JWA PTY LTD
Ecological Consultants
ABN 18 862 767 739

# ECOLOGICAL ASSESSMENT - BIO-BANKING ASSESSMENT METHODOLOGY

## COBAKI ESTATE

A Report Prepared for
Leda Manorstead Pty Ltd

NOVEMBER 2015

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# 1 INTRODUCTION

JWA have been engaged by Leda Manorstead Pty Ltd to complete an assessment of a clump of fifty two (52) Swamp mahogany trees utilising the Biodiversity Banking Assessment Methodology (BBAM) (2014). The purpose of this methodology is set out in Section 2.1.1.1:

a) *requirements for a reliable and transparent assessment of biodiversity values on land in order to:*
   i) *identify the biodiversity values on land subject to a proposed development or land proposed as a biobank site*
   ii) *determine the impacts of developments on biodiversity as part of an application for approval to undertake the development under NSW planning legislation*
   iii) *quantify and describe the biodiversity credits required for the unavoidable impacts of developments on biodiversity values*
   iv) *quantify and describe the biodiversity credits that can be created at a biobank site from the improvement in biodiversity values from management actions undertaken at the site.*

The BBAM provides a list of threatened species which require assessment in accordance with Step 2 of Section 6.5.1.3 of the BBAM.

*6.5.1.3 A candidate species is not considered to be present on the development site where:*
a) *after carrying out an assessment of the habitat components the assessor determines that the habitat is substantially degraded such that the particular species is unlikely to utilise the development site, or*
b) *an expert report prepared in accordance with Subsection 6.6.2 states that the species is unlikely to be present at the development site, or*
c) *the species is a vagrant species and unlikely to use habitat on the development site, or (d) records of the species presence in relation to the location of the development site are at least 20 years old or, in the opinion of the assessor, have doubtful authenticity.*

It should be noted that the Cobaki Estate site has a very long history of disturbance. This disturbance commenced in the early 1900's when much of the site was cleared for agriculture (sugar cane) in the lower lying portions of the site. The site was channelized at that time to allow better drainage from the site. Bund walls were also constructed to stop tidal water entering the site. The effect of this land-use substantially altered the naturalness of the Cobaki site generally. More recent land-use has involved cattle grazing which has been the most significant land-use for a long period of time.

The Swamp mahogany trees occurring on the site have been isolated to a significant degree by clearing (**FIGURE 1**).

N

**LEGEND**

Surveyed Swamp mahogany (*Eucalyptus robusta*)

Community 6 - Mid-high open woodland (*Eucalyptus robusta*)

0 100m

SCALE: 1 : 2500 @ A3

JWA PTY LTD
*Ecological Consultants*

CLIENT
Leda Manorstead Pty ltd

PROJECT
Cobaki Estate
Cobaki, NSW
Tweed Shire Council

FIGURE 1

PREPARED: BW
DATE: 17 November 2015
FILE: 97038_SM BAM.dwg

TITLE

SWAMP MAHOGANY TREE SURVEY

# 2 FLORA AND FAUNA ASSESSMENTS COMPLETED ON THE COBAKI ESTATE SITE

A significant number of flora and fauna studies have been completed over the last thirty-five (35) years. The list of these studies is included below:

- Cameron McNamara (1983) Cobaki Village Environmental Study. Report prepared for the Bradshaw Group. Includes a 1981 flora and fauna study.
- Winders Barlow and Morrison (1990a) Cobaki Community Project Vegetation Field Study.
- Winders Barlow and Morrison (1990b) Cobaki Community Project Evaluation of Terrestrial Fauna.
- Debus (1994) Bird Survey of the Cobaki Community Project site.
- James Warren Biological and Environmental Consultant (1994) Flora and Fauna Assessment. Bulk earthworks (cut and fill) at Cobaki Lakes.
- James Warren Biological and Environmental Consultant (1994) Flora and Fauna Assessment. Phase 1 Residential Development at Cobaki Lakes.
- Debus (May 1997) Supplementary bird survey on the Cobaki Community Project site.
- Debus (July 1997) Additional owl survey on the Cobaki Community Project site.
- Woodward Clyde (1997) Species Impact Statement – Cobaki Lakes. Prepared for Leda Developments Pty Ltd.
- Parker (1999) Species Impact Statement Cobaki Lakes Project. Prepared for Leda Manorstead Pty Ltd.
- James Warren and Associates (2008) Ecological Assessment. Response to the Director Generals Requirements. Volume 2. A report to Leda Manorstead Pty Ltd.
- JWA (June 2014) Flora survey of the Swamp Mahogany (*Eucalyptus robusta*) community on the Cobaki Estate Site.
- JWA (September 2015) Biodiversity Banking Assessment Methodology assessment and tree survey of the Swamp mahogany community.

# 3 SPECIES ANALYSIS

## 3.1 Powerful owl (*Ninox strenua*)

### *3.1.1 Habitat Requirement - NSW OEH (2015)*

The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest.

The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine (*Syncarpia glomulifera*), Black She-oak (*Allocasuarina littoralis*), Blackwood (*Acacia melanoxylon*), Rough-barked Apple (*Angophora floribunda*), Cherry Ballart (*Exocarpus cupressiformis*) and a number of eucalypt species.

The main prey items are medium-sized arboreal marsupials, particularly the Greater Glider, Common Ringtail Possum and Sugar Glider. There may be marked regional differences in the prey taken by Powerful Owls. For example in southern NSW, Ringtail Possum make up the bulk of prey in the lowland or coastal habitat. At higher elevations, such as the tableland forests, the Greater Glider may constitute almost all of the prey for a pair of Powerful Owls. Flying foxes are important prey in some areas; birds comprise about 10-50% of the diet depending on the availability of preferred mammals. As most prey species require hollows and a shrub layer, these are important habitat components for the owl.

Pairs of Powerful Owls demonstrate high fidelity to a large territory, the size of which varies with habitat quality and thus prey densities. In good habitats a mere 400 can support a pair; where hollow trees and prey have been depleted the owls need up to 4000 ha.

Powerful Owls nest in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old. While the female and young are in the nest hollow the male Powerful Owl roosts nearby (10-200 m) guarding them, often choosing a dense "grove" of trees that provide concealment from other birds that harass him.

Powerful Owls are monogamous and mate for life. Nesting occurs from late autumn to mid-winter, but is slightly earlier in north-eastern NSW (late summer - mid autumn). Clutches consist of two dull white eggs and incubation lasts approximately 38 days.

### *3.1.2 Occurrence of Suitable Habitat in Swamp Mahogany Community*

Suitable habitat does not occur in the Swamp mahogany community. Prey species have never been recorded in this community. There are no old growth trees with hollows (suitable for nesting) in the community.

### *3.1.3 Survey Effort and Results*

Leda commissioned a report from Dr Stephen Debus, an expert ornithologist. Dr Debus has researched and written widely on the large Australian forest owls (including the largest i.e. the Powerful owl).

The Powerful owl has been recorded as occurring on the site. It is assumed that the recorded occurrences of Greater gliders and Sugar gliders on the site have encouraged foraging activities with this species on the site. OEH consider that the Powerful owl to be a threatened species requiring credits for impacts on the Swamp mahogany trees. A report from Dr Debus is attached at **ATTACHMENT 1**. Dr Debus states that it is highly unlikely that the Swamp mahoganies would provide forage habitat for Powerful owls.

## 3.2 Australian Fritillary (*Argyreus hyperbius*)

### *3.2.1 Habitat Requirement – Qld DE&HP (2011)*

Most specimens have been collected from river estuaries or swampy coastal areas at or near sea level. The Australian fritillary butterfly is restricted to open, swampy, coastal areas where the larval food plant, *Viola betonicifolia,* grows as a small, insignificant ground herb in association with *Lomandra longifolia* (long leaved matrush) and grasses, especially the grass *Imperata cylindrica* (bladey grass). This habitat is called Melaleuca wetlands, although the larval food plant does not occur in all sub-types of this plant community. It is also sometimes found in disturbed areas (e.g. the drainage ditches of sugarcane farms) or in association with water course plant communities when its food plant *Viola betonicifolia* is present.

The Australian fritillary butterfly has been recorded in south-eastern Queensland and north-eastern New South Wales between Gympie and Port Macquarie.

### *3.2.2 Occurrence of Suitable Habitat in Swamp Mahogany Community*

Suitable habitat does not occur in the Swamp mahogany community. The groundcover community has been historically highly disturbed by cattle grazing and slashing. The critical food plant *Viola betonicifolia* is not present.

### *3.2.3 Survey Effort and Results*

A number of detailed flora and fauna assessments have been completed on the Cobaki Estate site over the last thirty-five (35) years. A detailed survey of the plants occurring in association with the Swamp mahogany community was completed in 2014.

The Australian fritillary has never been recorded in that time. The critical food plant *Viola betonicifolia* has never been recorded on the Cobaki Estate site or within the Swamp mahogany community.

### *3.2.4 Likelihood of Occurrence*

Very Low.

## 3.3 Eastern Chestnut Mouse (*Pseudomys gracilicaudatus*)

### *3.3.1 Habitat Requirement - NSW OEH (2015)*

In NSW the Eastern Chestnut Mouse is mostly found, in low numbers, in heathland and is most common in dense, wet heath and swamps.

Optimal habitat appears to be in vigorously regenerating heathland burnt from 18 months to four years previously. By the time the heath is mature, the larger Swamp Rat becomes dominant, and Eastern Chestnut Mouse numbers drop again.

Feeds at night via runways through the grassy and sedge understorey, within an area of less than half a hectare. It has a broad diet of grass stems, invertebrates, fungi and seeds, with the relative significance of each component varying seasonally.

Up to three litters are produced from spring to autumn; this strategy allows rapid build-up of numbers in years following fire.

#### *3.3.2 Occurrence of Suitable Habitat in Swamp Mahogany Community*

Suitable habitat does not occur in the Swamp mahogany community. The groundcover community has been historically highly disturbed by cattle grazing and slashing. The eastern chestnut mouse requires dense groundcover.

#### *3.3.3 Survey Effort and Results*

A number of detailed fauna surveys have been completed on the Cobaki Estate site over the last thirty-five (35) years. The eastern chestnut mouse has never been recorded in that time.

#### *3.3.4 Likelihood of Occurrence*

Very Low.

## 3.4 Eastern Pygmy-possum (*Cercartetus nanus*)

#### *3.4.1 Habitat Requirement - NSW OEH (2014)*

Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest.

Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes; an important pollinator of heathland plants such as banksias; soft fruits are eaten when flowers are unavailable.

Also feeds on insects throughout the year; this feed source may be more important in habitats where flowers are less abundant such as wet forests.

Shelters in tree hollows, rotten stumps, holes in the ground, abandoned bird-nests, Ringtail Possum (*Pseudocheirus peregrinus*) dreys or thickets of vegetation, (e.g. grass-tree skirts); nest-building appears to be restricted to breeding females; tree hollows are favoured but spherical nests have been found under the bark of eucalypts and in shredded bark in tree forks.

### *3.4.2 Occurrence of Suitable Habitat in Swamp Mahogany Community*

Suitable habitat is rainforest in north-eastern NSW. Swamp mahogany would provide forage habitat during flowering. The community is significantly constrained by its long term isolation.

### *3.4.3 Survey Effort and Results*

A number of detailed fauna surveys have been completed on the Cobaki Estate site over the last thirty-five (35) years. The eastern pygmy possum has never been recorded over this time period.

### *3.4.4 Likelihood of Occurrence*

Very low.

## 3.5 Koala (*Phascolarctos cinereus*)

### *3.5.1 Habitat Requirement - NSW OEH (2015)*

Inhabit eucalypt woodlands and forests.

Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. In Northern rivers region Swamp mahogany is one of its preferred food species. Swamp mahogany occurs in low dense mixed forests of eucalypts and paperbarks typically 15 to 20 m tall with minimal shrub cover and dense graminoid groundcover. Development of a sclerophyllous shrub understorey depends on density of the tree canopy. The boggy ground is heavily clothed in leaf litter, interspersed with patches of sedges and ferns, temporary pools of water and bare ground.

### *3.5.2 Occurrence of Suitable Habitat in Swamp Mahogany Community*

Suitable habitat does occur in the Swamp mahogany community. Swamp mahogany is a preferred food tree for the Koala in northern NSW.

### *3.5.3 Survey Effort and Results*

A number of detailed fauna surveys have been completed on the Cobaki Estate site. A very detailed koala survey and assessment was completed on the site in 2012 for the completion of a SEPP 44 – Koala Habitat Protection assessment (**ATTACHMENT 2**).

Koalas have consistently been recorded in low numbers on the Cobaki Estate site. Records occur for the western (elevated) portions of the site. Koalas (or signs of them) have never been recorded in the Swamp mahogany community in the lower lying eastern portion of the site.

### *3.5.4 Likelihood of Occurrence*

Low.

## 3.6 Regent Honeyeater (*Anthochaera Phrygia*)

### *3.6.1 Habitat Requirement - NSW OEH (2015)*

The Regent Honeyeater is a flagship threatened woodland bird whose conservation will benefit a large suite of other threatened and declining woodland fauna. The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River She-oak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes.

Every few years non-breeding flocks are seen foraging in flowering coastal Swamp Mahogany and Spotted Gum forests, particularly on the central coast and occasionally on the upper north coast. Birds are occasionally seen on the south coast.

In the last 10 years Regent Honeyeaters have been recorded in urban areas around Albury where woodlands tree species such as Mugga Ironbark and Yellow Box were planted 20 years ago.

The Regent Honeyeater is a generalist forager, although it feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar. Key eucalypt species include Mugga Ironbark, Yellow Box, White Box and Swamp Mahogany. Other tree species may be regionally important. For example the Lower Hunter Spotted Gum forests have recently been demonstrated to support regular breeding events. Flowering of associated species such as Thin-leaved Stringybark Eucalyptus eugenioides and other Stringybark species, and Broad-leaved Ironbark E. fibrosa can also contribute important nectar flows at times. Nectar and fruit from the mistletoes *Amyema miquelii*, *A. pendula* and *A. cambagei* are also utilised. When nectar is scarce lerp and honeydew can comprise a large proportion of the diet. Insects make up about 15% of the total diet and are important components of the diet of nestlings.

### *3.6.2 Occurrence of Suitable Habitat in Swamp Mahogany Community*

Suitable forage habitat does occur in the Swamp mahogany community. Breeding habitat is not known from the north coast of NSW.

### *3.6.3 Survey Effort and Results*

A number of detailed fauna assessments have been completed on the Cobaki Estate site over the last thirty-five (35) years. In particular a number of surveys were completed by Dr Stephen Debus in 1997. The most recent survey was completed in 2008. The regent honeyeater has never been recorded on the Cobaki Estate site.

### *3.6.4 Likelihood of Occurrence*

Very low.

## 3.7 Ripple-leaf Muttonwood (*Myrsine richmondensis*)

### *3.7.1 Habitat Requirement - NSW OEH (2015)*

Subtropical and dry rainforest and swamp forest on creek flats and slopes on basalt derived soil and alluvial deposits.

Flowers have been recorded in October and November, fruits have been observed from December to March.

### *3.7.2 Occurrence of Suitable Habitat in Swamp Mahogany Community*

Marginal habitat occurs in the Swamp mahogany community.

### *3.7.3 Survey Effort and Results*

A number of detailed flora assessments have been completed on the Cobaki Estate site over the last thirty-five (35) years.

A detailed survey of the plants occurring in association with the Swamp mahogany community was completed in 2014 (**ATTACHMENT 3**). The Ripple-leaf muttonwood has never been recorded on the Cobaki Estate site.

### *3.7.4 Likelihood of Occurrence*

Very low.

## 3.8 Squirrel Glider (*Petaurus norfolcensis*)

### *3.8.1 Habitat Requirement - NSW OEH (2015)*

Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas.

Prefers mixed species stands with a shrub or Acacia mid-storey.

Live in family groups of a single adult male one or more adult females and offspring.

Require abundant tree hollows for refuge and nest sites.

Diet varies seasonally and consists of Acacia gum, eucalypt sap, nectar, honeydew and manna, with invertebrates and pollen providing protein.

### *3.8.2 Occurrence of Suitable Habitat in Swamp Mahogany Community*

Suitable forage habitat does occur in this community but other habitat requirements are not met i.e. there are no hollows suitable for denning.

### *3.8.3 Survey Effort and Results*

A number of detailed fauna assessments have been completed on the Cobaki Estate site over the last thirty-five (35) years. Squirrel gliders have never been recorded on the Cobaki Estate site or within the Swamp mahogany community.

### *3.8.4 Likelihood of Occurrence*

Very low.

## 3.9 Wallum froglet (*Crinia tinnula*)

### *3.9.1 Habitat Requirement - NSW OEH (2015)*

Wallum Froglets are found in a wide range of habitats, usually associated with acidic swamps on coastal sand plains. They typically occur in sedgelands and wet heathlands. They can also be found along drainage lines within other vegetation communities and disturbed areas, and occasionally in swamp sclerophyll forests.

The species breeds in swamps with permanent water as well as shallow ephemeral pools and drainage ditches. Breeding is thought to peak in the colder months, but can occur throughout the year following rain. Eggs of 1.1-1.2mm are deposited in water with a pH of <6 and tadpoles take 2-6 months to develop into frogs.

Wallum Froglets shelter under leaf litter, vegetation, other debris or in burrows of other species. Shelter sites are wet or very damp and often located near the water's edge.

### *3.9.2 Occurrence of Suitable Habitat in Swamp Mahogany Community*

Suitable forage habitat does occur in the Swamp mahogany community. There is no suitable breeding habitat.

### *3.9.3 Survey Effort and Results*

A number of detailed fauna assessments have been completed on the Cobaki Estate site. **ATTACHMENT 4** shows the locations of all records of the Wallum froglet on the Cobaki Estate site. There are no records of the Wallum froglet in the Swamp mahogany community.

The frog may disperse into the Swamp mahogany area during very heavy stormwater events but would leave to occupy wetter and less disturbed habitats after the storm events.

### *3.9.4 Likelihood of Occurrence*

Possible.

## 3.10 White-eared Monarch (*Carterornis leucotis*)

### *3.10.1 Habitat Requirement - NSW OEH (2012)*

In NSW, White-eared Monarchs occurs in rainforest, especially drier types, such as littoral rainforest, as well as wet and dry sclerophyll forests, swamp forest and regrowth forest.

They appear to prefer the ecotone between rainforest and other open vegetation types or the edges of rainforest, such as along roads.

They are highly active when foraging, characteristically sallying, hovering and fluttering around the outer foliage of rainforest trees. They are usually observed high in the canopy or sub-canopy.

They eat insects, but their diet is not well studied.

They breed from about September to March, usually nesting high in the canopy, and often at the edge of patches of rainforest.

### *3.10.2 Occurrence of Suitable Habitat in Swamp Mahogany Community*

Suitable habitat does not occur in the Swamp mahogany community. There is no rainforest or wet/dry sclerophyll forest. The Swamp mahogany trees do not reach a standard of Swamp forest although Swamp mahogany is a component of Swamp forest.

### *3.10.3 Survey Effort and Results*

A number of detailed fauna assessments have been completed on the Cobaki Estate site over the last thirty-five (35) years. In particular a number of surveys were completed by Dr Stephen Debus in 1997. The most recent survey was completed in 2008. The white-eared monarch has never been recorded on the Cobaki Estate site.

### *3.10.4 Likelihood of Occurrence*

Very low.

# 4 CONCLUDING COMMENTS

It is concluded that an assessment of the nine (9) threatened species provided by the BBAM indicates that there is compliance with Section 6.5.1.3 (a) i.e.

*after carrying out an assessment of the habitat components the assessor determines that the habitat is substantially degraded such that the particular species is unlikely to utilise the development site.*

The degrading factors are:

- Long term clearing;
- Agricultural landuse;
- Drainage works;
- Bund construction works;
- Slashing; and
- Cattle grazing.

All of these factors, as well as the long term isolation of the Swamp mahogany trees, has caused an assessment of very low likelihood of occurrence of eight (8) of the species and a possible occurrence for the Wallum froglet.

# 5 REFERENCES

Office of Environment and Heritage (2012 – 2015) Threatened species profiles.

Queensland Department of Environment and Heritage Protection (2011) – Species profiles

# ATTACHMENT 1 – DR DEBUS EXPERT REPORT

STEPHEN DEBUS BA, Dip Natural Resources (Wildlife), Dip Ed, MSc (Zoology), PhD (Zool.)
BirdLife Australia D.L. Serventy Medal 2015

ECOLOGIST

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- Fauna surveys
- Ecology of birds
- Impact assessment
- Review & editorial
- Bibliographical

24 September 2015

James Warren
JWA Pty Ltd

Dear James,

**Expert report: Re Cobaki Estate – SEAR's report – Powerful Owl**

I have reviewed the relevant documentation and mapping, and the Biobanking Assessment Methodology requirements for an expert's report. I have examined the vegetation mapping and aerial photos of the subject site, and the table of vegetation types to be retained versus cleared, as supplied by JWA.

Given the area of forest habitat involved (59.5 ha), its layout in relation to the development zone, and the area of various forest and woodland types to be retained in a conservation zone (48.3 ha) versus the area to be cleared (11.3 ha), it is my opinion that:
(i) The retained forest area (48.3 ha) peripheral to the development zone may constitute part (10–20%) of the home range of one pair of Powerful Owls, which is likely to be hundreds of (if not greater than 1,000) hectares in the area concerned, and therefore mostly centred off site.
(ii) The total area of mid-high open woodland on site is 8.3 ha, of which 7.4 ha is to be removed. The woodland type of concern to this report, i.e. Swamp Mahogany, is 4.2 ha, of which 3.6 ha is to be removed, i.e. an insignificant part (at most 1%) of the potential home range of a Powerful Owl. Furthermore, given the nature/context of the remnant Swamp Mahogany trees and their isolation, in addition to JWA information that they contain no cavities and support no arboreal mammals, it is my opinion that there is a very low probability that the subject trees would be visited by a Powerful Owl, as the patch provides no nest sites or marsupial prey (or their den sites). During a flowering event it is possible that the trees might attract flying-foxes (regionally minor Powerful Owl prey), but the highly disturbed and cleared surrounds make it unlikely that a Powerful Owl would traverse the matrix to visit the subject trees and prey on flying-foxes.

(iii) The retained forest types (tall/very tall open/closed sclerophyll forest and tall open woodland, 44.9 ha, with only 3.8 ha of these types removed) represent much higher habitat quality for the Powerful Owl and its prey species than does the 3.6 ha of Swamp Mahogany mid-high open woodland.
(iv) The Powerful Owl is highly unlikely to occur in the Swamp Mahogany mid-high open woodland patch of concern.

