Flora and Fauna Assessment

Pacific Bay West
Residential Development

Lot 1 DP 592173, Lot 2 DP 226560, Lot 3 DP 820652, Lot 4 DP820652, Lot 5 DP820652, and LOT 23 DP716144

West Korora, Coffs Harbour

For

Thakral Pty Ltd

Prepared by:

BushFireSafe (Aust) Pty Ltd
Environmental Services

January 2009

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1.0 INTRODUCTION

1.1 BACKGROUND

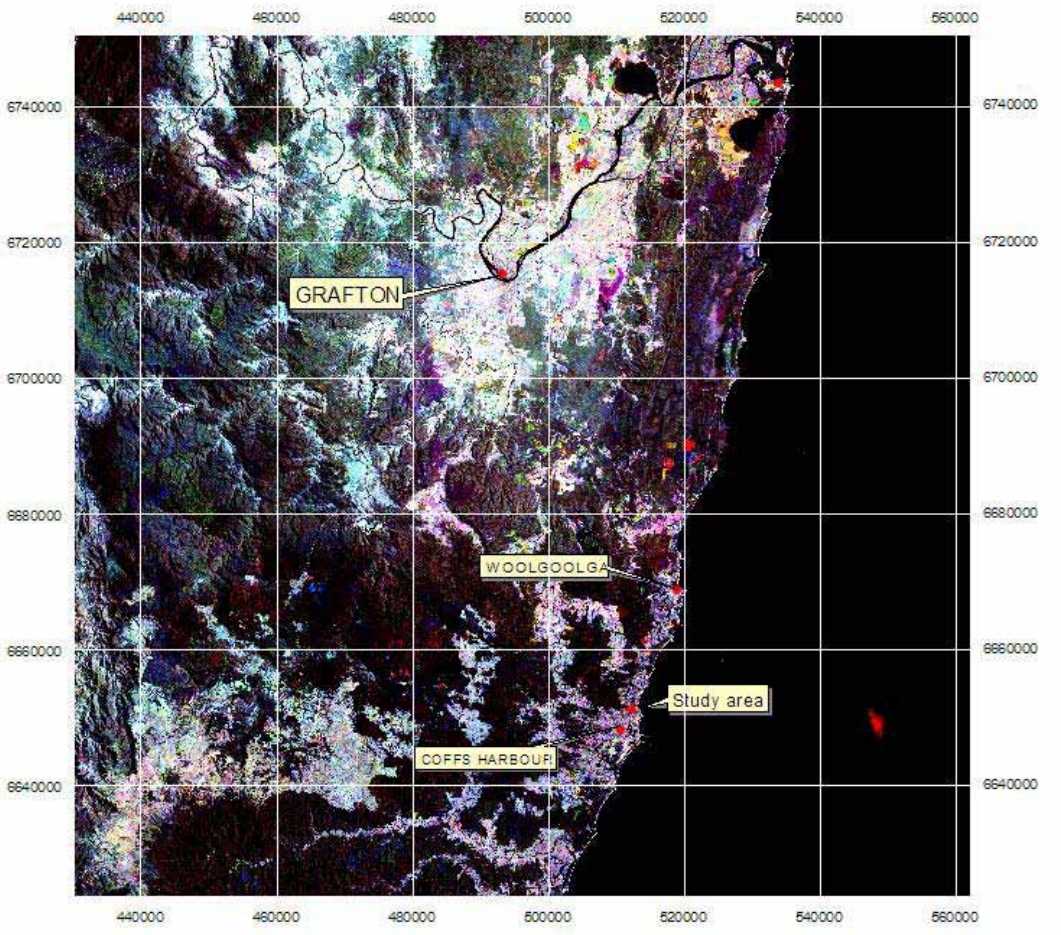
Bushfiresafe was engaged by Thackral Pty Ltd to complete a Flora and Fauna Assessment for lot 1 DP 592173, lot 2 DP 226560, lot 3 DP 820652, lot 4 DP 820652, lot 5 DP 820652, lot 23 DP 716144, Coffs Harbour.

The assessment involved the following:

- Determining the threatened flora species recorded from the locality
- Assessing the nature and condition of vegetation at the site, and searching for threatened flora species
- Determining the threatened fauna species occurring in the locality
- Searching for threatened fauna species
- Assessing the habitat value of the site for threatened species
- Addressing statutory requirements including State Environmental Planning Policy No. 44 (SEPP 44 – Koala Habitat Protection), Section 5A of the Environmental Planning & Assessment Act (1979) and the Commonwealth Environment Protection and Biodiversity Act (1999)

1.2 LOCATION OF PROPOSED DEVELOPMENT

The area subject to the proposed development is located on the western side of the Pacific Highway in West Korora, approximately 4.5 km north of Coffs Harbour CBD in the Coffs Harbour Local Government Area on the North Coast of NSW; the site occupies an area of approximately 29Ha (Map 1).



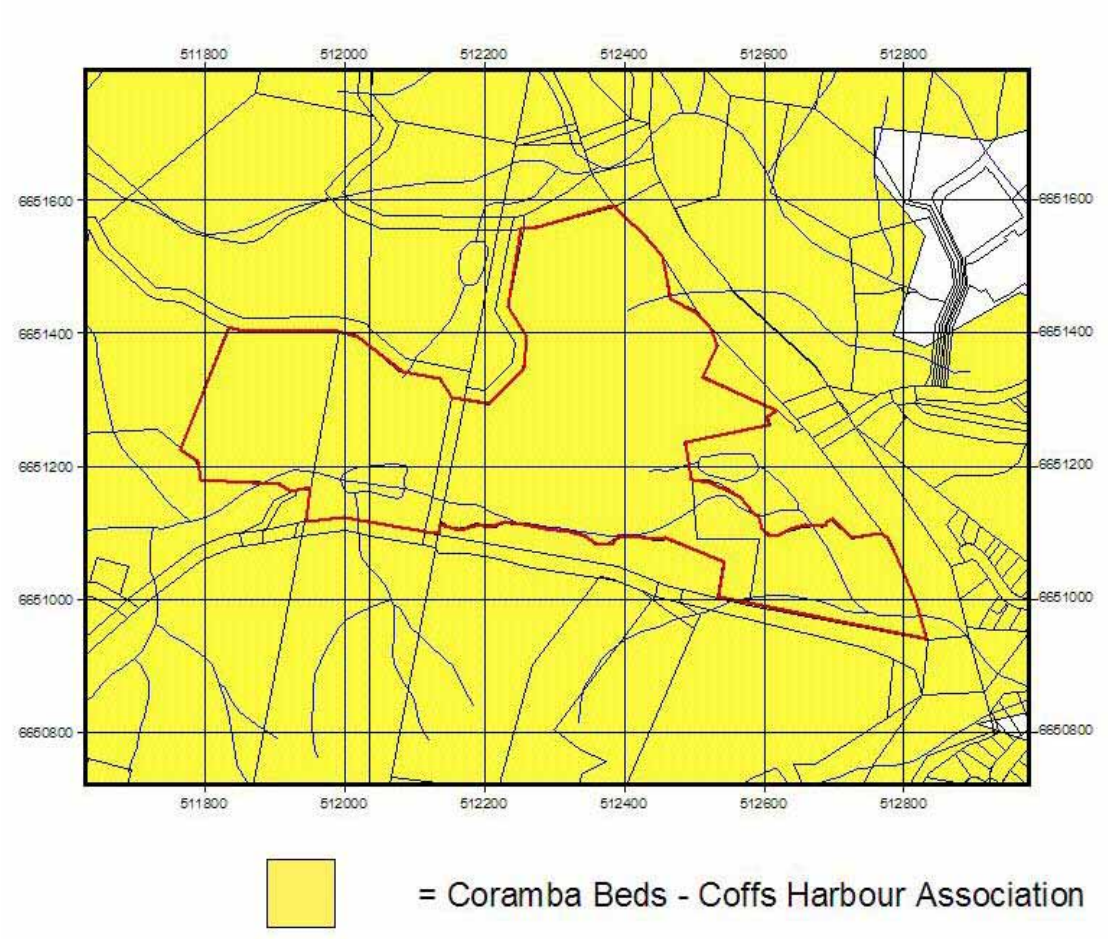
Map 1. District Locality Map, drawn by F. Forest (18-9-07)

The subject site has multiple zonings and the majority of the site is zoned 1(a) Rural Agricultural (mostly cleared areas), vegetated areas and areas surrounding Jordan's Creek are zoned 7(a) Environmental Protection Habitat & Catchment; a strip of land along the Pacific Highway is zoned 7(b) Environmental Protection Scenic Buffer under the Coffs Harbour Local Environment Plan (LEP) (Appendix 8).

The current 1(a) Rural Agricultural zoning of the site does not permit the development concepts presented in this proposed development, however Council have formally resolved to commence the preparation of an amendment to the Coffs Harbour Local Environmental Plan 2000 for the North Coffs area. The subject site will be included in this area and it is anticipated that the site will be rezoned to permit low and medium density residential development.

