

Rainbow Beach Open Space / Drainage / Habitat Corridor

Landscape Master Plan Design Report

Document Control Sheet

Project:	Rainbow Beach Open Space / Drainage / Habitat Corridor - Project Application MP 07_0001
Report Title:	Landscape Master Plan Design Report
Client Reference:	St Vincent's Foundation
Revision / Version:	Revision C
Author(s):	Vanessa Sutton, Christoph Kaufmann, Natasha Ridler
Approved by:	James Rosenwax
Date:	16 June 2010
File Location:	P:\0950 PROJECTS\09503178.00 Albury Industrial Hub DP\4 DOCS & REFS\4 Reports & Docs\Indesign
Distribution:	Electronic Copies to: James Dunn, Tierney Property Services

Revision	Date	Approved	Details of Revision
Revision A	26 May 2010	James Rosenwax	95% Draft Review
Revision B	11 June 2010	James Rosenwax	100% Final Draft
Revision C	16 June 2010	James Rosenwax	100% Final

This document has been prepared solely for the benefit of St. Vincent's Foundation Pty. Ltd. and is issued in confidence for the purposes only for which it is supplied. Unauthorised use of this document in any form whatsoever is prohibited. No liability is accepted by AECOM or any employee, contractor, or sub-consultant of this company with respect to its use by any other person. This disclaimer shall apply notwithstanding that the document may be made available to other persons for an application for permission or approval to fulfil a legal obligation.

Table of Contents

1.0	Introduction	4
1.01	Introduction	4
2.0	Site Appreciation	6
2.01	Context	6
2.02	Heritage	7
2.03	Existing Conditions: Site Features & Landscape Character	8
2.04	Existing Conditions: Indigenous Heritage	12
2.05	Existing Conditions: Soils	16
2.06	Vegetation - Pre-Settlement	20
2.07	Existing Conditions: Vegetation & Revegetation	24
2.08	Existing Vegetation Communities - Under Regeneration	28
2.09	Existing Conditions: Fauna	34
2.10	Existing Conditions: Site Views	38
2.11	Existing Conditions: Drainage	42
3.0	Concept Development - Proposed Site	46
3.01	Concept Development: Proposed Site Water Management	46
3.02	Concept Development: Opportunities & Constraints - Ecology	50
3.03	Concept Development: Bushfire Asset Protection Zones	54
3.04	Concept Development: Opportunities & Constraints - Community Open Space & Interaction	58
3.05	Concept Development: Spaces, Features & Circulation	62
4.0	Landscape Master Plan	66
4.01	Landscape Master Plan	66
5.0	Place Making	70
5.01	Precincts	70
	Precinct 1: Core Revegetation Area and Bushwalks	72
	Precinct 2: Southern Urban / Bushland Edge	76
	Precinct 3: Residential Park Link	80
	Precinct 4: Community Park	88
	Precinct 5: Wetland Walk	96
	Precinct 6: Urban Lake Edge	104
	Precinct 7: Duchess Gully Inlet	116
	Precinct 8: Prospect Hill & Clearing in the Forest	122
5.02	Beach Access	130

1.0 Introduction

1.01 Introduction



Figure 1.01 Oblique aerial of Site from the south

Legend

- Concept Plan Area
- Central Corridor

AECOM has been engaged by St Vincent's Foundation Pty Ltd to develop the landscape master plan for the Central Corridor within the Project Application Area (the Subject Site).

The landscape master plan forms part of the Part 3A Project Application for the creation of the Central Corridor. The Central Corridor is located within the Open Space, Drainage and Wildlife Habitat Corridor delineated by the concurrent Part 3A Concept Plan Application submitted over the broader Concept Plan Area.

The purpose of this report is to demonstrate an appreciation of the Subject Site; including its diverse landscape character, ecology and visual nature. Overlaid with this site appreciation will be an examination of the proposed water management systems, ongoing vegetation restoration work and an analysis of all the opportunities and constraints that might determine the development of a holistic landscape master plan.

The primary objective of the landscape master plan is to provide a structure for the Central Corridor, which draws upon and enhances the existing qualities of the Site through subtle manipulation of spaces, planting structure, and reference to the borrowed landscape and surroundings. The master plan aims to establish clarity to the Subject Site and a sense of place that is grounded in the protection and enhancement of the natural environment.

