JAMES WARREN & Associates Pty Ltd

ENVIRONMENTAL CONSULTANTS

RISE ESTATE
BILAMBIL HEIGHTS WEST TWEED
MP 08-0234

VOLUME 2 – APPENDICES TO THE ECOLOGICAL ASSESSMENT

APRIL 2009

REPORT PREPARED FOR
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APPENDIX 1 - FLORA ASSESSMENT

1.1 Introduction

This section of the report discusses the methods used in the vegetation assessment and provides a description of the location, composition and extent of the vegetation communities on the Subject site.

1.2 Methodology

1.2.1 Database searches

Searches of the NPWS database were completed to find records of National and NSW Threatened flora, known to occur within 10km of the Subject site.

1.2.2 Literature review

The following documents were reviewed as part of the flora assessment:

- Tweed Local Environment Plan (2000)
- Tweed Vegetation Management Strategy (2004)
- WBM Oceanics (1996) Terranora Golf Project – Flora and Fauna Report
- JWA (2004) 38 McAllisters Road - Flora and Fauna Assessment
- Tweed Shire Council (2002) Rare and Significant trees Register.
- JWA (2004) Flora and Fauna Assessment. Lot 5 DP 822786 Marana Street Bilambil Heights.

1.2.3 Vegetation Assessment

A broadscale vegetation survey was completed by two (2) scientists on the 22nd, 23rd and 24th of November 2005, and by one (1) scientist on the 29th of November 2005 over a total period of approximately sixty (60) hours.

A further thirty-eight (38) hours assessment was undertaken by two (2) scientists on February 27th and 28th 2006 to investigate 7(d) zoned land in the south of the site, and land occurring immediately adjacent, both on and off the site. This assessment was to determine the diversity and numbers of Threatened flora within this vegetation community, as it represents the best quality vegetation on the site.

Verification of vegetation community boundaries was completed during subsequent field surveys during May and June 2007, and March 2009. The effects of the Camphor laurel eradication program on community structure and diversity were documented during these survey periods.

Vegetation communities were assessed in order to ascertain their ecological value and levels of disturbance (such as the presence of Camphor laurel), and the presence of Threatened flora. All Threatened flora species were surveyed by GPS. Due to the large number of Threatened flora on the site, each individual tree was not given its own GPS

point. Rather, any trees within radius of up to 10 metres of a point were grouped together, with records noted of the species and number of trees and approximate height.

Mapping of vegetation communities was achieved using 1:1000 (2007) aerial photography, GPS and cadastral bases with relevant survey points.

1.3 Results

1.3.1 Results of Database Searches

Searches of the NPWS and EPBC databases revealed thirty-three (33) significant flora species within 10km of the Subject site. These species are shown in **TABLE 1**.

TABLE 1 - RECORDS OF SIGNIFICANT FLORA WITHIN 10 KM OF THE SUBJECT SITE

Common name	Botanical name	Status	
		TSC Act*	EPBC Act#
Arrow-head vine	*Tinospora tinosporoides*	V	V
Axe breaker	*Geijera paniculata*	E	-
Ball nut	*Floydia praealta*	V	V
Bopple nut	*Hicksbeachia pinnatifolia*	V	V
Brush cassia	*Cassia brewsteri var. marksiana*	E	-
Clear milkvine	*Marsdenia longiloba*	E	V
Coolamon	*Syzygium moorei*	V	V
Corokia	*Corokia whiteana*	V	V
Crystal Creek walnut	*Endiandra floydii*	E	E
Davidson's plum	*Davidsonia jerseyana*	E	E
Fine-leaved tuckeroo	*Lepiderema pulchella*	V	-
Hairy-joint grass	*Arthraxon hispidus*	V	V
Jointed baloghia	*Baloghia marmorata*	V	V
Marblewood	*Acacia bakeri*	V	-
Queensland xylosma	*Xylosma terrae-reginae*	E	-
Red lilly pilly	*Syzigium hodgkinsoniae*	V	V
Red-fruited ebony	*Diospyros mabacea*	E	E
Rough-shelled bush nut	*Macadamia tetraphylla*	V	V
Rusty plum	*Amorphospermum whitei*	V	-
Rusty rose walnut	*Endiandra hayesii*	V	V
Scented acronychia	*Acronychia littoralis*	E	E
Small-leaved hazelwood	*Symplocos baeuerlenii*	V	V
Small-leaved tamarind	*Diploglottis campbellii*	E	E
Smooth Davidson's Plum	*Davidsonia johnsonii*	E	E
Southern fontainea	*Fontainea australis*	V	V
Sothern ochrosia	*Ochrosia moorei*	E	E
Spiny gardenia	*Randia moorei*	E	E
Stinking cryptocarya	*Cryptocarya foetida*	V	V
Swamp orchid	*Phaius australis*	E	E
Sweet myrtle	*Gossia fragrantissima*	E	E
Thorny pea	*Desmodium acanthocladum*	V	V
Yellow satinheart	*Bosistoa transversa*	V	V
Yiel yiel	*Grevillea hilliana*	E	-

* E or V is Endangered or Vulnerable under the TSC Act 1995.
# E, V or R is Endangered, Vulnerable or Rare under the EPBC Act 1999.

1.3.2 Results of Literature Review

A comprehensive Flora and Fauna assessment was completed over the entire Terranora golf course site by WBM Oceanics in 1996. This assessment recorded thirteen (13) Threatened flora species, mostly within a large area of remnant rainforest in the south-west of the site. Threatened flora recorded included:

- Sweet myrtle (*Gossia fragrantissima*)
- Small-leaved tamarind (*Diploglottis campbellii*)
- Spiny gardenia (*Randia moorei*)
- Yellow satinheart (*Bosistoa transversa*)
- Stinking laurel (*Cryptocarya foetida*)
- Rough-shelled bush nut (*Macadamia tetraphylla*)
- Fine-leaved tuckeroo (*Lepiderema pulchella*)
- Marblewood (*Acacia bakeri*)
- White laceflower (*Archidendron hendersonii*)
- Yiel yiel (*Grevillea hilliana*)
- Rusty rose walnut (*Endiandra hayesii*)
- Southern ochrosia (*Ochrosia moorei*)
- Coolamon (*Syzygium moorei*)

The WBM Oceanics study completed detailed mapping of some of these Threatened species on the site where they occurred in remnant vegetation.

A number of ROTAP (Rare or Threatened Australian Plants – Briggs & Leigh 1995) and locally significant species (Sheringham & Westaway 1995) were also recorded from the WBM Oceanics survey. All Threatened, ROTAP and significant flora species recorded by WBM Oceanics are shown as **APPENDIX 1**.

A flora and fauna assessment was completed by JWA (2004) for a nearby site within the locality of the subject site. The threatened species Fine-leaved tuckeroo (*Lepiderema pulchella*) and the ROTAP (Rare or Threatened Australian Plant) species Smooth Scrub Turpentine (*Rhodamnia maideniana*) were recorded from this assessment of a nearby site in McAllisters Road, which occurs adjacent to the Subject site.

The Tweed Vegetation Management Strategy TVMS (2004) maps the southern portion of vegetation on the site as Subtropical rainforest (containing 9 Threatened flora records), while all vegetation in the northern portion of the site has been mapped as Camphor laurel (**FIGURE 1**). The golf course in the east of the site has not been assessed. The value of vegetation on the site and degree of Camphor laurel presence on the site has also been mapped under the TVMS. This is shown as **FIGURES 2** and **3** respectively.

The Tweed Shire Council Recreation Services Rare and Significant Tree Register does not record any rare or significant trees on the Subject site.

1.3.3 Vegetation communities on the site

Seven (7) broad vegetation communities were identified on the Subject site and are shown in **TABLE 2**.

LEGEND

Rainforest and Riparian Communities

102 - Sub-tropical / Warm Temperate Rainforest on Bedrock Substrates

Sclerophyll Open Forests on Bedrock Substrate

207 - Brush Box Open Forest

Miscellaneous Map Units

903 - Open Water

998 - Not Assessed

Highly Modified / Disturbed

1004 - Camphor Laurel Dominant Closed to Open Forest

Site Outline

SOURCE:
Tweed Shire Council - Vegetation Management Strategy Map 2

0 300m

SCALE: 1 : 10 000 @ A3

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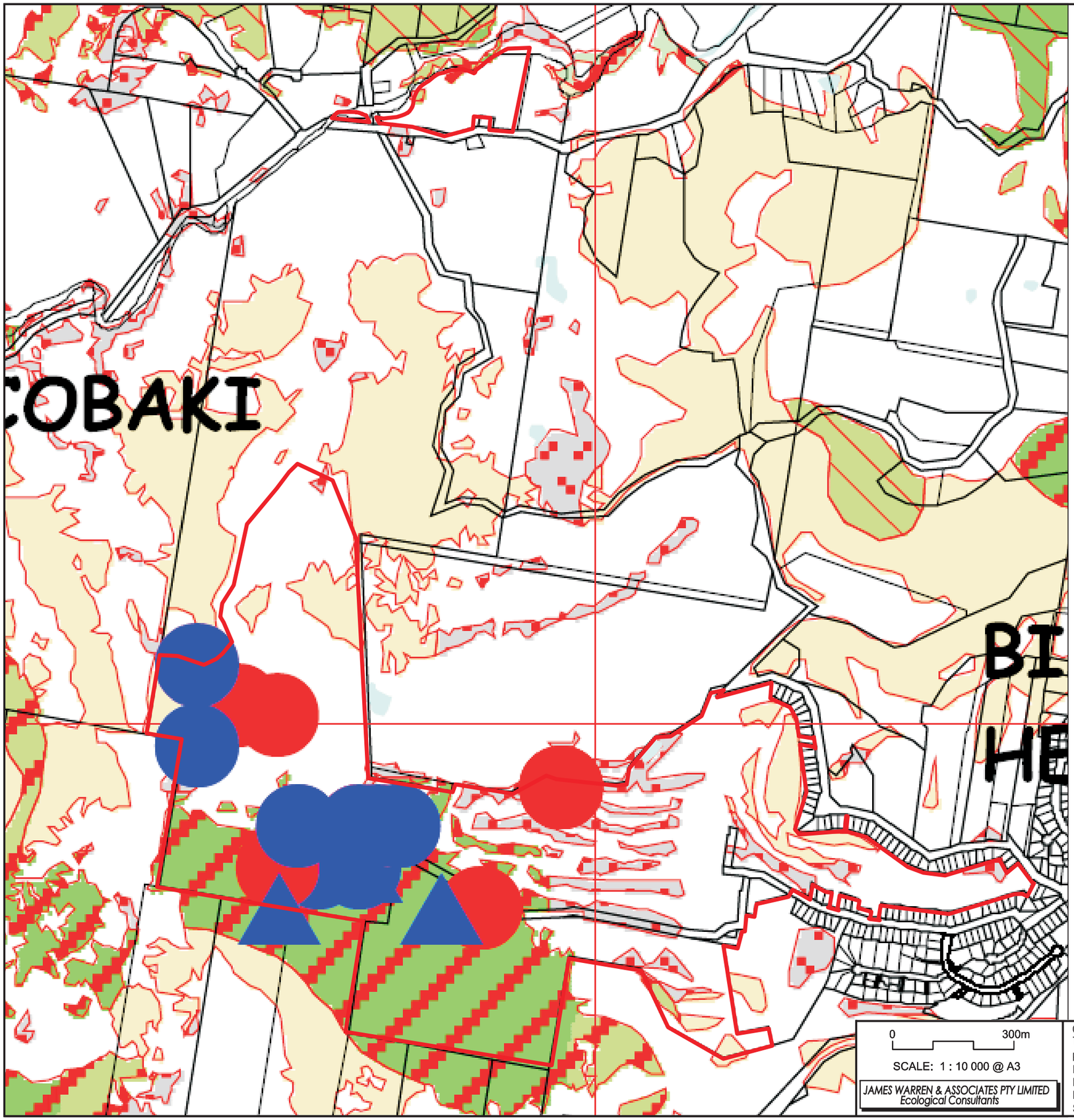
VOLUME 2
FIGURE 1

PREPARED: BW
DATE: 27 April 2009
FILE: N01051_EA_tweedveg.cdr

TITLE

TSC VEGETATION TYPE



LEGEND

Threatened Fauna (NPWS Atlas to July 2004)

- Endangered
- Vulnerable

Threatened Flora (NPWS Atlas to July 2004)

- Endangered
- Vulnerable

Ecological Senstivity

- 1 - High
- 2 - Moderate
- 3 - Low
- 4 - Not Determined

Ecological Status

- 1 - Very High
- 2 - High
- 3 - Medium
- 4 - Low
- 5 - Not Determined
- Site Outline

SOURCE:
Tweed Shire Council - Vegetation Management Strategy Map 4

0 300m

SCALE: 1 : 10 000 @ A3

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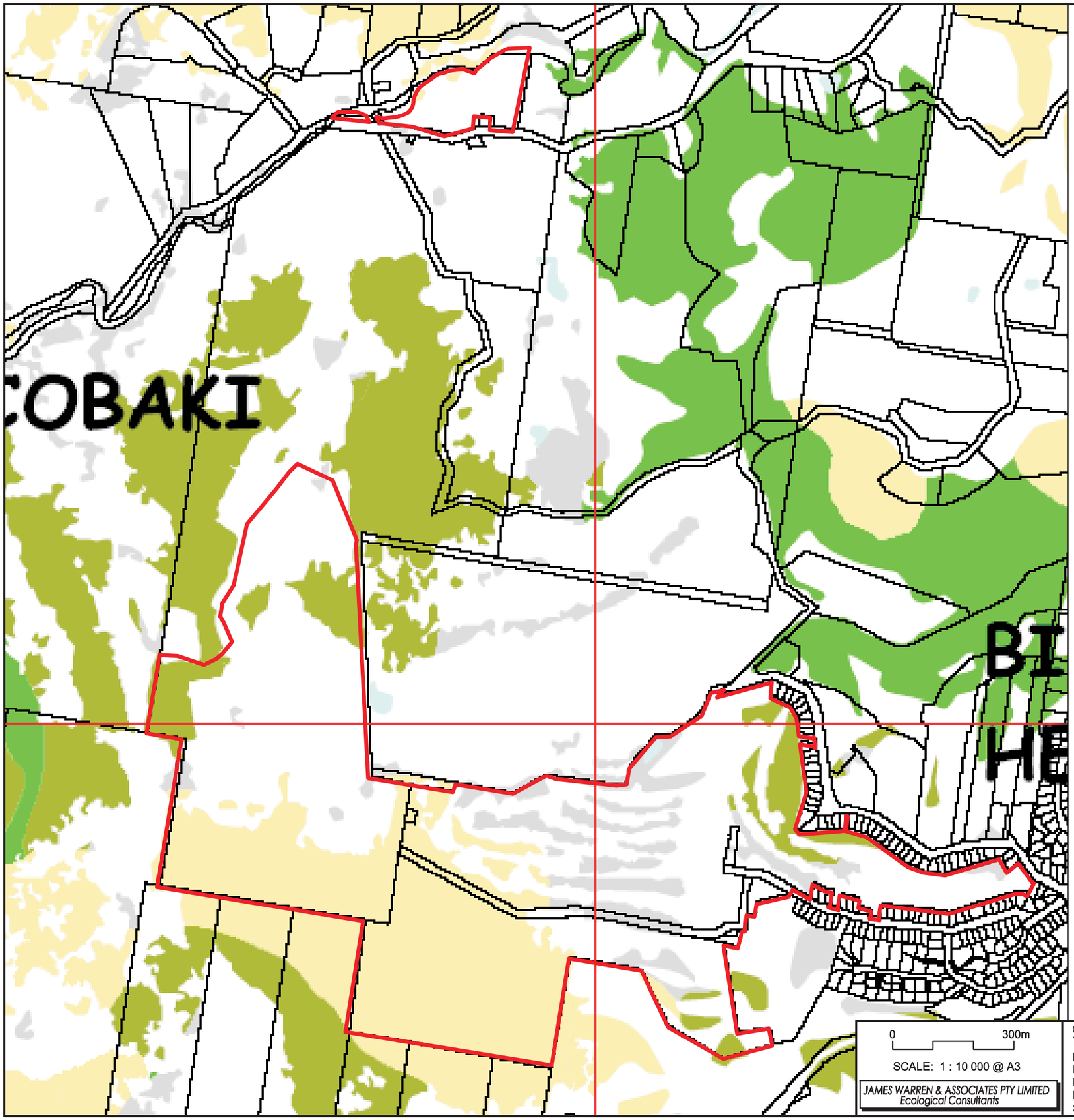
FIGURE 2

PREPARED: BW
DATE: 27 April 2009
FILE: N01051_EA_tweedvalue.cdr

TITLE

TSC ECOLOGICAL VALUES



LEGEND

- Dominant
- Co-dominant
- Occasional, Patchy or Edges
- Not Detected from API
- Not Determined
- Site Outline

SOURCE:
Tweed Shire Council - Vegetation Management Strategy Map 3

0 300m

SCALE: 1 : 10 000 @ A3

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FIGURE 3

PREPARED: BW
DATE: 27 April 2009
FILE: N01051_EA_camphor.cdr

TITLE

TSC
CAMPHOR LAUREL
ABUNDANCE

TABLE 2
VEGETATION COMMUNITIES PRESENT ON THE SUBJECT SITE

1	Tall closed forest (*Cinnamomum camphora* +/- mixed species)
2	Tall closed forest (mixed species)
3	Tall closed forest (*Lophostemon confertus*)
4	Regenerating closed forest (mixed species)
5	Landscape plantings
6	Disturbed land
7	Grassland with scattered trees

Vegetation communities on the site are shown as **FIGURE 4** and described below. The conservation value of vegetation communities on the site is discussed in reference to the Comprehensive Regional Assessment completed for NSW Forest and Non-Forest ecosystems as part of the Regional Forestry Agreement (RFA) process (CRA Unit 1999).

Vegetation communities on the site are also described at a local level with reference to the Tweed Vegetation Management Strategy (Kingston *et al.* 2004).

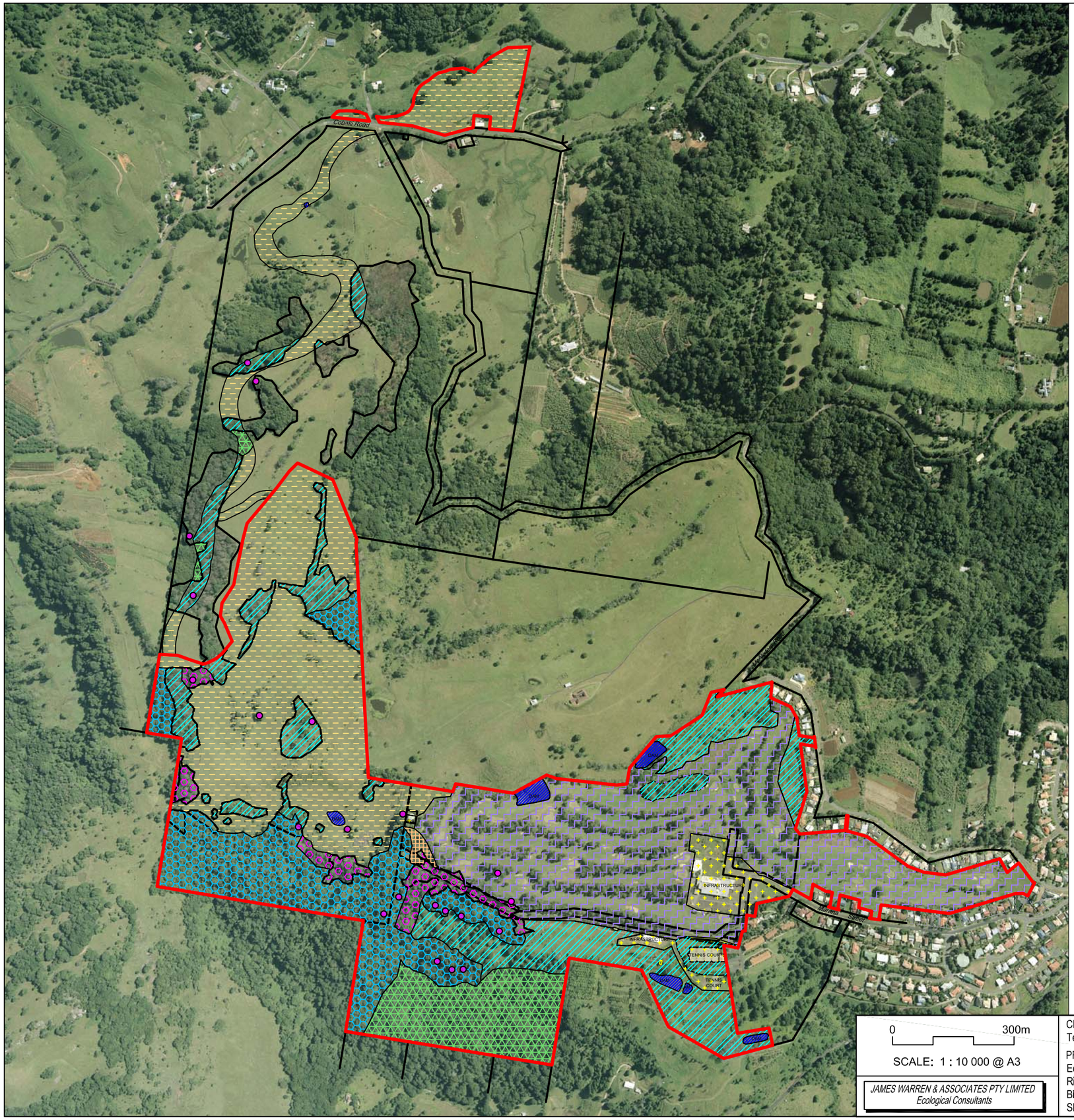
A list of the three-hundred and ninety-one (391) flora species recorded on the site is attached as **APPENDIX 2**.

Community 1 - Tall closed forest (*Cinnamomum camphora* +/- mixed species)

This community occurs as most of the fragmented vegetation in the northern and north-western portion of the site, and as a disturbed area in the south. Within this community vegetation has been degraded to varying degrees from invasion by Camphor laurel (*Cinnamomum camphora*) and (to a lesser degree) Large-leaved privet (*Ligustrum lucidum*). These areas of vegetation consist of regrowth Sub-tropical rainforest which has undergone substantial modification from clearing for grazing, access tracks and installation of water pipes and fencing. The WBM report (1996) noted that a 1961 aerial photograph of the site indicates that areas supporting most of this community were extensively cleared.

Typical native canopy species present include Guioa (*Guioa semiglauca*), Red kamala (*Mallotus phillippensis*) and Rough-leaved elm (*Aphananthe philippinensis*). Occasional mature trees (20-30 metres in height) occur, but are generally scarce, with examples including Red apple (*Acmena ingens*), Guioa (*Guioa semiglauca*), Cudgerie (*Flindersia schottiana*) and Teak (*Flindersia australis*). A number of very large mature figs also occur, with the White fig (*Ficus virens*) particularly common. The location of mature figs within the development area is shown in **FIGURE 4.**

Common midstorey species include Steelwood (*Sarcopteryix stipata*), Pepperberry (*Cryptocarya obovata*), Whalebone (*Streblus brunoniensis*) and Glossy laurel (*Cryptocarya laevigata*), along with Cockspur (*Maclura cochinchinensis*) and Lantana (*Lantana camara*). The ground layer is generally sparse. Numerous other species are present and occur to varying degrees within each remnant.
The Threatened species *Macadamia tetraphylla* and *Lepiderema pulchella* occur occasionally throughout this community. Other Threatened flora species occur sporadically, often in localised areas, while ROTAP flora species occur sporadically



LEGEND

- Community 1 - Tall closed forest (*Cinnamomum camphora* +/- mixed species)
- Community 2 - Tall closed forest (Mixed species)
- Community 3 - Tall closed forest (*Lophostemon confertus*)
- Community 4 - Regenerating closed forest (Mixed species)
- Community 5 - Landscape plantings (Disused golf courses)
- Community 6 - Disturbed land
- Community 7 - Grassland with scattered trees
- Dams
- Existing Infrastructure
- Location of Figs (*Ficus* sp.)
- Site Outline

N

SOURCE:
Vegetation - James Warren & Associates GPS Survey Feb/March 2006, April 2009
Aerial Photograph - Michel Group Services taken 2006 (Ref: bilambil_heights_2006-reduced.jpeg)

0 300m

SCALE: 1 : 10 000 @ A3

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VOLUME 2
FIGURE 4

PREPARED: BW
DATE: 27 April 2009
FILE: N01051_EA_Base.dwg

TITLE
EXISTING SITE VEGETATION

throughout, with *Cupaniopsis newmanii* being the most common. Several mature specimens of the ROTAP species Black walnut (*Endiandra globosa*) also occur.

Significant ongoing restoration works has involved the poisoning and removal of much of the Camphor laurel and Large-leaved privet within this community, resulting in significant canopy loss.

The area of this community in the south-east of the site has a more simplified species structure, generally consisting of Camphor laurel and Macaranga, with the secondary occurrence of Guioa, Red kamala and Three-veined laurel. This community includes large areas colonised by dense infestations of Lantana, Crofton weed and Wild tobacco. Threatened species include the occasional Rough-shelled bush nut and Fine-leaved tuckeroo. However, due to the high density of Lantana and steep topography, this area was extremely difficult to survey. As a result, there are likely to be further occurrences of these two Threatened flora species not located during the site survey, mostly within the most southerly portion of this community. The generally degraded nature of the vegetation is unlikely to provide suitable habitat for other Threatened flora species recorded on the site.

Conservation value
This community is considered an amalgam of Forest Ecosystem 168 - Rainforest (FE 168) Forest Ecosystem 201 - Camphor laurel (FE 201) (NPWS 1999). Rainforest (FE 168) is classified as **Endangered**, and has been identified as a priority for conservation on private land, while Camphor laurel (FE 201) is an exotic vegetation type and therefore has little conservation value.

Under the Tweed Vegetation Management Strategy (TVMS 2004) this community is considered to be an amalgam of Vegetation code 1004 (Camphor Laurel Dominant Closed to Open Forests) and Vegetation code 1002 (Early Regrowth Rainforest). Some elements of Vegetation code 102 (Sub-tropical rainforest) also occur. Sub-tropical rainforest is considered to be adequately conserved within the Tweed Shire.

Areas of this community which have undergone Camphor laurel eradication practices are considered to be represented by Vegetation code 1002 (Early regrowth rainforest). This is described as a highly modified/disturbed community and is considered to be adequately reserved within the Tweed Shire.

This Community is not considered to represent the EEC Lowland rainforest due to the extensive occurrence of Camphor laurel (and to a lesser degree Large-leaved privet) and historical disturbance.

Despite the occurrence of some Threatened flora species, the conservation value of this community has been lowered due to substantial historical disturbance and the significant invasion by Camphor laurel and Large-leaved privet. The (generally) simplified structure of this community is indicative of regrowth rainforest in the process of continued regeneration.

Community 2 - Tall closed forest (mixed species)

This community occurs in the south of the site, within a small area adjacent to and south of the water reservoir and is the best quality vegetation on the site. Many mature trees occur at heights of up to 30 metres and include Giant stinging trees, Giant water

gum, Celerywood, White figs, Cudgerie, Broad-leaved lilly pilly and the Threatened species Small-leaved tamarind.

The portion of this community in the south-west of the site is representative of dry rainforest with common midstorey species including Yellow tulip, Python tree, Whalebone, Native holly, Prickly alyxia, Small-leaved acalypha and Rough-leaved elm. The Threatened species Spiny gardenia and Sweet myrtle occur sporadically. The groundlayer is generally sparse, although the exotic species Coral berry (*Rivina humilis*) is scattered throughout.

From the middle of the community to the east, the vegetation shifts to species more representative of subtropical rainforest, with a dense midstorey tangled with Lawyer vine and Whip vine, along with numerous shrubs and small trees such as Fissistigma, Glossy laurel, Pinkheart, Smooth wilkiea, Brown pearwood, Brush bloodwood and Actephila. Several steep drainage lines run south from this part of the community, and there are several large gaps in the vegetation from tree fall where Lantana has colonised, but due to the shady conditions, does not extend into the rainforest. Where this community occurs at its eastern extent, species composition becomes lower, and there is evidence of previous disturbance (large Lantana gaps, informal tracks) until it intergrades with disturbed Camphor laurel forest. It appears that much of the eastern portion of this community was cleared to some extent, and the current vegetation consists of regrowth, although a number of mature figs remain.

The subtropical rainforest extends onto adjacent land to the south, where Threatened flora were also recorded.

Some large thickets of Lantana occur where there are gaps in the vegetation.

Twelve (12) Threatened species were recorded in this community and include:

- Fine-leaved tuckeroo (*Lepiderema pulchella*)
- Small-leaved tamarind (*Diploglottis campbellii*)
- Spiny gardenia (*Randia moorei*)
- Sweet myrtle (*Gossia fragrantissima*)
- Yiel yiel (*Grevillia hilliana*)
- Marblewood (*Acacia bakeri*)
- Southern ochrosia (*Ochrosia moorei*)
- Rusty rose walnut (*Endiandra hayesii*)
- Rough-shelled bush nut (*Macadamia tetraphylla*)
- Coolamon (*Syzygium moorei*)
- Yellow satinheart (*Bosistoa transversa*)
- Axe-breaker (*Geijera paniculata*)

Vegetation associated with the water reservoir and in scattered patches in the south of the site comprises a diversity of species, but lacks the maturity of the vegetation within the 7(a) area in the south of the site. Typical canopy species include Guioa (*Guioa semiglauca*) and Red kamala (*Mallotus phillippensis*), although occasional emergent species include Giant water gum (*Syzygium francissii*) and the Threatened species Yiel yiel (*Grevillia hilliana*). Midstorey species are similar to those found within

the 7(a) community, although there is a lack of vines and scramblers. Several stems of the ROTAP species Smooth scrub turpentine occur within this area.

Conservation value
This community is considered to have an extremely high conservation value due to the Threatened flora present and the relatively undisturbed nature of the vegetation. Ten (10) mature Small-leaved tamarind occur within this community and were fruiting heavily at the time of the February 2006 visit, and are likely to constitute a significant local population of this species. Also of significance is the occurrence of numerous Southern ochrosia and the record of Axe breaker.

This community is considered representative of Forest Ecosystem 168 - Rainforest (FE 168) (NPWS 1999). Rainforest (FE 168) is classified as **Endangered**, and has been identified as a priority for conservation on private land.

Under the Tweed Vegetation Management Strategy (TVMS 2004) this community is represented by both Vegetation code 102 (Sub-tropical rainforest) and Vegetation code 103 (Dry Rainforest). Sub-tropical rainforest is considered to be adequately conserved, while Dry rainforest is considered to be inadequately conserved within the Tweed Shire.

This community is representative of the EEC – 'Lowland rainforest in the NSW North Coast and Sydney Basin Bioregions'. Under Floyds (1990b) Rainforest alliance and sub-alliances classification system, part of this community represents the *Dendrocnide excelsa – Ficus* spp. Alliance. This community therefore has high conservation significance on the subject site.

Community 3 - Tall closed forest (*Lophostemon confertus*)

This community occurs immediately below the water reservoir and features a canopy of Brushbox (*Lophostemon confertus*) to a height of approximately twenty (20) metres. The midstorey is generally sparse and appears to have been cleared at some stage. Common species include those from the neighbouring rainforest community such as Palm lily, Guioa, Common lilly pilly and Three-veined laurel along with the ROTAP species Veiny laceflower. Lantana and Prickly smilax commonly occur. The ground layer is primarily comprised of the exotic species Mistflower.

Conservation value
This community is considered representative of Forest Ecosystem 103 – Northern Wet Brushbox (FE 103) (NPWS 1999).

Under the Tweed Vegetation Management Strategy (TVMS 2004) this community is represented by Vegetation code 207 (Brush Box Open Forest), and is considered to be adequately reserved.

This community is considered to have a moderate conservation value due to its small size and disturbed nature.

Community 4 - Regenerating closed forest (mixed species)

A program of poisoning Camphor laurel and Large-leaved privet has been in progress on the site for the last five (5) years. The sudden influx of light to many of the smaller trees and shrubs in the understorey has resulted in rapid growth of many of these understorey plants. Additionally, retained mature figs have allowed for regenerating to occur after weed removal.

Large numbers of native pioneer species including Macaranga (*Macaranga tanarius*) saplings in particular were noted to have germinated in some parts of the site. Other species observed include Guioa (*Guioa semiglauca*), Red kamala (*Mallotus phillippensis*), Celerywood, White figs, Cudgerie, Broad-leaved lilly pilly, Whalebone, Native holly, Prickly alyxia, Small-leaved acalypha, Rough-leaved elm, Glossy laurel, and it is anticipated that widespread germination of other native species will follow.

Conservation value

This community is considered representative of Forest Ecosystem 168 - Rainforest (FE 168) (NPWS 1999). Rainforest (FE 168) is classified as **Endangered**, and has been identified as a priority for conservation on private land.

Under the Tweed Vegetation Management Strategy (TVMS 2004) this community is represented by Vegetation code 102 (Sub-tropical rainforest). Sub-tropical rainforest is considered to be adequately conserved within the Tweed Shire.

This community is considered to represent regenerating EEC – 'Lowland rainforest in the NSW North Coast and Sydney Basin Bioregions'. This community therefore has moderate-high conservation significance on the subject site.

Community 5 - Landscape plantings

Landscape plantings are primarily associated with the eastern portion of the site which constitutes the Terranora golf course. Plantings include a variety of both native and exotic trees and shrubs, the most common of which are Spotted gum, Swamp mahogany, Crimson bottlebrush, Grevillea, Tea tree and Tibouchina. Other species include Jacaranda, Blackbutt, Cadagi, Poinciana, Figs and Paperbark. A small area of planted Swamp mahogany (with an understorey of regrowth Camphor laurel) occurs in the north-western portion of the golf course close to the water reservoir.

Threatened flora occurring include a single mature Small-leaved tamarind (*Diploglottis campbellii*) which occurs along the eastern boundary of this portion of the site. A single mature Rough-shelled bush nut (*Macadamia tetraphylla*) also occurs in remnant regrowth vegetation adjacent to the northern fairway. Four (4) planted Coolamon (*Syzygium moorei*) and two (2) Small-leaved tamarind also occur. The provenance of these trees is not known.

Conservation value

This community has a relatively low conservation value, although individual trees such as mature figs have value as a resource for fauna, and Threatened species have individual conservation value.

Community 6 - Disturbed land

A large area of extremely disturbed land occurs in the south-east portion of the site (formerly a shooting range). This area has been significantly disturbed and is highly degraded with little native vegetation occurring. Exotic species such as Molasses grass, Pigeon grass, regrowth Camphor laurel, Wild tobacco, Lantana, White passionfruit, Chinese burr, Crofton weed and Singapore daisy are most prevalent, with Molasses grass and Singapore daisy occurring in dense blankets. Other annual weed species present include Blue billygoat weed, Farmers friends and Fleabane.

A similar area of disturbed land occurs along the northern boundary of the golf course.

A program of poisoning Camphor laurel and Large-leaved privet has been in progress on the site for the last five (5) years. In most areas large numbers of both Large-leaved privet and Camphor laurel seedlings have responded to the opened canopy and are competing with native species for light and resources.

One (1) Threatened flora species occurs, a single mature Coolamon (*Syzygium moorei*) adjacent to the treatment pond in the vicinity of the shooting range.

Conservation value
This community has a relatively low conservation value due to degradation from invasive weeds. The single Coolamon has a high conservation value.

Community 7 – Grassland with scattered trees

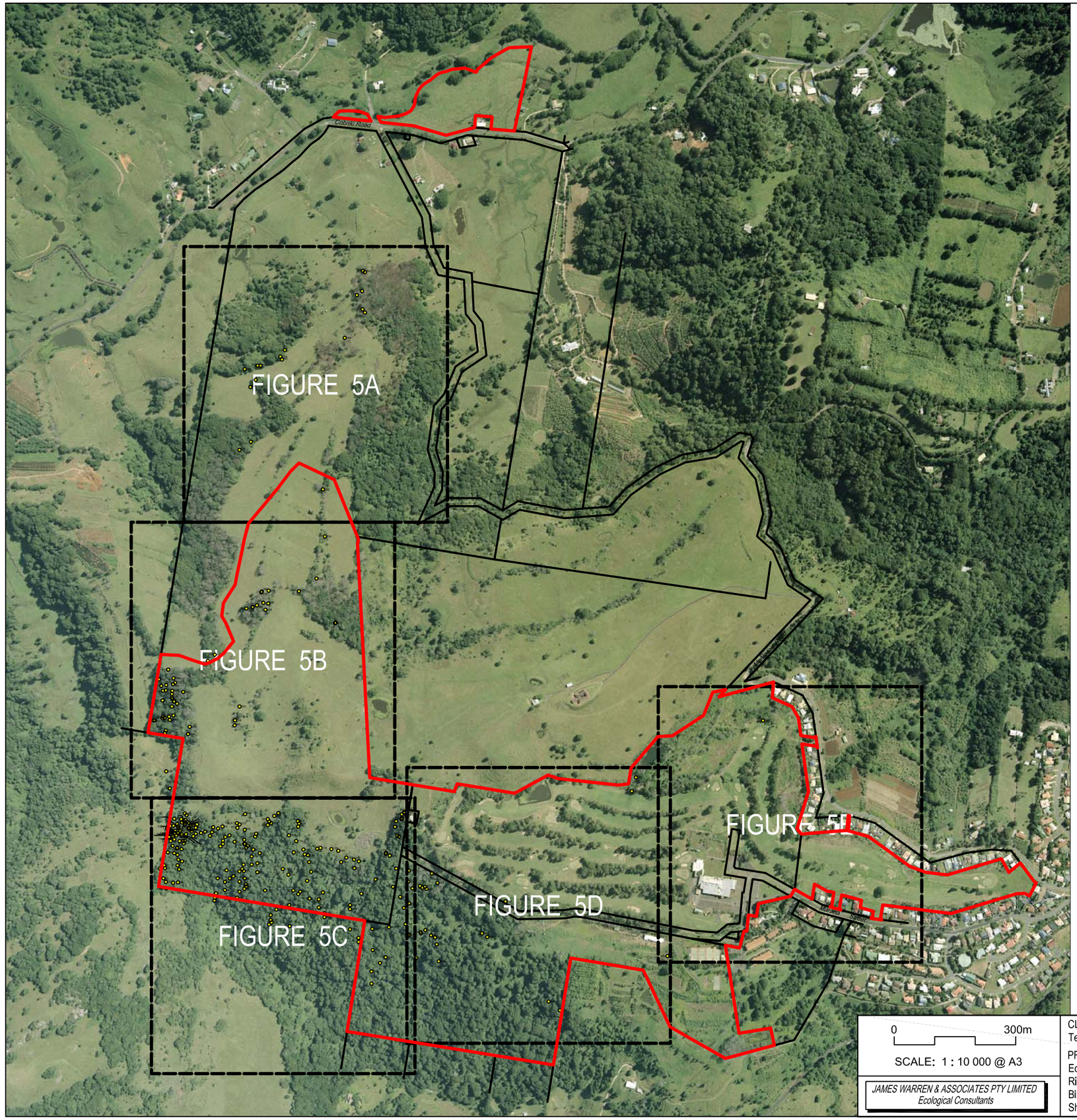
This community occurs over the majority of agricultural land in the western portion of the site, and includes pastoral species (mostly Paspalum) with occasional scattered trees including Camphor laurel and native species such as mature Teak (*Flindersia australis*) and Figs (*Ficus* sp.).

Conservation value
Exotic grasslands have a relatively low conservation value, although individual trees such as mature figs have value as a resource for fauna.

