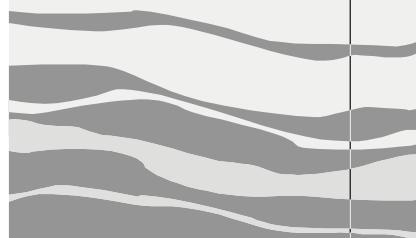


Turtle Street Resort

Curtis Island

Landscape Concept Background

for
Humphreys Reynolds Perkins



CHENOWETH ENVIRONMENTAL PLANNING & LANDSCAPE ARCHITECTURE

A B N 4 3 0 7 6 9 9 2 9 9 1
 Level 20, 344 Queen Street
 BRISBANE 4000, Australia
 Tel +61 (07) 3831 8582
 Fax +61 (07) 3831 8587
 E-mail: mail@chenoweth.com.au
10CH059 **September '10**

CONTENTS

1. BACKGROUND	2
2. SITE DESCRIPTION	2
2.1 Topography	2
2.2 Geology	2
2.3 Vegetation assemblages	2
3. DELINEATION OF LANDSCAPE ZONES	3
4. SELECTION OF APPROPRIATE SPECIES	4
5. APPROACH TO LANDSCAPE ESTABLISHMENT	6
5.1 Maximise Tree Retention	6
5.2 Minimise Disturbance	6
5.3 Encourage Natural Regeneration	6
5.4 Salvage of Topsoil	6
5.5 Salvage of Plants	6
5.6 Establishment of Nursery	7

1. BACKGROUND

This Landscape Concept Plan for the Turtle Street Resort located at Black Head Curtis Island has been prepared in response to Council's condition requiring an emphasis on endemic species.

The plan has been prepared following detailed site assessment conducted by Chenoweth Environmental Planning and Landscape Architecture (Chenoweth EPLA) in association with UPlan.

2. SITE DESCRIPTION

2.1 Topography

Black Head is a rocky headland on the eastern coast of Curtis Island. The northern and eastern edges of the headland are highly exposed to onshore winds which have a strong influence on the species assemblages and form of vegetation. The leeward side of the headland is protected from the south easterly exposure and consequently there is a significant change in the structure of vegetation. A number of gullies drain from the ridgeline toward a saltpan located to the west of the headland. The southern portions of the resort area are relatively flat and are protected from the onshore winds by ridgelines located to the east.

2.2 Geology

The northern portions of the headland include exposed areas of greywacke and mudstone or thin soils derived from the metasediments of the Shoalwater Formation. Deeper soils prevail in the more protected parts of the site. These soils give way to a mixture of sandy, rocky and muddy shores on the western edge of the resort site. In the southern flatter parts of the resort site there are deeper soils and little exposed rock.

2.3 Vegetation assemblages

Black Head is dominated by 5 mapped regional ecosystems. The areas that are wind exposed have been mapped as 12.12.19. Most of the areas of taller eucalypt on the leeward side of the headland are mapped as 12.11.7. The lower areas are largely a mix of 12.3.11 and 12.11.20. These ecosystems are described as:

- 12.2.2 - Microphyll/notophyll vine forest on beach ridges;
- 12.3.11 - *Eucalyptus tereticornis*, *Eucalyptus siderophloia*, *Corymbia intermedia* open forest on alluvial plains near coast;
- 12.11.7 – *Eucalyptus crebra* woodland on metamorphics +/- interbedded volcanics;
- 12.11.20 - *Corymbia intermedia*, *Lophostemon suaveolens* woodland on metamorphics +/- interbedded volcanics; and
- 12.12.19 – Vegetation complex of rocky headlands on Mesozoic to Proterozoic igneous rocks.