2.0 Site Appreciation

2.01 Context

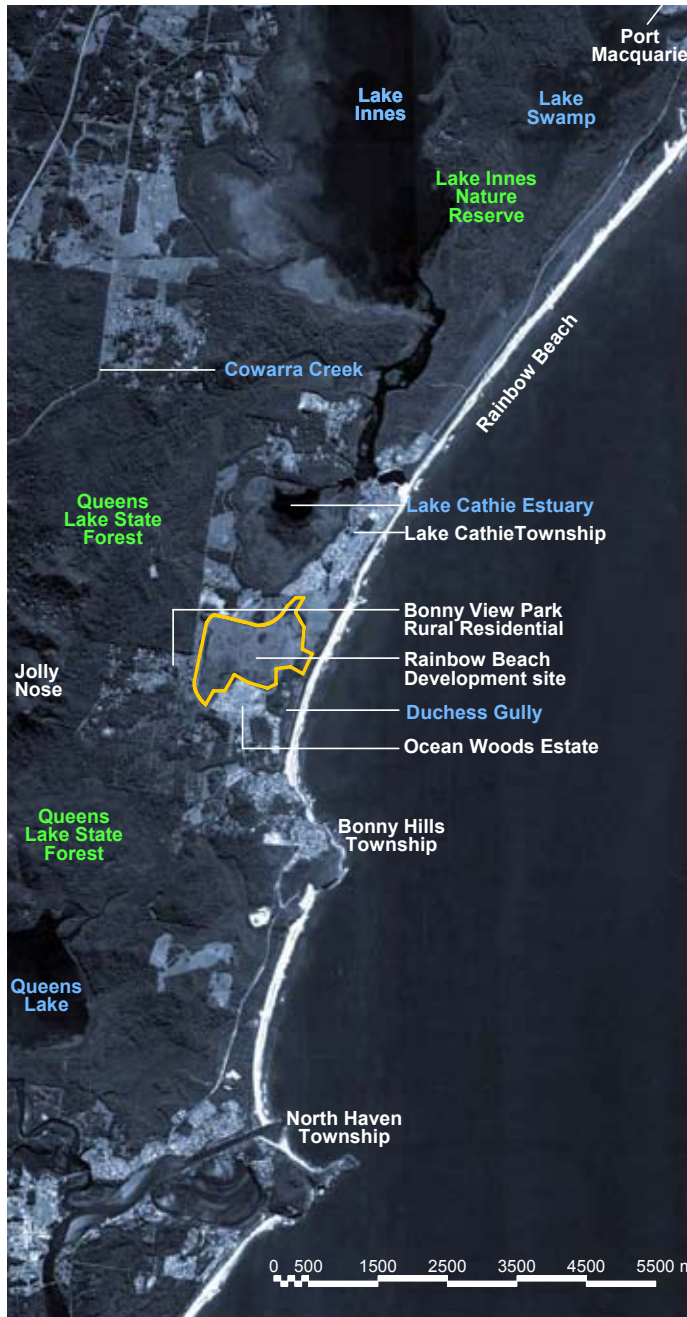


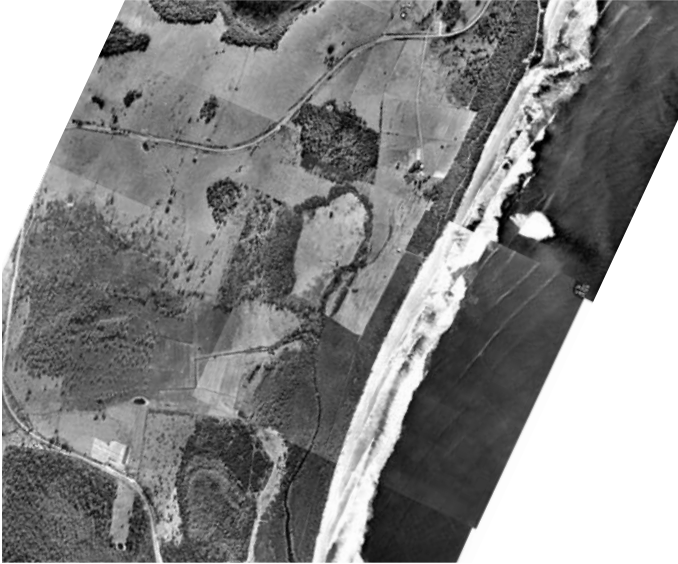
Figure 2.01 Site Context

The Concept Plan Area covers an area of approximately 177.4 ha, of which the Central Corridor forms approximately 75.2 ha. The Site is located in Rainbow Beach, Bonny Hills, south of Port Macquarie.

The Subject Site occupies an area of low lying land behind the coastal forest and dunes of Rainbow Beach, with higher ground to the west. Ocean Drive forms the north western boundary of the Site, connecting the townships of Lake Cathie to the north and Bonny Hills to the south.

The Queens Lake State Forest, with its distinctive ridgeline, The Jolly Nose, lies to the west of the Site.

2.02 Heritage



1977

Historically, the Site included Coastal Wetland and Swamp Forest in the lowland areas of the Site, and Eucalyptus forest/ rainforest in the upper reaches. Some significant time ago the Site underwent substantial clearing for pastoral grazing activity and an extensive drainage network was constructed on the coastal plain which eventually linked to Duchess Gully. This resulted in improved drainage for the Site and better pastoral conditions.

During the 1980s, further landform modifications, constructed drainage lines and bulk earthworks took place; including the excavation of a large 6.3 ha (approx) water body in the south of the Subject Site and the partial formation of a golf course development. This development was subsequently cut short and abandoned.



2002



2005

2.03 Existing Conditions: Site Features & Landscape Character



Figure 2.03 Existing Conditions: Site Features & Landscape Character

NOT TO SCALE

Legend

-  Concept Plan Area
-  Central Corridor
-  Creekline / Existing Lagoon
-  Hill
-  Wallum Froglet Habitat
-  Duchess Gully
-  Urban Edge
-  Low Lying Pasture Land
-  Significant Vegetation

2.03 Existing Conditions: Site Features & Landscape Character

The Central Corridor is located in the southern portion of the Concept Plan Area and includes the lower lying pasture land, the 6.3 ha Existing Lagoon, fragmented areas of remnant coastal forest and areas of native vegetation regeneration that is ongoing. These features, as well as other areas are illustrated in Figure 2.03, and are described in detail below.

Low Lying Pasture Land

The predominant use of the Site is for grazing and is characterised by areas of long pasture grass with sparse tree cover. Between the beach and the pasture areas, Duchess Gully (effectively a vegetated drainage line), links with fragmented tracts of forest vegetation forming the eastern boundary of the Central Corridor and fringes the remnant littoral rainforest that lies adjacent to the eastern site boundary.

Open Forest

At the upper reaches of the Central Corridor, within the proposed residential subdivision, there are pockets of remnant open forest characterised by groupings of tall Eucalyptus species with a low shrub and grass understorey.

Existing Lagoon

The 6.3 ha Existing Lagoon was constructed in the 1980's and when viewed against the backdrop of the 'Jolly Nose' ridgeline is picturesque in nature. Presently, the edge of the Existing Lagoon is not heavily vegetated, with only small pockets of planting to the embankments and a fragmented macrophyte wetland edge. Regeneration work is already taking place around the edges and embankments of the Existing Lagoon and this is beginning to soften its boundaries and provide aquatic habitat.

Duchess Gully and Coastal Wetland Forest

Duchess Gully runs generally north south through the Site, exiting the Site at the boundary with the existing Sewage Treatment Plant at the south eastern corner of the Central Corridor. The gully runs through an area of remnant Coastal Wetland Forest which forms a buffer to the treatment works. This forest is characterised by Eucalyptus canopy trees with an understorey of bracken fern. Along the gully, the dense planting is made up of Casuarina stands, Paperbarks and Banksia with an understorey of ferns, grasses and sedges prone to inundation.



Open Forest



Coastal Forest / Duchess Gully



Wallum Froglet Habitat

Hill

There is a small elevated knoll which sits between the pasture land and the Sewage Treatment Plant. This provides a potential focal feature with its relatively symmetrical form and dense forest backdrop. It provides a vantage point for views across the Subject Site.

Wallum Froglet Habitat

Within a pocket of land formed among the northern edges of the Existing Lagoon, a small depression; probably formed by excavation and formerly occupied by wet heath, has become a habitat for the Wallum Froglet. This area is characterised by dense sedgelands with some sparse immature growth of a Callistemon shrub layer. This area is prone to inundation and has an ephemeral quality that is quite unique and worth preserving.

Sedgelands/ Swamp Sclerophyll Forest

West of the Existing Lagoon lies an area of Swamp Sclerophyll Forest and Existing Treatment Wetlands. The forest is characterised by Paperbark Swamp and Sedgelands which has a distinct visual character. This forest sits just north of two Existing Treatment Wetlands with dense macrophyte planting. The forest areas are undergoing regeneration work to restore their degraded ecological quality. The land surrounding the wetlands has been planted extensively with Lilies, Sedges and Rushes.

Regeneration Areas

Beyond the Swamp Forest, land that was formerly grazed has been fenced off and is currently undergoing successful natural regeneration. The natural regeneration process is being assisted by selective planting and direct seeding so that the character of this area is gradually evolving from that of a disturbed and fragmented landscape to an ecologically rich native bushland.

The 'Borrowed Landscape'

The State Forest and ridgeline of the Jolly Nose to the west of the Site, and the dense Littoral Rainforest of the coastal dunes lend the Subject Site a containment that is enhanced in many ways by the Existing Lagoon and the diversity of the many ecosystems within their framework.



Existing Lagoon



Swamp Sclerophyll Forest



Hill



Rainbow Beach Residential Estate







2.04 Existing Conditions: Indigenous Heritage



Figure 2.04 Existing Conditions: Indigenous Heritage

NOT TO SCALE

Legend

-  Concept Plan Area
-  Central Corridor
-  Creekline / Existing Lagoon
-  Indigenous heritage site within Central Corridor
-  Indigenous heritage site outside of Central Corridor
-  Boundary between north and south survey areas

2.04 Existing Conditions: Indigenous Heritage

The Subject Site was surveyed for archaeological evidence in 1996, 2006, 2007 and 2009. A total of 16 sites of Aboriginal artefact occurrence within and immediately adjacent to the Site boundary.