1.3.4 Threatened flora on the site

1.3.4.1 Results of flora assessment

Flora surveys on the subject site have recorded seventeen (17) Threatened flora species, including (4) Threatened species not previously recorded on the site – Ball nut (*Floydia praealta*), Bopple nut (*Hicksbeachia pinnatifolia*), Axe breaker (*Geijera paniculata*) and Basket fern (*Drynaria rigidula*). The locations of Threatened flora recorded on the site are shown in **FIGURES 5(a) – 5(e)**. Due to the large number of Threatened flora on the site, each individual tree was not given its own GPS point. Rather, any trees within radius of up to 10 metres of a point were grouped together, with records noted of the species and number of trees and approximate height. Threatened species details that correspond to each point are included in **APPENDIX 3.**



LEGEND

Threatened Flora

Site Outline

N

SOURCE:
Threatened Flora - James Warren & Associates GPS Surveys Feb/March 2006, Feb/March 2007, June 2007
Aerial Photograph - Michel Group Services taken 2006 (Ref: bilambil_heights_2006-reduced.jpeg)

0 300m

SCALE: 1 : 10 000 @ A3

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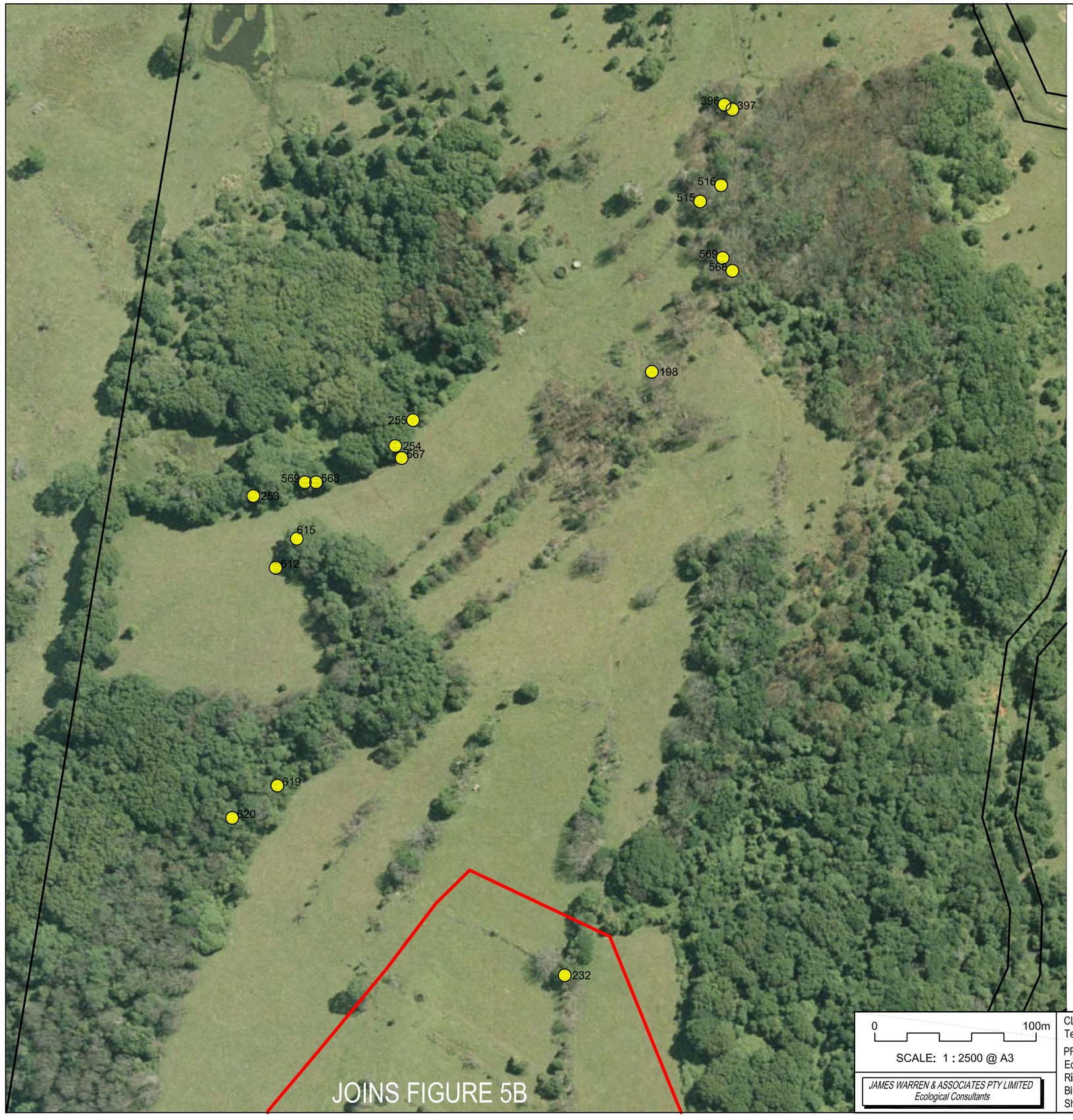
FIGURE 5

PREPARED: BW
DATE: 27 April 2009
FILE: N01051_EA_Base.dwg

TITLE
LOCATION OF THREATENED FLORA



LEGEND

Threatened Flora

Site Outline

N

SOURCE:
Threatened Flora - James Warren & Associates GPS Surveys Feb/March 2006, Feb/March 2007, June 2007
Aerial Photograph - Michel Group Services taken 2006 (Ref: bilambil_heights_2006-reduced.jpeg)

0 100m

SCALE: 1 : 2500 @ A3

JAMES WARREN & ASSOCIATES PTY LIMITED
Ecological Consultants

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Terranora Group Management Pty Ltd

PROJECT
Ecological Assessment
Rise Estate
Bilambil Heights, West Tweed, NSW
Shire of Tweed

VOLUME 2
FIGURE 5A

PREPARED: BW
DATE: 27 April 2009
FILE: N01051_EA_Base.dwg

TITLE
LOCATION OF THREATENED FLORA

JOINS FIGURE 5A

JOINS FIGURE 5C

LEGEND

- # Threatened Flora
- Site Outline

N

SOURCE:
Threatened Flora - James Warren & Associates GPS Surveys Feb/March 2006, Feb/March 2007, June 2007
Aerial Photograph - Michel Group Services taken 2006 (Ref: bilambil_heights_2006-reduced.jpeg)

0 100m

SCALE: 1 : 2500 @ A3

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Shire of Tweed

VOLUME 2
FIGURE 5B

PREPARED: BW
DATE: 27 April 2009
FILE: N01051_EA_Base.dwg

TITLE
LOCATION OF THREATENED FLORA

JOINS FIGURE 5B

JOINS FIGURE 5D

LEGEND

- # Threatened Flora
- Site Outline

N

SOURCE:
Threatened Flora - James Warren & Associates GPS Surveys Feb/March 2006, Feb/March 2007, June 2007
Aerial Photograph - Michel Group Services taken 2006 (Ref: bilambil_heights_2006-reduced.jpeg)

0 100m

SCALE: 1 : 2500 @ A3

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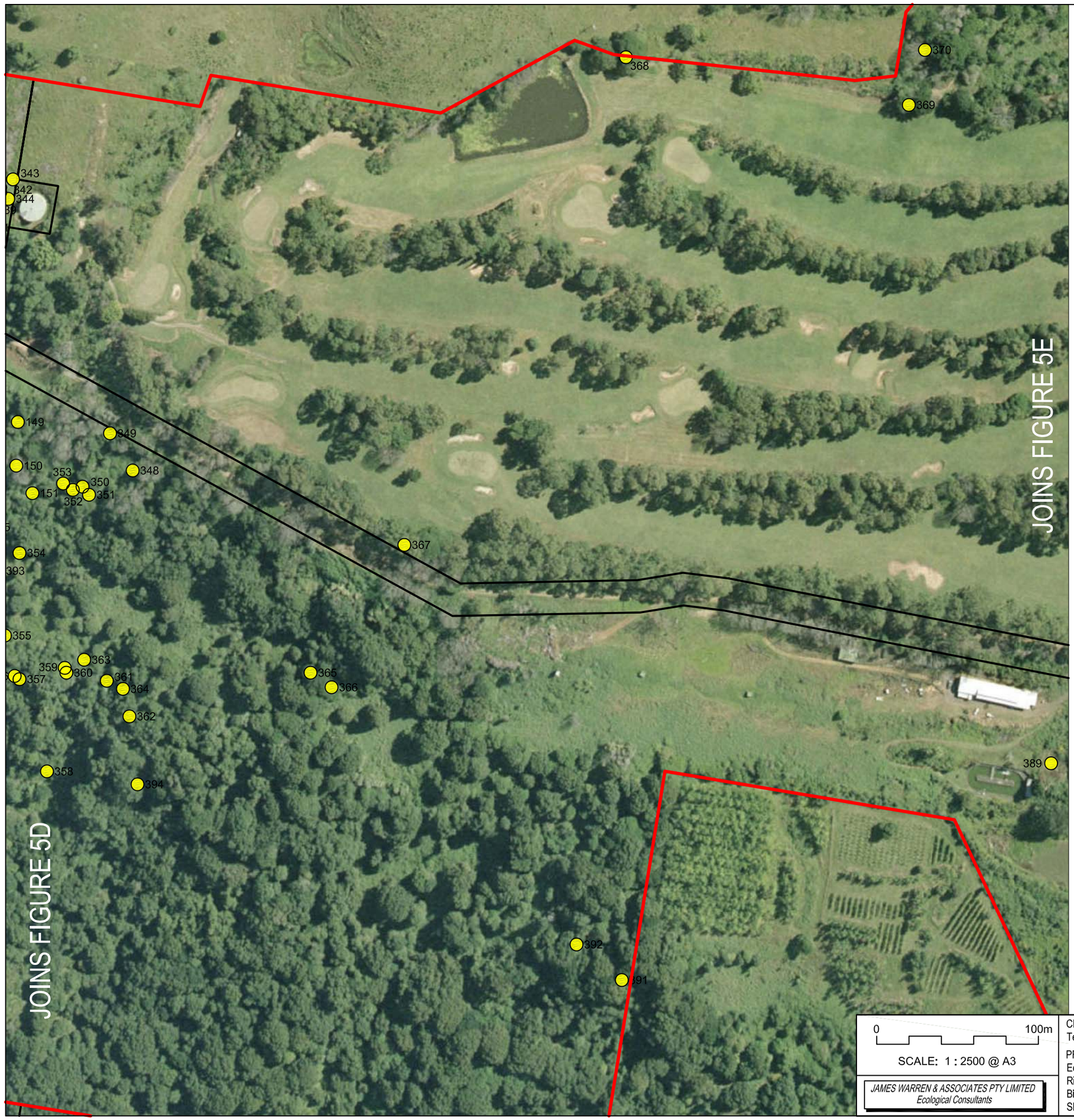
VOLUME 2
FIGURE 5C

PREPARED: BW
DATE: 27 April 2009
FILE: N01051_EA_Base.dwg

TITLE
LOCATION OF THREATENED FLORA



LEGEND

- # Threatened Flora
- Site Outline

N

SOURCE:
Threatened Flora - James Warren & Associates GPS Surveys Feb/March 2006, Feb/March 2007, June 2007
Aerial Photograph - Michel Group Services taken 2006 (Ref: bilambil_heights_2006-reduced.jpeg)

0 100m

SCALE: 1 : 2500 @ A3

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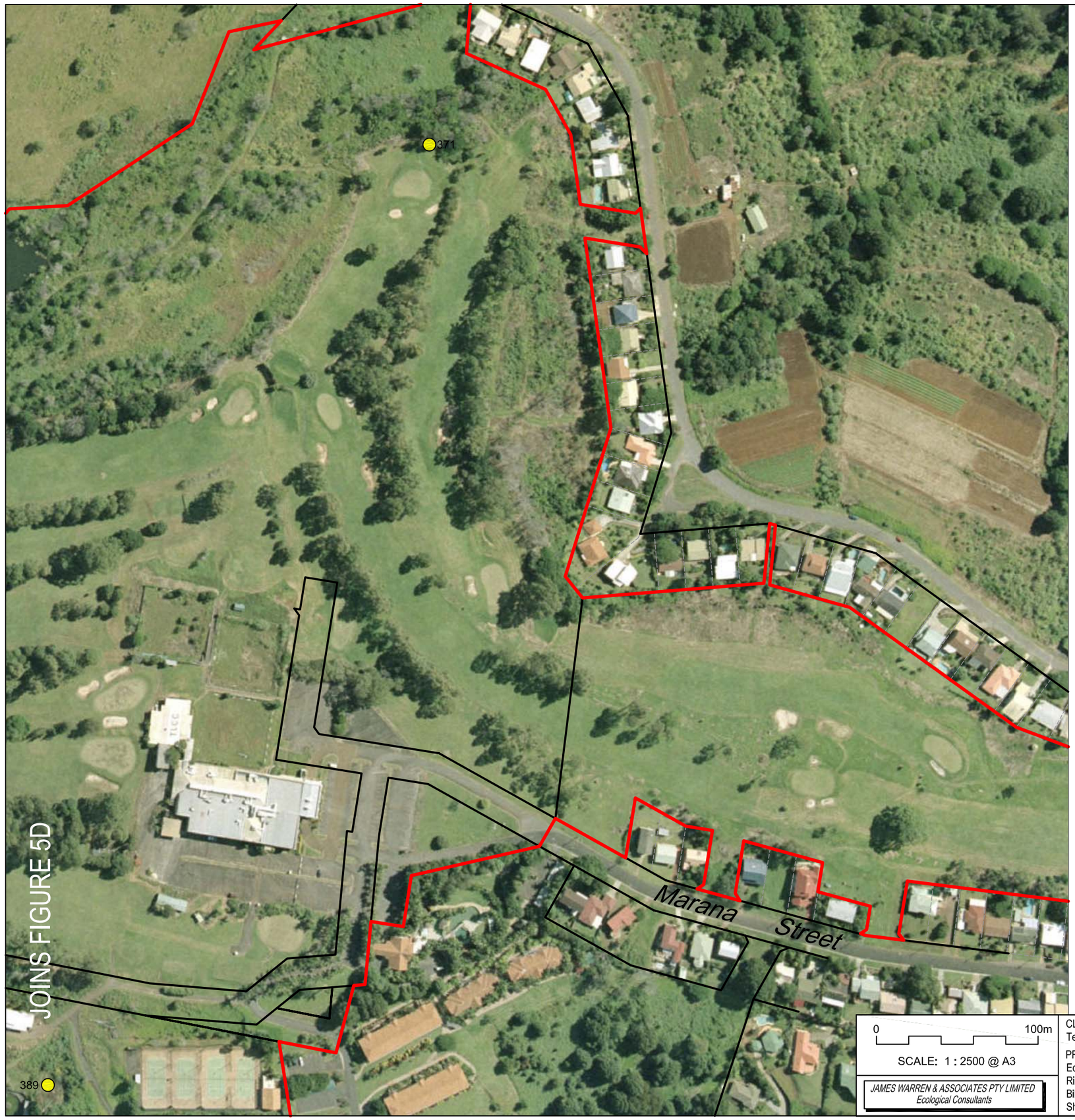
VOLUME 2
FIGURE 5D

PREPARED: BW
DATE: 27 April 2009
FILE: N01051_EA_Base.dwg

TITLE

LOCATION OF THREATENED FLORA



LEGEND

Threatened Flora

Site Outline

N

SOURCE:
Threatened Flora - James Warren & Associates GPS Surveys Feb/March 2006, Feb/March 2007, June 2007
Aerial Photograph - Michel Group Services taken 2006 (Ref: bilambil_heights_2006-reduced.jpeg)

0 100m

SCALE: 1 : 2500 @ A3

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VOLUME 2
FIGURE 5E

PREPARED: BW
DATE: 27 April 2009
FILE: N01051_EA_Base.dwg

TITLE

LOCATION OF THREATENED FLORA

Threatened flora species recorded by JWA are shown in **TABLE 3**, along with their classification under the *Threatened Species Conservation Act* (*TSC Act 1995*) and the Commonwealth *Environment Protection and Biodiversity Act* (*EPBC Act 1999*).

TABLE 3
THREATENED FLORA RECORDED ON THE SITE

Common name	Botanical name	TSC Act (1995)	EPBC Act (1999)
Axe breaker #	*Geijera paniculata*	E	-
Ball nut #	*Floydia praealta*	V	V
Basket fern #	*Drynaria ruigidula*	E	-
Bopple nut #	*Hicksbeachia pinnatifolia*	V	V
Coolamon	*Syzygium moorei*	V	-
Fine-leaved tuckeroo	*Lepiderema pulchella*	V	-
Marblewood	*Acacia bakeri*	V	-
Rough-shelled bush nut	*Macadamia tetraphylla*	V	V
Rusty rose walnut	*Endiandra hayesii*	V	V
Small-leaved tamarind	*Diploglottis campbellii*	E	-
Southern ochrosia	*Ochrosia moorei*	E	E
Spiny gardenia	*Randia moorei*	E	-
Stinking laurel	*Cryptocarya foetida*	V	V
Sweet myrtle	*Gossia fragrantissima*	E	E
White laceflower	*Archidendron hendersonii*	V	-
Yellow satinheart	*Bosistoa transversa*	V	V
Yiel yiel	*Grevillea hilliana*	E	-

V = Vulnerable, E = Endangered
# = Not previously recorded on site

1.3.4.2 Discussion

The subject site is particularly rich in Threatened flora, and contains an area of high quality dry and subtropical rainforest which is of a high conservation value. Despite the highest achievable survey effort in available time, it is likely that additional records of Threatened flora, and possibly additional Threatened flora species will be recorded on the site if further survey effort is undertaken. Additionally, natural reproduction and mortality of Threatened flora species on the site will result in fluctuations in population sizes over time.

The most commonly occurring Threatened flora species on the site are the Rough-shelled bush nut (*Macadamia tetraphylla*) and Fine-leaved tuckeroo (*Lepiderema pulchella*). The Fine-leaved tuckeroo is relatively prolific in some parts of the site, such as within Camphor-laurel dominated vegetation in the north-east. This species is also known to be prolific in bushland along McAllisters Road to the north-east of the site, indicating a robust and well-established local population.

Several mature Rough-shelled bush nut also occur on the site, often with associated seedlings and immature trees. Spiny gardenia (*Randia moorei*) and Sweet myrtle (*Gossia fragrantissima*) occur sparingly in the south-west of the site, while Bopple nuts are restricted to the northern part of the site, and Stinking laurel only occur in one portion of the site to the south-west.

Other Threatened flora species generally occur as occasional scattered individuals. Threatened species which are restricted to the southwest 7A zoned portion of the site include Southern ochrosia, Rusty rose walnut, Yellow satinheart, Small-leaved tamarind and Axe breaker. The record for Axe breaker (a mature tree with up to fifty associated saplings) is particularly significant, as it constitutes the only record for the entire Tweed LGA (NPWS Wildlife Atlas 2006). Also of significance is the single record of Basket fern in the north-eastern portion of the site. This species is only known from a few locations within the Tweed Valley.

An Assessment of Significance (7 part test) has been completed for all Threatened flora species in accordance with Schedules of the TSC Act (1995) to determine if the proposed development will have a significant impact (**APPENDIX 3**).
Seven (7) ROTAP species were also identified on the site:

- Ardisia (*Ardisia bakeri*);
- Black walnut (*Endiandra globosa*);
- Blunt wisteria (*Millettia australis*);
- Long-leaved tuckeroo (*Cupaniopsis newmanii*);
- Smooth scrub turpentine (*Rhodamnia maideniana*);
- Stream lily (*Helmholtzia glaberrima*); and
- Veiny laceflower (*Archidendron muellerianum*).

1.3.5 Endangered Ecological Communities (EECs)

Better quality rainforest in the south of the site and some patches in the northern portion of the site are considered to represent the EEC Lowland rainforest. Additionally, several areas that have been subject to Camphor laurel poisoning practices are regenerating into this rainforest EEC. The Scientific Committee Final Determination notes that Lowland rainforest includes subtropical rainforest and some related structurally forms of dry rainforest and states:

> *"Lowland rainforest may be associated with a range of high-nutrient geological substrates, notably basalts and fine-grained sedimentary rocks, on coastal plains and plateau, footslopes and foothills. In the north of its range, Lowland Rainforest is found up to 600 metres above sea level…"*

Depauperate rainforest vegetation over large portions of the site has been degraded by Camphor laurel and Large-leaved privet and is not considered to adequately represent this EEC.

An Assessment of Significance (7 part test) has been completed in accordance with Schedules of the TSC Act (1995) to determine if the proposed development will have a significant impact on this EEC (**APPENDIX 3**).

ANNEXURE 1 - PLANT SPECIES LIST

Grouping	Family	Botanical Name	Common Name
Ferns and Fern Allies	Adiantaceae	*Adiantum aethiopicum*	Common maidenhair
Ferns and Fern Allies	Adiantaceae	*Adiantum hispidulum*	Rough maidenhair
Ferns and Fern Allies	Adiantiaceae	*Adiantum diaphanum*	Filmy maidenhair
Ferns and Fern Allies	Adiantiaceae	*Pellaea falcata*	Sickle fern
Ferns and Fern Allies	Aspleniaceae	*Asplenium Australascium*	Bird's nest fern
Ferns and Fern Allies	Blechnaceae	*Blechnum indicum*	Swamp water fern
Ferns and Fern Allies	Blechnaceae	*Doodia aspera*	Prickly rasp fern
Ferns and Fern Allies	Cyatheaceae	*Culcita dubia*	Soft bracken
Ferns and Fern Allies	Davalliaceae	*Arthropteris tenella*	
Ferns and Fern Allies	Davalliaceae	*Davallia solida* var. *pyxidata*	Hare's foot fern
Ferns and Fern Allies	Davalliaceae	*Nephrolepis cordifolia**	Fishbone fern
Ferns and Fern Allies	Dennstaedtiaceae	*Hypolepis muelleri*	Harsh ground fern
Ferns and Fern Allies	Dennstaedtiaceae	*Pteridium esculentum*	Bracken fern
Ferns and Fern Allies	Dicksoniaceae	*Calochlaena dubia*	Rainbow fern
Ferns and Fern Allies	Dicksoniaceae	*Dicksonia* sp.	Tree fern
Ferns and Fern Allies	Glecheniaceae	*Sticherus flabellatus*	Umbrella fern
Ferns and Fern Allies	Polypodiaceae	*Platycerium bifurcatum*	Elkhorn fern
Ferns and Fern Allies	Polypodiaceae	*Platycerium superbum*	Staghorn fern
Ferns and Fern Allies	Polypodiaceae	*Pyrrosia* sp.	Rock felt fern
Ferns and Fern Allies	Psilotaceae	*Psilotum nudum*	Skeleton fork-fern
Ferns and Fern Allies	Thelypteridaceae	*Christella dentata*	Binung
Gymnosperms	Araucariaceae	*Araucaria bidwillii*	Bunya pine
Gymnosperms	Araucariaceae	*Araucaria cunninghamii*	Hoop pine
Gymnosperms	Araucariaceae	*Araucaria robusta*	Kauri Pine
Gymnosperms	Pinaceae	*Pinus elliottii**	Slash pine
Gymnosperms	Podocarpaceae	*Podocarpus elatus*	Plum pine
Monocotyledons	Araceae	*Alocasia brisbanensis*	Cunjevoi
Monocotyledons	Araceae	*Monstera deliciosa**	Fruit salad plant
Monocotyledons	Araceae	*Pothos longipes*	Pothos vine

Grouping	Family	Botanical Name	Common Name
Monocotyledons	Arecaceae	*Archontophoenix cunninghamiana*	Bangalow palm
Monocotyledons	Arecaceae	*Linospadix monostachya*	Walking stick palm
Monocotyledons	Arecaceae	*Calamus muelleri*	Lawyer vine
Monocotyledons	Arecaceae	*Syagrus romanzoffiana**	Cocos palm
Monocotyledons	Asparagaceae	*Asparagus densiflorus**	Ground asparagus
Monocotyledons	Asparagaceae	*Asparagus plumosus**	Climbing asparagus fern
Monocotyledons	Asteliaceae	*Cordyline petiolaris*	Broad-leaved palm lily
Monocotyledons	Asteliaceae	*Cordyline rubra*	Red fruited palm lily
Monocotyledons	Asteliaceae	*Cordyline stricta*	Narrow-leaved palm lily
Monocotyledons	Commelinaceae	*Commelina benghalensis**	Hairy wandering jew
Monocotyledons	Commelinaceae	*Commelina cyanea*	Native wandering jew
Monocotyledons	Cyperaceae	*Cyperus rotundus*	Nutgrass
Monocotyledons	Cyperaceae	*Schoenus brevifolius*	
Monocotyledons	Flagellariaceae	*Flagellaria indica*	Whip vine
Monocotyledons	Iridaceae	*Watsonia* sp.	Bugle lily
Monocotyledons	Lemnaceae	*Lemna disperma*	Duckweed
Monocotyledons	Luzuriagaceae	*Geitonoplesium cymosum*	Scrambling lily
Monocotyledons	Nymphaeaceae	*Nymphae sp.*	Water lily
Monocotyledons	Orchidaceae	*Dendrobium sp.*	
Monocotyledons	Phormiaceae	*Dianella caerulea*	Flax lily
Monocotyledons	Poaceae	*Andropogon virginicus**	Whiskey grass
Monocotyledons	Poaceae	*Chloris gayana**	Rhodes grass
Monocotyledons	Poaceae	*Cymbopogon refractus*	Barged wire grass
Monocotyledons	Poaceae	*Cynodon dactylon**	Couch grass
Monocotyledons	Poaceae	*Eragrostis* sp.*	Lovegrass
Monocotyledons	Poaceae	*Dichelachne sp.*	Plume grass
Monocotyledons	Poaceae	*Imperata cylindrica*	Blady grass
Monocotyledons	Poaceae	*Melinis minutiflora**	Molasses grass
Monocotyledons	Poaceae	*Melinis repens**	Red natal grass
Monocotyledons	Poaceae	*Microlaena stipoides* var. *stipoides*	Weeping grass
Monocotyledons	Poaceae	*Oplismenus aemulus*	Basket grass
Monocotyledons	Poaceae	*Paspalum dilatatum**	Paspalum
Monocotyledons	Poaceae	*Pennisetum clandestinum**	Kikuyu
Monocotyledons	Poaceae	*Pennisetum purpureum**	Elephant grass
Monocotyledons	Poaceae	*Phragmites australis*	Common reed
Monocotyledons	Poaceae	*Setaria sphacelata**	Pigeon grass
Monocotyledons	Poaceae	*Sporobolus africanus**	Parramatta grass
Monocotyledons	Poaceae	*Themeda triandra*	Kangaroo grass
Monocotyledons	Polyganaceae	*Persicaria hydropiper*	Smartweed
Monocotyledons	Philydraceae	*Helmholtzia glaberimma #*	Flax lily
Monocotyledons	Ripogonaceae	*Ripogonum album*	White supplejack
Monocotyledons	Ripogonaceae	*Ripogonum discolor*	Prickly supplejack
Monocotyledons	Smilacaceae	*Smilax australis*	Prickly smilax
Monocotyledons	Typhaceae	*Typha orientalis*	Broad-leaved cumbungi
Monocotyledons	Viscaceae	*Notothixos cornifolius*	Kurajong mistletoe
Monocotyledons	Zingiberaceae	*Alpinia arundelliana*	Native ginger
Monocotyledons	Zingiberaceae	*Alpinia caerulea*	Native ginger
Dicotyledons	Akaniaceae	*Akania lucens*	Turnipwood
Dicotyledons	Amaranthaceae	*Nyssanthes diffusa*	Barbwire weed

Grouping	Family	Botanical Name	Common Name
Dicotyledons	Anacardiaceae	*Euroschinus falcata*	Ribbonwood
Dicotyledons	Anacardiaceae	*Mangifera indica**	Mango
Dicotyledons	Annonaceae	*Meiogyne stenopetala*	
Dicotyledons	Annonaceae	*Melodorum leichhardtii*	Zig-zag vine
Dicotyledons	Apocynaceae	*Alyxia ruscifolia*	Prickly alyxia
Dicotyledons	Apocynaceae	*Nerium oleander**	Oleander
Dicotyledons	Apocynaceae	*Carissa ovata*	Currant bush
Dicotyledons	**Apocynaceae**	*Ochrosia moorei*	**Southern ochrosia**
Dicotyledons	Apocynaceae	*Parsonsia straminea*	Common silkpod
Dicotyledons	Apocynaceae	*Parsonsia ventricosa*	Acuminate silkpod
Dicotyledons	Apocynaceae	*Plumeria acutifolia**	Frangipani
Dicotyledons	Apocynaceae	*Tabernaemontana pandacaqui*	Banana bush
Dicotyledons	Araliaceae	*Polyscias elegans*	Celerywood
Dicotyledons	Araliaceae	*Schefflera actinophylla**	Umbrella tree
Dicotyledons	Aristolochiaceae	*Aristolochia praevenosa*	Richmond Birdwing butterfly vine
Dicotyledons	Asclepiadaceae	*Gomphocarpus physocarpus**	Balloon cotton bush
Dicotyledons	Asteraceae	*Ageratina adenophora**	Crofton weed
Dicotyledons	Asteraceae	*Ageratina riparia**	Mistflower
Dicotyledons	Asteraceae	*Ageratum houstonianum**	Blue billygoat weed
Dicotyledons	Asteraceae	*Ambrosia artemisiifolia**	Annual ragweed
Dicotyledons	Asteraceae	*Baccharis halimifolia**	Groundsel bush
Dicotyledons	Asteraceae	*Bidens pilosa**	Cobblers pegs
Dicotyledons	Asteraceae	*Carduus sp.**	Milk thistle
Dicotyledons	Asteraceae	*Conyza albida**	Fleabane
Dicotyledons	Asteraceae	*Crassocephalum crepidioides**	Thickhead
Dicotyledons	Asteraceae	*Hypochoeris radicata**	Flatweed
Dicotyledons	Asteraceae	*Onopordium acanthum**	Scotch Thistle
Dicotyledons	Asteraceae	*Senecio madagascariensis**	Fireweed
Dicotyledons	Asteraceae	*Sigesbeckia orientalis*	Indian weed
Dicotyledons	Asteraceae	*Tagetes minuta**	Stinking roger
Dicotyledons	Asteraceae	*Taraxacum officinale**	Dandelion
Dicotyledons	Asteraceae	*Wedelia trilobata**	Singapore daisy
Dicotyledons	Balsaminaceae	*Impatiens walleriana**	Busy lizzie
Dicotyledons	Basellaceae	*Anredera cordifolia**	Madeira vine
Dicotyledons	Bignoniaceae	*Jacaranda mimosifolia**	Jacaranda
Dicotyledons	Bignoniaceae	*Pandorea pandorana*	Wonga wonga vine
Dicotyledons	Boraginaceae	*Ehretia acuminate*	Koda
Dicotyledons	Boraginaceae	*Ehretia membranifolia**	Peach Bush
Dicotyledons	Caesalpiniaceae	*Caesalpinia decapetala**	Thorny Poinciana
Dicotyledons	Caesalpiniaceae	*Caesalpinia frerrea**	Leopard tree
Dicotyledons	Caesalpiniaceae	*Caesalpinia subtropica*	Corky prickle vine
Dicotyledons	Caesalpiniaceae	*Senna pendula* var. *glabrata**	Winter senna
Dicotyledons	Caesalpiniaceae	*Senna* X floribunda*	Smooth senna
Dicotyledons	Capparaceae	*Capparis arborea*	Brush caper berry
Dicotyledons	Caprifoliaceae	*Lonicera japonica**	Japanese honeysuckle
Dicotyledons	Caricaceae	*Carica papaya**	Paw paw
Dicotyledons	Caryophyllaceae	*Stellaria media**	Chick weed
Dicotyledons	Casuarinaceae	*Casuarina glauca*	Swamp oak
Dicotyledons	Celastraceae	*Cassine australis*	Red-fruited olive plum

Grouping	Family	Botanical Name	Common Name
Dicotyledons	Celastraceae	*Hedraianthera porphyropetala*	Hedraianthera
Dicotyledons	Celastraceae	*Maytenus bilocularis*	Orangebark
Dicotyledons	Celastraceae	*Maytenus disperma*	Orangebush
Dicotyledons	Celastraceae	*Siphonodon australis*	Ivorywood
Dicotyledons	Convolvulaceae	*Ipomoea cairica**	Coastal morning glory
Dicotyledons	Cornaceae	*Alangium villosum*	Muskwood
Dicotyledons	Cunoniaceae	*Ceratopetalum gummiferum*	Christmas bush
Dicotyledons	Cunoniaceae	*Pseudoweinmannia lachnocarpa*	Rose marara
Dicotyledons	Cupressaceae	*Callitris* sp.	Cypress pine
Dicotyledons	Dilleniaceae	*Hibbertia scandens*	Climbing guinea flower
Dicotyledons	Dioscoreaceae	*Dioscorea transversa*	Native yam
Dicotyledons	Ebenaceae	*Diospyros australis*	Black plum
Dicotyledons	Ebenaceae	*Diospyros fasciculosa*	Grey ebony
Dicotyledons	Ebenaceae	*Diospyros pentamera*	Myrtle ebony
Dicotyledons	Elaeocarpaceae	*Elaeocarpus grandis*	Blue quandong
Dicotyledons	Elaeocarpaceae	*Elaeocarpus kirtonii*	Silver Quandong
Dicotyledons	Elaeocarpaceae	*Elaeocarpus obovatus*	Hard quandong
Dicotyledons	Elaeocarpaceae	*Elaeocarpus reticulatus*	Blueberry ash
Dicotyledons	Elaeocarpaceae	*Sloanea australis*	Maiden's blush
Dicotyledons	Elaeocarpaceae	*Sloanea woollsii*	Yellow carabeen
Dicotyledons	Escalloniaceae	*Polyosma cunninghamii*	Featherwood
Dicotyledons	Escalloniaceae	*Quintinia verdonii*	Grey Possumwood
Dicotyledons	Euphorbiaceae	*Acalypha capillipes*	Small-leaved acalypha
Dicotyledons	Euphorbiaceae	*Actephila lindleyi*	Actephila
Dicotyledons	Euphorbiaceae	*Alchornea ilicifolia*	Native holly
Dicotyledons	Euphorbiaceae	*Baloghia inophylla*	Brush bloodwood
Dicotyledons	Euphorbiaceae	*Breynia oblongifolia*	Coffee bush
Dicotyledons	Euphorbiaceae	*Bridelia exaltata*	Brush ironbark
Dicotyledons	Euphorbiaceae	*Cleistanthus cunninghamii*	Cleistanthus
Dicotyledons	Euphorbiaceae	*Croton acronychiodes*	Thick-leaved croton
Dicotyledons	Euphorbiaceae	*Croton verrauxii*	Native carscarilla
Dicotyledons	Euphorbiaceae	*Drypetes deplanchei* subsp. *Deplanchei*	Yellow tulip
Dicotyledons	Euphorbiaceae	*Euphorbia peplus**	Petty spurge
Dicotyledons	Euphorbiaceae	*Excoecaria dallachyana*	Brush poison tree
Dicotyledons	Euphorbiaceae	*Glochidion ferdinandi* var. *ferdinandi*	Cheese tree
Dicotyledons	Euphorbiaceae	*Macaranga tanarius*	Macaranga
Dicotyledons	Euphorbiaceae	*Mallotus discolor*	Yellow kamala
Dicotyledons	Euphorbiaceae	*Mallotus philippensis*	Red kamala
Dicotyledons	Euphorbiaceae	*Omalanthus populifolius*	Native Bleeding heart
Dicotyledons	Euphorbiaceae	*Ricinus communis**	Castor oil plant
Dicotyledons	Eupomatiaceae	*Eupomatia laurina*	Bolwarra
Dicotyledons	Fabaceae	*Austrosteenisia glabristyla*	Giant blood vine
Dicotyledons	Fabaceae	*Milletia australis #*	Blunt wistaria
Dicotyledons	Fabaceae	*Milletia megasperma*	Native wistaria
Dicotyledons	Fabaceae	*Castanospermum australe*	Blackbean
Dicotyledons	Fabaceae	*Derris involuta*	Native derris
Dicotyledons	Fabaceae	*Desmodium uncinatum**	Silver-leaved desmodium

Grouping	Family	Botanical Name	Common Name
Dicotyledons	Fabaceae	*Erythrina x sykesii**	Coral tree
Dicotyledons	Fabaceae	*Macroptilium atropurpureum**	Siratro
Dicotyledons	Fabaceae	*Pueraria lobata**	Kudzu
Dicotyledons	Fabaceae	*Trifolium repens**	White clover
Dicotyledons	Flacourtiaceae	*Casearia multinervosa*	Casearia
Dicotyledons	Flacourtiaceae	*Scolopia braunii*	Flintwood
Dicotyledons	Icacinaceae	*Citronella moorei*	Churnwood
Dicotyledons	Icacinaceae	*Pennantia cunninghamii*	Brown Beech
Dicotyledons	Lamiaceae	*Plectranthus* sp.	
Dicotyledons	Lauraceae	*Beilschmiedia elliptica*	Grey walnut
Dicotyledons	Lauraceae	*Beilschmiedia obtusifolia*	Blush walnut
Dicotyledons	Lauraceae	*Cinnamomum camphora**	Camphor laurel
Dicotyledons	Lauraceae	*Cinnamomum oliveri*	Oliver's sassafras
Dicotyledons	Lauraceae	*Cinnamomum virens*	Red-barked sassafras
Dicotyledons	**Lauraceae**	*Cryptocarya foetida*	**Stinking cryptocarya**
Dicotyledons	Lauraceae	*Cryptocarya glaucescens*	Jackwood
Dicotyledons	Lauraceae	*Cryptocarya laevigata*	Glossy laurel
Dicotyledons	Lauraceae	*Cryptocarya obovata*	Pepperberry
Dicotyledons	Lauraceae	*Cryptocarya triplinervis* var *pubens*	Three-veined laurel
Dicotyledons	Lauraceae	*Endiandra globosa #*	Black walnut
Dicotyledons	**Lauraceae**	*Endiandra hayesii*	**Rusty rose walnut**
Dicotyledons	Lauraceae	*Endiandra muelleri* subsp. *muelleri*	Green-leaved rose walnut
Dicotyledons	Lauraceae	*Endiandra pubens*	Hairy walnut
Dicotyledons	Lauraceae	*Litsea reticulata*	Bolly gum
Dicotyledons	Lauraceae	*Neolitsea australiensis*	Green bolly gum
Dicotyledons	Lauraceae	*Neolitsea dealbata*	White bolly gum
Dicotyledons	Loganiaceae	*Strychnos arborea*	Strychnine Tree
Dicotyledons	Lythraceae	*Lagerstroemia indica**	Crepe Myrtle
Dicotyledons	Malvaceae	*Eriobotrya japonica**	Loquat
Dicotyledons	Malvaceae	*Hibiscus* sp.*	Hibiscus
Dicotyledons	Malvaceae	*Sida rhombifolia**	Paddy's lucerne
Dicotyledons	Meliaceae	*Anthocarapa nitidula*	Incense Cedar
Dicotyledons	Meliaceae	*Dysoxylum fraserianum*	Rosewood
Dicotyledons	Meliaceae	*Dysoxylum mollissimum* ssp. *Molle*	Red bean
Dicotyledons	Meliaceae	*Dysoxylum rufum*	Hairy rosewood
Dicotyledons	Meliaceae	*Melia azedarach*	White cedar
Dicotyledons	Meliaceae	*Synoum glandulosum*	Scentless rosewood
Dicotyledons	Meliaceae	*Toona ciliata*	Red cedar
Dicotyledons	Menispermaceae	*Carronia multisepala*	Carronia
Dicotyledons	Menispermaceae	*Hypserpa decumbens*	Hypserpa
Dicotyledons	Menispermaceae	*Sarcopetalum harveyanum*	Pearl vine
Dicotyledons	Menispermaceae	*Stephania japonica*	Snake vine
Dicotyledons	Menyanthaceae	*Nymphoides indica*	Water snowflake
Dicotyledons	**Mimosaceae**	*Acacia bakeri*	**Baker's wattle/ Marblewood**
Dicotyledons	Mimosaceae	*Acacia melanoxylon*	Blackwood wattle
Dicotyledons	Mimosaceae	*Archidendron grandiflorum*	Lace flower tree

Grouping	Family	Botanical Name	Common Name
Dicotyledons	**Mimosaceae**	*Archidendron hendersonii*	**White lace flower**
Dicotyledons	Mimosaceae	*Archidendron muellerianum* #	Veiny lace flower
Dicotyledons	Monimiaceae	*Daphnandra* sp.	Socketwood
Dicotyledons	Monimiaceae	*Wilkiea austroqueenslandica*	Smooth wilkiea
Dicotyledons	Monimiaceae	*Wilkiea huegeliana*	Veiny wilkiea
Dicotyledons	Monimiaceae	*Wilkiea macrophylla*	Large-leaved wilkiea
Dicotyledons	Moraceae	*Ficus benjamina*	Weeping fig
Dicotyledons	Moraceae	*Ficus coronata*	Creek sandpaper fig
Dicotyledons	Moraceae	*Ficus fraseri*	Sandpaper fig
Dicotyledons	Moraceae	*Ficus macrophylla*	Moreton bay fig
Dicotyledons	Moraceae	*Ficus obliqua*	Small-leaved fig
Dicotyledons	Moraceae	*Ficus virens*	White fig
Dicotyledons	Moraceae	*Ficus watkinsiana*	Strangler fig
Dicotyledons	Moraceae	*Maclura cochinchinensis*	Cockspur
Dicotyledons	Moraceae	*Morus alba**	Mulberry
Dicotyledons	Moraceae	*Streblus brunonianus*	Whalebone tree
Dicotyledons	Moraceae	*Trophis scandens*	Burny vine
Dicotyledons	Myrsinaceae	*Ardisia crenata**	Coral berry
Dicotyledons	Myrsinaceae	*Embelia australiana*	Embelia
Dicotyledons	Myrsinaceae	*Rapanea variabilis*	Muttonwood
Dicotyledons	Myrtaceae	*Acmena hemilampra*	Broad-leaved apple
Dicotyledons	Myrtaceae	*Acmena ingens*	Red apple
Dicotyledons	Myrtaceae	*Acmena smithii*	Lilly pilly
Dicotyledons	Myrtaceae	*Archirhodomyrtus beckleri*	Rose myrtle
Dicotyledons	Myrtaceae	*Backhousia myrtifolia*	Grey myrtle
Dicotyledons	Myrtaceae	*Callistemon citrinus*	Crimson bottlebrush
Dicotyledons	Myrtaceae	*Callistemon salignus*	Willow bottlebrush
Dicotyledons	Myrtaceae	*Corymbia citriodora*	Lemon scented gum
Dicotyledons	Myrtaceae	*Corymbia intermedia*	Pink bloodwood
Dicotyledons	Myrtaceae	*Corymbia maculata*	Spotted gum
Dicotyledons	Myrtaceae	*Eucalyptus robusta*	Swamp mahogany
Dicotyledons	Myrtaceae	*Eucalyptus tereticornis*	Forest red gum
Dicotyledons	Myrtaceae	*Eucalyptus torelliana**	Cadaghi
Dicotyledons	Myrtaceae	*Gossia acmenoides*	Scrub ironwood
Dicotyledons	Myrtaceae	*Gossia bidwillii*	Python tree
Dicotyledons	**Myrtaceae**	*Gossia fragrantissima*	**Sweet myrtle**
Dicotyledons	Myrtaceae	*Gossia hillii*	Scaly myrtle
Dicotyledons	Myrtaceae	*Leptospermum parvifolium*	Tea-tree
Dicotyledons	Myrtaceae	*Leptospermum petersonii*	Lemon-scented teatree
Dicotyledons	Myrtaceae	*Lophostemon confertus*	Brushbox
Dicotyledons	Myrtaceae	*Melaleuca quinquenervia*	Broad-leaved paperbark
Dicotyledons	Myrtaceae	*Pilidiostigma glabrum*	Plum myrtle
Dicotyledons	Myrtaceae	*Rhodamnia argentea*	Silver myrtle
Dicotyledons	Myrtaceae	*Rhodamnia maideniana* #	Smooth scrub turpentine
Dicotyledons	Myrtaceae	*Rhodomyrtus psidiodes*	Native guava
Dicotyledons	Myrtaceae	*Syzygium crebrinerve*	Purple cherry
Dicotyledons	Myrtaceae	*Syzygium francisii*	Giant water gum
Dicotyledons	Myrtaceae	*Syzygium luehmannii*	Riberry
Dicotyledons	**Myrtaceae**	*Syzygium moorei*	**Durobby**