Within these ecosystems there is further delineation of vegetation communities resulting from differences in site topography and geology. For the purpose of defining distinct zones around which appropriate landscapes can be designed, the following areas were identified during the site inspection:

- Rocky headland – ranging in height from very low vegetation through to wind sheared trees up to 2m;
- Eucalyptus woodland – including three height ranges:
 - 6- 10m
 - 6- 12m
 - 8- 14m
- Headland/tidal interface – includes species of the Eucalypt forest in a relatively sheltered location;
- Mangrove/tidal interface – includes an area currently disturbed, that would support both Eucalypt and vine forest species; and
- Ecotonal forest – includes species from the Eucalyptus forest and species from nearby areas supporting dominance of either Melaleuca or vine forest species. The ecotonal forest is largely centred on the proposed Central Facilities.

3. DELINEATION OF LANDSCAPE ZONES

The natural vegetation communities of the site provide a sound basis by which to delineate landscape zones. There are a number of benefits to utilising species that naturally occur in these communities and similar nearby communities including:

- Maintaining the character of the site;
- Greater likelihood of consistent plant establishment as the species are adapted to local conditions;
- Maintaining habitat values; and
- Lower maintenance cost of landscapes.

Furthermore, vegetation will provide additional values such as water management through the establishment of wetland features in the vicinity of the central facilities and a buffering role in some locations. For example, the proposed ‘Mangrove/tidal interface zone’ includes an area where a road is proposed adjacent to mangroves, in this area the dense planting of trees, shrubs and ground covers will assist in providing an important buffering role.

4. SELECTION OF APPROPRIATE SPECIES

The site includes not only many species from which suitable landscape species can be selected, but also regenerating areas that can be integrated into landscapes without the need for planting.

Species lists prepared for the site as part of previous assessments were reviewed to identify plants that are currently in horticultural use, or if not, have attributes that indicate they would be suitable. The list of species was supplemented by undertaking an additional site visit by Chenoweth EPLA and Uplan to identify additional species from the broader Black Head area; in readily accessible areas along the access road from South End; and immediately adjacent to the track from Black Head to the Monte Christo runway.

Additional species were selected from Herbarium records and lists prepared as part of the Curtis Island Facility Flora Report for Santos by URS and the flora study prepared for the QCLNG Project EIS by Unidel.

Not all species naturally occurring on the wind exposed headland would be suitable for replanting in this environment following disturbance. It is likely that some of these plants have taken many years to establish, gradually being ‘sculpted’ into low profiled specimens that can cope with the prevailing harsh conditions (e.g. *Cyclophyllum coprosmoides*¹, *Jacksonia scoparia*² or *Melaleuca nervosa*³). It is anticipated that planting such species would result in high rates of senescence. There are however species that are adapted to this environment that are less likely to be significantly impacted by the prevailing harsh conditions (e.g. *Themeda triandra*⁴, *Lithomyrtus obtusa*⁵ or *Myoporum boninense*⁶).



1 – Coast Canthium (*Cyclophyllum coprosmoides*)



2 – Dogwood (*Jacksonia scoparia*)



3 – Paper-barked Tea-tree (*Melaleuca nervosa*)



4 – Kangaroo Grass (*Themeda triandra*)



5 – Beach Myrtella (*Lithomyrtus obtusa*)



6 - Coastal Boobialla (*Myoporum boninense*)

There are a number of niches within each zone that result in specific species distribution. For instance, moist areas near rocks or slightly sandy profiles can result in minor changes in the species assemblages. The establishment of built

infrastructure in this landscape will generate new niches that are likely to be suited to species currently absent from the prevailing environment. These niches have been considered in the planting pallets within the broader landscape zones. For example, where wetland areas may be required, species such as *Marsilea mutica*⁷ or *Philydrum lanuginosum*⁸ (recorded in areas to the south and west of Black Head respectively) can be utilised.



7 – Nardoo (*Marsilea mutica*)



8 – Frog's Mouth (*Philydrum lanuginosum*)

At the detailed design phase additional species could be identified by undertaking further assessment of the prevailing habitats of Curtis Island (e.g. including, but not limited to dry rainforests located in the centre and east of the island).

To ensure plants are genetically conditioned to the prevailing environmental conditions of Curtis Island it is best that all plants utilised in landscapes are established from local provenance. This means seeds, cuttings and other propagative material is harvested from the natural communities of Curtis Island.