I note also that there will be 61.8 ha of strategic revegetation, contiguous with and/or forming corridors between high-quality habitat, including that off site, that will enhance the site for the Powerful Owl in the long term.

Yours sincerely,

D Stephen Debus

**Abridged CV: Stephen John Stewart DEBUS**

**BA (Biol./Behav. Sc.), Dip. Natural Resources (Wildlife), Dip. Ed. (Sci.), MSc. (Zool.), PhD (Zool.)**

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**Website:**

www.une.edu.au/staff/sdebus.php

**Professional capacities:**

Vertebrate fauna surveys. Research and survey of threatened forest and woodland birds, particularly raptors and owls. Ecology/biology/behaviour of birds, especially predatory species. Conservation and management of threatened bird species. Distribution, status and biology/ecology of NSW birds. Reviews and biological profiles of bird species. Editing ornithological papers. Peer review of ornithological documents/EISs/species impact statements. Impact assessment (avifauna). Review of conservation status of NSW fauna.

**Computer skills:**

Proficient in Word and Excel, limited experience with GIS and ArcView

**Employment:**

Eco Logical Australia 2011-15 (casual; senior ecologist: fauna survey and report)

EA Systems (now EnviroAg Australia) 2000-14 (casual; ecologist: fauna survey and assessment)

Research assistant, Zoology, UNE, casual 1984-2014 (field ornithology: bird banding, bird surveys/censusing, ecological studies)

Tutor/demonstrator, Zoology UNE (casual), 2007-13

NSW Dept Environment & Climate Change, 2008-09 (temporary) (threatened species officer: Project Officer, NSW Scientific Committee)

Research Assistant, Ecosystem Management UNE (casual), 2008-09 (bird survey)

Post-doctoral research fellow, Zoology, UNE, 2005-07 (ecology of woodland birds)

Junior research fellow, Zoology, University of New England, 1990-1993, 1998-2004 (ecology of rare forest owls in relation to habitat and forest management; ecology and management of birds)

Technical officer, University Partnerships Pty Ltd (UNE), 1995-1996 (fauna survey and report, Eastlink EIS)

Casual assistant demonstrator, Depts Zoology and Ecosystem Management, UNE, 1988-2002 (field practical classes on population ecology and behavioural ecology of birds)

Casual teacher, New England Institute of TAFE, 1987-1993 (bird biology: including laboratory and field practical classes on classification, identification and ecology)

Field technician, National Parks & Wildlife Service Armidale, 1986 (fauna inventory, vegetation sampling and analysis)

Research assistant, Department of Ecosystem Management, University of New England, casual 1986-1987 (field survey of vegetation and fauna)

**Honorary position:**

Adjunct associate lecturer/research associate, Zoology UNE, 2004-2015 (includes collaborative research and publication, co-supervision of Honours/Masters/PhD students)

**Consultant biologist:**

3E Environmental 2012-15 (flora & fauna survey and report)

BirdLife Australia – Northern NSW (for Bundarra-Barraba Operations Group of the Regent Honeyeater Recovery Team), 2007-15 (Regent Honeyeater/woodland bird survey and monitoring)

Conacher Environmental Group 2008, 2015 (fauna survey and report)

Southern New England Landcare 2014 (fauna surveys on farms, data submission, landholder workshop, report review)

28 South Environmental 2013 (threatened fauna survey and report)

Ecotone Environmental Services 2012-13 (peer review of threatened fauna assessment; targeted fauna survey: federally listed birds)

NSW National Parks & Wildlife Service/Dept Environment & Conservation/DECC 1987-2013 (fauna survey, review of avifaunal component of environmental impact statements/ fauna impact statements/fauna reports, preparation of recovery plans and species profiles for threatened species)

James Warren & Associates 1997-2013 (fauna survey and report)

Australian Museum, 1995, 2012 (review of fauna impact statement, avifauna; feather sampling of wild-caught birds for DNA analysis)

Cumberland Ecology 2004-2012 (fauna survey and report)

Arnhem Environmental 1996-2012 (fauna survey)

Eco Logical Australia 2010-2011 (threatened bird research, fauna database compilation)

Warkworth Mining Ltd 2008, 2011 (avifauna survey and report)

Terra Consulting/Geolyse/Orogen 2004-11 (fauna survey and assessment)
State Forests of NSW 1987-2009 (fauna survey, review of avifaunal component of environmental impact statements/fauna impact statements/fauna reports, fauna survey worskhop)

TransGrid 2009 (investigation and report: bird-related outages on 500 kV transmission lines)

Earth Services 2007-08 (fauna survey and report)

Armidale Dumaresq Council 2006-08 (fauna assessment)

Tamworth Regional Council 2007-08 (starling control/raptor assessment)

PLACE Environmental 2006-07 (fauna assessment)

ACT Planning & Land Authority 2005-06 (fauna assessment)

Greenloaning Biostudies 1996-2004 (fauna survey)

Burnett Shire Council 2003 (fauna survey and assessment)

Inverell Shire Council 2003 (fauna assessment)

HWR Ecological 2003 (fauna survey)

WBM Oceanics 1999-2002 (fauna survey)

Resource Strategies 1999 (fauna survey)

Network Design & Construction Ltd, 1999 (fauna survey)

Woodward-Clyde Pty Ltd, 1994-1999 (fauna survey)

Telstra Environmental Evaluation Team 1998 (fauna survey and report)

Maunsell Pty Ltd, 1995-97 (fauna survey, review of environmental assessment)

Austeco Pty Ltd, 1990-1997 (fauna survey)

North-west Ecological Services 1997 (fauna survey)

ANCA 1995-1996 (fauna survey, Jervis Bay National Park)

SA National Parks & Wildlife Service, 1995 (fauna survey)

**Grants and awards:**

Search for Red Goshawk in NSW: $1,000 from the Australian Bird Environment Fund (Bird Observers Club of Aust.), 1987.

Distribution, status and habitat requirements of the Sooty Owl in northern NSW: $2,000 as a Cayley Memorial Scholarship (Gould League of NSW) 1990-93; with Associate Professors Hugh Ford & Harry Recher (UNE), $34,280 from WWF Australia and $64,835 from ANPWS (Endangered Species Program) 1990-93.

Will wildlife corridors work for sedentary birds?: with Professor Hugh Ford, $42,565 from the NSW Environmental Trust 2005, $43,359 in 2006-07.

Bird Observers Club of Australia: Distinguished Service Award, 2005 (editing the *Australian Bird Watcher*/*Australian Field Ornithology* for 21 years 1984-2005).

Royal Zoological Society of NSW Whitley Award, 2013 (*Birds of Prey of Australia: A Field Guide*, 2nd edn, best vertebrate guide in 2012)

BirdLife Australia's D.L. Serventy Medal for publication in ornithology, 2015

**Voluntary work:**

Editor: *Australasian Raptor Association News* 1980-1989 and *Boobook* (re-named) 2004-15 (biannual journal for bird-of-prey enthusiasts); *Australian Field Ornithology* 1984-2015 (quarterly journal)

Sub-editor: *Corella* Wedge-tailed Eagle special issue, 2007; White-bellied Sea-Eagle special issue, 2009; rare raptors special issue, 2011

Committee member: Australian Bird Study Association 1981-1988, 2005-15; Birds Australia Northern NSW Group 1996-99, 2004-12; Australasian Ornithological Conference 2009 organising committee 2008-09; ABSA/BirdLife Southern NSW conference organising committee 2013-14

Regent Honeyeater Recovery Team: Bundarra-Barraba Operations Group rep, 2008-14

Red Goshawk National Recovery Team 2014-15

**Publications:**

~130 refereed papers (selection appended), books and book contributions, theses: see appended list

**Refereed publications (selected titles):**

Debus, S.J.S. 1984. Biology of the Little Eagle on the Northern Tablelands of New South Wales. *Emu* 84: 87-92.

_____, Ley, A.J., Trémont, S. & Trémont, R. 1991. Breeding behaviour and diet of the Australian Hobby *Falco longipennis* in northern New South Wales. *Aust. Bird Watcher* 14: 123-137.

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_____ 1993b. The status of the Red Goshawk *Erythrotriorchis radiatus* in New South Wales, in Olsen, P.D. (Ed.), *Australian Raptor Studies*, pp. 182-191. Australasian Raptor Association, RAOU, Melbourne.

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Debus, S.J.S., McAllan, I.A.W. & Mead, D.A. 1993. Museum specimens of the Red Goshawk *Erythrotriorchis radiatus*. I. Annotated list of specimens; II. Morphology, biology and conservation status in eastern Australia. *Sunbird* 23: 5-28; 75-89.

Debus, S.J.S., McAllan, I.A.W. & Morris, A.K. 1993. The Square-tailed Kite *Lophoictinia isura* in New South Wales. *Aust. Birds* 26: 104-118.

Peake, P., Conole, L.E., Debus, S.J.S., McIntyre, A. & Bramwell, M. 1993. The Masked Owl *Tyto novaehollandiae* in Victoria. *Aust. Bird Watcher* 15: 124-136.

Ford, H.A., Davis, W.E., Debus, S., Ley, A., Recher, H. & Williams, B. 1993. Foraging and aggressive behaviour of the Regent Honeyeater *Xanthomyza phrygia* in northern New South Wales. *Emu* 93: 277-281.

Debus, S.J.S. 1994. The Sooty Owl *Tyto tenebricosa* in New South Wales. *Aust. Birds* 28 supplement: 4-19.

_____ & Chafer, C.J. 1994. The Powerful Owl *Ninox strenua* in New South Wales. *Aust. Birds* 28 supplement: 21-38.

_____ & Rose, A.B. 1994. The Masked Owl *Tyto novaehollandiae* in New South Wales. *Aust. Birds* 28 supplement: 40-64.

Debus, S.J.S. 1995. Surveys of large forest owls in northern New South Wales: methodology, calling behaviour and owl responses. *Corella* 19: 38-50.

Kavanagh, R.P., Debus, S., Tweedie, T. & Webster, R. 1995. Distribution of nocturnal forest birds and mammals in north-eastern New South Wales: relationships with environmental variables and management history. *Wildlife Research* 22: 359-377.

Debus, S.J.S. 1997a. A survey of the raptors of Jervis Bay National Park. *Aust. Birds* 30: 29-44.

_____ 1997b. The Barking Owl in New South Wales. *Aust. Birds* 30: 53-80.

_____ 1997c. Aspects of the biology of captive-bred, hack-released Masked Owls *Tyto novaehollandiae*. In Czechura, G. & Debus, S. (Eds), *Australian Raptor Studies II*, pp. 14-33. Birds Australia Monograph 3, Birds Australia, Melbourne.

_____ 1997d. Vocal behaviour of the Southern Boobook *Ninox novaeseelandiae* and other nocturnal birds. In Czechura, G. & Debus, S. (Eds), *Australian Raptor Studies II*, pp. 71-85. Birds Australia Monograph 3, Birds Australia, Melbourne.

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Debus, S. 2004. The impact of habitat fragmentation on woodland birds: A test of some hypotheses in New England. PhD thesis, University of New England, Armidale.

# ATTACHMENT 2 – KOALA HABITAT ASSESSMENT

JAMES WARREN & Associates Pty Ltd

ENVIRONMENTAL CONSULTANTS

# KOALA HABITAT ASSESSMENT

## IN ACCORDANCE WITH STATE ENVIRONMENTAL PLANNING POLICY NO. 44 (SEPP 44)

## COBAKI ESTATE

DECEMBER 2011

A REPORT TO LEDA MANORSTEAD PTY LTD

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# 1. INTRODUCTION

## 1.1 Background

James Warren & Associates (JWA) have been engaged by LEDA Manorstead Pty Ltd to complete a Koala Habitat Assessment of the Cobaki Estate site in accordance with the requirements of State Environmental Planning Policy No. 44 (SEPP 44).

The Minister for Planning approved a Concept Plan for the Cobaki Estate site in December 2010. Development Applications have subsequently been approved by Tweed Shire Council for the first stages of development i.e. Precincts 1, 2 and 6.

Subsequent to the Concept Approval the Tweed Coast Koala Habitat Study (Biolink 2011) has been released. This report describes the results of a koala habitat and population assessment for the coastal portion of the Tweed LGA. In recent comments on the submitted Development Applications for the first stages of Cobaki Estate, TSC has referenced the Tweed Coast Koala Habitat Study and requested a further detailed Koala habitat assessment of the site.

## 1.2 The Subject Site

The subject site consists of land described as Lot 1 DP 570076, Lot 2 DP 566529, Lot 1 DP 562222, Lot 1 DP 570077, Lot 1 823679, Lots 46, 54, 55, 199, 200, 201, 202, 205, 206, 209, 228 & 305 DP 755740, Cobaki, off Pigabeen Road, Tweed Heads. The site covers an area of approximately 605 hectares and is shown in **FIGURE 1.**

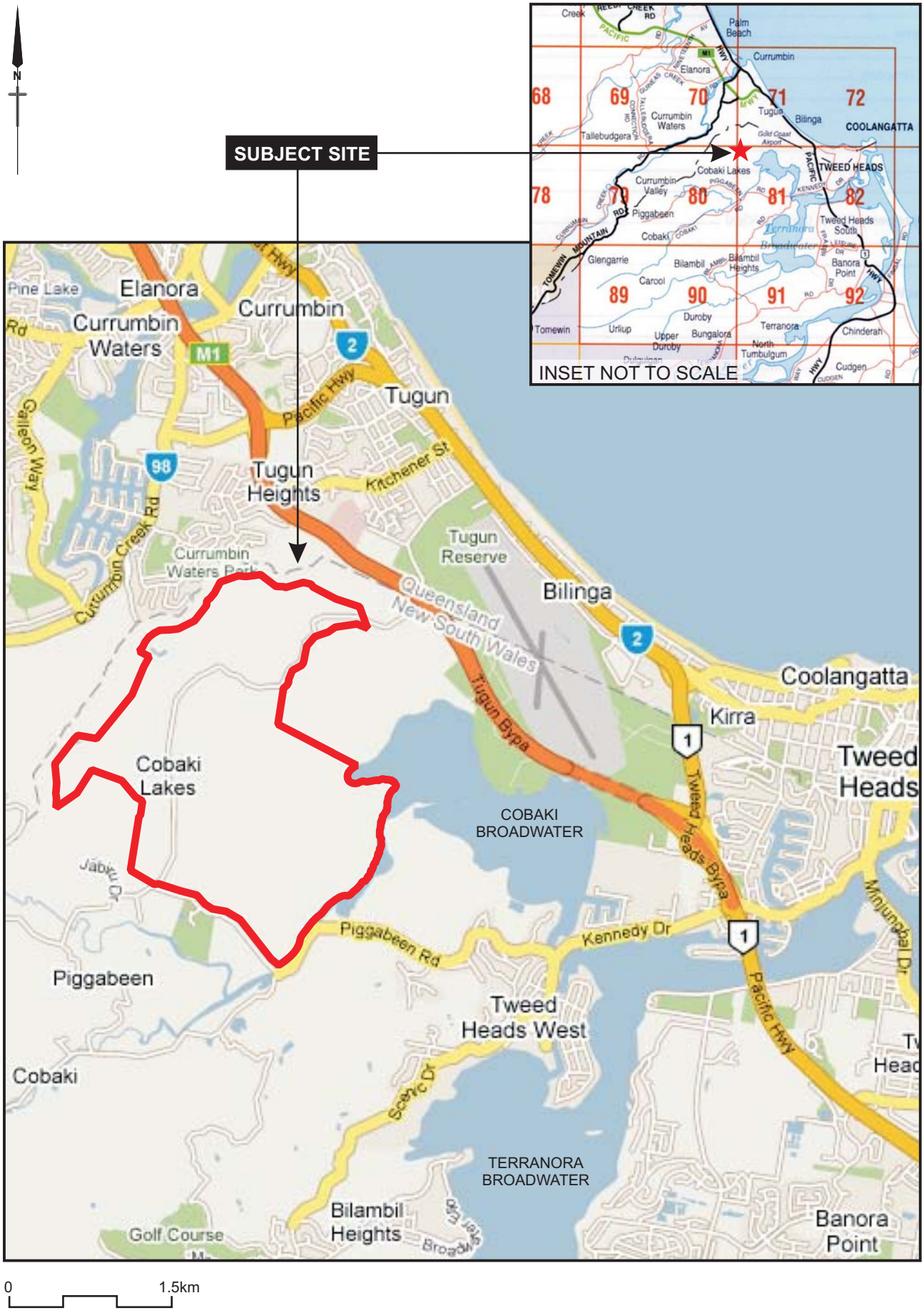
The site lies adjacent to private landholdings to the north-west and south-east, and comprises a large portion of land cleared for agricultural purposes (i.e. grazing) throughout which a number of vegetation communities occur. Extensive clearing and subsequent slashing over the drainage basin has resulted in the recruitment of a combination of native and introduced grass species in place of native plants. Forested Crown lands which form the NSW-QLD border also form the northern and western boundary of the Cobaki Estate site.

**FIGURE 2** shows a recent aerial photograph of the site.

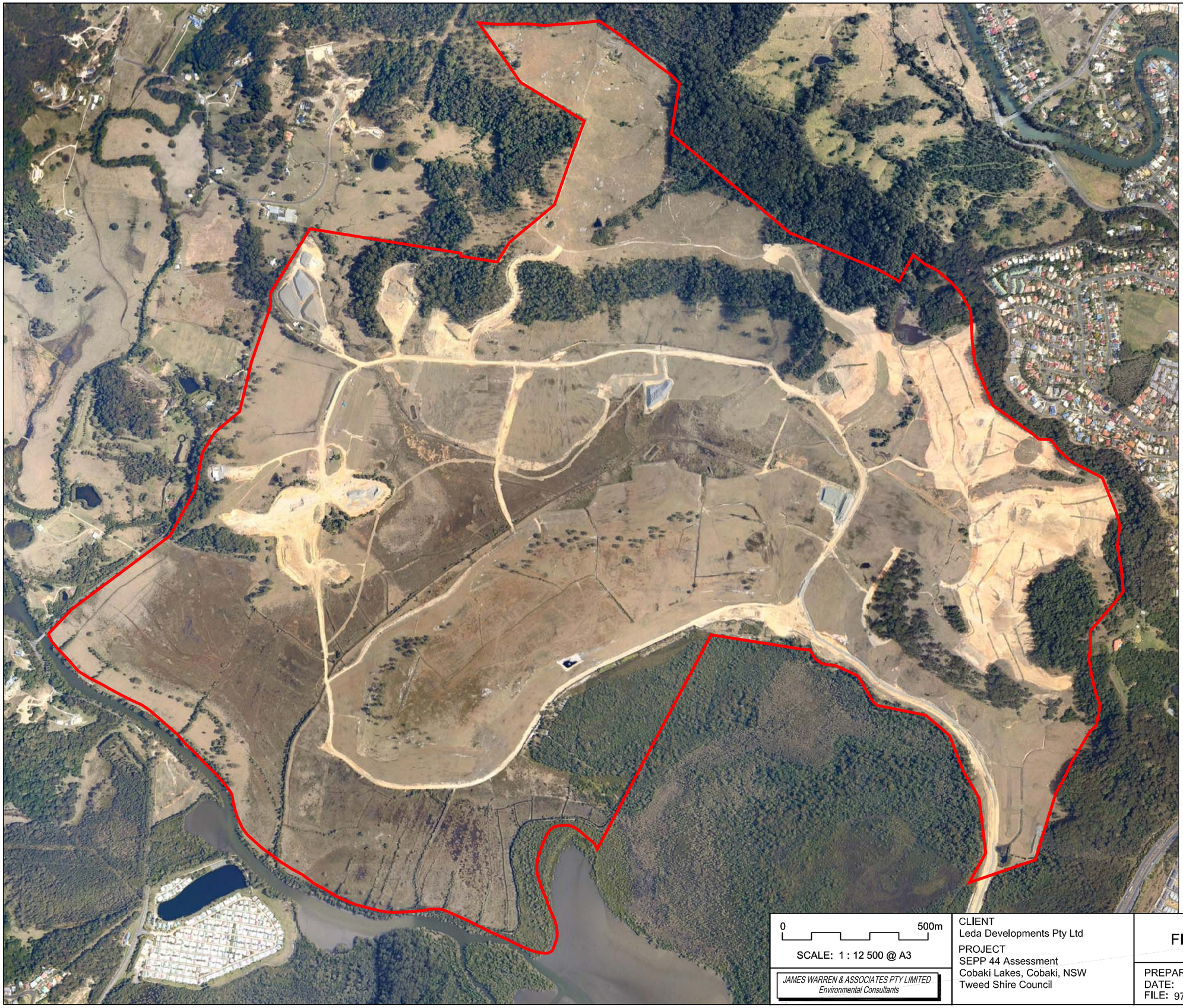
## 1.3 Aims & Objectives

The aim of this report is to provide a detailed and comprehensive assessment of the Koala habitat values of the Cobaki Estate site and the use of the site by any local population of Koalas. The objectives of the report to achieve this aim are as follows:

1. Provide a summary of the Koala habitat assessments and surveys completed on the Cobaki Estate site to date;
2. Review existing data available on Koala habitat and Koala records for the locality;




| | | | |
|---|---|---|---|
| SOURCE: Google Maps<br>SCALE: 1 : 50 000 @ A4<br>JAMES WARREN & ASSOCIATES PTY LIMITED<br>Environmental Consultants | CLIENT<br>Leda Developments Pty Ltd<br>PROJECT<br>SEPP 44 Assessment<br>Cobaki Lakes, Cobaki, NSW<br>Shire of Tweed | **FIGURE 1**<br>PREPARED: BW<br>DATE: 19 December 2011<br>FILE: 97038_Locality.cdr | TITLE<br>**LOCALITY PLAN** |



**LEGEND**

Site Outline

SOURCE:
Aerial - Near Map 21 Sept 2011 Aerial Photograph

0 500m

SCALE: 1 : 12 500 @ A3

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FIGURE 2

PREPARED: BW
DATE: 19 December 2011
FILE: 97038_Base.dwg

TITLE

AERIAL PHOTOGRAPH

3. Complete a detailed and comprehensive assessment of Koala habitat on the site and Koala usage of the site using the Spot Assessment Technique (SAT) (Phillips and Callaghan 2011); and
4. Based on the results of the site assessment, complete an assessment in accordance with the requirements of SEPP 44.