Grouping	Family	Botanical Name	Common Name
Dicotyledons	Myrtaceae	*Syzygium oleosum*	Blue lilly pilly
Dicotyledons	Myrtaceae	*Syzygium wilsonii*	Powder puff lilly pilly
Dicotyledons	Niemeyera	*Niemeyera antiloga*	Brown pearwood
Dicotyledons	Ochnaceae	*Jasminum* sp.*	Jasmine
Dicotyledons	Ochnaceae	*Ochna serrulata**	Mickey mouse plant
Dicotyledons	Oleaceae	*Ligustrum lucidum**	Large-leaved privet
Dicotyledons	Oleaceae	*Notelaea johnsonii*	Veinless mock olive
Dicotyledons	Oleaceae	*Notelaea longifolia*	Large mock olive
Dicotyledons	Oleaceae	*Notelaea venosa*	Smooth mock olive
Dicotyledons	Oleaceae	*Olea paniculata*	Native Olive
Dicotyledons	Onagraceae	*Ludwigia hexapetala*	Water primrose
Dicotyledons	Passifloraceae	*Passiflora edulis**	Passionfruit
Dicotyledons	Passifloraceae	*Passiflora subpeltata**	White passionflower
Dicotyledons	Phytolacaceae	*Phytolacca octandra**	Inkweed
Dicotyledons	Phytolacaceae	*Rivina humilis**	Coral berry
Dicotyledons	Piperaceae	*Piper novae-hollandiae*	Giant pepper vine
Dicotyledons	Pittosporaceae	*Auranticarpa rhombifolium*	Hollywood
Dicotyledons	Pittosporaceae	*Hymenosporum flavum*	Native frangipani
Dicotyledons	Pittosporaceae	*Pittosporum multiflorum*	Orange thorn
Dicotyledons	Pittosporaceae	*Pittosporum revolutum*	Hairy pittosporum
Dicotyledons	Pittosporaceae	*Pittosporum undulatum*	Sweet pittosporum
Dicotyledons	Polygonaceae	*Persicaria* sp.	Smartweed
Dicotyledons	Proteaceae	*Banksia integrifolia*	Coast banksia
Dicotyledons	Proteaceae	*Buckinghamia celsissima*	Ivory curl tree
Dicotyledons	**Proteaceae**	*Floydia praealta*	**Ball nut**
Dicotyledons	**Proteaceae**	*Grevillea hilliana*	**White silky oak/White yiel yiel**
Dicotyledons	Proteaceae	*Grevillea robusta*	Silky oak
Dicotyledons	Proteaceae	*Grevillea* sp.	Grevillea
Dicotyledons	Proteaceae	*Helicia glabriflora*	Smooth helicia
Dicotyledons	**Proteaceae**	*Hicksbeachia pinnatifolia*	**Red bopple nut**
Dicotyledons	**Proteaceae**	*Macadamia tetraphylla*	**Rough-shelled bush nut**
Dicotyledons	Proteaceae	*Stenocarpus salignus*	Scrub beefwood
Dicotyledons	Proteaceae	*Stenocarpus sinuatus*	Firewheel tree
Dicotyledons	Proteaceae	*Triunia youngiana*	Native honeysuckle
Dicotyledons	Rhamnaceae	*Alphitonia excelsa*	Red ash
Dicotyledons	Rhamnaceae	*Emmenosperma alphitonioides*	Yellow ash
Dicotyledons	Rosaceae	*Prunus persica**	Peach
Dicotyledons	Rosaceae	*Rubus elliptica**	Yellow raspberry
Dicotyledons	Rosaceae	*Rubus parvifolius*	Native raspberry
Dicotyledons	Rubiaceae	*Atractocarpus chartaceus*	Narrow-leaved gardenia
Dicotyledons	**Rubiaceae**	*Randia moorei*	**Spiny gardenia**
Dicotyledons	Rubiaceae	*Canthium odoratum*	Shiny-leaved Canthium
Dicotyledons	Rubiaceae	*Hodgkinsonia ovatiflora*	Hodgkinsonia
Dicotyledons	Rubiaceae	*Ixora beckleri*	Native ixora
Dicotyledons	Rubiaceae	*Morinda jasminoides*	Morinda
Dicotyledons	Rubiaceae	*Pavetta australiensis*	Pavetta
Dicotyledons	Rubiaceae	*Psychotria loniceroides*	Hairy psychotria
Dicotyledons	Rutaceae	*Sarcomelicope simplicifolia*	Baurella
Dicotyledons	Rutaceae	*Bosistoa pentacocca*	Ferny leaf bosistoa

Grouping	Family	Botanical Name	Common Name
Dicotyledons	**Rutaceae**	*Bosistoa transversa*	**Yellow satinheart**
Dicotyledons	Rutaceae	*Bouchardatia neurococca*	Union nut
Dicotyledons	Rutaceae	*Citris limon**	Lemon bush
Dicotyledons	Rutaceae	*Flindersia australis*	Teak
Dicotyledons	Rutaceae	*Flindersia bennettiana*	Bennett's ash
Dicotyledons	Rutaceae	*Flindersia schottiana*	Cudgerie
Dicotyledons	Rutaceae	*Flindersia xanthoxyla*	Yellowwood
Dicotyledons	**Rutaceae**	*Geijera paniculata*	**Axebreaker**
Dicotyledons	Rutaceae	*Medicosma cunninghamii*	Medicosma
Dicotyledons	Rutaceae	*Melicope elleryana*	Pink-flowered doughwood
Dicotyledons	Rutaceae	*Microcitrus australasica*	Finger Lime
Dicotyledons	Rutaceae	*Pentaceras australe*	Crow's ash
Dicotyledons	Sapindaceae	*Alectryon subcinereus*	Native quince
Dicotyledons	Sapindaceae	*Alectryon tomentosus*	Hairy Bird's Eye
Dicotyledons	Sapindaceae	*Arytera distylis*	Twin–leaf coogera
Dicotyledons	Sapindaceae	*Arytera divaricata*	Coogera
Dicotyledons	Sapindaceae	*Atalya salicifolia*	Brush whitewood
Dicotyledons	Sapindaceae	*Cupaniopsis anacardioides*	Tuckeroo
Dicotyledons	Sapindaceae	*Cupaniopsis newmanii #*	Long-leaved tuckeroo
Dicotyledons	Sapindaceae	*Cupaniopsis parvifolia*	Small-leaved tuckeroo
Dicotyledons	Sapindaceae	*Diploglottis australis*	Native tamarind
Dicotyledons	**Sapindaceae**	*Diploglottis campbellii*	**Small-leaved tamarind**
Dicotyledons	Sapindaceae	*Elattostachys nervosa*	Green tamarind
Dicotyledons	Sapindaceae	*Guioa semiglauca*	Guioa
Dicotyledons	Sapindaceae	*Harpullia alata*	Wing-leaved Tulip
Dicotyledons	Sapindaceae	*Harpullia hillii*	Oblong-leaved tulip
Dicotyledons	Sapindaceae	*Harpullia pendula*	Tulipwood
Dicotyledons	Sapindaceae	*Jagera pseudorhus*	Foambark
Dicotyledons	**Sapindaceae**	*Lepiderema pulchella*	**Fine-leaved tuckeroo**
Dicotyledons	Sapindaceae	*Mischarytera lauteriana*	Corduroy tamarind
Dicotyledons	Sapindaceae	*Mischocarpus anodontus*	Veiny pear fruit
Dicotyledons	Sapindaceae	*Mischocarpus pyriformis*	Yellow pear fruit
Dicotyledons	Sapindaceae	*Rhysotoechia bifoliolata*	Twin-leaved Tuckeroo
Dicotyledons	Sapindaceae	*Sarcopteryx stipata*	Steelwood
Dicotyledons	Sapindaceae	*Toechima dasyrrhache*	Blunt-leaved steelwood
Dicotyledons	Sapindaceae	*Toechima tenax*	Pitted-leaf steelwood
Dicotyledons	Sapotaceae	*Planchonella australis*	Black apple
Dicotyledons	Sapotaceae	*Planchonella laurifolia*	Blush condoo
Dicotyledons	Sapotaceae	*Pouteria pohlmaniana*	Yellow boxwood
Dicotyledons	Simaroubaceae	*Ailanthus triphysa*	White bean
Dicotyledons	Solanaceae	*Duboisia myoporoides*	Corkwood
Dicotyledons	Solanaceae	*Solanum torvum**	Devil's apple
Dicotyledons	Solanaceae	*Solanum hispidulum**	Giant devil's thorn
Dicotyledons	Solanaceae	*Solanum mauritianum**	Wild tobacco tree
Dicotyledons	Solanaceae	*Solanum nigrum**	Black-berry nightshade
Dicotyledons	Solanaceae	*Solanum seaforthianum**	Brazilian nightshade
Dicotyledons	Solanaceae	*Solanum stelligerum*	Star nightshade
Dicotyledons	Sterculiaceae	*Argyrodendron trifoliatum*	White booyong
Dicotyledons	Sterculiaceae	*Brachychiton acerifolius*	Flame tree
Dicotyledons	Sterculiaceae	*Brachychiton discolor*	Lacebark tree

Grouping	Family	Botanical Name	Common Name
Dicotyledons	Sterculiaceae	*Commersonia bartramia*	Brown kurrajong
Dicotyledons	Sterculiaceae	*Sterculia quadrifida*	Red-fruited kurrajong
Dicotyledons	Symplocaceae	*Symplocos stawellii*	White hazelwood
Dicotyledons	Symplocaceae	*Symplocos thwaitesii*	Buff hazelwood
Dicotyledons	Tiliaceae	*Triumfetta rhomboidea**	Chinese burr
Dicotyledons	Ulmaceae	*Aphananthe philippinensis*	Rough–leaved elm
Dicotyledons	Ulmaceae	*Celtis paniculata*	Native celtis
Dicotyledons	Ulmaceae	*Celtis sinensis**	Hackberry
Dicotyledons	Ulmaceae	*Trema tomentosa*	Poison peach
Dicotyledons	Urticaceae	*Dendrocnide excelsa*	Giant Stinging Tree
Dicotyledons	Urticaceae	*Dendrocnide photoinphylla*	Shiny-leaved stinger
Dicotyledons	Urticaceae	*Pipturus argenteus*	White Nettle
Dicotyledons	Verbenaceae	*Clerodendrum floribundum*	Smooth clerodendrum
Dicotyledons	Verbenaceae	*Gmelina leichhardtii*	White beech
Dicotyledons	Verbenaceae	*Lantana camara**	Lantana
Dicotyledons	Verbenaceae	*Verbena bonariensis**	Purple top
Dicotyledons	Verbenaceae	*Verbena littoralis**	Common verbena
Dicotyledons	Vitaceae	*Cayratia acris*	Hairy water vine
Dicotyledons	Vitaceae	*Cayratia clematidea*	Native grape
Dicotyledons	Vitaceae	*Cissus antarctica*	Water vine
Dicotyledons	Vitaceae	*Cissus hypoglauca*	Five-leaf water vine
Dicotyledons	Vitaceae	*Cissus sterculiifolia*	Long-leaved water vine

* Introduced Species

ROTAP (Briggs & Leigh 1996)

Threatened species are shown in bold

APPENDIX 2 - FAUNA ASSESSMENT

1.1. Introduction

While the site is largely cleared and fragmented, large areas of vegetation remain which are likely to provide habitat for a variety of fauna, including Threatened species.

This section includes a description of the methods used in determining which fauna species use, or are likely to use, the Study area and a discussion of the results of the Fauna assessment. The fauna assessment involved a full fauna survey (i.e. specialised bird, bat and amphibian survey, spotlighting, hair sampling and trapping). The site was surveyed in Summer 2006 and Winter 2007.

1.2. Methodology

1.2.1 Database searches

Searches of the NPWS and EPBC databases were completed (March 2009) to find records of State and Commonwealth Threatened fauna species[1] within 10km of the Subject site.

1.2.2 Literature review

A comprehensive literature review and detailed fauna survey was completed by WBM Oceanics (1996) for the entire Terranora golf resort. This review used a number of sources to identify records of Threatened species in the locality.

1.2.3 Habitat assessment

Site habitats were assessed to determine their value for native fauna species. This assessment was completed in conjunction with the flora survey. The assessment focused on identifying habitat features typically associated with Threatened species as well as other native fauna groups. Particular attention was paid to habitat features such as:

- The presence of mature trees with hollows, fissures and/or other suitable roosting/nesting places;
- The presence of Koala food trees;
- The presence of preferred Glossy black cockatoo feed trees (Forest oak and/or Black she-oak);
- The presence of characteristic signs of foraging (e.g. Yellow-bellied glider feeding scars);
- Condition, flow and water quality of drainage lines and bodies of water;
- Areas of dense vegetation;
- Presence of hollow logs/debris and areas of dense leaf litter;
- Presence of fruiting flora species;

[1] As listed within schedules of the TSC Act (1995) and EPBC Act (1999).

- Presence of blossoming flora species, particularly winter-flowering species;
- Vegetation connectivity and proximity to neighbouring areas of intact vegetation; and
- Presence of caves and man-made structures suitable as microchiropteran bat roost sites.

1.2.4 Fauna survey

1.2.4.1 Introduction

A detailed spring fauna survey was carried out by two (2) – three (3) scientists between the 2nd and 6th October 2006. A detailed winter fauna survey was carried out by two (2) – three (3) scientists between the 18th and 22nd of June 2007. The weather was generally fine and warm during both survey periods with cool nights during the winter survey.

Detailed fauna surveys were designed to target threatened species identified as occurring in the Study area. The following survey techniques were utilised in this assessment. **FIGURE 6** shows the location of trap sites.

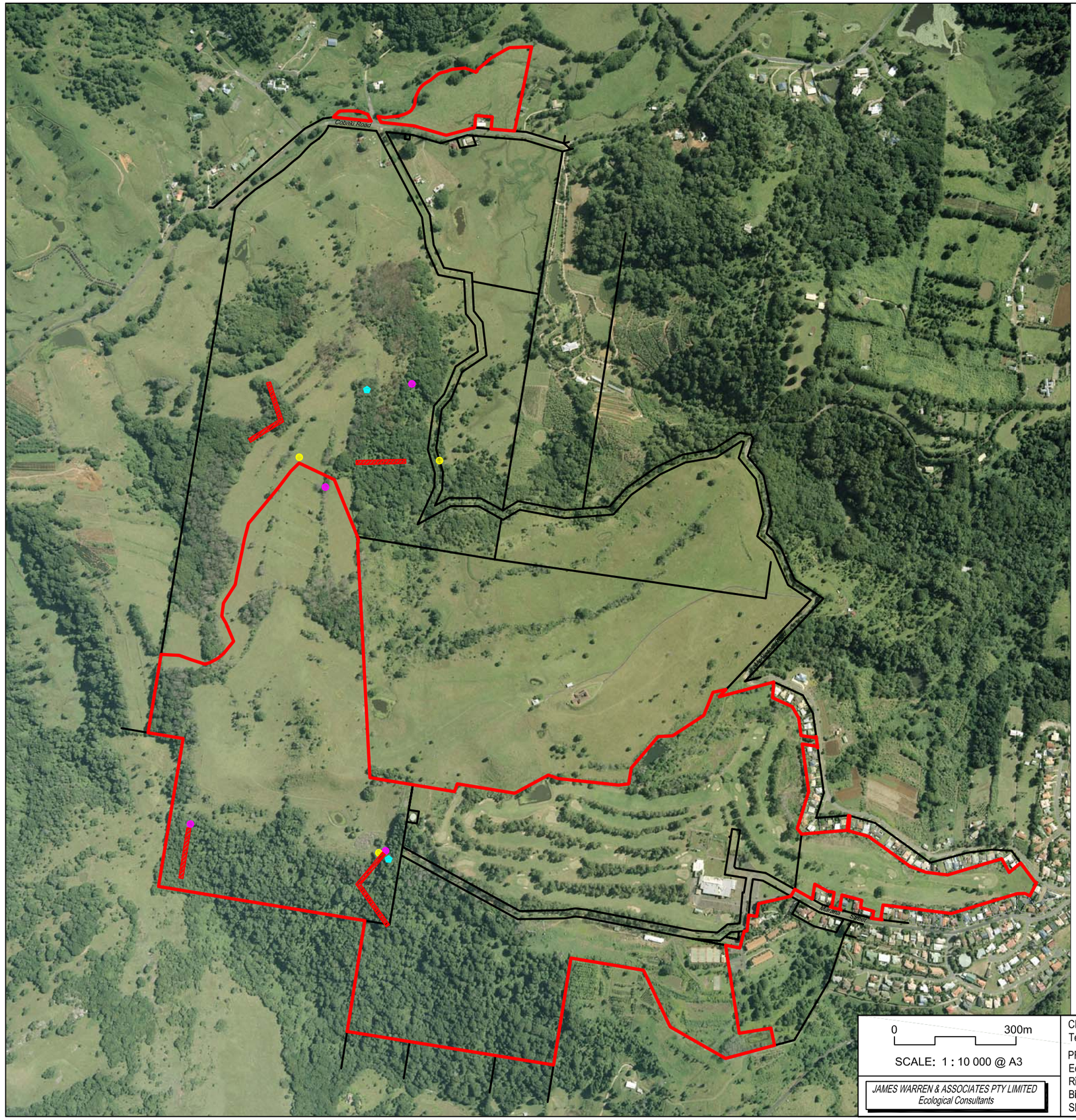
Opportunistic Sightings
The 'random meander' technique (Cropper 1993) was used to traverse the site. All incidental records of fauna utilising the study area were recorded.

Active Searching
Logs, sheets of tin, cardboard, bark and leaves were overturned in search of reptiles and amphibians while incidentally traversing the site. Diggings and signs of droppings were searched for. The site was actively searched for scats and bones. Approximately ten (10) hours of active searching was completed during each survey period (i.e. total of 20 hours). Active observation of bird, reptile and amphibian activity was undertaken during all field work.

Type 'A' Elliott Box Traps and Cage Traps
This methodology provides an insight into the size and density of populations of ground fauna which may form a component of the diet of raptors such as the Eastern grass owl and the Masked owl. It also indicates the extent of invasion by exotic species such as the Black rat and the House mouse which allows an assessment of the 'naturalness' of the area to be made.

Four (4) lines of Type 'A' Elliot traps with twenty-five (25) traps in each line were set for a period of four (4) nights during both survey periods for a total of eight hundred (800) trap nights. Elliot traps were baited with a mixture of rolled oats, honey, peanut butter and pistachio essence.

Eight (8) cage traps were also deployed for four (4) nights during both survey periods for a total of sixty-four (64) trap nights. Cage traps were alternately baited with fruit and chicken necks to target both herbivorous and carnivorous species.



LEGEND

- Trapping Transect (Elliott Traps, Hair Tubes, Cage Traps)
- Call Playback Locations
- Harp Trap Locations
- Anabat Locations
- Site Outline

N

SOURCE:
Trapping Sites - James Warren & Associates GPS Survey June 2007
Aerial Photograph - Michel Group Services taken 2006 (Ref: bilambil_heights_2006-reduced.jpeg)

0 300m

SCALE: 1 : 10 000 @ A3

JAMES WARREN & ASSOCIATES PTY LIMITED
Ecological Consultants

CLIENT
Terranora Group Management Pty Ltd

PROJECT
Ecological Assessment
Rise Estate
Bilambil Heights, West Tweed, NSW
Shire of Tweed

VOLUME 2
FIGURE 6

PREPARED: BW
DATE: 27 April 2009
FILE: N01051_EA_Base.dwg

TITLE

LOCATION OF TRAPPING SITES

Hair Tubes
Four (4) lines of ten (10) hair tubes each were laid on the site during both survey periods. Each hair tube was baited with rolled oats, honey, peanut butter and pistachio essence and then set for a period of fourteen (14) nights. A total of 1,120 trap nights were completed. Hair tube records were analysed by Barbara Triggs.

Call playback techniques
Call playback was carried out over four (4) nights at various locations throughout the site for a period of one (1) hour during both the Spring and Winter survey periods, for a total of eight (8) hours Call playback. Target species included: Masked owl, Barking Owl, Sooty owl, Powerful owl and Marbled frog mouth. Calls were broadcast, and then followed by a five (5) minute listening period.

Specialist avian survey

Spring Survey

Diurnal birds were surveyed visually and aurally by habitat search for an hour before dusk on the 2nd, an hour after dawn and an hour before dusk on the 3rd, an hour after dawn and an hour before dusk on the 4th, an hour after dawn and an hour before dusk on the 5th and an hour after dawn on the 6th October 2006, for a total of 8 hours.

Winter Survey

A census of bird occurrence was carried out by Dr. Stephen Debus to sample both diurnal and nocturnal birds between the 21st and 22nd June 2007.

Diurnal birds were surveyed visually and aurally by habitat search over most of the site from 16:30–17:30 h on 21st, and for the first 3.5 hrs of daylight (06:15–09:45 h) on the 22nd (fine weather), for a total of 4.5 hours.

Nocturnal birds were surveyed by means of listening, call-playback and spotlighting at one site on the evening 21st, starting at dusk.

Harp Netting
Two (2) Harp traps were set in potential flyways over four (4) nights during both survey periods. Flyways were chosen on the basis of adequate cover on both sides of the trap, and screening was incorporated to enhance capture success. An overall total of sixteen (16) trap nights was achieved in this component of the Study.

Anabat Recording
An Anabat II sonar detector (Titley Electronics, Ballina) was used to down-load the ultrasonic calls of Microchiropteran bats. Recording was undertaken for twelve (12) hours per night over four (4) nights. A total of forty-eight (48) hours of recording was undertaken. Recording times commenced from slightly before dusk. Recording was undertaken by positioning the Anabat II sonar detector facing across possible bat flyways. Anabat records were identified by Dr. Greg Ford.

Spotlighting
Spotlighting was undertaken by two (2) people for two hours (2) hours on four consecutive nights during both survey periods for a total of thirty-two (32) person hours spotlighting. Vegetated areas of the site were traversed on foot utilising existing tracks

and spotlighting was carried out using a 50W spotlight powered by a 12V battery. The observers walked at approximately 1km/h allowing intensive listening as an adjunct to visual detection.

A summary of the total trapping effort is shown in **TABLE 1.**

TABLE 1
SUMMARY OF TRAPPING EFFORT

Survey Technique	Effort
Elliott trapping	800 trap nights
Cage traps	64 trap nights
Harp traps	16 trap nights
Hair tubes	1,120 trap nights
Anabat (bat calls)	8 nights (96 hours)
Spotlighting	32 hours
Call playback	8 nights (8hrs)
Bird survey	12.5 hours Specialised avian survey, 10 days opportunistic records
Active searches	20 hours

1.3 Results

1.3.1 Database Searches

Searches of the NPWS and EPBC databases revealed records of fifty-nine (59) significant fauna species, and one (1) significant fauna population, within 10km of the Subject site (**TABLE 2**). Oceanic and coastal species have been omitted from the results as they will not occur on the subject site.

TABLE 2
RECORDS OF SIGNIFICANT FAUNA WITHIN 10 KM OF THE SUBJECT SITE

Common Name	Scientific Name	Status	
		TSC Act (1995)*	EPBC Act (1999)#
INVERTEBRATES			
Imperial moth	*Phyllodes imperialis*	E[1]	E
Mitchell's rainforest snail	*Thersites mitchellae*	E[1]	CE
AMPHIBIANS			
Giant barred frog	*Mixophyes iteratus*	E[1]	E
Green-thighed frog	*Litoria brevipalmata*	V	-
Pouched frog	*Assa darlingtoni*	V	-
Wallum froglet	*Crinia tinnula*	V	-
Wallum sedge frog	*Litoria olongburensis*	V	V
REPTILES			
Three-toed snake-toothed skink	*Coeranoscincus reticulatus*	V	V

Common Name	Scientific Name	Status	
BIRDS			
Albert's lyrebird	*Menura alberti*	V	-
Australian cotton pygmy-goose	*Nettapus coromandelianus albipennis*	E	M
Australian painted snipe	*Rostratula australis*	E[1]	V, M
Barking owl	*Ninox connivens*	V	-
Barred cuckoo-shrike	*Coracina lineata*	V	-
Black bittern	*Ixobrychus flavicollis*	V	-
Black-breasted button-quail	*Turnix melanogaster*	E[1]	V
Black-faced monarch	*Monarcha melanopsis*	-	M
Black-necked stork	*Ephippiorhynchus asiaticus*	E[1]	-
Black-throated finch	*Peophila cincta cincta*	E[1]	E
Bush-hen	*Amaurornis olivaceus*	V	-
Bush-stone curlew	*Burhinus grallarius*	E[1]	-
Cattle egret	*Ardea ibis*	-	M
Collared kingfisher	*Todiramphus chloris*	V	-
Comb-crested jacana	*Irediparra gallinacea*	V	-
Coxen's fig parrot	*Cyclopsitta diophthalma coxeni*	E[1]	E, M
Glossy black-cockatoo	*Calyptorhynchus lathami*	V	-
Grass owl	*Tyto capensis*	V	-
Great egret	*Ardea alba*	-	M
Latham's snipe	*Gallinago hardwickii*	-	M
Magpie goose	*Anseranas semipalmata*	V	-
Mangrove honeyeater	*Lichenostomus fasciogularis*	V	-
Masked owl	*Tyto novaehollandiae*	V	-
Osprey	*Pandion haliaetus*	V	-
Rainbow bee-eater	*Merops ornatus*	-	M
Regent honeyeater	*Xanthomyza phrygia*	E[1]	E, M
Rose-crowned fruit-dove	*Ptilinopus regina*	V	-
Rufous fantail	*Rhipidura rufifrons*	-	M
Satin flycatcher	*Myiagra cyanoleuca*	-	M
Sooty owl	*Tyto tenebricosa*	V	-
Spectacled monarch	*Monarcha trivirgatus*	-	M
Square-tailed kite	*Lophoictinia isura*	V	-
Swift parrot	*Lathamus discolor*	E[1]	E
White-bellied sea-eagle	*Haliaeetus leucogaster*	-	M
White-eared monarch	*Monarcha leucotis*	V	-
Wompoo fruit-dove	*Ptilinopus magnificus*	V	-
MAMMALS			
Beccari's freetail-bat	*Mormopterus beccarii*	V	-
Cobaki Lakes and Tweed Heads West population of the Long-nosed potoroo	*Potorous tridactylus*	E[2]	-
Common blossom-bat	*Syconycteris australis*	V	-
Common planigale	*Planigale maculata*	V	-
Eastern bentwing bat	*Miniopterus schreibersii oceanensis*	V	-

Common Name	Scientific Name	Status	
Eastern long-eared bat	*Nyctophilus bifax*	V	-
Eastern pygmy possum	*Cercartetus nanus*	V	-
False water rat	*Xeromys myoides*	-	V
Grey-headed flying-fox	*Pteropus poliocephalus*	V	V
Koala	*Phascolarctos cinereus*	V	-
Large-eared pied bat	*Chalinolobus dwyeri*	V	V
Large-footed myotis	*Myotis adversus*	V	-
Little bentwing bat	*Miniopterus australis*	V	-
Long-nosed potoroo	*Potorous tridactylus*	V	V
Spotted-tail quoll	*Dasyurus maculatus maculatus*	V	E
Yellow-bellied sheathtail bat	*Saccolaimus flaviventris*	V	-

* V, E^1 & E^2 is Vulnerable, Endangered or an Endangered Population under the TSC Act 1995;
# CE, E, V & M is Critically Endangered, Endangered, Vulnerable & Migratory under the EPBC Act 1999.

1.3.2 Results of Literature review

Threatened species recorded in the WBM Oceanics Study (1996) of Terranora Golf Resort include:

- Rose-crowned fruit dove (*Ptilinopus regina*); and
- White-eared monarch (*Monarcha leucotis*).

1.3.3 Habitat Suitability for Significant Fauna

1.3.3.1 Amphibians

Amphibians occurring in the region are poikilothermic, predominantly insectivorous and generally require free water for reproduction, with the exception of two highland genera (*Assa darlingtoni* and *Philoria* spp.) The habitat requirements of most species are unlikely to be determined by forest cover or floristics, but are more strongly influenced by factors such as climate, distance to water bodies, riparian vegetation, hydrological and morphological characteristics of water bodies and the availability of suitable micro-habitat for aestivation and shelter.

The majority of species that occur within the region lay eggs in or near temporary or permanent water bodies and rely on free water for larval development and metamorphosis. Of these species, only a few are dependent on forested habitats beyond the riparian zone or beyond areas of temporary inundation. These species include the Red-eyed tree frog (*Litoria chloris*), Leseuer's frog (*Litoria leseueri*), Fletcher's frog (*Lechriodus fletcheri*) and the Barred frogs of the *Mixophyes* genus.

Grasslands provide suitable habitat for a range of Amphibian species, particularly along drainage depressions and soaks. Species commonly encountered in grassland communities include the Common eastern froglet, Eastern sign bearing froglet, Striped marsh frog, Spotted grass frog, Eastern dwarf tree frog, Rocket frog, Whistling tree frog and Cane toad.

A range of frogs is likely to utilise the site, from common species associated with rural lands and dams to rainforest dwelling species. Although intermittent, drainage lines on

the subject site provide rocky areas and areas of moderately deep leaf litter for shelter. However, species which typically occur in undisturbed low elevation Rainforest and permanent streams such as the Giant barred frog (*Mixophyes iteratus*) are unlikely to occur at the study site.

1.3.3.2 Reptiles

As reptiles are poikilothermic, and predominantly insectivorous or carnivorous, their habitat requirements are less directly determined by vegetation species composition than other taxa which feed directly on plants. Reptile distributions are strongly influenced by structural characteristics of the vegetation, climate and other factors affecting thermoregulation such as shade and availability of shelter and basking sites (Smith *et al* 1994).

In a survey of the moist forest herpetofauna of North-eastern NSW, Smith *et al* (1989) found that few species discriminated between rainforest and wet sclerophyll forest, however, most species exhibited a response to differences in elevation and the availability of microhabitat components and other substrates.

The availability of microhabitats, of varying thermal properties is particularly important for most reptile species, as behavioural thermoregulation (regulation of body heat) is important in controlling critical body functions such as digestion, foraging activity and reproduction.

Reptile diversity and abundance is often (but not always) significantly higher in drier habitat types, particularly those with a wide variety of ground substrate microhabitats. This contrasts markedly with the distribution patterns of birds, and most mammals.

The single limiting factor in terms of species diversity in coastal vegetation is the lack of shelter sites (e.g. logs, tree hollows and decorticating bark). Such habitat components characterise eucalypt forests and woodlands, where species diversity may be much higher, depending on disturbance factors.

A range of reptile species is likely to occur considering the diversity of environments and the presence of fallen timber and rocky areas.

1.3.3.3 Birds

The significance of near coastal environments of the N.S.W. Far North Coast and South-East Queensland as over-wintering habitat for migratory birds has been established by many observers and bird banders including Keast (1968), Robertson (1973), Gravatt (1974), Porter (1982) and Robertson and Woodall (1983). These patterns may be attributable to the relatively high winter temperatures and long growing season of this region compared with the rest of south-eastern Australia (Fitzpatrick and Nix 1973; Edwards 1979; Nix 1982; Specht *et al* 1981).

Many insectivorous birds from higher latitudes and elevation over-winter in the locality. These include species such as the Fantail cuckoo, Sacred kingfisher, Rainbow bee-eater, Noisy pitta, Tree martin, Black-faced cuckoo-shrike, Cicada bird, Golden

whistler, Rufous whistler, Rose robin, Grey fantail, White-throated gerygone, Silvereye, Olive-backed oriole and Spangled drongo.

Birds such as honeyeaters and lorikeets are Blossom nomads (*ibid.*). These birds move locally in response to variation in the availability of nectar and or pollen, important components in their diet. Porter (1982) highlights the importance of Forest red gum, Broad-leaved paperbark and Coast banksia for Scaly-breasted and Rainbow lorikeets as these species flower during the lorikeet's winter breeding period. A sequence of important nectar bearing plants in the genera Eucalyptus, Banksia, Melaleuca and Callistemon provide a continuity of food for nectarivorous birds.

Studies of bird usage in rainforest remnants by Holmes (1987), Connelly and Specht (1988) and Lott & Duigan (1993) indicate that the diversity and abundance of birds is related to the size of the Rainforest patches and their degree of isolation from major areas of native forest. Lott & Duigan (1993) and Howe *et al* (1981) also note that sites with a higher diversity of vegetation and those which are closer to water generally support a greater diversity of birds. Locally nomadic and migratory rainforest species such as the Wompoo, Rose-crowned and Superb fruit-doves, Common koel and Black-faced cuckoo-shrike are known to use scattered areas of habitat as "stepping-stones" between more intact areas of forest (Date *et al* 1992; Lott & Duigan 1993).

The site comprises good quality habitat for a range of bird species, including numerous mature Figs, which are likely to be of particular importance as a forage resource for frugivorous birds within the locality.

There is a lack of trees with hollows necessary for hollow-nesting birds, however, the Study area may represent important forage habitat for hollow-dependent avifauna breeding in the locality.

1.3.3.4 Mammals

Small terrestrial mammals generally occur in highest densities in association with a complex vegetation structure. A dense understorey layer, which provides shelter from predators and provides nesting opportunities, is particularly important.

In general medium-large terrestrial mammals such as macropods select habitats which provide a dense cover for shelter and refuge and open areas for feeding. The larger species tend to occupy drier more open habitats: the smaller species, moister and more densely vegetated habitats.

All Arboreal mammals that occur in the region (with the exception of the Koala) utilise tree hollows for nesting and shelter (although the Common ringtail possum is not dependent on hollows). Smith & Lindenmeyer (1988) consider that shortage of nest hollows is likely to limit arboreal mammal populations where density of hollow bearing trees is less than 2 to 8 trees per hectare.

Arboreal folivores (*e.g.* Common ringtail possum, Greater glider) are widespread and abundant but exhibit local variation in response to such factors as tree species composition, foliage protein and fibre levels, leaf toughness, toxins, forest structure and the availability of shelter sites. Arboreal folivores are expected to be most

abundant in areas of high productivity, high soil fertility and moderate climate, in conjunction with adequate shelter and suitable foraging substrate.

Arboreal nectarivore/insectivores feed on a wide variety of plant and insect exudates including the nectar of flowering eucalypts, and shrubs such as Banksia and Acacia sp. These species also feed extensively on insects, particularly under the shedding bark of eucalypts. The distribution of nectarivore/insectivores is considered to be related to the abundance of nectar and pollen producing plants, the abundance of bark shedding eucalypts which harbour insect prey, and the occurrence of sap and gum exudate producing trees (Sap feed trees) and shrubs (*e.g.* Acacia sp.). Arboreal nectarivores and insectivores are generally hollow dependent species.

The site provides relatively poor habitat for arboreal mammals due to the general lack of hollow trees, although rainforest fruits provide forage resources for species such as the Common brushtail possum and Ringtail possum. Due to the generally poorly developed ground layer, a limited range of small ground-dwelling mammals may occur. Introduced species such as the House mouse and Black rat are likely to be prevalent. Commonly occurring medium and large terrestrial mammal such as Bandicoots and Wallabies are also likely to utilise site habitats.

Insectivorous bats like insectivorous birds overlap considerably in diet and broad vegetation preferences (Hall 1981), but specialise in foraging in specific layers or substrates within the forest (Crome and Richards 1988). The Study area is likely to provide forage habitat for a relatively high diversity and abundance of insectivorous bats, due to the combination of open, forested and denser areas of vegetation.

The site comprises good quality habitat for a range of frugivorous bats due to the high diversity of fruiting trees, including numerous mature Figs, which are likely to be of particular importance as a forage resource for frugivorous bats within the locality.

1.3.4 Significant species considered possible occurrences in the Study area

Based on the assessment of habitats in the Study area, Significant fauna species known from the locality were assessed for the likelihood of their occurrence on the Subject site. This is shown in **TABLE 3**. Oceanic and coastal species have not been included in the Table.

TABLE 3
SIGNIFICANT FAUNA CONSIDERED POSSIBLE OCCURRENCES ON THE SITE

Species	Likelihood of occurrence in the Study area	Notes
Albert's lyrebird (*Menura alberti*)	**Possible**	Restricted to south-east Queensland and far north-east New South Wales. Inhabits mixed rainforest and wet open forest, frequently dominated by Brush box. Although much of the vegetation on the site is disturbed, dense rainforest and regrowth rainforest in the south of the site (and on adjoining lands) provides suitable (if fragmented) habitat for this species.

Species	Likelihood of occurrence in the Study area	Notes
Australian cotton pygmy-goose (*Nettapus coromandelianus albipennis)*	Unlikely	Although once found from north Queensland to the Hunter River in NSW, the Cotton Pygmy-goose is now only a rare visitor to NSW. It inhabits freshwater lakes, lagoons, swamps and dams, particularly those vegetated with waterlilies and other floating and submerged aquatic vegetation. Habitat on the site is unsuitable for this species.
Australian painted snipe (*Rostratula australis*)	Unlikely	In NSW, this species has been recorded at the Paroo wetlands, Lake Cowell, Macquarie Marshes and Hexham Swamp. No records exist for this species in the Tweed LGA.
Barking owl (*Ninox connivens*)	Unlikely	The Barking owl is distributed thinly throughout NSW. It occurs in eucalypt woodland, open forest, swamp woodlands and timber along watercourses. Territories range from 30 to over 1000 hectares. Habitat on the site is unsuitable for this species.
Barred Cuckoo-shrike (*Coracina lineata*)	**Possible**	The Barred cuckoo-shrike is generally uncommon and is rare in NSW. This species lives in rainforest, eucalypt forests and woodland, swamp woodlands and timber along watercourses, and wanders nomadically in search of fruit. Suitable habitat occurs on the site.
Beccari's Free-tail bat (*Mormopterus beccarii*)	**Possible**	This species is rare in northern NSW. The only confirmed record in NSW is a colony found in the roof of a house in Murwillumbah. It inhabits a range of vegetation types from rainforests to open forests and woodlands, usually along watercourses. Suitable habitat occurs on the site.
Black bittern (*Ixobrychus flavicollis*)	Unlikely	This species occurs in coastal and sub-coastal areas of south-western, northern and eastern Australia. It is usually found in dense vegetation fringing and in streams, swamps, tidal creeks and mudflats, particularly amongst swamp she-oaks and mangroves. Suitable habitat does not occur on the site.

Species	Likelihood of occurrence in the Study area	Notes
Black-breasted button-quail (*Turnix melanogaster*)	**Possible**	In north-east NSW, there are few reliable records, all north of the Bruxner Highway and east of the Great Divide. Prefers drier rainforests and viney scrubs, often in association with Hoop Pine and a deep, moist leaf litter layer. Suitable habitat occurs in the southern portion of the subject site.
Black-faced monarch (*Monarcha melanopsis*)	**Possible**	Inhabits rainforests, eucalypt forests and coastal scrubs. Suitable habitat occurs on the subject site.
Black flying-fox (*Pteropus alecto*)	**RECORDED DURING SITE SURVEY**	Black flying foxes occur in coastal and near-coastal areas across northern Australia. They are relatively uncommon in NSW. Large communal day-time camps occupy remnants of coastal subtropical rainforest or swamp forest and at night they travel up to 50km to feed on blossoms and fruits. Numerous figs on the site provide an excellent food resource for this species.
Black-necked stork (*Ephippiorhynchus asiaticus*)	Unlikely	This species is widespread in northern Australia and sparse in coastal eastern Australia from Qld to southern NSW. It inhabits swamps, mangroves, mudflats, dry floodplains and irrigated land. It occasionally forages in open grassy woodland. Suitable habitat does not occur on the site.
Black-throated finch (*Peophila cincta cincta*)	Unlikely	The Black-throated Finch occupies woodland savannah and riverine vegetation. The preferred inland habitat is grassy woodlands, dominated by seeding grasses, *Eucalyptus, Melaleuca* or *Acacia,* with access to water. Within NSW, the species has a patchy distribution with only five records since the mid 1960s, all in the southern part of the New England Tablelands.
Bush-hen (*Amaurornis olivaceus*)	Unlikely	The Bush-hen occurs in coastal northern Australia and through eastern Qld to the NSW north coast. It inhabits a variety of coastal wetlands from mangroves, lagoons and swamps, to river margins and creeks running through rainforest. Suitable habitat does not occur on the site.

Species	Likelihood of occurrence in the Study area	Notes
Bush-stone curlew (*Burhinus grallarius*)	Unlikely	This species is rare east of the Great Divide except for isolated populations along the north coast. It forages and breeds in open-grassed woodlands or sparsely treed rangelands, often with a non-existent shrub layer and abundant leaf litter. Suitable habitat does not occur on the site.
Cattle egret (*Ardea ibis*)	**RECORDED DURING SITE SURVEY**	This species has been recorded foraging within pastures on the subject site and on the edges of farm dams both on the site and on land adjacent to the subject site.
Collared kingfisher (*Todiramphus chloris*)	Unlikely	The Collared kingfisher is most commonly observed in the Tweed River estuary in NSW. It is virtually restricted to mangroves and other estuarine habitats in Australia, mainly about the mouths of the larger coastal rivers. Suitable habitat does not occur on the site.
Comb-crested jacana (*Irediparra gallinacea*)	Unlikely	This species is found in coastal and sub-coastal northern and eastern Australia. In NSW populations are localised and scattered. It lives amongst vegetation floating on the surface of slow-moving rivers and permanent lagoons, swamps, lakes and dams. Suitable habitat does not occur on the site. Dams generally have poor vegetation cover.
Common blossom bat (*Syconycteris australis*)	Unlikely	Common blossom bats occur in coastal areas of north-east NSW and eastern Qld. They often roost in littoral rainforest and feed on flowers in adjacent heathland and paperbark swamps. Suitable habitat does not occur on the site.
Common planigale (*Planigale maculata*)	**Possible**	This species occurs in coastal north-east NSW. It occupies a wide range of habitats from rainforest, sclerophyll forest, grasslands, marshlands, rocky areas and even some suburban areas, and usually occurs close to water. Suitable habitat occurs on the site.
Coxen's fig-parrot (*Cyclopsitta diophthalma coxeni)*	**Possible**	This is a very rare species that lives in the canopy of dense rainforest. Although this species is seldom recorded, the site is likely to provide a significant forage resource for this species.

Species	Likelihood of occurrence in the Study area	Notes
Eastern bent-wing bat (*Mormopterus schreibersii oceanensis*)	**RECORDED DURING SITE SURVEY**	Caves are the primary roosting habitat for this species, but it will also use derelict mines, storm-water tunnels, buildings and other man-made structures. It hunts in forested areas, catching moths and other flying insects above the tree tops. Suitable forage habitat occurs on the subject site.
Eastern free-tail bat (*Mormopterus norfolkensis*)	**RECORDED DURING SITE SURVEY**	The Eastern Freetail-bat is found along the east coast from south Queensland to southern NSW. It generally occurs in dry sclerophyll forest and woodland east of the Great Dividing Range. It roosts mainly in tree hollows but will also roost under bark or in man-made structures.
Eastern long-eared bat (*Nyctophilus bifax*)	**Possible**	This species occurs from Cape York through eastern Qld to the far north-east corner of NSW. It inhabits lowland subtropical rainforest and wet and swamp eucalypt forest, extending into adjacent moist eucalypt forest. Suitable habitat occurs on the site.
Eastern pygmy possum (*Cercartetus nanus*)	**Possible**	This species has a patchy distribution from south-east Qld through eastern NSW. It inhabits a range of vegetation types from rainforest, wet eucalypt forest and tea-tree – banksia scrub. Suitable habitat is considered to occur within rainforest communities on the subject site.
False water rat (*Xeromys myoides*)	Unlikely	False Water-rats are small nocturnal, native rodents that forage for small crabs, shellfish and worms inside mangrove forests. Suitable habitat does not occur on the subject site.
Giant barred frog (*Mixophyes iteratus*)	Unlikely	Giant barred frogs forage and live amongst deep, damp leaf litter in rainforests, moist eucalypt forest and nearby dry eucalypt forest, at elevations below 1000 m. They breed around shallow, flowing rocky streams from late spring to summer. A history of clearing and disturbance by cattle has precluded the occurrence of suitable habitat for this species.