All field inspections were conducted in collaboration with the Aboriginal community, and included ground-truthing existing registered AHIMS sites, inspecting lands in proximity to known Aboriginal sites and in areas previously identified as having potential archaeological value. The inspections conducted were done so in consultation with representatives from the Birpai, Bunyah and Bril Bril Local Aboriginal Land Councils. Findings are summarised below.

A1: Artefact Scatter/ Open Campsite

Contains stone artefacts and unmodified beach pebbles scattered across a 200m² area south of Duchess Gully and two artefacts on the northern bank of the gully.

No management action is required as the site is to be retained in its present condition which has naturally stabilised.

A2: Artefact Scatter/ Open Campsite

Contains stone tools and cores on the eastern bank of Duchess Gully and a wider scatter of unmodified pebbles.

No management action is required, providing the beach access is confined to the existing track alignment and the site left to regenerate.

A3: Artefact Scatter/ Open Campsite

Contains two artefact locations on either side of Duchess Gully - a siltstone pebble tool and quartz core and stone artefacts in the drainage cutting north of Duchess Gully.

Assessed to be of moderate archaeological/scientific significance as a result of disturbance context, likely size and research potential. No works proposed in vicinity of this site.

A4: Artefact Scatter/ Open Campsite

This is the largest and most extensive find within a topographically intact but cleared sand rise just north of the knoll. 115 stone artefacts were found over four different locations and this area has been assessed as having high probability of containing a well preserved archeological deposit and deemed to have a high level of archeological significance warranting permanent conservation.

All land above the 6m contour is to be excluded from development and retained in its present condition.

A5: Isolated Find

This is an isolated find, not affected by the proposed development and warranting no management action.

A6: Artefact Scatter/ Open Campsite

Contains pebble tools and flakes recorded on drain cuttings, suggesting further research potential in the surrounding alluvium and further archeological investigation has been recommended prior to development, however not located within Project Area.

A7: Artefact Scatter/ Open Campsite

Contains pebble tools and flakes recorded on drain cuttings, suggesting further research potential in the surrounding alluvium and further archeological investigation has been recommended prior to development, however not located within Project Area.

A8: Artefact Scatter/ Open Campsite

Contains pebble tools and flakes recorded within the low lying bedrock footslope. This area will not warrant any management action providing the terrain is left undisturbed.

A9: Isolated Find

This is an isolated find, not affected by the proposed development and warranting no management action.

A10: Artefact Scatter/ Open Campsite

13 stone artefacts were recorded over a 50m² area on the slightly elevated rim of the coastal plain, including flake cores and a tool. Assessed as being of moderate archaeological/scientific significance. Comprises homogenous group of artefact types and is believed to represent a small campsite occupied on a one-off or itinerant basis.

A11: Artefact Scatter

Located outside Concept Plan Area.

A12: Artefact Scatter

This occurs on the eroded bedrock footslope of the knoll and is deemed to be of moderate social and cultural significance. Assessed to be of high social/cultural significance. Site offers a good representative example of a small bedrock sub-coastal campsite and is therefore worthy of preservation.

A13: Artefact Scatter

Located outside Concept Plan Area.

A14: Artefact Scatter

Located outside Concept Plan Area.

A15: Artefact Scatter

Believed to have washed downstream from location A15. Low significance owing to its lack of spatial integrity and negligible potential to yield any further research information.

A16: Midden

Pipi shell deposit, charcoal, fire shattered pebbles, places, unworked pebbles. Not affected by the proposed development and warranting no management action.



Example of Artefacts found at A12.