# 2. HISTORY OF KOALA ASSESSMENTS AT COBAKI ESTATE

## 2.1 Background

The Cobaki Estate site has been comprehensively studied over the last thirty (30) years. Assessments of the site and surrounds that are relevant to the Koala and its habitat include, but are not limited to, the following:

- Cameron McNamara (1983) Cobaki Village Environmental Study (Report Prepared for the Bradshaw Group);
- WBM (1991) Flora and Fauna Studies, Proposed Boyd Street Extension to Cobaki;
- Warren (1992) Fauna Impact Assessment of the Proposed Boyd Street Access;
- Warren (1993) Flora and Fauna survey of proposed cut/fill areas at Cobaki Lakes development (Unpublished Report);
- Warren (1994) Flora and Fauna survey of the Cobaki Lakes development site (Unpublished Report);
- Woodward-Clyde (1997) Species Impact Statement - AGC Woodward-Clyde Pty Ltd;
- Parker (1999) A Species Impact Statement for the Cobaki Lakes Project;
- EcoPro Pty Ltd (2004) Tugun Bypass: Species Impact Statement (SIS). A report prepared for the Queensland Department of Main Roads;
- JWA (2008a) Cobaki Estate Ecological Assessment – Volumes 1 & 2. Response to the Director General's Environmental Assessment Requirements. May 2008
- JWA (2008b) Cobaki Estate Ecological Assessment – Volumes 1 & 2. Response to the Director General's Environmental Assessment Requirements. As Amended November 2008
- JWA (2009) SEPP 44 Assessment. Cobaki Estate Preferred Project Report. October 2009.
- JWA (2010) Revised Cobaki Estate Ecological Assessment. Cobaki Estate Preferred Project Report. June 2010.

A brief summary of findings that relate to Koalas and their habitats is provided in the following sections.

## 2.2 Cameron McNamara (1983)

The fauna survey component of this study was carried out by Barry (1981). This survey was mainly restricted to less elevated portions of the site. Barry set a number of trap lines and one drift fence with pits.

No Koalas were reported as occurring on the site, or any comment made on the Koala habitat potential of the site.

## 2.3 WBM (1991)

The survey (carried out in October and November 1991) centred on the fauna existing in the Crown Reserve area between the QLD – NSW border and the Cobaki property boundary. The survey included day and night observations.

No Koalas were reported as occurring on the site, or any comment made on the Koala habitat potential of the site. It was recorded that a fire that burnt through much of the area of the Crown Reserve two (2) months prior to this survey could have led to an underestimation of the species diversity in the area.

## 2.4 Warren (1992)

Further survey work was carried out within the Crown reserve in the area of the proposed Boyd Street Extension. This survey targeted a number of Threatened fauna species and included day and night observations.

No Koalas were reported as occurring on the site, or any comment made on the Koala habitat potential of the site.

## 2.5 Warren (1993)

The area subject of the bulk earthworks (cut and fill) was the subject of an intensive fauna survey in April and May 1993 and again in October and November 1994. The surveys centred on the identification of Threatened fauna given that numerous studies had already been carried out on the site and included spotlighting surveys.

No Koalas were reported as occurring on the site, or any comment made on the Koala habitat potential of the site.

## 2.6 Warren (1994)

Supplementary work in the proposed cut/fill areas (C5, F8-11) was carried out in September and October 1994. Again this survey work was designed to record Threatened fauna species and included spotlighting surveys.

Approximately 483 trees in the Scribbly gum/Swamp mahogany community, and the Blackbutt community in the Stages 7-10 and SIS Study site were assessed for Koala activity. Most of the trees inspected were restricted to Grey gum, Tallowwood and Forest red gum as these are known to be preferentially browsed by Koalas in the region.

The analysis was based on scratch density on trees as well as the occurrence of faecal pellets around the base of the tree. Each tree was allocated a rating of 0-5 depending on the density of pellets or scratch marks. 0 indicated absence of Koala activity whilst 5 indicated a level of high activity. Only a very small number of trees showed any

indication of activity and none of the trees showed an activity level greater than 2. In some cases it was difficult to ascribe the scratches to Koalas as there were no faecal pellets and it is known that Common brushtail possums and Lace monitors occur on the site.

## 2.7 Woodward-Clyde (1997)

A detail botanical survey was undertaken between April and June 1997. The fauna section of the SIS relied upon the comprehensive fauna study effort which had been previously completed on the site. A complete fauna list from the previous sixteen (16) years of surveys included the Koala.

## 2.8 Parker (1999)

Parker used the vegetation descriptions from WBM (1991) as a basis of the vegetation assessment. The fauna section of the SIS relies on the comprehensive fauna study effort which has been previously completed on the site. A complete fauna list from the previous eighteen (18) years of surveys included the Koala.

## 2.9 EcoPro Pty Ltd (2004)

Ten (10) primary survey precincts were selected as being representative of vegetation communities along the proposal corridor. Survey methods involved the use of standardised techniques for fauna. Supplementary sampling included Koala spot assessments (Phillips and Callaghan 1995).

Eleven (11) spot assessment sites were surveyed in total. No Koalas or evidence of Koala activity were recorded. It was concluded that as intensive searches for this species failed to reveal its presence, it was unlikely to occur in the area.

## 2.10 JWA (2008a)

Areas of the site containing preferred Koala food trees (i.e. Swamp mahogany, Forest red gum, Tallowwood, Grey gum) were searched for evidence of Koala activity (i.e. scats, scratches) in December 2007. Two (2) scientists spent approximately twelve (12) hours on this component of the assessment.

A nocturnal survey was also completed including spotlighting and call playback techniques. Approximately eight (8) hours was spent on this component of the assessment.

No conclusive evidence of Koala activity (scats) was recorded on the site. Whilst a number of trees contained scratch marks this is not considered a conclusive method of identifying Koala activity when not accompanied by scats as they may be attributed to

other more common arboreal species. One (1) male Koala was heard calling approximately 200-300m north of the south-western corner of the subject site.

It was concluded that Koalas may occasionally disperse across the site whilst moving through the locality.

An assessment of potential impacts on Koala habitat was also completed. It was determined that 5.26 hectares of suitable Koala habitat (13.40% of the total available habitat) would be lost from the subject site as a result of the proposed Concept Plan.

## 2.11 JWA (2008b)

The amened Ecological Assessment calculated impacts based a revised layout and determined that 9.24 hectares of suitable Koala habitat (20.8% of the total available habitat) may potentially be lost from the subject site as a result of the proposed Concept Plan.

## 2.12 JWA (2009)

Subsequent to the Concept Plan application an assessment of the proposed Concept Plan against the requirements of SEPP 44 was completed to accompany the Preferred Project report.

The exact number and location of trees listed under Schedule 2 which occur on the subject site was determined. In total, four hundred and sixty three (463) Koala food trees listed under Schedule 2 occur on the subject site as follows:

- One hundred and fifty six (156) Forest red gum (*Eucalyptus tereticornis*);
- One hundred and twenty nine (129) Tallowwood (*Eucalyptus microcorys*);
- Seventy three (73) Swamp Mahogany (*Eucalyptus robusta*); and
- One hundred and thirteen (113) Scribbly gum (*Eucalyptus racemosa*).

Although the percentage of Koala food trees on the subject site was not quantitatively assessed, mapping clearly showed that the total number of Koala food trees was unlikely to exceed fifteen per cent (15%) of the total trees present. Therefore, the subject site was not considered to contain core Koala habitat as defined under SEPP 44.

The assessment of SEPP 44 determined that core Koala habitat as defined by SEPP 44 does not occur on the subject site and thus there is no requirement for the preparation of a Koala Plan of Management.

## 2.13 JWA (2010)

The amened Ecological Assessment calculated impacts based a revised layout and determined that 12.5 hectares of suitable Koala habitat (29.3% of the total available

habitat) may potentially be lost from the subject site. All potential Koala habitat to be removed occurred within portions of the site with existing development approval.

# 3. REVIEW OF AVAILABLE KOALA HABITAT DATA & RECORDS

## 3.1 Introduction

The following sections provide a review of the various assessments of available Koala habitat in the Cobaki Estate area as well as know Koala records in the locality of the site.

## 3.2 Koala habitat values on the Cobaki Estate site

### 3.2.1 Tweed Coast Koala Habitat Atlas (Australian Koala Foundation 1996)

In April, 1993 Council resolved to contribute $10,000 to the Australian Koala Foundation (AKF) to assist them in the preparation of a Tweed Coast Koala Atlas for the eastern section of the Shire.

The objectives of the AKF study were as follows:

a. to quantify tree preferences and habitat utilisation;
b. to delineate areas of Primary and Secondary Koala Habitat;
c. to examine the relationship of this information in terms of State Environmental Planning Policy No 44 (Koala Habitat);
d. to identify threatening processes; and
e. to recommend measures to provide Koala populations with a measure of long term viability.

The Tweed Coast Koala atlas maps parts of the Cobaki Estate site as Secondary Habitat (**FIGURE 3**). However, clearing activities have occurred since the preparation of this mapping. Large areas of vegetation mapped as secondary habitat are now open grassland with scattered trees. In particular, the elevated plateau in the western portion of the site does not represent secondary Koala habitat as described in the Summary of Tweed Coast Koala Atlas.

### 3.2.2 Tweed Coast Koala Habitat Study (Biolink 2011)

This report describes the results of a koala habitat and population assessment for the coastal portion of the Tweed LGA. The study area covered the coastal strip from Queensland border at Tweed Heads to the Byron Shire Council Border south of Wooyung. The study area included lands surrounding the Cobaki Broadwater with six (6) field sites occurring within or immediately adjacent to the Cobaki Estate site (**FIGURE 4**).

The vegetation mapping work of Kingston et al. (2004) provided the basis for koala habitat classifications. Vegetation communities were categorised in accord with the

**Legend**

- Primary Habitat
- Secondary Habitat (Class A)
- Secondary Habitat (Class B)
- Unknown Habitat Quality
- Mainly Cleared (Some Trees)
- Other Vegetation Communities
- Subject Site

N

0 750m

SOURCE: Australian Koala Foundation - Tweed Coast Koala Habitat Atlas (Tweed Shire Council Mapping)
SCALE: 1 : 30 000 @ A4

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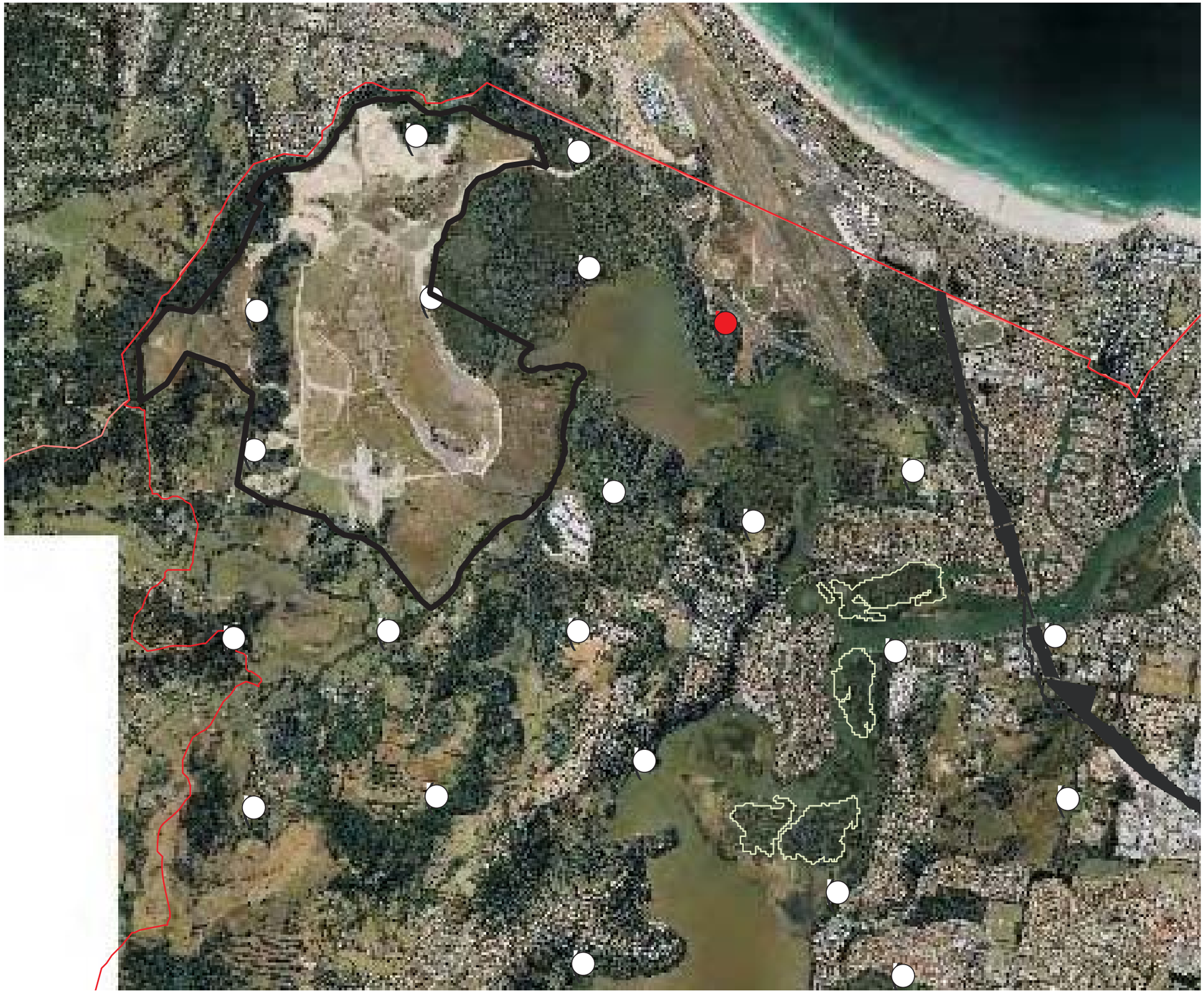
**FIGURE 3**

PREPARED: BW
DATE: 19 December 2011
FILE: 97038_Tweed Koala Atlas.cdr

TITLE

**TWEED COAST KOALA HABITAT ATLAS**



**LEGEND**
- Active Field Sites
- Inactive Field Sites
- Nature Reserve
- Study Area Boundary
- LGA Boundary
- Subject Site

N

0 750m
1 : 30 000

SOURCE: Biolink Ecological Consultants - Tweed Coast Koala Habitat Study (2011) - Figure 3.1

SCALE: 1 : 30 000 @ A3

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**FIGURE 4**

PREPARED: BW
DATE: 19 December 2011
FILE: 97038_Phillips Survey.cdr

TITLE

**LOCATION OF ACTIVE & INACTIVE FIELD SITES**

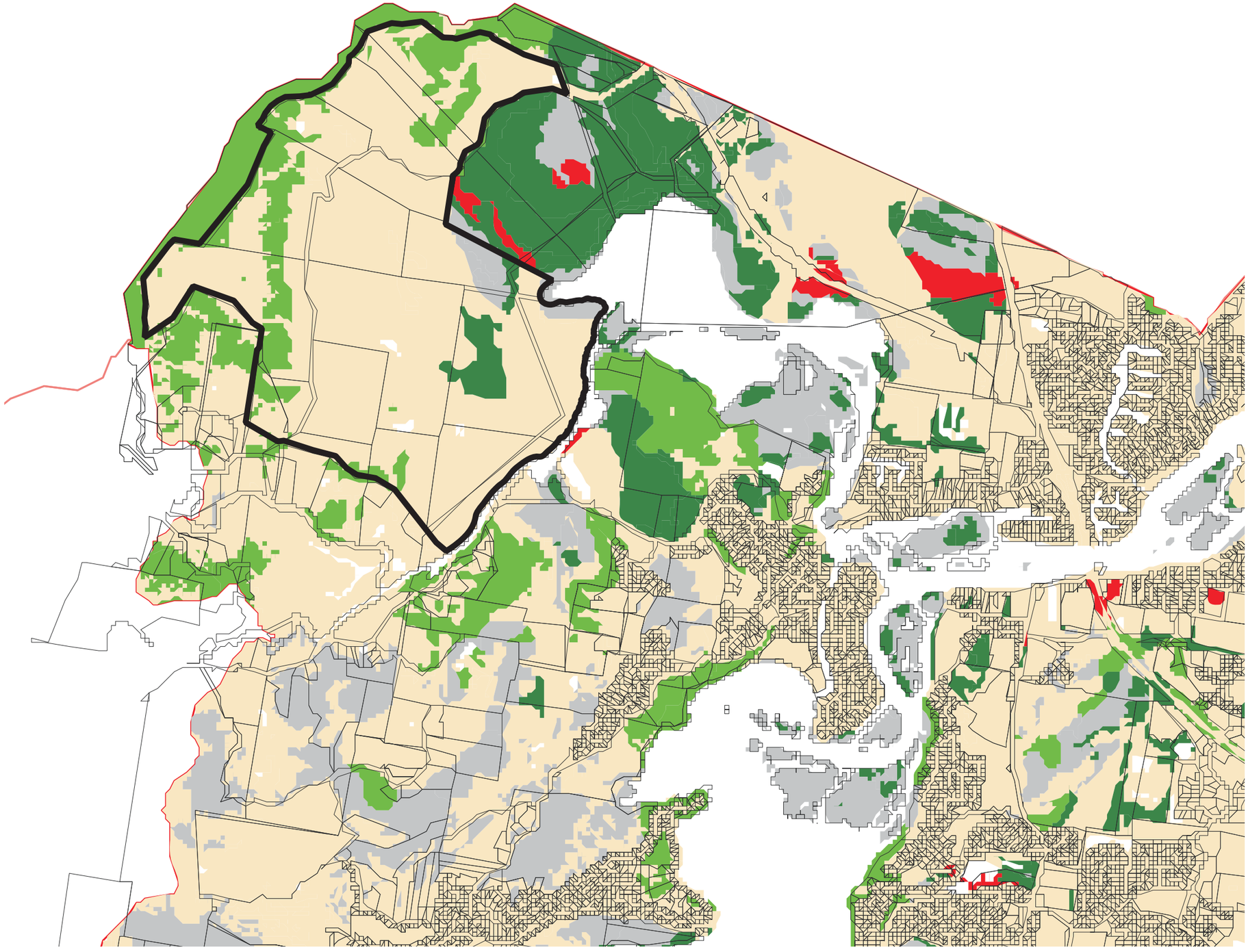
definitions detailed below; such ecologically-based determinations considered to better reflect the extent of *potential koala habitat* for the purposes of SEPP 44 than that otherwise obtained using the 15% rule (see SEPP 44, Part 1, 4 Definitions). The terms "Primary", "Secondary" and "Supplementary" food tree species are outlined below:

- **Primary Habitat** – areas of forest and/or woodland wherein primary food tree species comprise the dominant or co-dominant (i.e. ≥ 50%) overstorey tree species.
- **Secondary (Class A) Habitat** – areas of forest and/or woodland wherein primary food tree species are present but not dominant or co-dominant and usually (but not always) growing in association with one or more secondary food tree species.
- **Secondary (Class B) Habitat** – areas of forest and/or woodland wherein primary food tree species are absent, habitat containing secondary and/or supplementary food tree species only.

The Tweed Coast Koala Habitat Study maps the majority of the vegetated areas of the Cobaki Estate site as Secondary (Class B) Habitat (**FIGURE 5**). An area of Primary Habitat is mapped as occurring in the eastern portion of the site.

A review of the Tweed Coast Koala Habitat Study mapping of the site has revealed the following:

1. Areas of Sub-tropical rainforest in the northern portion of the site associated with Mount Woodgee have been mapped as Secondary (Class B) Habitat. Whilst scattered Brushbox (*Lophostemon confertus*) occur in this area, and this species was indicated as a Preferred Koala food tree in the study albeit with a relatively low 'strike-rate', Koalas are not generally known to inhabit rainforest communities, and the definition of Other in the habitat categorisation section of the report includes rainforests.
2. A relatively large area of Primary Koala habitat mapped in the eastern portion of the subject site is comprised of scattered mature Scribbly gum (*Eucalyptus racemosa*). This species is listed as a Preferred Koala food tree within Schedule 2 of SEPP 44 and received a moderate 'strike-rate' in the study. However it is worth noting that in this instance these trees occur as an isolated stand in a cleared grazing land environment.
3. Similar isolated stands of Schedule 2 Koala food trees which received a much higher 'strike-rate' in the study (i.e. *Eucalyptus robusta, Eucalyptus tereticornis*) occur on the site and have been included in the Secondary (Class B) Habitat mapping.




SOURCE: Biolink Ecological Consultants - Tweed Coast Koala Habitat Study (2011) Figure 4.5

SCALE: 1 : 30 000 @ A3

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**FIGURE 5**

PREPARED: BW
DATE: 19 December 2011
FILE:97038_Phillips Habitat.cdr

TITLE

**POTENTIAL KOALA HABITAT**

## 3.3 Koala records

### 3.3.1 BioNet Atlas of NSW Wildlife

A search for Koala records within 10km of the Cobaki Estate site was completed on the 24th November 2011 utilising the BioNet Atlas of NSW Wildlife. The search returned twenty-two (22) records within 10km of the site, including two (2) records from the subject site between 2004 and 2006 (**FIGURE 6**) i.e.:

- A record from approximately the centre of the site; and
- A record from a small patch of vegetation in the southern portion of the site abutting Piggabeen Road.

Other nearby records occur near Jabiru Drive approximately 1km to the south-west of the site, approximately 250m to the south-east over Cobaki Creek, and adjacent to the eastern site boundary surrounding Cobaki Broadwater. Interestingly a number of records occur within Cobaki Broadwater itself, highlighting the inevitable error associated with mapping public records and at such a large scale.