Species	Likelihood of occurrence in the Study area	Notes
Glossy black-cockatoo (*Calyptorhynchus lathami*)	Unlikely	This species feeds on adult *Allocasuarina littoralis* and *A. torulosa* with individual trees believed to be selected on the basis of the nitrogen content of seeds. Breeding sites for the Glossy black cockatoo consist of nests in large trees with large hollows (dead or alive) near streams and within 5-20km of a food source. Suitable habitat does not occur on the subject site.
Grass owl (*Tyto capensis*)	Unlikely	The Grass owl occupies coastal heath and grassland across northern Australia (Reader's Digest 1993). In NSW they are more likely to be found in the north-east. Areas of tall grass in the Study area may provide suitable habitat for this species. Suitable habitat does not occur on the site.
Great egret (*Ardea alba*)	**Possible**	Great Egrets prefer shallow water, particularly when flowing, but may be seen on any watered area, including damp grasslands. Suitable habitat occurs on and adjacent to the subject site.
Green-thighed frog (*Litoria brevipalmata*)	Unlikely	This species occurs in isolated localities along the coast and ranges from the NSW central coast to south-east Qld. It is found in a range of habitats from rainforest and moist eucalypt forest to dry eucalypt forest and heath, typically in areas where surface water gathers after rain. Steep slopes on the site ensure that streams are ephemeral in nature and therefore unlikely to provide suitable habitat for this species.
Grey-headed flying fox (*Pteropus poliocephalus*)	**RECORDED DURING SITE SURVEY**	This species occurs from central eastern Qld south to Vic. In NSW they mainly occur in coastal areas and along river valleys. They typically roost in conspicuous camps in lowland rainforest and swamp forest, often in isolated remnants or on islands in rivers. They forage on fruit, nectar and pollen in rainforests and eucalypt forests. Numerous figs on the site provide an excellent food resource for this species.
Imperial moth (*Phyllodes imperialis*)	Unlikely	This species is known from only 5 locations in lower montane rainforests. Two isolated specimens were collected from Dorrigo in north-eastern NSW. Breeding habitat is considered to be restricted to undisturbed old growth subtropical rainforest below 600m altitude.

Species	Likelihood of occurrence in the Study area	Notes
Koala (*Phascolarctos cinereus*)	**Possible**	The Koala occurs in eucalypt woodlands and forests throughout eastern Australia. They inhabit areas where there are appropriate food trees. Planted Swamp mahogany on the Golf course provide some forage habitat for the Koala, however this species is poorly known from the locality.
Large-eared pied bat (*Chalinolobus dwyeri*)	Unlikely	The Large-eared pied bat is found mainly in areas with extensive cliffs and caves, from Rockhampton in Qld south to Bungonia in the NSW southern highlands. The species is generally rare with a very patchy distribution in NSW, with records from the Richmond Range area, Nightcap Range, Koonyum Range west of Mullumbimby, and the Glenreagh area south of Grafton.
Large-footed myotis (*Myotis adversus*)	Unlikely	This species is distributed throughout eastern Australia. It forages over bodies of water ranging from rainforest streams to large lakes and reservoirs. It roosts during the day in caves, mines, tunnels, tree hollows and under bridges. Suitable habitat is not considered to occur on the subject site.
Latham's snipe (*Gallinago hardwickii*)	Unlikely	Latham's Snipe is a non-breeding visitor to south-eastern Australia, and is a passage migrant through northern Australia (i.e. it travels through northern Australia to reach non-breeding areas located further south). Whilst in Australia it inhabits well-vegetated freshwater wetlands. Suitable habitat does not occur on the subject site.
Little bent-wing bat (*Miniopterus australis*)	**RECORDED DURING SITE SURVEY**	This species occurs in coastal north-east NSW and eastern Qld. It inhabits moist eucalypt forest, rainforest and dense coastal scrub. It generally occupies caves and tunnels during the day, and may occasionally roost singularly or in small collectives under the bark of mature paperbark trees. Suitable habitat occurs on the site.
Long-nosed potoroo (*Potorous tridactylus*)	Unlikely	The Long-nosed potoroo forages in coastal heath or occasionally in dense moist escarpment forest. It requires dense ground cover in areas with foxes and is also found in dense riparian and alluvial plains vegetation (tussocks, sedges, rushes). A history of clearing and disturbance by cattle has precluded the occurrence of suitable habitat for this species.

Species	Likelihood of occurrence in the Study area	Notes
Magpie goose (*Anseranas semipalmata*)	Unlikely	The Magpie goose occurs mainly in coastal and sub-coastal areas of northern Australia. The species is now a rare vagrant in NSW. It generally inhabits open lakes, swamps and permanent wetlands which are dominated by rush and sedge vegetation, with grasslands nearby. Suitable habitat does not occur on the site.
Mangrove honeyeater (*Lichenostomus fasciogularis*)	Unlikely	The Mangrove honeyeater is common in Qld but rare in NSW, where it is known from a few scattered localities, including the Tweed, Richmond and Clarence River estuaries. It primarily inhabits mangroves but also occurs in other near-coastal forests and woodlands, including casuarinas and paperbark swamp forests. Suitable habitat does not occur on the site.
Masked owl (*Tyto novaehollandiae*)	**Possible**	In NSW this species is recorded sporadically in the north-east along the coast and tablelands. It inhabits dry eucalypt forest and woodlands. It has a large home range of 500 – 1000 hectares covering forested and partly open country. This species may utilise the site as part of a foraging territory within the locality. Suitable roost/nest sites do not occur.
Mitchell's rainforest snail (*Thersites mitchellae*)	Unlikely	This snail is restricted to remnant areas of lowland subtropical rainforest and swamp sclerophyll forest with a rainforest understorey on alluvial soils with a basaltic influence on the coastal plain between the Richmond and Tweed Rivers (NPWS 2000). Suitable habitat does not occur on the site, and the site is too elevated for this species, which has not been recorded west of the Tweed River.
Osprey (*Pandion haliaetus*)	Unlikely	This raptor is thinly distributed in coastal Australia. It nests in singularly overtopping, generally dead trees. The Osprey hunts in coastal rivers, estuaries and streams and may gather nesting material from nearby forests. A pair of resident Osprey nest at Kennedy Drive on the Tweed River. They are unlikely to utilise the site for foraging.

Species	Likelihood of occurrence in the Study area	Notes
Pouched frog (*Assa darlingtoni*)	Unlikely	This species is patchily distributed in north-east NSW and south-east Qld. It lives in cool, moist rainforest, or moist eucalypt forest in mountainous areas. A history of clearing and disturbance by cattle has precluded the occurrence of suitable habitat for this species.
Rainbow bee-eater (*Merops ornatus*)	**RECORDED DURING SITE SURVEY**	The Rainbow Bee-eater occurs mainly in open forests and woodlands, shrublands, and in various cleared or semi-cleared habitats, including farmland and areas of human habitation. This species was observed foraging over the subject site during the spring survey period.
Regent honeyeater (*Xanthomyza phrygia*)	Unlikely	Breeding and sheltering sites for Regent honeyeater consist of Ironbark and Spotted gum forest, Whitebox and yellowbox riparian habitats with predominance of Casuarina. Suitable habitat does not exist on the subject site.
Rose-crowned fruit-dove (*Ptilinopus regina*)	**RECORDED DURING SITE SURVEY**	The Rose-crowned fruit-dove occurs along the coast and the ranges of Qld and eastern NSW. It occurs mainly in subtropical and dry rainforest and occasionally in moist eucalypt forest and swamp forest, where fruit is plentiful. This species has been recorded on the site, and is likely to forage over most forested parts of the site
Rufous fantail (*Rhipidura rufifrons*)	**RECORDED DURING SITE SURVEY**	Inhabits dense undergrowth in woodland or forest, usually in damp situations or by rivers, occasionally in mangroves. This species was recorded on the subject site during the spring survey period.
Satin flycatcher (*Myiagra cyanoleuca*)	**LIKELY**	Inhabits dense forests, woodland and scrub. Occasionally, swampy woodlands and mangroves. Suitable habitat occurs on the subject site for this species.
Sooty owl (*Tyto tenebricosa*)	**Possible**	In NSW, the Sooty owl occurs throughout the coastal area and adjacent ranges. It inhabits rainforests, particularly rainforest gullies overtopped by eucalypts. The dense canopy of rainforest in the south of the site offers suitable roost habitat for this species.

Species	Likelihood of occurrence in the Study area	Notes
Spectacled monarch (*Monarcha trivirgatus*)	**RECORDED DURING SITE SURVEY**	Inhabits rainforest and woodlands with dense understorey, and mangroves. This species was recorded on the subject site during the spring survey period.
Spotted-tail quoll	Unlikely	The Spotted-tail quoll forages in a broad range of habitats but is more abundant in larger, less disturbed forests. A history of clearing and disturbance by cattle has precluded the occurrence of suitable habitat for this species.
Square-tailed kite (*Lophoictinia isura*)	**Possible**	This species is uncommon, yet widespread. It is thinly distributed through open forests, woodland and sandplains, both coastal and subcoastal. This species may utilise the site as forage habitat. No suitable nest trees occur.
Swift parrot (*Lathamus discolor*)	Unlikely	This species breeds only in eastern and northern Tasmania. Dispersal of the species to the mainland during non-breeding periods is reliant on seasonal availability of nectar resources along latitudinal and elevational range from coast to slopes (Environment Australia 1999; Garnett 1992). The small number of planted Swamp mahogany on the Golf course are unlikely to attract Swift parrots to the site.
Three-toed snake-toothed skink (*Coeranoscincus reticulatus*)	**Possible**	The Three-toed snake-toothed skink inhabits rainforest and occasionally moist eucalypt forest (Cogger 1996, NPWS 2002). Within these habitats soil type appears to be important, and rich dark soils or loamy basaltic soils are those in which this species has been encountered. Suitable habitat exists on the subject site.
Wallum froglet (*Crinia tinnula*)	Unlikely	The Wallum froglet is found in coastal areas from south-east Qld to the central coast of NSW. It is found only in acid Paperbark swamps and sedge swamps of the coastal 'wallum' country. Suitable habitat does not occur on the site.
Wallum sedge frog (*Litoria olongburensis*)	Unlikely	Breeding habitat for the Wallum sedge frog consists of marshy or swampy wallum areas with emergent vegetation. Breeding habitat is often, but not always, ephemeral. Suitable habitat doe not occur on the subject site.

Species	Likelihood of occurrence in the Study area	Notes
White-bellied sea-eagle (*Haliaeetus leucogaster*)	**RECORDED DURING SITE SURVEY**	White-bellied Sea-Eagles are a common sight in coastal and near coastal areas of Australia. They feed mainly off aquatic animals, such as fish, turtles and sea snakes, but also take birds and mammals. This species was observed soaring low over the vegetated southern portion of the subject site.
White-eared monarch (*Monarcha leucotis*)	**RECORDED DURING SITE SURVEY**	This species is restricted to eastern Qld and the NSW north coast. It occurs primarily in coastal rainforest, swamp forest and wet eucalypt forest and appears to prefer forest edges. This species was recorded within the 7(a) zoned portion of the subject site. Lantana gaps in better quality rainforest on the site provide good habitat for this species.
Wompoo fruit dove (*Ptilinopus magnificus*)	**LIKELY**	This species is found along the coast and coastal ranges from Cape York to the Hunter River in NSW. It occurs in rainforests, low-elevation moist eucalypt forest and brushbox forests. They most often occur in mature forests, but are also found in remnant and regenerating forest. A variety of fruiting trees on the site provides a good quality food resource for this species.
Yellow-bellied sheathtail bat	**Possible**	This species occur across northern Australia and in NSW there are only a few scattered records. It roosts in tree hollows in a wide range of habitats. It forages over the forest canopy. Suitable forage habitat may occur on the subject site.

1.3.5 Results of Fauna Survey

1.3.5.1 Amphibians

Seven (7) species of amphibian were recorded during site surveys (**TABLE 4**). No Threatened amphibian species were recorded.

TABLE 4
AMPHIBIAN SPECIES RECORDED ON THE SUBJECT SITE

Common name	Scientific name	Method of identification
Cane toad*	*Bufo marinus*	Observed
Common eastern froglet	*Crinia signifera*	Call identification
Eastern dwarf tree frog	*Litoria fallax*	Call identification
Green tree frog	*Litoria caerulea*	Observed, Call identification

Spotted grass frog	*Limnodynastes tasmaniensis*	Capture
Striped marsh frog	*Limnodynastes peronii*	Capture, Call identification
Tusked frog	*Adelotus brevis*	Call identification

* Introduced species

1.3.5.2 Reptiles

Six (6) reptile species were recorded during the fauna surveys (**TABLE 5**). No Threatened reptile species were recorded.

TABLE 5
REPTILE SPECIES RECORDED ON THE SUBJECT SITE

Common name	Scientific name	Method of identification
Carpet python	*Morelia spilota*	Observed
Common garden skink	*Lampropholis delicata*	Capture
Friendly sun skink	*Lampropholis amicula*	Capture
Blue-tongued lizard	*Tiliqua scincoides*	Observed
Wall skink	*Cryptoblepharus virgatus*	Observed
	Ophioscincus truncatus	Capture

1.3.5.3 Birds

Seventy-nine (79) bird species were recorded during the fauna surveys including two (2) Threatened species:

- Rose-crowned fruit-dove (*Ptilinopus regina*); and
- White-eared monarch (*Monarcha leucotis*).

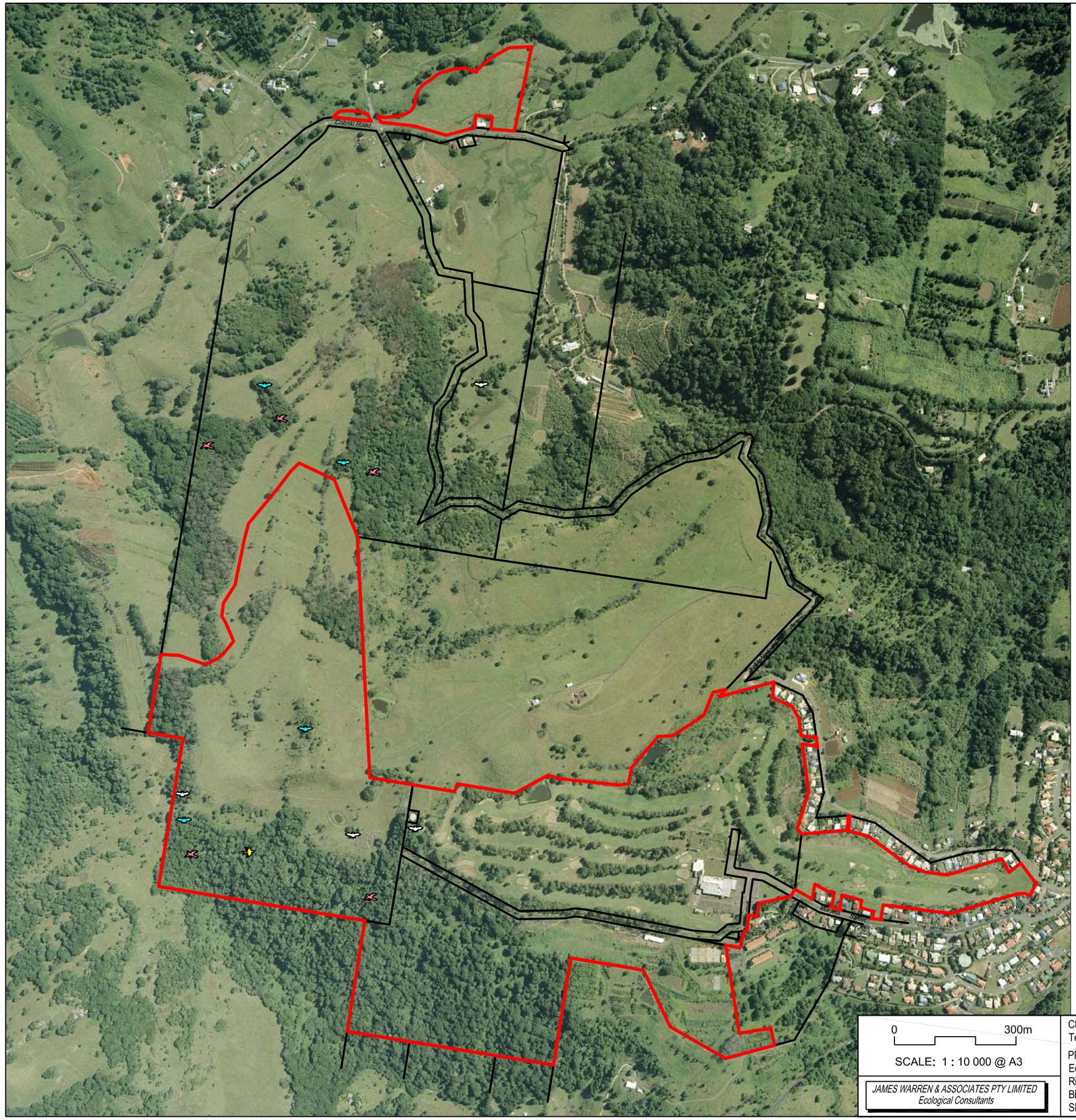
Five (5) Migratory species as listed within schedules of the EPBC Act (1999) were also recorded:

- Cattle egret (*Ardea ibis*);
- Rainbow bee-eater (*Merops ornatus*);
- Rufous fantail (*Rhipidura rufifrons*);
- Spectacled monarch (*Monarcha trivirgatus*); and
- White-bellied sea-eagle (*Haliaetus leucogaster*).

TABLE 6 lists the bird species recorded during the survey. **FIGURE 7** shows the locations of Threatened fauna species on the subject site.

TABLE 6
BIRD SPECIES RECORDED DURING THE SURVEY

Common name	Scientific name
Australian brush-turkey	*Alectura lathami*
Barn owl	*Tyto alba*
Bar-shouldered dove	*Geopelia humeralis*
Black-faced cuckoo-shrike	*Coracina novaehollandiae*
Blue-faced honeyeater	*Entomyzon cyanotis*



LEGEND

- Rose-crowned fruit dove (*Ptilinopus regina*)
- White-eared monarch (*Monarcha leucotis*)
- Grey-headed flying fox (*Pteropus poliocephalus*)
- Black flying fox (*Pteropus alecto*)
- Site Outline

N

SOURCE:
Fauna - James Warren & Associates GPS Survey June 2007
Aerial Photograph - Michel Group Services taken 2006 (Ref: bilambil_heights_2006-reduced.jpeg)

0 300m

SCALE: 1 : 10 000 @ A3

JAMES WARREN & ASSOCIATES PTY LIMITED
Ecological Consultants

CLIENT
Terranora Group Management Pty Ltd

PROJECT
Ecological Assessment
Rise Estate
Bilambil Heights, West Tweed, NSW
Shire of Tweed

VOLUME 2
FIGURE 7

PREPARED: BW
DATE: 27 April 2009
FILE: N01051_EA_Base.dwg

TITLE

LOCATION OF THREATENED FAUNA

Common name	Scientific name
Brahminy kite	*Haliastur indus*
Brown cuckoo-dove	*Macropygia amboinensis*
Brown falcon	*Falco berigora*
Brown goshawk	*Accipiter fasciatus*
Brown honeyeater	*Lichmera indistincta*
Brown quail	*Coturnix ypsilophora*
Brown thornbill	*Acanthiza pusilla*
Cattle egret*	*Ardea ibis*
Chestnut-breasted manikin	*Lonchura castaneothorax*
Crested pigeon	*Ocyphaps lophotes*
Double-barred finch	*Taeniopygia bichenovii*
Eastern rosella	*Platycercus eximius*
Eastern spinebill	*Acanthorhynchus tenuirostris*
Eastern whipbird	*Psophodes olivaceus*
Eastern yellow robin	*Eopsaltria australis*
Figbird	*Sphecotheres viridis*
Galah	*Eolophus roseicapillus*
Golden-headed cisticola	*Cisticola exilis*
Golden whistler	*Pachycephala pectoralis*
Grey fantail	*Rhipidura fuliginosa*
Grey shrike-thrush	*Colluricincla harmonica*
King quail	*Coturnix chinensis*
Large-billed scrubwren	*Sericornis magnirostris*
Laughing kookaburra	*Dacelo novaeguineae*
Lewin's honeyeater	*Meliphaga lewinii*
Little shrike-thrush	*Colluricincla megarhyncha*
Magpie	*Gymnorhina tibicen*
Magpie-lark	*Grallina cyanoleuca*
Masked lapwing	*Vanellus miles*
Noisy miner	*Manorina melanocephala*
Pacific black duck	*Anas superciliosa*
Pheasant coucal	*Centropus phasianinus*
Pied butcherbird	*Cracticus nigrogularis*
Pied currawong	*Strepera graculina*
Rainbow bee-eater*	*Merops ornatus*
Rainbow lorikeet	*Trichoglossus haematodus*
Red-backed fairy-wren	*Malurus melanocephalus*
Red-browed finch	*Neochmia temporalis*
Regent bowerbird	*Sericulus chrysocephalus*
Rose-crowned fruit-dove	*Ptilinopus regina*
Rose robin	*Petroica rosea*
Rufous fantail*	*Rhipidura rufifrons*
Rufous whistler	*Pachycephala rufiventris*
Satin bowerbird	*Ptilonorhynchus violaceus*
Scaly-breasted lorikeet	*Trichoglossus chlorolepidotus*
Scarlet honeyeater	*Myzomela sanguinolenta*
Shining bronze cuckoo	*Chalcites lucidus*
Silvereye	*Zosterops lateralis*
Spangled drongo	*Dicrurus bracteatus*
Spectacled monarch*	*Monarcha trivirgatus*
Spotted turtle-dove	*Streptopelia chinensis*
Straw-necked ibis	*Threskiornis spinicollis*

Common name	Scientific name
Striated pardalote	*Pardalotus striatus*
Superb fairy-wren	*Malurus cyaneus*
Tawny frogmouth	*Podargus strigoides*
Tawny grassbird	*Megalurus timoriensis*
Torresian crow	*Corvus orru*
Tree martin	*Hirundo nigricans*
Variegated fairy-wren	*Malurus lamberti*
Wedge-tailed eagle	*Aquila audax*
Welcome swallow	*Hirundo neoxena*
Whistling kite	*Haliastur sphenurus*
White ibis	*Threskiornis molucca*
White-bellied sea-eagle*	*Haliaetus leucogaster*
White-browed scrubwren	*Sericornis frontalis*
White-eared monarch	*Monarcha leucotis*
White-faced heron	*Egretta novaehollandiae*
White-headed pigeon	*Columba leucomela*
White-throated treecreeper	*Cormobates leucophaeus*
Willie wagtail	*Rhipidura leucophrys*
Wonga pigeon	*Leucosarcia melanoleuca*
Yellow-faced honeyeater	*Lichenostomus chrysops*
Yellow-tailed black-cockatoo	*Calyptorhynchus funereus*

Threatened species are shown in Bold

* Denotes a Migratory species as listed within Schedules of the EPBC Act (1999).

1.3.5.4 Mammals

Twenty-one (21) mammal species were recorded, including five (5) Threatened species:

- Black flying-fox;
- Eastern bent-wing bat;
- Eastern free-tail bat;
- Little bent-wing bat; and
- Grey-headed flying-fox.

TABLE 7 lists the mammal species recorded during the survey. **FIGURE 7** shows the locations of Threatened fauna species on the subject site.

TABLE 7
MAMMALS RECORDED DURING THE FIELD SURVEY

Scientific Name	Common Name	Method of Identification
Pteropus alecto	**Black flying-fox**	Observed
Rattus rattus	Black rat*	Capture
Rattus fuscipes	Bush rat	Capture
Chalinolobus morio	Chocolate wattled bat	Capture (Harp trap)
Trichosurus vulpecula	Common brushtail possum	Capture
Bos taurus	Cow*	Observed
Canis familiaris	Dog*	Observed, Tracks
Miniopterus schreibersii	**Eastern bent-wing bat**	ANABAT detector

Scientific Name	Common Name	Method of Identification
oceanensis		
Vespadelus pumilus	Eastern forest bat	ANABAT detector
Mormopterus norfolkensis	**Eastern free-tail bat**	ANABAT detector
Macropus giganteus	Eastern grey kangaroo	Observed
Rhinolophus megaphyllus	Eastern horse-shoe bat	ANABAT detector
Tachyglossus aculeatus	Echidna	Observed
Melomys cervinipes	Grassland melomys	Capture
Pteropus poliocephalus	**Grey-headed flying-fox**	Observed
Mus musculus	House mouse*	Capture
Vespadelus darlingtoni	Large forest bat	ANABAT detector
Miniopterus australis	**Little bent-wing bat**	ANABAT detector
Perameles nasuta	Long-nosed bandicoot	Capture
Isoodon macrourus	Northern brown bandicoot	Capture
Wallabia bicolor	Swamp wallaby	Observed, Tracks

* Introduced species
Threatened species are shown in bold

APPENDIX 3 – 7 PART TESTS

Background

Under the *Threatened Species Conservation Amendment Act 2002*, the factors to be considered when determining whether an action, development or activity is likely to significantly affect threatened species, populations or ecological communities, or their habitats (known previously as the "8-part test"), have been revised. This affects s5A *EP&A Act*, s94 *Threatened Species Conservation Act 1995* (*TSC Act*) and s220ZZ *Fisheries Management Act 1994* (*FM Act*).

The revised factors maintain the same intent but focus consideration of likely impacts in the context of the local rather than the regional environment as the long-term loss of biodiversity at all levels arises primarily from the accumulation of losses and depletions of populations at a local level. This is the broad principle underpinning the *TSC Act*, State and Federal biodiversity strategies and international agreements. The consideration of impacts at a local level is designed to make it easier for local government to assess, and easier for applicants and consultants to undertake the Assessment of Significance because there is no longer a need to research regional and statewide information. The Assessment of Significance is only the first step in considering potential impacts. Further consideration is required when a significant effect is likely and is more appropriately considered when preparing a Species Impact Statement.

The Assessment of Significance should not be considered a "pass or fail" test as such, but a system allowing proponents to undertake a qualitative analysis of the likely impacts and ultimately whether further assessment needs to be undertaken via a Species Impact Statement. All factors must be considered and an overall conclusion must be drawn from all factors in combination. Where there is any doubt regarding the likely impacts, or where detailed information is not available, a Species Impact Statement should be prepared.

Flora

Seventeen (17) Threatened flora species were recorded from the Subject site. An Assessment of Significance has been completed for these species below.

(a) In the case of a Threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

Axe breaker (*Geijera paniculata*)

Extent of the local population

The NPWS database (July 2007) contains one (1) record of this species within 10 km of the Subject site, which appears to be from the site itself. This represents the only known record for this species within the Tweed LGA. One (1) mature tree occurs on the site, with thirty-nine (39) saplings within a 20 metre radius of this parent tree.

Stages of the life-cycle affected by the proposed development
Axe breaker is very rare in north-east NSW, and is known only from the Tweed, Lismore and Wardell areas (NPWS 2002). Suitable habitat includes dry subtropical rainforest and vine scrubs.

NPWS have identified the following threats to the species:

- Clearing and fragmentation of habitat for development and agriculture
- Risk of local extinction because numbers are low
- Infestation of habitat by introduced weeds
- Grazing and trampling by domestic stock
- Fire

Likelihood of local extinction
The area in which the Axe breaker occurs will be retained and will not suffer any immediate disturbance from the proposed development. As these trees occur within potential access of any visitors to the area of 7(a) rainforest in the south of the site, there is some potential for incidental damage to vegetation by residents. This may include some impacts on the small population of Axe breaker on the site. The walking trail proposed in the south of the site will be located to avoid this area, and be situated along disturbed tracks which currently occur within this vegetation community.

Ball nut (*Floydia praealta*)

Extent of the local population
The NPWS database (June 2006) does not contain any records of this species within 10 km of the Subject site. Sixteen (16) records occur within the Tweed LGA. One (1) mature tree occurs in the north of the site, outside of the proposed development area.

Stages of the life-cycle affected by the proposed development
The Ball nut occurs in riverine and subtropical rainforest, usually on basalt-derived soils. The species occurs in small, scattered populations from Gympie (Qld) to the Clarence River in Northern NSW (NPWS 2002).

NPWS have identified the following threats to the species:

- Clearing and fragmentation of habitat for coastal development, agriculture, roadworks and powerlines
- Risk of local extinction because numbers are small and sparsely distributed
- Infestation of habitat by weeds

Likelihood of local extinction
The Ball nut on the site occurs outside of the proposed development area. This tree will be retained (in association with nearby White laceflower). The proposed development is highly unlikely to result in the local extinction of this species. Furthermore, seed will be collected and propagated to ameliorate for the loss of any trees to the development envelope, and to further bolster the local population.

Basket fern (*Drynaria rigidula*)

Extent of the local population

The NPWS database (July 2007) does not contain any records of this species within 10 km of the Subject site. Three (3) records only occur within the Tweed LGA. A single Basket fern was recorded in the north-eastern portion of the subject site, outside of the proposed development area.

Stages of the life-cycle affected by the proposed development

The Basket fern occurs mainly in rocky areas on hillsides and in shaded positions in subtropical rainforest and in dry rainforest. It grows on rocks or as an epiphyte. The species is currently known from only 3 locations in N.S.W., although it is common in Queensland. Only one plant is known from each of the known locations in N.S.W.

NPWS have identified the following threats to the species:

- Loss of habitat through clearing for agriculture and development.
- Frequent fires, as the plant has limited tolerance for fire.
- Browsing and trampling by domestic stock.
- Invasion of weeds and habitat degradation, which limits opportunities for establishment of young plants.
- Removal of forest understorey, resulting in loss of habitat.
- Risk of local extinction because numbers are low.

Likelihood of local extinction

The Proposed development will not result in the removal of the Basket fern from the site. The retained plant will be included in future conservation areas and buffered with plantings of local rainforest species.

Bopple nut (*Hicksbeachia pinnatifolia*)

Extent of the local population

The NPWS database (July 2007) does not contain any records of this species within 10 km of the Subject site. Thirty-four (34) records occur within the Tweed LGA. Forty-nine (49) stems of this species occur in the north of the site, outside of the proposed development area.

Stages of the life-cycle affected by the proposed development

The Bopple nut occurs in subtropical rainforest, moist eucalypt forest and Brushbox forest. The species occurs in coastal areas of Northern NSW from the Nambucca Valley to south-east Queensland (NPWS 2002).

NPWS have identified the following threats to the species:

- Clearing of rainforest habitat for development and agriculture
- Infestation of habitat by introduced weeds, particularly Lantana and exotic vines
- Fire
- Collection of seed for horticulture

Likelihood of local extinction
The Proposed development will not result in the removal of any Bopple nuts from the site. The retained trees will be included in future conservation areas and buffered with plantings of local rainforest species. The Proposed development is highly unlikely to result in the local extinction of this species. Furthermore, seed will be collected and propagated to ameliorate for the loss of any trees to the development envelope, and to further bolster the local population.

Coolamon (*Syzygium moorei*)

Extent of the local population
The NPWS database (July 2007) contains eleven (11) records of this species within 10 km of the Subject site. One hundred and thirteen (113) records occur within the Tweed LGA. Five (5) mature stems of this species occur on the site. An additional four (4) planted stems occur within landscape plantings associated with the golf course.

Stages of the life-cycle affected by the proposed development
Coolamon is found in the Richmond, Tweed and Brunswick River valleys in north-east NSW, and has a limited occurrence in south-east Queensland. Suitable habitat consists of subtropical and riverine rainforest at low altitude (NPWS 2002). The species often occurs as isolated paddock trees.
NPWS have identified the following threats to the species:

- Clearing and fragmentation of habitat for development, agriculture and road-works
- Weed infestation and general degradation of rainforest habitat
- Grazing and trampling by domestic stock
- Illegal collection for horticulture

Likelihood of local extinction
The proposed development will not remove any of the naturally occurring Coolamon from the subject site. Loss of one (1) planted tree in the golf course is not considered significant, as the provenance of these trees is unknown.

The retained trees will be included in conservation areas and buffered with plantings of local rainforest species. The Proposed development is highly unlikely to result in the local extinction of this species. Furthermore, and 163 plants to date have been propagated from seed collected from the site and planted to ameliorate losses of trees to the development envelope, and to further bolster the local population.

Fine-leaved tuckeroo (*Lepiderema pulchella*)

Extent of the local population
The NPWS database (July 2007) contains forty (40) records of this species within 10 km of the Subject site. Sixty-four (64) records occur within the Tweed LGA. This species is particularly prevalent within the locality (*pers obs.)* and also occurs as numerous saplings on the Subject site.

The Proposed development has the potential to result in the loss of 114 Fine-leaved tuckeroo, many of them seedlings or young saplings, however this equates to only approximately 10.1% of the known population on the subject site.

Stages of the life-cycle affected by the proposed development
The Fine-leaved Tuckeroo inhabits lowland subtropical forest, particularly riverine areas, and in NSW is largely confined to infertile metasediments in the Tweed Valley (NPWS 2002). Sites in NSW include Middle Pocket, North Pumpenbil Creek, Hopkins Creek, Numinbah Gap, Stott's Island Nature Reserve, Tomewin, Piggabeen and Bilambil (Floyd, 1989).

NPWS have identified the following threats to the species:

- Invasion of habitat by introduced weeds
- Clearing and fragmentation of habitat for development
- Collection of seed for horticulture

Likelihood of local extinction
The Proposed development has potential to result in the loss of numerous Fine-leaved tuckeroo from the construction of the 'spine road' and associated development. However, this species occurs widely on the site, and is known to be locally common in bushland along McAllisters Road to the northeast of the site (*Pers obs.*). This species appears to germinate readily, and 547 plants to date have been propagated from seed collected from the site and planted to ameliorate losses. In any case, the Proposed development is highly unlikely to result in the local extinction of this species.

Marblewood (*Acacia bakeri*)

Extent of the local population
The NPWS database (July 2007) contains fourteen (14) records of this species within 10 km of the Subject site. Sixty-five (65) records occur within the Tweed LGA. This species occurs sparsely on the Subject site, with several mature individuals recorded. A total of nineteen (19) Marblewood were recorded on the subject site.

Stages of the life-cycle affected by the proposed development
Marblewood has a restricted distribution from coastal south-east Queensland to north-east NSW (Mullumbimby). Suitable habitat consists of subtropical rainforest and adjacent eucalypt forest.

NPWS have identified the following threats to the species:

- Loss of habitat from development and agriculture
- Invasion by weeds, particularly Lantana
- Fire
- Visitor impacts in high-use areas

Likelihood of local extinction
The Proposed development will not result in the removal of any Marblewood from the site. The retained trees will be included in conservation areas. The Proposed development is highly unlikely to result in the local extinction of this species.

Furthermore, 17 plants to date have been propagated from seed collected from the site and planted to ameliorate losses loss of any trees to the development envelope, and to further bolster the local population.

Rough-shelled bush nut (*Macadamia tetraphylla*)

Extent of the local population

The NPWS database (July 2007) contains five (5) records of this species within 10 km of the Subject site. Sixty-six (66) records occur within the Tweed LGA. This species occurs sporadically over much of the site, both in disturbed and remnant vegetation.

The Proposed development has the potential to result in the loss of up to 29 stems of the Rough-shelled bush nut from the site, many of them saplings. This equates to 7.4% of the population on the subject site.

Stages of the life-cycle affected by the proposed development

The Rough-shelled bush nut occurs in subtropical rainforest, usually near the coast, and is confined mainly to the Richmond and Tweed Rivers in north-east NSW, extending over the border into Queensland (NPWS 2002).

NPWS have identified the following threats to the species:

- Clearing and fragmentation of habitat for coastal development, agriculture and roadworks
- Risk of local extinction due to low numbers
- Grazing and trampling by domestic stock
- Fire
- Invasion of habitat by introduced weeds
- Loss of local genetic strains through hybridisation with commercial varieties

Likelihood of local extinction

The Proposed development has potential to result in the removal of up to 29 Rough-shelled bush nut, most of which are immature. This species appears to propagate readily on the site, and with retention of other trees within conservation areas, the Proposed development is highly unlikely to result in the local extinction of this species. This species appears to germinate readily, and 334 plants to date have been propagated from seed collected from the site and planted to ameliorate losses.

Rusty rose walnut (*Endiandra hayesii*)

Extent of the local population

The NPWS database (July 2007) contains two (2) records of this species within 10 km of the Subject site. Forty-three (43) records occur within the Tweed LGA. Only one (1) stem of this species was recorded on the site, within the 7(a) vegetation in the south-west of the site.

Stages of the life-cycle affected by the proposed development

The Rusty rose walnut occurs from Burleigh Heads in Queensland to the Richmond River in NSW and is locally abundant in some parts of its range (NPWS 2002). Preferred habitat consists of sheltered moist gullies in lowland subtropical and warm temperate

rainforest on alluvium or basaltic soils. A draft Recovery Plan (2004) has been prepared for this species.

NPWS have identified the following threats to the species:

- Clearing and fragmentation of habitat for coastal development, agriculture and roadworks
- Timber harvesting activities
- Invasion of habitat by introduced weeds
- Trampling by visitors
- Fire

Likelihood of local extinction
The majority of the 7(a) area in the south-west of the site will not be subject to development (apart from the construction of a fire trail, and impacts on the Rusty rose walnut are unlikely to be significant. Nine (9) plants to date have been propagated from seed collected from the site and planted. The Proposed development is highly unlikely to result in the local extinction of this species.

Small-leaved tamarind (*Diploglotiis campbellii*)

Extent of the local population
The NPWS database (July 2007) contains seven (7) records of this species within 10 km of the Subject site. Thirty-four (34) records occur within the Tweed LGA. Twenty-four (24) stems of this species were recorded on the site, including eleven (11) mature trees, the majority of which occur within the 7(a) vegetation in the south-west of the site. A single mature (wild) tree and two immature planted trees of unknown provenance occur in association with the golf course.

Stages of the life-cycle affected by the proposed development
The small-leaved tamarind has a restricted distribution between the upper Tallebudgera Valley in southern Queensland, and Tintenbar in north-east NSW (NPWS 2002). Suitable habitat consists of riverine and subtropical rainforest and Brush box forest. Some isolated trees also occur within paddocks and roadsides. The species is generally found on soils derived from basalt and quartz monzonite (NPWS 2002). A draft Recovery Plan (2004) has been prepared for this species.

NPWS have identified the following threats to the species:

- Risk of local extinction because populations are small
- Loss or damage to plants in roadside locations during road-works
- Clearing and fragmentation of habitat for development, agriculture and roadworks
- Infestation of habitat by weeds
- Fire
- Inappropriate or excessive collection of fruit and seeds for bush tucker and horticulture

Likelihood of local extinction
The Proposed development will not result in the removal of any Small-leaved tamarind from the site, with the exception of two immature planted trees of unknown origin. The single wild tree associated with the golf course will be retained within the landscape plantings in this area, while other trees will be protected within 7(a) zoned vegetation in the south of the site. Very heavy fruiting of this species was observed during the site surveys. 413 plants to date have been propagated from seed collected from the site and planted.

Southern ochrosia (*Ochrosia moorei*)

Extent of the local population
The NPWS database (July 2007) contains no records of this species within 10 km of the Subject site. Sixteen (16) records occur within the Tweed LGA. Forty-eight (48) stems of this species were recorded on the site within the 7(a) vegetation in the south-west of the site.

Stages of the life-cycle affected by the proposed development
Southern ochrosia is sparsely distributed across a limited range from the Richmond River in NSW to south-east Queensland. Typically habitat for the species is riverine and lowland subtropical rainforest (NPWS 2002).

NPWS have identified the following threats to the species:

- Clearing and fragmentation of habitat for development, agriculture and roadworks
- Risk of local extinction because populations are small
- Infestation of habitat by weeds
- Collection of seed for horticulture

Likelihood of local extinction
The Proposed development will not result in the removal of any Southern ochrosia from the site. This species occurs within the sub-tropical rainforest within the 7(a) zoned remnant in the south-west of the site, which is very difficult to navigate due to dense Lawyer vine, therefore illegal collection of fruit is relatively unlikely. The Proposed development is highly unlikely to result in the local extinction of this species.

Spiny gardenia (*Randia moorei*)

Extent of the local population
The NPWS database (July 2007) contains twenty-one (21) records of this species within 10 km of the Subject site. Forty-eight (48) records occur within the Tweed LGA. Sixty-one (61) stems of this species have been recorded on the site.

Stages of the life-cycle affected by the proposed development
Spiny gardenia occurs from Lismore in north-east NSW north to the Logan River in south-east Qld. It is sparsely distributed, with most records in the Tweed and Brunswick areas (NPWS 2002). Spiny gardenia has been recorded from sub-tropical, riverine, littoral and dry rainforest habitats. A draft Recovery Plan (2004) has been prepared for this species.

NPWS have identified the following threats to the species:

- Clearing and fragmentation of habitat for development, agriculture and roadworks
- Invasion of habitat by introduced weeds
- Trampling by visitors
- Fire

Likelihood of local extinction
The Proposed development will potentially result in the removal of one (1) Spiny gardenia from the site. This species occurs within the sub-tropical rainforest within the 7(a) zoned remnant in the south-west of the site, the majority of which will not be subject to any development apart from the construction of a fire trail. The Proposed development is highly unlikely to result in the local extinction of this species. Furthermore, 16 plants to date have been propagated from seed collected from the site and planted to ameliorate for the loss of any trees to the development envelope, and to further bolster the local population.

Stinking laurel (*Cryptocarya foetida*)

Extent of the local population
The NPWS database (July 2007) contains sixteen (16) records of this species within 10 km of the Subject site. Forty-four (44) records occur within the Tweed LGA. One hundred and thirty-seven (137) stems of this species were recorded on the site, and are concentrated within bushland along the western boundary of the site.

The Proposed development has the potential to result in the loss of up to 49 stems of Stinking laurel from the site, all of which are immature saplings, mostly less than 3 metres in height.

Stages of the life-cycle affected by the proposed development
Stinking laurel occurs throughout coastal south-east Qld and north-eastern NSW south to Iluka. Though seedlings can be fairly numerous, few mature trees are known (NPWS 2002). Stinking laurel is found in littoral rainforest, usually on sandy soils, but mature trees have been found on basalt soils. The seeds are readily dispersed by fruit-eating birds, and seedlings and saplings have been recorded from other habitats where they are unlikely to develop to maturity (NPWS 2002).

NPWS have identified the following threats to the species:

- Risk of local extinction because populations are small
- Clearing and fragmentation of habitat for coastal development, agriculture and roadworks
- Infestation of habitat by weeds
- Trampling by visitors
- Fire

Stages of the life-cycle affected by the proposed development
The Proposed 'spine road' is likely to result in the removal of a number of Stinking laurel saplings. The number of saplings has been calculated at 49, and it is highly likely that these trees can be translocated to a more suitable location on the site, where they will have better opportunities to develop to maturity. The Stinking laurel parent tree was not located during the survey, and may occur on neighbouring land to the west of the site. With the translocation of trees requiring removal and the retention of other individuals, the Proposed development is highly unlikely to result in the local extinction of this species.

Sweet myrtle (*Gossia fragrantissima*)

Extent of the local population
The NPWS database (July 2007) contains seven (7) records of this species within 10 km of the Subject site, which also account for all known records within the Tweed LGA. Fifty-seven (57) stems of this species were recorded on the site, and occur mostly within better quality vegetation in the south of the site.

The Proposed development has the potential to result in the loss of up to 5 stems (8.8%) of Sweet myrtle from the site.

Stages of the life-cycle affected by the proposed development
Sweet myrtle occurs in south-east Queensland and north-east NSW south to the Richmond River, and is mostly found on basalt-derived soils (NPWS 2002). Suitable habitat consists of dry subtropical and riverine rainforest. It is also often found as an isolated paddock tree or in regrowth due to its ability to coppice after clearing.

