbia polysciada
Corymbia ptychocarpa *	Eucalyptus alba
Eucalyptus bleeseri	Eucalyptus clavigera
Eucalyptus herbertiana	Eucalyptus phoenicea
Eucalyptus tectifera	Grevillea heliosperma
Grevillea pteridifolia *	Polyalthia australis

Shrubs	
Acacia dimidiata	Acacia dunnii
Acacia gonocarpa	Acacia hemignosta
Acacia lamprocarpa	Acacia latescens
Acacia mounfordiae	Acacia nuperrima
Acacia producta	Acacia stigmatophylla
Acacia wickhamii	Brachychiton paradoxum



Eucalyptus tintinnaus and Grevillea dryandri



Shade trees and groundcovers to carpark



Grevillea pteridifolia

Chlerodendron floribundum	Cochlospermum fraseri
Crotalaria novae-hollandiae	Dodonaea platyptera
Grevillea aurea	Grevillea angulata
Grevillea decurrens	Grevillea dryandri
Grevillea pungens	Grevillea wickhamii
Jacksonia dilitata	Pachynema dilatatum
Templetonia hookeri	Verticordia cunninghamii
Vitex trifolia	



Mixed Acacia screen to carpark

Groundcovers	
Canavalia rosea	Grevillea formosa
Grevillea goodii	Haemodorum coccineum
Hoya australis	Ipomoea pes-caprae

Native Grasses	
Chrysopogon elongatus	Cymbopogon bombycinus
Heteropogon contortus	Ectrosia leporina
Themeda triandri	



Heamodorum coccineum

Indicative Construction Costs

The utility landscape treatment is a low to moderate cost landscape treatment. An efficient, temporary irrigation system is usually required to establish the plantings and would remain as a permanent part of the landscape.

Planting, irrigation and associated softworks - \$40-70/m²

Indicative Maintenance Costs

The ongoing maintenance costs for the utility landscapes will be low. The major activities would be occasionally pruning and plant replacement, while irrigation and fertiliser costs would be kept very low with appropriate selection of native plants. Tree management in the first 5 years is also important to ensure the establishment of stable, well formed trees that will continue to increase in value as they mature.

Maintenance costs, averaged over 10 years and inclusive of a tree management would be \$3-8/m²/annum.

HABITAT LANDSCAPE TREATMENT

Description of Landscape Character

The habitat landscape treatment utilises the greatest diversity of native plants to create a naturalistic habitat. Trees, shrubs and groundcovers are combined in mixed plantings that display various plant forms, textures and colour. Over time, the habitat landscape will evolve and the plant composition will change as short lived species such as Grevilleas and Acacias die back and longer lived species mature.

Natural regeneration is encouraged

Typical Applications

The habitat landscape treatment is utilised primarily in the landscape buffer along the adjoining arterial roads and also in the areas adjoining Rapid Creek.

Selected Plant Species and other Materials and Elements

The recommended species for this treatment are:

Trees	
Acacia torulosa	Acacia aulococarpa
Acacia latescens	Acacia leptocarpa
Acacia mimula	Acacia plectocarpa
Adansonia gregorii	Aidia racemosa *
Alstonia actinophylla	Brachychiton diversifolius
Buchanania arborescens *	Corymbia bella *
Corymbia bleeseri	Corymbia confertifolia
Corymbia disjuncta	Corymbia polycarpa
Corymbia polysciada	Corymbia ptychocarpa *
Corymbia setosa	Cupaniopsis anacardioides
Denhamia obscura	Diospyros maritima *
Eucalyptus alba	Eucalyptus bigalerita
Eucalyptus bleeseri	Eucalyptus clavigera
Eucalyptus herbertiana	Eucalyptus phoenicea
Eucalyptus tectifera	Ficus coronulata *
Ficus scobina *	Ficus virens *
Ganophyllum falcatum	Grevillea heliosperma
Grevillea pteridifolia	Helecia australasica *
Hibiscus tiliaceus	Melaleuca argentea *
Melaleuca leucadendra *	Melicope elleryana *
Millettia pinnata *	Myristica insipida *