2.05 Existing Conditions: Soils

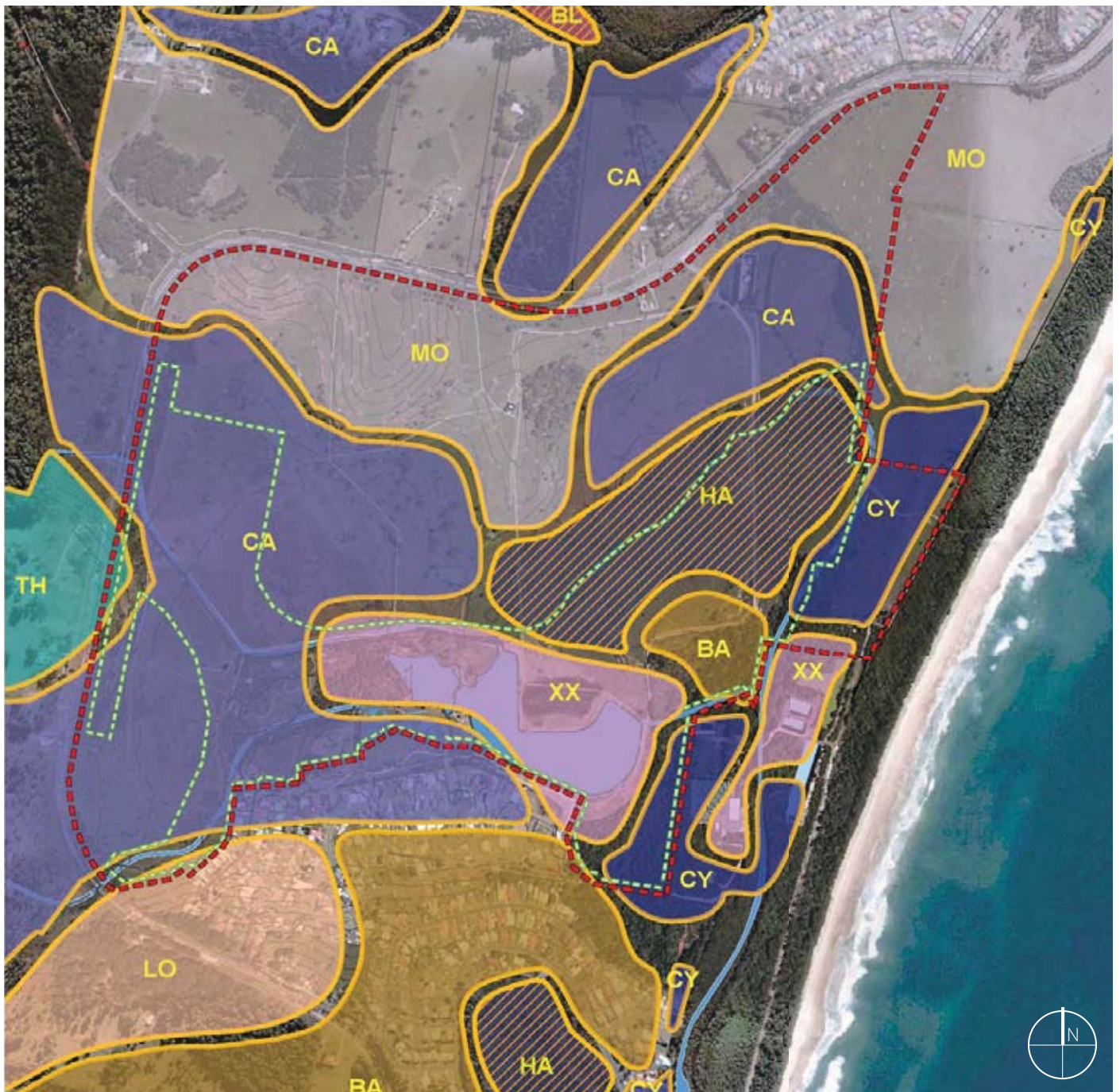





Figure 2.05 Existing Conditions: Soils

NOT TO SCALE

Legend

-  Concept Plan Area
-  Central Corridor
-  Acid sulphate soils

BA

BA Burrawan: Residual Landscapes. Well drained, 90-105cm, Red/Brown Kursols/Dermosols with imperfectly drained mottled yellow kursols on lower slopes. Well drained soils with low wet bearing strength, organic topsoils, high erodibility, low subsoil permeability, strong acidity and aluminium toxicity potential. Hardsetting surfaces, localised poor drainage and high run-on, localised seasonal waterlogging, water erosion and foundation hazard.

CA

CA Cairncross: Transferral Landscapes. Poorly drained, >300cm Mottled brown or Grey Kursols and Sodsols. Soils with high subsoil plasticity, shrink-swell potential, organic topsoils, low wet bearing strength, sodicity, low permeability, strong acidity, aluminium toxicity potential, low fertility. Poor drainage, hardsetting surface, high run-on, localised flood hazard, seasonal waterlogging, erosion and foundation hazards.

CY

CY Crowdy Bay: Aeolian Landscapes. >300cm rapidly drained Aeris Podzols, and poorly drained humic Aquic Podzols. Sandy soils with high erodibility, high permeability, very low water holding capacity, low fertility. Rapid drainage, groundwater pollution hazard, Localised seasonal waterlogging, high wind erosion, non-cohesive soils, localised low moisture availability and high fire hazard.

HA

HA Harrington: Aeolian Landscapes. >300cm imperfectly drained Semiaquic Podzols and Aquic Podzols. Sandy soils with high erodibility, strong acidity, low available water holding capacity, low fertility. Localised impeded drainage, seasonal waterlogging, groundwater pollution hazard, localised acid sulphate soils, high wind erosion and non cohesive soils. Low moisture availability and high fire hazard.

LO

LO Lorne: Erosional Landscapes. Moderately well drained, 80-180cm catenary sequences of Red Kursols on upper slopes and Brown Kursols on lower slopes. Soils with low wet bearing strength, organic topsoils, high erodibility, strong acidity and aluminium toxicity potential. Localised run-on, hardsetting surfaces, locally shallow soils, water erosion and foundation hazard.

MO

MO Moripo: Erosional Landscapes. Moderately well drained, stony, 50-150cm Brown and yellow Dermosols and brown Chromosols. Stony soils with strong structure, high erodibility, neutral to moderate alkalinity. Gully erosion risk, localised shallow soils and high run-on. Localised waterlogging and foundation hazard.

TH

TH Thrumster: Residual Landscapes. 200-300cm well drained Red Ferrosols on crests, tending shallower on steeper sideslopes with 200-300cm imperfectly drained Mottled Brown Kursols downslope. Soils with strong structure, strong acidity, aluminium toxicity potential, high plasticity and topsoil fertility. Productive arable land, deep soils, localised rill erosion risk, localised waterlogging and mass movement risk, woody weeds.

XX

XX Disturbed Terrain: Disturbed Landscapes. Various Anthroposols, original soil has been removed, greatly destroyed or buried. Landfill includes soil, rock, building or waste materials. Soils with high variability, which may include foundation hazard, unconsolidated low bearing strength materials, impermeability, poor drainage, low fertility, toxic materials and wind erosion hazard. Sources of sediment and groundwater contamination.

2.05 Existing Conditions: Soils

The Subject Site can be generally categorised as a silted estuarine system with a frontal dune and swampy wetlands behind.

The surrounding higher ground which slopes down onto the alluvial plain is deeply weathered metasediments derived from phyllites and shales.

Erosion from the hinterland has provided a heavy clay alluvial plain which blends into the sandy deposits washed and blown in from the sea.

The low lying areas therefore experience periodic inundation and can potentially develop Acid Sulphate Soils.

Previous development activities including excavation to create the Existing Lagoon and other drainage has altered the groundwater regime and led to the development of Acid Sulphate Soils which have been located within the Alluvial flats (classified HA on the Soil Landscape Classification mapping) which are overlain with sandy and low cohesive soils and sandy topsoils.

The sloping areas (classified MO on the Soil Landscape Classification mapping) generally provide naturally well-drained ground draining down onto poorly drained alluvial plains with clayey topsoils (classified CA on the Soil Landscape Classification mapping)

The ridgelines on the northern side of the Site are underlain by weathered rock at relatively shallow depths.

The hill, or knoll to the south east of the Site (classified BA on the Soil Landscape Classification mapping) is made up of clay soils with low subsoil permeability and sandy topsoils.



Alluvial Plain - Jolly Nose ridgeline in distance



Alluvial Plain looking west toward the higher ground




2.06 Vegetation - Extrapolated Pre-Settlement



Figure 2.06 Vegetation - Extrapolated Pre-Settlement

NOT TO SCALE

Legend

-  Concept Plan Area
-  Central Corridor
-  Creekline / Existing Lagoon



Coastal vegetation with rainforest

Littoral rainforest: *Acmena hemilampra*, *A. smithii*, *Banksia integrifolia* subsp *integrifolia*, *Cupaniopsis anacardioides*, *Euroschinus falcata* var. *falcata*, *Ficus macrophylla*, subsp *macrophylla*, *F. obliqua*, *Glochidial ferdinandi*

Wallum shrublands: *Corymbia gummifera*, *Banksu aemula*

Sedgeland: *Juncus sp*, *Baumea sp*, *Lepyrodia sp*, *Gahnia sp*



Coastal wetland with rainforest

Open forest: *Eucalyptus tereticornis*, *E. robusta*, with understorey commonly comprised of rainforest trees, shrubs and vines or blady grass and bracken fern where area has been affected by fire.

Wallum shrublands: *Corymbia gummifera*, *Banksu aemula*

Sedgeland: *Juncus sp*, *Baumea sp*, *Lepyrodia sp*, *Gahnia sp*



Coastal wetland

Wet heath: *Banksia*, *Melaleuca*, *Xanthorrhoea*, *Baumea*, *Juncus*, *Pimelia* and various *Epacrids*.

Swamp forest: *Melaleuca quinquenervia*, *M. alternifolia*, *M. stypheloides*, *M. linearifolia* and *Xanthorrhoea*, ferns and rainforest shrubs and vines. Casuarina stands with understorey of *Lomandra* and other grasses in areas prone to long inundation.