NPWS have identified the following threats to the species:

- Habitat degradation through weed invasion and disturbance
- Loss of habitat from clearing and fragmentation
- Risk of local extinction because populations are small
- Grazing by domestic stock

Stages of the life-cycle affected by the proposed development
Sweet myrtle on the site will require removal for the construction of the Proposed 'spine road'. There is every possibility that these trees may be successfully translocated to a more secure location. Furthermore, 337 plants to date have been propagated from seed collected from the site and planted to ameliorate losses and to ameliorate for the failure of any translocated trees. With the translocation of trees requiring removal and the retention of other individuals, the Proposed development is highly unlikely to result in the local extinction of this species.

White laceflower (*Archidendron hendersonii*)

Extent of the local population
The NPWS database (July 2007) contains no records of this species within 10 km of the Subject site. Two (2) records occur within the Tweed LGA. Four (4) stems of this species were recorded in the north of the site, all of which occur outside of the area to be developed under the proposed layout.

Stages of the life-cycle affected by the proposed development
White laceflower occurs in riverine, lowland subtropical rainforest, and littoral rainforest. The species is distributed from north Queensland south to the Richmond River in northern NSW, and is found on a variety of soils including coastal sands, and soils derived from basalt and metasediments (NPWS 2002).

NPWS have identified the following threats to the species:

- Loss of habitat through clearing and fragmentation.
- Habitat degradation through weed invasion and disturbance.
- Illegal collection of seeds for horticulture.

Likelihood of local extinction
The four (4) White laceflower on the site occur outside the area proposed for development. These trees will be retained (in association with Ball nut). The Proposed development is highly unlikely to result in the local extinction of this species. Furthermore, 74 plants to date have been propagated from seed collected from the site and planted to further bolster the local population.

Yellow satinheart (*Bosistoa transversa*)

Extent of the local population
The NPWS database (July 2007) contains nine (9) records of this species within 10 km of the Subject site. Twenty-eight (28) records occur within the Tweed LGA. One hundred and seventy-three (173) stems of this species (most of which are immature saplings) were recorded on the site, and occur mostly within better quality vegetation in the south of the site.

The Proposed development has the potential to result in the loss of 7 stems (all saplings) of Yellow satinheart from the site. This equates to a loss of 4% of the known population on the subject site.

Stages of the life-cycle affected by the proposed development
Yellow satinheart occurs from Maryborough in Queensland, south to Mullumbimby in NSW. The species generally occurs in lowland subtropical rainforest up to 150 metres altitude (NPWS 2002).

NPWS have identified the following threats to the species:
- Loss of habitat from clearing and fragmentation
- Habitat degradation through weed invasion and disturbance
- Grazing by domestic stock
- Fire

Stages of the life-cycle affected by the proposed development
There is every possibility that the saplings may be successfully translocated to a more secure location. Furthermore, 8 plants to date have been propagated from seed collected from the site and planted to ameliorate for the failure of the translocated saplings. With the successful translocation and the retention of all other individuals, the Proposed development is highly unlikely to result in the local extinction of this species.

Yiel yiel (*Grevillia hilliana*)

Extent of the local population

The NPWS database (July 2007) contains two (2) records of this species within 10 km of the Subject site, which also account for all known records within the Tweed LGA. Fifty (50) stems of this species were recorded on the site, and occur mostly within better quality vegetation in the south of the site.

The Proposed development has the potential to result in the loss of 11 stems of Yiel yiel from the site. This equates to a loss of 22% of the known population from the subject site.

Stages of the life-cycle affected by the proposed development

Yiel yiel occurs north of Brunswick Heads on the north coast of NSW and in Qld. The only populations currently known in NSW are in the Brunswick Heads and Tweed Heads areas, in small patches of remnant habitat (NPWS 2002). Suitable habitat comprises sub-tropical rainforest, often on basalt derived soils.

NPWS have identified the following threats to the species:

- Risk of local extinction because populations are small and distribution is restricted
- Loss of habitat through clearing for development
- Habitat degradation through invasion by introduced weeds
- Seed collection for horticulture

Stages of the life-cycle affected by the proposed development

With the retention of all other Yiel yiel on the site, the Proposed development is highly unlikely to result in the local extinction of this species. Furthermore, 32 plants to date have been propagated from seed collected from the site and planted to ameliorate for the loss of any trees to the development envelope, and to further bolster the local population.

(b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

Thirty-three (33) endangered populations have been identified under the *TSC Act*. The following four (4) endangered populations occur in north-eastern NSW:

- Long-nosed potoroo population, Cobaki Lakes and Tweed Heads West;
- Emu population in the NSW North Coast Bioregion and Port Stephens LGA;
- Low growing form of *Zieria smithii*, Diggers Head; and
- *Glycine clandestina* (Broad-leaf form) in the Nambucca LGA.

The proposed action will not have an adverse affect on any of these endangered populations.

(c) In the case of an endangered ecological community or critically endangered ecological community whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

Seventy-nine (79) endangered ecological communities have been identified under the *TSC Act*. The following eight (8) endangered populations occur in north-eastern NSW:

- Coastal saltmarsh in the NSW North Coast, Sydney Basin and South East Corner bioregions;
- Freshwater wetlands on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions;
- Swamp sclerophyll forest on the coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions;
- Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions;
- Subtropical coastal floodplain forest of the NSW North Coast bioregion;
- Littoral rainforest in the NSW North Coast, Sydney Basin and South East Corner bioregions;
- Lowland rainforest on floodplain in the NSW North Coast bioregion; and
- *Themeda* grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner bioregions.

The proposed action will not have an adverse affect on any of these endangered ecological communities.

(d) In relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed

9.38 hectares of Camphor laurel dominated vegetation (39.3% of this community within the development area) will be removed for the Proposed development. While this vegetation is dominated by the exotic species Camphor laurel, it also supports various rainforest flora including Threatened flora species, such as Fine-leaved Tuckeroo and Rough-shelled bush nut. Most of the Threatened flora species recorded on the site have potential to become established in Camphor laurel dominated vegetation, with the exception of species such as Southern ochrosia, Rusty rose walnut, Axe breaker and Small-leaved tamarind, which only occur in better quality rainforest.

However, insofar as the *quality* of the habitat to be removed is concerned, it is considered that most the Camphor laurel dominated vegetation to be removed is of

relatively low quality, and it must be questioned whether this vegetation type has any long-term viability in its ability to support Threatened flora and/or the establishment of subtropical rainforest communities.

The most significant vegetation loss in regard to conservation status will be the loss of 1.10ha of Sub-tropical rainforest (Community 2), representing only 8.5% of this community within the development area. This area constitutes the best quality habitat for Threatened flora on the entire site.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action

Habitat for Threatened flora species is already highly fragmented and has had a history of disturbance from land clearing and grazing on the subject site. The Proposed development is unlikely to contribute to any significant degree an increase in the fragmentation of Camphor laurel dominated vegetation. There will be no fragmentation or disturbance to good quality rainforest remnant in the south of the site, although it is acknowledged that there is potential for increased disturbance (trampling, collection of seed/fruit, vandalism) to Threatened flora in this area from the construction of walking trails.

With the implementation of the Site Rehabilitation & Pest Management Plan (JWA 2007 – **VOLUME 3**) a minimum five (5) metre buffer of retained native vegetation will be created around each retained threatened species, to reduce detrimental edge effects and other disturbance related impacts. Furthermore, numbers of Threatened species will be bolstered through propagation and planting in conservation areas.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

The habitat to be removed has little long term viability in its ability to support any substantial population of any Threatened flora species. Furthermore, extensive restoration works in the remaining Camphor laurel dominated vegetation on the site in accordance with the Site Rehabilitation & Pest Management Plan (JWA 2007 – **VOLUME 3**) is likely to improve habitat for the establishment of Threatened flora on the site.

(e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

Critical habitat areas listed under the *Threatened Species Conservation Act (1995)* currently consist of habitat for Mitchell's rainforest snail in Stott's Island Nature Reserve, and habitat for the Little penguin population in Sydney's North Harbour.

There will be no adverse effects on either of these critical habitats from the action proposed.

(f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

No Approved recovery plan has been prepared for any of these Threatened flora species, although it is acknowledged that Draft recovery plans have been completed for the Rusty rose walnut, Spiny gardenia and Small-leaved tamarind.

No approved Threat Abatement Plans have any relevance to Threatened flora on the Subject site.

(g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

A "threatening process" means a process that threatens, or may have the capability to threaten, the survival or evolutionary development of a species, population or ecological community. Key Threatening Processes have been listed in Schedule 3 of the *TSC Act (1995).*

Key Threatening Processes (Schedule 3):

- Exotic vines and scramblers;
- *Bufo marinus*;
- Invasion of the yellow crazy ant;
- Feral pigs;
- Competition and habitat destruction by feral goats;
- Entanglement in, or digestion of anthropogenic debris in marine and estuarine environments;
- Introduction of the large earth Bumble bee, *Bombus terrestris*;
- Removal of dead wood and dead trees;
- Death or injury to marine species following capture in shark control programs on ocean beaches;
- Invasion of native plant communities by exotic perennial grasses;
- Infection of frogs by amphibian chytrid, causing the disease chytrodiomycosis
- Competition from feral honeybees;
- Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands;
- Clearing of native vegetation;
- Bushrock removal;
- Ecological consequences of high frequency fires;
- Human-caused climate change;
- Invasion of native plant communities by Bitou Bush and Boneseed;
- Loss and/or degradation of sites used for hilltopping by butterflies;
- Predation by the European red fox;
- Predation by feral cats;
- Predation by the ship rat on Lord Howe Island;
- Predation by the Plague minnow (*Gambusia holbrooki*);
- Infection of native plants by *Phytophthora cinnamomi;*

- Infection by Psittacine circoviral (beak and feather) disease affecting endangered psittacine species and populations;
- Importation of red imported fire ants into NSW; and
- Competition and grazing by the feral European rabbit.

The proposed development will contribute towards the clearing of native vegetation, a key threatening process listed on Schedule 3 of the *TSC Act (1995)*. The final determination of the NSW Scientific Committee notes that clearing of native vegetation is recognised as a major factor contributing to loss of biological diversity, with impacts such as: destruction of habitat; fragmentation of habitat; riparian zone degradation; increased greenhouse gas emissions; increased habitat for invasive species; loss of leaf litter layer; loss or disruption of ecological function (*e.g.* loss of populations of pollinators or seed dispersers) and changes to soil biota.

Due to the fact that the majority of vegetation proposed to be removed from the Subject site contains, or is dominated by exotic species, the amount of 'native vegetation' to be cleared is difficult to determine, although 1.10 hectares of Subtropical rainforest and 0.48 hectares of Brushbox forest will be removed for the Proposed development.

Another Key Threatening Process of relevance to the site is the recently listed 'Invasion by exotic vines and scramblers'. Several exotic vine species occur on the site, and are well established is some areas and having detrimental impacts on native vegetation communities. The most significant exotic vine on the site – Madeira vine (*Anredera cordifolia*) is currently established in a number of areas. The Proposed development is highly unlikely to increase the impact of exotic vines on the site. Conversely, with the establishment of appropriate practices in accordance with the Site Rehabilitation & Pest Management Plan (JWA 2007 – **VOLUME 3**), these species will be controlled/eliminated over time.

Habitat loss is the main threatening process affecting all subject species. The Proposed development will make a contribution towards the loss of habitat in the region. However, as previously discussed, 28.9ha of Camphor laurel dominated vegetation and currently denuded grazing land will be rehabilitated to Rainforest communities over time, under the Site Rehabilitation & Pest Management Plan (JWA 2007 – **VOLUME 3**).

On the basis of this assessment, it is considered that a Species Impact Statement (SIS) is not required.

Endangered Ecological Communities (EECs)

One (1) Endangered Ecological Community (EEC) – Lowland rainforest – occurs on the subject site. An Assessment of Significance has been completed for this community below.

Lowland rainforest

(a) In the case of a Threatened species, whether the life cycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.

Not applicable.

(b) In the case of an endangered population, whether the life cycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised.

Not applicable.

(c) In the case of an endangered ecological community or critically endangered ecological community whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

The Rainforest community (Community 2) occurs in the south of the site, and within a small area adjacent to and south of the water reservoir, and is the best quality vegetation on the site. Additionally, several areas that have been subject to Camphor laurel poisoning practices are regenerating into this rainforest EEC (Community 4).

Community 1 is not considered to represent the EEC Lowland rainforest due to the extensive occurrence of Camphor laurel (and to a lesser degree Large-leaved privet) and historical disturbance.

Under the proposed development, 1.10 ha (8.5% of this community within the MP08-0234 development area) will be removed. This removal is not considered be an adverse affect on the extent, or to substantially modify the composition of the community such that the local occurrence is likely to be put at risk of extinction. Conversely, rehabilitation works at the subject site in accordance with the Site Rehabilitation & Pest Management Plan (JWA 2007 – **VOLUME 3**) aim to:

- To enhance the vegetation to be conserved;
- To revegetate disturbed areas with endemic species including threatened plant species;

- To obtain a minimum of 70% native canopy cover;
- To obtain a minimum five (5) metre buffer of retained native vegetation around each retained threatened species, to reduce detrimental edge effects and other disturbance related impacts;
- To improve the value of the subject site as habitat for fauna groups; and
- To manage weeds using plantings of endemic species and best practice control methods to achieve less than 10% exotic weed cover within each stratum.

Under the Site Rehabilitation & Pest Management Plan (JWA 2007 – **VOLUME 3**) 28.9ha of Camphor laurel dominated vegetation and currently denuded grazing land will be rehabilitated to Rainforest communities over time.

(d) In relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

Approximately 75.6% of the total MP08-0234 development area (approximately 94.04 hectares) will be subject to urban development. Nearly all urban development of the site occurs within grasslands with scattered trees, or Camphor laurel dominated vegetation on the site.

The EEC Lowland rainforest on the site is essentially isolated, and does not retain any connectivity with other nearby similar communities. The proposed development will not further isolate this community on the site. As previously discussed, 28.9ha of Camphor laurel dominated vegetation and currently denuded grazing land will be rehabilitated to Rainforest communities over time, under the Site Rehabilitation & Pest Management Plan (JWA 2007 – **VOLUME 3**). The rehabilitation works include:

- Restoration and embellishment of approximately 15.42ha of existing mature EEC (54.4% of rehabilitation area);
- Assisted regeneration of approximately 2.1ha of existing regenerating EEC (7.3% of rehabilitation area);
- Regeneration of approximately 10.14ha of disturbed land/depauperate rainforest to create additional EEC (35.1% of rehabilitation area); and
- Revegetation of approximately 1.2ha cleared land to create additional EEC(4.2% of rehabilitation area).

Proposed rehabilitation works in accordance with the Site Rehabilitation & Pest Management Plan (**VOLUME 3**) will result in an increase of 11.34ha of EEC to offset the loss of 4.21ha.

(e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

Not applicable. Critical habitat areas listed under the *Threatened Species Conservation Act (2002)* currently consist of habitat for Mitchell's rainforest snail in Stott's Island Nature Reserve, and habitat for the Little penguin population in Sydney's North Harbour.

(f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

No Recovery plan has been prepared for the EEC Lowland rainforest.

No approved Threat Abatement Plans have any relevance to this EEC on the Subject site.

(g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

A "threatening process" means a process that threatens, or may have the capability to threaten, the survival or evolutionary development of a species, population or ecological community. Key Threatening Processes have been listed in Schedule 3 of the *TSC Act (2002).*

Key Threatening Processes (Schedule 3):

- *Lantana camara*;
- Exotic vines and scramblers;
- *Bufo marinus*;
- Invasion of the yellow crazy ant;
- Feral pigs;
- Competition and habitat destruction by feral goats;
- Entanglement in, or digestion of anthropogenic debris in marine and estuarine environments;
- Introduction of the large earth Bumble bee, *Bombus terrestris*;
- Removal of dead wood and dead trees;
- Death or injury to marine species following capture in shark control programs on ocean beaches;
- Invasion of native plant communities by exotic perennial grasses;
- Infection of frogs by amphibian chytrid, causing the disease chytrodiomycosis
- Competition from feral honeybees;
- Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands;

- Clearing of native vegetation;
- Bushrock removal;
- Ecological consequences of high frequency fires;
- Human-caused climate change;
- Invasion of native plant communities by Bitou Bush and Boneseed;
- Loss and/or degradation of sites used for hilltopping by butterflies;
- Predation by the European red fox;
- Predation by feral cats;
- Predation by the ship rat on Lord Howe Island;
- Predation by the Plague minnow (*Gambusia holbrooki*);
- Infection of native plants by *Phytophthora cinnamomi;*
- Infection by Psittacine circoviral (beak and feather) disease affecting endangered psittacine species and populations;
- Importation of red imported fire ants into NSW; and
- Competition and grazing by the feral European rabbit.

The Proposed development will contribute towards the clearing of native vegetation, a key threatening process listed on Schedule 3 of the *TSC Act (2002).* 0.45 ha (3.5% of this community on the site) of the Lowland rainforest communities on the site will be removed or modified. The final determination of the NSW Scientific Committee notes that clearing of native vegetation is recognised as a major factor contributing to loss of biological diversity, with impacts such as: destruction of habitat; fragmentation of habitat; riparian zone degradation; increased greenhouse gas emissions; increased habitat for invasive species; loss of leaf litter layer; loss or disruption of ecological function (e.g. loss of populations of pollinators or seed dispersers) and changes to soil biota.

As previously discussed, 28.9ha of Camphor laurel dominated vegetation and currently denuded grazing land will be rehabilitated to Rainforest communities over time, under the Site Rehabilitation & Pest Management Plan (JWA 2007 – **VOLUME 3**).

On the basis of this assessment, it is considered that a Species Impact Statement (SIS) is not required.

Fauna

An Assessment of Significance will be completed for each fauna species recorded on the Subject site, or considered a possible occurrence on the Subject site.

(a) In the case of a Threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

Albert's lyrebird (*Menura alberti*)

Extent of the local population

The NPWS database (March 2009) contains one (1) record of this species within 10 km of the Subject site. Seventy-six (76) records occur within the Tweed LGA. This species has not been recorded from the subject site however suitable habitat is considered to occur.

Stages of the life-cycle affected by the proposed development
As part of the RFA process, Environment Australia (1999) conducted an analysis of the responses of forest fauna to various forms of land cover disturbance in the North-east region. The analysis was based on local expert knowledge and identified breeding and sheltering sites for Albert's lyrebird as consisting of Wet sclerophyll, temperate subtropical rainforest, dark southerly slopes sometimes abutting cliff lines and in lawyer cant thickets, tree-ferns and stumps. They usually use a well developed litter layer. Albert's lyrebird forages in areas of high year-round moisture levels to maintain moist litter and feeds on litter invertebrates.

The RFA analysis (Environment Australia 1999) ranked the significance of various forms of disturbance for Albert's lyrebird, with the following results:

1st order disturbances	Clearing resulting in fragmentation
2nd order disturbances	Weed invasion by lantana following logging of wet sclerophyll on higher nutrient sites Climate changes
3rd order disturbances	Management burns Logging that alters microclimate and litter dynamics
4th order disturbances	Exotic predators Road kills

Likelihood of local extinction
The Proposed development is unlikely to have any direct impacts on the Albert's lyrebird, as the most suitable habitat for this species in the south of the site will be retained. However, it is acknowledged that there are potential impacts from human disturbance and roaming dogs. With the adoption of suitable amelioration measures (public education, signage, a ban on dog walking/access to this portion of the site, pest management), the Proposed development is unlikely to result in the local extinction of this species.

Barred cuckoo-shrike (*Coracina lineata*)

Extent of the local population
The NPWS database (March 2009) contains two (2) records of this species within 10 km of the Subject site. Fourteen (14) records occur within the Tweed LGA. This species has not been recorded from the subject site however suitable habitat is considered to occur.

Stages of the life-cycle affected by the proposed development
As part of the RFA process, Environment Australia (1999) conducted an analysis of the responses of forest fauna to various forms of land cover disturbance in the North-east region. The analysis was based on local expert knowledge and identified breeding and sheltering sites for the Barred cuckoo shrike as consisting of low elevation subtropical and littoral rainforest and coastal wet sclerophyll forest close to fruiting figs with the preferred habitat being a mature canopy. The Barred cuckoo-shrike forages in mature canopy and feeds on fruit and large insects including cicadas and phasmids with other small fruited figs as their preferred food.

The RFA analysis (Environment Australia 1999) ranked the significance of various forms of disturbance for the Barred cuckoo-shrike, with the following results:

1st order disturbances	Urban development Weed invasion Loss of habitat trees (fig trees) in agricultural land Intensive horticulture

Likelihood of local extinction

The Proposed development is unlikely to have any direct impacts on the Barred cuckoo-shrike, as the most suitable habitat for this species in the south of the site will be retained. Retention of mature figs within other areas of Camphor laurel dominated forest on the site, and the subsequent restoration of this habitat will also assure retention of suitable foraging habitat. The Proposed development is unlikely to result in the local extinction of this species.

Beccari's free-tail bat (*Mormopterus beccarii*)

Extent of the local population

The NPWS database (March 2009) contains two (2) records of this species within 10 km of the Subject site, and within the Tweed LGA. This species has not been recorded from the subject site however suitable habitat is considered to occur.

Stages of the life-cycle affected by the proposed development

As part of the RFA process, Environment Australia (1999) conducted an analysis of the responses of forest fauna to various forms of land cover disturbance in the North-east region. The analysis was based on local expert knowledge and identified breeding and sheltering sites for Beccari's free-tail bat as consisting of hollows in trees and dead stags. Beccari's free-tail bat forages in open forests and feeds on flying insects.

The RFA analysis (Environment Australia 1999) ranked the significance of various forms of disturbance for the Beccari's free-tail bat, with the following results:

1st order disturbances	Clearing – loss of habitat Logging – loss of hollows
3rd order disturbances	Clearing – fragmentation Frequent burning (impact on invertebrates) Pesticides Grazing
5th order disturbances	Logging – loss of understorey complexity Wildfire

Likelihood of local extinction

This species may forage widely over forested parts of the site. While the Proposed development will result in a contraction of forage habitat, it is considered that retention of large areas of forest on the site will continue to provide suitable forage habitat. The Proposed development is unlikely to result in the local extinction of this species.

Black breasted button quail (*Turnix melanogaster*)

The NPWS database (March 2009) does not contain any records of this species within 10 km of the Subject site. Thirteen (13) records occur within the Tweed LGA. This species

has not been recorded from the subject site however suitable habitat is considered to occur.

Stages of the life-cycle affected by the proposed development
Environment Australia (1999) identified breeding and sheltering sites for the Black-breasted button quail as consisting of Dry rainforest in association with eucalypt forest and with a well developed litter layer, disturbed areas with a lantana understorey, areas of subtropical rainforest adjacent to eucalypt forest, and dry rainforest with an emergent layer dominated by Hoop pine. This species also frequents small grassy clearings on the edge of dry rainforest (Readers Digest 1997).

The Black-breasted button quail forages by scratching in the leaf litter for invertebrates (most preferred including spiders, ants, centipedes, millipedes, land snails) and seeds, and forms a characteristic saucer-shape depression (Readers Digest 1997, NPWS 2002).

As part of the RFA process, Environment Australia (1999) conducted an analysis of the responses of forest fauna to various forms of land cover disturbance in the North-east region. The analysis was based on local expert knowledge and ranked the significance of various forms of disturbance for the Black-breasted button quail, with the following results:

1st order disturbances	Clearing for agriculture
2nd order disturbances	High frequency burning
3rd order disturbances	Any logging alters microclimate and removes shelter Grazing by cattle and macropods
4th order disturbances	Weed invasion in lowland remnants by exotic vines Introduced predators

Likelihood of local extinction
This species is likely to benefit from the large-scale rainforest restoration works proposed for the site. The loss of potential foraging habitat is not considered significant in relation to the regional distribution of habitat for this species. The Proposed development is unlikely to result in the local extinction of this species.

Black flying-fox (*Pteropus alecto*)

Extent of the local population
The NPWS database (March 2009) contains no records of this species within 10 km of the Subject site or within the Tweed LGA. This species has been recorded from rainforest communities on the subject site.

Stages of the life-cycle affected by the proposed development
As part of the RFA process, Environment Australia (1999) conducted an analysis of the responses of forest fauna to various forms of land cover disturbance in the North-east region. The analysis was based on local expert knowledge and identified breeding sites for the Black flying fox as consisting of sub-tropical rainforest and swamp forest with a

complex mosaic of rainforest, swamp and sclerophyll forest resources less than 40—50km from the roost. There is high site fidelity, with roosts often in riverine rainforest. The Black flying fox forages in subtropical rainforest with mosaic of resources including rainforest fruit, nectar and pollen.

The RFA analysis (Environment Australia 1999) ranked the significance of various forms of disturbance for the Black flying fox, with the following results:

1st order disturbances	Clearing – habitat loss
2nd order disturbances	Direct disturbance to camps and proximity to humans Drainage of swamps
3rd order disturbances	Shooting Power lines Logging of Sclerophyll forest - loss of older trees Management burns
4th order disturbances	Clearing resulting in fragmentation, Wildfire Weed invasion
5th order disturbances	Disease (Lyssavirus) Apiary (competition for nectar) Barbed wire fences
6th order disturbances	Climate change

Likelihood of local extinction
The Proposed development is unlikely to have any significant impacts on the population of Black flying foxes within the locality, provided mature Figs on the site are retained. This species is likely to benefit from the large-scale rainforest restoration works proposed for the site. The Proposed development is unlikely to result in the local extinction of this species.

Black-breasted button-quail (*Turnix melanogaster*)

Extent of the local population
The NPWS database (March 2009) does not contain any records of this species within 10 km of the Subject site. Thirteen (13) records occur within the Tweed LGA. This species has not been recorded from the subject site however suitable habitat is considered to occur.

Stages of the life-cycle affected by the proposed development
As part of the RFA process, Environment Australia (1999) conducted an analysis of the responses of forest fauna to various forms of land cover disturbance in the North-east region. The analysis was based on local expert knowledge and identified breeding and sheltering sites for the Black-breasted button quail as consisting of Dry rainforest in association with eucalypt forest and well developed litter layer, disturbed areas with a lantana understorey, areas of subtropical rainforest adjacent to eucalypt forest, and dry rainforest with an emergent layer dominated by Hoop pine. The Black-breasted button quail forages on invertebrates (most preferred including spiders, ants, centipedes, millipedes, land snails) and seeds.

The RFA analysis (Environment Australia 1999) ranked the significance of various forms of disturbance for the Black-breasted button quail, with the following results:

1st order disturbances	Clearing for agriculture
2nd order disturbances	High frequency burning
3rd order disturbances	Any logging alters microclimate and removes shelter Grazing by cattle and macropods
4th order disturbances	Weed invasion in lowland remnants by exotic vines Introduced predators

Likelihood of local extinction
The Proposed development is unlikely to have any direct impacts on the Albert's lyrebird, as the most suitable habitat for this species in the south of the site will be retained. However, it is acknowledged that there are potential impacts from human disturbance and roaming dogs. With the adoption of suitable amelioration measures (public education, signage, a ban on dog walking/access to this portion of the site), the Proposed development is unlikely to result in the local extinction of this species.

Common planigale (*Planigale maculata*)

Extent of the local population
The NPWS database (March 2009) contains four (4) records of this species within 10 km of the Subject site. Thirty (30) records occur within the Tweed LGA. This species has not been recorded from the subject site however suitable habitat is considered to occur.

Stages of the life-cycle affected by the proposed development
As part of the RFA process, Environment Australia (1999) conducted an analysis of the responses of forest fauna to various forms of land cover disturbance in the North-east region. The analysis was based on local expert knowledge and identified breeding and sheltering sites for Planigales as consisting of nests of eucalypt leaves in logs or under bark, in cracks in the soil or in grass tussocks. Nests were also located in building debris. The Common planigale forages in dry sclerophyll, swamp sclerophyll, heathland and grassland at the ecotone with rainforest in areas with dense leaf litter or ground cover.

The RFA analysis (Environment Australia 1999) ranked the significance of various forms of disturbance for the Common planigale, with the following results:

1st order disturbances	Predation by cats Loss of habitat
2nd order disturbances	Altered fire regimes Baiting for dingoes
3rd order disturbances	Exotic competitors
4th order disturbances	Predation by cane toads

Likelihood of local extinction
The Proposed development will result in the loss of some marginal habitat for the Common planigale, however the retention of large areas of forest will continue to

provide suitable habitat for this species. The most significant impact on this species (if it occurs on the site) is likely to be predation by cats.

Coxen's fig parrot (*Cyclopsitta diophthalma coxeni*)

Extent of the local population

The NPWS database (March 2009) does not contain any records of this species within 10 km of the Subject site or within the Tweed LGA. This species has not been recorded from the subject site however suitable habitat is considered to occur.

Stages of the life-cycle affected by the proposed development

The Coxen's fig parrot is usually recorded from drier rainforests and adjacent wet eucalypt forest but is rarely seen because it is small in size and cryptic in its habits (NPWS 2002). It is also found in the wetter lowland rainforests that are now largely cleared in NSW. The species shows a decided preference for fig trees, but also feeds on other fruiting rainforest plants.

The NPWS Threatened Species Unit (2002) has identified the following threats for the Coxen's fig parrot:

- Clearing of rainforest and fig trees on farms;
- Dissection of habitat corridors by development and roads;
- Logging or clearing of eucalypt forest adjacent to rainforest; and
- Illegal bird trapping and collection of eggs.

Likelihood of local extinction

The subject site offers excellent forage habitat for the Coxen's fig parrot. With the retention of the best quality rainforest on the site and the retention of mature figs wherever possible, the Proposed development is unlikely to result in the local extinction of this species.

Eastern bent-wing bat (*Miniopterus schreibersii oceanensis*

Extent of the local population

The NPWS database (March 2009) contains ten (10) records of the Eastern bent-wing bat within 10 km of the Subject site. Eight (8) records of the Eastern bent-wing bat occur within the Tweed LGA.

Stages of the life-cycle affected by the proposed development

As part of the RFA process, Environment Australia (1999) conducted an analysis of the responses of forest fauna to various forms of land cover disturbance in the North-east region. The analysis was based on local expert knowledge and identified breeding sites for Eastern bent-wing bat as consisting of limestone caves, where it usually occurs in association with the Common bent-wing bat. It congregates in high numbers in maternity roost (in 1000's). It also shelters in a range of artificial structures including culverts, drains, mines etc. The Eastern bent-wing bat forages on flying insects in forested areas, predominantly swamp forest, moist eucalypt forest, rainforest and some dry forests.

The RFA analysis (Environment Australia 1999) ranked the significance of various forms of disturbance for the Eastern bent-wing bat, with the following results:

1st order disturbances	Clearing – habitat loss
2nd order disturbances	Disturbance to camps/caves by limestone mining (cave collapse, altered air flow, noise, dust etc) and recreational activities.
3rd order disturbances	Clearing – fragmentation Logging – loss of foraging habitat Frequent burning Altered hydrology/microclimate – old growth-regrowth
4th order disturbances	Grazing Wildfire Pesticides
5th order disturbances	Introduced predators

Likelihood of local extinction
This species may forage widely over forested parts of the site. While the Proposed development will result in a contraction of forage habitat, it is considered that retention of large areas of forest on the site will continue to provide suitable forage habitat. The Proposed development is unlikely to result in the local extinction of this species.

Eastern free-tail bat (Mormopterus norfolkensis)

Extent of the local population
The NPWS database (March 2009) does not contain any records of the Eastern free-tail bat within 10 km of the Subject site. Three (3) records occur within the Tweed LGA.

Stages of the life-cycle affected by the proposed development
The Eastern free-tail bat is a poorly known species for which specific habitat requirements are not known. The species has been recorded from forest types ranging from rainforest to dry sclerophyll forest and woodland, but most records are from dry sclerophyll forest and woodland (NPWS 2002).

Breeding sites for the Eastern free-tail bat as consist of large mature tree hollows in dry forest woodland and possibly in moist forest (Environment Australia 1999). Inferences from wing morphology and echolocation call design suggest that it forages for flying insects in more open forest as well as adjacent cleared areas (Allison 1983).

As part of the RFA process, Environment Australia (1999) conducted an analysis of the responses of forest fauna to various forms of land cover disturbance in the North-east region. The analysis was based on local expert knowledge and ranked the significance of various forms of disturbance for the Eastern free-tail bat, with the following results:

1st order disturbances	Logging – loss of hollows Clearing – loss of habitat
3rd order disturbances	Clearing - fragmentation

	Pesticides Grazing
4th order disturbances	Logging – loss of Understorey
5th order disturbances	Wildfire

Likelihood of local extinction
Given the high mobility of these species, the loss of potential foraging habitat is not considered significant in relation to the regional distribution of habitat for this species. No roost habitat will be affected by the proposed development and it is considered that this species will continue to forage over the retained vegetation on the subject site.

Eastern long-eared bat (*Nyctophilus bifax*)

Extent of the local population
The NPWS database (March 2009) contains four (4) records of this species within 10 km of the Subject site. Thirty (30) records occur within the Tweed LGA. This species has not been recorded from the subject site however suitable habitat is considered to occur.

Stages of the life-cycle affected by the proposed development
As part of the RFA process, Environment Australia (1999) conducted an analysis of the responses of forest fauna to various forms of land cover disturbance in the North-east region. The analysis was based on local expert knowledge and identified breeding sites for the Eastern long-eared bat as consisting of hollows in littoral and subtropical rainforest and other associated moist and coastal swamp forest. This species will roost communally in foliage. The Eastern long-eared bat forages on flying insects and gleans insects from leaves and bark. It prefers structurally complex forests.
The RFA analysis (Environment Australia 1999) ranked the significance of various forms of disturbance for the Eastern long-eared bat, with the following results:

1st order disturbances	Clearing – habitat loss
2nd order disturbances	Clearing - fragmentation
3rd order disturbances	Logging – loss of understorey Frequent burning Grazing Mining – sand
4th order disturbances	Logging – loss of hollows Weed invasion Weed spraying
5th order disturbances	Dams Wildfire Road kills

Likelihood of local extinction
This species may forage widely over forested parts of the site. While the Proposed development will result in a contraction of forage habitat, it is considered that retention of large areas of forest on the site will continue to provide suitable forage habitat. The Proposed development is unlikely to result in the local extinction of this species.

Eastern pygmy possum (*Cercatetus nanus*)

Extent of the local population

The NPWS database (March 2009) contains one (1) record of this species within 10 km of the Subject site, and within the Tweed LGA. This species has not been recorded from the subject site however suitable habitat is considered to occur.

Stages of the life-cycle affected by the proposed development

The Eastern pygmy possum inhabits a range of vegetation types from rainforest through sclerophyll forest to heath (NPWS 2002, Strahan 1995). Hollows in trees are favoured as nest sites and there is a preference for small hollow entrances (Strahan 1995, Environment Australia 1999, NPWS 2002). Additionally, spherical nests constructed of short, shredded bark, have been found between the wood and bark of eucalypts or in the forks of tea-trees, and abandoned bird nests have also been utilised (Strahan 1995, NPWS 2002).

The Eastern pygmy possum feeds largely on the pollen and nectar from banksias, eucalypts, bottlebrushes and understorey plants, and will also eat fruits and insect when flowers are unavailable (Strahan 1995, NPWS 2002).

As part of the RFA process, Environment Australia (1999) conducted an analysis of the responses of forest fauna to various forms of land cover disturbance in the North-east region. The analysis was based on local expert knowledge and ranked the significance of various forms of disturbance for the Eastern pygmy possum, with the following results:

1st order disturbances	High frequency burning
2nd order disturbances	Habitat clearing

Likelihood of local extinction

The Proposed development will result in the loss of some marginal habitat for this species, however the retention of large areas of forest will continue to provide suitable habitat for this species. The most significant impact on this species (if it occurs on the site) is likely to be predation by cats. No roost habitat will be affected by the proposed development.

Grey-headed flying fox (*Pteropus poliocephalus*)

Extent of the local population

The NPWS database (March 2009) contains fifteen (15) records of this species within 10 km of the Subject site. One hundred and eighty-four (184) records occur within the Tweed LGA. The Grey-headed flying-fox has been recorded foraging in various locations on the subject site.

Stages of the life-cycle affected by the proposed development

As part of the RFA process, Environment Australia (1999) conducted an analysis of the responses of forest fauna to various forms of land cover disturbance in the North-east

region. The analysis was based on local expert knowledge and identified breeding and sheltering sites for the Grey-headed flying fox as consisting of mainly rainforest and moist riparian forest with a complex mosaic of rainforest, swamp and sclerophyll forest resources less than 40-50km from roost. There is high site fidelity with roosts often in riverine rainforest. The Grey-headed flying fox forages in subtropical rainforest with a mosaic of resources – rainforest fruit, nectar and pollen. The Grey-headed flying fox is less restricted to rainforest remnants than the Black flying fox.

The RFA analysis (Environment Australia 1999) ranked the significance of various forms of disturbance for the Grey-headed flying fox, with the following results:

1st order disturbances	Clearing – habitat loss
2nd order disturbances	Direct disturbance to camps Drainage of swamps
3rd order disturbances	Powerlines Logging of Sclerophyll Management burns Shooting
4th order disturbances	Clearing resulting in fragmentation Wildfire
5th order disturbances	Disease – lyssavirus Apiary Barbed wire fences Weed invasion
6th order disturbances	Climate change

Likelihood of local extinction
The Proposed development is unlikely to have any significant impacts on the population of Grey-headed flying foxes within the locality, provided mature Figs on the site are retained. This species is likely to benefit from the large-scale rainforest restoration works proposed fro the site. The Proposed development is unlikely to result in the local extinction of this species.

Koala (*Phascolarctos cinereus*)

Extent of the local population
The NPWS database (March 2009) contains one hundred and forty-seven (147) records of this species within 10 km of the Subject site. Five hundred and fifty-two (552) records occur within the Tweed LGA.

Stages of the life-cycle affected by the proposed development
As part of the RFA process, Environment Australia (1999) conducted an analysis of the responses of forest fauna to various forms of land cover disturbance in the North-east region. The analysis was based on local expert knowledge and identified feeding sites for Koalas in coastal forested environments (not woodland) as areas with stands with a high diversity of known food trees (three or more) including Tallowwood, Grey gum, Forest oak, Sydney blue gum, Swamp mahogany and Red gums. The Koala shelters in larger trees with big lateral branches (not necessarily food trees). The Koala disperses over any open habitat (including pasture and grassland) as long as scattered trees are present.

The RFA analysis (Environment Australia 1999) ranked the significance of various forms of disturbance for the Koala, with the following results:

1st order disturbances	Habitat clearing
2nd order disturbances	Introduced predators – foxes and dogs
3rd order disturbances	Intensive logging that removes the critical tree size classes from the stand (may be frequent or single and intensive) Logging that fails to retain stems in the 30-80 DBH size class.
4th order disturbances	Wildfire
5th order disturbances	Road kills
6th order disturbances	Disease

Likelihood of local extinction
The site offers relatively poor Koala habitat due to the lack of feed trees available, combined with the relative isolation of the site, and lack of any connectivity with good quality Koala habitat. Any extensive use of the site, save for the very occasional straying individual is considered highly unlikely. Although the majority of planted feed trees associated with the golf course are likely to be removed, retention of the small area of planted Swamp mahogany on the north-west of the golf course will continue to provide a marginal forage resource for any individuals of the species which may occasionally stray through the site.

The proposed development is considered unlikely to result in the local extinction of this species.

Little bent-wing bat (*Miniopterus australis*)

Extent of the local population
The NPWS database (March 2009) contains ten (10) records of the Little bent-wing bat within 10 km of the Subject site. Fifty-two (52) records of the Little bent-wing bat occur within the Tweed LGA.

Stages of the life-cycle affected by the proposed development
As part of the RFA process, Environment Australia (1999) conducted an analysis of the responses of forest fauna to various forms of land cover disturbance in the North-east region. The analysis was based on local expert knowledge and identified breeding sites for Little bent-wing bat as consisting of limestone caves, where it usually occurs in association with the Common bent-wing bat. It congregates in high numbers in maternity roost (in 1000's). It also shelters in a range of artificial structures including culverts, drains, mines etc. The Little bent-wing bat forages on flying insects in forested areas, predominantly swamp forest, moist eucalypt forest, rainforest and some dry forests.

The RFA analysis (Environment Australia 1999) ranked the significance of various forms of disturbance for the Little bent-wing bat, with the following results:

1st order disturbances	Clearing – habitat loss

2nd order disturbances	Disturbance to camps/caves by limestone mining (cave collapse, altered air flow, noise, dust etc) and recreational activities.
3rd order disturbances	Clearing – fragmentation Logging – loss of foraging habitat Frequent burning Altered hydrology/microclimate – old growth-regrowth
4th order disturbances	Grazing Wildfire Pesticides
5th order disturbances	Introduced predators

Likelihood of local extinction
This species may forage widely over forested parts of the site. While the Proposed development will result in a contraction of forage habitat, it is considered that retention of large areas of forest on the site will continue to provide suitable forage habitat. The Proposed development is unlikely to result in the local extinction of this species.

Masked owl (*Tyto novaehollandiae*)

Extent of the local population
The NPWS database (March 2009) contains two (2) records of this species within 10 km of the Subject site. Twelve (12) records occur within the Tweed LGA. This species has not been recorded from the subject site however suitable habitat is considered to occur.

Stages of the life-cycle affected by the proposed development
The Masked owl feeds in sclerophyll forest with sparse, open understorey, particularly in the ecotone between wet and dry forest and non-forest habitat. It feeds on medium and small terrestrial mammals, some arboreal mammals and birds (Environment Australia 1999; Kavanagh & Murray 1996). Studies by Kavanagh & Murray (1996) suggest that the Masked owl may forage over a large area (1,000ha) containing a mosaic or relatively undisturbed and disturbed environments.

Nesting occurs at any time of year in deep hollows (usually vertical) in large, live trees (tall Eucalypts are favoured) or ledges in caves (Environment Australia 1999; Debus 1993). This owl shelters in hollows and in densely foliaged native and exotic understorey trees.

As part of the RFA process, Environment Australia (1999) conducted an analysis of the responses of forest fauna to various forms of land cover disturbance in the North-east region. The analysis was based on local expert knowledge and ranked the significance of various forms of disturbance for the Masked owl, with the following results:

1st order disturbances	Clearing for agriculture
2nd order disturbances	Logging which increases structural density of forest which effects mid to ground layer and thus affects manoeuvrability
3rd order disturbances	Fire – high frequency
4th order disturbances	Clearing for urban development

5th order disturbances	Road-kills
6th order disturbances	Nest and roost site disturbance

Likelihood of local extinction
Although Masked owls forage widely, the species may utilise the site as part of its forage habitat within the locality. While the Proposed development will result in a contraction of forage habitat, it is considered that retention of large areas of forest on the site will continue to provide suitable forage habitat. The Proposed development is unlikely to result in the local extinction of this species.

Rose-crowned fruit dove (*Ptilinopus regina*)

Extent of the local population
The NPWS database (March 2009) contains six (6) records of the Rose-crowned fruit-dove within 10 km of the Subject site. One hundred and two (102) records occur within the Tweed LGA. The Rose-crowned fruit-dove has been recorded from rainforest and Camphor laurel dominated communities throughout the subject site on a number of occasions.