Attached is a preliminary list of species known to occur on Curtis Island that are suitable for use in landscapes. Each species has been assigned to the specific landscape zone and/or niche to which they are suited.

5. APPROACH TO LANDSCAPE ESTABLISHMENT

5.1 Maximise Tree Retention

Opportunities to maximise the retention of existing trees should be made during the detailed design phase of the resort. This is likely to require detailed survey of trees in areas where buildings or other infrastructure is proposed.

5.2 Minimise Disturbance

Relatively few areas are devoid of at least some native vegetation cover. Minimising disturbance through considered design and careful construction techniques will maximise retention of the natural surface. Retention and management of native vegetation will minimise areas requiring planting.

Management plans should identify the measures necessary to minimise disturbance and therefore minimise areas requiring landscape treatments.

5.3 Encourage Natural Regeneration

Although native vegetation is present across most of the site, there are a number of areas that also support exotic species such as Snake weed (*Stachytarpheta jamaicensis*), Mossman River grass (*Cenchrus echinatus*) and Corky Passion Flower (*Passiflora suberosa*). These weeds inhibit natural regeneration and should be ‘managed’ out of the system through regular and targeted maintenance.

5.4 Salvage of Topsoil

Construction will inevitably result in the removal of topsoil supporting not only native plants, but also their seed. The salvage of this soil and reapplication to surfaces devoid of native vegetation will facilitate the natural regeneration of plants. It will be important to ensure good vehicle hygiene practices are maintained (i.e. vehicles will need to be weed-seed free) and that there is little to no time between salvage and reapplication (i.e. stockpiling should be no longer than 1 week).

5.5 Salvage of Plants

There are a number of plants that will perish as a result of construction. Many of these are not worthy of translocation, although some including *Xanthorrhoea johnsonii*⁹, *Xanthorrhoea pumilio*¹⁰ and *Livistona decora*¹¹ would make valuable contributions to landscaping around the resort.



9 – Forest Grass Tree (*Xanthorrhoea johnsonii*)



10 – A grass tree (*Xanthorrhoea pumilio*)



11 – Cabbage Palm (*Livistona decora*)

Numerous *Xanthorrhoea johnsonii* were observed in the area to be utilised for effluent irrigation. It is likely that these specimens will not tolerate irrigation and will perish as a consequence. These plants should also form part of the salvage program.

5.6 Establishment of Nursery

The establishment of an on site nursery will provide a central location in which salvaged plants can be stored and native plants can be propagated from local provenance material for use in landscapes in the resort. This approach has previously been adopted by several award winning resorts around Queensland including, amongst others:

- King Fisher Bay Resort on Fraser Island (<http://www.kingfisherbay.com/wilderness.html>);
- Couran Cove on Stradbroke Island (http://www.couran.com/_assets/1-23-01-2008-09-46-14.pdf); and the
- Hyatt Regency Coolum (http://www.hyattlendlease.com.au/lweb/hyattcoolum/main.nsf/all/life_nursery).

ATTACHMENT – Preliminary list of species suitable for use in the Turtle Street Resort