Swamp Oak Open Forest: *Casuarina glauca*, *Lomandra longifolia*, *Gahnia clarkei*, *Acacia implexa*



Wet and dry forest

Open forest: *Eucalyptus tereticornis*, *E. robusta*, with understorey commonly comprised of rainforest trees, shrubs and vines

Swamp forest: *Melaleuca quinquenervia*, *M. alternifolia*, *M. stypheloides*, *M. linearifolia* and *Xanthorrhoea*, ferns and rainforest shrubs and vines.



Forest

Open forest: *Eucalyptus tereticornis*, *E. robusta*, with understorey commonly comprised of rainforest trees, shrubs and vines

Sedgeland: *Juncus sp*, *Baumea sp*, *Lepyrodia sp*, *Gahnia sp*



Coastal wetland with sedgelands

Wet heath: *Banksia*, *Melaleuca*, *Xanthorrhoea*, *Baumea*, *Juncus*, *Pimelia* and various *Epacrids*.

Swamp forest: *Melaleuca quinquenervia*, *M. alternifolia*, *M. stypheloides*, *M. linearifolia* and *Xanthorrhoea*, ferns and rainforest shrubs and vines. Casuarina stands with understorey of *Lomandra* and other grasses in areas prone to long inundation.

Wallum shrublands: *Corymbia gummifera*, *Banksu aemula*

Sedgeland: *Juncus sp*, *Baumea sp*, *Lepyrodia sp*, *Gahnia sp*

2.06 Vegetation - Pre-Settlement

It is estimated that the Subject Site once comprised distinct endemic vegetation communities arising from their relationship within the topography and natural coastal flooding systems that governed the Site prior to intervention.

The upper reaches of the Site comprised open Eucalypt Forest. The central flood plains, which were probably subject to periodic inundation and drying, comprised Wet and Dry Forest with an open Eucalyptus Forest structure and Paperbark Swamp and sedgelands within.

The dunal forests adjacent to the beach were made up of Coastal vegetation, with Rainforest, wetlands and Littoral Rainforest characterised by Ficus, Tuckeroo and Lilypily and sedgelands of Juncus, Baumea and Ghania etc. Further south, the coastal wetland comprised a Eucalyptus open forest structure with rainforest understorey and sedgelands.



Coastal vegetation behind Rainbow Beach and existing beach access



Remnant Wet and Dry Forest


2.07 Existing Conditions: Vegetation & Revegetation





Figure 2.07 Existing Conditions: Vegetation & Revegetation

NOT TO SCALE


Legend


 Concept Plan Area


 Central Corridor

 Creekline / Existing Lagoon

Existing Vegetation


 Coastal Dry Sclerophyll Forest - Blackbutt / Tallowood


 Coastal Wet Sclerophyll Forest - Brushbox


 Coastal Dry Sclerophyll Forest - Blackbutt

 Open Tall Dry Sclerophyll Forest - Grey Ironbark / Grey Gum

 Swamp Sclerophyll Forest - Paperbark / Swamp Mahogany / Swamp Oak

 Swamp Oak Forest


 Dunal scrub

 Coastal Wet Sclerophyll Forest


Communities currently under revegetation


 Swamp Sclerophyll Forest


 Subtropical Coastal Forest

 Dry Sclerophyll Forest, Tallowood / Red Mahogany

 Dry Sclerophyll Forest, Blackbutt / Red Mahogany

 Swamp Oak Forest

 Mixed wet Sclerophyll Forest

 Native grass edge

Source: Darkheart Eco-Consultancy. Ecological Survey and Statutory Assessments 2008

Source: Wild Things Native Gardens. Rainbow Beach - Proposed Revegetation Report 2008

2.07 Existing Vegetation Communities

The recent history of the Subject Site (last 30 years) has led to a seriously disturbed environment, with vast tracts of endemic communities being lost to clearing and subsequent grazing.

Man made modifications to landform, drainage lines and earthworks have disturbed the natural drainage patterns of the Site and altered the patterns of vegetation throughout.

Remnant pockets of endemic vegetation communities still exist which have been mapped, and the species found within them listed.

Bush Regeneration Work:

Extensive bush regeneration work has been taking place site-wide with the following objectives:

- > to strengthen and re-create wildlife movement corridors through the replanting of food trees for native fauna;
- > to restore and re connect vegetation communities endemic to the Site;
- > to restore and protect Endangered Ecological Communities;
- > to enhance and protect existing habitats such as the Wallum Froglet area;
- > to manage out weed invasion; and
- > to enhance and create aquatic habitat where possible.

The landscape master plan will aim to give the ongoing regeneration works a clear direction in terms of density, scale and structure of planting in a visual and aesthetic sense as well as in an environmental sense.



Coastal Dry Sclerophyll Forest: Blackbutt/Tallowwood

Upper Canopy: *Eucalyptus pilularis*, *Eucalyptus microcorys*, *Eucalyptus planchoniana*. Lower Canopy: *Banksia integrifolia*. Ground layer: *Bladey grass* and *Bracken Fern*.



Open Tall Forest: Grey Ironbark, Grey Gum

Upper Canopy: *Eucalyptus siderophloia*, *Eucalyptus propinqua*, *Eucalyptus microcorys*, remnant *Eucalyptus tereticornis*, some *Lophostemon confertus*. Lower Canopy: *Banksia integrifolia*. Ground layer: *Bladey grass*.



Dunal Scrub

Mixed Canopy: *Leptospermum laevigatum*, *Monotoca eliptica*, *Banksia integrifolia*, *Melaleuca nodosa*, *Wallum Heath*, *Wallum Beard Heath*. Ground layer: *Lomandra* and *Kangaroo Grass*.



Coastal Wet Sclerophyll Forest: Brushbox

Upper Canopy: *Lophostemon confertus*, *Eucalyptus grandis*, *Melaleuca styphelioides*. Lower Canopy: *Melaleuca styphenoidies*, *Ficus macrophylla*. Ground layer: *Doodia aspera*, *Blechnum*, *Bracken Fern*.



Coastal Dry Sclerophyll Forest: Blackbutt

Upper Canopy: *Eucalyptus pilularis*, *Eucalyptus reinifera*, *Melaleuca styphelioides*. Lower Canopy: *Banksia integrifolia*. Ground layer: *Bladey grass*, *Bracken Fern*.



Swamp Sclerophyll Forest: Paperbark/Swamp Mahogany/Swamp Oak

Upper Canopy: *Melaleuca linariifolia*, *Melaleuca styphelioides*, *Eucalyptus robusta*, *Allocasuariana littoralis*, *Casuarina glauca*, *Melaleuca quinquenervia*. Shrub Layer: *Wallum Heath*, *Wallum Beard Heath*. Ground layer: *Swamp Fern*, *Xanthorrhoea fulva*.



Swamp Oak Forest

Upper Canopy: *Casuarina glauca*, *Melaleuca styphenoidies*, remnant *Eucalyptus tereticornis*, some *Lophostemon confertus*. Lower Canopy: *Melaleuca quinquenervia*, *Melaleuca linearifolia*, *Xanthorrhoea*. Ground layer: *Lomandra*.



Coastal Wet Sclerophyll Forest

Upper Canopy: *Eucalyptus pilularis*, *Eucalyptus microcorys*, *Eucalyptus tereticornis*, *Eucalyptus robusta*. Some remnant Rainforest trees: *Acmena smithii*, *Cupaniopsis*. Lower Canopy: *Banksia integrifolia*. Ground layer: *Bladey grass* and *Bracken Fern*.