General view of habitat treatment under existing trees



Augmentation of remnant bush



Mixed Acacias, Grevilleas, Eucalypts and Cycas armstrongii



Direct seed mix adjoining Power water access track

Pandanus spiralis	Polyalthia australis
Sterculia quadrifida *	Syzygium armstrongii *
Terminalia microcarpa *	Timonius timon *
Wrightia pubescens *	



Plant diversity in Habitat treatment

Shrubs	
Acacia dimidiata	Acacia dunnii
Acacia gonocarpa	Acacia hemignosta
Acacia lamprocarpa	Acacia latescens
Acacia moutfordiae	Acacia nuperrima
Acacia producta	Acacia stigmatophylla
Acacia wickhamii	Bossiaea bossiaeooides
Brachychiton paradoxum	Breynia cernua *
Chlerodendron floribundum	Cochlospermum fraseri
Crotalaria novae-hollandiae	Dodonaea platyptera
Exocarpus latifolius	Flueggea virosa *
Grevillea aurea	Grevillea angulata
Grevillea decurrens	Grevillea dryandri
Grevillea pungens	Grevillea wickhamii
Helicteres isora *	Ixora timorensis
Jacksonia dilitata	Leea rubra *
Melastoma malabathricum *	Micromelum minutum *
Pachynema dilatatum	Premna acuminata *
Tabernaemontana orientalis *	Templetonia hookeri
Verticordia cunninghamii	Vitex trifolia



Pandanus spiralis

Groundcovers	
Canavalia rosea	Crinum angustifolia
Curcuma australasica	Grevillea formosa
Grevillea goodii	Haemodorum coccineum
Hoya australis	Ipomoea pes-caprae
Stenochleana palustris *	Vitex rotundifolia *



Vitex trifolia

Native Grasses	
Chrysopogon elongatus	Cymbopogon bombycinus
Heteropogon contortus	Ectrosia leporina
Themeda triandri	



Curcuma australasica

Indicative Construction Costs

The habitat landscape treatment is a low cost landscape treatment. Irrigation system is usually not required where the works are appropriately programmed to coincide with the wet season.

Planting and associated softworks - \$10-15/m²

Additional landscape elements, including footpaths, signage and furniture that may be included in these zones as part of the airports recreational and community benefits program would be additional.

Indicative Maintenance Costs

The ongoing maintenance costs for the habitat landscapes will be very low. The major cost would be weed control and occasional tree removal.

Maintenance costs, averaged over 10 years would be > \$2/m²/annum.

APPENDIX

DARWIN INTERNATIONAL AIRPORT

PLANT SPECIES NOT PERMITTED OR RESTRICTED

Plants are not permitted or restricted on the basis of being either a bird/animal attractant (that can threaten planes) or that provide mosquito breeding receptacles (health risk associated with health and quarantine requirements)

These lists are not exhaustive and should be used as a guide to species and families that will be allowed to restricted. Each proposal should be accompanied by a planting schedule and further restrictions or deletions may apply.

CATEGORY A - SPECIES NOT PERMITTED

Including any species delared under the NT Weeds Management Act 2001

Botanical name	Common name	Basis for non-permission
A01-Trees		
<i>Adenanthera pavonina</i>	Red Bead Tree	Bird/animal
<i>Albizia lebbek</i>		Bird/animal
<i>Anacardium occidentale</i>	Cashew	Bird/animal
<i>Arfeuillea arborescens</i>		Bird/animal
<i>Azadirachta indica</i>	Neem	Bird/animal
<i>Bambusa sp.</i>	Bamboo	
<i>Cassia fistula</i>	Golden shower	Bird/animal
<i>Delonix regia</i>	Poinciana	Bird/animal/mosquito/weed
<i>Gmelina</i>		Bird/animal
<i>Khaya senegalensis</i>	African mahogany	Bird/animal
<i>Mangifera indica</i>	Mango	Bird/animal
<i>Musa sp.</i>	Banana	Bird/animal/mosquito
<i>Pandanus sp.</i>	Pandanus	Mosquito ✖
<i>Schleichera oleosa</i>	Ceylon Oak	Bird/animal
<i>Spathodea campanulata</i>	African tulip tree	Bird/animal/mosquito
A02-Shrubs		
<i>Asclepias curassavica</i>	Red Cotton Bush	Mosquito
<i>Dillenia suffruticosa</i>		
<i>Duranta repens</i>	Pigeon Berry	Bird/animal
<i>Bauhinia galpinii</i>	Bauhinia	Bird/animal
<i>Nerium oleander</i>		Bird/animal/weed
<i>Cascabela thevetia</i>	Yellow oleander	Bird/animal/weed
<i>Sansevieria trifasciata</i>	Mother in Law Tongue	Mosquito/weed
<i>Curculigo</i>	Palm grass	Mosquito/weed
<i>Ochna serrulata</i>	Mickey Mouse Plant	Mosquito/weed
<i>Ardisia</i>		Mosquito
A03-Palms		
<i>Arecastrum romanzoffianum</i>	Queen Palm	Bird/animal/mosquito
<i>Caryota mitis</i>	Clumping fish tail Palm	Bird/animal/mosquito