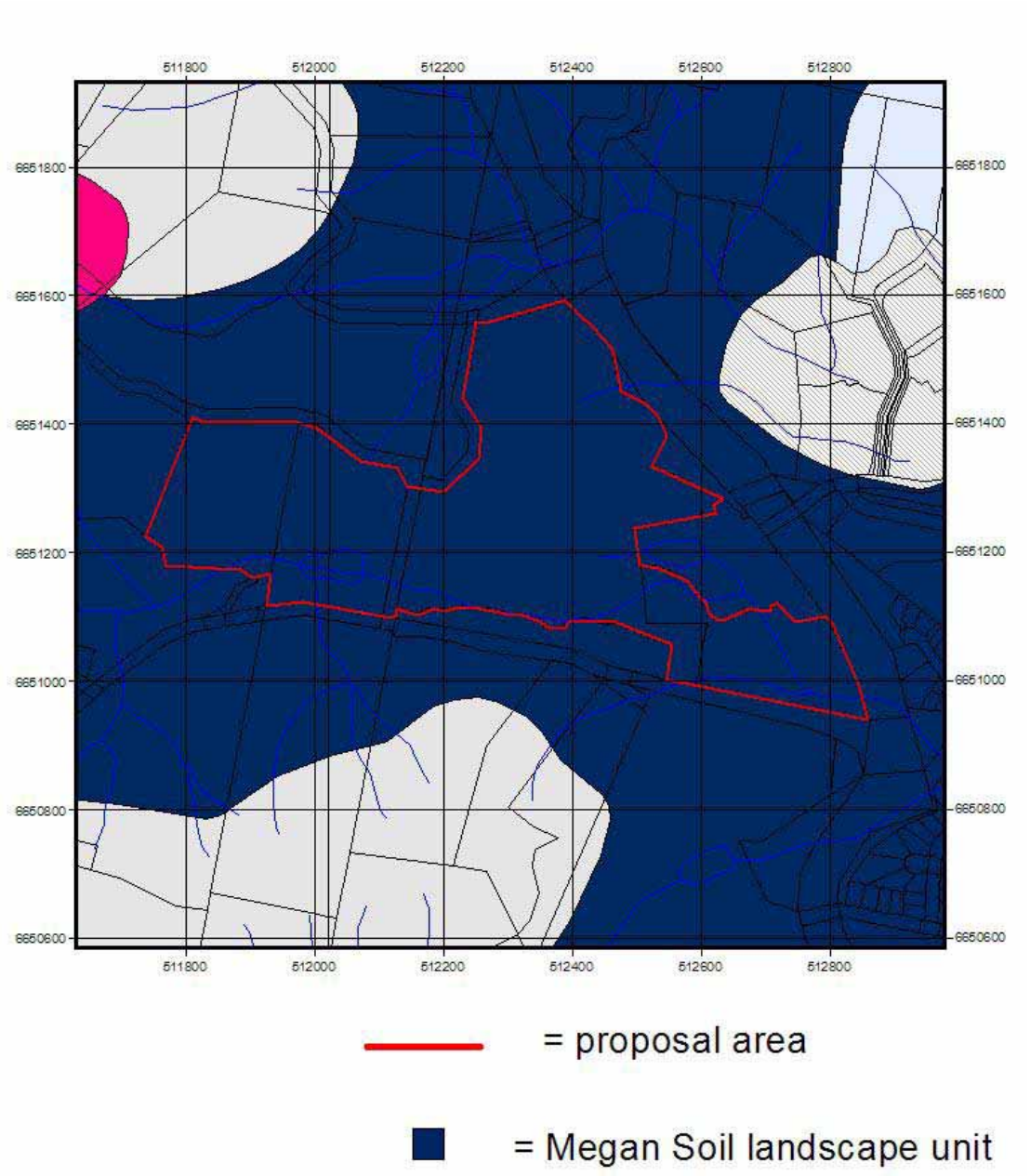
1.3 GEOLOGY AND SOILS

The mapped geology (Map 2) for the site is sandstones of the Coramba Beds of the Coffs Harbour Association (Pogson and Hitchins, 1973).



Map 2: Simplified Geology Drawn by F. Forest (18-9-07) after Pogson and Hitchins, 1973.

Soils were a heavy clay loam on alluvial benches grading to a yellow podsol on hill slopes. Soil landscape mapping (Map 3) describes the Megan unit with the following hazards; steep slopes, mass movement hazard, water erosion hazard and with high foundation hazard (NSW DLWC, *et al*., 1999).



Map 3: Soils of the Subject Property. Drawn by F. Forest (18-9-07)

1.4 TOPOGRAPHY

The subject site consists of undulating topography with some level areas; the steeper areas are located in the northern and north-western portions near Bruxner Park Road.

The subject property ranges in height from 70m above sea level in the north-western parts and 10m above sea level in the south-eastern corner (C.M.A. 1986). A diagram of the subject site showing the 10m contour interval is presented as Appendix 10.

1.5 LAND USE

The majority of the site consists of vacant land with the exception of a rugby playing field with associated amenities and a gym building located in the middle of Lot 5 DP 820652. There is also a small shed located in the far north western corner of Lot 2 DP 226560. The above mentioned infrastructure shall be removed for the proposed development.

1.6 THE PROPOSED DEVELOPMENT

It is proposed to develop the site to include 200 residential dwellings within the 1(a) zone in three distinct areas: the eastern precinct located north of Jordan's Creek between the Pacific Highway and the large area of natural vegetation in the central portion of the subject property; the southern precinct located south of Jordan's Creek between the Pacific Highway and West Korora Road; and a western precinct located west of the large area of natural vegetation to the western boundary of the subject property. There is no development proposed for the areas within the 7(a) Environmental Protection Habitat and Catchment zone; the 7(b) Environmental Protection Scenic buffer zone; or within the natural vegetation in the central portion of the subject property. The riparian area within the 7(a) zone will undergo rehabilitation with the area within lot 23 DP 716144 (south-eastern corner) being retained for compensatory planting (Compensatory Planting Zone). An accompanying Vegetation Management Plan shall be implemented for this area.

2.0 FLORA ASSESSMENT

2.1 AIMS OF THIS STUDY.

- To examine the occurrence, ecology and threat status of plant communities and species within the study area,
- to describe areas examined during the course of studies,
- to make ameliorative recommendations.

2.2 METHODS

The methods adopted in this report follow guidelines recommended by DEC (2004) for development activities.

2.2.1 NPWS WILDLIFE ATLAS SEARCH

The NPWS Wildlife Atlas was searched for records of threatened species from within 10km of the site ("the locality"). The likelihood that each threatened species recorded from the locality might occur at the site was assessed on the basis of its habitat preferences.

2.2.2 COMMUNITY DESCRIPTIONS

A review of literature was conducted for over storey communities in the North Coast Botanical region (Thackway and Creswell 1995, Binns and Chapman 1995, Fisher *et al*., 1996, Floyd 1989, 1990, Hager and Benson 1994, Kingston *et al*., 2004, Moore and Floyd 1994, NPWS 1995, 1999 and Pressey and Griffith 1992). Community descriptions are based upon species information collected and collated and upon the authors' visual estimate of major canopy species upon the site.) An assessment of forest stand condition (Kingston *et al*., 2004 and NPWS July 1999) was applied to each native vegetation community present.

2.2.3 O.H & S.

A checklist for Occupational Health and Safety Assessment was made at each site visit and included steel capped safety boots, long-sleeved shirts, long trousers and adequate water, food and first-aid kit. No visual risk assessment of standing and stag tree threats was undertaken.

2.2.4 Methods. Summer survey effort;

A site survey was undertaken by Craig Harman, Kimberly Stewart (B. Environmental Science) and Wayne Hadaway in the January 2007. The survey involved walking four transects; the first of which was oriented in a north-south direction in the 7(a) zone

within lot 4 and lot 5. The second transect was oriented in the same direction, along the western side. The third transect was oriented in a north-south direction on the eastern portion of the subject property and the fourth transect was located in the 7(a) zone along the southern portion of the subject property; a random meander was also undertaken along Jordan's Creek and its tributaries.

All flora species, threatened or not, that were encountered during the transects and meander, were recorded. All individuals of threatened flora species were marked with flagging tape; all flora were identified by Craig Harman, Kimberly Stewart (B. Environmental Science) and Wayne Hadaway.

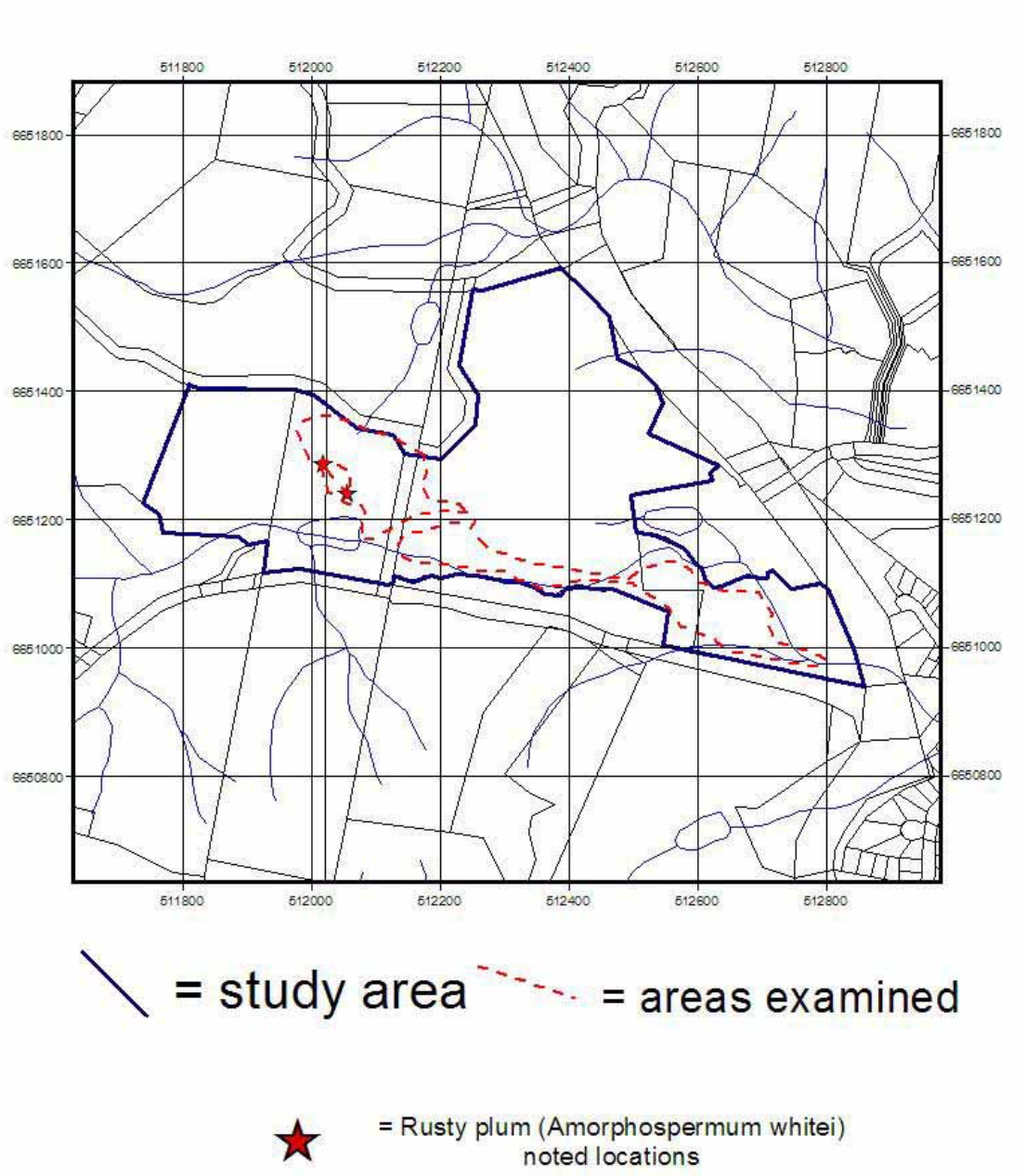
2.2.5 Methods. Autumn survey effort;
A site survey was undertaken by Craig Harman, Kimberly Stewart (B. Environmental Science) and Wayne Hadaway in March 2007. The survey involved walking four transects; the first of which was oriented in a north-south direction in the 7(a) zone within lot 4 and lot 5. The second transect was oriented in the same direction, along the western side. The third transect was oriented in a north-south direction on the eastern portion of the subject property and the fourth transect was located in the 7(a) zone along the southern portion of the subject property; a random meander was also undertaken along Jordan's Creek and its tributaries.