2.08 Existing Vegetation Communities - Under Regeneration

Natural Regeneration

The following planting lists represent those species currently being seeded or planted directly on Site in order to recreate species diversity and restore different endemic communities.

These lists do not represent the full range of species typically found within these communities.

Swamp Scleropyll Forest EEC



Upper Canopy

- > *Callistemon salignus* (Willow Bottlebrush)
- > *Casuarina glauca* (Swamp Oak)
- > *Eucalyptus resinifera* subsp. *hemilampra* (Red Mahogany)
- > *Eucalyptus robusta* (Swampy Mahogany)
- > *Livistona australis* (Cabbage Palm)
- > *Melaleuca quinquenervia* (Broad-leafed Paperbark)

Lower Canopy

- > *Allocasuarina littoralis* (Black Sheoak)
- > *Elaeocarpus reticulatus* (Blueberry Ash)
- > *Glochidian ferdinandi* (Cheese Tree)
- > *Melaleuca ericifolia* (Swamp Paperbark)
- > *Melaleuca linariifolia* (Snow in Summer)
- > *Melaleuca stypheloides* (Prickly-leaved Paperbark)
- > *Syzygium smithii* (Lilly Pilly)

Colonising Shrubs

- > *Acacia elongata* (Swamp Wattle)
- > *Acacia irrorata* (Green Wattle)
- > *Acacia longifolia* (Sydney Golden Wattle)
- > *Breynia oblongifolia* (Coffee Bush)
- > *Dodonaea triquetra* (Hop Bush)
- > *Homalanthus populifolius*
- > *Polyscias sambucifolia* (Elderberry Panax)
- > *Pultenaea villosa* (Hairy Bush Pea)
- > *Viminaria juncea* (Native Broom)

Source: Darkheart Eco-Consultancy. Ecological Survey and Statutory Assessments 2008

Source: Wild Things Native Gardens. Rainbow Beach - Proposed Revegetation Report 2008

Groundcovers

- > *Carex appressa* (Tall Sedge)
- > *Crinum pedunculatum* (Spider Lily)
- > *Dianella caerulea* (Blue Flax Lily)
- > *Gahnia clarkei* (Tall Saw Sedge)
- > *Gahnia sieberiana* (Red-fruited Saw Sedge)
- > *Lomandra longifolia* (Spiny-headed Mat-rush)
- > *Morinda jasminoides* (Sweet Morinda)

Subtropical Coastal Forest EEC



Upper Canopy

- > *Callistemon cunninghamiana* subsp. *cunninghamiana*
- > *Casuarina glauca* (Swamp Oak)
- > *Corymbia intermedia* (Pink Bloodwood)
- > *Cupaniopsis anacardioides* (Tuckaroo)
- > *Cupaniopsis parvifolia* (Small-Leaved Tuckaroo)
- > *Drypetes australasica* (Yellow Tulipwood)
- > *Eucalyptus acmeniodes* (White Mahogany)
- > *Eucalyptus amplifolia* (Cabbage Gum)
- > *Eucalyptus moluccana* (Grey Box)
- > *Eucalyptus propinqua* (Grey Gum)
- > *Eucalyptus resinifera* subsp. *hemilampra* (Red Mahogany)
- > *Eucalyptus robusta* (Swampy Mahogany)
- > *Eucalyptus siderophloia* (Small-fruited Grey Gum)
- > *Eucalyptus tereticornis* (Forest Red Gum)
- > *Ficus obliqua* (Small-leaved Fig)
- > *Ficus superba* var. *henniana* (Deciduous Fig)
- > *Glochidian ferdinandi* (Cheese Tree)
- > *Melaleuca quinquenervia* (Broad-leafed Paperbark)

Lower Canopy

- > *Allocasuarina torulosa* (Forest Oak)
- > *Alphitonia excelsa* (Red Ash)
- > *Callitris columellaris* (Native Cypress Pine)
- > *Elaeocarpus reticulatus* (Blueberry Ash)
- > *Melaleuca alternifolia* (Tea Tree)
- > *Melaleuca decora* (White Feather Honeymyrtle)
- > *Melaleuca nodosa* (Ball Honeymyrtle)
- > *Melaleuca salignus*
- > *Melaleuca stypheloides* (Prickly-leaved Paperbark)

Colonising Shrubs

- > *Acacia concurrens* (Curracabah)
- > *Breynia oblongifolia* (Coffee Bush)
- > *Commersonia fraseri* (Brush Kurrajong)
- > *Hovea acutifolia* (Native Pea)
- > *Notelaea longifolia* (Native Olive)
- > *Persoonia stradbrogensis* (Geebung)
- > *Wilkstroemia indica* (Wilkstroemia)

Groundcovers

- > *Dianella caerulea* (Blue Flax Lily)
- > *Dianella longifolia* (Flax Lily)
- > *Eustrephus latifolius* (Wombat Berry)
- > *Gahnia aspera* (Rough Saw Sedge)
- > *Gahnia clarkei* (Tall Saw Sedge)
- > *Hardenbergia violacea* (False Sarsparilla)
- > *Hibbertia scandens* (Climbing Guinea Flower)
- > *Lomandra longifolia* (Spiny-headed Mat-rush)
- > *Morinda jasminoides* (Sweet Morinda)

Riverflat Eucalypt Forest



Upper Canopy

- > *Angophora floribunda* (Rough Barked Apple)
- > *Callistemon cunninghamiana* subsp. *cunninghamiana*
- > *Casuarina glauca* (Swamp Oak)
- > *Eucalyptus amplifolia* (Cabbage Gum)
- > *Eucalyptus grandis* (Flooded Gum)
- > *Eucalyptus moluccana* (Grey Box)
- > *Eucalyptus saligna* (Sydney Blue Gum)
- > *Eucalyptus tereticornis* (Forest Red Gum)
- > *Eucalyptus viminalis* (White Gum)
- > *Livistona australis* (Cabbage Palm)
- > *Melia azedarach* (Native White Cedar)

Lower Canopy

- > *Backhousia myrtifolia* (Grey Myrtle)
- > *Melaleuca decora* (White Feather Honeymyrtle)
- > *Melaleuca linariifolia* (Snow in Summer)
- > *Melaleuca stypheloides* (Prickly-leaved Paperbark)
- > *Syzygium smithii* (Lilly Pilly)
- > *Tristaniopsis laurina* (Water Gum)

Colonising Shrubs

- > *Acacia floribunda* (White Sally Wattle)
- > *Breynia oblongifolia* (Coffee Bush)
- > *Commersonia fraseri* (Brush Kurrajong)
- > *Ozothamnus diosmifolius* (Rice Flower)

Groundcovers

- > *Eustrephus latifolius* (Wombat Berry)
- > *Hardenbergia violacea* (False Sarsparilla)
- > *Lomandra longifolia* (Spiny-headed Mat-rush)