Stages of the life-cycle affected by the proposed development
The Rose-crowned fruit-dove forages in lowland subtropical rainforest including remnants dominated by Camphor laurel, Littoral rainforest and wet sclerophyll forests. The Camphor laurel has become very important in replacing lowland species previously used but now cleared (Environment Australia 1999). Other habitats occupied are gallery forests or sclerophyll woodlands (often dominated by Melaleuca or Eucalyptus species), with abundant fruiting trees, near or next to rainforest (Marchant & Higgins 1993). The Rose-crowned fruit-dove appears to be tolerant of disturbance, having been recorded in patches of rainforest as small as two (2) hectares (Frith 1952).

Breeding and sheltering sites for the Rose-crowned fruit-dove consist of scattered patches of habitat in lowland subtropical rainforest including remnants dominated by Camphor laurel and wet sclerophyll forests (Environment Australia 1999). The Rose-crowned fruit-dove erects nests usually within 6m of the ground, thus rainforest of any age and structure is suitable (Recher & Date 1988).

As part of the RFA process, Environment Australia (1999) conducted an analysis of the responses of forest fauna to various forms of land cover disturbance in the North-east region. The analysis was based on local expert knowledge and ranked the significance of various forms of disturbance for the Rose-crowned fruit-dove, with the following results:

1st order disturbances	Clearance for agriculture Urban development Weed invasion Loss of habitat Intensive horticulture
2nd order disturbances	Logging that reduces age classes of mesomorphic midstorey

Likelihood of local extinction

The Rose-crowned fruit dove has been recorded over much of the site, where forested areas or mature figs occur. The site provides an excellent forage resource for this species, and with the retention of mature figs on the site, future forage resources for the Rose-crowned fruit dove are assured. However, increased noise, light and traffic from the Proposed development has the potential to diminish the quality of some forage habitat for the species. The best forage habitat for the species in the south of the site (including adjacent land) will be retained.

This species will benefit form the proposed large-scale rainforest restoration works on the subject site. The Proposed development is unlikely to result in the local extinction of this species.

Sooty owl (*Tyto tenebricosa*)

Extent of the local population

The NPWS database (March 2009) contains one (1) record of this species within 10 km of the Subject site. Sixty-six (66) records occur within the Tweed LGA. This species has not been recorded from the subject site however suitable habitat is considered to occur.

Stages of the life-cycle affected by the proposed development

The sooty owl inhabits rainforest and tall, moist eucalypt forest of coastal and near coastal areas. An abundant and diverse supply of arboreal and terrestrial mammals, especially Common ringtail possums, Sugar gliders, Bush rats and Brown antechinuses, and a selection of large tree hollows are prime factors in determining the location of this species (Debus 1994a).

Sooty owls are solitary, sedentary inhabitants of dense forest. They maintain permanent territories of between 200 and 800ha in size (Kavanagh & Peake 1993). Sheltering sites for the Sooty owl consist of patches of dense, tall understorey, strangler figs, hollows in live and dead trees, vine tangles, dense tree-fern heads, caves and rocky ledges and in rainforest vegetation near waterfalls and rock ledges in very dense, dark gorges (Environment Australia 1999).

Breeding may occur at any time but is usually between autumn and winter. Nesting occurs very large, live old trees with hollows, within wet forest (Rainforest and Wet sclerophyll) with a well developed mesomorphic understorey, usually situated in or near gullies (Environment Australia 1999; Debus 1994a).

As part of the RFA process, Environment Australia (1999) conducted an analysis of the responses of forest fauna to various forms of land cover disturbance in the North-east region. The analysis was based on local expert knowledge and ranked the significance of various forms of disturbance for the Sooty owl, with the following results:

1st order disturbances	Logging which reduces prey mammals
2nd order disturbances	Nest and roost site disturbance
3rd order disturbances	wildfire
4th order disturbances	Fire which reduces prey –
5th order disturbances	Bird watching including survey playback

Likelihood of local extinction

The Sooty owl is only likely to roost in the most developed vegetation on the site, in this case the dense, mature rainforest in the south of the site. The proposed development is unlikely to have any significant impacts on roosting habitat for the species. Due to the thick midstorey in this vegetation community, human disturbance is likely to be minimal. There will be some contraction of forage habitat, although neighbouring land will continue to provide forage opportunities for the species. The Proposed development is unlikely to result in the local extinction of this species.

Square-tailed kite (*Lophoictinia isura*)

Extent of the local population

The NPWS database (March 2009) contains one (1) record of this species within 10 km of the Subject site. Two (2) records occur within the Tweed LGA. This species has not been recorded from the subject site however suitable habitat is considered to occur.

Stages of the life-cycle affected by the proposed development

Square-tailed kites are uncommon yet widespread. They inhabit dry woodland and open forest mainly in coastal or subcoastal districts, preferring vegetation along major rivers and belts of trees in urban or semi-urban areas for hunting (NPWS 2002; Marchant & Higgins 1993).

Breeding sites for the Square-tailed kite as consist of nests in tall trees with large branches in tall, open sclerophyll forest and woodland with or adjacent to areas of high densities of passerine birds (Environment Australia 1999). The Square-tailed kite forages on a high density of passerine birds, particularly honeyeaters. It will occasionally take lorikeets, quail, pipits as well as fledglings and nestlings, lizards and insects (Environment Australia 1999; Marchant & Higgins 1993).

As part of the RFA process, Environment Australia (1999) conducted an analysis of the responses of forest fauna to various forms of land cover disturbance in the North-east region. The analysis was based on local expert knowledge and ranked the significance of various forms of disturbance for the Square-tailed kite, with the following results:

1st order disturbances	Clearing for agriculture
2nd order disturbances	Grazing and associated burning Logging which increases the structural density through reducing age classes, decreased nectar production Intensive horticulture Nest site loss
3rd order disturbances	Urban development
4th order disturbances	Egg collecting

Likelihood of local extinction

This species may utilise the site as part of its forage range within the locality. Suitable nesting/roosting habitat does not occur on the site. The Proposed development is not considered likely to have any significant impacts on the habitat requirements of the Square-tailed kite, and is unlikely to result in the local extinction of this species.

Three-toed snake-toothed skink (*Coeranoscincus reticulatus*)

Extent of the local population

The NPWS database (March 2009) contains no records of this species within 10 km of the Subject site. Two (2) records occur within the Tweed LGA. This species has not been recorded from the subject site however suitable habitat is considered to occur.

The loss of potential foraging habitat is not considered significant in relation to the regional distribution of habitat for this species.

Stages of the life-cycle affected by the proposed development

As part of the RFA process, Environment Australia (1999) conducted an analysis of the responses of forest fauna to various forms of land cover disturbance in the North-east region. The analysis was based on local expert knowledge and identified breeding sites for the Three-toed snake-toothed skink as consisting of friable soil, leaf litter and large logs in subtropical and temperate rainforest, wet sclerophyll forest, and possibly open coastal forest. Soils typically have moderate to high moisture levels. Sheltering sites are similar but include rocks and deep leaf litter. This species requires continuous forest cover for dispersal.

The RFA analysis (Environment Australia 1999) ranked the significance of various forms of disturbance for the Three-toed snake-toothed skink, with the following results:

1st order disturbances	Logging (changing canopy structure, loss of large ground logs, desiccation and altered microhabitat, logging that reduces age/size structure)
2nd order disturbances	Any fires Predation by introduced species
3rd order disturbances	Road kills Clearing for agriculture or grazing Grazing and associated burning Weed invasion Feral pigs

Likelihood of local extinction

The best habitat for the White-eared monarch is dense vegetation in the south of the site. Due to the thick midstorey in this vegetation community, human disturbance is likely to be minimal. The loss of potential foraging habitat is not considered significant in relation to the regional distribution of habitat for this species.

This species is likely to benefit from the proposed large-scale rainforest restoration works on the subject site. The Proposed development is unlikely to result in the local extinction of this species.

White-eared monarch (*Monarcha leucotis*)

Extent of the local population

The NPWS database (March 2009) contains seven (7) records of this species within 10 km of the Subject site. Eighty-six (86) records occur within the Tweed LGA. This species has been recorded from rainforest communities in the southern portion of the subject site on a number of occasions.

Stages of the life-cycle affected by the proposed development
As part of the RFA process, Environment Australia (1999) conducted an analysis of the responses of forest fauna to various forms of land cover disturbance in the North-east region. The analysis was based on local expert knowledge and identified breeding and sheltering sites for the White-eared monarch as consisting of Lowland subtropical rainforest edges and remnants, Littoral and floodplain rainforest, swamp sclerophyll forest with mesomorphic mid-storey, and coastal wet sclerophyll forest. The White-eared monarch seems to prefer edges with rainforest, edges of gaps within forests and edges between forests and cleared land. The White-eared monarch forages by hover gleaning of rainforest foliage insects and extends into forest interiors. The White-eared monarch also feeds through the canopy or descends to above the shrub layer.
The RFA analysis (Environment Australia 1999) ranked the significance of various forms of disturbance for the White-eared monarch, with the following results:

1st order disturbances	Clearing resulting in fragmentation
2nd order disturbances	Urban development and rural development Weed invasion of remnants
3rd order disturbances	Intensive horticulture

Likelihood of local extinction
The best habitat for the White-eared monarch is dense vegetation in the south of the site, where it was recorded during the spring survey period (2006) and by WBM (1996). The proposed development is unlikely to have any significant impacts on roosting habitat for the species. Due to the thick midstorey in this vegetation community, human disturbance is likely to be minimal.

This species is likely to benefit from the proposed large-scale rainforest restoration works on the subject site. The Proposed development is unlikely to result in the local extinction of this species.

Wompoo fruit dove (*Ptilinopus magnificus*)

Extent of the local population
The NPWS database (March 2009) contains two (2) records of the Wompoo fruit-dove within 10 km of the Subject site. Sixty-two (62) records occur within the Tweed LGA. The Wompoo fruit-dove has not been recorded from the subject site however suitable habitat occurs.

Stages of the life-cycle affected by the proposed development
The Wompoo fruit-dove forages in subtropical, dry, warm-temperate and littoral rainforests and occasionally in wet sclerophyll forests, tall open forest, gallery forest, open woodlands or vine thickets near rainforests (Environment Australia 1999; Marchant & Higgins 1993).

Breeding sites for the Wompoo fruit-dove consist of subtropical, dry and warm-temperate rainforests and wet sclerophyll forests, with a good fruit supply nearby

(Environment Australia 1999). Common food items include the fruits of Figs, Laurels, Quandong and Giant stinging trees, as well as scattered Figs in cleared habitat. This bird disperses from higher to lower elevations in autumn/winter, with its movements tracking food availability (Environment Australia 1999; Lindsey 1992).

As part of the RFA process, Environment Australia (1999) conducted an analysis of the responses of forest fauna to various forms of land cover disturbance in the North-east region. The analysis was based on local expert knowledge and ranked the significance of various forms of disturbance for the Wompoo fruit-dove, with the following results:

1st order disturbances	Clearing for agriculture Logging that reduces size class of fleshy fruit trees in wet sclerophyll forest
2nd order disturbances	Weed invasion in lowland remnants Urban development Loss of habitat and fig trees in agricultural land
3rd order disturbances	Intensive horticulture

Likelihood of local extinction
As per the Rose-crowned fruit dove, the site provides an excellent forage resource for this species, and with the retention of mature figs on the site, future forage resources for the Superb fruit dove are assured. However, increased noise, light and traffic from the Proposed development has the potential to diminish the quality of some forage habitat for the species. The best forage habitat for the species in the south of the site (including adjacent land) will be retained.

This species is likely to benefit from the proposed large-scale rainforest restoration works on the subject site. The Proposed development is unlikely to result in the local extinction of this species.

Yellow-bellied sheath-tail bat (*Saccolaimus flaviventris*)

Extent of the local population
The NPWS database (March 2009) contains three (3) records of this species within 10 km of the Subject site. Four (4) records occur within the Tweed LGA. This species has not been recorded from the subject site however suitable habitat is considered to occur.

Stages of the life-cycle affected by the proposed development
The Yellow-bellied sheath-tail bat occurs a wide range of habitats including wet and dry sclerophyll forests and woodlands (NPWS 2002, SFNSW 1995). Foraging and seasonal movements of this species are poorly known, however it is though to forage on aerial insects in open areas such as above the forest canopy or in open habitat (NPWS 2002, SFNSW 1995).

This species is though to roost in tree hollows of mature eucalypts and is thus likely to be sensitive to the loss of hollow-bearing trees, particularly as hollow formation is likely to take from 80 to 150 years (Richards 1991).

As part of the RFA process, Environment Australia (1999) conducted an analysis of the responses of forest fauna to various forms of land cover disturbance in the North-east region. The analysis identified a lack of knowledge on this species and ranked the

significance of various forms of disturbance for the Yellow-tailed sheath-tail bat, with the following results:

1st order disturbances	Logging – loss of hollows & old growth
2nd order disturbances	Clearing – habitat loss
3rd order disturbances	Grazing Frequent burning
4th order disturbances	Pesticides
5th order disturbances	Barbed wire Disease - lyssavirus

Likelihood of local extinction
This species may forage widely over forested parts of the site. While the Proposed development will result in a contraction of forage habitat, it is considered that retention of large areas of forest on the site will continue to provide suitable forage habitat.

Given the high mobility of this species, the loss of potential foraging habitat is not considered significant in relation to the regional distribution of habitat. No roost habitat will be affected by the proposed development.

(b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

Thirty-three (33) endangered populations have been identified under the *TSC Act*. The following four (4) endangered populations occur in north-eastern NSW:

- Long-nosed potoroo population, Cobaki Lakes and Tweed Heads West;
- Emu population in the NSW North Coast Bioregion and Port Stephens LGA;
- Low growing form of *Zieria smithii*, Diggers Head; and
- *Glycine clandestina* (Broad-leaf form) in the Nambucca LGA.

The proposed action will not have an adverse affect on any of these endangered populations.
(c) In the case of an endangered ecological community or critically endangered ecological community whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

Seventy-nine (79) endangered ecological communities have been identified under the *TSC Act*. The following eight (8) endangered populations occur in north-eastern NSW:

- Coastal saltmarsh in the NSW North Coast, Sydney Basin and South East Corner bioregions;
- Freshwater wetlands on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions;
- Swamp sclerophyll forest on the coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions;
- Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions;
- Subtropical coastal floodplain forest of the NSW North Coast bioregion;
- Littoral rainforest in the NSW North Coast, Sydney Basin and South East Corner bioregions;
- Lowland rainforest on floodplain in the NSW North Coast bioregion; and
- *Themeda* grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner bioregions.

The proposed action will not have an adverse affect on any of these endangered ecological communities.

(d) In relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed

Approximately 9.38 hectares of Camphor laurel dominated vegetation, 1.10 hectares of Subtropical rainforest and 0.48 hectares of Brushbox will be removed as a result of the Proposed development, in addition to approximately 82.93 hectares of vegetation which consists of pastureland, disturbed land or landscape plantings.

In combination, loss of this habitat is not considered to have any significant impacts on any Threatened fauna species which may occur on the site. Retained areas of Camphor laurel dominated vegetation and Subtropical rainforest will be rehabilitated in accordance with the Site Rehabilitation & Pest Management Plan (JWA 2007 – **VOLUME 3**) and will continue to provide habitat for Threatened fauna within the locality.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action

Vegetation communities on the subject site have undergone substantial fragmentation and modification over time. The proposed development will not further fragment habitat on the site. Conversely, under the proposed Site Rehabilitation & Pest Management Plan (JWA 2007 – **VOLUME 3**), 28.9ha of Camphor laurel dominated vegetation and currently denuded grazing land will be rehabilitated to Rainforest communities over time.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

The habitat to be removed as a result of the Proposed development is not considered likely to be critical to the long term survival of any of these Threatened fauna species within the locality. The most important habitat on the site (subtropical and dry rainforest in the south of the site, and to a lesser degree – Camphor laurel dominated vegetation) will be retained and rehabilitated.

(e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

Critical habitat areas listed under the *Threatened Species Conservation Act (1995)* currently consist of habitat for Mitchell's rainforest snail in Stott's Island Nature Reserve, and habitat for the Little penguin population in Sydney's North Harbour.

There will be no adverse effects on either of these critical habitats from the action proposed.

(f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

An Approved recovery plan has been completed for the Coxen's fig parrot.

Recovery objectives listed in the Recovery Plan include:

- Protect and maintain wild populations of Coxen's fig parrot and their habitat from humans-induced threatening processes in the long term;
- Protect and maintain the full genetic diversity of Coxen's fig parrot;
- Understand the ecology of Coxen's fig parrot;
- Secure and breed a captive population of Coxen's fig parrot; and
- Increase the extent, quality and connectivity of habitat of Coxen's fig parrot.

Recovery performance criteria include:

- Wild populations have not suffered reduction due to anything other than stochastic events;
- Ecological research and monitoring strategies are established;
- Wild populations are located;
- A population of captive-bred birds is established and increasing;
- Knowledge of the bird's conservation status, current distribution, life history and taxonomic status is significantly increased;
- Historical, existing and potential threats are identified;
- Existing habitat is conserved and key areas of degraded and former habitat are rehabilitated; and
- Active community participation in Coxen's fig parrot recovery is achieved.

Recovery actions include:

- Implement a community strategy to significantly raise community awareness of Coxen's fig parrot and its plight so that the community supports, becomes actively involved in and promotes the recovery of Coxen's fig parrot and develops independent skills to locate and reliable identify Coxen's fig parrot and report sightings;
- Locate wild populations and implement an ecological research and monitoring strategy;
- Research, document and implement a captive breeding program;
- Undertake an assessment of Coxen's fig parrot habitat; and
- Undertake a program to protect known habitat, rehabilitate current habitat and revegetate former habitat of Coxen's fig parrot.

The Coxen's fig parrot has not been recorded from the subject site despite detailed avifauna surveys of the site, including targeted survey for this species. However, due to the excellent forage resources available, this species is considered a possible occurrence. In any event, the Proposed development aims to address the relevant recommendation of the Recovery Plan, such as retention of habitat, monitoring of the population utilising the site (if observed), and implementing community strategies to raise awareness of the species. Any measures will require extensive liaison with the Department of Environment and Conservation (DEC).

It is also acknowledged that draft Recovery Plans have also been prepared for the Koala and Masked and Sooty owls.

None of the approved Threat Abatement Plans are likely to have any great significance to Threatened fauna utilising the Subject site.

(g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

A "threatening process" means a process that threatens, or may have the capability to threaten, the survival or evolutionary development of a species, population or ecological community. Key Threatening Processes have been listed in Schedule 3 of the *TSC Act (1995).*

Key Threatening Processes (Schedule 3):

- Exotic vines and scramblers;
- *Bufo marinus*;
- Invasion of the yellow crazy ant;
- Feral pigs;
- Competition and habitat destruction by feral goats;
- Entanglement in, or digestion of anthropogenic debris in marine and estuarine environments;
- Introduction of the large earth Bumble bee, *Bombus terrestris*;
- Removal of dead wood and dead trees;
- Death or injury to marine species following capture in shark control programs on ocean beaches;
- Invasion of native plant communities by exotic perennial grasses;

- Infection of frogs by amphibian chytrid, causing the disease chytrodiomycosis
- Competition from feral honeybees;
- Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands;
- Clearing of native vegetation;
- Bushrock removal;
- Ecological consequences of high frequency fires;
- Human-caused climate change;
- Invasion of native plant communities by Bitou Bush and Boneseed;
- Loss and/or degradation of sites used for hilltopping by butterflies;
- Predation by the European red fox;
- Predation by feral cats;
- Predation by the ship rat on Lord Howe Island;
- Predation by the Plague minnow (*Gambusia holbrooki*);
- Infection of native plants by *Phytophthora cinnamomi;*
- Infection by Psittacine circoviral (beak and feather) disease affecting endangered psittacine species and populations;
- Importation of red imported fire ants into NSW; and
- Competition and grazing by the feral European rabbit.

The Proposed development will contribute towards the clearing of native vegetation, a key threatening process listed on Schedule 3 of the *TSC Act (1995)*. The final determination of the NSW Scientific Committee notes that clearing of native vegetation is recognised as a major factor contributing to loss of biological diversity, with impacts such as: destruction of habitat; fragmentation of habitat; riparian zone degradation; increased greenhouse gas emissions; increased habitat for invasive species; loss of leaf litter layer; loss or disruption of ecological function (*e.g.* loss of populations of pollinators or seed dispersers) and changes to soil biota.

Due to the fact that the majority of vegetation proposed to be removed from the Subject site contains, or is dominated by exotic species, the amount of 'native vegetation' to be cleared is difficult to determine, although 1.10 hectares of Subtropical rainforest and 0.48 hectares of Brushbox forest will be removed for the Proposed development.

Another Key Threatening Process of relevance to the site is the recently listed 'Invasion by exotic vines and scramblers'. Several exotic vine species occur on the site, and are well established is some areas and having detrimental impacts on native vegetation communities. The most significant exotic vine on the site – Madeira vine (*Anredera cordifolia*) is currently established in a number of areas. The Proposed development is highly unlikely to increase the impact of exotic vines on the site. Conversely, with the establishment of appropriate practices in accordance with the Site Rehabilitation & Pest Management Plan (JWA 2007 – **VOLUME 3**), these species will be controlled/eliminated over time.

Habitat loss is the main threatening process affecting all subject species. The Proposed development will make a contribution towards the loss of habitat in the region. However, as previously discussed, 28.9ha of Camphor laurel dominated vegetation and currently denuded grazing land will be rehabilitated to Rainforest communities over time, under the Site Rehabilitation & Pest Management Plan (JWA 2007 – **VOLUME 3**).

On the basis of this assessment, it is considered that a Species Impact Statement (SIS) is not required.

APPENDIX 4 – ASSESSMENT OF COMMONWEALTH LEGISLATION

1. Introduction

The *Environment Protection & Biodiversity Conservation (EPBC) Act (1999)* was passed by Commonwealth Parliament in June 1999 and came into force on 16 July, 2000. A person must not, without an approval under the Act, take an action that has or will have, or is likely to have, a significant impact on a matter of National Environmental Significance (NES). These matters are listed as:

(a) the world heritage values of a declared World Heritage property;

(b) the ecological character of a declared Ramsar wetland;

(c) a threatened species or endangered community listed under the Act;

(d) a migratory species listed under the Act; or

(e) the environment in a Commonwealth marine area or on Commonwealth land.

The Act also prohibits the taking, without an approval under the Act, of:

(a) a nuclear action; or

(b) an action in a Commonwealth marine area or on Commonwealth land that has or will have, or is likely to have, a significant impact on the environment.

An action includes a project, development, undertaking or an activity or series of activities. An action does not require approval if it is a lawful continuation of a use of land, sea or seabed that was occurring before the commencement of the Act. An enlargement, expansion or intensification of a use is not a continuation of a use.

The *EPBC Act (1999)* does not require Commonwealth approval for the rezoning of land. It does, however, suggest that when rezoning land, planning authorities should consider whether to allow actions that could significantly affect NES matters or the environment of Commonwealth land.

Matters of NES in NSW are:

(a) Declared World Heritage Areas;

(b) Declared Ramsar Wetlands;

(c) Listed Threatened Species (Schedule 1 and 2 of Commonwealth Endangered Species Protection Act 1992);

(d) Listed Ecological Communities in NSW; and

(e) Listed migratory species (JAMBA and CAMBA).

2. Subject Site Assessment

2.1 Background

A Commonwealth Assessment will be required for proposed activities on the subject site if they affect a matter of NES. Matters of NES in NSW were identified in the previous section. There are no declared World Heritage Areas or Ramsar Wetlands in the Locality, Study area or Subject site.

2.2 Species occurring on the Subject site

2.2.1 Listed Threatened species

Eight (8) Commonwealth Threatened flora species were recorded on the Subject site:

- Ball nut (*Floydia praealta*) – Vulnerable
- Bopple nut (*Hicksbeachia pinnatifolia*) – Vulnerable
- Rough-shelled bush nut (*Macadamia tetraphylla*) –Vulnerable
- Rusty rose walnut (*Endiandra hayesii*) – Vulnerable
- Southern ochrosia (*Ochrosia moorei*) – Endangered
- Stinking laurel (*Cryptocarya foetida*) – Vulnerable
- Sweet myrtle (*Gossia fragrantissima*) – Endangered
- Yellow satinheart (*Bosistoa transversa*) - Vulnerable

One (1) Commonwealth Threatened fauna species were recorded on the Subject site – the Grey-headed flying-fox (*Pteropus poliocephalus*) – which is listed as Vulnerable.

A further three (3) species were considered possible or likely occurrences due to the presence of suitable habitat:

- Three-toed snake-toothed skink (*Coeranoscincus reticulatus*) -Vulnerable
- Black-breasted button-quail (*Turnix melanogaster*) – Vulnerable
- Coxen's fig parrot (*Cyclopsitta diophthalma coxeni*) - Endangered

2.2.2 Listed Ecological Communities

None of the ecological communities currently listed in the *EPBC Act (1999)* occur in the study area or wider locality.

2.2.3 Listed Migratory Species

Listed migratory species in NSW are considered predominantly in the Japan-Australia Migratory Bird Agreement (JAMBA) and China-Australia Migratory Bird Agreement (CAMBA).

Five (5) Migratory species as listed within schedules of the EPBC Act (1999) were also recorded:

- Cattle egret (*Ardea ibis*);
- Rainbow bee-eater (*Merops ornatus*);
- Rufous fantail (*Rhipidura rufifrons*);
- Spectacled monarch (*Monarcha trivirgatus*); and
- White-bellied sea-eagle (*Haliaetus leucogaster*).

A further three (3) Migratory species were considered possible or likely occurrences due to the presence of suitable habitat:

- Black-faced monarch (*Monarcha melanopsis*);
- Great egret (*Ardea alba*); and
- Satin flycatcher (*Myiagra cyanoleuca*).

2.3 Assessment against EPBC Act Principal Significant Impact Guidelines

2.3.1 Background

The Commonwealth DEH has prepared EPBC Act Policy Statements, including the EPBC Act – Principal Significant Impact Guidelines 1.1 (2005) which outline a self-assessment process to assist in determining whether an action should be referred to the Department for a decision on whether assessment and approval is required under the Act. The following sections assess the proposed development (the action) against these guidelines.

2.3.2 Critically Endangered and Endangered Species

Significant Impact Criteria

An action has, will have, or is likely to have a significant impact on a critically endangered or endangered species if it does, will, or is likely to:

- lead to a long-term decrease in the size of a population; or
- reduce the area of occupancy of the species; or
- fragment an existing population into two or more populations; or
- adversely affect habitat critical to the survival of a species; or
- disrupt the breeding cycle of a population; or
- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline; or
- result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat; or
- interfere with the recovery of the species.

Assessment of Proposed Action

Two (2) Endangered flora species as listed within schedules of the EPBC Act (1999) were recorded from the subject site:

- Southern ochrosia (*Ochrosia moorei*); and
- Sweet myrtle (*Gossia fragrantissima*).

The Southern ochrosia was recorded from the well-vegetated southern portion of the subject site which comprises Subtropical rainforest vegetation. This area of the subject site will be retained and rehabilitated in accordance with the Site Rehabilitation & Pest Management Plan (JWA 2007 – **VOLUME 3**). Furthermore, this species may be propagated and planted out elsewhere on the site to increase numbers of the local population. A significant impact as outlined above will not be incurred on this species.

The Sweet myrtle has been recorded from the southern portion of the subject site, with the large majority occurring within the well-vegetated southern portion of the subject site which comprises Subtropical rainforest vegetation. This area of the subject site will be retained and rehabilitated in accordance with the Site Rehabilitation & Pest Management Plan (JWA 2007 – **VOLUME 3**). Five (5) stems of Sweet myrtle will require removal under the proposed development (8.8% of this species on the site) however this species will be propagated and planted out elsewhere on the site to increase numbers of the local population. A significant impact as outlined above will not be incurred on this species.

One (1) Endangered fauna species as listed within schedules of the EPBC Act (1999) - Coxen's fig parrot (*Cyclopsitta diophthalma coxeni*) - was considered a possible occurrence on the subject site based on the presence of suitable habitat. The retention of mature figs on the subject site as well as large-scale rainforest restoration works are likely to increase the sites habitat values for this species should it occur. A significant impact as outlined above will not be incurred on this species.

2.3.3 Vulnerable Species

Significant Impact Criteria

An action has, will have, or is likely to have a significant impact on a vulnerable species if it does, will, or is likely to:

- lead to a long-term decrease in the size of an important population of a species; or
- reduce the area of occupancy of an important population; or
- fragment an existing important population into two or more populations; or
- adversely affect habitat critical to the survival of a species; or
- disrupt the breeding cycle of an important population; or
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline; or

- result in invasive species that are harmful a vulnerable species becoming established in the vulnerable species' habitat; or
- interferes substantially with the recovery of the species.

An important population is one that is necessary for a species' long-term survival and recovery. This may include populations that are:

- key source populations either for breeding or dispersal;
- populations that are necessary for maintaining genetic diversity; and/or
- populations that are near the limit of the species range.

Assessment of Proposed Action

Six (6) Vulnerable flora species as listed within schedules of the EPBC Act (1999) were recorded from the subject site:

- Ball nut (*Floydia praealta*) – Vulnerable
- Bopple nut (*Hicksbeachia pinnatifolia*) – Vulnerable
- Rough-shelled bush nut (*Macadamia tetraphylla*) –Vulnerable
- Rusty rose walnut (*Endiandra hayesii*) – Vulnerable
- Stinking laurel (*Cryptocarya foetida*) – Vulnerable
- Yellow satinheart (*Bosistoa transversa*) - Vulnerable

A single Ball nut occurs outside the proposed development envelope on the subject site and will be retained. Furthermore, propagation of this plant species will be completed and offspring planted out in conservation areas on the site. The population size of this species on the subject site (and within the locality) will therefore be increased. A significant impact as outlined above will not be incurred on this species.

The Bopple nut occurs outside the proposed development envelope on the subject site and will be retained. Forty-nine (49) Bopple nuts occur on the subject site and all will be retained. A significant impact as outlined above will not be incurred on this species.

The Proposed development has potential to result in the removal of up to 29 Rough-shelled bush nut (7.4% of the population on site), most of which are immature. Due to the large numbers of this species occurring on the site and within the locality, it is considered that losses are unlikely to have any significant impact on the local population. This species appears to propagate readily on the site, and with retention of other trees within conservation areas, the proposed development is highly unlikely to result in the local extinction of this species. This species appears to germinate readily, and seedlings will be propagated from seed collected from the site to ameliorate losses. A significant impact as outlined above will not be incurred on this species.

A single Rusty rose walnut was recorded from within the intact Subtropical rainforest community in the southern portion of the subject site. This species will not be impacted by the proposed development. Furthermore, propagation of this plant species will be completed and offspring planted out in conservation areas on the site. A significant impact as outlined above will not be incurred on this species.

A total of one hundred and thirty-seven (137) Stinking laurel were recorded from one general location in the western portion of the subject site. The Proposed development has the potential to result in the loss of up to 49 stems (35.8% of the population on site), all of which are immature saplings, mostly less than 3 metres in height. It is highly likely that these trees can be translocated to a more suitable location on the site, where they will have better opportunities to develop to maturity. With the translocation of these stems and the retention of all other individuals within conservation areas, a significant impact as outlined above will not be incurred on this species. Furthermore, seed will be collected and propagated to ameliorate for the loss of any trees to the development envelope, and to further bolster the local population.

A total of one hundred and seventy-three (173) Yellow satinheart were recorded from the subject site. The majority of these occur within the intact Subtropical rainforest community in the southern portion of the subject site and will not be impacted by the proposed development. The removal of seven (7) Yellow satinheart from the proposed development area is not considered a significant impact as outlined above.

2.3.4 Migratory Species

Significant Impact Criteria

An action has, will have, or is likely to have a significant impact on a migratory species if it does, will, or is likely to:

- substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat of the migratory species; or
- result in invasive species that is harmful to the migratory species becoming established* in an area of important habitat of the migratory species; or
- seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of the species.

(* Introducing an invasive species into the habitat may result in that species becoming established. An invasive species may harm a migratory species by direct competition, modification of habitat, or predation.)

An area of important habitat is:

1. habitat utilised by a migratory species occasionally or periodically within a region that supports an *ecologically significant proportion* of the population of the species, or
2. habitat utilised by a migratory species which is at the limit of the species range, or
3. habitat within an area where the species is declining.

Assessment of Proposed Action

It is considered that although a number of listed migratory species are known or likely to occur occasionally in the Study area, no area of important habitat occurs in the Study area for listed migratory species.

2.3.5 Wetlands of International Importance

Significant Impact Criteria

An action is likely to have a significant impact on the ecological character of a declared Ramsar wetland if there is a real chance or possibility that it will result in:

- areas of the wetland being destroyed or substantially modified, or
- a substantial and measurable change in the hydrological regime of the wetland for example, a substantial change to the volume, timing, duration and frequency of ground and surface water flows to and within the wetland, or
- the habitat or lifecycle of native species, including invertebrate fauna and fish species, dependant upon the wetland being seriously affected, or
- a substantial and measurable change in the water quality of the wetland for example, a substantial change in the level of salinity, pollutants, or nutrients in the wetland, or water temperature which may adversely impact on biodiversity, ecological integrity, social amenity or human health, or
- an invasive species that is harmful to the ecological character of the wetland being established in the wetland.

Assessment of Proposed Action

No Wetlands of International Importance will be affected by the proposed development.

2.3.6 Requirement for Commonwealth Referral

Based on the assessment provided above, Referral to the Commonwealth DEH is not required. The proposed action is unlikely to result in a significant impact on any matter of NES.

APPENDIX 5 – THREATENED FLORA LOCATION INFORMATION

Reference	Common Name	Scientific Name	Height	GPS
1	Yiel yiel	*Grevillea hilliana*	3m	0544 992, 6879 003
	Yellow satinheart	*Bosistoa transversa*	6m	
	Marblewwod	*Acacia bakeri*	15m	
	Small-leaved tamarind	*Diploglottis campbellii*	2m	0545 004, 6879 012
3	Yiel yiel	*Grevillea hilliana*	1.5m	0545 051, 6878 999
	Spiny gardenia	*Randia moorei*	4m	
	" "	" "	4m	
	Sweet myrtle	*Austromyrtus fragrantissima*	5m	
	" "	" "	1.5m	
	" "	" "	2m	
	" "	" "	2m	
	Small-leaved tamarind	*Diploglottis campbellii*	20m	
	" "	" "	15m	
	Yellow satinheart	*Bosistoa transversa*	2m	
4	Marblewood	*Acacia bakeri*	20m	0545 053, 6878 993
	Spiny gardenia	*Randia moorei*	2m	
	" "	" "	5m	
	Sweet myrtle	*Austromyrtus fragrantissima*	3m	
	" "	" "	0.5m	
5	Yiel yiel	*Grevillea hilliana*	1.5m	0545 054, 6878 989
	Fine-leaved tuckeroo	*Lepiderema pulchella*	0.5m	
6	Sweet myrtle	*Austromyrtus fragrantissima*	10m	0545 042, 6878 995
7	Yiel yiel	*Grevillea hilliana*	20m	0545 045, 6878 977
	Small-leaved tamarind	*Diploglottis campbellii*	1.5m	
	" "	" "	2m	

Reference	Common Name	Scientific Name	Height	GPS
8	Small-leaved tamarind " " Yellow satinheart Sweet myrtle " " " " Spiny gardenia	*Diploglottis campbellii* " " *Bosistoa transversa* *Austromyrtus fragrantissima* " " " " *Randia moorei*	28m 1m 1m 2m 6m 8m 2m	0545 046, 6878 982
9	Sweet myrtle Yellow satinheart	*Austromyrtus fragrantissima* *Bosistoa transversa*	2m 8m	0545 040, 6878 980
10	Spiny gardenia Sweet myrtle	*Randia moorei* *Austromyrtus fragrantissima*	4m 2m	0545 036, 6878 981
11	Marblewood Sweet myrtle	*Acacia bakeri* *Austromyrtus fragrantissima*	15m 2m	0545 049, 6878 971
12	Yellow satinheart Yiel yiel	*Bosistoa transversa* *Grevillea hilliana*	1m 12m	0545 027, 6878 988
13	Sweet myrtle Yellow satinheart Small-leaved tamarind	*Austromyrtus fragrantissima* *Bosistoa transversa* *Diploglottis campbellii*	3m 0.5m 25m	0545 030, 6878 982
14	Yellow satinheart " " Small-leaved tamarind	*Bosistoa transversa* " " *Diploglottis campbellii*	10m 2m 1.5m	0545 044, 6878 961
15	Spiny gardenia Small-leaved tamarind Yellow satinheart	*Randia moorei* *Diploglottis campbellii* *Bosistoa transversa*	3m 2m 1m (x 4)	0545 040, 6878 968

Reference	Common Name	Scientific Name	Height	GPS
16	Yiel yiel Spiny gardenia " " Yellow satinheart Sweet myrtle	*Grevillea hilliana* *Randia moorei* " " *Bosistoa transversa* *Austromyrtus fragrantissima*	6m 2m 2.5m 1.5m 3m	0545 057, 6878 957
17	Yellow satinheart " "	*Bosistoa transversa* " "	8m 2.5m	0545 034, 6878 994
18	Spiny gardenia " " " "	*Randia moorei* " " " "	2m 1.5m 2m (x2)	0545 051, 6878 941
19	Small-leaved tamarind Yellow satinheart " " Spiny gardenia	*Diploglottis campbellii* *Bosistoa transversa* " " *Randia moorei*	27m 3.5m 4m 2m	0545 070, 6878 958
20	Yellow satinheart " " Small-leaved tamarind	*Bosistoa transversa* " " *Diploglottis campbellii*	2.5m 5m 30m	0545 031, 6878 967
21	Spiny gardenia	*Randia moorei*	2m	0545 054, 6878 911
22	Fine-leaved tuckeroo	*Lepiderema pulchella*	2m	0545 035, 6878 957
23	Yiel yiel Yellow satinheart " " " "	*Grevillea hilliana* *Bosistoa transversa* " " " "	0.5m 2.5m 0.3m (x 3) 2m (x 5)	0545 051, 6878 939
24	Yellow satinheart	*Bosistoa transversa*	6m	0545 040, 6878 945

Reference	Common Name	Scientific Name	Height	GPS
25	Spiny gardenia “ “ “ “	*Randia moorei* “ “ “ “	2.5m 2.5m 1.5m	0545 044, 6878 927
	Marblewood	*Acacia bakeri*	2m	
	Small-leaved tamarind	*Diploglottis campbellii*	28m	
26	Spiny gardenia “ “	*Randia moorei* “ “	3m (x 2) 2m	0545 028, 6878 929
	Yiel yiel “ “	*Grevillea hilliana* “ “	28m 30m	
	Yellow satinheart “ “ “ “	*Bosistoa transversa* “ “ “ “	12m 1.5m 6m	
	Small-leaved tamarind	*Diploglottis campbellii*	0.5m	
27	Yiel yiel “ “	*Grevillea hilliana* “ “	27m 25m	0545 019, 6878 897
	Yellow satinheart “ “ “ “ “ “	*Bosistoa transversa* “ “ “ “ “ “	5m 2m (x3) 7m 6m	
	Spiny gardenia	*Randia moorei*	2.5m	
28	Fine-leaved tuckeroo “ “ “ “	*Lepiderema pulchella* “ “ “ “	2m (x 3) 1.5m (x 2) 2m	0545 009, 6878 889
	Yiel yiel	*Grevillea hilliana*	2m	

Reference	Common Name	Scientific Name	Height	GPS
29	Rough-shelled bush nut “ “ Fine-leaved tuckeroo “ “ Marblewood	*Macadamia tetraphylla* “ “ *Lepiderema pulchella* “ “ *Acacia bakeri*	4m 2m 0.5m 1m 1.5m	0545 021, 6878 890
30	Rough-shelled bush nut	*Macadamia tetraphylla*	2.5m	0545 017, 6878 865
31	Sweet myrtle	*Austromyrtus fragrantissima*	2m	0545 012, 6878 842
32	Rough-shelled bush nut	*Macadamia tetraphylla*	3m	0545 024, 6878 840
33	Small-leaved tamarind Yiel yiel	*Diploglottis campbellii* *Grevillea hilliana*	32m 1m	0545 023, 6878 856
34	Rough-shelled bush nut Fine-leaved tuckeroo Yellow satinheart	*Macadamia tetraphylla* *Lepiderema pulchella* *Bosistoa transversa*	0.5m 5m 1m	0545 041, 6878 854
35	Yellow satinheart “ “ “ “ “ “ Rough-shelled bush nut	*Bosistoa transversa* “ “ “ “ “ “ *Macadamia tetraphylla*	2m (x 3) 1.5m 10m 2.5m 1m	0545 053, 6878 855
36	Small-leaved tamarind “ “ Spiny gardenia Rough-shelled bush nut Fine-leaved tuckeroo	*Diploglottis campbellii* “ “ *Randia moorei* *Macadamia tetraphylla* *Lepiderema pulchella*	30m 2m (x 3) 2m 2.5m 1.5m (x 2)	0545 056, 6878 887

Reference	Common Name	Scientific Name	Height	GPS
37	Spiny gardenia	*Randia moorei*	2m (x 2)	0545 052, 6878 897
	Sweet myrtle	*Austromyrtus fragrantissima*	1.5m	
38	Sweet myrtle	*Austromyrtus fragrantissima*	12m	0545 063, 6878 907
39	Yellow satinheart	*Bosistoa transversa*	1.5m (x 2)	0545 052, 6878 923
	Sweet myrtle	*Austromyrtus fragrantissima*	6m	
40	Sweet myrtle	*Austromyrtus fragrantissima*	15m	0545 062, 6878 937
	Spiny gardenia	*Randia moorei*	2m	
	Yellow satinheart	*Bosistoa transversa*	1.5m (x 3)	
41	Fine-leaved tuckeroo	*Lepiderema pulchella*	3m	0545 067, 6878 951
	Yellow satinheart	*Bosistoa transversa*	15m	
	" "	" "	2m	
42	Yellow satinheart	*Bosistoa transversa*	1.5m	0545 066, 6878 957
	" "	" "	5m	
	Sweet myrtle	*Austromyrtus fragrantissima*	4m	
43	Sweet myrtle	*Austromyrtus fragrantissima*	4m	0545 073, 6878 974
	Spiny gardenia	*Randia moorei*	2m	
44	Spiny gardenia	*Randia moorei*	4m	0545 067, 6879 007
	Sweet myrtle	*Austromyrtus fragrantissima*	4m	
	" "	" "	3.5m	
45	Sweet myrtle	*Austromyrtus fragrantissima*	12m	0545 071, 6879 000
	" "	" "	2m	
	" "	" "	0.5m	
	Spiny gardenia	*Randia moorei*	1.5m	