All flora species, threatened or not that were encountered during the transects and meander were recorded. All individuals of threatened flora species were marked with flagging tape; all flora were identified by Craig Harman, Kimberly Stewart (B. Environmental Science) and Wayne Hadaway.

2.2.6 Methods. Winter survey effort;
An irregular traverse of the area was made so as to ensure a comprehensive coverage of the differing ecological communities present (Map #5/.). An overview of all species present was made; the plant specimens were collected and keyed if necessary, through the Flora of N.S.W. (Harden 1990-3 & 2000 & 2002) and other guides (Floyd, A.G. 1989, Williams, J.B. & Harden, G.J. Williams, J.B. 1985, Jones, D.L. 1993). A 10x hand-lens, a 45x and 75x hand held microscope and a scalpel were used to examine samples for their correct identification. A checklist from this visit was compiled. The checklist transcript of the taxon recorded and identified in the field, to species level, was later transcribed to Microsoft Excel and Microsoft Word.

2.2.7 Methods. Spring survey effort;
An irregular traverse of the area was made so as to ensure a comprehensive coverage of the differing ecological communities present (Map 4). An overview of all species present was made; the plant specimens were collected and keyed if necessary, through the Flora of N.S.W. (Harden 1990-3 & 2000 & 2002) and other guides (Floyd, A.G. 1989, Williams, J.B. & Harden, G.J. Williams, J.B. 1985, Jones, D.L. 1993). A 10x hand-lens, a 45x and 75x hand held microscope and a scalpel were used to examine samples for their correct identification. A checklist from this visit was compiled. The checklist transcript of the taxon recorded and identified in the field, to species level, was later transcribed to Microsoft Excel and Microsoft Word.

Community descriptions are based upon species information collected and collated and upon the author's visual estimate of major canopy species upon the site. Taxonomic verification was undertaken by Mr F Forest. Ground truthing of vegetation mapping was undertaken on the 7th December 2007.



Map 4. Area covered during the random walk for the Flora survey. Drawn by F. Forest (18-9-07)

2.3 LIMITATIONS

Limited time was available to visit the site. A proportion of the study area was not examined at all.

A limitation of this study is a lack of survey over non-vascular plants and non-flowering species of Cyperaceae, Poaceae and Orchidaceae. The health and condition of communities present was not undertaken during this survey.

This study has conducted an appraisal of the vascular flora species evident above ground. No study has been undertaken in relation to those parts of the vascular plants below ground level.

No study of the soil stored seed bank or other forms of dormant propogules has been conducted.

2.4 RESULTS

2.4.1 NPWS WILDLIFE ATLAS SEARCH

The NPWS Wildlife Atlas search revealed 14 records of threatened flora species within 10 km of the subject site (Table 1). On the basis of habitat preferences, 14 of these species were considered possible occurrences at the subject site.

Table 1: Species recorded in the NSW Flora Atlas for within 10km of the site

Family	Scientific name	Common name	Status
Asclepidiaceae	*Marsdenia longiloba*	Slender Marsdenia	E1
Cyperaceae	*Eleocharis tetraquetra*	Square-stemmed Spike-rush	E1
Fabaceae (Caesalpinioideae)	*Senna acclinus*	Rainforest Senna	E1
Faboideae	*Pultenaea maritima*	Coast Headland Pea	V
Lindsaceae	*Lindsaea incisa*	Slender Screw Fern	E1
Orchidaceae	*Phaius australis*	Southern Swamp Orchid	E1
	Sarcochilus hartmannii	Hartman's Sarcochilus	V
Poaceae	*Alexfloydia repens*	Floyd's Grass	E1
	Arthrotaxon hispidus	Hairy Jointgrass	V
Rutaceae	*Acronychia littoralis*	Scented Acronychia	E1
	Zieria prostrata	Headland Zieria	E1
Santalaceae	*Thesium australe*	Austral Toadflax	V
Sapotaceae	*Amorphospermum whitei*	Rusty Plum	V
Simaroubaceae	*Quassia sp. Moonee Creek*	Moonee Quassia	E1

2.4.2 SITE SURVEY

A total of 197 species were recorded with 154 (78%) native and 43 (22%) non-native species being noted (Appendix 1). One threatened species, *Amorphospermum whitei* Aubrev. was noted (Section 2.7) and was represented by approximately 15 mature trees with multiple stems, possibly as a result of a previous fire (pers. comm.). Eight species were recorded that are within 50 kilometres of their southern distributional limits (herbarium lodgements and personal unpublished information) (Table 2).

Table 2: Species at or near their southern distributional limits

Family	Scientific Name	Common name
Araucariaceae	*Araucaria cunninghamii*	Hoop Pine
Arecaceae	*Calamus muelleri*	Lawyer Vine
Davalliaceae	*Nephrolepis cordifolia*	Fishbone Fern
Eupomatiaceae	*Eupomatia bennettii*	Small Bolwarra
Meliaceae	*Dysoxylum muelleri*	Red Bean
Ripogonaceae	*Ripogonum fawcettianum*	Hairy Supplejack
Sapindaceae	*Castanospora alphandii*	Brown Tamarind
Sapotaceae	*Amorphospermum whitei*	Rusty Plum

Table 3: Species diversity by life form

Native species	
Trees	71
Shrubs	21
Herbs	32
Vines	29
Epiphytic	1
Total	**154**

Non-native species	
trees	7
shrubs	8
vines	6
herbs	22
Total	**43**
Overall total	**197**

2.5 COMMUNITY DESCRIPTION

A review of literature was conducted for over storey communities in the North Coast Botanical region (Thackway and Creswell 1995, Binns and Chapman 1995, Fisher et al 1996, Floyd 1989, 1990, Hager and Benson 1994, Kingston et al 2004, Moore and Floyd 1994, NPWS 1995 and 1999 and Pressey and Griffith 1992). A visual assessment of over storey species present in the study area suggests the following Endangered Ecological Communities of being present; Lowland Rainforest in NSW North Coast and Sydney Basin Bioregions. Five over storey communities are recognized and described at 2.5.1. Vegetation communities were identified on and/or adjacent to the subject site and are shown in Appendix 7.

2.5.1 VEGETATION COMMUNITIES PRESENT ON THE SUBJECT SITE

COMMUNITY 1 *

STRUCTURAL FORMATION,

Closed Forest to Tall Open Forest.

Association. *Lophostemon confertus / Araucaria cunninghamii*

Geology. Quaternary alluvium and greywackes of the Coramba beds.

Topography. Riparian corridor, Quaternary alluvium flats and adjacent lower hill slopes.

Disturbance; Logging, fires, invasion by exotic species.

Notes. A sub-canopy to 25 metres of subtropical rainforest species was present. Equivalent to Lowland Rainforest in NSW North Coast and Sydney Basin Bioregions.

Conservation. Equivalent to URov 1 – *Lophostemon confertus*, considered inadequately reserved.

Equivalent to Forest Ecosystem no. 50 – Wet Bangalow – Brush Box, considered vulnerable with 60% target set and not met and with < 39% cleared in Upper N.E NSW (NPWS 1999).

Equivalent to EF001a *Lophostemon confertus*, conservation code 2 = inadequately conserved over all of its range with between 5% and 10% conserved in the Central zone between Grafton and Kempsey. (Hager and Benson 1994)

Equivalent to Forest type 53 – Brush Box (Forestry Commission 1989).

Equivalent to F2 *Lophostemon confertus* tall to very tall closed forest, considered inadequately conserved on bedrock soils. (Pressey and Griffith 1992)

Equivalent to map unit; LR18 – Headland Brush Box and RF 53 – Brush Box. (Fisher et al 1996)

Species Conservation.

The following are approaching or are at their distributional limits; *Araucaria cunninghamii, Dysoxylum muelleri, Castanospora alphandii, Eupomatia bennettii* and *Ripogonum fawcettianum.*

COMMUNITY 2 *

STRUCTURAL FORMATION,

Tall Open Forest.

Association. *Eucalyptus grandis*

Geology. Quaternary alluvium and greywackes of the Coramba beds.

Topography. Quaternary alluvium flats and adjacent lower hill slopes.

Disturbance; Defoliation of Flooded Gum has been noted by the author in the Coffs Harbour region for the past ten years. Logging, fires, invasion by exotic species.

Notes. A sub-canopy to 25 metres of subtropical and warm-temperate rainforest species was present.

Conservation. Equivalent to URov 16 - *Eucalyptus grandis* considered inadequately reserved.