Dry Sclerophyll Forest Tallowood / Red Mahogany



Upper Canopy

- > *Casuarina glauca* (Swamp Oak)
- > *Corymbia intermedia* (Pink Bloodwood)
- > *Eucalyptus microcorys* (Tallow wood)
- > *Eucalyptus resinifera* (Red Mahogany)
- > *Eucalyptus robusta* (Swampy Mahogany)
- > *Eucalyptus umbra* (Broad-leaved White Mahogany)
- > *Lophostemon confertus* (Queensland Brush Box)
- > *Melaleuca quinquenervia* (Broad-leaved Paperbark)
- > *Melaleuca stypheloides* (Prickly-leaved Paperbark)
- > *Syncarpia glomulifera* (Turpentine)

Lower Canopy

- > *Allocasuarina littoralis* (Black Sheoak)
- > *Allocasuarina torulosa* (Forest Sheoak)
- > *Glochidian ferdinandi* (Cheese Tree)
- > *Melaleuca linariifolia* (Snow in Summer)
- > *Melaleuca sieberi* (Small-leaved Paperbark)

Colonising Shrubs

- > *Acacia elongata* (Swamp Wattle)
- > *Acacia falcata* (Sickle Wattle)
- > *Acacia longifolia* (Sydney Golden Wattle)
- > *Acacia myrtifolia* (Red-stemmed Wattle)
- > *Breynia oblongifolia* (Coffee Bush)
- > *Dodonaea triquetra* (Hop Bush)
- > *Jacksonia scoparia* (Dogwood)
- > *Notelaea longifolia* (Native Olive)
- > *Ozothamnus diosmifolius* (Rice Flower)
- > *Persoonia stradbrogensis* (Geebung)
- > *Polyscias sambucifolia* (Elderberry Panax)
- > *Pultenaea villosa* (Hair Bush Pea)

Shrubs

- > *Banksia spinulosa* (Hairpin Banksia)
- > *Clerodendrum tomentosum* (Hairy Clerodendrum)
- > *Leptospermum whitei* (Tea Tree)
- > Groundcovers
- > *Eustrephis latifolius* (Wombat Berry)
- > *Gymnostachys anceps*
- > *Hibbertia scandens* (Climbing Guinea Flower)
- > *Lepidosperma laterale* (Variable Sword Sedge)
- > *Lomandra longifolia* (Spiny Mat-rush)

Dry Sclerophyll Forest Blackbutt



Upper Canopy

- > *Angophora floribunda* (Rough Barked Apple)
- > *Corymbia intermedia* (Pink Bloodwood)
- > *Cupaniopsis anacardioides* (Tuckaroo)
- > *Eucalyptus microcorys* (Tallow wood)
- > *Eucalyptus pilularis* (Blackbutt)
- > *Eucalyptus planchoniana* (Needlebark)
- > *Eucalyptus resinifera subsp. hemilampra* (Red Mahogany)
- > *Eucalyptus robusta* (Swampy Mahogany)
- > *Eucalyptus signata* (Coastal Scribbly Gum)
- > *Eucalyptus tereticornis* (Forest Red Gum)
- > *Euroschinus falcatus* (Ribbon wood)
- > *Ficus macrophylla* (Moreton Bay Fig)
- > *Melaleuca quinquenervia* (Broad-leaved Paperbark)

Lower Canopy

- > *Banksia integrifolia* (Coast Banksia)
- > *Elaeocarpus reticulatus* (Blueberry Ash)
- > *Glochidian ferdinandi* (Cheese Tree)
- > *Myrsine howittiana* (Brush Muttonwood)
- > *Syzygium oleosum* (Blue Lily Pilly)
- > *Syzygium smithii* (Lilly Pilly)

Colonising Shrubs

- > *Acacia longifolia* var. *longifolia* (Sydney Golden Wattle)
- > *Acacia longifolia* var. *sophorae* (Coastal Wattle)
- > *Acacia myrtifolia* (Red-stemmed Wattle)
- > *Acacia ulicifolia* (Juniper Wattle)
- > *Breynia oblongifolia* (Coffee Bush)
- > *Dodonaea triquetra* (Hop Bush)
- > *Homalanthus populifolius* (Bleeding-heart)
- > *Nematolepis squamea*
- > *Persoonia stradbrogensis* (Geebung)
- > *Pultenaea villosa* (Hair Bush Pea)
- > *Trema tomentosa* (Native Peach)
- > *Zieria smithii* (Sandfly Zieria)

Shrubs

- > *Banksia serrata* (Old Man Banksia)
- > *Clerodendrum tomentosum* (Hairy Clerodendrum)
- > *Leptospermum polygalifolium* (Yellow Tea Tree)
- > *Monotoca elliptica* (Broom-heath)
- > *Notolaea longifolia* (Native Olive)

Groundcovers

- > *Dianella caerulea* (Blue Flax Lily)
- > *Eustrephis latifolius* (Wombat Berry)
- > *Gahnia aspera* (Rough Saw Sedge)
- > *Gymnostachys anceps*
- > *Hibbertia scandens* (Climbing Guinea Flower)
- > *Lomandra longifolia* (Spiny Mat-rush)

Dry Sclerophyll Forest Blackbutt / Red Mahogany



Upper Canopy

- > *Eucalyptus microcorys* (Tallow wood)
- > *Eucalyptus pilularis* (Blackbutt)
- > *Eucalyptus resinifera* subsp. *hemilampra* (Red Mahogany)
- > *Eucalyptus robusta* (Swampy Mahogany)
- > *Eucalyptus signata* (Coastal Scribbly Gum)
- > *Melaleuca quinquenervia* (Broad-leafed Paperbark)
- > *Syncarpia glomulifera* (Turpentine)

Lower Canopy

- > *Allocasuarina littoralis* (Black Sheoak)
- > *Banksia integrifolia* (Coast Banksia)
- > *Elaeocarpus reticulatus* (Blueberry Ash)
- > *Endiandra sieberi* (Corkwood)
- > *Melaleuca sieberi* (Small-leaved Paperbark)
- > *Myrsine variabilis* (Muttonwood)
- > *Syzygium smithii* (Lilly Pilly)

Colonising Shrubs

- > *Acacia binervata* (Two-veined Hickory)
- > *Acacia longifolia* var. *longifolia* (Sydney Golden Wattle)
- > *Acacia suaveolens* (Sweet Scented Wattle)
- > *Banksia integrifolia* (Coast Banksia)
- > *Breynia oblongifolia* (Coffee Bush)
- > *Dillwynia juniperina* (Prickly Parrot-Pea)
- > *Dodonaea triquetra* (Hop Bush)
- > *Homalanthus populifolius* (Bleeding-heart)
- > *Nematolepis squamea*
- > *Oxylobium robusta*
- > *Platylobium formosum* (Handsome Flat-pea)
- > *Polyscias sambucifolia* (Elderberry Panax)
- > *Synoum glandulosum* (Rosewood)

Shrubs

- > *Banksia aemula/oblongifolia* (Fern-leaved Banksia)
- > *Banksia robur* (Swamp Banksia)
- > *Banksia spinulosa* (Hairpin Banksia)
- > *Callistemon pachyphyllus* (Wallum Bottlebrush)
- > *Leptospermum laevigatum* (Coastal Tea Tree)
- > *Leptospermum polygalifolium* (Yellow Tea Tree)
- > *Leptospermum whitei* (Tea Tree)
- > *Notolaea longifolia* (Native Olive)
- > *Persoonia stradbrogensis* (Geebung)
- > *Pittosporum revolutum* (Brisbane Laurel)