### 3.3.2 Tweed Coast Koala Habitat Study (Biolink 2011)

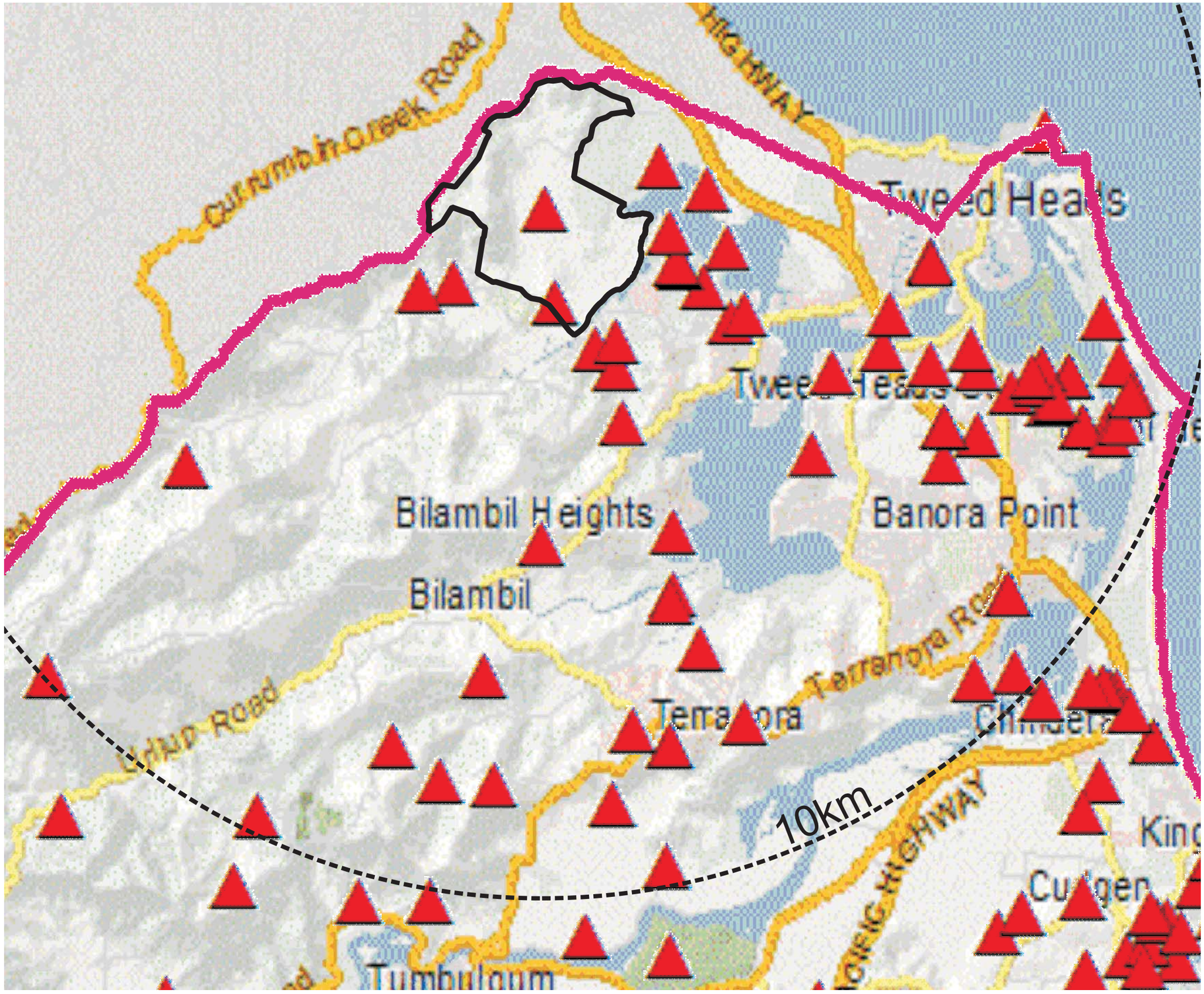
Detailed koala population assessments in the Tweed Coast Study Area involved application of a systematic sampling strategy primarily reliant on Spot Assessment Technique (SAT) methodology (Phillips & Callaghan 2011) to gather data on koala presence and absence, food tree preferences, koala density and activity. Collectively, 134 field sites were sampled comprising 85 primary and 49 supplementary field sites, the latter focused around areas of significant koala activity.

Six (6) field sites occurring within or immediately adjacent to the Cobaki Estate site (**FIGURE 4**). No Koala activity was recorded in the field sites on or immediately surrounding the Cobaki Estate (**FIGURE 4**). The closest recorded activity was approximately 2.5 km away on the eastern side of the Cobaki Broadwater (**FIGURE 4**).

The study concluded that north of the Tweed River, Koala activity data indicates the persistence of small relic populations in the Terranora-Bilambil Heights and Tweed Heads South areas, however the short to medium-term viability of these populations is considered low in the absence of recruitment and the escalation of threatening processes arising from ongoing development.

### 3.3.3 Targeted surveys on and adjacent to the Cobaki Estate site

Section 2 provided a brief summary of findings from various studies completed at the site over the past 30 years. The results of targeted Koala assessments can be further summarised as follows:




**LEGEND**
Koala Records
Subject Site

0 1500m
1 : 60 000

SOURCE: Atlas of NSW Wildlife Records

SCALE: 1 : 60 000 @ A3

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**FIGURE 6**

PREPARED: BW
DATE: 19 December 2011
FILE:97038_NPWS Records.cdr

TITLE

**NPWS KOALA RECORDS WITHIN 10KM OF SITE**

*Warren (1994)*

- Approximately 483 trees were assessed for Koala activity. Most of the trees inspected were restricted to Grey gum, Tallowwood and Forest red gum as these are known to be preferentially browsed by Koalas in the region.
- The analysis was based on scratch density on trees as well as the occurrence of faecal pellets around the base of the tree. Each tree was allocated a rating of 0-5 depending on the density of pellets or scratch marks. 0 indicated absence of Koala activity whilst 5 indicated a level of high activity.
- Only a very small number of trees showed any indication of activity and none of the trees showed an activity level greater than 2.

*EcoPro Pty Ltd (2004)*

- Ten (10) primary survey precincts were selected along the proposal corridor.
- Supplementary sampling included Koala spot assessments (Phillips and Callaghan 1995).
- Eleven (11) spot assessment sites were surveyed in total.
- No Koalas or evidence of Koala activity was recorded.
- It was concluded that as intensive searches for this species failed to reveal its presence, it was unlikely to occur in the area.

*JWA (2008)*

- A search was completed for evidence of Koalas with areas containing preferred Koala food trees (i.e. Swamp mahogany, Forest red gum, Tallowwood, Grey gum, Scribbly gum).
- Approximately 12 person-hours were spent looking for Koalas, scats and/or tree scratches.
- A further eight (8) hours person-hours was spent on a nocturnal survey that including spotlighting and call playback techniques.
- No Koalas were sighted and no scats were found.

*JWA (2009)*

- Subsequent to the Concept Plan application an assessment of the proposed Concept Plan against the requirements of SEPP 44 was completed to accompany the Preferred Project report.
- In total, four hundred and sixty three (463) Koala food trees listed under Schedule 2 were mapped on the subject site as follows (**FIGURE 7**):
    - One hundred and fifty six (156) Forest red gum (*Eucalyptus tereticornis*);

N

**LEGEND**

- *Eucalyptus microcorys*
- *Eucalyptus racemosa*
- *Eucalyptus robusta*
- *Eucalyptus tereticornis*
- Site Outline

SOURCE:
Habitat - James Warren & Associates Pty Ltd
Aerial - Near Map 21 Sept 2011 Aerial Photograph

0 500m

SCALE: 1 : 12 500 @ A3

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FIGURE 7

PREPARED: BW
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FILE: 97038_Base.dwg

TITLE

# IDENTIFIED KOALA HABITAT

- One hundred and twenty nine (129) Tallowwood (*Eucalyptus microcorys*);
- Seventy three (73) Swamp Mahogany (*Eucalyptus robusta*); and
- One hundred and thirteen (113) Scribbly gum (*Eucalyptus signata*).

- The assessment of SEPP 44 determined that core Koala habitat as defined by SEPP 44 does not occur on the subject site and thus there was no requirement for the preparation of a Koala Plan of Management.

# 4. SITE ASSESSMENT

## 4.1 Introduction

A realistic and thorough assessment of habitat occupied by free-ranging Koalas should employ a number and variety of techniques. This section provides details of a recent targeted Koala survey at Cobaki Estate utilising the following techniques:

- Preliminary site assessment;
- SAT (Spot Assessment Technique) analysis (Phillips & Callaghan 2011);
- Diurnal surveys for roosting Koalas;
- Diurnal searches for evidence of Koala activity (i.e. scats & scratches);
- Spotlighting surveys; and
- Call playback technique.

The results of the assessment are also discussed.

## 4.2 Methodology

### 4.2.1 Preliminary site assessment

A preliminary site assessment was completed in September 2011 to ground-truth existing vegetation mapping and verify the location and extent of identified potential Koala habitat areas on the site.

Opportunistic searches for Koalas and/or evidence of Koala activity (i.e. sctas) were completed whilst traversing the site.

### 4.2.2 Spot Assessment Technique (SAT)

#### *4.2.2.1 Background*

The Spot Assessment Technique (SAT) developed by Stephen Phillips and John Callaghan describes a point-based tree sampling methodology that utilizes the presence/absence of Koala faecal pellets (scats) within a prescribed search area around the base of trees to derive a measure of Koala activity. Confidence intervals associated with Koala activity data from 405 randomly selected field plots within which faecal pellets were recorded have been utilised to assign threshold values for three population density/habitat biomes in eastern Australia.

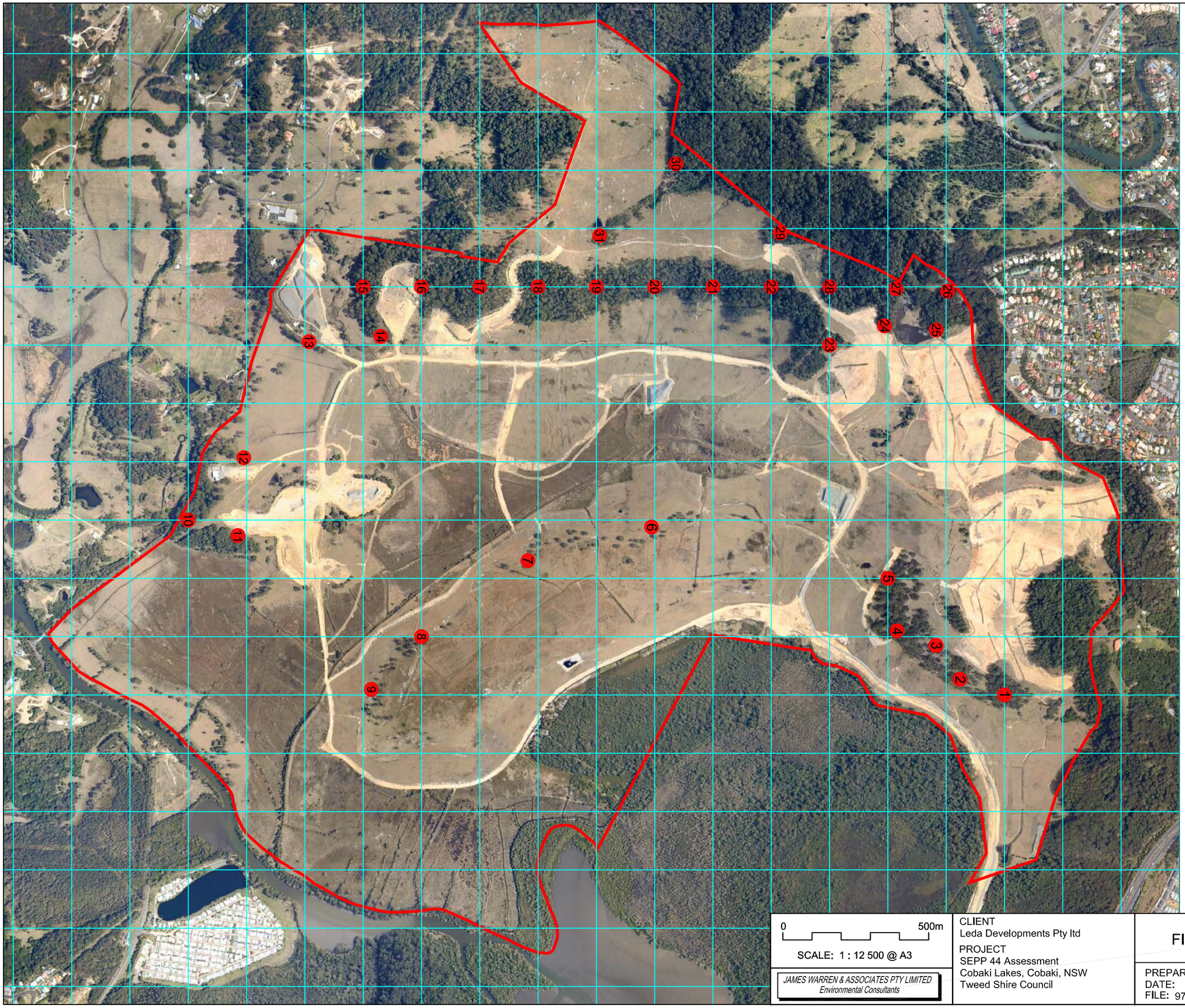
#### *4.2.2.2 Site selection*

To ensure a uniform and unbiased survey effort across the Cobaki Estate site, a 200m grid was overlaid on an aerial photograph of the site. Grid points, where they

intersected vegetated areas, were then used as field sites. In instances where the grid points fell on a cleared area adjacent to discrete vegetation patches, the site was relocated accordingly. Thirty-one (31) field sites were identified and surveyed **(FIGURE 8).** Details of the location of each field site are provided in **TABLE 1.**

**TABLE 1**
**FIELD SITE LOCATIONS**

| Field site no. | GPS | | Brief description |
|---|---|---|---|
| | Easting | Northing | |
| 1 | 547467 | 6884784 | Blackbutt forest with maintained midstorey & groundcover – ridge top |
| 2 | 547413 | 6884631 | Blackbutt forest with maintained midstorey & groundcover – ridge top |
| 3 | 547297 | 6884549 | Blackbutt forest (+/- Grey gum) with maintained midstorey & groundcover – moderately steep westerly aspect |
| 4 | 547247 | 6884415 | Blackbutt forest (+/- Brushbox) with maintained midstorey & groundcover – ridge top |
| 5 | 547067 | 6884384 | Blackbutt forest with maintained midstorey & groundcover – moderately steep south-easterly aspect |
| 6 | 546891 | 6883573 | Swamp mahogany woodland with maintained midstorey & groundcover – on flat sand plain |
| 7 | 547006 | 6883149 | Swamp mahogany woodland with maintained midstorey & groundcover – on flat sand plain |
| 8 | 547267 | 6882784 | Scribbly gum woodland with maintained midstorey & groundcover – on flat sand plain |
| 9 | 547448 | 6882612 | Scribbly gum woodland with maintained midstorey & groundcover – on flat sand plain |
| 10 | 546867 | 6881984 | Blackbutt forest – steep south-westerly aspect |
| 11 | 546920 | 6882154 | Blackbutt forest (+/- Brushbox) – steep easterly aspect |
| 12 | 546653 | 6882174 | Blackbutt forest and adjacent scattered Forest red gum |
| 13 | 546255 | 6882398 | Linear stand of old growth Forest red gum |
| 14 | 546237 | 6882644 | Blackbutt forest (+/- Brushbox) with maintained midstorey & groundcover – moderately steep easterly aspect |
| 15 | 546067 | 6882584 | Blackbutt forest (+/- Brushbox) with maintained midstorey & groundcover – steep southerly aspect |




SOURCE:
Aerial - Near Map 21 Sept 2011 Aerial Photograph

DRAFT 19.12.11

0 500m

SCALE: 1 : 12 500 @ A3

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FIGURE 8

PREPARED: BW
DATE: 19 December 2011
FILE: 97038_Base.dwg

TITLE

SAT SURVEY LOCATIONS

| Field site no. | GPS | | Brief description |
|---|---|---|---|
| 16 | 546067 | 6882784 | Blackbutt forest (+/- Brushbox) with maintained midstorey & groundcover – gentle north-easterly aspect |
| 17 | 546067 | 6882984 | Blackbutt forest (+/- Brushbox) at the top of a very steep rock ridgeline |
| 18 | 546067 | 6883184 | Blackbutt forest (+/- Brushbox) – moderately steep south-easterly aspect |
| 19 | 546067 | 6883384 | Blackbutt forest (+/- Brushbox) – very steep easterly aspect |
| 20 | 546067 | 6883584 | Blackbutt forest (+/- Brushbox) – steep easterly aspect |
| 21 | 546067 | 6883784 | Brushbox forest – steep northerly aspect |
| 22 | 546067 | 6883984 | Blackbutt forest in steep eastern facing gully |
| 23 | 546267 | 6884184 | Blackbutt forest (+/- Grey gum) - steep southerly aspect |
| 24 | 546201 | 6884373 | Blackbutt forest – steep westerly aspect |
| 25 | 546215 | 6884550 | Brushbox forest – moderately steep easterly aspect |
| 26 | 546082 | 6884589 | Blackbutt forest – steep south-easterly aspect |
| 27 | 546073 | 6884412 | Very tall Flooded gum forest in easterly facing gully |
| 28 | 546067 | 6884184 | Brushbox forest in steep northern facing gully |
| 29 | 545882 | 6884015 | Brushbox forest in steep gully |
| 30 | 545645 | 6883657 | Blackbutt forest – gentle easterly aspect |
| 31 | 545891 | 6883395 | **Brief description:** Regrowth – gentle westerly aspect |

#### *4.2.2.3 Applying the SAT*

The Spot Assessment Technique (SAT) was then applied at each of the thirty-one (31) field sites by two (2) scientists on the 15th, 16th and 17th November 2011.

Within each field site Koala "activity" was assessed within the immediate area by first selecting and marking an important or centre tree using the following criteria:

- a tree of any species beneath which one or more Koala faecal pellets have been observed; and/or
- a tree in which a Koala has been observed; and/or
- any other tree known or considered to be potentially important for Koalas, or for other assessment purposes.

The twenty-nine (29) closest trees were then similarly marked. For the purposes of the SAT analysis, a tree is defined as a "*live woody stem of any plant species except cycads, palms, tree ferns and grass trees*" (Phillips & Callaghan 2011).

A systematic search for Koala faecal pellets beneath each of the marked trees was completed. Firstly a quick inspection of the undisturbed ground surface within 100cm from the base of each tree then a more thorough inspection involving disturbance of the leaf litter and ground cover. The search under each tree was concluded when either a single pellet was detected or when two (2) minutes expired.

This process was repeated until each of the 30 trees in the site was assessed. Where the location of faecal pellets falls within overlapping search areas (i.e. two or more trees growing in close proximity to each other) both were positively scored for the pellets. Further details such as the site's location, selection criteria for the centre and the tree species were also recorded.

The activity level for each site is expressed as a proportion of surveyed trees within the site that have a positive koala scat record. For example, if 15 trees out of the 30 surveyed record scat(s) then the resulting activity level is 50%. Sites were then categorised as 'active or 'inactive'.

### 4.2.3 Diurnal surveys for roosting Koalas

All trees surveyed during the SAT analysis were also searched for roosting Koalas. Each tree was viewed from several different angles as roosting Koalas can often be inconspicuous.

Searches were also completed opportunistically whilst moving on foot between SAT analysis field sites.

A pair of binoculars was utilised during searches.

### 4.2.4 Diurnal searches for evidence of Koala activity (i.e. scats & scratches)

Additional to the scat searches completed during the SAT analysis, searches for scats were completed opportunistically whilst moving on foot between SAT analysis field sites. Preferred Koala food tree species were randomly selected and the same methodology applied as during the SAT analysis (i.e. searches within 100cm of the base of the tree for a maximum of 2 minutes).

### 4.2.5 Spotlighting surveys

At night, predetermined routes on the Cobaki Estate site were driven in a four-wheel drive vehicle at approximately 10km/h. A large spotlight was used to detect 'eye-shine' from nocturnal fauna. If fauna could not be identified from the vehicle, it was

necessary to approach them on foot with a handheld spotlight and to identify them with binoculars.

'On foot' spotlighting was also undertaken regularly during spotlighting surveys to access the gullies on the subject site.

Spotlighting surveys were completed by two (2) JWA scientists on the nights of the 15th, 16th and 17th November 2011. A total of eighteen (18) person hours of survey was completed over three (3) nights.

### 4.2.6 Call playback technique

Koalas were targeted using a 'Call Playback' system. The calls of a male Koala were broadcast from a CD player through a loudspeaker at various locations adjacent to potential habitat. A pause of five (5) minutes was maintained between each series of calls to provide an opportunity for the scientists to listen for a response and to spotlight for the presence of the target species.

## 4.3 Results

### 4.3.1 Preliminary site assessment

The preliminary site assessment confirmed the previous vegetation and Koala habitat mapping over the site.

A small number of fresh scats were recorded from a single location on the subject site (**FIGURE 9**).

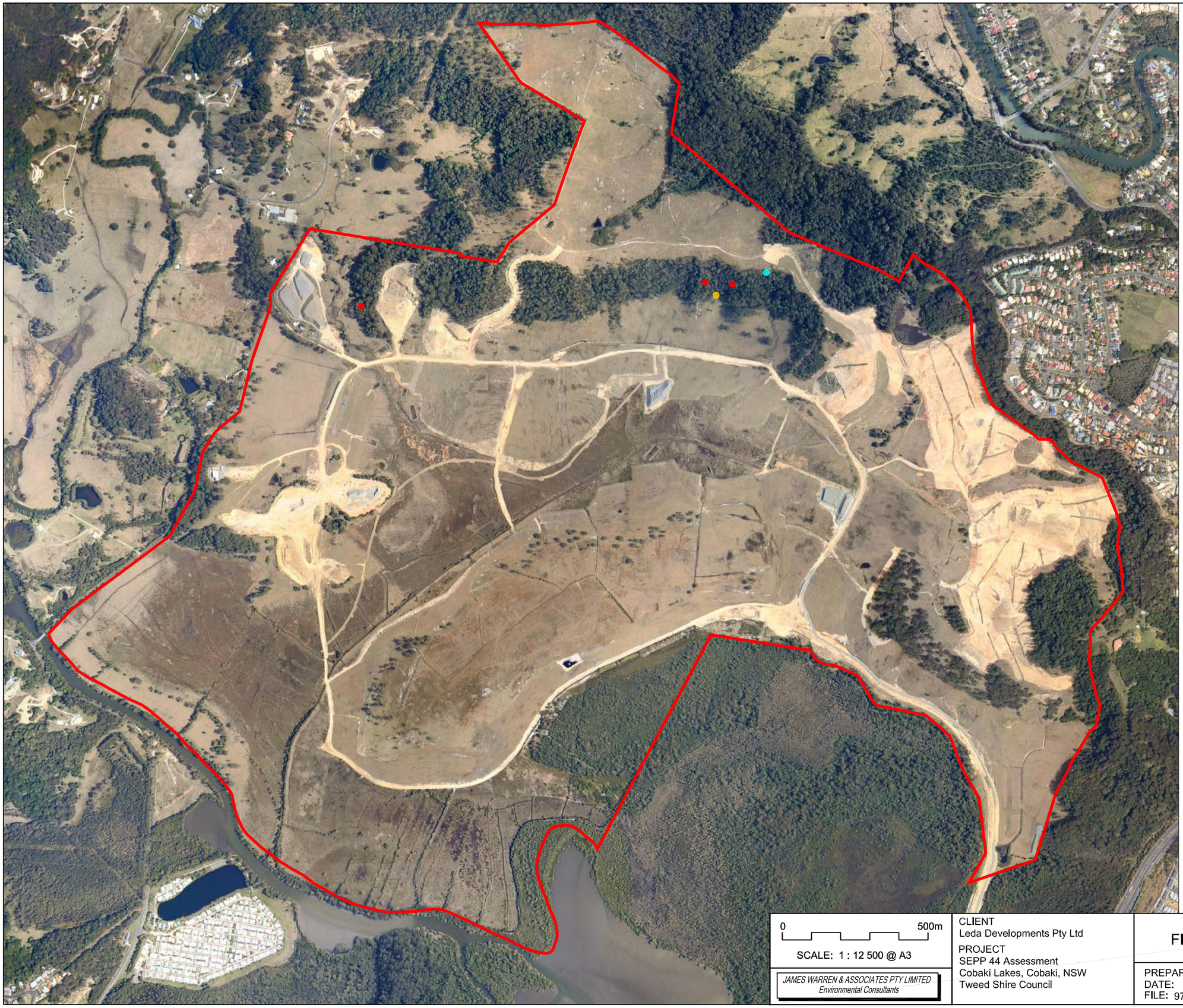
### 4.3.2 Spot Assessment Technique (SAT)

The SAT was applied at thirty-one (31) field sites, totalling nine-hundred and thirty (930) trees, and failed to record a single scat. Therefore, all field sites were classed as inactive.