Equivalent to Forest Ecosystem no. 154 – Wet Flooded Gum – Tallowwood. > 55% cleared in Upper N.E NSW (NPWS 1999).

Equivalent to EF010a *Eucalyptus grandis* conservation code 2 = inadequately conserved over all of its range with < 5% conserved in the Central zone between Grafton and Kempsey. (Hager and Benson 1994)

Equivalent to Forest type 48 – Flooded Gum. (Forestry Commission 1989).

Equivalent to map unit; RV1 – Coastal Riparian Vegetation and N27 – Flooded Gum (Fisher et al 1996)

Species Conservation.

The following are approaching or are at their distributional limits; *Dysoxylum muelleri, Eupomatia bennettii* and *Ripogonum fawcettianum.*

COMMUNITY 3 *

STRUCTURAL FORMATION,

Tall Open Forest.

Association. *Eucalyptus pilularis – E. microcorys/ E. siderophloia*

Geology. Quaternary alluvium and greywackes of the Coramba beds.

Topography. Bedrock spurs adjoining Quaternary alluvium flats and lower hill slopes.

Disturbance; Logging, fires, invasion by exotic species.

Notes. A sub-canopy to 20 metres of subtropical and warm-temperate rainforest species was present. A wide variety of native vine species was evident. This community occurs on the ridge within the 7(a) Environmental Protection Habitat & Catchment zone in lots 4 & 5 DP820652 and consists of primary and secondary Koala habitat with an area of approximately 7.5ha and a .2ha narrow strip within the south/eastern portion of the property.

Conservation. This ecosystem is distributed near coastal ranges of the mid-north coast with major occurrences on the Comara, Snowy and Bushman's Ranges and the Dorrigo Escarpment. It is reserved in New England and Bindarri National Parks.

Equivalent to URov 9 - *Eucalyptus pilularis* and/or URov 11 *Eucalyptus microcorys/ E. pilularis/ Allocasuarina torulosa* –considered inadequately reserved.

Equivalent to Forest Ecosystem no. 95 – Northern Moist Blackbutt. < 39% cleared in Upper N.E NSW (NPWS 1999).

Equivalent to EF145b *Eucalyptus pilularis - E. microcorys* conservation code 2 = inadequately conserved over all of its range with < 5% conserved in the Central zone between Grafton and Kempsey. (Hager and Benson 1994)

Equivalent to Forest type 36 – Moist Blackbutt. (Forestry Commission 1989).

Equivalent to map unit; N7 – Moist Blackbutt (Fisher et al 1996)

Species Conservation.

Amorphospermum whitei was noted in the type. The following species are approaching or are at their distributional limits; *Calamus muelleri* and *Ripogonum fawcettianum.*

COMMUNITY 4 *

STRUCTURAL FORMATION,

Tall Open Forest.

Association. *Eucalyptus propinqua / E. siderophloia / E. microcor*ys

Geology. Greywackes of the Coramba beds.

Topography. Upper hill slopes to ridge crests.

Disturbance; Logging, fires, invasion by exotic species.

Notes. A sub-canopy to 15 metres warm-temperate rainforest species was present. A wide variety of native vine species was evident. This community occurs over a small area in the upper north western portion of the subject property and represents approximately .6ha which is identified as primary Koala habitat. The Dry Grassy Tallowwood-Grey Gum ecosystem is distributed throughout the coastal lowlands and foothills of the mid north coast from the Manning Valley north to the Corindi River. Extensive stands are protected in Kumbatine and Bago Bluff National Parks and Ngambaa Nature Reserve.

Conservation. Nearest equivalent is URov 5 - *Eucalyptus propinqua / E. acmenoides / Syncarpia glomulifera* - considered inadequately reserved.

Equivalent to Forest Ecosystem no. 52 – Foothill Grey Gum - Ironbark – Spotted Gum. > 75% endemism, <39% required to meet targets, < 39% cleared in Upper N.E NSW (NPWS 1999).

Equivalent to EF075b *Eucalyptus propinqua - E. siderophloia* conservation code 1 = not/ partly conserved over all of its range with < 1% conserved in the Central zone between Grafton and Kempsey. (Hager and Benson 1994)

Equivalent to Forest type 62 – Grey Gum - Grey Ironbark - White Mahogany. (Forestry Commission 1989).

Equivalent to map unit; SF 60 – Moist Grey Ironbark/ Grey Gum/ Tallowwood/ White Mahogany (Fisher et al 1996)

Species Conservation. None noted.

Community 5 *

STRUCTURAL FORMATION,

Hummock Grassland to Sod Grassland and Forbland.

Association. *Paspalum wetsteinii – Chloris gayana – Axonopus affinis – Sporobolus fertilis – Bidens pilosa –Ageratum houstonianum*

Geology. Greywackes of the Coramba beds, Quaternary alluvium.

Topography. Riparian, upper hill slopes to ridge crests.

Disturbance; Logging, clearing, fires, invasion by exotic species.

Notes. Highly disturbed and modified ecosystem

Conservation. No equivalent

Species Conservation. None noted.

2.6 THREAT STATUS.

Clearing, settlement and horticulture within the period of European history has profoundly affected all aspects of the study area. For many years a large scale valuable logging industry has been based upon the majority of large tree species present. Fire is also likely to have impacted across the study area although the period to the last fire was not determined.

A visual assessment of threats listed on Schedule 3 of the Act noted the following threatening processes;

- High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition,
- Clearing of native vegetation,

- Invasion of native plant communities by exotic perennial grasses,
- Removal of dead wood and dead trees,
- Invasion, establishment and spread of Lantana, and,
- Invasion of native plant communities by bitou bush and boneseed.

Further threats noted included runoff from adjoining agricultural lands and road surfaces, dumping of domestic garden wastes, maintenance of infrastructure including clearing under and adjacent to powerlines and the invasion of native plant communities by a range of exotic species including; Senna, Mexican Sunflower, Mickey Mouse Plant, Crofton Weed, Camphor Laurel, Cocos Palm, Umbrella Tree, Slash Pine and Hackberry. No scientific research is known to have been undertaken on or nearby to the study area.

2.7 Threatened species and Endangered Ecological Communities.

Two populations of the threatened species Rusty Plum (*Amorphospermum whitei*) were identified during the property flora survey. These populations occur within an area that will not be impacted by the proposed development. Table 4 below provides a summary of this threatened species, its life history and conservation status.

Table 4. life history based upon observation.

Species name *Amorphospermum whitei*	**Authority** Aubrev.	**Family** Sapotaceae	
LIFE HISTORY			
Growth form	Small to medium sized tree to 20 metres and 50cm diameter. Commonly with an irregularly fluted trunk. Creamy grey corky bark.		
Vegetative spread	no		
Longevity	Not known but suggest > 150 years		
Primary juvenile period	Not known		
Flowers	Rusty brown in dense cluster in the leaf axils to c. 3 mm long		
Flowering period	August to November		
Fruit/seed	Drupe, purple black, fleshy to 6 cm, surrounding one or rarely two shiny seeds with a glossy elliptical scar on one side.		
Dispersal, establishment and growth	Brushtail Possums noted to utilize fruit and move seed (pers. obs.)		
Fire response	May survive light fire (pers. comm.) but likely killed by intense fires.		
Interaction with other organisms	Brushtail Possums noted to utilize fruit (pers. obs.), pollinators not noted		
DISTRIBUTION			
Status / origin	native		
Botanical subregions	NC, QLD		
Habitat	Tall Open Forest. *Eucalyptus pilularis – E. microcorys/ E. siderophloia* Tall Open Forest of *Lophostemon confertus*		
Altitude	< 600 metres	**Annual rainfall;**	1759 mm
Typical local abundance	Locally abundant with small dense populations		
Vegetation	Tall Open Forest	**Association;**	*Lophostemon confertus; Eucalyptus pilularis – E. microcorys/ E. siderophloia*
Topography	Riparian, lower slopes and foothills		
Substrate	Lithic sandstones of the Coramba Beds - Coffs Harbour Association		
Exposure	Heavy shade		

CONSERVATION	
Conserved areas	Bundagen F.R., Sherwood N.R., Bruxner Park N.R., Woolgoolga F.R., Waihou F.R., Minyon F.R., Broken Head N.R., Numinbah N.R.
Other notes	The species will not be impacted by this proposal as it occurs in areas t be retained.

3.0 FAUNA ASSESSMENT

3.1 METHODS

The methods adopted in this report follow guidelines recommended by DEC (2004) for development activities.

3.1.1 NPWS WILDLIFE ATLAS SEARCH

The NPWS Wildlife Atlas was searched for records of threatened fauna species from within 10km of the subject site.

3.1.2 SITE SURVEY

The fauna survey took place concurrently with the flora surveys during January, March, July and September 2007 following the same transects and random meander as outlined above in the flora survey. The survey involved both searching for threatened species and assessing the value of the site as habitat for fauna. Birds were surveyed by listening for their calls and observing through binoculars for any species present. Frogs were surveyed by listening for their calls and both reptiles and frogs were surveyed by searching potential hiding places, such as under stones and logs. Scats, tracks and other signs of mammals, herptiles and birds were also searched for. All fauna species seen, heard or represented by scats, tracks or other signs were noted, and 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 condition, flow and water quality of drainage lines and bodies of water
- Areas of dense vegetation
- The presence of hollow logs/debris and areas of dense leaf litter
- The presence of fruiting flora species
- The presence of blossoming flora species, particularly winter-flowering species
- Vegetation connectivity and proximity to neighbouring areas of intact vegetation
- The presence of caves and man-made structures that may be suitable for microchiropteran bat roost sites
- The presence of bulky nests which may belong to raptors

3.1.3 SITE NIGHT SURVEY

Comprehensive night surveys were undertaken on nights within the months of the January, March, July and September 2007 by Kimberly Stewart (B. Environmental Science) and Wayne Hadaway. The survey involved the following:

STAG WATCHES

Two hollow-bearing trees located on the southern property boundary along West Korora Road were watched on the afternoons of each survey night. Stag watches on identified hollow-bearing trees commenced half an hour before sunset, and finished an hour after sunset.