Groundcovers

- > *Crinum pedunculatum* (Spider Lily)
- > *Eustrephis latifolius* (Wombat Berry)
- > *Gahnia clarkei* (Tall Saw Sedge)
- > *Hibbertia scandens* (Climbing Guinea Flower)
- > *Lomandra hystrix* (Mat-rush)
- > *Lomandra longifolia* (Spiny Mat-rush)

Swamp Oak Forest



Upper Canopy

- > *Casuarina glauca* (Swamp Oak)
- > *Cupaniopsis anacardioides* (Tuckaroo)
- > *Ficus fraseri* (White Sandpaper Fig)
- > *Melaleuca quinquenervia* (Broad-leafed Paperbark)

Lower Canopy

- > *Acacia melanoxylon* (Australian Blackwood)
- > *Acronychia oblongifolia* (White Aspen)
- > *Alphitonia excelsa* (Red Ash)
- > *Callistemon salignus* (Willow Bottlebrush)
- > *Glochidian ferdinandi* (Cheese Tree)
- > *Guioa semiglauca*
- > *Melaleuca alternifolia* (Narrow-leaved Paperbark)
- > *Melaleuca ericifolia* (Swamp Paperbark)
- > *Melaleuca stypheloides* (Prickly-leaved Paperbark)
- > *Myrsine howittiana* (Brush Muttonwood)
- > *Pittosporum revolutum* (Brisbane Laurel)
- > *Polyscias elegans* (Celerywood)
- > *Syzygium smithii* (Lilly Pilly)
- > *Tristaniopsis laurina* (Water Gum)

Shrubs

- > *Breynia oblongifolia* (Coffee Bush)
- > *Clerodendrum tomentosum* (Hairy Clerodendrum)
- > *Cordyline stricta* (Narrow Palm Lily)
- > *Cryptocarya rigida* (Forest Maple)
- > *Eupomatia laurina* (Native Guava)
- > *Myoporum acuminatum* (Mangrove Boobialla)
- > *Notolaea longifolia* (Native Olive)
- > *Polyscias sambucifolia* (Elderberry Panax)

Groundcovers

- > *Crinum pedunculatum* (Spider Lily)
- > *Gahnia clarkei* (Tall Saw Sedge)
- > *Hibbertia scandens* (Climbing Guniea Flower)
- > *Lomandra longifolia* (Spiny Mat-rush)
- > *Morinda jasminoides* (Sweet Morinda)

Mixed wet Sclerophyll Forest



Upper Canopy

- > *Casuarina glauca* (Swamp Oak)
- > *Cupaniopsis anacardioides* (Tuckaroo)
- > *Eucalyptus pilularis* (Blackbutt)
- > *Eucalyptus grandis*
- > *Eucalyptus robusta* (Swampy Mahogany)
- > *Eucalyptus saligna* (Sydney Blue Gum)
- > *Euroschinus falcatus* (Ribbon Wood)
- > *Ficus rubiginosa* (Port Jackson Fig)
- > *Ficus macrophylla* (Moreton Bay Fig)
- > *Lophostemon confertus* (Queensland Brush Box)
- > *Melaleuca quinquenervia* (Broad-leafed Paperbark)

Lower Canopy

- > *Acacia melanoxylon* (Australian Blackwood)
- > *Acronychia oblongifolia* (White Aspen)
- > *Alphitonia excelsa* (Red Ash)
- > *Banksia integrifolia* (Coast Banksia)
- > *Elaeocarpus reticulatus* (Blueberry Ash)
- > *Glochidian ferdinandi* (Cheese Tree)
- > *Guioa semiglauca*
- > *Myrsine variabilis* (Muttonwood)
- > *Schizomeria ovata* (White Cherry)
- > *Syzygium smithii* (Lilly Pilly)
- > *Tristaniopsis laurina* (Water Gum)

Colonising Shrubs

- > *Acacia binervata* (Two-veined Hickory)
- > *Acacia longifolia* var. *longifolia* (Sydney Golden Wattle)
- > *Breynia oblongifolia* (Coffee Bush)
- > *Commersonia fraserii* (Brush Kurrajong)
- > *Dodenaea triquetra* (Hop Bush)
- > *Nematolepis squamea* (Satinwood)
- > *Ozothamnus diosmifolius* (Rice Flower)
- > *Polyscias sambucifolia* (Elderberry Panax)
- > *Trema tomentosa* (Native Peach)

Shrubs

- > *Clerodendrum tomentosum* (Hairy Clerodendrum)
- > *Cordyline stricta* (Narrow Palm Lily)
- > *Cryptocarya rigida* (Forest Maple)
- > *Elaeodendron australe* (Red Olive Plum)
- > *Endiandra sieberi* (Hard Corkwood)
- > *Eupomatia laurina* (Native Guava)
- > *Notolaea longifolia* (Native Olive)
- > *Rhodomyrtus psidioides* (Native Guava)
- > *Synoum glandulosum* (Rosewood)

Groundcovers

- > *Dianella caerulea* (Blue Flax Lily)
- > *Eustrephis latifolius* (Wombat Berry)
- > *Gahnia clarkei* (Tall Saw Sedge)
- > *Hibbertia scandens* (Climbing Guniea Flower)
- > *Lomandra longifolia* (Spiny Mat-rush)
- > *Morinda jasminoides* (Sweet Morinda)

Native grassland



Groundcovers

- > *Dianella caerulea* (Blue Flax Lily)
- > *Dianella longifolia* (Flax Lily)
- > *Carex appressa* (Tall Sedge)
- > *Crinum pedunculatum* (Spider Lily)
- > *Chorizandra cymbaria* (Heron Bristle Rush)
- > *Chorizandra sphaerocephala* (Roundhead Bristle Rush)
- > *Gahnia aspera* (Rough Saw Sedge)
- > *Gahnia clarkei* (Tall Saw Sedge)
- > *Gahnia sieberiana* (Red-fruited Saw Sedge)
- > *Gymnostachys anceps* (Settlers Flax)
- > *Isolepis nodosa* (Knobbly Club Rush)
- > *Lepidosperma laterale* (Variable Sword Sedge)
- > *Lomandra hystrix* (Mat-rush)
- > *Lomandra longifolia* (Spiny Mat-rush)









2.09 Existing Conditions: Fauna



Figure 2.09 Existing Conditions: Fauna

NOT TO SCALE

Legend

-  Concept Plan Area
-  Central Corridor
-  Creekline / Existing Lagoon
-  Existing trees
-  Existing vegetation
-  Fauna hazard
-  Fauna movement corridors
-  Freshwater aquatic species within lagoon

Threatened species recorded

-  Koala
-  Wallum Froglet
-  Swift Parrot
-  Square Tailed Kite
-  Wompoo Fruit- Dove
-  Grey- Headed Flying Fox
-  Little Bent- Wing Bat
-  Common Planigal
-  Eastern Chestnut Mouse