Botanical Name	Common Name	Rocky headland coastal villas	Eucalyptus woodland apartments (trees 6-10m)	Eucalyptus woodland apartments & villas (trees 6-12m)	Eucalyptus woodland apartments & villas (trees 8-14m)	Headland/tidal interface	Mangrove / tidal interface	Ecotonal forest central facility	Wetland	Sheltered locations near buildings
<i>Acacia amblygona</i>		●	●	●	●	●				
<i>Acacia conferta</i>	Crowded Wattle		●	●	●					
<i>Acacia disparrima</i>	Hickory Wattle		●	●	●					
<i>Acacia podalyriifolia</i>			●	●	●					
<i>Acronychia imperforata</i>	Beach Acronychia						●	●		
<i>Alchornea ilicifolia</i>	Native Holly								●	
<i>Alectryon diversifolius</i>	Scrub Boonaree								●	
<i>Alectryon tomentosa</i>	Hairy Bird's Eye								●	
<i>Allocasuarina littoralis</i>			●	●	●					
<i>Allocasuarina luehmannii</i>	Bull oak		●	●	●	●				
<i>Allocasuarina torulosa</i>	Forest She-oak		●	●	●				●	
<i>Allopterus semialata</i>	Cockatoo Grass		●	●	●					
<i>Alphitonia excelsa</i>	Red Ash		●	●	●				●	
<i>Alyxia ruscifolia</i>	Chain Fruit								●	
<i>Alyxia stellata</i>									●	
<i>Arundinella nepalensis</i>			●	●	●		●	●		
<i>Arytera divaricata</i>	Coogera								●	
<i>Banksia integrifolia</i>	Coastal Banksia		●	●	●				●	
<i>Blechnum patersonii</i>	Strap Fern								●	
<i>Breynia oblongifolia</i>	Coffee Bush								●	
<i>Bursaria incana</i>	Prickly Pine		●	●	●					
<i>Callistemon viminalis</i>			●	●	●					
<i>Carissa ovata</i>	Currant Bush							●		
<i>Cheilanthes tenuifolia</i>								●		●
<i>Chrysocephalum apiculatum</i>	Yellow Buttons	●	●	●	●			●		

Botanical Name	Common Name	Rocky headland coastal villas	Eucalyptus woodland apartments (trees 6-10m)	Eucalyptus woodland apartments & villas (trees 6-12m)	Eucalyptus woodland apartments & villas (trees 8-14m)	Headland/tidal interface	Mangrove / tidal interface	Ecotonal forest central facility	Wetland	Sheltered locations near buildings
<i>Clerodendron floribundum</i>	Lolly Bush			●	●			●		
<i>Corymbia clarksoniana</i>			●	●	●			●		
<i>Corymbia intermedia</i>			●	●	●			●		
<i>Corymbia tessellaris</i>	Moreton Bay Ash		●	●	●			●		
<i>Crinum flaccidum</i>						●	●	●		
<i>Cupaniopsis anacardiooides</i>	Tuckeroo		●	●	●		●	●		
<i>Cyclophyllum coprosmoides</i>	Beach Canthium				●		●	●		
<i>Cymbopogon bombycinus</i>	Silky Oilgrass	●	●	●	●					
<i>Cymbopogon refractus</i>	Barbed Wire Grass	●	●	●	●					
<i>Dianella brevipedunculata</i>		●	●	●	●		●	●		
<i>Dianella caerulea</i>		●	●	●	●		●	●		
<i>Dianella longifolia</i>		●	●	●	●		●	●		
<i>Diospyros fasciculosa</i>								●		
<i>Diospyros geminata</i>								●		
<i>Dodonaea lanceolata</i>	Native Hop Bush		●	●	●					
<i>Drynaria rigidula</i>	Rock Fern				●			●		●
<i>Eremochloa bimaculata</i>	Poverty Grass		●	●	●					
<i>Eucalyptus crebra</i>			●	●	●			●		
<i>Eucalyptus exserta</i>	Queensland Peppermint		●	●	●			●		
<i>Eucalyptus tereticornis</i>			●	●	●			●		
<i>Ficus rubiginosa</i>	Rock Fig				●			●		
<i>Gahnia aspera</i>	Saw Sedge		●	●	●			●		
<i>Glochidion lobocarpum</i>					●			●		
<i>Grewia retusifolia</i>			●	●	●					
<i>Hardenbergia violacea</i>	False Sarsaparilla		●	●	●			●		
<i>Helichrysum boormanii</i> var. <i>tryonii</i>		●	●	●	●					