Survey sheets for each field site are contained in **APPENDIX 1.**

### 4.3.3 Diurnal surveys for roosting Koalas

Searches for Koalas in each tree at each SAT field site, as well as opportunistically whilst moving between each SAT field site, failed to locate any Koalas.



N

**LEGEND**

- Koala scats (JWA 2009)
- Koala scats (JWA September 2011)
- Koala scats (this study - JWA November 2011)
- Site Outline

SOURCE:
Scats - James Warren & Associates Pty Ltd
Aerial - Near Map 21 Sept 2011 Aerial Photograph

0 500m

SCALE: 1 : 12 500 @ A3

JAMES WARREN & ASSOCIATES PTY LIMITED
Environmental Consultants

CLIENT
Leda Developments Pty Ltd

PROJECT
SEPP 44 Assessment
Cobaki Lakes, Cobaki, NSW
Tweed Shire Council

FIGURE 9

PREPARED: BW
DATE: 19 December 2011
FILE: 97038_Base.dwg

TITLE

KOALA
SCAT RECORDS

### 4.3.4 Diurnal searches for evidence of Koala activity (i.e. scats & scratches)

Additional to the scat searches completed during the SAT analysis, searches for scats were completed opportunistically whilst moving on foot between SAT analysis field sites.

A small number of Koala scats were recorded at a single location on the site (**FIGURE 9**). This record generally corresponds with the locations of historical records of low level Koala activity on the site (**FIGURE 9**).

### 4.3.5 Spotlighting surveys

Spotlighting surveys on the site failed to locate any Koalas. Spotlighting surveys on the night of 17th November particularly focused on the area where a small number of scats were recorded.

### 4.3.6 Call playback technique

Call playback surveys on the site failed to record any Koalas.

# 5. STATE ENVIRONMENTAL PLANNING POLICY NO. 44 – KOALA HABITAT PROTECTION

In response to the state wide decline of Koala populations, the DoP has legislated State Environmental Planning Policy No. 44 - Koala Habitat Protection (SEPP 44). The aim of the policy is to "encourage the proper conservation and management of areas of natural vegetation that provide habitat for Koalas, to ensure permanent free-living populations over their present range and to reverse the current trend of population decline."

The following questions are posed in order to assess if the SEPP 44 applies to the Cobaki estate.

*1. Does the policy apply?*

*Does the subject land occur in an LGA identified in Schedule 1?*

Yes. The subject site occurs in the Tweed LGA, which is listed under Schedule 1.

*Is the landholding to which the DA applies greater than 1 hectare in area?*

Yes.

*2. Is the land potential Koala habitat?*

*Does the site contain areas of native vegetation where the trees of types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component?*

Yes. Relatively small and isolated areas of Cobaki Estate support Schedule 2 food trees. An assessment of Koala habitat was completed by JWA in the EA as part of the Preferred Project Report submitted to the NSW Department of Planning (DoP) in 2010 (JWA 2010). Five vegetation communities constitute Koala habitat as follows:

- A Mid-high open woodland in the eastern portion of the site of which 95% of the total number of trees in the upper strata are *Eucalyptus robusta* (Swamp mahogany).
- A Mid-high open woodland in the south eastern portion of the site of which 95% of the total number of trees in the upper strata are *Eucalyptus signata* (Scribbly gum).
- A Very tall open/closed sclerophyll forest in the western portion of the site of which at least 15% of the total number of trees in the upper strata are *E. microcorys* (Tallowwoods).

- A Tall open sclerophyll forest in the south of the site of which *E. tereticornis* (Forest red gums) constitute at least 15% of the total number of trees in the upper strata.

- A Tall open/closed sclerophyll forest in the north west of the site dominated by Grey gum (*E. propinqua*).

Swamp mahogany, Scribbly gum, Tallowwood and Forest red gum are all listed in Schedule 2 of the SEPP 44 and vegetation dominated by these species is considered as potential Koala habitat. The Grey gum is not a Schedule 2 SEPP 44 listed food tree but is recognised in the Approved Recovery Plan for the Koala as a secondary Koala food tree on the north coast of NSW. Therefore, vegetation dominated by this species is also considered as potential Koala habitat.

*3. Is there core Koala habitat on the subject land?*

No. Where potential habitat is identified, the area must be investigated for core koala habitat. Core Koala habitat is defined in Section 2.1 of Circular No. B35 (DoP 1995) as 'an area of land with a resident breeding population of koalas, evidenced by attributes such as breeding females and recent sightings and historical records of a population'.

The results of this assessment, and previous assessments on the subject site, have indicated that the site does not support core Koala habitat. Whilst the site may be utilised occasionally by one or two Koalas, a resident breeding population of Koalas is not considered to occur.

# 6. DISCUSSION AND CONCLUSIONS

The assessment resulted in a record of low level Koala activity on the subject site. A small number of scats were found in a single location on the site.

Phillips & Callaghan (2011) state that low activity levels recorded in what might otherwise be medium-high carrying capacity Koala habitat may be a result of contemporary population dynamics, landscape configuration and/or historical disturbances including logging, mining, fire, agricultural activities and/or urban development. Further, it is suggested that low activity levels are also associated with low density Koala populations. Stable, low density Koala populations occur naturally in some areas and generally reflect the absence of primary Koala food tree species and reliance by the population on secondary food tree species only.

Where the results of the of a SAT site returns an activity level within the low use range, the level of use by Koalas is likely to be transitory (Phillips & Callaghan 2011).

Surveys of the Cobaki Estate site over the past thirty (30) years have not recorded a significant population of Koalas on the site. Sporadic records of a small number of Koala scats exist for the site and similar results were again recorded during this assessment.

Whilst several small and isolated patches of primary (SEPP 44 - Schedule 2) Koala food trees occur it is considered that the subject site generally represents secondary habitat for the Koala. Historical evidence of low level activity suggests that a low density Koala population may be present within the vicinity of the site, likely within the vegetated lands to the west. It would appear that the site has over time provided, and continues to provide, forage resources for one (1) or possibly two (2) Koalas as they move through the locality.

The results of the SEPP 44 assessment indicates that the site does not support core Koala habitat.

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# APPENDIX 1 – FIELD DATA SHEETS

| **Field Site No:** 1 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 547467; 6884784 | | | | | |
| **Brief description:** Blackbutt forest with maintained midstorey & groundcover – ridge top | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree (Reason for choice:** Secondary feed tree species) | *Eucalyptus pilularis* | 15m | 35cm | 0 | |
| 2 | *E. siderophloia* | 19m | 42cm | 0 | |
| 3 | *E. pilularis* | 21m | 40cm | 0 | |
| 4 | *E. pilularis* | 22m | 45cm | 0 | |
| 5 | *E. pilularis* | 21m | 44cm | 0 | |
| 6 | *E. siderophloia* | 20m | 48cm | 0 | |
| 7 | *E. pilularis* | 24m | 58cm | 0 | |
| 8 | *E. pilularis* | 25m | 62cm | 0 | |
| 9 | *E. pilularis* | 25m | 60cm | 0 | |
| 10 | *E. pilularis* | 26m | 59cm | 0 | |
| 11 | *E. pilularis* | 23m | 40cm | 0 | |
| 12 | *E. pilularis* | 23m | 38cm | 0 | |
| 13 | *E. pilularis* | 24m | 57cm | 0 | |
| 14 | *E. pilularis* | 22m | 42cm | 0 | |
| 15 | *E. pilularis* | 18m | 54cm | 0 | |
| 16 | *E. pilularis* | 22m | 30cm | 0 | |
| 17 | *E. pilularis* | 24m | 43cm | 0 | |
| 18 | *E. pilularis* | 21m | 56cm | 0 | |
| 19 | *E. pilularis* | 18m | 31cm | 0 | |
| 20 | *E. pilularis* | 19m | 44cm | 0 | |
| 21 | *E. pilularis* | 23m | 55cm | 0 | |
| 22 | *E. pilularis* | 22m | 60cm | 0 | |
| 23 | *E. pilularis* | 24m | 52cm | 0 | |
| 24 | *E. pilularis* | 24m | 58cm | 0 | |
| 25 | *E. pilularis* | 21m | 30cm | 0 | |
| 26 | *E. pilularis* | 24m | 44cm | 0 | |
| 27 | *E. pilularis* | 24m | 42cm | 0 | |
| 28 | *E. pilularis* | 25m | 46cm | 0 | |
| 29 | *E. pilularis* | 21m | 44cm | 0 | |
| 30 | *E. pilularis* | 25m | 45cm | 0 | |

| **Field Site No:** 2 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 547413; 6884631 | | | | | |
| **Brief description:** Blackbutt forest with maintained midstorey & groundcover – ridgetop | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree (Reason for choice:** Secondary feed tree species) | *Eucalyptus pilularis* | 23m | 49cm | 0 | |
| 2 | *E. pilularis* | 14m | 54cm | 0 | |
| 3 | *E. pilularis* | 22m | 40cm | 0 | |
| 4 | *E. pilularis* | 24m | 56cm | 0 | |
| 5 | *E. pilularis* | 24m | 52cm | 0 | |
| 6 | *E. pilularis* | 25m | 54cm | 0 | |
| 7 | *E. pilularis* | 24m | 60cm | 0 | |
| 8 | *E. pilularis* | 24m | 66cm | 0 | |
| 9 | *E. pilularis* | 23m | 58cm | 0 | |
| 10 | *E. pilularis* | 25m | 56cm | 0 | |
| 11 | *E. pilularis* | 25m | 60cm | 0 | |
| 12 | *Schefflera actinophylla* | 8m | 50cm | 0 | |
| 13 | *E. pilularis* | 25m | 54cm | 0 | |
| 14 | *E. pilularis* | 26m | 46cm | 0 | |
| 15 | *E. pilularis* | 25m | 64cm | 0 | |
| 16 | *E. pilularis* | 24m | 62cm | 0 | |
| 17 | *E. pilularis* | 23m | 55cm | 0 | |
| 18 | *E. pilularis* | 24m | 53cm | 0 | |
| 19 | *E. pilularis* | 23m | 48cm x (2) | 0 | Twin trunk |
| 20 | *E. pilularis* | 26m | 58cm | 0 | |
| 21 | *E. pilularis* | 26m | 49cm | 0 | |
| 22 | *E. pilularis* | 25m | 57cm | 0 | |
| 23 | *E. pilularis* | 26m | 50cm | 0 | |
| 24 | *E. pilularis* | 23m | 45cm | 0 | |
| 25 | *E. pilularis* | 12m | 40cm | 0 | Crown snapped off |
| 26 | *E. pilularis* | 22m | 45cm | 0 | |
| 27 | *E. pilularis* | 16m | 42cm | 0 | |
| 28 | *E. pilularis* | 22m | 44cm | 0 | |
| 29 | *E. pilularis* | 22m | 56cm | 0 | |
| 30 | *E. pilularis* | 24m | 60cm | 0 | |

| **Field Site No:** 3 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 547297; 6884549 | | | | | |
| **Brief description:** Blackbutt forest (+/- Grey gum) with maintained midstorey & groundcover – moderately steep westerly aspect | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree (Reason for choice:** Secondary feed tree species) | *Eucalyptus propinqua* | 23m | 57cm | 0 | |
| 2 | *E. siderophloia* | 25m | 52cm | 0 | |
| 3 | *E. siderophloia* | 21m | 42cm | 0 | |
| 4 | *E. propinqua* | 25m | 45cm | 0 | |
| 5 | *E. propinqua* | 15m | 36cm | 0 | |
| 6 | *E. pilularis* | 24m | 52cm | 0 | |
| 7 | *E. microcorys* | 19m | 46cm | 0 | |
| 8 | *E. pilularis* | 22m | 56cm | 0 | |
| 9 | *E. pilularis* | 25m | 62cm | 0 | |
| 10 | *E. pilularis* | 26m | 58cm | 0 | |
| 11 | *E. pilularis* | 26m | 55cm | 0 | |
| 12 | *E. pilularis* | 23m | 51cm | 0 | |
| 13 | *E. pilularis* | 27m | 66cm | 0 | |
| 14 | *E. pilularis* | 22m | 40cm | 0 | |
| 15 | *E. pilularis* | 25m | 46cm | 0 | |
| 16 | *E. pilularis* | 23m | 65cm | 0 | |
| 17 | *E. propinqua* | 23m | 44cm | 0 | |
| 18 | *E. pilularis* | 24m | 64cm | 0 | |
| 19 | *E. pilularis* | 24m | 59cm | 0 | |
| 20 | *E. propinqua* | 20m | 40cm | 0 | |
| 21 | *E. pilularis* | 21m | 40cm | 0 | |
| 22 | *E. pilularis* | 24m | 49cm | 0 | |
| 23 | *E. pilularis* | 26m | 71cm | 0 | |
| 24 | *E. pilularis* | 25m | 57cm | 0 | |
| 25 | *Corymbia intermedia* | 19m | 44cm | 0 | |
| 26 | *E. pilularis* | 17m | 42cm | 0 | |
| 27 | *Lophostemon confertus* | 22m | 28cm | 0 | |
| 28 | *E. propinqua* | 28m | 55cm | 0 | |
| 29 | *E. propinqua* | 26m | 54cm | 0 | |
| 30 | *L. confertus* | 10m | 40cm | 0 | Crown snapped off |

| **Field Site No:** 4 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 547247; 6884415 | | | | | |
| **Brief description:** Blackbutt forest (+/- Brushbox) with maintained midstorey & groundcover – ridgetop | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree (Reason for choice:** Primary feed tree species) | *Eucalyptus microcorys* | 22m | 90cm | 0 | |
| 2 | *E. pilularis* | 24m | 120cm | 0 | Old growth tree with numerous hollows |
| 3 | *E. microcorys* | 12m | 28cm | 0 | |
| 4 | *Corymbia intermedia* | 12m | 22cm | 0 | |
| 5 | *E. siderophloia* | 8m | 15cm | 0 | |
| 6 | *E. microcorys* | 22m | 38cm | 0 | |
| 7 | *E. microcorys* | 23m | 36cm | 0 | |
| 8 | *E. pilularis* | 17m | 20cm | 0 | |
| 9 | *Lophostemon confertus* | 7m | 12cm | 0 | |
| 10 | *C. intermedia* | 9m | 15cm | 0 | |
| 11 | *E. microcorys* | 17m | 30cm | 0 | |
| 12 | *E. pilularis* | 16m | 25cm | 0 | |
| 13 | *E. pilularis* | 26m | 45cm | 0 | |
| 14 | *E. pilularis* | 16m | 30cm | 0 | |
| 15 | *E. siderophloia* | 29m | 60cm | 0 | |
| 16 | *C. intermedia* | 27m | 57cm | 0 | |
| 17 | *E. pilularis* | 18m | 31cm | 0 | |
| 18 | *E. pilularis* | 10m | 16cm | 0 | |
| 19 | *E. pilularis* | 16m | 25cm | 0 | |
| 20 | *E. pilularis* | 28m | 43cm | 0 | |
| 21 | *E. pilularis* | 26m | 42cm | 0 | |
| 22 | *E. pilularis* | 24m | 48cm | 0 | |
| 23 | *L. confertus* | 13m | 30cm | 0 | |
| 24 | *L. confertus* | 16m | 36cm | 0 | |
| 25 | *C. intermedia* | 26m | 65cm | 0 | Basal hollow |
| 26 | *E. pilularis* | 15m | 38cm | 0 | |
| 27 | *L. confertus* | 13m | 42cm | 0 | |
| 28 | *Acacia melanoxylon* | 8m | 15cm | 0 | |
| 29 | *C. intermedia* | 7m | 10cm | 0 | |
| 30 | *L. confertus* | 8m | 16cm | 0 | Crown snapped off |

| **Field Site No:** 5 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 547067; 6884384 | | | | | |
| **Brief description:** Blackbutt forest with maintained midstorey & groundcover – moderately steep south-easterly aspect | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree** **(Reason for choice:** Secondary feed tree species) | *Eucalyptus pilularis* | 23m | 130cm | 0 | Old growth tree with numerous hollows |
| 2 | *E. pilularis* | 17m | 65cm | 0 | |
| 3 | *E. microcorys* | 6m | 15cm | 0 | |
| 4 | *Lophostemon suaveolens* | 8m | 22cm | 0 | |
| 5 | *E. pilularis* | 26m | 60cm | 0 | |
| 6 | *E. pilularis* | 26m | 68cm | 0 | |
| 7 | *Corymbia intermedia* | 21m | 40cm | 0 | |
| 8 | *L. suaveolens* | 12m | 35cm | 0 | |
| 9 | *E. siderophloia* | 13m | 30cm | 0 | |
| 10 | *C. intermedia* | 19m | 51cm | 0 | |
| 11 | *E. pilularis* | 25m | 42cm | 0 | |
| 12 | *E. pilularis* | 29m | 72cm | 0 | |
| 13 | *E. siderophloia* | 25m | 52cm | 0 | |
| 14 | *L. suaveolens* | 14m | 25cm | 0 | |
| 15 | *E. pilularis* | 23m | 33cm | 0 | |
| 16 | *E. siderophloia* | 24m | 36cm | 0 | |
| 17 | *C. intermedia* | 7m | 25cm | 0 | |
| 18 | *E. siderophloia* | 21m | 36cm | 0 | |
| 19 | *E. siderophloia* | 22m | 34cm | 0 | |
| 20 | *E. pilularis* | 25m | 58cm | 0 | |
| 21 | *L. confertus* | 16m | 42cm (x2) | 0 | Twin trunk |
| 22 | *E. siderophloia* | 23m | 46cm | 0 | |
| 23 | *E. pilularis* | 19m | 78cm | 0 | |
| 24 | *L. confertus* | 15m | 58cm | 0 | |
| 25 | *L. confertus* | 19m | 52cm | 0 | |
| 26 | *E. pilularis* | 21m | 59cm | 0 | |
| 27 | *E. pilularis* | 22m | 58cm | 0 | |
| 28 | *E. propinqua* | 23m | 100cm | 0 | Old growth tree with numerous hollows + Osprey nest |
| 29 | *E. pilularis* | 18m | 60cm | 0 | |
| 30 | *E. pilularis* | 18m | 56cm | 0 | |

| **Field Site No:** 6 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 546891; 6883573 | | | | | |
| **Brief description:** Swamp mahogany woodland with maintained midstorey & groundcover – on flat sandplain | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree (Reason for choice:** Primary feed tree species) | *Eucalyptus robusta* | 14m | 55cm | 0 | |
| 2 | *E. robusta* | 10m | 54cm | 0 | |
| 3 | *E. robusta* | 14m | 55cm | 0 | |
| 4 | *E. robusta* | 16m | 56cm | 0 | |
| 5 | *E. robusta* | 15m | 45cm | 0 | |
| 6 | *E. robusta* | 15m | 52cm | 0 | |
| 7 | *E. robusta* | 15m | 54cm | 0 | |
| 8 | *E. robusta* | 17m | 61cm | 0 | |
| 9 | *E. robusta* | 15m | 60cm | 0 | |
| 10 | *E. racemosa* | 16m | 57cm | 0 | |
| 11 | *E. robusta* | 17m | 56cm | 0 | |
| 12 | *E. robusta* | 14m | 36cm | 0 | |
| 13 | *E. robusta* | 14m | 34cm | 0 | |
| 14 | *L. suaveolens* | 7m | 20cm | 0 | |
| 15 | *E. robusta* | 16m | 52cm | 0 | |
| 16 | *E. robusta* | 16m | 61cm | 0 | |
| 17 | *E. robusta* | 16m | 48cm | 0 | |
| 18 | *E. robusta* | 13m | 40cm | 0 | |
| 19 | *E. robusta* | 12m | 44cm | 0 | |
| 20 | *E. robusta* | 14m | 49cm | 0 | |
| 21 | *E. robusta* | 16m | 56cm | 0 | |
| 22 | *E. robusta* | 10m | 32cm | 0 | |
| 23 | *E. robusta* | 18m | 60cm | 0 | |
| 24 | *E. robusta* | 15m | 62cm | 0 | |
| 25 | *Melaleuca quinquenervia* | 6m | 15cm | 0 | |
| 26 | *E. robusta* | 10m | 32cm | 0 | |
| 27 | *E. robusta* | 12m | 34cm | 0 | |
| 28 | *E. robusta* | 14m | 39cm | 0 | |
| 29 | *E. robusta* | 15m | 46cm | 0 | |
| 30 | *E. robusta* | 12m | 32cm | 0 | |