SPOTLIGHTING

Spotlighting surveys were conducted at the site by Kimberly Stewart (B. Environmental Science) and Wayne Hadaway on two nights per seasonal survey. Spotlighting was concentrated on the following areas:

- The vegetation along Jordan's Creek
- Grasslands north and south of Jordan's Creek
- The vegetated area located in the middle of the subject property, the 7(a) zone, Primary Koala Habitat

Spotlighting effort was 6 person hours for each of the two nights per seasonal survey; total of 12 person hours.

CALL PLAYBACK

Call playback surveys were conducted at the site by Kimberly Stewart (B. Environmental Science) and Wayne Hadaway on 2 nights per seasonal survey. Playbacks of calls of the following species were made;

- Squirrel Glider
- Yellow-bellied Glider
- Koala
- Powerful Owl
- Masked Owl
- Wallum Frog, Giant Barred Frog

Each playback involved broadcasting the species' call for 2 minutes, followed by 5 minutes of quiet listening. With the exception of the Squirrel Glider and Yellow-bellied Glider calls, which were broadcast 3 times per night, the calls of each species were broadcast twice per night. Playbacks were broadcast from near and within all vegetation communities in and adjacent to the development property, as this was considered the area where the target species were most likely to be detected.

The targeted call playback survey conducted by Kimberly Stewart (B. Environmental Science) and Wayne Hadaway carried out as described above recorded one species; Giant Barred Frog.

BAT ECHOLOCATION

Bat echolocation surveys were conducted using an Anabat on 2 nights per seasonal surveys. Two sites were targeted on each night with the Anabat recording, for intervals not less than 60 minutes per site, through the recording period at each site the surrounding area was traversed with spotlights for the opportunistic sighting of bat movement.

The Anabat II S/N106782 was used for the bat echolocation survey and was placed in an elevated location at each site (approximately 1 metre). The Anabat was placed in a vertical position with a sensitivity setting of 6.5, division ratio of 16, volume of 7; a 20 second calibration was carried out to commence each recording session.

The targeted bat echolocation survey conducted by Kimberly Stewart (B. Environmental Science) and Wayne Hadaway carried out as described above observed no evident bat movement or Anabat detection; the mobility of bat species means that failure to detect them at a location does not necessarily mean they are *never* present at

that location. The bat echolocation night observations focused on the areas described in Appendix 3.

TRAPPING

Trapping surveys were conducted by Kimberly Stewart (B. Environmental Science) and Wayne Hadaway, using multiple trapping methods on the 2 nights of each seasonal survey. Total trapping time was over eight hundred trap hours, this equates to a minimum of two hundred hours per community.

These methods included:

- Large and small Elliot Traps at intervals of 50m in both north-south and east-west directions throughout all communities
- Harp Trap set in multiple locations
- Cage Traps set in multiple locations

The targeted trapping survey conducted by Kimberly Stewart and Wayne Hadaway carried out as described above recorded three rat species.

3.1.4 LIMITATIONS

Many fauna species are cryptic and/or nocturnal and/or wide-ranging and mobile, and are therefore unlikely to be detected even during seasonal surveys. The fauna assessment is, accordingly, largely an assessment of the *potential* of the subject site as habitat for various fauna species. With the exception of species definitely recorded from the site, there is no certainty as to the presence or absence of the species discussed.

The area for the proposed development is planned within the previously cleared areas which now consist of managed grasslands. The 7(a) vegetated areas within the subject property are to be retained and rehabilitated along with a large area of grassland within the south-eastern portion between Jordan's Creek and West Korora Road. Consequently, should fauna inhabit this area and were not detected during the surveys; the proposed rehabilitation will enhance the available habitat for these species.

3.2 RESULTS

3.2.1 NPWS WILDLIFE ATLAS SEARCH

The NPWS Wildlife Atlas search revealed records of 41 threatened fauna species within 10 km of the subject site (Table 5). On the basis of habitat preferences, 33 of these species were considered possible occurrences at the subject site.

Table 5: Habitat of Threatened Fauna Species and Their Likelihood of Occurrence at the Subject Site

Scientific Name	Common Name	Habitat	Likelihood of Occurrence at Subject Site
Litoria brevipalmata	Green-thighed Frog	Rainforest and moist eucalypt forest to dry eucalypt forest and heath	Possible
Crinia tinnula	Wallum Froglet	Only in acid paperbark swamps and sedge swamps of the coastal "wallum" country	Unlikely
Mixophyes iteratus	Giant Barred Frog	Rainforests and moist eucalypt forest	Possible
Lophoictinia isura	Square-tailed Kite	Open forest, woodland and sand plains both coastal and subcoastal	Possible
Pandion haliaetus	Osprey	Coastal rivers, estuaries and streams	Possible
Ixobrychus flavicollis	Black Bittern	Riparian Habitats	Possible

Scientific Name	Common Name	Habitat	Likelihood of Occurrence at Subject Site
Calyptorhynchus lathami	Glossy Black-cockatoo	Coastal forests and open inland woodland	Possible
Coracina lineata	Barred Cuckoo-shrike	Rainforest, eucalypt forest, woodland and swamp woodland	Possible
Ephippiorhynchus asiaticus	Black-necked Stork	Grassland Habitats	Possible
Ptilinopus magnificus	Wompoo Fruit Dove	Rainforest, low elevation forest along coast and ranges	Possible
Ptilinopus regina	Rose-crowned Fruit-dove	Tropical and subtropical rainforest	Possible
Grus rubicunda	Brolga	Shallow wetland and grassland	Possible
Haematopus fuliginosus	Sooty Oystercatcher	Rocky outcrops and headlands along coast	Unlikely
Haematopus longirostris	Pied Oystercatcher	Coastal beaches and dunes	Unlikely
Todiramphus chloris	Collared Kingfisher	Paperbark forest and mangroves	Unlikely
Irediparra gallinacean	Comb-crested Jacana	Floating vegetation on freshwater lakes and ponds	Possible
Sterna albifrons	Little Tern	Almost exclusively coastal, may occur several kilometres from the sea in harbours, inlets and rivers	Unlikely
Sterna fuscata	Sooty Tern	Tropical and sub-tropical seas	Unlikely
Grantiella picta	Painted Honeyeater	Brigalow and Box-Gum Woodlands and Box-Ironbark Forests	Unlikely
Xanthomyza Phrygia	Regent Honeyeater	Coastal rivers, estuaries and streams around Coffs Harbour	Possible
Cylopsitta diophthalma coxeni	Double-eyed Fig-parrot	Rainforests and moist eucalypt forest	Possible
Lathamus discolour	Swift Parrot	Riparian vegetation and woodland	Possible
Ninox strenua	Powerful Owl	Variety of habitats including coastal forests	Possible
Tyto capensis	Grass Owl	Coastal heath and tall grassland	Possible
Tyto Novaihollandiae	Masked Owl	Heavy eucalypt forest	Possible
Tyto tenebricosa	Sooty Owl	Heavily wooded habitat	Possible
Dasyurus maculatus	Spotted-tailed Quoll	Sclerophyll forests, woodlands, rainforest and coastal heathlands	Possible
Phascogale tapoatafa	Brush-tailed Phascogale	Sub-tropical, wet sclerophyll forest, heathlands and swamp	Possible
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	New England Tablelands and North West Slopes	Unlikely
Mormopterus norfolkensis	Eastern Freetail-bat	Dry sclerophyll forest and woodland east of the Great Dividing Range	Possible
Petaurus australis	Yellow-bellied glider	Open forest, woodland with range of eucalypt species	Possible
Petaurus norfolcensis	Squirrel Glider	Wet and open dry sclerophyll forests	Possible
Phascolarctos cinereus	Koala	Eucalypt forest and woodland	Possible
Potorous tridactylus	Long-nosed Potoroo	Inhabits coastal heaths and dry and wet sclerophyll forests	Possible
Pteropus poliocephalus	Grey-headed Flying-fox	Eucalypt forest and woodland	Possible
Syconycteris australis	Common Blossom-bat	Blossom producing trees	Possible
Kerivoula papuensis	Golden-tipped Bat	Subtropical rainforest	Possible
Miniopterus australis	Little Bentwing-bat	Coastal plain and nearby ranges	Possible
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	Along the east and north-west coasts of Australia	Possible

Scientific Name	Common Name	Habitat	Likelihood of Occurrence at Subject Site
Myotis adversus	Large-footed Myotis	Coastal rivers, estuaries and streams	Possible
Hoplocephalus stephensi	Stephens' Banded Snake	Variety of habitats	Possible

Sources: NPWS (2002b), NPWS (2005), Pizzey and Knight (1999), Churchill (1998), Wilson and Knowles (1988), Readers Digest (1993), Robinson (1995).

3.2.2 SITE SURVEY

3.2.2.1 FAUNA RECORDED

38 species of vertebrates were recorded during the site survey, none of which are threatened; all species detected during the surveys are listed in Appendix 2.

3.2.2.2 HABITAT FEATURES

In terms of habitat for threatened species, the most important features of the subject site are the presence of mature Flooded Gum, Tallowwood and Brushbox trees within Community 1 and the Riparian vegetation along Jordan's Creek in Community 3. Although detection of threatened fauna species was limited, the vegetation communities along Jordan's Creek represent the majority (80%) of suitable habitat. Hence this vegetation should be maintained and where ever possible expanded to provide a 30m buffer zone as recommended in the Department of Water and Energy guidelines for riparian corridors (DWE, 2008). An assessment of the habitat features observed during the fauna survey is listed in Table 6.