CATEGORY A - SPECIES NOT PERMITTED

<i>Ptychosperma macarthurii</i>	MacArthurs Palm	Bird/animal/mosquito
<i>Archontophoenix alexandrae</i>	Alexandra Palm	Bird/animal/mosquito
<i>Dyopsis lutescens</i>	Golden Cane	Mosquito
<i>Livistona</i>	Fan Palm	Bird/animal/mosquito
<i>Rhaphis</i>	Lady Palm	Mosquito
<i>Phoenix dactylifera</i>	Phoenix Palm	Mosquito
V i n e s / Groundcovers		
<i>Ananas</i> sp.	Pineapple	Mosquito
<i>Antigonon leptopus</i>	Coral Vine	Mosquito
<i>Bromelia</i> sp.	Bromeliad	Mosquito
<i>Thunbergia grandiflora</i>		Mosquito
<i>Lantana camara</i> (& <i>montevidensis</i>)	Lantana	Mosquito/weed
<i>Nepenthes</i> & <i>Sarracenia</i> sp.	Pitcher plant	Mosquito

* *Pandanus* sp. is not recommended close to loading and unloading areas. It is widespread in the Rapid Creek corridor and is permitted for use at >400m distance from loading and unloading areas.

CATEGORY B — SPECIES ONLY PERMITTED SINGULARLY OR IN THREES, AND NO MORE THAN A TOTAL OF FIVE OF EACH SPECIES IN ANY ONE DEVELOPMENT

Botanical name	Common name	Basis for restriction
B01-Trees		
<i>Alphitonia excelsa</i>	Soap Tree	Bird/animal
<i>Bambusa arnhemica</i>	Bamboo	Bird/animal
<i>Callitris intratropica</i>	Northern Cypress Pine	Bird/animal
<i>Casuarina cunninghamiana</i>	River Sheoak	Bird/animal
<i>Casuarina equisetifolia</i>	Beach Sheoak	Bird/animal
<i>Casuarina torulosa</i>	Forrest Sheoak	Bird/animal
<i>Carallia brachiata</i>	Freshwater mangrove	Bird/animal
<i>Eucalyptus papuana</i>	Ghost Gum	Bird/animal
<i>Eucalyptus setosa</i>	Rough Leaved Bloodwood	Bird/animal
<i>Lophostemon lactifluus</i>	Water Gum	Bird/animal
<i>Lysiphyllum cunninghamii</i>	Native Bauhinia	Bird/animal
<i>Melaleuca argentea</i>	Silver Paperbark	Bird/animal
<i>Melaleuca dealbata</i>	Blue Paperbark	Bird/animal
<i>Melaleuca leucadendron</i>	Weeping Paperbark	Bird/animal
<i>Melaleuca linariifolia</i>	Snow in Summer	Bird/animal
<i>Melaleuca styphelioides</i>	Prickly Paperbark	Bird/animal
<i>Morinda citrifolia</i>	Cheese fruit	Bird/animal
<i>Schefflera actinophylla</i>	Umbrella Tree	Bird/animal
B02-Shrubs		
<i>Melaleuca bracteata</i>	Revolution Gold	Bird/animal
<i>Melaleuca linariifolia</i>	Pink Tips	Bird/animal
<i>Melaleuca minutifolia</i>	Small Leaved Paperbark	Bird/animal
B03-Palms		