| **Field Site No:** 7 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 547006; 6883149 | | | | | |
| **Brief description:** Swamp mahogany woodland with maintained midstorey & groundcover – on flat sandplain | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree** **(Reason for choice:** Primary feed tree species) | *Eucalyptus robusta* | 17m | 49cm | 0 | |
| 2 | *E. robusta* | 5m | 22cm | 0 | |
| 3 | *E. robusta* | 5m | 18cm | 0 | |
| 4 | *E. robusta* | 3m | 18cm | 0 | |
| 5 | *E. robusta* | 4m | 16cm | 0 | |
| 6 | *E. robusta* | 5m | 18cm | 0 | |
| 7 | *Melaleuca quinquenervia* | 5m | 22cm | 0 | |
| 8 | *E. robusta* | 5m | 24cm | 0 | |
| 9 | *E. robusta* | 4m | 12cm | 0 | |
| 10 | *E. racemosa* | 5m | 25cm | 0 | |
| 11 | *M. quinquenervia* | 7m | 31cm | 0 | |
| 12 | *E. robusta* | 5m | 18cm | 0 | |
| 13 | *M. quinquenervia* | 5m | 14cm | 0 | |
| 14 | *E. robusta* | 17m | 40cm | 0 | |
| 15 | *E. racemosa* | 19m | 79cm | 0 | Old growth tree with numerous hollows |
| 16 | *E. robusta* | 14m | 40cm | 0 | |
| 17 | *E. robusta* | 13m | 35cm | 0 | |
| 18 | *E. robusta* | 16m | 42cm | 0 | |
| 19 | *E. robusta* | 17m | 56cm | 0 | |
| 20 | *E. robusta* | 17m | 61cm | 0 | |
| 21 | *E. robusta* | 14m | 40cm | 0 | |
| 22 | *E. robusta* | 14m | 34cm | 0 | |
| 23 | *M. quinquenervia* | 14m | 36cm | 0 | |
| 24 | *E. robusta* | 15m | 66cm | 0 | |
| 25 | *E. robusta* | 16m | 35cm | 0 | |
| 26 | *E. robusta* | 17m | 48cm | 0 | |
| 27 | *E. robusta* | 17m | 38cm | 0 | |
| 28 | *E. robusta* | 15m | 45cm | 0 | |
| 29 | *E. robusta* | 14m | 40cm | 0 | |
| 30 | *E. robusta* | 18m | 60cm | 0 | |

| **Field Site No:** 8 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 547267; 6882784 | | | | | |
| **Brief description:** Scribbly gum woodland with maintained midstorey & groundcover – on flat sandplain | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree (Reason for choice:** Primary feed tree species) | *Eucalyptus racemosa* | 15m | 62cm | 0 | Hollow-bearing tree |
| 2 | *Elaeocarpus reticulatus* | 6m | 20cm | 0 | Hollow-bearing tree |
| 3 | *E. racemosa* | 17m | 81cm | 0 | Hollow-bearing tree |
| 4 | *E. racemosa* | 18m | 62cm | 0 | Hollow-bearing tree |
| 5 | *E. racemosa* | 19m | 71cm | 0 | |
| 6 | *E. racemosa* | 14m | 52cm | 0 | Hollow-bearing tree |
| 7 | *E. racemosa* | 12m | 91cm | 0 | |
| 8 | *E. racemosa* | 14m | 59cm | 0 | Hollow-bearing tree |
| 9 | *E. racemosa* | 17m | 64cm | 0 | Hollow-bearing tree |
| 10 | *E. racemosa* | 17m | 79cm | 0 | |
| 11 | *E. racemosa* | 18m | 81cm | 0 | Crown snapped off |
| 12 | *E. racemosa* | 10m | 110cm | 0 | Hollow-bearing tree |
| 13 | *E. racemosa* | 19m | 100cm | 0 | Hollow-bearing tree |
| 14 | *E. racemosa* | 18m | 90cm | 0 | Hollow-bearing tree |
| 15 | *E. racemosa* | 18m | 90cm | 0 | |
| 16 | *E. racemosa* | 19m | 58cm | 0 | Hollow-bearing tree |
| 17 | *E. racemosa* | 20m | 120cm | 0 | Hollow-bearing tree |
| 18 | *E. racemosa* | 20m | 79cm | 0 | Hollow-bearing tree |
| 19 | *E. racemosa* | 19m | 84cm | 0 | |
| 20 | *E. racemosa* | 17m | 48cm | 0 | Hollow-bearing tree |
| 21 | *E. racemosa* | 18m | 82cm | 0 | Hollow-bearing tree |
| 22 | *E. racemosa* | 16m | 74cm | 0 | Hollow-bearing tree |
| 23 | *E. racemosa* | 19m | 61cm | 0 | Hollow-bearing tree |
| 24 | *E. racemosa* | 19m | 58cm | 0 | Hollow-bearing tree |
| 25 | *E. racemosa* | 19m | 65cm | 0 | Hollow-bearing tree |
| 26 | *E. racemosa* | 14m | 72cm | 0 | Hollow-bearing tree |
| 27 | *Lophostemon confertus* | 10m | 30cm | 0 | |
| 28 | *E. racemosa* | 16m | 56cm | 0 | Hollow-bearing tree |
| 29 | *E. racemosa* | 18m | 58cm | 0 | Hollow-bearing tree |
| 30 | *E. racemosa* | 18m | 88cm | 0 | Hollow-bearing tree |

| **Field Site No:** 9 |
|---|

| **GPS:** 547448; 6882612 | | | | | |
|---|---|---|---|---|---|
| **Brief description:** Scribbly gum woodland with maintained midstorey & groundcover – on flat sandplain | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree (Reason for choice:** Primary feed tree species) | *Eucalyptus racemosa* | 16m | 66cm | 0 | Hollow-bearing tree |
| 2 | *E. racemosa* | 17m | 72cm | 0 | Hollow-bearing tree |
| 3 | *E. racemosa* | 18m | 61cm | 0 | Hollow-bearing tree |
| 4 | *E. racemosa* | 18m | 68cm | 0 | Hollow-bearing tree |
| 5 | *E. racemosa* | 17m | 100cm | 0 | Hollow-bearing tree |
| 6 | *E. racemosa* | 17m | 65cm | 0 | Hollow-bearing tree |
| 7 | *E. racemosa* | 18m | 62cm | 0 | Hollow-bearing tree |
| 8 | *E. racemosa* | 17m | 78cm | 0 | Hollow-bearing tree |
| 9 | *E. racemosa* | 16m | 74cm | 0 | Hollow-bearing tree |
| 10 | *E. racemosa* | 18m | 85cm | 0 | Hollow-bearing tree |
| 11 | *E. racemosa* | 20m | 90cm | 0 | Hollow-bearing tree |
| 12 | *E. racemosa* | 20m | 110cm | 0 | Hollow-bearing tree |
| 13 | *E. racemosa* | 16m | 62cm | 0 | Hollow-bearing tree |
| 14 | *E. racemosa* | 18m | 72cm | 0 | Hollow-bearing tree |
| 15 | *E. racemosa* | 18m | 78cm | 0 | Hollow-bearing tree + Boobook owl roosting + Sulphur-crested cockatoo nesting |
| 16 | *E. resinifera* | 17m | 51cm | 0 | |
| 17 | *E. racemosa* | 16m | 56cm | 0 | |
| 18 | *E. resinifera* | 19m | 54cm | 0 | |
| 19 | *E. racemosa* | 13m | 55cm | 0 | |
| 20 | *E. racemosa* | 16m | 110cm | 0 | Hollow-bearing tree |
| 21 | *E. racemosa* | 20m | 75cm | 0 | Hollow-bearing tree |
| 22 | *E. racemosa* | 21m | 90cm | 0 | Hollow-bearing tree |
| 23 | *E. racemosa* | 16m | 84cm | 0 | Hollow-bearing tree + Wood duck nesting |
| 24 | *Corymbia intermedia* | 16m | 45cm | 0 | |
| 25 | *E. racemosa* | 11m | 110cm | 0 | Hollow-bearing tree |
| 26 | *C. intermedia* | 16m | 44cm | 0 | |
| 27 | *Lophostemon confertus* | 18m | 71cm | 0 | Hollow-bearing tree |
| 28 | *E. racemosa* | 19m | 76cm | 0 | Hollow-bearing tree |
| 29 | *E. racemosa* | 14m | 34cm | 0 | |
| 30 | *E. racemosa* | 16m | 58cm | 0 | |

| **Field Site No:** 10 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 546867; 6881984 | | | | | |
| **Brief description:** Blackbutt forest – steep south-westerly aspect | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree (Reason for choice:** Secondary feed tree species) | *Eucalyptus pilularis* | 25m | 48cm | 0 | |
| 2 | *Allocasuarina torulosa* | 12m | 20cm | 0 | |
| 3 | *A. torulosa* | 10m | 10cm | 0 | |
| 4 | *Cinnamomum camphora* | 4m | 8cm | 0 | |
| 5 | *C. camphora* | 7m | 14cm | 0 | |
| 6 | *Daviesia arborea* | 6m | 24cm | 0 | |
| 7 | *E. pilularis* | 23m | 38cm | 0 | |
| 8 | *E. pilularis* | 20m | 36cm | 0 | |
| 9 | *E. pilularis* | 6m | 16cm | 0 | |
| 10 | *E. pilularis* | 23m | 36cm | 0 | |
| 11 | *E. pilularis* | 24m | 34cm | 0 | |
| 12 | *E. pilularis* | 21m | 46cm | 0 | |
| 13 | *E. pilularis* | 7m | 17cm | 0 | |
| 14 | *E. pilularis* | 12m | 22cm | 0 | |
| 15 | *E. pilularis* | 26m | 36cm | 0 | |
| 16 | *E. pilularis* | 25m | 42cm | 0 | |
| 17 | *E. pilularis* | 14m | 18cm | 0 | |
| 18 | *E. pilularis* | 18m | 34cm | 0 | |
| 19 | *E. pilularis* | 17m | 28cm | 0 | |
| 20 | *D. arborea* | 12m | 38cm | 0 | |
| 21 | *C. camphora* | 11m | 29cm | 0 | |
| 22 | *E. pilularis* | 20m | 33cm | 0 | |
| 23 | *Callistemon* sp. | 11m | 21cm | 0 | Twin trunk |
| 24 | *E. pilularis* | 16m | 28cm | 0 | |
| 25 | *E. pilularis* | 30m | 92cm | 0 | |
| 26 | *A. torulosa* | 12m | 12cm | 0 | |
| 27 | *E. pilularis* | 28m | 30cm | 0 | |
| 28 | *E. pilularis* | 29m | 89cm | 0 | |
| 29 | *Callistemon* sp. | 14m | 18cm | 0 | |
| 30 | *D. arborea* | 6m | 18cm | 0 | |

| **Field Site No:** 11 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 546920; 6882154 | | | | | |
| **Brief description:** Blackbutt forest (+/- Brushbox) – steep easterly aspect | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree (Reason for choice:** Secondary feed tree species) | *Eucalyptus pilularis* | 30m | 60cm | 0 | |
| 2 | *E. microcorys* | 10m | 20cm | 0 | |
| 3 | *Lophostemon confertus* | 10m | 10cm | 0 | |
| 4 | *Daviesia arborea* | 4m | 15cm | 0 | |
| 5 | *E. pilularis* | 31m | 58cm | 0 | |
| 6 | *Cinnamomum camphora* | 6m | 15cm | 0 | |
| 7 | *E. pilularis* | 29m | 62cm | 0 | |
| 8 | *L. confertus* | 9m | 10cm | 0 | |
| 9 | *L. confertus* | 8m | 12cm | 0 | |
| 10 | *L. confertus* | 10m | 15cm | 0 | |
| 11 | *E. pilularis* | 28m | 51cm | 0 | |
| 12 | *D. arborea* | 6m | 20cm | 0 | |
| 13 | *E. microcorys* | 9m | 16cm | 0 | |
| 14 | *E. pilularis* | 28m | 71cm | 0 | |
| 15 | *C. camphora* | 5m | 10cm | 0 | |
| 16 | *E. pilularis* | 15m | 26cm | 0 | |
| 17 | *E. pilularis* | 28m | 54cm | 0 | |
| 18 | *E. pilularis* | 27m | 52cm | 0 | |
| 19 | *C. camphora* | 6m | 14cm | 0 | |
| 20 | *E. pilularis* | 19m | 32cm | 0 | |
| 21 | *D. arborea* | 4m | 8cm | 0 | |
| 22 | *E. pilularis* | 29m | 86cm | 0 | |
| 23 | *L. confertus* | 18m | 38cm | 0 | Twin trunk |
| 24 | *L. confertus* | 6m | 10cm | 0 | |
| 25 | *C. camphora* | 5m | 10cm | 0 | |
| 26 | *L. confertus* | 12m | 11cm | 0 | |
| 27 | *L. confertus* | 12m | 10cm | 0 | |
| 28 | *L. confertus* | 12m | 15cm | 0 | |
| 29 | *L. confertus* | 16m | 20cm | 0 | |
| 30 | *E. pilularis* | 24m | 22cm | 0 | |

| **Field Site No:** 12 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 546653; 6882174 | | | | | |
| **Brief description:** Blackbutt forest and adjacent scattered Forest red gum | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree (Reason for choice:** Secondary feed tree species) | *Eucalyptus pilularis* | 27m | 95cm | 0 | Old growth trees with hollows |
| 2 | *E. tereticornis* | 24m | 70cm | 0 | |
| 3 | *E. tereticornis* | 26m | 62cm | 0 | |
| 4 | *E. tereticornis* | 28m | 60cm | 0 | |
| 5 | *E. tereticornis* | 26m | 60cm | 0 | |
| 6 | *Corymbia intermedia* | 17m | 52cm | 0 | Hollows |
| 7 | *Ficus watkinsiana* | 6m | 10cm | 0 | |
| 8 | *E. pilularis* | 28m | 100cm | 0 | |
| 9 | *E. microcorys* | 16m | 45cm (x2) | 0 | Twin trunk |
| 10 | *E. siderophloia* | 26m | 44cm | 0 | |
| 11 | *E. tereticornis* | 26m | 54cm | 0 | |
| 12 | *E. siderophloia* | 27m | 58cm | 0 | |
| 13 | *E. pilularis* | 29m | 72cm | 0 | |
| 14 | *E. pilularis* | 29m | 68cm | 0 | |
| 15 | *E. pilularis* | 24m | 44cm | 0 | |
| 16 | *E. pilularis* | 27m | 42cm (x2) | 0 | Twin trunk |
| 17 | *E. pilularis* | 28m | 56cm | 0 | |
| 18 | *E. pilularis* | 29m | 62cm | 0 | |
| 19 | *E. siderophloia* | 24m | 55cm | 0 | |
| 20 | *Lophostemon suaveolens* | 14m | 30cm | 0 | |
| 21 | *E. pilularis* | 26m | 56cm | 0 | |
| 22 | *E. tereticornis* | 25m | 60cm | 0 | |
| 23 | *E. tereticornis* | 26m | 51cm | 0 | |
| 24 | *E. tereticornis* | 28m | 71cm | 0 | |
| 25 | *E. siderophloia* | 24m | 49cm | 0 | |
| 26 | *E. pilularis* | 28m | 58cm | 0 | |
| 27 | *E. siderophloia* | 26m | 49cm | 0 | |
| 28 | *E. tereticornis* | 26m | 47cm | 0 | |
| 29 | *E. pilularis* | 28m | 81cm | 0 | |
| 30 | *C. intermedia* | 16m | 29cm | 0 | |

| **Field Site No:** 13 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 546255; 6882398 | | | | | |
| **Brief description:** Linear stand of old growth Forest red gum | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree (Reason for choice:** Primary feed tree species) | *Eucalyptus tereticornis* | 30m | 75cm | 0 | Old growth tree |
| 2 | *Lophostemon suaveolens* | 22m | 42cm | 0 | |
| 3 | *E. tereticornis* | 28m | 87cm | 0 | Old growth tree |
| 4 | *Corymbia intermedia* | 22m | 36cm | 0 | |
| 5 | *L. suaveolens* | 14m | 55cm | 0 | |
| 6 | *C. intermedia* | 14m | 32cm | 0 | |
| 7 | *E. tereticornis* | 26m | 60cm | 0 | |
| 8 | *E. tereticornis* | 29m | 120cm | 0 | Old growth tree |
| 9 | *E. tereticornis* | 9m | 26cm | 0 | |
| 10 | *E. tereticornis* | 8m | 30cm | 0 | |
| 11 | *E. tereticornis* | 6m | 22cm | 0 | |
| 12 | *E. tereticornis* | 6m | 20cm | 0 | |
| 13 | *E. tereticornis* | 24m | 70cm | 0 | Old growth tree |
| 14 | *E. tereticornis* | 21m | 50cm | 0 | |
| 15 | *C. intermedia* | 21m | 36cm | 0 | |
| 16 | *C. intermedia* | 15m | 28cm (x2) | 0 | Twin trunk |
| 17 | *E. tereticornis* | 30m | 86cm | 0 | Old growth tree |
| 18 | *E. tereticornis* | 30m | 76cm | 0 | Old growth tree |
| 19 | *L. suaveolens* | 14m | 29cm | 0 | |
| 20 | *L. suaveolens* | 14m | 32cm | 0 | |
| 21 | *E. tereticornis* | 30m | 130cm | 0 | Old growth tree |
| 22 | *E. tereticornis* | 30m | 92cm | 0 | Old growth tree |
| 23 | *E. tereticornis* | 30m | 68cm | 0 | |
| 24 | *L. suaveolens* | 10m | 30cm | 0 | |
| 25 | *L. suaveolens* | 14m | 30cm | 0 | |
| 26 | *E. tereticornis* | 30m | 70cm | 0 | |
| 27 | *Melaleuca quinquenervia* | 24m | 45cm | 0 | |
| 28 | *M. quinquenervia* | 24m | 52cm | 0 | |
| 29 | *L. suaveolens* | 9m | 36cm | 0 | |
| 30 | *E. tereticornis* | 30m | 96cm | 0 | Old growth tree |

| **Field Site No:** 14 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 546237; 6882644 | | | | | |
| **Brief description:** Blackbutt forest (+/- Brushbox) with maintained midstorey & groundcover – moderately steep easterly aspect | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree (Reason for choice:** Primary feed tree species) | *Eucalyptus microcorys* | 22m | 68cm | 0 | |
| 2 | *Lophostemon confertus* | 22m | 48cm | 0 | |
| 3 | *E. microcorys* | 24m | 78cm | 0 | |
| 4 | *E. microcorys* | 4m | 10cm | 0 | |
| 5 | *E. microcorys* | 5m | 12cm | 0 | |
| 6 | *Corymbia intermedia* | 6m | 18cm | 0 | |
| 7 | *L. confertus* | 3m | 6cm | 0 | |
| 8 | *Eucalyptus pilularis* | 15m | 34cm | 0 | |
| 9 | *C. intermedia* | 22m | 42cm | 0 | |
| 10 | *E. microcorys* | 24m | 45cm | 0 | |
| 11 | *L. confertus* | 9m | 13cm | 0 | |
| 12 | *C. intermedia* | 21m | 32cm | 0 | |
| 13 | *L. confertus* | 15m | 26cm | 0 | |
| 14 | *L. confertus* | 19m | 32cm (x2) | 0 | Twin trunk |
| 15 | *L. confertus* | 16m | 32cm | 0 | |
| 16 | *L. confertus* | 5m | 6cm | 0 | |
| 17 | *L. confertus* | 17m | 24cm | 0 | |
| 18 | *C. intermedia* | 18m | 29cm | 0 | |
| 19 | *L. confertus* | 18m | 24cm | 0 | |
| 20 | *L. confertus* | 19m | 33cm | 0 | |
| 21 | *L. confertus* | 19m | 28cm | 0 | |
| 22 | *Eucalyptus pilularis* | 9m | 12cm | 0 | |
| 23 | *L. confertus* | 20m | 36cm | 0 | |
| 24 | *L. confertus* | 21m | 41cm | 0 | |
| 25 | *L. confertus* | 10m | 12cm | 0 | |
| 26 | *C. intermedia* | 21m | 27cm | 0 | |
| 27 | *E. pilularis* | 10m | 16cm | 0 | |
| 28 | *C. intermedia* | 18m | 48cm | 0 | |
| 29 | *E. pilularis* | 25m | 45cm | 0 | |
| 30 | *L. confertus* | 22m | 42cm | 0 | |

| **Field Site No:** 15 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 546067; 6882584 | | | | | |
| **Brief description:** Blackbutt forest (+/- Brushbox) with maintained midstorey & groundcover – steep southerly aspect | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree (Reason for choice:** Primary feed tree species) | *Eucalyptus microcorys* | 23m | 42cm | 0 | |
| 2 | *Cinnamomum camphora* | 3m | 5cm | 0 | |
| 3 | *E. microcorys* | 25m | 56cm | 0 | |
| 4 | *Lophostemon confertus* | 23m | 31cm (x2) | 0 | Twin trunk |
| 5 | *E. pilularis* | 12m | 14cm | 0 | |
| 6 | *Glochidion ferdinandi* | 3m | 8cm | 0 | |
| 7 | *Notelaea* sp. | 2m | 6cm | 0 | |
| 8 | *L. confertus* | 10m | 12cm | 0 | |
| 9 | *L. confertus* | 10m | 10cm | 0 | |
| 10 | *Corymbia intermedia* | 23m | 48cm | 0 | |
| 11 | *C. intermedia* | 26m | 62cm | 0 | |
| 12 | *L. confertus* | 7m | 9cm | 0 | |
| 13 | *C. camphora* | 2m | 5cm | 0 | |
| 14 | *Trochocarpa laurina* | 2m | 6cm | 0 | |
| 15 | *C. camphora* | 6m | 11cm | 0 | |
| 16 | *E. pilularis* | 28m | 78cm | 0 | |
| 17 | *E. microcorys* | 20m | 28cm | 0 | |
| 18 | *C. intermedia* | 24m | 61cm | 0 | |
| 19 | *C. camphora* | 3m | 6cm | 0 | |
| 20 | *Acacia longissima* | 4m | 7cm | 0 | |
| 21 | *C. intermedia* | 5m | 8cm | 0 | |
| 22 | *L. confertus* | 20m | 40cm | 0 | |
| 23 | *E. pilularis* | 26m | 50cm | 0 | |
| 24 | *E. pilularis* | 28m | 54cm | 0 | |
| 25 | *L. confertus* | 16m | 28cm (x2) | 0 | Twin trunk |
| 26 | *L. confertus* | 15m | 32cm | 0 | |
| 27 | *C. intermedia* | 21m | 33cm | 0 | |
| 28 | *C. intermedia* | 24m | 38cm | 0 | |
| 29 | *L. confertus* | 11m | 12cm | 0 | |
| 30 | *L. confertus* | 13m | 21cm | 0 | |