Table 6: Assessment of Habitat Features of Subject Site

Feature	Assessment
The presence of mature trees with hollows, fissures and/or other suitable roosting/nesting places	Two trees observed with hollows or fissures on the southern border of property along West Korora Road
The presence of Koala food trees	Eucalypts present
The presence of caves or hollows suitable for Molossidae species	No caves present and unlikely to be on property
The presence of Petauridae feeding scars	Yes, southern edge of Jordan's Creek on the south eastern portion of the property
Condition, flow and water quality of drainage lines and bodies of water	Yes, in good condition, flow and drainage lines are adequate
Areas of dense vegetation.	Yes, community group 1 & 3
Presence of hollow logs/debris and areas of dense leaf litter	Yes, amongst community group 1 & 3
Presence of fruiting flora species	Some species in 7(a) zones
Presence of blossoming flora species, particularly winter-flowering species	Eucalypts in community 1 & 3
Vegetation connectivity and proximity to neighbouring areas of intact vegetation	Property is part of a regional habitat link connecting Bruxner Park lands with Jordan's Creek and areas to the east.
Presence of caves and man-made structures that may be suitable for michrochiropteran bat roost sites	Absent
Presence of bulky nests which may belong to raptors	Absent

3.2.2.3 SUITABILITY OF HABITAT FOR THREATENED SPECIES

Based on the habitat features present, and considering that the natural vegetation is Rainforest and Wet Sclerophyll, an assessment was made of the suitability of the

subject site as habitat for the threatened species listed in Table 5 and it was concluded that the site may provide suitable habitat for 33 of the listed threatened fauna species.

The Giant Barred Frog was identified on the 3rd and 4th of March 2007 by Kimberly Stewart and Wayne Hadaway by using the Frog Call Playback method. A search for an opportunistic habitat for the Giant Barred Frog was conducted, concluding the area along Jordan's Creek near the crossing and fish weir was a suitable habitat site. This area shall remain intact and quarrantined from development; strategies to upgrade this man-made wetland without any disturbance to the Giant Barred Frog habitat are proposed in the accompanying Vegetation Management Plan.

4.0 IMPACTS AND AMELIORATION

The concept plan for the proposed development identified large areas of native vegetation that will be retained. An accompanying Vegetation Management Plan outlines strategies for removal of non-native plants from within these areas and proposes the revegetation of a 30m buffer zone to Jordan's Creek and surrounding the man-made wetland (habitat for the Giant Barred Frog). One section of the northern bank of Jordan's Creek must be modified to accommodate flooding issues associated with the development and is assessed below

4.1 FLOODING CONSTRAINTS ALONG JORDAN'S CREEK

A section of Jordan's Creek in the vicinity of the existing playing fields represents the southern boundary of the subject property. A Director General of Planning requirement (DGR) for approval was that enhanced flooding of adjoining lands should not occur as a result of the development proceeding. Modelling of flooding for the: existing; 100year event; and possible effects of climate change of flooding levels indicate that flooding may occur on adjoining lands as a result of a constriction in the channel of Jordan's Creek slightly to the north (upstream) of the playing fields. A proposal to provide a flood bypass along a section of Jordan's Creek will alleviate this constriction and eliminate any flooding issues for adjoining properties.

4.1.1 FLOOD BYPASS

It is proposed to create a flood bypass along a section of Jordan's Creek upstream of the playing fields and rejoining Jordan's Creek downstream of the existing associated buildings. This bypass will involve: the removal of approximately 130m of riparian vegetation along the north bank of Jordan's Creek; excavation of the channel bank to a depth of 0.50 above the existing channel invert for a width of 6m to create a near horizontal terrace; and the gradual sloping of the terraced area to the existing land surface over an additional distance ranging from 11 to 14 metres. This work is illustrated diagrammatically in Appendix 11.

4.1.2 RIPARIAN VEGETATION

The vegetation along this section of Jordan's Creek was assessed on the 4th of February, 2009; recording all species present in the affected riparian zone. 46 native taxa were recorded and 14 non-native taxa; the complete list is included in Table 7 below. Mature Camphor Laurel trees dominate the over storey along this section of Jordan's Creek (Image 1) with the more abundant native species (Pear-Fruited Tamarind, Creek Sandpaper Fig and Scentless Rosewood) being early colonising species and forming a regenerating rainforest understorey. No threatened species were recorded along this section of the creek bank. Discussions with the Coffs Harbour City Council Biodiversity officer suggest that an area downstream of where a Power line crosses the creek has been revegetated in the past (possibly 15 years ago) as indicated by the uniform

diameter of overstorey plants and abundant Wattle and Lomandra plants in this area (Image 2).

Table 7. Plants recorded from within the affected riparian zone of Jordan's Creek

Family	Species Name	Common Name
TREES		
Arecaceae	*Archontophoenix cunninghamiana*	Bangalow Palm
Casuarinaceae	*Allocasuarina torulosa*	Forest Oak
Celastraceae	*Cassine australis*	Red Olive Berry
Euphorbiaceae	*Glochidion ferdinandi*	Cheese Tree
Fabaceae (Mimosoideae)	*Acacia fimbriata*	Fringed Wattle
	Acacia irrorata	Green Wattle
	Acacia melanoxylon	Black Wattle
Lauraceae	*Neolitsea dealbata*	Hairy-leaved Bolly Gum
Meliaceae	*Dysoxylum muelleri*	Red Bean
	Synoum glandulosum	Scentless Rosewood
Moraceae	*Ficus coronata*	Creek Sandpaper Fig
Myrtaceae	*Acmena smithii*	Lily Pilly
	Corymbia intermedia	Pink Bloodwood
	Eucalyptus propinqua	Grey Gum
	Eucalyptus siderophloia	Northern Grey Ironbark
	Lophostemon confertus	Brush Box
Oleaceae	*Notelaea longifolia*	Mock Olive
	Olea paniculata	Native Olive
Sapindaceae	*Cupaniopsis anacardioides*	Tuckeroo
	Diploglottis australis	Native Tamarind
	Guioa semiglauca	Guioa
	Mischocarpus pyriformis ssp. pyriformis	Pear-fruited Tamarind
SHRUBS		
Araliaceae	*Astrotricha longifolia*	Star Hairs
Asteliaceae	*Cordyline stricta*	Cordyline
Cyathaceae	*Cyathea leichhardtiana*	Prickly Treefern
Euphorbiaceae	*Croton verreauxii*	Croton
Euphorbiaceae	*Omalanthus populifolius*	Bleeding Heart
Eupomatiaceae	*Eupomatia laurina*	Bolwarra
Pittosporaceae	*Pittosporum revolutum*	Hairy Pittosporum
HERBS		
Adiantaceae	*Adiantum formosum*	Giant Maidenhair
Araceae	*Alocasia brisbanensis*	Cunjevoi
Blechnaceae	*Blechnum cartilagineum*	Gristle Fern
Convulvulaceae	*Dichondra repens*	Kidney Weed
Cyperaceae	*Carex polyantha*	Carex Sedge
Davalliaceae	*Nephrolepis cordifolia*	Fishbone Fern

Dennstaedtiaceae	*Pteridium esculentum*	Bracken Fern
Lomandraceae	*Lomandra hystrix*	A Lomandra
Phormiaceae	*Dianella caerulea*	Dianella
Poaceae	*Oplismenus aemulus*	Basket Grass
VINES		
Asclepidiaceae	*Marsdenia rostrata*	Common Milk Vine
Luzuriagaceae	*Geitonoplesium cymosum*	Scrambling Lilly
Moraceae	*Malaisia scandens*	Burny Vine
Ripogonaceae	*Ripogonum elseyanum*	Hairy Supplejack
Smilacaceae	*Smilax australis* *Smilax glyciphylla*	Austral Sarsaparilla Sweet Sarsaparilla
Vitaceae	*Cissus antarctica*	Water Vine
EXOTICS		
Araliaceae	*Schefflera actinophylla*	Umbrella Tree
Asteraceae	*Ageratina adenophora* *Ageratum houstonianum* *Bidens pilosa* *Tithonia diversifolia*	Crofton Weed Goatweed Farmer's Friend Mexican Sunflower
Convulvulaceae	*Ipomoea cairica*	Morning Glory Vine
Faboideae (Ceasalpinoideae)	*Senna pendula var. glabrata*	Senna
Lauraceae	*Cinnamomum camphora*	Camphor Laurel
Passifloraceae	*Passiflora edulis* *Passiflora subpeltata*	Passionfruit White Passionflower
Poaceae	*Pennisetum clandestinum*	Kikuyu
Polygonaceae	*Rumex crispus*	Curled Dock
Solanaceae	*Solanum mauritianum*	Tobacco Bush
Verbenaceae	*Lantana camara*	Lantana

Image 1 Camphor Laurel dominate the tree taxa in the affected area along Jordan's Creek (Photographs, S. Cotter).

Image 2 Left: Lomanda and Wattle present in an area previously revegetated and Right: revegetated area to the left (downstream) of where the power lines cross Jordan' Creek. (Photographs, S. Cotter).

The number of individual native plants removed for the construction of the flood bypass will be compensated at a 10:1 rate by planting both within the 30m buffer zone to Jordan's Creek or in the Compensatory Planting Zone located in the southeast portion of the subject property between Jordan's Creek and West Korora Road as recommended in the Vegetation Management Plan. The area of riparian vegetation to be removed (2400m2 – 0.24Ha) will be offset by the 6.8Ha of high ecological value Primary Koala Habitat native vegetation that will be retained as part of this development. This retained vegetation will be positively managed to: enhance and propagate existing threatened flora species (Rusty Plum); provide suitable habitat for the Threatened fauna species (Giant Barred Frog); and to provide a habitat link for the threatened Koala that is known to occur in the general area, between Jordan's Creek and a recognised regionally-significant Fauna corridor along Bruxner Park Road to the north of the subject property. Management strategies will focus on: the removal of non-native species; providing adequate bushfire protection; and to undertake progressive revegetation that will enhance the connectivity with the retained vegetation. These measures are outlined in the Vegetation Management Plan.

4.1.3 AQUATIC ECOLOGY

Jordan's Creek represents an important waterway having a high ecological status within the Korora Basin and, with an outlet into the Solitary Islands Marine Park, has an important role is transference of: sediment and pollutants; or aquatic species (fish and/or invertebrates) from the hinterland to this Marine Park. As a consequence any modification of the channel bank can significantly affect the waterway. Given this situation, the following modifications to the scheme are recommended that will prevent any detrimental effect on the waterway; retain the integrity of Jordan's Creek; and negate the need to undertake a detailed aquatic ecological study.