Reference	Common Name	Scientific Name	Height	GPS
46	Sweet myrtle " " Spiny gardenia	*Austromyrtus fragrantissima* " " *Randia moorei*	1.5m (x 2) 5m 3m	0545 079, 6878 990
47	Yellow satinheart " " " "	*Bosistoa transversa* " " " "	2m (x 3) 2.5m (x 3) 6m	0545 081, 6879 001
58	Spiny gardenia " " Sweet myrtle " "	*Randia moorei* " " *Austromyrtus fragrantissima* " "	0.5m 3m 2.5m 1.5m	0545 070, 6878 997
59	Sweet myrtle " " Spiny gardenia " "	*Austromyrtus fragrantissima* " " *Randia moorei* " "	2m 3m 11m 1.5m	0545 063, 6879 003
50	Marblewood " " Yiel yiel Fine-leaved tuckeroo " " " "	*Acacia bakeri* " " *Grevillea hilliana* *Lepiderema pulchella* " " " "	0.5m (x 4) 1m (x 3) 9m 2m 0.5m (x 2) 1m	0545 061, 6879 011
51	Fine-leaved tuckeroo Sweet myrtle	*Lepiderema pulchella* *Austromyrtus fragrantissima*	4m 3.5m	0545 070, 0879 025

Reference	Common Name	Scientific Name	Height	GPS
52	Yiel yiel " " " "	*Grevillea hilliana* " " " "	21m 7m 3m (x 3)	0545 074, 6879 021
	Fine-leaved tuckeroo " " " "	*Lepiderema pulchella* " " " "	2.5m (x 2) 2m (x 3) 2.5m (x 2)	
	Marblewood " "	*Acacia bakeri* " "	1.5m 2m (x2)	
53	Marblewood Yellow satinheart	*Acacia bakeri* *Bosistoa transversa*	29m 4m	0545 071, 6879 009
54	Yiel yiel	*Grevillea hilliana*	2m (x 2)	0545 085, 6878 997
	Fine-leaved tuckeroo " " " " " "	*Lepiderema pulchella* " " " " " "	1.5m 1m (x 2) 5m 2m	
55	Yellow satinheart	*Bosistoa transversa*	2m (x 2)	0545 079, 6878 988
	Sweet myrtle " "	*Austromyrtus fragrantissima* " "	0.5m (x 2) 1m	

Reference	Common Name	Scientific Name	Height	GPS
56	Yellow satinheart " " Small-leaved tamarind	*Bosistoa transversa* " " *Diploglottis campbellii*	2m (x 2) 1.5m (x 3) 24m	0545 081, 6878 988
57	Yellow satinheart " " Spiny gardenia " "	*Bosistoa transversa* " " *Randia moorei* " "	1.5m 1m (x 3) 2m 1m	0545 086, 6878 986
58	Yellow satinheart " " Sweet myrtle	*Bosistoa transversa* " " *Austromyrtus fragrantissima*	3m 2m 2m	0545 087, 6878 981
59	Yellow satinheart	*Bosistoa transversa*	5m	0545 091, 6878 969
60	Yellow satinheart Sweet myrtle " "	*Bosistoa transversa* *Austromyrtus fragrantissima* " "	1.5m 2m 3.5m	0545 097, 6878 975
61	Rough-shelled bush nut " " " " Yellow satinheart " " Sweet myrtle	*Macadamia tetraphylla* " " " " *Bosistoa transversa* " " *Austromyrtus fragrantissima*	3m (x 2) 5m 0.5m 1.5m 2m 6.5m	15m north of last point
62	Spiny gardenia Sweet myrtle Yellow satinheart	*Randia moorei* *Austromyrtus fragrantissima* *Bosistoa transversa*	2.5m 3m 2m	0545 090, 6978 997

Reference	Common Name	Scientific Name	Height	GPS
63	Yellow satinheart “ “ Fine-leaved tuckeroo “ “ “ “	*Bosistoa transversa* “ “ *Lepiderema pulchella* “ “ “ “	6m 3m 2m 1.5m (x 2) 2m (x 3)	0545 100, 6878 998
64	Rough-shelled bush nut “ “ Fine-leaved tuckeroo	*Macadamia tetraphylla* “ “ *Lepiderema pulchella*	2m 15m 2m (x 2)	0545 110, 6878 977
65	Yellow satinheart “ “ Fine-leaved tuckeroo “ “	*Bosistoa transversa* “ “ *Lepiderema pulchella* “ “	2.5m 2m 1.5m (x 2) 2m	0545 120, 6878 980
66	Yellow satinheart “ “	*Bosistoa transversa* “ “	1.5m (x 3) 2m (x 3)	0545 132, 6878 970
67	Yellow satinheart “ “ Fine-leaved tuckeroo Sweet myrtle	*Bosistoa transversa* “ “ *Lepiderema pulchella* *Austromyrtus fragrantissima*	3m 2.5m 5m 1.5m	0545 140, 6878 991
68	Rough-shelled bush nut	*Macadamia tetraphylla*	3m	0545 137, 6878 979
69	Yellow satinheart “ “	*Bosistoa transversa* “ “	1.5m (x 2) 2m	0545 170, 6878 967

Reference	Common Name	Scientific Name	Height	GPS
70	Yellow satinheart	*Bosistoa transversa*	2m (x 2)	0545 164, 6878 958
71	Fine-leaved tuckeroo “ “ “ “ Yellow satinheart	*Lepiderema pulchella* “ “ “ “ *Bosistoa transversa*	2m 3m 6m 4m	0545 164, 6878 950
72	Yellow satinheart	*Bosistoa transversa*	1.5m	0545 158, 6878 944
73	Fine-leaved tuckeroo “ “ Yellow satinheart “ “	*Lepiderema pulchella* “ “ *Bosistoa transversa* “ “	2m (x 2) 1.5m (x 2) 1m (x 2) 1.5m (x 3)	0545 151, 6878 865
74	Rough-shelled bush nut Yellow satinheart Fine-leaved tuckeroo	*Macadamia tetraphylla* *Bosistoa transversa* *Lepiderema pulchella*	2m 6m 3m	0545 147, 6878 828
75	Rough-shelled bush nut	*Macadamia tetraphylla*	18m	0545 143, 6878 810
76	Yellow satinheart “ “	*Bosistoa transversa* “ “	4m 2m	0545 173, 6878 885
77	Yiel yiel Fine-leaved tuckeroo “ “	*Grevillea hilliana* *Lepiderema pulchella* “ “	3m 2m 2m	0545 180, 6878 971

Reference	Common Name	Scientific Name	Height	GPS
78	Fine-leaved tuckeroo “ “ “ “ “ “ “ “	*Lepiderema pulchella* “ “ “ “ “ “ “ “	18m 4m 4m 1.5m 1m (x 7)	0545 152, 6878 988
79	Fine-leaved tuckeroo “ “	*Lepiderema pulchella* “ “	3m (x 2) 1m (x 2)	0545 163, 6878 993
80	Yellow satinheart	*Bosistoa transversa*	2m	0545 193, 6878 955
81	Rough-shelled bush nut	*Macadamia tetraphylla*	5m	0545 219, 6878 950
82	Yellow satinheart “ “ Fine-leaved tuckeroo	*Bosistoa transversa* “ “ *Lepiderema pulchella*	4m 3m 1.5m	0545 225, 6878 945
83	Fine-leaved tuckeroo “ “	*Lepiderema pulchella* “ “	4m (x 2) 2m (x 2)	0545 239, 6878 936
84	Rough-shelled bush nut	*Macadamia tetraphylla*	19m	0545 255, 6878 927
85	Rough-shelled bush nut	*Macadamia tetraphylla*	1.5m	0545 249, 6878 902
86	Fine-leaved tuckeroo “ “ “ “ Yellow satinheart	*Lepiderema pulchella* “ “ “ “ *Bosistoa transversa*	2.5m (x2) 1m (x 2) 1.5m 1.5m	0545 249, 6878 880

Reference	Common Name	Scientific Name	Height	GPS
87	Yellow satinheart " " Rough-shelled bush nut	*Bosistoa transversa* " " *Macadamia tetraphylla*	2m (x 3) 5m 2m	0545 216, 6878 883
88	Yellow satinheart Fine-leaved tuckeroo	*Bosistoa transversa* *Lepiderema pulchella*	1.5m 1m (x 3)	0545 212, 6878 888
89	Fine-leaved tuckeroo Rough-shelled bush nut " " Yellow satinheart	*Lepiderema pulchella* *Macadamia tetraphylla* " " *Bosistoa transversa*	2m (x 3) 7m 3.5m 4m	0545 181, 6878 865
90	Rough-shelled bush nut " " Yellow satinheart	*Macadamia tetraphylla* " " *Bosistoa transversa*	2m (x 3) 1m 1.5m	0545 190, 6878 870
91	Yellow satinheart " "	*Bosistoa transversa* " "	4m 1.5m (x 2)	0545 222, 6878 845
92	Southern ochrosia Fine-leaved tuckeroo " "	*Ochrosia moorei* *Lepiderema pulchella* " "	5.5m 2m (x 6) 1m (x 4)	0545 221, 6878 850
93	Fine-leaved tuckeroo " "	*Lepiderema pulchella* " "	2.5m (x 2) 1m (x 6)	0545 218, 6878 865

Reference	Common Name	Scientific Name	Height	GPS
94	Southern ochrosia “ “ “ “ “ “ “ “ “ “ “ “ “ “ “ “ “ “	*Ochrosia moorei* “ “ “ “ “ “ “ “ “ “ “ “ “ “ “ “ “ “	2.5m (x 8) 0.5m (x 3) 3m (x 12) 5m 2m (x 6) 6m 4m 3m (x 2) 5m 6m (x 7)	0545 217, 6878 839
	Fine-leaved tuckeroo “ “	*Lepiderema pulchella* “ “	3.5m 2m (x 3)	
	Yellow satinheart	*Bosistoa transversa*	2m (x 3)	
95	Fine-leaved tuckeroo “ “	*Lepiderema pulchella* “ “	4m (x 2) 1m (x4)	0545 169, 6878 656
	Yellow satinheart	*Bosistoa transversa*	4.5m	
96	Yellow satinheart	*Bosistoa transversa*	7m	20m south of last point

Reference	Common Name	Scientific Name	Height	GPS
97	Small-leaved tamarind “ “ Yellow satinheart Rough-shelled bush nut “ “ “ “ Coolamon	*Diploglottis campbellii* “ “ *Bosistoa transversa* *Macadamia tetraphylla* “ “ “ “ *Syzygium moorei*	2.5m 28m 5m 4m (x 2) 9m 0.5m 26m	0545 144, 6878 817
98	Yellow satinheart Rough-shelled bush nut	*Bosistoa transversa* *Macadamia tetraphylla*	5m 12m	30m east of last point
99	Southern ochrosia “ “ “ “	*Ochrosia moorei* “ “ “ “	4m (x3) 1m (x2) 5m	25m east of last point
100	Yellow satinheart “ “	*Bosistoa transversa* “ “	7m 1m (x 5)	0545 205, 6878 832
101	Small-leaved tamarind Yellow satinheart	*Diploglottis campbellii* *Bosistoa transversa*	1m 1.5m (x2)	25m north of last point
102	Yellow satinheart “ “ Rough-shelled bush nut	*Bosistoa transversa* “ “ *Macadamia tetraphylla*	3m 0.5m (x 2) 0.5m	25m north of last point
103	Spiny gardenia Fine-leaved tuckeroo	*Randia moorei* *Lepiderema pulchella*	1.5m 2m	20m NNE of last point

Reference	Common Name	Scientific Name	Height	GPS
104	Rough-shelled bush nut	*Macadamia tetraphylla*	2m	20m east of last point
	Fine-leaved tuckeroo	*Lepiderema pulchella*	2m (x2)	
	" "	" "	1m (x4)	
	Yellow satinheart	*Bosistoa transversa*	2m (x2)	
105	Sweet myrtle	*Austromyrtus fragrantissima*	1.5m	20m north of last point
	Spiny gardenia	*Randia moorei*	2m	
	Yellow satinheart	*Bosistoa transversa*	2m	
	Yiel yiel	*Grevillea hilliana*	3.5m	
	Fine-leaved tuckeroo	*Lepiderema pulchella*	1m (x3)	
106	Rough-shelled bush nut	*Macadamia tetraphylla*	2.5m	25m NNW of last point
	Fine-leaved tuckeroo	*Lepiderema pulchella*	2.5m	
107	Rough-shelled bush nut	*Macadamia tetraphylla*	4m	10m NNW of last point
108	Fine-leaved tuckeroo	*Lepiderema pulchella*	1.5m	10m north of last point
109	Yellow satinheart	*Bosistoa transversa*	2m	0545 345, 6878 957
110	Yiel yiel	*Grevillea hilliana*	2m	0545 327, 6878 971
	Yellow satinheart	*Bosistoa transversa*	5m	
111	Rough-shelled bush nut	*Macadamia tetraphylla*	4m	0545 363, 6878 936
	Yiel yiel	*Grevillea hilliana*	2.5m	
112	Fine-leaved tuckeroo	*Lepiderema pulchella*	1.5m	0545 339, 6878 929
	" "	" "	2m (x3)	
	" "	" "	7m	
113	Fine-leaved tuckeroo	*Lepiderema pulchella*	14m	0545 366, 6878 924

Reference	Common Name	Scientific Name	Height	GPS
114	Fine-leaved tuckeroo	*Lepiderema pulchella*	2m (x4)	0545 374, 6878 922
115	Fine-leaved tuckeroo " "	*Lepiderema pulchella* " "	4m 2m (x4)	0545 377, 6878 905
116	Rough-shelled bush nut Fine-leaved tuckeroo	*Macadamia tetraphylla* *Lepiderema pulchella*	5m 1.5m (x6)	0545 382, 6878 881
117	Yiel yiel	*Grevillea hilliana*	0.5m	0545 372, 6878 859
118	Fine-leaved tuckeroo	*Lepiderema pulchella*	2m (x3)	0545 378, 6878 815
119	Yellow satinheart Fine-leaved tuckeroo Rough-shelled bush nut	*Bosistoa transversa* *Lepiderema pulchella* *Macadamia tetraphylla*	3m (x4) 1.5m (x2) 1.5m (x3)	0545 355, 6878 832
120	Yellow satinheart	*Bosistoa transversa*	6m	0545 350, 6878 826
121	Spiny gardenia Rough-shelled bush nut Fine-leaved tuckeroo	*Randia moorei* *Macadamia tetraphylla* *Lepiderema pulchella*	1.5m 2m 1m (x4)	0545 338, 6878 835
122	Yellow satinheart	*Bosistoa transversa*	1.5m (x2)	0545 328, 6878 799
123	Small-leaved tamarind	*Diploglottis campbellii*	30m	0545 268, 6878 835
124	Yellow satinheart Rough-shelled bush nut	*Bosistoa transversa* *Macadamia tetraphylla*	1.5m 2.5m	0545 296, 6878 788

Reference	Common Name	Scientific Name	Height	GPS
125	Rough-shelled bush nut	*Macadamia tetraphylla*	3m	20m south-west of last point
126	Yellow satinheart “ “ Rough-shelled bush nut	*Bosistoa transversa* “ “ *Macadamia tetraphylla*	6m 24 (x4) 3m	0545 284, 6878 756
127	Rusty rose walnut	*Endiandra hayesii*	2m	0545 278, 6878 751
128	Fine-leaved tuckeroo Yellow satinheart	*Lepiderema pulchella* *Bosistoa transversa*	2m (x2) 1.5m (x3)	0545 282, 6878 762
129	Yellow satinheart	*Bosistoa transversa*	3m	0545 329, 6878 747
130	Yellow satinheart	*Bosistoa transversa*	1.5m (x3)	25m NNE from last point
131	Fine-leaved tuckeroo “ “ “ “ Yellow satinheart	*Lepiderema pulchella* “ “ “ “ *Bosistoa transversa*	6m (x2) 1m (x3) 0.5m (x3) 1m (x2)	10m north from last point
132	Fine-leaved tuckeroo “ “ “ “	*Lepiderema pulchella* “ “ “ “	2.5m (x2) 5m 0.5m (x4)	20m NW of last point

Reference	Common Name	Scientific Name	Height	GPS
133	Rough-shelled bush nut Fine-leaved tuckeroo	*Macadamia tetraphylla* *Lepiderema pulchella*	5.5m 3m	20m north from last point
134	Fine-leaved tuckeroo Spiny gardenia	*Lepiderema pulchella* *Randia moorei*	1.5m (x2) 2m	20m NNE from last point
135	Yiel yiel Fine-leaved tuckeroo	*Grevillea hilliana* *Lepiderema pulchella*	2m 2m (x2)	0545 326, 6878 874
136	Yiel yiel " " " " Fine-leaved tuckeroo	*Grevillea hilliana* " " " " *Lepiderema pulchella*	4m (x2) 2m 1m (x4) 1m (x4)	20m NW of last point
137	Rough-shelled bush nut Fine-leaved tuckeroo	*Macadamia tetraphylla* *Lepiderema pulchella*	1m 1m (x2)	0545 397, 6878 938
138	Rough-shelled bush nut " "	*Macadamia tetraphylla* " "	14m 5m	0545 405, 6878 940
139	Rough-shelled bush nut	*Macadamia tetraphylla*	3m (x3)	0545 432, 6878 937
140	Fine-leaved tuckeroo Sweet myrtle " "	*Lepiderema pulchella* *Austromyrtus fragrantissima* " "	4.5m 3m 1.5m (x2)	0545 449, 6878 933
141	Yiel yiel	*Grevillea hilliana*	13m	0545 456, 6878 905

Reference	Common Name	Scientific Name	Height	GPS
142	Fine-leaved tuckeroo " "	*Lepiderema pulchella* " "	17m 1m (x11)	0545 469, 6878 916
143	Fine-leaved tuckeroo " "	*Lepiderema pulchella* " "	4m 2m (x3)	0545 488, 6878 911
144	Fine-leaved tuckeroo " " " " " "	*Lepiderema pulchella* " " " " " "	12m 10m 6m 1m (x9)	0545 500, 6878 907
145	Fine-leaved tuckeroo	*Lepiderema pulchella*	2m (x4)	0545 489, 6878 890
146	Fine-leaved tuckeroo " "	*Lepiderema pulchella* " "	2.5m 4m	0545 566, 6878 925
147	Fine-leaved tuckeroo	*Lepiderema pulchella*	3m (x2)	0545 567, 6878 928
148	Rough-shelled bush nut Fine-leaved tuckeroo	*Macadamia tetraphylla* *Lepiderema pulchella*	10m 2m (x3)	0545 576, 6878 921
149	Rough-shelled bush nut " "	*Macadamia tetraphylla* " "	5m 4.5m (x6)	0545 623, 6878 884
150	Rough-shelled bush nut	*Macadamia tetraphylla*	1.5m	0545 622, 6878 857
151	Rough-shelled bush nut " " Fine-leaved tuckeroo	*Macadamia tetraphylla* " " *Lepiderema pulchella*	8m 1m 3m (x3)	20m SSE of last point

Reference	Common Name	Scientific Name	Height	GPS
152	Rough-shelled bush nut	*Macadamia tetraphylla*	0.5m (x3)	0545 584, 6878 844
153	Rough-shelled bush nut " "	*Macadamia tetraphylla* " "	3 (x4) 12m	0545 574, 6878 744
154	Rough-shelled bush nut " " " " Fine-leaved tuckeroo " "	*Macadamia tetraphylla* " " " " *Lepiderema pulchella* " "	6m 2m 10m 2m (x3) 3m	0545 566, 6878 670
155	Rough-shelled bush nut Fine-leaved tuckeroo	*Macadamia tetraphylla* *Lepiderema pulchella*	12m (x2) 1m (x3)	20m SW of last point
156	Rough-shelled bush nut	*Macadamia tetraphylla*	20m	30m SW of last point
157	Rough-shelled bush nut " "	*Macadamia tetraphylla* " "	6m 8m	30m south of last point
158	Yiel yiel Rough-shelled bush nut	*Grevillea hilliana* *Macadamia tetraphylla*	2.5m 1m (x4)	0545 533, 6878 740
159	Fine-leaved tuckeroo " "	*Lepiderema pulchella* " "	2.5m 1m (x 15)	0545 534, 6878 688

Reference	Common Name	Scientific Name	Height	GPS
160	Small-leaved tamarind	*Diploglottis campbellii*	25m	40m WNW of last point
	Yellow satinheart	*Bosistoa transversa*	2m (x3)	
	Yiel yiel	*Grevillea hilliana*	5m	
	Spiny gardenia	*Randia moorei*	2m	
161	Spiny gardenia	*Randia moorei*	1m	10m North of last point
	Yellow satinheart	*Bosistoa transversa*	2m	
162	Fine-leaved tuckeroo	*Lepiderema pulchella*	2m (x5)	30m NW of last point
	Rough-shelled bush nut	*Macadamia tetraphylla*	6m	
	" "	" "	5m	
163	Fine-leaved tuckeroo	*Lepiderema pulchella*	2m (x4)	50m North of last point
164	Rough-shelled bush nut	*Macadamia tetraphylla*	1.5m	10m North of last point
	" "	" "	3m	
165	Spiny gardenia	*Austromyrtus fragrantissima*	8m	40m NE of last point
	" "	" "	4m	
	Fine-leaved tuckeroo	*Lepiderema pulchella*	1m (x 6)	
166	Rough-shelled bush nut	*Macadamia tetraphylla*	4m	50m NE of last point
	" "	" "	1.5m	
167	Fine-leaved tuckeroo	*Lepiderema pulchella*	3m	0545 828, 6880 109
168	Rough-shelled bush nut	*Macadamia tetraphylla*	2m	0545 814, 6880 106
169	Rough-shelled bush nut	*Macadamia tetraphylla*	16m	0545 816, 6880 119
170	Fine-leaved tuckeroo	*Lepiderema pulchella*	2.5m	0545 799, 6880 078
	" "	" "	1m	
	" "	" "	2m	

Reference	Common Name	Scientific Name	Height	GPS
171	Fine-leaved tuckeroo " "	*Lepiderema pulchella* " "	1m 2m	0545 739, 6880 000
172	Fine-leaved Tuckeroo " "	*Lepiderema pulchella* " "	4m (x2) 2m	0545 770, 6879 987
173	Fine-leaved tuckeroo " " " " " "	*Lepiderema pulchella* " " " " " "	3m (x2) 8m 4m (x2) 2m (x3)	0545 756, 6880 007
174	Fine-leaved tuckeroo	*Lepiderema pulchella*	6m	0545 775, 6879 956
175	Fine-leaved tuckeroo	*Lepiderema pulchella*	2m	0545 768, 6879 932
176	Fine-leaved tuckeroo Coolamon	*Lepiderema pulchella* *Syzygium moorei*	4m 17m	0545 775, 6879 900
177	Coolamon	*Syzygium moorei*	16m (x2)	0545 812, 6879 888
178	Yiel yiel	*Grevillia hilliana*	6m	0545 824, 6879 859
179	Coolamon Fine-leaved tuckeroo " "	*Syzygium moorei* *Lepiderema pulchella* " "	8m 1m 1.5m	0545 799, 6879 864
180	Fine-leaved Tuckeroo " "	*Lepiderema pulchella* " "	2m 30cm	0545 754, 6879 846
181	Rough-shelled bush nut " "	*Macadamia tetraphylla* " "	12m 2m	0545 833, 6879 755
182	Rough-shelled bush nut " " Fine-leaved tuckeroo	*Macadamia tetraphylla* " " *Lepiderema pulchella*	6m 2m 6m	0545 840, 6879 776

Reference	Common Name	Scientific Name	Height	GPS
183	Rough-shelled bush nut “ “ “ “ “ “	*Macadamia tetraphylla* “ “ “ “ “ “	3m 2m (x2) 3m 1.5m	0545 849, 6879 792
184	Fine-leaved Tuckeroo Rough-shelled bush nut	*Lepiderema pulchella* *Macadamia tetraphylla*	5m 30cm	0545 853, 6879 800
185	Fine-leaved Tuckeroo	*Lepiderema pulchella*	9m	0545 849, 6879 800
186	Rough-shelled bush nut	*Macadamia tetraphylla*	1m (x2)	0545 838, 6879 779
187	Fine-leaved Tuckeroo “ “	*Lepiderema pulchella* “ “	8m 1m (x20)	0545 829, 6879 736
188	Fine-leaved Tuckeroo	*Lepiderema pulchella*	4m	0545 829, 6879 732
189	Fine-leaved Tuckeroo	*Lepiderema pulchella*	8m	0545 677, 6879 716
190	Fine-leaved Tuckeroo “ “	*Lepiderema pulchella* “ “	2m 1m	0545 747, 6880 044
191	Fine-leaved Tuckeroo “ “ “ “	*Lepiderema pulchella* “ “ “ “	3m (x2) 1m (x3) 2m	0545 744, 6880 045
192	Fine-leaved Tuckeroo	*Lepiderema pulchella*	3m	0545 748, 6880 054
193	Rough-shelled bush nut	*Macadamia tetraphylla*	3m	0545 656, 6880 688
194	Fine-leaved Tuckeroo	*Lepiderema pulchella*	10m	0545 663, 6880 137
195	Fine-leaved Tuckeroo	*Lepiderema pulchella*	7m	0545 718, 6880 133
196	Fine-leaved Tuckeroo	*Lepiderema pulchella*	8m	0545 714, 6880 139
197	Ball nut	*Floydia praealta*	14m	0545 465, 6880 178
198	White laceflower “ “ “ “ “ “ Rough-shelled bush nut	*Archidendron hendersonii* “ “ “ “ “ “ *Macadamia tetraphylla*	10m 8m 3m 2m 4m (x2)	0545 465, 6880 199

Reference	Common Name	Scientific Name	Height	GPS
199	Fine-leaved tuckeroo	*Lepiderema pulchella*	12m	0545 651, 6880 125
200	Fine-leaved tuckeroo	*Lepiderema pulchella*	12m	0545 686, 6880 057
201	Fine-leaved tuckeroo	*Lepiderema pulchella*	5m	0545 699, 6880 092
202	Fine-leaved tuckeroo	*Lepiderema pulchella*	(x2)	0545 690, 6880 103
203	Fine-leaved tuckeroo	*Lepiderema pulchella*	7m	0545 597, 6880 123
204	Rough-shelled bush nut	*Macadamia tetraphylla*	10m	0545 559, 6880 086
205	Rough-shelled bush nut “ “ “ “	*Macadamia tetraphylla* “ “ “ “	8m 7m 2m	0545 561, 6880 043
206	Rough-shelled bush nut “ “ “ “ “ “ “ “	*Macadamia tetraphylla* “ “ “ “ “ “ “ “	5m 7m 1m 3m 10m	0545 571, 6880 014
207	Rough-shelled bush nut “ “ “ “ “ “	*Macadamia tetraphylla* “ “ “ “ “ “	14m 2m (x6) 4m 3m	0545 569, 6879 994
208	Rough-shelled bush nut “ “ “ “ Fine-leaved tuckeroo	*Macadamia tetraphylla* “ “ “ “ *Lepiderema pulchella*	4m 10m 9m	0545 582, 6879 969
209	Rough-shelled bush nut “ “	*Macadamia tetraphylla* “ “	12m 8m	0545 599 6879 952
210	Fine-leaved tuckeroo	*Lepiderema pulchella*	7m	0545 665, 6879 928
211	Three-leaved bosistoa “ “	*Bosistoa transversa* “ “	0.5m 1m	0545 668, 6879 827

Reference	Common Name	Scientific Name	Height	GPS
212	Spiny gardenia " " Fine-leaved tuckeroo	*Randia moorei* " " *Lepiderema pulchella*	7m (x6) 3m 2m (x3)	0545 508, 6879 849
213	Fine-leaved tuckeroo " "	*Lepiderema pulchella* " "	8m (x2) 5m	0545 505, 6879 797
214	Rough-shelled bush nut " " " " " " " "	*Macadamia tetraphylla* " " " " " " " "	20m 2m 5m (x2 1m 3m (x2)	0545 503, 6879 933
215	Fine-leaved tuckeroo " " " "	*Lepiderema pulchella* " " " "	3m (x4) 2m(x2) 16m	0545 523, 6879 919
216	Fine-leaved tuckeroo	*Lepiderema pulchella*	3m (x3) 2.5m	0545 523, 6879 891
217	Fine-leaved Tuckeroo " " " " " " " "	*Lepiderema pulchella* " " " " " " " "	6m 1.5m 2m 8m 1m	0545 513, 6879 878
218	Fine-leaved tuckeroo	*Lepiderema pulchella*	12m	0545 482, 6879 885
219	Fine-leaved tuckeroo	*Lepiderema pulchella*	18m	0545 482, 6879 874
220	Fine-leaved tuckeroo	*Lepiderema pulchella*	2m	0545 482, 6879 924
221	Fine-leaved tuckeroo	*Lepiderema pulchella*	5m	0545 441, 6879 495
222	Fine-leaved tuckeroo	*Lepiderema pulchella*	3m	0545 443, 6879 496

Reference	Common Name	Scientific Name	Height	GPS
223	Rough-shelled bush nut “ “ “ “	*Macadamia tetraphylla* “ “ “ “	1m (x2) 1.5m (x3) 0.3m	0545 395, 6879 605
224	Fine-leaved tuckeroo “ “	*Lepiderema pulchella* “ “	2m 0.3m (x3)	0545 431, 6879 709
225	Fine-leaved tuckeroo	*Lepiderema pulchella*	1m	0545 500, 6879 624
226	Fine-leaved tuckeroo “ “ “ “	*Lepiderema pulchella* “ “ “ “	1.5m 1m (x2) 0.3m (x3)	0545 561, 6879 722
227	Fine-leaved tuckeroo “ “ “ “ “ “	*Lepiderema pulchella* “ “ “ “ “ “	18m 3m (x2) 5m (x2) 1.5m (x3)	0545 584, 6879 738
228	Fine-leaved tuckeroo	*Lepiderema pulchella*	1.5m	0545 594, 6879 720
229	Fine-leaved tuckeroo	*Lepiderema pulchella*	3m	0545 534, 6879 779
230	Fine-leaved tuckeroo	*Lepiderema pulchella*	3m (x2)	0545 517, 6879 736

Reference	Common Name	Scientific Name	Height	GPS
231	Fine-leaved tuckeroo “ “ “ “ “ “	*Lepiderema pulchella* “ “ “ “ “ “	5m 2m (x2) 1m 0.5m (x2)	0545 504, 6879 753
232	Fine-leaved tuckeroo	*Lepiderema pulchella*	2m	0545 411, 6879 825
233	Rough-shelled bush nut	*Macadamia tetraphylla*	10m	0545 378, 6880 313
234	Rough-shelled bush nut	*Macadamia tetraphylla*	7m	0545 353, 6880 309
235	Rough-shelled bush nut	*Macadamia tetraphylla*	4m	0545 366, 6880 334
236	Rough-shelled bush nut	*Macadamia tetraphylla*	12m	0545 350, 6880 342
237	Fine-leaved tuckeroo “ “	*Lepiderema pulchella* “ “	3m 8m (x2)	0545 276, 6880 285
238	Bopple nut “ “ “ “ “ “ “ “ Rough-shelled bush nut “ “	*Hicksbeachia pinnatifolia* “ “ “ “ “ “ “ “ *Macadamia tetraphylla* “ “	10m (x2) 3m 1.5m 1m 0.5m (x2) 4m 1.5m	0545 304, 6880 285
239	Rough-shelled bush nut “ “ “ “	*Macadamia tetraphylla* “ “ “ “	3m 1m 0.5m (x3)	0545 240, 6880 268
240	Rough-shelled bush nut	*Macadamia tetraphylla*	6m	0545 245, 6880 261

Reference	Common Name	Scientific Name	Height	GPS
241	Fine-leaved tuckeroo	*Lepiderema pulchella*	2m	0545 244, 6880 242
242	Marblewood	*Acacia bakeri*	18m	0545 233, 6880 245
243	Rough-shelled bush nut	*Macadamia tetraphylla*	5m	0545 217, 6880 251
244	Bopple nut “ “ “ “ “ “ “ “	*Hicksbeachia pinnatifolia* “ “ “ “ “ “ “ “	10m 2.5m 1.5m 3m 1m (x2)	0545 190, 6880 280
245	Bopple nut	*Hicksbeachia pinnatifolia*	5m	0545 214, 6880 284
246	Bopple nut “ “	*Hicksbeachia pinnatifolia* “ “	6m 0.5m	0545 213, 6880 288
247	Fine-leaved tuckeroo	*Lepiderema pulchella*	5m	0545 209, 6880 296
248	Bopple nut “ “ “ “ Fine-leaved tuckeroo	*Hicksbeachia pinnatifolia* “ “ “ “ *Lepiderema pulchella*	7m 3m 1.5m 1.5m	0545 198, 6880 282
249	Fine-leaved tuckeroo “ “ “ “	*Lepiderema pulchella* “ “ “ “	4m 7m 2m	0545 195, 6880 152
250	Fine-leaved tuckeroo	*Lepiderema pulchella*	6m	0545 207, 6880 210
251	Fine-leaved tuckeroo “ “ “ “	*Lepiderema pulchella* “ “ “ “	8m 6m 2m	0545 213, 6880 216
252	Rough-shelled bush nut “ “	*Macadamia tetraphylla* “ “	1m 0.6m	0545 232, 6880 212

Reference	Common Name	Scientific Name	Height	GPS
253	Rough-shelled bush nut “ “ “ “	*Macadamia tetraphylla* “ “ “ “	8m 1m 0.5m (x5)	0545 218, 6880 122
254	Rough-shelled bush nut	*Macadamia tetraphylla*	1m	0545 306, 6880 153
255	Rough-shelled bush nut	*Macadamia tetraphylla*	8m	0545 317, 6880 169
256	Rough-shelled bush nut	*Macadamia tetraphylla*	5m	0545 352, 6880 264
257	Fine-leaved tuckeroo “ “	*Lepiderema pulchella* “ “	9m 0.5m	0545 348, 6880 287
258	Rough-shelled bush nut	*Macadamia tetraphylla*	6m	0545 331, 6880 310
259	Rough-shelled bush nut “ “	*Macadamia tetraphylla* “ “	3m 1m (x2)	0545 144, 6879 438
260	Sweet myrtle Rough-shelled bush nut Fine-leaved tuckeroo	*Austromyrtus fragrantissima* *Macadamia tetraphylla* *Lepiderema pulchella*	7m 2m (x2) 1.5m	0545 144, 6879 417
261	Fine-leaved tuckeroo “ “ Rough-shelled bush nut	*Lepiderema pulchella* “ “ *Macadamia tetraphylla*	2m 1m 2m	0545 127, 6879 402
262	Fine-leaved tuckeroo	*Lepiderema pulchella*	3m (x2)	0545 138, 6880 013
263	Fine-leaved tuckeroo	*Lepiderema pulchella*	1.5m	0545 122, 6880 015
264	Fine-leaved tuckeroo	*Lepiderema pulchella*	2m (x2)	0545 110, 6880 009
265	Fine-leaved tuckeroo “ “	*Lepiderema pulchella* “ “	5m 2m (x2)	0545 097, 6879 980

Reference	Common Name	Scientific Name	Height	GPS
266	Fine-leaved tuckeroo	*Lepiderema pulchella*	1.5m	0545 110, 6879 933
267	Fine-leaved tuckeroo " "	*Lepiderema pulchella* " "	4m 2m (x2)	0545 118, 6879 940
268	Fine-leaved tuckeroo	*Lepiderema pulchella*	4m	0545 119, 6879 942
269	Rough-shelled bush nut Fine-leaved tuckeroo	*Macadamia tetraphylla* *Lepiderema pulchella*	10m 4m	0545 095, 6879 937
270	Fine-leaved tuckeroo " "	*Lepiderema pulchella* " "	3m (x2) 0.5m	0545 138, 6879 897
271	Fine-leaved tuckeroo	*Lepiderema pulchella*	9m	0545 139, 6879 890
272	Fine-leaved tuckeroo " "	*Lepiderema pulchella* " "	4m 3m	0545 152, 6879 879
273	Fine-leaved tuckeroo " "	*Lepiderema pulchella* " "	1m (x10) 0.3m (x5)	0545 140, 6879 874
274	Fine-leaved tuckeroo	*Lepiderema pulchella*	2m (x3)	0545 116, 6879 903
275	Fine-leaved tuckeroo	*Lepiderema pulchella*	5m	0545 093, 6879 833
276	Fine-leaved tuckeroo	*Lepiderema pulchella*	3m	0545 092, 6879 845
277	Fine-leaved tuckeroo " " " "	*Lepiderema pulchella* " " " "	4m 2m (x2) 0.3m	0545 095, 6879 829

Reference	Common Name	Scientific Name	Height	GPS
278	Fine-leaved tuckeroo " "	*Lepiderema pulchella* " "	2m (x2) 1.5m (x2)	0545 100, 6879 822
279	Fine-leaved tuckeroo " "	*Lepiderema pulchella* " "	5m 1m	0545 100, 6879 812
280	Fine-leaved tuckeroo " "	*Lepiderema pulchella* " "	1.5m 1m (x3)	0545 108, 6879 796
281	Rough-shelled bush nut	*Macadamia tetraphylla*	4m	0545 075, 6879 709
282	Rough-shelled bush nut " "	*Macadamia tetraphylla* " "	2m 1.5m	0545 064, 6879 633
283	Rough-shelled bush nut	*Macadamia tetraphylla*	6m (x2)	0545 074, 6879 618
284	Rough-shelled bush nut	*Macadamia tetraphylla*	3m	0545 074, 6879 623
285	Rough-shelled bush nut Fine-leaved tuckeroo	*Macadamia tetraphylla* *Lepiderema pulchella*	4m 1m (x3)	0545 154, 6879 495
286	Fine-leaved tuckeroo " "	*Lepiderema pulchella* " "	2.5m 0.5m (x3)	0545 160, 6879 627
287	Fine-leaved tuckeroo	*Lepiderema pulchella*	2m (x2)	0545 176, 6879 702
288	Fine-leaved tuckeroo	*Lepiderema pulchella*	0.5m	0545 727, 6879 575

Reference	Common Name	Scientific Name	Height	GPS
289	Fine-leaved tuckeroo “ “ “ “	*Lepiderema pulchella* “ “ “ “	1.5m (x2) 0.5m (x2) 0.3m	0545 260, 6879 273
290	Fine-leaved tuckeroo	*Lepiderema pulchella*	1.5m (x2)	0545 259, 6879 571
291	Fine-leaved tuckeroo “ “	*Lepiderema pulchella* “ “	1m (x2) 0.5m	0545 264, 6879 545
292	Fine-leaved tuckeroo “ “ “ “	*Lepiderema pulchella* “ “ “ “	3m 2m 0.3m (x5)	0545 269, 6879 528
293	Fine-leaved tuckeroo	*Lepiderema pulchella*	4m	0545 248, 6879 539
294	Fine-leaved tuckeroo	*Lepiderema pulchella*	3m	0545 237, 6879 534
295	Fine-leaved tuckeroo	*Lepiderema pulchella*	2m	0545 238, 6879 535
296	Fine-leaved tuckeroo “ “	*Lepiderema pulchella* “ “	1.5m 0.3m (x2)	0545 222, 6879 531
297	Rough-shelled bush nut	*Macadamia tetraphylla*	9m	0545 205, 6879 289
298	Rough-shelled bush nut	*Macadamia tetraphylla*	10m	0545 194, 6879 255

Reference	Common Name	Scientific Name	Height	GPS
299	Fine-leaved tuckeroo “ “ “ “ “ “ Yiel yiel	*Lepiderema pulchella* “ “ “ “ “ “ *Grevillea hilliana*	4.5m 1m (x5) 0.5m (x5) 0.3m (x7) 1m	0545 090, 6879 238
300	Fine-leaved tuckeroo “ “	*Lepiderema pulchella* “ “	7m 1m	0545 066, 6879 325
301	Fine-leaved tuckeroo “ “	*Lepiderema pulchella* “ “	0.5m 0.3m	0545 029, 6879 380
302	Fine-leaved tuckeroo	*Lepiderema pulchella*	2m	0545 006, 6879 356
303	Fine-leaved tuckeroo “ “ “ “ Stinking laurel “ “	*Lepiderema pulchella* “ “ “ “ *Cryptocarya foetida* “ “	2m 0.5m 0.3m 0.5m (x2) 1.5m	0545 012, 6879 340
304	Stinking laurel “ “ “ “ “ “	*Cryptocarya foetida* “ “ “ “ “ “	1.5m 2m (x5) 2.5m 4m (x2)	0545 024, 6879 342
305	Sweet myrtle	*Austromyrtus fragrantissima*	7m	0545 042, 6879 359

Reference	Common Name	Scientific Name	Height	GPS
306	Stinking laurel “ “ “ “ “ “	*Cryptocarya foetida* “ “ “ “ “ “	1.5m 0.5m (x5) 1m 2m	0545 046, 6879 348
307	Stinking laurel “ “ “ “	*Cryptocarya foetida* “ “ “ “	2m (x20) 0.5m (x4) 0.3m (x5)	0545 041, 6879 344
	Fine-leaved tuckeroo	*Lepiderema pulchella*	0.5m	
308	Stinking laurel	*Cryptocarya foetida*	0.3m (x5)	0545 039, 6879 328
	Fine-leaved tuckeroo	*Lepiderema pulchella*	0.5m	
	Spiny gardenia	*Randia moorei*	2.5m	
309	Stinking laurel	*Cryptocarya foetida*	0.3m (x10)	0545 023, 6879 329
310	Stinking laurel “ “	*Cryptocarya foetida* “ “	1m (x4) 0.3m (x30)	0545 016, 6879 328
311	Stinking laurel “ “	*Cryptocarya foetida* “ “	0.5m (x4) 0.3m	0545 039, 6879 308
312	Fine-leaved tuckeroo “ “	*Lepiderema pulchella* “ “	3m 1.5m	0545 044, 6879 302

Reference	Common Name	Scientific Name	Height	GPS
313	Fine-leaved tuckeroo “ “ Stinking laurel	*Lepiderema pulchella* “ “ *Cryptocarya foetida*	1.5m 0.3m (x2) 0.5m	0545 015, 6879 304
314	Fine-leaved tuckeroo Yiel yiel Stinking laurel	*Lepiderema pulchella* *Grevillea hilliana* *Cryptocarya foetida*	2m (x2) 6m 1m	0545 038, 6879 289
315	Stinking laurel Fine-leaved tuckeroo “ “	*Cryptocarya foetida* *Lepiderema pulchella* “ “	2m 10m 0.3m	0545 043, 6879 301
316	Fine-leaved tuckeroo “ “ “ “	*Lepiderema pulchella* “ “ “ “	1.5m (x4) 0.5m (x2) 1m	0545 051, 6879 296
317	Stinking laurel “ “ Fine-leaved tuckeroo	*Cryptocarya foetida* “ “ *Lepiderema pulchella*	2m (x5) 0.5m (x4) 1m (x2)	0545 042, 6879 267
318	Fine-leaved tuckeroo Stinking laurel	*Lepiderema pulchella* *Cryptocarya foetida*	1.5m 1.5m (x5)	0545 031, 6879 264