| **Field Site No:** 16 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 546067; 6882784 | | | | | |
| **Brief description:** Blackbutt forest (+/- Brushbox) with maintained midstorey & groundcover – gentle north-easterly aspect | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree** **(Reason for choice:** Secondary feed tree species) | *Corymbia intermedia* | 24m | 44cm | 0 | |
| 2 | *Eucalyptus pilularis* | 6m | 16cm | 0 | |
| 3 | *E. pilularis* | 28m | 81cm | 0 | |
| 4 | *E. pilularis* | 27m | 67cm | 0 | |
| 5 | *Eucalyptus siderophloia* | 23m | 42cm | 0 | |
| 6 | *E. pilularis* | 6m | 11cm | 0 | |
| 7 | *Lophostemon confertus* | 4m | 8cm | 0 | |
| 8 | *L. confertus* | 4m | 7cm | 0 | |
| 9 | *L. confertus* | 4m | 7cm | 0 | |
| 10 | *E. pilularis* | 4m | 6cm | 0 | |
| 11 | *E. pilularis* | 6m | 10cm | 0 | |
| 12 | *E. pilularis* | 6m | 18cm | 0 | |
| 13 | *E. pilularis* | 5m | 10cm | 0 | |
| 14 | *E. pilularis* | 4m | 12cm | 0 | |
| 15 | *E. pilularis* | 6m | 12cm | 0 | |
| 16 | *E. pilularis* | 4m | 15cm | 0 | |
| 17 | *E. pilularis* | 4m | 12cm | 0 | |
| 18 | *E. pilularis* | 5m | 10cm | 0 | |
| 19 | *E. pilularis* | 6m | 11cm | 0 | |
| 20 | *E. pilularis* | 4m | 6cm | 0 | |
| 21 | *E. pilularis* | 3m | 7cm | 0 | |
| 22 | *E. pilularis* | 3m | 6cm | 0 | |
| 23 | *E. pilularis* | 7m | 12cm | 0 | |
| 24 | *E. pilularis* | 7m | 18cm | 0 | |
| 25 | *C. intermedia* | 4m | 11cm | 0 | |
| 26 | *E. pilularis* | 28m | 42cm | 0 | |
| 27 | *E. pilularis* | 26m | 40cm | 0 | |
| 28 | *E. pilularis* | 30m | 58cm | 0 | |
| 29 | *E. pilularis* | 30m | 62cm | 0 | |
| 30 | *E. pilularis* | 30m | 56cm | 0 | |

| **Field Site No:** 17 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 546067; 6882984 | | | | | |
| **Brief description:** Blackbutt forest (+/- Brushbox) at the top of a very steep rock ridgeline | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree (Reason for choice:** Secondary feed tree species) | *Eucalyptus pilularis* | 16m | 35cm | 0 | |
| 2 | *Allocasuarina torulosa* | 8m | 15cm | 0 | |
| 3 | *Lophostemon confertus* | 14m | 22m | 0 | |
| 4 | *A. torulosa* | 4m | 10cm | 0 | |
| 5 | *Eucalyptus siderophloia* | 7m | 12cm | 0 | |
| 6 | *E. pilularis* | 18m | 33cm | 0 | |
| 7 | *A. torulosa* | 5m | 12cm | 0 | |
| 8 | *A. torulosa* | 6m | 13cm | 0 | |
| 9 | *A. torulosa* | 8m | 13cm | 0 | |
| 10 | *A. torulosa* | 9m | 17cm | 0 | |
| 11 | *E. siderophloia* | 13m | 19cm | 0 | |
| 12 | *A. torulosa* | 10m | 16cm | 0 | |
| 13 | *E. siderophloia* | 8m | 12cm | 0 | |
| 14 | *Corymbia intermedia* | 5m | 7cm | 0 | |
| 15 | *A. torulosa* | 6m | 7cm | 0 | |
| 16 | *C. intermedia* | 9m | 11cm | 0 | |
| 17 | *L. confertus* | 8m | 11cm | 0 | |
| 18 | *C. intermedia* | 7m | 7cm | 0 | |
| 19 | *L. confertus* | 14m | 20cm | 0 | |
| 20 | *E. pilularis* | 13m | 17cm | 0 | |
| 21 | *A. torulosa* | 6m | 12cm | 0 | |
| 22 | *E. pilularis* | 18m | 31cm | 0 | |
| 23 | *E. siderophloia* | 20m | 33cm (x2) | 0 | Twin trunk |
| 24 | *C. intermedia* | 16m | 34cm | 0 | |
| 25 | *L. confertus* | 13m | 21cm | 0 | |
| 26 | *L. confertus* | 12m | 16cm | 0 | |
| 27 | *E. pilularis* | 16m | 15cm | 0 | |
| 28 | *E. pilularis* | 14m | 21cm | 0 | |
| 29 | *E. pilularis* | 14m | 16cm | 0 | |
| 30 | *E. pilularis* | 18m | 28cm | 0 | |

| **Field Site No:** 18 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 546067; 6883184 | | | | | |
| **Brief description:** Blackbutt forest (+/- Brushbox) – moderately steep south-easterly aspect | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree (Reason for choice:** Secondary feed tree species) | *Eucalyptus pilularis* | 25m | 50cm | 0 | |
| 2 | *Corymbia intermedia* | 21m | 36cm | 0 | |
| 3 | *E. pilularis* | 7m | 12cm | 0 | |
| 4 | *Acacia longissima* | 8m | 14cm | 0 | |
| 5 | *Lophostemon confertus* | 6m | 7cm | 0 | |
| 6 | *Persoonia stradbrokensis* | 4m | 7cm | 0 | |
| 7 | *L. confertus* | 3m | 5cm | 0 | |
| 8 | *Allocasuarina torulosa* | 6m | 11cm | 0 | |
| 9 | *L. confertus* | 5m | 7cm | 0 | |
| 10 | *A. torulosa* | 6m | 10cm | 0 | |
| 11 | *C. intermedia* | 7m | 11cm | 0 | |
| 12 | *E. siderophloia* | 16m | 32cm | 0 | |
| 13 | *L. confertus* | 4m | 6cm | 0 | |
| 14 | *L. confertus* | 4m | 5cm | 0 | |
| 15 | *L. confertus* | 7m | 6cm | 0 | |
| 16 | *L. confertus* | 3m | 5cm | 0 | |
| 17 | *L. confertus* | 4m | 5cm | 0 | |
| 18 | *L. confertus* | 5m | 7cm | 0 | |
| 19 | *L. confertus* | 4m | 6cm | 0 | |
| 20 | *C. intermedia* | 8m | 14cm | 0 | |
| 21 | *E. pilularis* | 24m | 59cm | 0 | |
| 22 | *L. suaveolens* | 14m | 55cm | 0 | Numerous hollows |
| 23 | *E. pilularis* | 13m | 16cm | 0 | |
| 24 | *C. intermedia* | 18m | 38cm | 0 | |
| 25 | *C. intermedia* | 18m | 31cm | 0 | |
| 26 | *E. siderophloia* | 20m | 35cm | 0 | |
| 27 | *E. pilularis* | 24m | 49cm | 0 | |
| 28 | *L. confertus* | 6m | 7cm | 0 | |
| 29 | *L. confertus* | 6m | 11cm | 0 | |
| 30 | *L. confertus* | 7m | 8cm | 0 | |

| **Field Site No:** 19 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 546067; 6883384 | | | | | |
| **Brief description:** Blackbutt forest (+/- Brushbox) – very steep easterly aspect | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree (Reason for choice:** Secondary feed tree species) | *Corymbia intermedia* | 16m | 35cm | 0 | |
| 2 | *Eucalyptus pilularis* | 15m | 32cm | 0 | |
| 3 | *C. intermedia* | 5m | 10cm | 0 | |
| 4 | *Lophostemon confertus* | 5m | 11cm | 0 | |
| 5 | *Guioa semiglauca* | 7m | 7cm | 0 | |
| 6 | *Jagera pseudorhus* | 7m | 10cm | 0 | |
| 7 | *C. intermedia* | 13m | 20cm | 0 | |
| 8 | *Alphitonia excelsa* | 6m | 12cm | 0 | |
| 9 | *E. pilularis* | 5m | 4cm | 0 | |
| 10 | *L. confertus* | 10m | 11cm | 0 | |
| 11 | *Allocasuarina torulosa* | 6m | 24cm | 0 | |
| 12 | *A. torulosa* | 12m | 31cm | 0 | |
| 13 | *L. suaveolens* | 12m | 19cm | 0 | |
| 14 | *L. suaveolens* | 10m | 14cm | 0 | |
| 15 | *C. intermedia* | 22m | 35cm | 0 | |
| 16 | *C. intermedia* | 9m | 14cm | 0 | |
| 17 | *E. pilularis* | 11m | 13cm | 0 | |
| 18 | *G. semiglauca* | 9m | 11cm | 0 | |
| 19 | *E. pilularis* | 14m | 21cm | 0 | |
| 20 | *L. suaveolens* | 6m | 10cm | 0 | |
| 21 | *E. pilularis* | 15m | 19cm | 0 | |
| 22 | *E. pilularis* | 21m | 40cm | 0 | Numerous hollows |
| 23 | *C. intermedia* | 20m | 34cm | 0 | |
| 24 | *E. pilularis* | 25m | 42cm | 0 | |
| 25 | *Acacia longissima* | 8m | 9cm | 0 | |
| 26 | *L. suaveolens* | 16m | 36cm | 0 | |
| 27 | *A. torulosa* | 4m | 11cm | 0 | |
| 28 | *L. confertus* | 4m | 6cm | 0 | |
| 29 | *L. confertus* | 6m | 12cm | 0 | |
| 30 | *L. confertus* | 5m | 12cm | 0 | |

| **Field Site No:** 20 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 546067; 6883584 | | | | | |
| **Brief description:** Blackbutt forest (+/- Brushbox) – steep easterly aspect | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree (Reason for choice:** Primary feed tree species) | *Eucalyptus tereticornis* | 26m | 60cm | 0 | |
| 2 | *Lophostemon suaveolens* | 17m | 28cm | 0 | |
| 3 | *E. siderophloia* | 24m | 35cm | 0 | |
| 4 | *L. confertus* | 6m | 10cm | 0 | |
| 5 | *L. confertus* | 4m | 6cm | 0 | |
| 6 | *L. confertus* | 3m | 12cm | 0 | |
| 7 | *L. confertus* | 3m | 6cm | 0 | |
| 8 | *L. confertus* | 6m | 12cm | 0 | |
| 9 | *Schefflera actinophylla* | 7m | 12cm | 0 | |
| 10 | *L. confertus* | 16m | 30cm (x2) | 0 | Twin trunk |
| 11 | *Corymbia intermedia* | 18m | 34cm | 0 | |
| 12 | *Guioa semiglauca* | 4m | 6cm | 0 | |
| 13 | *E. siderophloia* | 18m | 38cm | 0 | |
| 14 | *L. confertus* | 10m | 28cm | 0 | |
| 15 | *L. confertus* | 8m | 11cm | 0 | |
| 16 | *E. tereticornis* | 21m | 36cm | 0 | |
| 17 | *L. confertus* | 10m | 14cm | 0 | |
| 18 | *E. pilularis* | 6m | 11cm | 0 | |
| 19 | *L. suaveolens* | 15m | 32cm | 0 | |
| 20 | *L. confertus* | 21m | 48cm | 0 | |
| 21 | *E. pilularis* | 14m | 24cm | 0 | |
| 22 | *E. pilularis* | 16m | 31cm | 0 | |
| 23 | *L. suaveolens* | 14m | 30cm | 0 | Twin trunk |
| 24 | *E. tereticornis* | 25m | 60cm | 0 | |
| 25 | *L. confertus* | 6m | 14cm | 0 | |
| 26 | *L. confertus* | 7m | 12cm | 0 | |
| 27 | *L. confertus* | 6m | 14cm | 0 | |
| 28 | *L. confertus* | 6m | 13cm | 0 | |
| 29 | *Allocasuarina torulosa* | 5m | 9cm | 0 | |
| 30 | *L. confertus* | 6m | 10cm | 0 | |

| **Field Site No:** 21 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 546067; 6883784 | | | | | |
| **Brief description:** Brushbox forest – steep northerly aspect | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree (Reason for choice:** Primary feed tree species) | *Eucalyptus microcorys* | 24m | 42cm | 0 | |
| 2 | *Lophostemon confertus* | 13m | 15cm | 0 | |
| 3 | *L. confertus* | 13m | 15cm | 0 | |
| 4 | *L. confertus* | 12m | 10cm | 0 | |
| 5 | *L. confertus* | 10m | 11cm | 0 | |
| 6 | *L. confertus* | 9m | 6cm | 0 | |
| 7 | *L. confertus* | 9m | 7cm | 0 | |
| 8 | *Allocasuarina torulosa* | 12m | 10cm | 0 | |
| 9 | *E. siderophloia* | 26m | 35cm | 0 | |
| 10 | *L. confertus* | 5m | 6cm | 0 | |
| 11 | *A. torulosa* | 6m | 7cm | 0 | |
| 12 | *L. confertus* | 9m | 11cm | 0 | |
| 13 | *L. confertus* | 6m | 16cm | 0 | |
| 14 | *Corymbia intermedia* | 15m | 35cm | 0 | |
| 15 | *L. confertus* | 24m | 46cm | 0 | |
| 16 | *L. confertus* | 25m | 42cm | 0 | |
| 17 | *C. intermedia* | 21m | 28cm | 0 | |
| 18 | *L. confertus* | 5m | 5cm | 0 | |
| 19 | *Acacia melanoxylon* | 4m | 5cm | 0 | |
| 20 | *Diploglottis cunninghamii* | 5m | 6cm | 0 | |
| 21 | *L. confertus* | 9m | 11cm | 0 | |
| 22 | *E. siderophloia* | 19m | 34cm | 0 | |
| 23 | *A. torulosa* | 3m | 4cm | 0 | |
| 24 | *A. torulosa* | 10m | 16cm (x2) | 0 | Twin trunk |
| 25 | *E. pilularis* | 15m | 21cm | 0 | |
| 26 | *E. pilularis* | 14m | 16cm | 0 | |
| 27 | *L. confertus* | 13m | 19cm | 0 | |
| 28 | *A. torulosa* | 7m | 17cm | 0 | |
| 29 | *E. tereticornis* | 8m | 11cm | 0 | |
| 30 | *C. intermedia* | 26m | 36cm | 0 | |

| **Field Site No:** 22 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 546067; 6883984 | | | | | |
| **Brief description:** Blackbutt forest in steep eastern facing gully | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree (Reason for choice:** Secondary feed tree species) | *Eucalyptus propinqua* | 21m | 32cm | 0 | |
| 2 | *Corymbia intermedia* | 26m | 42cm | 0 | |
| 3 | *Guioa semiglauca* | 6m | 7cm | 0 | |
| 4 | *Macaranga tanarius* | 6m | 11cm | 0 | |
| 5 | *C. intermedia* | 10m | 12cm | 0 | |
| 6 | *C. intermedia* | 9m | 17cm | 0 | |
| 7 | *C. intermedia* | 9m | 8cm | 0 | |
| 8 | *C. intermedia* | 10m | 10cm | 0 | |
| 9 | *E. pilularis* | 12m | 12cm | 0 | |
| 10 | *C. intermedia* | 18m | 36cm | 0 | |
| 11 | *C. intermedia* | 24m | 41cm | 0 | |
| 12 | *Glochidion ferdinandi* | 8m | 17cm | 0 | |
| 13 | *G. ferdinandi* | 6m | 10cm | 0 | |
| 14 | *G. ferdinandi* | 5m | 8cm | 0 | |
| 15 | *G. ferdinandi* | 5m | 8cm | 0 | |
| 16 | *G. ferdinandi* | 4m | 8cm | 0 | |
| 17 | *Rhodamnia rubescens* | 6m | 11cm | 0 | |
| 18 | *R. rubescens* | 4m | 5cm | 0 | |
| 19 | *R. rubescens* | 6m | 5cm | 0 | |
| 20 | *R. rubescens* | 5m | 5cm | 0 | |
| 21 | *R. rubescens* | 4m | 5cm | 0 | |
| 22 | *R. rubescens* | 3m | 10cm | 0 | |
| 23 | *Lophostemon confertus* | 15m | 24cm | 0 | |
| 24 | *L. confertus* | 26m | 48cm | 0 | |
| 25 | *C. intermedia* | 25m | 42cm | 0 | |
| 26 | *Allocasuarina torulosa* | 5m | 6cm | 0 | |
| 27 | *G. ferdinandi* | 5m | 10cm | 0 | |
| 28 | *C. intermedia* | 10m | 10cm | 0 | |
| 29 | *A. torulosa* | 10m | 11cm | 0 | |
| 30 | *E. propinqua* | 21m | 34cm | 0 | |

| **Field Site No:** 23 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 546267; 6884184 | | | | | |
| **Brief description:** Blackbutt forest (+/- Grey gum) - steep southerly aspect | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree (Reason for choice:** Secondary feed tree species) | *Eucalyptus propinqua* | 25m | 41cm | 0 | |
| 2 | *Corymbia intermedia* | 25m | 36cm | 0 | |
| 3 | *C. intermedia* | 24m | 32cm | 0 | |
| 4 | *Lophostemon confertus* | 10m | 12cm | 0 | |
| 5 | *L. confertus* | 8m | 12cm | 0 | |
| 6 | *L. confertus* | 8m | 6cm (x2) | 0 | Twin trunk |
| 7 | *L. confertus* | 4m | 10cm | 0 | |
| 8 | *L. confertus* | 8m | 10cm | 0 | |
| 9 | *L. confertus* | 4m | 6cm | 0 | |
| 10 | *L. confertus* | 6m | 6cm | 0 | |
| 11 | *L. confertus* | 10m | 10cm | 0 | |
| 12 | *L. confertus* | 11m | 10cm | 0 | |
| 13 | *L. confertus* | 12m | 15cm | 0 | |
| 14 | *E. pilularis* | 27m | 44cm | 0 | |
| 15 | *E. pilularis* | 15m | 8cm | 0 | |
| 16 | *E. pilularis* | 15m | 15cm | 0 | |
| 17 | *E. pilularis* | 15m | 17cm | 0 | |
| 18 | *E. pilularis* | 27m | 46cm | 0 | |
| 19 | *E. pilularis* | 25m | 42cm | 0 | |
| 20 | *E. pilularis* | 10m | 15cm | 0 | |
| 21 | *E. siderophloia* | 16m | 28cm | 0 | |
| 22 | *Guioa semiglauca* | 10m | 15cm | 0 | |
| 23 | *Trochocarpa laurina* | 4m | 8cm | 0 | |
| 24 | *Schefflera actinophylla* | 6m | 15cm (x2) | 0 | Twin trunk |
| 25 | *Acacia melanoxylon* | 14m | 15cm | 0 | |
| 26 | *L. confertus* | 22m | 31cm | 0 | |
| 27 | *E. propinqua* | 22m | 32cm | 0 | |
| 28 | *E. propinqua* | 19m | 22cm | 0 | |
| 29 | *C. intermedia* | 21m | 32cm | 0 | |
| 30 | *E. siderophloia* | 21m | 29m | 0 | |

| **Field Site No:** 24 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 546201; 6884373 | | | | | |
| **Brief description:** Blackbutt forest – steep westerly aspect | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree (Reason for choice:** Secondary feed tree species) | *Eucalyptus pilularis* | 26m | 35cm | 0 | |
| 2 | *Lophostemon confertus* | 3m | 4cm | 0 | |
| 3 | *Acacia longissima* | 9m | 20cm | 0 | |
| 4 | *Corymbia intermedia* | 22m | 34cm | 0 | |
| 5 | *E. pilularis* | 17m | 20cm | 0 | |
| 6 | *E. pilularis* | 24m | 37cm | 0 | |
| 7 | *E. pilularis* | 26m | 80cm | 0 | |
| 8 | *L. confertus* | 9m | 10cm (x2) | 0 | Twin trunk |
| 9 | *L. confertus* | 5m | 5cm | 0 | |
| 10 | *A. lonmgissima* | 3m | 3cm | 0 | |
| 11 | *E. pilularis* | 25m | 42cm | 0 | |
| 12 | *A. lonmgissima* | 10m | 25cm | 0 | |
| 13 | *A. lonmgissima* | 4m | 15cm | 0 | |
| 14 | *E. pilularis* | 24m | 40cm | 0 | |
| 15 | *E. pilularis* | 26m | 64cm | 0 | |
| 16 | *L. confertus* | 19m | 32cm | 0 | |
| 17 | *L. confertus* | 11m | 19cm | 0 | |
| 18 | *L. confertus* | 8m | 11cm | 0 | |
| 19 | *L. confertus* | 8m | 8cm | 0 | |
| 20 | *L. confertus* | 5m | 6cm | 0 | |
| 21 | *E. pilularis* | 22m | 34cm | 0 | |
| 22 | *E. pilularis* | 26m | 41cm | 0 | |
| 23 | *L. confertus* | 5m | 4cm | 0 | |
| 24 | *L. confertus* | 4m | 3cm | 0 | |
| 25 | *L. confertus* | 8m | 10cm | 0 | |
| 26 | *L. confertus* | 11m | 14cm | 0 | |
| 27 | *L. confertus* | 10m | 15cm | 0 | |
| 28 | *L. confertus* | 9m | 10cm | 0 | |
| 29 | *L. confertus* | 10m | 8cm | 0 | |
| 30 | *L. confertus* | 8m | 15cm | 0 | |