- The existing channel bank above the level of the low flow conditions along Jordan's Creek will not be affected during any excavation (*i.e*. a height of 0.50 of existing channel bank will be retained without modification where ever the channel bank slopes gradually towards the creek).

- In two locations, the existence of mature Camphor Laurel trees have created a steep, near vertical channel bank with a gradually sloping, depositional bank directly opposite on the southern side of Jordan's Creek. It is proposed to retain the integrity of this high bank by commencing the necessary excavation at least 2m away from the existing bank. This will create an in-stream island during high flow events which will be vegetated using species common to the area.

- The gradient of the terraced area should match that existing along Jordan's Creek. This will ensure that no water is retained within the bypass channel once flood levels recede and hence any fish that may enter this channel will not be trapped; adequate passing being provided at the convergence of the channels.

- Where the flood bypass rejoins Jordan's Creek, the channel bed will comprise cobble-size clasts without any fined matrix (sand, gravel) material to replicate the existing channel bed conditions along Jordan's Creek. These will provide: suitable habitat for invertebrates during prolonged high flow events (summer flooding); prevent stream erosion from occurring during re-entry of the flood waters into Jordan's Creek; and provide adequate fish passage should any fish enter the bypass channel.

- All excavated sloping areas should be vegetated with appropriate species to prevent any slumping and/or erosion.

- An erosion and sediment control plan should be developed before undertaking any activity and must consider the prevention of sediment entering Jordan's Creek during any excavation.

- Excavated material should be tested for soil contaminates. If contaminates are present, the excavated material should either removed from the site and disposed appropriately, or spread over the site during construction of the residential areas and appropriately sealed beneath non-contaminated materials.

- A 20m Core Riparian Zone (Department of Water and Energy requirements for semi-permanent third order stream having a defined channel) will be revegetated and commence from the top of the flood bypass channel where it reaches the existing land surface. A 10m wide Vegetated Buffer Zone will be planted with appropriate species and combined with the CRZ, will provide a 30m wide buffer to the development.

4.2 RESIDENTIAL AREAS

The proposed development will not result in loss of any native vegetation for the construction of the residential dwellings, access roads, driveways, associated infrastructure and Asset Protection Zones for Bushfire protection.

Potential environment impacts associated with the development of the residential areas include:

- Potential degradation of likely habitat for a small number of threatened species through sediment erosion during construction and pollution run-off;
- An increase in traffic along the Pacific Hwy due to the proposed development is likely to result in an increase in heavy traffic to the site;
- Increased potential for establishment of weeds in areas of retained native vegetation and on neighbouring areas;
- Impacts on water quality entering Jordan's Creek
- Increases in noise, light and disturbance may cause more reclusive species to move away from habitat edges of retained vegetation in the study area, in effect increasing the penetration of edge-effects on habitat

4.3 AMELIORATION AND OPPORTUNITIES FOR THE ENVIRONMENT

It is recommended that building envelopes be positioned to minimise the need to clear vegetation for units, houses and for bushfire buffers. An environmental management plan should be developed with the following components: Vegetation Management Plan; Landscape Plan; Koala Plan; and Erosion, Sediment Control and Stormwater Plan. The following amelioration measures are recommended for the development:

Vegetation Management Plan

- Rehabilitation of vegetated areas within the 7(a) zones and along Jordan's Creek
- Weed control in developed areas and areas of retained habitat
- Camphor Laurel trees located within Jordan's Creed shall be selectively removed over a period of 5 years rather than all at the same time
- Regeneration of vegetation in the south eastern portion of the subject property (is currently grasslands) to include re-vegetation (Compensatory Planting Zone)
- A 30 metre buffer around Jordan's Creek
- A 30 metre buffer around the man-made wetland located in the south western portion of the property
- Retention and enhancement of areas of natural habitat throughout the development area

Landscape Plan

- Landscape, embellishment plantings and compensatory planting shall be of local indigenous species
- Fencing to be provided to limit entry to vegetation areas and to provide physical separation between residential development and natural areas

Koala Plan

- Suitable traffic control measures should be incorporated into the development for the protective measures of Koalas
- All fencing within the development area and surrounds should include the free movement of Koala
- All swimming pools should include a safety rope for Koala movement
- Connectivity of key habitat (Jordan's Creek and along Bruxner Park Road) through planting of koala-friendly species
- Construction of fauna underpass with appropriate vegetation linking the developed precincts with the Pacific Bay Resort (existing passageway) and under access road to western development precinct to encourage Koala movement along these habitat corridors

Erosion, Sediment Control and Stormwater Plan

- All stormwater from development to be diverted away from Jordan's Creek and stored onsite to allow dissipation over a period of time

The buffer zones to Jordan's Creek and the Freshwater lagoon recommended above have been determined after discussions with staff from the Department of Fisheries and the Coffs Harbour City Council Biodiversity officer. Jordan's Creek is a third-order stream at the Pacific Bay West lands and hence a 30m buffer to residential areas would be appropriate for this development. These distances are less than that required by the Director General, Department of Planning but meet the Department of Water and Energy guidelines for riparian corridors.

4.3.1 Controls on erosion

In order to maintain water quality downstream from Jordan's Creek an Erosion, Sediment Control and Stormwater Management Plan should be prepared and implemented throughout the development stages. This is particularly important so as to eliminate any erosion and hence sediment entering Jordan's Creek during construction of the Flood Bypass.

4.3.2 Fish Passage

A crossing of Jordan's Creek is located on the southern aspect of the subject property and a culvert has been put in place for the flow of water and fish passage. The eastern side of the culvert showed reduced opportunity for fish passage and a fish blockage with a waterfall effect, further investigation of Jordan's Creek identified rocky outcrops at a number of locations along the creek which allows for changes to the elevation of the creek bed in some cases up to 500mm lower.

It is a recommendation of this report that any proposed future crossing of Jordan's Creek should be constructed so that there is no disturbance to the creek and riparian vegetation; a comprehensive Aquatic study should be undertaken for Jordan's Creek to appropriately address the crossing and the fish passage prior to any new crossing being considered. For the existing crossing, located in the western portion of the subject property, a freshwater wetland has established upstream of the culvert. This man-made wetland is currently a habitat for various species including the endangered Giant Barred Frog that has been identified as occurring within the wetland environment. The water quality was assessed visually and appeared to be in a healthy state with no sightings of Gambusia (mosquito fish) present.

5.0 STATUTORY CONSIDERATIONS

5.1 ASSESSMENTS OF SIGNIFICANCE (7 PART TEST)

Threatened species impact assessment is an integral component of environmental impact assessment. The ultimate objective of the application of section 5A of the *Environmental Planning and Assessment Act 1979* (EP&A Act), the Assessment of Significance, is to improve the standard of consideration afforded to threatened species, populations and ecological communities, and their habitats through the planning and assessment process, and to ensure this consideration is transparent.

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 5A EPA 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 state wide 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.

5.1.1 DEFINITIONS

LOCAL POPULATION

For the purposes of the TSC Act (1995) a local population is defined as "a population that occurs within the study area, unless the existence of contiguous or proximal occupied habitat and the movement of individuals or exchange of genetic material across the boundary of the study area can be demonstrated" (NPWS 1996).

REGION

The subject site is located within the New South Wales North Coast bioregion (Thackway and Cresswell 1995), which extends from the Queensland/NSW border south to about Port Stephens, and west to the Great Dividing Range.

5.1.2 Flora

One species of threatened flora was identified on the subject site.
One Endangered Ecological Community - Lowland Rainforest in NSW North Coast and Sydney Basin Bioregions was identified on the subject site.

The NPWS Wildlife Atlas search identified 15 threatened flora species occurring within a 10km radius of the subject site; due to the lack of vegetation communities that provide suitable habitat for the following; Z. Smithii, Coast Headland Pea, Headland Zieria, no 7 part test has been addressed for the above mentioned species.

5.1.3 Endangered Ecological Community

Lowland Rainforest in NSW North Coast and Sydney Basin Bioregions.

Description

Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions is the name given to the ecological community of subtropical rainforest and some related, structurally complex forms of dry rainforest, excluding Littoral Rainforest and Lowland Rainforest on Floodplain in the NSW North Coast Bioregion. Lowland Rainforest may be associated with a range of high-nutrient geological substrates, notably basalts and fine-grained sedimentary rocks, on coastal plains and plateaux, foot-slopes and foothills. In the north of its range, Lowland Rainforest is found up to 600m above sea level. On the site the community is dominated by *Lophostemon confertus* and *Araucaria cunninghamii.*

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.

Not applicable.

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.

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 actions proposed are not likely to adversely effect or modify the extent or composition of the community on the site.

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.

(ii) No area of habitat is to be fragmented,

(iii) The endangered ecological community within the study area will not be modified, fragmented or isolated.

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

No critical habitat has been declared for this endangered ecological community.

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

No recovery plan or threat abatement plan has been formulated for this endangered ecological community or its Key Threatening Processes.

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.

The action is considered part of the following Key Threatening Processes;

- Clearing of native vegetation,
- Invasion of native plant communities by exotic perennial grasses,

- Removal of dead wood and dead trees,
- Invasion, establishment and spread of Lantana, and,
- Invasion and establishment of exotic vines and scramblers.

Conclusion
The Lowland Rainforest Endangered Ecological Community will not be harmed by the development; areas of rainforest vegetation shall be retained with previously cleared lands being rehabilitated according to the Vegetation Management plan. Therefore the proposed development is unlikely to have a significant effect on the Endangered Ecological Community. Consequently, a Species Impact Statement is not necessary.

5.1.4 THREATENED SPECIES

Family - Sapotaceae
Binomial - *Amorphospermum whitei*
Common name – Rusty Plum
Conservation status in NSW: Vulnerable
National conservation status: N/a
Habitat and ecology; Occurs in rainforests and wet sclerophyll forests

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.

The species, *Amorphospermum whitei,* is not likely to be adversely effected by the proposed action such that a viable local population will be placed at risk of extinction on the site. No examples of this species will be damaged or removed.