Reference	Common Name	Scientific Name	Height	GPS
319	Fine-leaved tuckeroo Stinking laurel “ “ “ “ “ “	*Lepiderema pulchella* *Cryptocarya foetida* “ “ “ “ “ “	1.5m (x6) 4m 3m (x2) 2.5m 1m (x4)	0545 020, 6879 261
320	Fine-leaved tuckeroo “ “ Stinking laurel	*Lepiderema pulchella* “ “ *Cryptocarya foetida*	6m 3m 1.5m	0545 016, 6879 264
321	Fine-leaved tuckeroo “ “ “ “ “ “	*Lepiderema pulchella* “ “ “ “ “ “	18m 5m 1m (x8) 0.3m (x5)	0544 996, 6879 255
322	Fine-leaved tuckeroo	*Lepiderema pulchella*	3m	0544 993, 6879 255
323	Fine-leaved tuckeroo “ “ “ “	*Lepiderema pulchella* “ “ “ “	7m 1m (x2) 3m	0545 015, 6879 260
324	Stinking laurel “ “	*Cryptocarya foetida* “ “	1m 0.3m (x2)	0545 033, 6879 256

Reference	Common Name	Scientific Name	Height	GPS
325	Fine-leaved tuckeroo “ “ “ “ “ “	*Lepiderema pulchella* “ “ “ “ “ “	2m 1.5m 1m 0.3m (x4)	0545 038, 6879 320
326	Fine-leaved tuckeroo “ “ “ “ “ “	*Lepiderema pulchella* “ “ “ “ “ “	7m 6m 18m 2m	0545 038, 6879 311
327	Fine-leaved tuckeroo Rough-shelled bush nut	*Lepiderema pulchella* *Macadamia tetraphylla*	1.5m (x3) 0.5m	0545 023, 6879 230
328	Sweet myrtle “ “	*Austromyrtus fragrantissima* “ “	4m 2.5m	0545 021, 6879 224
329	Sweet myrtle	*Austromyrtus fragrantissima*	6m	0545 048, 6879 103
330	Fine-leaved tuckeroo “ “ “ “	*Lepiderema pulchella* “ “ “ “	6m (x2) 2m (x2) 0.5m (x5)	0545 024, 6879 129
331	Sweet myrtle	*Austromyrtus fragrantissima*	4m	0545 033, 6879 087
332	Axebreaker “ “ “ “	*Geijera paniculata* “ “ “ “	2m (x3) 2.5m 4m	0545 036, 6878 984
333	Axebreaker “ “	*Geijera paniculata* “ “	14m 2.5m	0545 053, 6878 976

Reference	Common Name	Scientific Name	Height	GPS
334	Axebreaker	*Geijera paniculata*	1-2m (x30)	0545 058, 6878 983
335	Axebreaker " "	*Geijera paniculata* " "	4m 1m (x2)	0545 063, 6878 973
336	Yiel yiel	*Grevillea hilliana*	12m	0545 589, 6878 992
337	Yiel yiel	*Grevillea hilliana*	10m	0545 592, 6879 006
338	Fine-leaved tuckeroo	*Lepiderema pulchella*	1m	0545 605, 6879 011
339	Spiny gardenia " "	*Randia moorei* " "	5m 2m	0545 606, 6879 014
340	Spiny gardenia	*Randia moorei*	5m	0545 606, 6879 023
341	Spiny gardenia	*Randia moorei*	1.5m	0545 606, 6879 011
342	Yiel yiel	*Grevillea hilliana*	2m	0545 621, 6879 019
343	Fine-leaved tuckeroo	*Lepiderema pulchella*	3m	0545 620, 6879 034
344	Spiny gardenia " "	*Randia moorei* " "	3m 6m	0545 626, 6879 015
345	Fine-leaved tuckeroo	*Lepiderema pulchella*	5m	0545 621, 6879 022
346	Spiny gardenia	*Randia moorei*	1m	0545 595, 6878 970
347	Spiny gardenia	*Randia moorei*	2m	0545 599, 6878 968
348	Rough-shelled bush nut	*Macadamia tetraphylla*	4m	0545 694, 6878 854
349	Rough-shelled bush nut	*Macadamia tetraphylla*	10m	0545 680, 6878 877
350	Rough-shelled bush nut	*Macadamia tetraphylla*	1m	0545 663, 6878 844
351	Rough-shelled bush nut " "	*Macadamia tetraphylla* " "	11m 0.3m (x3)	0545 667, 6878 839

Reference	Common Name	Scientific Name	Height	GPS
352	Rough-shelled bush nut “ “ “ “	*Macadamia tetraphylla* “ “ “ “	10m 1m (x2) 0.5m (x2)	0545 657, 6878 842
353	Rough-shelled bush nut	*Macadamia tetraphylla*	4m	0545 651, 6878 846
354	Rough-shelled bush nut	*Macadamia tetraphylla*	1m	0545 624, 6878 803
355	Fine-leaved tuckeroo “ “	*Lepiderema pulchella* “ “	3m (x2) 1m (x3)	0545 615, 6878 752
356	Fine-leaved tuckeroo	*Lepiderema pulchella*	1.5m	0545 621, 6878 727
357	Fine-leaved tuckeroo “ “ “ “	*Lepiderema pulchella* “ “ “ “	8m 2m (x2) 1m (x3)	0545 624, 6878 725
358	Fine-leaved tuckeroo	*Lepiderema pulchella*	1.5m	0545 641, 6878 668
359	Fine-leaved tuckeroo	*Lepiderema pulchella*	5m	0545 652, 6878 732
360	Fine-leaved tuckeroo “ “ “ “ “ “	*Lepiderema pulchella* “ “ “ “ “ “	7m 6m 1m (x2) 2m	0545 653, 6878 729

Reference	Common Name	Scientific Name	Height	GPS
361	Fine-leaved tuckeroo “ “ “ “	*Lepiderema pulchella* “ “ “ “	6m (x2) 1m (x3) 0.3m (x4)	0545 678, 6878 724
362	Fine-leaved tuckeroo	*Lepiderema pulchella*	1.5m	0545 692, 6878 702
363	Fine-leaved tuckeroo	*Lepiderema pulchella*	1.5m	0545 664, 6878 737
364	Fine-leaved tuckeroo	*Lepiderema pulchella*	9m	0545 688, 6878 719
365	Fine-leaved tuckeroo	*Lepiderema pulchella*	12m	0545 804, 6878 729
366	Fine-leaved tuckeroo	*Lepiderema pulchella*	2.5m	0545 817, 6878 720
367	Fine-leaved tuckeroo	*Lepiderema pulchella*	0.5m	0545 862, 6878 808
368	Small-leaved tamarind	*Diploglottis campbellii*	15m	0546 002, 6879 100
369	Rough-shelled bush nut	*Macadamia tetraphylla*	14m	0546 174, 6879 080
370	Rough-shelled bush nut	*Macadamia tetraphylla*	2m	0546 184, 6879 114
371	Coolamon (planted)	*Syzygium moorei*	5m (x4)	0546 489, 6879 273
372	Sweet myrtle	*Gossia fragrantissima*	2m	0545 205, 6878 998
373	Sweet myrtle	*Gossia fragrantissima*	5m	0545 199, 6879 001
374	Fine-leaved tuckeroo	*Lepiderema pulchella*	4m(x2)	0545 352, 6879 000
375	Fine-leaved tuckeroo	*Lepiderema pulchella*	5m, 0.5m	0545 349, 6879 006
376	Rough-shelled bush nut Fine-leaved tuckeroo	*Macadamia tetraphylla* *Lepiderema pulchella*	1.5m 2m, 0.5m	0545 301, 6879 026
377	Yiel yiel Fine-leaved tuckeroo	*Grevillia hilliana* *Lepiderema pulchella*	3m 2m, 1m	0545 291, 6879 019

Reference	Common Name	Scientific Name	Height	GPS
378	Yiel yiel Rough-shelled bush nut Yellow satinheart	*Grevillia hilliana* *Macadamia tetraphylla* *Bosistoa transversa*	2m 1.5m 1m	0545 279, 6879 005
379	Yiel yiel Rough-shelled bush nut Fine-leaved tuckeroo	*Grevillia hilliana* *Macadamia tetraphylla* *Lepiderema pulchella*	18m 1m 2.5m	0545 283, 6879001
380	Yiel yiel	*Grevillia hilliana*	16m	0545 275, 6879 011
381	Rough-shelled bush nut Fine-leaved tuckeroo	*Macadamia tetraphylla* *Lepiderema pulchella*	10m 2.5m	0545 244, 6878 968
382	Fine-leaved tuckeroo	*Lepiderema pulchella*	8m, 2m	0545 246, 6878 975
383	Yiel yiel	*Grevillia hilliana*	16m	0545 086, 6879 220
384	Rough-shelled bush nut	*Macadamia tetraphylla*	12m	0545 140, 6879 429
385	Fine-leaved tuckeroo Rough-shelled bush nut	*Lepiderema pulchella* *Macadamia tetraphylla*	3m & 2m 0.5m	0545 137, 6879 441
386	Rough-shelled bush nut	*Macadamia tetraphylla*	2m	0545 155, 6879 455
387	Fine-leaved tuckeroo	*Lepiderema pulchella*	4m	0545 143, 6879 450
388	Rough-shelled bush nut Fine-leaved tuckeroo	*Macadamia tetraphylla* *Lepiderema pulchella*	4m 2m	0545 150, 6879 450
389	Coolamon	*Syzygium moorei*	15m	0546 262, 6878 673
390	Fine-leaved tuckeroo	*Lepiderema pulchella*	3m	0545 592, 6878 879
391	Fine-leaved tuckeroo	*Lepiderema pulchella*	12m, 1m	0546 008, 6878539
392	Fine-leaved tuckeroo	*Lepiderema pulchella*	12m	0545 980, 6878 561
393	Fine-leaved tuckeroo	*Lepiderema pulchella*	10m	0545 611, 6878 792
394	Fine-leaved tuckeroo	*Lepiderema pulchella*	6m x 2	0545 697, 6878 660
395	Fine-leaved tuckeroo	*Lepiderema pulchella*	2m x2	0545 602, 6878 819

Reference	Common Name	Scientific Name	Height	GPS
396	Fine-leaved tuckeroo	*Lepiderema pulchella*	2.5m (x2) 1m (x7) 20 seedlings	0545 510, 6880 376
397	Bopple nut	*Hicksbeachia pinnatifolia*	4m	0545 515, 6880 373
398	Fine-leaved tuckeroo	*Lepiderema pulchella*	2.5m (x2) 1m (x2) 10 seedlings	0545 539, 6880 347
399	Fine-leaved tuckeroo	*Lepiderema pulchella*	3m 10 seedlings	0545 551, 6880 347
400	Fine-leaved tuckeroo	*Lepiderema pulchella*	3m 4 seedlings	0545 550, 6880 343
401	Rough-shelled bush nut	*Macadamia tetraphylla*	9m 2 seedlings	0545 552, 6880 346
402	Fine-leaved tuckeroo	*Lepiderema pulchella*	2m	0545 559, 6880 353
403	Bopple nut	*Hicksbeachia pinnatifolia*	10m (multi-stem)	0545 570, 6880 385
404	Rough-shelled bush nut ---------- Fine-leaved tuckeroo	*Macadamia tetraphylla* ---------- *Lepiderema pulchella*	6m --------- 4 seedlings	0545 579, 6880 388
405	Bopple nut	*Hicksbeachia pinnatifolia*	5m 3.5m 2m	0545 577, 6880 386
406	Bopple nut ---------- Fine-leaved tuckeroo	*Hicksbeachia pinnatifolia* ---------- *Lepiderema pulchella*	5m --------- 4 seedlings	0545 578, 6880 384
407	Fine-leaved tuckeroo	*Lepiderema pulchella*	4m	0545 591, 6880 389
408	Rough-shelled bush nut	*Macadamia tetraphylla*	0.5m	0545 617, 6880 389
409	Rough-shelled bush nut	*Macadamia tetraphylla*	2.5m	0545 570, 6880 354

Reference	Common Name	Scientific Name	Height	GPS
410	Bopple nut	*Hicksbeachia pinnatifolia*	4m	0545 539, 6880 363
411	Rough-shelled bush nut ---------- Fine-leaved tuckeroo	*Macadamia tetraphylla* ---------- *Lepiderema pulchella*	3m --------- 1.5m	0545 554, 6880 369
412	Bopple nut	*Hicksbeachia pinnatifolia*	12m 2m 1m	0545 565, 6880 366
413	Rough-shelled bush nut	*Macadamia tetraphylla*	14m 5 seedlings	0545 566, 6880 359
414	Rough-shelled bush nut ---------- Fine-leaved tuckeroo	*Macadamia tetraphylla* ---------- *Lepiderema pulchella*	1.5m --------- 1m	0545 570, 6880 357
415	Fine-leaved tuckeroo	*Lepiderema pulchella*	2.5m	0545 581, 6880 376
416	Rough-shelled bush nut	*Macadamia tetraphylla*	2m	0545 582, 6880 372
417	BN – 8m, 4m, 3m, 2m ---------- Fine-leaved tuckeroo	---------- *Lepiderema pulchella*	--------- 2.5m	0545 589, 6880 366
418	Rough-shelled bush nut	*Macadamia tetraphylla*	7m	0545 587, 6880 362
419	Fine-leaved tuckeroo	*Lepiderema pulchella*	2m 1 seedling	0545 617, 6880 366
420	Rough-shelled bush nut ---------- Fine-leaved tuckeroo	*Macadamia tetraphylla* ---------- *Lepiderema pulchella*	5m 1m (x12) --------- 2m 1.5m	0545 606, 6880 351
421	Rough-shelled bush nut	*Macadamia tetraphylla*	3m 1m 2 seedlings	0545 611, 6880 351

Reference	Common Name	Scientific Name	Height	GPS
422	Rough-shelled bush nut	*Macadamia tetraphylla*	4m	0545 605, 6880 349
423	Rough-shelled bush nut	*Macadamia tetraphylla*	3.5m	0545 593, 6880 354
424	Fine-leaved tuckeroo ---------- Rough-shelled bush nut	*Lepiderema pulchella* ---------- *Macadamia tetraphylla*	5m (x2) 4m (x2) 2m --------- 4m 1m 2 seedlings	0545 585, 6880 349
425	Rough-shelled bush nut	*Macadamia tetraphylla*	5m	0545 595, 6880 347
426	Rough-shelled bush nut	*Macadamia tetraphylla*	5m	0545 606, 6880 340
427	Rough-shelled bush nut	*Macadamia tetraphylla*	5m 1m (x2)	0545 601, 6880 339
428	Rough-shelled bush nut	*Macadamia tetraphylla*	15m 5m (x3) 20 seedlings	0545 586, 6880 326
429	Rough-shelled bush nut	*Macadamia tetraphylla*	4m	0545 592, 6880 342
430	Rough-shelled bush nut	*Macadamia tetraphylla*	9m	0545 597, 6880 335
431	Rough-shelled bush nut	*Macadamia tetraphylla*	10m (multi-stem)	0545 581, 6880 357
432	Bopple nut ---------- Rough-shelled bush nut	*Hicksbeachia pinnatifolia* ---------- *Macadamia tetraphylla*	7m --------- 5m	0545 575, 6880 351
433	Bopple nut ---------- Rough-shelled bush nut	*Hicksbeachia pinnatifolia* ---------- *Macadamia tetraphylla*	9m 1.5m --------- 2m (x2)	0545 566, 6880 346

Reference	Common Name	Scientific Name	Height	GPS
434	Bopple nut ---------- Fine-leaved tuckeroo	*Hicksbeachia pinnatifolia* ---------- *Lepiderema pulchella*	6m --------- 5m	0545 559, 6880 348
435	Rough-shelled bush nut	*Macadamia tetraphylla*	1.5m	0545 546, 6880 355
436	Fine-leaved tuckeroo	*Lepiderema pulchella*	6m 3 seedlings	0545 572, 6880 317
437	Rough-shelled bush nut	*Macadamia tetraphylla*	8m	0545 586, 6880 323
438	Fine-leaved tuckeroo	*Lepiderema pulchella*	5m 3m 1m (x2)	0545 618, 6880 300
439	Fine-leaved tuckeroo	*Lepiderema pulchella*	6m 2.5m 1m	0545 618, 6880 297
440	Fine-leaved tuckeroo	*Lepiderema pulchella*	4m 1m	0545 629, 6880 298
441	Fine-leaved tuckeroo	*Lepiderema pulchella*	6m 2m	0545 626, 6880 308
442	Fine-leaved tuckeroo	*Lepiderema pulchella*	8m	0545 631, 6880 332
443	Fine-leaved tuckeroo ---------- Rough-shelled bush nut	*Lepiderema pulchella* ---------- *Macadamia tetraphylla*	3.5m --------- 6m	0545 621, 6880 358
444	Rough-shelled bush nut	*Macadamia tetraphylla*	10m 3m (x2) 10 seedlings	0545 630, 6880 357
445	Rough-shelled bush nut ---------- Fine-leaved tuckeroo	*Macadamia tetraphylla* ---------- - *Lepiderema pulchella*	3m --------- 4m	0545 632, 6880 353

Reference	Common Name	Scientific Name	Height	GPS
446	Fine-leaved tuckeroo	*Lepiderema pulchella*	6m 2.5m (x2)	0545 633, 6880 368
447	Fine-leaved tuckeroo	*Lepiderema pulchella*	5.5m	0545 626, 6880 363
448	Rough-shelled bush nut ---------- Fine-leaved tuckeroo	*Macadamia tetraphylla* ---------- - *Lepiderema pulchella*	11m --------- 6m 2 seedlings	0545 622, 6880 360
449	Fine-leaved tuckeroo	*Lepiderema pulchella*	6m (x6) 4 seedlings	0545 613, 6880 383
450	Fine-leaved tuckeroo	*Lepiderema pulchella*	3m	0545 624, 6880 391
451	Fine-leaved tuckeroo	*Lepiderema pulchella*	2.5m 2 seedlings	0545 645, 6880 376
452	Fine-leaved tuckeroo	*Lepiderema pulchella*	2m (x3) 1m	0545 640, 6880 378
453	Fine-leaved tuckeroo	*Lepiderema pulchella*	3m 1m (x4)	0545 642, 6880 378
454	Fine-leaved tuckeroo	*Lepiderema pulchella*	1.5m (x6)	0545 645, 6880 366
455	Fine-leaved tuckeroo	*Lepiderema pulchella*	3m 2m	0545 650, 6880 358
456	Fine-leaved tuckeroo ---------- Rough-shelled bush nut	*Lepiderema pulchella* ---------- *Macadamia tetraphylla*	4.5m 10 seedlings -- ------- 1m (x3) 6 seedlings	0545 654, 6880 359
457	Rough-shelled bush nut	*Macadamia tetraphylla*	14m 6 seedlings	0545 644, 6880 352
458	Fine-leaved tuckeroo	*Lepiderema pulchella*	4m 4 seedlings	0545 640, 6880 351

Reference	Common Name	Scientific Name	Height	GPS
459	Rough-shelled bush nut	*Macadamia tetraphylla*	1.5m	0545 641, 6880 349
460	Fine-leaved tuckeroo	*Lepiderema pulchella*	5m 3m	0545 662, 6880 328
461	Fine-leaved tuckeroo	*Lepiderema pulchella*	2m 1m (x4)	0545 664, 6880 337
462	Fine-leaved tuckeroo	*Lepiderema pulchella*	4.5m 2m 1m (x3)	0545 674, 6880 338
463	Fine-leaved tuckeroo	*Lepiderema pulchella*	6m 4m 2 seedlings	0545 676, 6880 342
464	Fine-leaved tuckeroo	*Lepiderema pulchella*	5m 2m 1.5m	0545 678, 6880 351
465	Fine-leaved tuckeroo	*Lepiderema pulchella*	2m (x2) 2 seedlings	0545 668, 6880 362
467	Bopple nut	*Hicksbeachia pinnatifolia*	5m 4m 1m (x3)	0545 658, 6880 369
468	Fine-leaved tuckeroo	*Lepiderema pulchella*	3m	0545 666, 6880 369
469	Fine-leaved tuckeroo	*Lepiderema pulchella*	3m 1m (x2) 3 seedlings	0545 662, 6880 375
470	Fine-leaved tuckeroo	*Lepiderema pulchella*	4m 2m (x2)	0545 657, 6880 380
471	Fine-leaved tuckeroo	*Lepiderema pulchella*	11m 2 seedlings	0545 636, 6880 402

Reference	Common Name	Scientific Name	Height	GPS
472	Fine-leaved tuckeroo	*Lepiderema pulchella*	6m 4m 2m (x2) 2 seedlings	0545 544, 6880 330
473	Fine-leaved tuckeroo	*Lepiderema pulchella*	5m (x2) 3 seedlings	0545 563, 6880 319
474	Fine-leaved tuckeroo	*Lepiderema pulchella*	4m 3m 2.5m	0545 556, 6880 306
475	Fine-leaved tuckeroo	*Lepiderema pulchella*	7m 4m	0545 552, 6880 304
476	Fine-leaved tuckeroo	*Lepiderema pulchella*	4.5m 2m	0545 546, 6880 309
477	Fine-leaved tuckeroo	*Lepiderema pulchella*	4m 3m	0545 554, 6880 303
478	Fine-leaved tuckeroo	*Lepiderema pulchella*	4m (x3) 1m 4 seedlings	0545 554, 6880 299
479	Fine-leaved tuckeroo	*Lepiderema pulchella*	4m (x3)	0545 554, 6880 296
480	Fine-leaved tuckeroo	*Lepiderema pulchella*	4m 2.5m	0545 571, 6880 299
481	Fine-leaved tuckeroo	*Lepiderema pulchella*	2.5m (x2)	0545 564, 6880 286
482	Fine-leaved tuckeroo	*Lepiderema pulchella*	4m	0545 572, 6880 293
483	Fine-leaved tuckeroo	*Lepiderema pulchella*	1.5m	0545 592, 6880 281
484	Fine-leaved tuckeroo	*Lepiderema pulchella*	4m 2 seedlings	0545 595, 6880 293
485	Fine-leaved tuckeroo	*Lepiderema pulchella*	3.5m	0545 592, 6880 294

Reference	Common Name	Scientific Name	Height	GPS
486	Fine-leaved tuckeroo	*Lepiderema pulchella*	6m 4m (x2) 1m	0545 602, 6880 283
487	Fine-leaved tuckeroo	*Lepiderema pulchella*	5m 4m 3m	0545 607, 6880 282
488	Fine-leaved tuckeroo	*Lepiderema pulchella*	10m 9m	0545 606, 6880 293
489	Fine-leaved tuckeroo	*Lepiderema pulchella*	8m 7m 2m 1m (x2)	0545 610, 6880 294
490	Rough-shelled bush nut	*Macadamia tetraphylla*	1.5m	0545 613, 6880 299
491	Fine-leaved tuckeroo	*Lepiderema pulchella*	3m	0545 622, 6880 288
492	Fine-leaved tuckeroo	*Lepiderema pulchella*	3.5m	0545 614, 6880 283
493	Fine-leaved tuckeroo	*Lepiderema pulchella*	1.5m (x2)	0545 629, 6880 288
494	Fine-leaved tuckeroo	*Lepiderema pulchella*	1.5m	0545 637, 6880 294
495	Fine-leaved tuckeroo	*Lepiderema pulchella*	2m (x2) 3 seedlings	0545 646, 6880 302
496	Fine-leaved tuckeroo	*Lepiderema pulchella*	1.5m	0545 659, 6880 278
497	Marblewood	*Acacia bakeri*	20m	0545 657, 6880 255
498	Fine-leaved tuckeroo	*Lepiderema pulchella*	1m	0545 658, 6880 258
499	Fine-leaved tuckeroo	*Lepiderema pulchella*	1m (x3)	0545 666, 6880 259
500	Fine-leaved tuckeroo	*Lepiderema pulchella*	10m 4m	0545 691, 6880 238
501	Fine-leaved tuckeroo	*Lepiderema pulchella*	1m (x3)	0545 698, 6880 243
502	Fine-leaved tuckeroo	*Lepiderema pulchella*	2m	0545 710, 6880 246
503	Basket fern	*Drynaria rigidula*		0545 717, 6880 249

Reference	Common Name	Scientific Name	Height	GPS
504	Fine-leaved tuckeroo	*Lepiderema pulchella*	6m	0545 714, 6880 235
505	Fine-leaved tuckeroo	*Lepiderema pulchella*	1.5m 2 seedlings	0545 742, 6880 234
506	Fine-leaved tuckeroo	*Lepiderema pulchella*	2.5m 4 seedlings	0545 724, 6880 263
507	Fine-leaved tuckeroo	*Lepiderema pulchella*	12m 7m 5m 1m (x2)	0545 706, 6880 288
508	Rough-shelled bush nut	*Macadamia tetraphylla*	2.5m	0545 690, 6880 229
509	Fine-leaved tuckeroo	*Lepiderema pulchella*	9m	0545 697, 6880 237
510	Fine-leaved tuckeroo	*Lepiderema pulchella*	6m 2.5m 1m (x3)	0545 685, 6880 230
511	Fine-leaved tuckeroo	*Lepiderema pulchella*	2m	0545 495, 6880 316
512	Fine-leaved tuckeroo	*Lepiderema pulchella*	1.5m	0545 508, 6880 326
513	Fine-leaved tuckeroo	*Lepiderema pulchella*	4m 2.5m	0545 540, 6880 271
514	Fine-leaved tuckeroo	*Lepiderema pulchella*	2.5m	0545 545, 6880 284
515	Rough-shelled bush nut ---------- Fine-leaved tuckeroo	*Macadamia tetraphylla* ---------- *Lepiderema pulchella*	10m --------- 2 seedlings	0545 549, 6880 273
516	Fine-leaved tuckeroo	*Lepiderema pulchella*	2.5m	0545 559, 6880 270
517	Fine-leaved tuckeroo	*Lepiderema pulchella*	9m	0545 562, 6880 266
518	Fine-leaved tuckeroo	*Lepiderema pulchella*	2.5m 4m	0545 580, 6880 275
519	Rough-shelled bush nut	*Macadamia tetraphylla*	1m	0545 583, 6880 280

Reference	Common Name	Scientific Name	Height	GPS
520	Fine-leaved tuckeroo	*Lepiderema pulchella*	7m 2.5m 2m	0545 607, 6880 265
521	Fine-leaved tuckeroo	*Lepiderema pulchella*	5m 3m	0545 612, 6880 257
522	Fine-leaved tuckeroo	*Lepiderema pulchella*	1.5m	0545 610, 6880 249
523	Fine-leaved tuckeroo	*Lepiderema pulchella*	4.5m 3m	0545 625, 6880 261
524	Fine-leaved tuckeroo	*Lepiderema pulchella*	2m 3 seedlings	0545 646, 6880 268
525	Fine-leaved tuckeroo	*Lepiderema pulchella*	2m	0545 637, 6880 266
526	Fine-leaved tuckeroo	*Lepiderema pulchella*	1m	0545 634, 6880 250
527	Fine-leaved tuckeroo	*Lepiderema pulchella*	1.5m	0545 683, 6880 187
528	Fine-leaved tuckeroo	*Lepiderema pulchella*	3m	0545 678, 6880 202
529	Fine-leaved tuckeroo	*Lepiderema pulchella*	1.5m	0545 673, 6880 197
530	Fine-leaved tuckeroo	*Lepiderema pulchella*	2.5m (x2) 1m (x3) 2 seedlings	0545 680, 6880 169
531	Fine-leaved tuckeroo ---------- Rough-shelled bush nut	*Lepiderema pulchella* ---------- *Macadamia tetraphylla*	6m --------- 1m	0545 671, 6880 178
532	Rough-shelled bush nut	*Macadamia tetraphylla*	3.5m	0545 689, 6880 167
533	Rough-shelled bush nut	*Macadamia tetraphylla*	2m (x2)	0545 675, 6880 194
534	Rough-shelled bush nut	*Macadamia tetraphylla*	5m	0545 664, 6880 197
535	Rough-shelled bush nut	*Macadamia tetraphylla*	1.5m	0545 663, 6880 194

Reference	Common Name	Scientific Name	Height	GPS
536	Fine-leaved tuckeroo --- Rough-shelled bush nut	*Lepiderema pulchella* --- *Macadamia tetraphylla*	8m (x2) 6m (x2) 10m (x2) 5m 1m (x3) 5 seedlings --- 1m	0545 656, 6880 197
537	Fine-leaved tuckeroo	*Lepiderema pulchella*	3m	0545 639, 6880 231
538	Fine-leaved tuckeroo	*Lepiderema pulchella*	2.5m (x2) 2m (x2)	0545 624, 6880 249
539	Fine-leaved tuckeroo	*Lepiderema pulchella*	3m 2m (x2) 1m	0545 614, 6880 234
540	Fine-leaved tuckeroo	*Lepiderema pulchella*	5m (x2) 3m 2m (x2)	0545 622, 6880 229
541	Fine-leaved tuckeroo	*Lepiderema pulchella*	1.5m (x3) 1m (x3)	0545 627, 6880 220
542	Fine-leaved tuckeroo --- Rough-shelled bush nut	*Lepiderema pulchella* --- *Macadamia tetraphylla*	2m (x3) --- 2 seedlings	0545 618, 6880 222
543	Fine-leaved tuckeroo	*Lepiderema pulchella*	4m 2 seedlings	0545 627, 6880 226
544	Fine-leaved tuckeroo --- Rough-shelled bush nut	*Lepiderema pulchella* --- *Macadamia tetraphylla*	8m 1.5m (x5) --- 3m	0545 631, 6880 221

Reference	Common Name	Scientific Name	Height	GPS
545	Fine-leaved tuckeroo	*Lepiderema pulchella*	3m 1.5m	0545 635, 6880 211
546	Fine-leaved tuckeroo ---------- Rough-shelled bush nut	*Lepiderema pulchella* ---------- *Macadamia tetraphylla*	4m (x2) 3m --------- 1.5m 1m	0545 631, 6880 216
547	Rough-shelled bush nut ---------- Fine-leaved tuckeroo	*Macadamia tetraphylla* ---------- *Lepiderema pulchella*	4m 1m (x4) --------- 3m	0545 646, 6880 222
548	Rough-shelled bush nut	*Macadamia tetraphylla*	2.5m 2m	0545 635, 6880 208
549	Rough-shelled bush nut	*Macadamia tetraphylla*	3.5m 1.5m 1m (x2)	0545 671, 6880 204
550	Rough-shelled bush nut ---------- Fine-leaved tuckeroo	*Macadamia tetraphylla* ---------- *Lepiderema pulchella*	12m (Multi-stem) --------- 2.5m 1m	0545 607, 6880 182
551	Rough-shelled bush nut	*Macadamia tetraphylla*	8m	0545 638, 6880 195
552	Fine-leaved tuckeroo	*Lepiderema pulchella*	8m	0545 643, 6880 172
553	Rough-shelled bush nut	*Macadamia tetraphylla*	3m	0545 640, 6880 172
554	Fine-leaved tuckeroo ---------- Rough-shelled bush nut	*Lepiderema pulchella* ---------- *Macadamia tetraphylla*	7m --------- 3m 1m	0545 621, 6880 167

Reference	Common Name	Scientific Name	Height	GPS
555	Rough-shelled bush nut	*Macadamia tetraphylla*	0.5m	0545 577, 6880 207
556	Fine-leaved tuckeroo	*Lepiderema pulchella*	3.5m	0545 589, 6880 207
557	Rough-shelled bush nut ---------- Fine-leaved tuckeroo	*Macadamia tetraphylla* ---------- *Lepiderema pulchella*	1.5m --------- 4m	0545 594, 6880 212
558	Fine-leaved tuckeroo	*Lepiderema pulchella*	11m	0545 600, 6880 217
559	Fine-leaved tuckeroo	*Lepiderema pulchella*	5m	0545 560, 6880 248
560	Fine-leaved tuckeroo	*Lepiderema pulchella*	9m	0545 588, 6880 248
561	Rough-shelled bush nut	*Macadamia tetraphylla*	2m	0545 580, 6880 230
562	Fine-leaved tuckeroo	*Lepiderema pulchella*	6m 4m	0545 595, 6880 261
563	Rough-shelled bush nut	*Macadamia tetraphylla*	12m 1 seedling	0545 533, 6880 263
564	Fine-leaved tuckeroo	*Lepiderema pulchella*	10m 6m	0545 515, 6880 273
565	Fine-leaved tuckeroo	*Lepiderema pulchella*	4m	0545 509, 6880 281
566	Bopple nut ---------- Rough-shelled bush nut	*Hicksbeachia pinnatifolia* ---------- *Macadamia tetraphylla*	10m 5m 2m (x2) 3 seedlings --------- 3m	0545 555, 6880 373
567	Rough-shelled bush nut	*Macadamia tetraphylla*	2.5m	0545 310, 6880 157
568	Fine-leaved tuckeroo	*Lepiderema pulchella*	4m	0545 257, 6880 142
569	Fine-leaved tuckeroo	*Lepiderema pulchella*	0.5m	0545 250, 6880 142

Reference	Common Name	Scientific Name	Height	GPS
570	Fine-leaved tuckeroo “ “ “ “	*Lepiderema pulchella* “ “ “ “	3.5m (x2) 3m (x2) 0.5m (x2)	0545 404, 6880 165
571	Fine-leaved tuckeroo	*Lepiderema pulchella*	1.5m (x3)	0545 696, 6880 014
572	Fine-leaved tuckeroo “ “	*Lepiderema pulchella* “ “	1m 0.5m	0545 712, 6880 014
573	Fine-leaved tuckeroo	*Lepiderema pulchella*	1m	0545 715, 6880 017
574	Fine-leaved tuckeroo	*Lepiderema pulchella*	3m	0545 717, 6880 040
575	Fine-leaved tuckeroo “ “	*Lepiderema pulchella* “ “	2m 0.3m	0545 725, 6880 044
576	Fine-leaved tuckeroo “ “ “ “	*Lepiderema pulchella* “ “ “ “	7m 2.5m 1m (x3)	0545 723, 6880 051
577	Fine-leaved tuckeroo	*Lepiderema pulchella*	2.5m	0545 717, 6880 106
578	Fine-leaved tuckeroo	*Lepiderema pulchella*	0.5m	0545 809, 6880 092
579	Fine-leaved tuckeroo	*Lepiderema pulchella*	5m	0545 794, 6880 100
580	Fine-leaved tuckeroo	*Lepiderema pulchella*	2.5m	0545 813, 6880 082
581	Rough-shelled bush nut	*Macadamia tetraphylla*	5m	0545 818, 6880 076
582	Fine-leaved tuckeroo “ “	*Lepiderema pulchella* “ “	4m (x2) 2m	0545 772, 6880 006

Reference	Common Name	Scientific Name	Height	GPS
583	Fine-leaved tuckeroo “ “ “ “ “ “	*Lepiderema pulchella* “ “ “ “ “ “	3m (x2) 8m 4m (x2) 2m (x3)	0545 762, 6880 013
584	Fine-leaved tuckeroo “ “	*Lepiderema pulchella* “ “	1m 0.5m	0545 810, 6880 095
585	Fine-leaved tuckeroo “ “	*Lepiderema pulchella* “ “	2m 0.5m	0545 814, 6880 109
586	Fine-leaved tuckeroo Marblewood	*Lepiderema pulchella* *Acacia bakeri*	15m 15m	0545 840, 6880 131
587	Fine-leaved tuckeroo	*Lepiderema pulchella*	4m	0545 735, 6880 031
588	Fine-leaved tuckeroo “ “ “ “	*Lepiderema pulchella* “ “ “ “	3m 1.5m (x2) 1m (x4)	0545 720, 6880 022
589	Fine-leaved tuckeroo	*Lepiderema pulchella*	3m	0545 738, 6880 060
590	Fine-leaved tuckeroo	*Lepiderema pulchella*	1m (x2)	0545 756, 6880 010
591	Fine-leaved tuckeroo	*Lepiderema pulchella*	1m	0545 875, 6880 133
592	Rough-shelled bush nut	*Macadamia tetraphylla*	1m	0545 865, 6880 127
593	Fine-leaved tuckeroo “ “	*Lepiderema pulchella* “ “	12m 15m	0545 840, 6880 118
594	Rough-shelled bush nut	*Macadamia tetraphylla*	0.3m	0545 830, 6880 118

Reference	Common Name	Scientific Name	Height	GPS
595	Rough-shelled bush nut	*Macadamia tetraphylla*	1m (x5)	0545 872, 6880 081
596	Rough-shelled bush nut “ “	*Macadamia tetraphylla* “ “	2m 1m (x11)	0545 876, 6880 077
597	Rough-shelled bush nut	*Macadamia tetraphylla*	5.5m	0545 870, 6880 073
598	Rough-shelled bush nut	*Macadamia tetraphylla*	6m	0545 818, 6880 083
599	Fine-leaved tuckeroo	*Lepiderema pulchella*	8m	0545 350, 6879 004
600	Fine-leaved tuckeroo	*Lepiderema pulchella*	1.5m	0545 366, 6878 975
601	Yiel yiel	*Grevillea hilliana*	6.5m	0545 275, 6879 008
602	Fine-leaved tuckeroo	*Lepiderema pulchella*	4.5m	0545 218, 6878 996
603	Sweet myrtle	*Austromyrtus fragrantissima*	3.5m	0545 200, 6879 001
604	Fine-leaved tuckeroo	*Lepiderema pulchella*	5.5m	0545 219, 6879 035
605	Rough-shelled bush nut	*Macadamia tetraphylla*	1m	0545 193, 6879 254
606	Fine-leaved tuckeroo	*Lepiderema pulchella*	0.5m (x3)	0545 276, 6879 555
607	Rough-shelled bush nut	*Macadamia tetraphylla*	2m	0545 352, 6879 585
608	Fine-leaved tuckeroo Rough-shelled bush nut	*Lepiderema pulchella* *Macadamia tetraphylla*	1m 1m	0545 313, 6880 023
609	Rough-shelled bush nut	*Macadamia tetraphylla*	1m	0545 302, 6880 043
610	Rough-shelled bush nut	*Macadamia tetraphylla*	1m	0545 266, 6880 095
611	Rough-shelled bush nut	*Macadamia tetraphylla*	3m	0545 258, 6880 100
612	Fine-leaved tuckeroo	*Lepiderema pulchella*	2m	0545 232, 6880 089
613	Fine-leaved tuckeroo “ “	*Lepiderema pulchella* “ “	2m 1m	0545 257, 6880 101

Reference	Common Name	Scientific Name	Height	GPS
614	Fine-leaved tuckeroo " "	*Lepiderema pulchella* " "	0.5m (x3) 0.3m (x5)	0545 267, 6880 108
615	Fine-leaved tuckeroo	*Lepiderema pulchella*	1m (x2)	0545 245, 6880 107
616	Fine-leaved tuckeroo	*Lepiderema pulchella*	1m	0545 253, 6879 996
617	Fine-leaved tuckeroo	*Lepiderema pulchella*	1m	0545 248, 6879 986
618	Fine-leaved tuckeroo	*Lepiderema pulchella*	0.3m (x5)	0545 268, 6879 988
619	Rough-shelled bush nut	*Macadamia tetraphylla*	2.5m	0545 233, 6879 954
620	Fine-leaved tuckeroo	*Lepiderema pulchella*	8m	0545 205, 6879 934

APPENDIX 6 – REVEGETATION TRIAL PLANTINGS

*Acacia bakeri**	17	0
Acmena hemilampra	154	16
Acmena ingens	254	104
Acmena smithii	113	0
Acronychia oblongifolia	119	16
Alphitonia excelsa	29	0
Aphananthe phillipensis	9	0
Araucaria cunninghamii	9	0
*Archidendron hendersonii**	26	48
Archontophoenix cunninghamiana	17	20
Argyrodendrom actinophyllum	9	16
Argyrodendrom trifoliolatum	99	16
Argophyllum nullamense	29	0
Arytera divaricata	17	24
Auranticarpa rhombifolia	19	0
Austromyrtus hillii	39	0
Baloghia inophylla	115	16
Baloghia marmorata	0	122
*Bosistoa transversa**	0	8
Brachychiton acerifolius	32	0
Castanospermum australe	17	0
Castanospora alphandii	94	48
Commersonia bartramia	62	16
Cryptocarya foetida	0	130
Cryptocarya rigida	17	16
Cupaniopsis newmanii	39	16
Decaspermum humile	132	48
Diospyros australis	0	60
Diospyros fasciculosa	17	0
Diospyros mabacea	66	146
*Diploglottis campbellii **	265	148
Doryphora sassafras	77	16
Dysoxylum mollissimum	191	0
Ehretia acuminata	130	16
Elaeocarpus grandis	150	20
Elaeodendron australe	47	0
Endiandra compressa	31	0
*Endiandra hayesii**	9	0
Ficus coronata	44	0
Ficus superba	73	8
Flindersia australis	54	0
Flindersia bennettiana	89	16
Flindersia schottiana	47	0

Geissois benthamii	205	16
Glochidion ferdinandi	17	0
*Gossia fragrantissima**	275	62
*Grevillea hilliana **	30	2
Grevillea robusta	206	0
Guioa semiglauca	59	0
Harpullia hillii	26	16
Harpullia pendula	132	88
Helicia ferruginea	0	27
Hicksbeachia pinnatifolia	17	0
Hymenosporum flavum	52	16
Ixora beckleri	9	0
Jagera psuedorhus	60	0
Lenwebbia prominens	60	0
*Lepiderema pulchella **	407	140
Litsea australis	20	0
Lomatia arborescens	20	0
Lophostemon confertus	17	0
Macaranga tanarius	34	0
*Macadamia tetraphylla**	289	45
Mallotus claoxyloides	20	0
Mallotus discolor	4	104
Mallotus philippensis	17	0
Melia azederach	71	0
Melicope elleryana	16	16
Melicope micrococca	39	40
Mischocarpus pyriformis	89	72
Myrsine howittiana	0	16
Myrsine richmondensis	0	130
Neolitsea dealbata	97	0
Olea paniculata	55	64
Omalanthus nutans	77	16
Petalostigma triloculare	17	0
Podocarpus elatus	83	0
Pouteria australis	37	0
Pouteria chartacea	189	80
Pouteria queenslandica	0	16
Psychotria loniceroides	17	0
Quintinia verdonii	43	16
*Randia moorei **	13	3
Rhodomyrtus psidioides	103	32
Sarcomelicope simplicifolia	25	0

Sarcopteryx stipata	38	0
Sloanea australis	48	0
Sloanea woollsii	91	0
Solanum aviculare	0	16
Sterculia quadrifida	105	0
Stenocarpus salignus	66	0
Stenocapus sinuatus	26	0
Syzygium australe	230	32
Syzygium francisii	22	48
Syzygium luehmannii	125	0
Syzygium moorei *	162	1
Syzygium oleosum	17	16
Toechima dasyrrhache	13	0
Toona ciliata	71	56
Waterhousea floribunda	123	16
Wilkiea macrophylla	0	30
* *denotes threatened species*		
TOTAL threatened spp only	***1492***	***449***
TOTAL all incl threatened spp	**6839**	**2342**
	P1	P2

AS OF 22nd SEPTEMBER 2008

TOTAL threatened spp only	***1941***
TOTAL all incl threatened spp	***9181***