| **Field Site No:** 25 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 546215; 6884550 | | | | | |
| **Brief description:** Brushbox forest – moderately steep easterly aspect | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree (Reason for choice:** Secondary feed tree species) | *Lophostemon confertus* | 16m | 48cm | 0 | |
| 2 | *L. confertus* | 18m | 41cm | 0 | |
| 3 | *L. confertus* | 18m | 32cm | 0 | |
| 4 | *Cinnamomum camphora* | 10m | 10cm | 0 | |
| 5 | *L. confertus* | 20m | 32cm | 0 | |
| 6 | *Syzygium* sp. | 5m | 7cm | 0 | |
| 7 | *Syzygium* sp. | 6m | 5cm | 0 | |
| 8 | *Syzygium* sp. | 4m | 5cm | 0 | |
| 9 | *Syzygium* sp. | 3m | 4cm | 0 | |
| 10 | *Syzygium* sp. | 4m | 6cm | 0 | |
| 11 | *Syzygium* sp. | 4m | 6cm | 0 | |
| 12 | *C. camphora* | 6m | 15cm | 0 | |
| 13 | *L. confertus* | 12m | 10cm | 0 | |
| 14 | *L. confertus* | 15m | 20cm | 0 | |
| 15 | *L. confertus* | 15m | 15cm | 0 | |
| 16 | *Glochidion ferdinandi* | 5m | 14cm | 0 | |
| 17 | *L. confertus* | 16m | 20cm | 0 | |
| 18 | *L. confertus* | 15m | 10cm | 0 | |
| 19 | *L. confertus* | 10m | 10cm | 0 | |
| 20 | *L. confertus* | 15m | 15cm | 0 | |
| 21 | *L. confertus* | 14m | 10cm | 0 | |
| 22 | *Syzygium* sp. | 6m | 6cm | 0 | |
| 23 | *Syzygium* sp. | 4m | 10cm | 0 | |
| 24 | *Syzygium* sp. | 4m | 5cm | 0 | |
| 25 | *Syzygium* sp. | 5m | 4cm | 0 | |
| 26 | *Syzygium* sp. | 4m | 6cm | 0 | |
| 27 | *Syzygium* sp. | 3m | 6cm | 0 | |
| 28 | *Corymbia intermedia* | 21m | 30cm | 0 | |
| 29 | *C. intermedia* | 17m | 26cm | 0 | |
| 30 | *L. confertus* | 21m | 34cm (x2) | 0 | Twin trunk |

| **Field Site No:** 26 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 546082; 6884589 | | | | | |
| **Brief description:** Blackbutt forest – steep south-easterly aspect | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree (Reason for choice:** Secondary feed tree species) | *Eucalyptus pilularis* | 25m | 51cm | 0 | |
| 2 | *Trochocarpa laurina* | 3m | 4cm | 0 | |
| 3 | *Syzygium* sp. | 2m | 2cm | 0 | |
| 4 | *Syzygium* sp. | 2m | 2cm | 0 | |
| 5 | *Syzygium* sp. | 3m | 3cm | 0 | |
| 6 | *Syzygium* sp. | 2m | 2cm | 0 | |
| 7 | *Syzygium* sp. | 3m | 2cm | 0 | |
| 8 | *Syzygium* sp. | 3m | 4cm | 0 | |
| 9 | *Notelaea* sp. | 2m | 2cm | 0 | |
| 10 | *Jagera pseudorhus* | 12m | 33cm (x2) | 0 | Twin trunk |
| 11 | *E. pilularis* | 21m | 36cm | 0 | |
| 12 | *Glochidion ferdinandi* | 9m | 22cm (x2) | 0 | Twin trunk |
| 13 | *Flindersia* sp. | 6m | 14cm | 0 | |
| 14 | *Acronychia oblongifolia* | 6m | 16cm | 0 | |
| 15 | *E. pilularis* | 20m | 35cm | 0 | |
| 16 | *Acacia melanoxylon* | 6m | 16cm | 0 | |
| 17 | *J. pseudorhus* | 11m | 19cm | 0 | |
| 18 | *E. pilularis* | 12m | 15cm | 0 | |
| 19 | *E. pilularis* | 14m | 16cm | 0 | |
| 20 | *E. pilularis* | 20m | 31cm | 0 | |
| 21 | *E. pilularis* | 14m | 14cm | 0 | |
| 22 | *T. laurina* | 2m | 2cm | 0 | |
| 23 | *Cinnamomum camphora* | 10m | 20cm | 0 | |
| 24 | *G. ferdinandi* | 4m | 11cm | 0 | |
| 25 | *T. laurina* | 4m | 4cm | 0 | |
| 26 | *T. laurina* | 5m | 15cm (x2) | 0 | Twin trunk |
| 27 | *E. pilularis* | 27m | 100cm | 0 | |
| 28 | *C. intermedia* | 16m | 28cm | 0 | |
| 29 | *Cryptocarya glaucescens* | 2m | 3cm | 0 | |
| 30 | *C. glaucescens* | 4m | 4cm | 0 | |

| **Field Site No:** 27 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 546073; 6884412 | | | | | |
| **Brief description:** Very tall Flooded gum forest in easterly facing gully | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree (Reason for choice:** Secondary feed tree species) | *Eucalyptus grandis* | 38m | 45cm | 0 | |
| 2 | *L. confertus* | 22m | 34cm | 0 | |
| 3 | *E. grandis* | 32m | 32cm | 0 | |
| 4 | *Cryptocarya glaucescens* | 3m | 3m | 0 | |
| 5 | *Schefflera actinophylla* | 5m | 8cm | 0 | |
| 6 | *Cinnamomum camphora* | 3m | 4cm | 0 | |
| 7 | *Guioa semiglauca* | 9m | 14cm | 0 | |
| 8 | *E. grandis* | 35m | 65cm | 0 | |
| 9 | *L. confertus* | 20m | 34cm | 0 | |
| 10 | *E. grandis* | 32m | 40cm | 0 | |
| 11 | *Notelaea* sp. | 3m | 5cm | 0 | |
| 12 | *E. grandis* | 34m | 60cm | 0 | |
| 13 | *Wilkaea* sp. | 3m | 4cm | 0 | |
| 14 | *C. camphora* | 10m | 17cm | 0 | |
| 15 | *L. confertus* | 15m | 15cm | 0 | |
| 16 | *Homalanthus populifolius* | 5m | 10cm | 0 | |
| 17 | *C. camphora* | 7m | 11cm | 0 | |
| 18 | *H. populifolius* | 6m | 10cm | 0 | |
| 19 | *Eupomatia laurina* | 2m | 3cm | 0 | |
| 20 | *L. confertus* | 16m | 22cm | 0 | |
| 21 | *E. grandis* | 32m | 51cm | 0 | |
| 22 | *E. grandis* | 35m | 60cm | 0 | |
| 23 | *E. grandis* | 35m | 52cm | 0 | |
| 24 | *L. confertus* | 5m | 10cm | 0 | |
| 25 | *L. confertus* | 6m | 9cm | 0 | |
| 26 | *L. confertus* | 6m | 11cm | 0 | |
| 27 | *L. confertus* | 7m | 17cm | 0 | |
| 28 | *G. semiglauca* | 12m | 8cm | 0 | |
| 29 | *Mallotus philippensis* | 2m | 2cm | 0 | |
| 30 | *L. confertus* | 14m | 11cm | 0 | |

| **Field Site No:** 28 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 546067; 6884184 | | | | | |
| **Brief description:** Brushbox forest in steep northern facing gully | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree (Reason for choice:** Primary feed tree species) | *Eucalyptus microcorys* | 16m | 30cm | 0 | |
| 2 | *Corymbia intermedia* | 9m | 9cm | 0 | |
| 3 | *Alphitonia excelsa* | 4m | 4cm | 0 | |
| 4 | *Lophostemon confertus* | 4m | 5cm | 0 | |
| 5 | *C. intermedia* | 24m | 38cm | 0 | |
| 6 | *L. confertus* | 13m | 15cm | 0 | |
| 7 | *L. confertus* | 5m | 4cm | 0 | |
| 8 | *L. confertus* | 4m | 4cm | 0 | |
| 9 | *L. confertus* | 5m | 6cm | 0 | |
| 10 | *L. confertus* | 8m | 18cm | 0 | |
| 11 | *L. confertus* | 7m | 12cm | 0 | |
| 12 | *L. confertus* | 4m | 10cm | 0 | |
| 13 | *L. confertus* | 3m | 5cm | 0 | |
| 14 | *L. confertus* | 4m | 5cm | 0 | |
| 15 | *L. confertus* | 5m | 5cm | 0 | |
| 16 | *E. microcorys* | 21m | 28cm | 0 | |
| 17 | *L. confertus* | 14m | 10cm | 0 | |
| 18 | *L. confertus* | 12m | 8cm | 0 | |
| 19 | *E. microcorys* | 16m | 25cm | 0 | |
| 20 | *L. confertus* | 10m | 10cm | 0 | |
| 21 | *Acacia melanoxylon* | 10m | 15cm | 0 | |
| 22 | *Eucalyptus propinqua* | 26m | 61cm | 0 | |
| 23 | *C. intermedia* | 25m | 49cm | 0 | |
| 24 | *L. confertus* | 10m | 10cm | 0 | |
| 25 | *L. confertus* | 12m | 10cm | 0 | |
| 26 | *L. confertus* | 4m | 6cm | 0 | |
| 27 | *L. confertus* | 6m | 15cm | 0 | |
| 28 | *L. confertus* | 7m | 15cm | 0 | |
| 29 | *L. confertus* | 10m | 10cm | 0 | |
| 30 | *L. confertus* | 4m | 6cm | 0 | |

| **Field Site No:** 29 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 545882; 6884015 | | | | | |
| **Brief description:** Brushbox forest in steep gully | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree (Reason for choice:** Secondary feed tree species) | *Eucalyptus propinqua* | 25m | 50cm | 0 | |
| 2 | *Corymbia intermedia* | 23m | 40cm | 0 | |
| 3 | *E. propinqua* | 23m | 31cm | 0 | |
| 4 | *Lophostemon confertus* | 10m | 20cm | 0 | |
| 5 | *L. confertus* | 9m | 19cm | 0 | |
| 6 | *L. confertus* | 7m | 19cm | 0 | |
| 7 | *L. confertus* | 5m | 10cm | 0 | |
| 8 | *L. confertus* | 7m | 5cm | 0 | |
| 9 | *L. confertus* | 5m | 10cm | 0 | |
| 10 | *L. confertus* | 10m | 10cm | 0 | |
| 11 | *L. confertus* | 12m | 15cm | 0 | |
| 12 | *L. confertus* | 14m | 21cm | 0 | |
| 13 | *L. confertus* | 10m | 10cm | 0 | |
| 14 | *L. confertus* | 7m | 10cm | 0 | |
| 15 | *Syzygium* sp. | 7m | 11cm | 0 | |
| 16 | *Syzygium* sp. | 5m | 5cm | 0 | |
| 17 | *Notelaea* sp. | 4m | 4cm | 0 | |
| 18 | *Flindersia* sp. | 5m | 5cm | 0 | |
| 19 | *E. propinqua* | 26m | 32cm | 0 | |
| 20 | *Allocasuarina torulosa* | 5m | 10cm | 0 | |
| 21 | *E. propinqua* | 25m | 35cm | 0 | |
| 22 | *E. propinqua* | 26m | 41cm | 0 | |
| 23 | *L. confertus* | 22m | 32cm | 0 | |
| 24 | *L. confertus* | 20m | 35cm | 0 | |
| 25 | *L. confertus* | 18m | 32cm | 0 | |
| 26 | *L. confertus* | 22m | 41cm | 0 | |
| 27 | *L. confertus* | 26m | 54cm | 0 | |
| 28 | *A. torulosa* | 6m | 21cm | 0 | |
| 29 | *E. propinqua* | 12m | 16cm | 0 | |
| 30 | *Acacia melanoxylon* | 6m | 10cm | 0 | |

| **Field Site No:** 30 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 545645; 6883657 | | | | | |
| **Brief description:** Blackbutt forest – gentle easterly aspect | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree (Reason for choice:** Primary feed tree species) | *Eucalyptus microcorys* | 17m | 32cm | 0 | |
| 2 | *Callistemon* sp. | 16m | 35cm | 0 | |
| 3 | *Eucalyptus pilularis* | 24m | 61cm | 0 | |
| 4 | *Corymbia intermedia* | 25m | 56cm | 0 | |
| 5 | *C. intermedia* | 22m | 48cm | 0 | |
| 6 | *C. intermedia* | 25m | 47cm | 0 | |
| 7 | *E. pilularis* | 27m | 85cm | 0 | |
| 8 | *Lophostemon confertus* | 9m | 15cm | 0 | |
| 9 | *E. pilularis* | 26m | 58cm | 0 | |
| 10 | *L. confertus* | 6m | 6cm | 0 | |
| 11 | *L. confertus* | 4m | 4cm | 0 | |
| 12 | *L. confertus* | 3m | 4cm | 0 | |
| 13 | *L. confertus* | 6m | 3cm | 0 | |
| 14 | *L. confertus* | 5m | 5cm | 0 | |
| 15 | *L. confertus* | 5m | 10cm | 0 | |
| 16 | *E. pilularis* | 25m | 35cm | 0 | |
| 17 | *E. pilularis* | 25m | 40cm | 0 | |
| 18 | *E. pilularis* | 24m | 48cm | 0 | |
| 19 | *E. pilularis* | 26m | 41cm | 0 | |
| 20 | *E. pilularis* | 28m | 30cm | 0 | |
| 21 | *E. pilularis* | 26m | 38cm | 0 | |
| 22 | *E. pilularis* | 23m | 41cm | 0 | |
| 23 | *E. pilularis* | 25m | 28cm | 0 | |
| 24 | *E. pilularis* | 21m | 29cm | 0 | |
| 25 | *C. intermedia* | 24m | 35cm | 0 | |
| 26 | *L. confertus* | 6m | 15cm | 0 | |
| 27 | *L. confertus* | 10m | 15cm | 0 | |
| 28 | *L. confertus* | 11m | 10cm | 0 | |
| 29 | *L. confertus* | 4m | 5cm | 0 | |
| 30 | *L. confertus* | 3m | 5cm | 0 | |

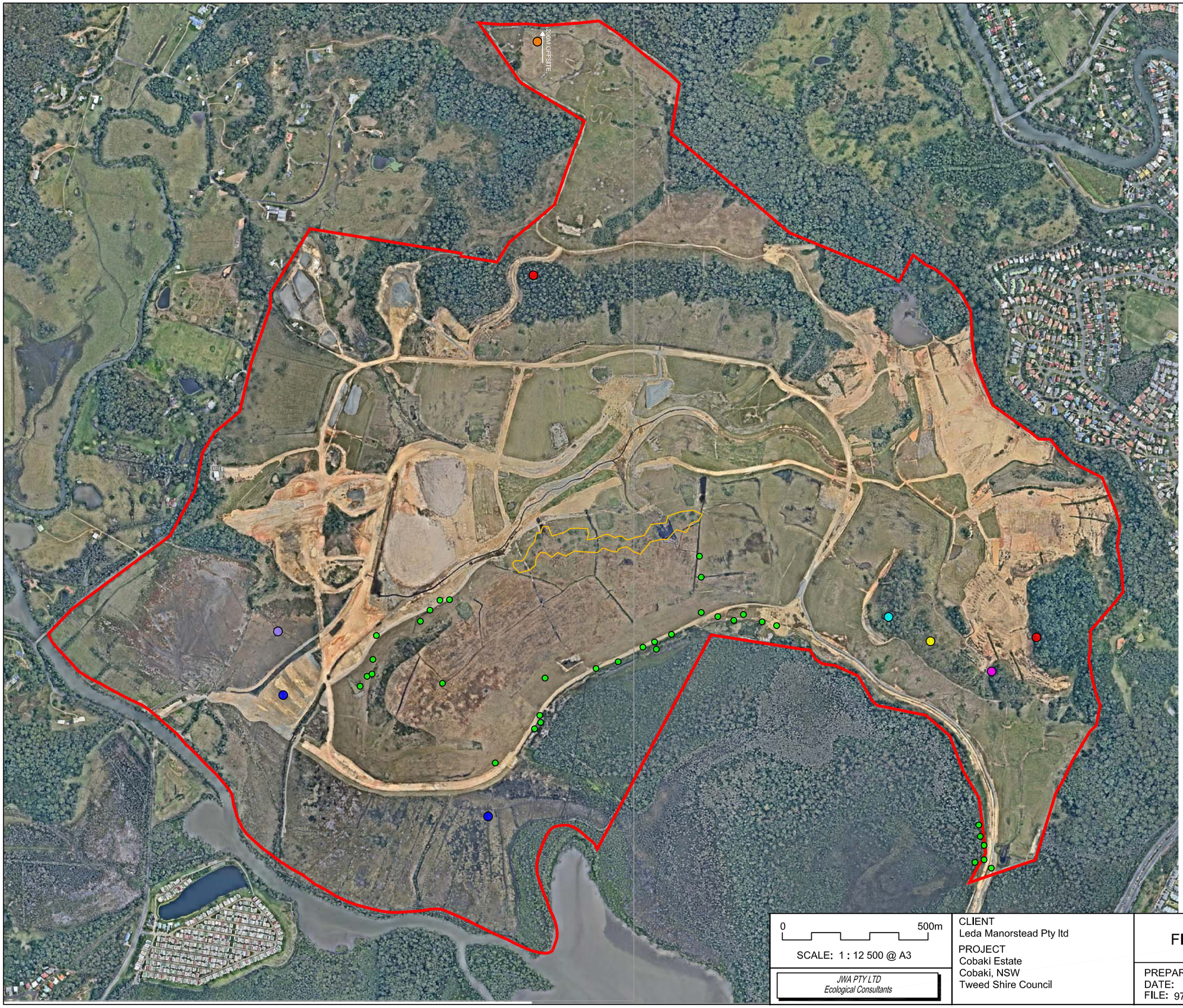
| **Field Site No:** 31 | | | | | |
|---|---|---|---|---|---|
| **GPS:** 545891; 6883395 | | | | | |
| **Brief description:** Regrowth forest – gentle westerly aspect | | | | | |
| **Tree** | **Species** | **Height** | **DBH** | **Scats (1 = yes; 0 = no)** | **Notes** |
| **Centre tree (Reason for choice:** Secondary feed tree species) | *Eucalyptus pilularis* | 9m | 15cm | 0 | |
| 2 | *E. pilularis* | 6m | 5cm | 0 | |
| 3 | *E. pilularis* | 4m | 6cm | 0 | |
| 4 | *E. pilularis* | 5m | 6cm | 0 | |
| 5 | *E. pilularis* | 2m | 4cm | 0 | |
| 6 | *E. pilularis* | 5m | 7cm | 0 | |
| 7 | *E. pilularis* | 7m | 8cm | 0 | |
| 8 | *Corymbia intermedia* | 6m | 10cm | 0 | |
| 9 | *E. pilularis* | 6m | 8cm | 0 | |
| 10 | *E. pilularis* | 6m | 6cm | 0 | |
| 11 | *E. pilularis* | 4m | 4cm | 0 | |
| 12 | *E. pilularis* | 3m | 4cm | 0 | |
| 13 | *E. pilularis* | 6m | 3cm | 0 | |
| 14 | *E. pilularis* | 5m | 5cm | 0 | |
| 15 | *C. intermedia* | 5m | 10cm | 0 | |
| 16 | *C. intermedia* | 5m | 5cm | 0 | |
| 17 | *Lophostemon confertus* | 5m | 4cm | 0 | |
| 18 | *L. confertus* | 4m | 8cm | 0 | |
| 19 | *L. confertus* | 6m | 4cm | 0 | |
| 20 | *L. confertus* | 8m | 9cm | 0 | |
| 21 | *E. pilularis* | 6m | 8cm | 0 | |
| 22 | *E. pilularis* | 3m | 4cm | 0 | |
| 23 | *E. pilularis* | 5m | 8cm | 0 | |
| 24 | *E. pilularis* | 2m | 2cm | 0 | |
| 25 | *E. pilularis* | 4m | 5cm | 0 | |
| 26 | *E. pilularis* | 6m | 5cm | 0 | |
| 27 | *E. pilularis* | 5m | 7cm | 0 | |
| 28 | *E. pilularis* | 6m | 5cm | 0 | |
| 29 | *E. pilularis* | 4m | 5cm | 0 | |
| 30 | *E. pilularis* | 3m | 5cm | 0 | |

# ATTACHMENT 3 - PLANT SPECIES TABLE

| Botanical Name | Common Name | Life Form |
|---|---|---|
| *Acacia ulicifolia* | Prickly moses | Small shrub |
| *Andropogon virginicus** | Whisky grass | Grass |
| *Aotus lanigera* | Golden candlesticks | Small shrub |
| *Austromyrtus dulcis* | Midgen berry | Small shrub |
| *Baeckea frutescens* | Weeping Baeckea | Small shrub |
| *Baloskion pallens* | Didgery sticks | Rush |
| *Baloskion tetraphyllum* | Tassel cord rush | Rush |
| *Blechnum indicum* | Swamp water fern | Fern |
| *Cypress polystachyos* | Bunchy sedge | Sedge |
| *Dianella caerulea* | Blue flax lily | Herb |
| *Eucalyptus robusta* | Swamp mahogany | Tree |
| *Fimbristylis nutans* | | Sedge |
| *Gahnia aspera* | Rough saw-sedge | Sedge |
| *Homoranthus virgatus* | | Small shrub |
| *Hovea* sp. | | Small shrub |
| *Imperata cylindrica* | Blady grass | Grass |
| *Kennedia rubicunda* | Dusky coral pea | Climber |
| *Lomandra longifolia* | Spiny-head mat-rush | Rush |
| *Lygodium microphyllum* | Climbing snake fern | Fern |
| *Pteridium esculentum* | Common bracken | Fern |
| *Selaginella uliginosa* | Swamp Selaginella | Clubmoss |
| *Senecio madagascariensis** | Fireweed | Forb |

* Introduced species

# ATTACHMENT 4 - LOCATIONS OF WALLUM FROGLET




N

**LEGEND**

- Community 6 - Mid-high open woodland (*Eucalyptus robusta*)
- Black-necked stork (*Ephippiorhynchus asiaticus*)
- Osprey (*Pandion haliaetus*) - Old Nest
- Osprey (*Pandion haliaetus*) - New Nest
- Powerful owl (*Ninox strenua*)
- *Grey-headed flying-fox* (*Pteropus poliocephalus*)
- Koala (*Phascolarctos cinereus*)
- Wallum froglet (*Crinia tinnula*) Locations
- Masked owl (*Tyto novaehollandiae*)
- Site Outline

0 500m

SCALE: 1 : 12 500 @ A3

*JWA PTY LTD*
*Ecological Consultants*

CLIENT
Leda Manorstead Pty ltd

PROJECT
Cobaki Estate
Cobaki, NSW
Tweed Shire Council

FIGURE 1

PREPARED: BW
DATE: 17 November 2015
FILE: 97038_SM BAM.dwg

TITLE
SWAMP MAHOGANY COMMUNITY & THREATENED FAUNA LOCATIONS