Botanical Name	Common Name	Rocky headland coastal villas	Eucalyptus woodland apartments (trees 6-10m)	Eucalyptus woodland apartments & villas (trees 6-12m)	Eucalyptus woodland apartments & villas (trees 8-14m)	Headland/tidal interface	Mangrove / tidal interface	Ecotonal forest central facility	Wetland	Sheltered locations near buildings
<i>Helichrysum bracteatum</i>			●	●	●			●		
<i>Hibbertia scandens</i>			●	●	●	●	●	●		●
<i>Hibbertia vestita</i>			●	●	●					
<i>Hibiscus heterophyllus</i>	Native Hibiscus		●	●	●			●		
<i>Hoya australis</i>	Hoya							●		●
<i>Imperata cylindrica</i>	Blady Grass		●	●	●					
<i>Jacksonia scoparia</i>	Dogwood		●	●	●	●		●		
<i>Jagera pseudorhus</i>	Foam Bark							●		
<i>Jasminum simplicifolium</i>	Native Jasmine		●	●	●			●		
<i>Juncus usitatus</i>										●
<i>Keraudrenia lanceolata</i>			●	●	●			●		
<i>Leptospermum polygalifolium</i>	Wild May		●	●	●			●		
<i>Lithomyrtus obtusa</i>		●	●			●				
<i>Livistona decora</i>	Cabbage Palm							●		
<i>Lomandra confertifolia spp pallida</i>	Mat rush		●	●	●			●		
<i>Lomandra longifolia</i>	Mat rush		●	●	●			●		
<i>Lomandra multiflora</i>	Many Flowered Mat rush	●	●	●	●			●		
<i>Lophostemon suaveolens</i>	Swamp Box		●	●	●			●		
<i>Mallotus discolor</i>	White Kamala							●		
<i>Mallotus philippensis</i>	Red Kamala							●		
<i>Marsilea crenata</i>										●
<i>Melaleuca nervosa</i>			●			●				
<i>Melaleuca quinquenervia</i>	Broad Leaved Tea tree					●	●	●		
<i>Melaleuca viridiflora</i>	Broad Leaved Tea tree					●	●	●		
<i>Melia azedarach</i>	White Cedar							●		
<i>Myoporum boninense</i>	Coastal Boobialla	●				●	●	●		

Botanical Name	Common Name	Rocky headland coastal villas	Eucalyptus woodland apartments (trees 6-10m)	Eucalyptus woodland apartments & villas (trees 6-12m)	Eucalyptus woodland apartments & villas (trees 8-14m)	Headland/tidal interface	Mangrove / tidal interface	Ecotonal forest central facility	Wetland	Sheltered locations near buildings
<i>Myrsine variabilis</i>	Muttonwood							●		
<i>Oplismenus aemulus</i>	Creeping Beard Grass							●		●
<i>Ottelia ovatifolia</i>	Water Poppy								●	
<i>Pandanus tectorius</i>	Pandanus	●						●		
<i>Pandorea pandorana</i>	Wonga vine		●	●	●			●		
<i>Panicum effusum</i>			●	●	●					
<i>Peperomia blanda</i>	Peperomia							●		●
<i>Petalostigma pubescens</i>	Bitter Bark		●	●	●					
<i>Pimelea linifolia</i>	Rice Flower		●	●	●					
<i>Pittosporum ferrugineum</i>								●		
<i>Pittosporum revolutum</i>			●	●	●			●		
<i>Planchonia careya</i>	Cocky Apple		●	●	●			●		
<i>Pleiogynium timorense</i>	Burdekin Plum							●		
<i>Podolepis longipedata</i>		●	●	●	●					
<i>Pogonolobus reticulatus</i>			●	●	●			●		
<i>Polyalthia nitidissima</i>	Canary Beech							●		
<i>Pouteria sericea</i>	Mongo							●		●
<i>Psydrax odoratum</i>								●		●
<i>Schoenoplectus validus</i>									●	
<i>Sophora tomentosa</i>			●	●	●	●	●	●		
<i>Tetragonia tetragonoides</i>	New Zealand spinach						●			
<i>Themeda triandra</i>	Kangaroo Grass	●	●	●	●	●	●	●		
<i>Xanthorrhoea johnsonii</i>	Grass Tree		●	●	●			●		
<i>Xanthorrhoea pumilio</i>	Grass Tree	●								