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.

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.

Not applicable.

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.

(ii) No area of habitat is to be fragmented,

(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

No critical habitat has been declared for this species.

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

No recovery plan or threat abatement plan has been formulated for this species or Key Threatening Processes.

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.

The action is considered part of the following Key Threatening Processes;

- Clearing of native vegetation,
- Invasion of native plant communities by exotic perennial grasses,
- Removal of dead wood and dead trees,
- Invasion, establishment and spread of Lantana, and,
- Invasion and establishment of exotic vines and scramblers.

Asclepiadaceae
***Marsdenia longiloba* Slender Marsdenia**
Conservation status in NSW: Endangered

Slender Marsdenia is a slender climber of the milk vine group, with pairs of very finely pointed leaves and 5-6 tiny glands at the base of the leaves. The stems of Slender Marsdenia exude clear, watery sap when cut, unlike most of the milk vines which have milky sap. Clusters of small white star-shaped flowers are produced in summer and are followed by long, narrow seed-capsules that split to release many seeds with tufts of long silky hair. Slender Marsdenia are found scattered throughout the north coast of NSW north from Barrington Tops and also occurs in south-east Queensland.

Slender Marsdenia habitat is in subtropical and warm temperate rainforest, lowland moist eucalypt forest adjoining rainforest and, sometimes, in areas with rock outcrops.

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.

No examples of *Marsdenia longiloba* were noted. No adverse effect is likely such that a viable local population will be placed at risk of extinction.

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.

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.

Not applicable.

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.
(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

Not applicable.

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

No recovery plan or threat abatement plan has been formulated for this species or Key Threatening Processes.

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.

The action is considered part of the following Key Threatening Processes;

- Clearing of native vegetation,
- Invasion of native plant communities by exotic perennial grasses,
- Removal of dead wood and dead trees,
- Invasion, establishment and spread of Lantana, and,
- Invasion and establishment of exotic vines and scramblers.

CYPERACEAE
***Eleocharis tetraquetra* (Square-stemmed Spike-rush)**
Conservation status in NSW: Endangered

A tufted perennial plant distinguished by its slender four-angled stem and broad spikelet on top of the stem. Stems grow 30 to 100 cm tall and are 1 – 1.5 mm in diameter. The leaves are at the base of the stem and are not very conspicuous, being reduced to tubular sheaths. The spikelet is 10 – 20 mm long and 3.5 – 5mm in diameter. The seeds are contained within the spikelet and are a shining yellow or brown colour, approximately 1.5 mm long and 1 mm wide.

Thought to be extinct in NSW until it was rediscovered in 1997 at Boambee near Coffs Harbour. It has since been found in other north coast localities near Grafton and Murwillumbah. The species also occurs in south-east Queensland. It is found in damp locations on stream edges and in and on the margins of freshwater swamps.

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.

No examples of *Eleocharis tetraquetra* were noted. No adverse effect is likely such that a viable local population will be placed at risk of extinction.

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.

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.

Not applicable.

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.
(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

Not applicable.

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

No recovery plan or threat abatement plan has been formulated for this species or Key Threatening Processes.

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.

The action is considered part of the following Key Threatening Processes;

- Clearing of native vegetation,
- Invasion of native plant communities by exotic perennial grasses,
- Removal of dead wood and dead trees,

- Invasion, establishment and spread of Lantana, and,
- Invasion and establishment of exotic vines and scramblers.

FABACEAE (Caesalpinioideae)
***Senna acclinis* (Rainforest Cassia)**
Conservation status in NSW: Endangered

Rainforest Cassia is a shrub to 3 m tall with compound leaves to 15 cm long, each with up to 6 pairs of oval-shaped leaflets at about 15 mm intervals along the central spine. There is a gland between the lower one to four pairs of leaflets. The flowers are in groups of two to five on a short stalk, hanging on the underside of the branchlets. They are bright golden yellow and cup-shaped. The seed pod is long and narrow, 12 - 15 cm long, 6 - 8 mm wide and more or less flat. *Senna acclinis* can
easily be mistaken for introduced Senna (formerly Cassia) species which are environmental weeds. The Rainforest Cassia is found in Coastal districts and adjacent tablelands of NSW from the Illawarra in NSW to Queensland and grows in or on the edges of subtropical and dry rainforest.

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.

No examples of *Senna acclinis* were noted. No adverse effect is likely such that a viable local population will be placed at risk of extinction.

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.

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.**

Not applicable.

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.
(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

Not applicable.

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

No recovery plan or threat abatement plan has been formulated for this species or Key Threatening Processes.

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.
The action is considered part of the following Key Threatening Processes;

- Clearing of native vegetation,
- Invasion of native plant communities by exotic perennial grasses,
- Removal of dead wood and dead trees,
- Invasion, establishment and spread of Lantana, and,
- Invasion and establishment of exotic vines and scramblers.

FABACEAE (Faboideae)
***Pultenaea maritima* (Coast Headland Pea)**
Conservation status in NSW: Vulnerable

Pultenaea maritima is a prostrate, mat forming shrub with hairy stems. Its leaves are 3.5-5 mm long, 1.8-2.8 mm wide, with incurved margins. The stipules (at the leaf bases) are 1.1-2 mm long. Inflorescences are leafy and appear at or towards the ends of branches. The pea-flowers are 6.5-10 mm long on stalks about 0.5 mm long. Pods are about 5 mm long. The species was only recently described and was previously considered a prostrate maritime form of *Pultenaea villosa*. The Coastal Headland Pea occurs in New South Wales and Queensland. Within NSW, the species has been recorded from Newcastle north to Byron Bay on 16 headlands. The number of individuals at each of these sites is unknown. Five sites occur within

conservation reserves.

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.

No examples of *Pultenaea maritima* were noted. No adverse effect is likely such that a viable local population will be placed at risk of extinction.

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.

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.

Not applicable.

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.
(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

Not applicable.

f) Whether the action proposed is consistent with the objectives or actions of a

recovery plan or threat abatement plan.

No recovery plan or threat abatement plan has been formulated for this species or Key Threatening Processes.

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.

The action is considered part of the following Key Threatening Processes;

- Clearing of native vegetation,
- Invasion of native plant communities by exotic perennial grasses,
- Removal of dead wood and dead trees,
- Invasion, establishment and spread of Lantana, and,
- Invasion and establishment of exotic vines and scramblers.

LINDSAEACEAE
***Lindsaea incisa* (Slender Screw Fern)**
Conservation status in NSW: Endangered

Slender Screw Fern is a delicate-looking ground fern with a creeping underground root. The light-green fronds are slender, up to 30 cm long, and stand erect or tangled through other vegetation. Divided fan-shaped leaflets are spaced along the stems, often in pairs. The leafless part of the stem is straw-coloured, darker at the base, and is much shorter than the frond length. The spores are produced under membranous flaps on the lobes of some of the leaflets.

In NSW it is known only from a few locations between Woombah and just south of Coffs Harbour. Also occurs in north and south-east Queensland. The Slender Screw Fern occurs in dry eucalypt forest on sandstone and moist shrubby eucalypt forest on metasediments. It is usually found in waterlogged or poorly drained sites along creeks, where ferns, sedges and shrubs grow thickly.

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.

No examples of *Lindsaea incisa* were noted. No adverse effect is likely such that a viable local population will be placed at risk of extinction.

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.

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.

Not applicable.

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.
(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

Not applicable.

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

No recovery plan or threat abatement plan has been formulated for this species or Key Threatening Processes.

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.

The action is considered part of the following Key Threatening Processes;

- Clearing of native vegetation,
- Invasion of native plant communities by exotic perennial grasses,
- Removal of dead wood and dead trees,
- Invasion, establishment and spread of Lantana, and,

- Invasion and establishment of exotic vines and scramblers.

ORCHIDACEAE
***Phaius australis* (Southern Swamp Orchid)**
Conservation status in NSW: Endangered

This orchid has flower stems up to 2 m tall and large broad leaves with a pleated appearance, both arising from a fleshy bulb near ground level. The large, showy flowers, with up to 20 per stem, have four petals which are white on the outside and brown with white or yellow veins on the inside. The central tongue of the flower is pink and yellow with lobes slightly curved inwards. The Southern Swamp Orchid is found in Queensland and north-east NSW as far south as Coffs Harbour in swampy grassland or swampy forest including rainforest, eucalypt or paperbark forest, mostly in coastal areas.

Sarcochilus hartmannii* (Hartman's Sarcochilus*)
Conservation status in NSW: Vulnerable

Hartman's Sarcochilus is an epiphytic orchid with upright or semi-upright stems attached by fleshy creeping roots to rocks. Stems can be up to 100 cm long, though are usually shorter. Leaves are arranged in two ranks, scattered along the stem, and are about 20 cm long by 2 cm wide and folded. The flowering stem is up to 25 cm long with as many as 25 flowers. Each flower is 3 cm across, and is white with reddish-brown spots in the central parts of the flowers.

Found from the Richmond River in northern NSW to Gympie in south-east Queensland; favours cliff faces on steep narrow ridges supporting eucalypt forest and clefts in volcanic rock from 500 to 1,000 m in altitude. Also found occasionally at the bases of fibrous trunks of trees, including cycads and grass-trees.

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.

No examples of *Phaius australis* or *Sarcochilus hartmannii* were noted. No adverse effect is likely such that a viable local population will be placed at risk of extinction.

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.

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.

No

In relation to the regional distribution of habitat, no native vegetation will be removed or modified and therefore will not have an adverse affect on any Southern Swamp Orchid or Hartman's Sarcochilus endangered or critically 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, 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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.

(ii) No area of habitat is to be fragmented,

(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

Not applicable.

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

No recovery plan or threat abatement plan has been formulated for these species or Key Threatening Processes.

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.

The action is considered part of the following Key Threatening Processes;

- Clearing of native vegetation,
- Invasion of native plant communities by exotic perennial grasses,
- Removal of dead wood and dead trees,
- Invasion, establishment and spread of Lantana, and,
- Invasion and establishment of exotic vines and scramblers.

POACEAE
***Alexfloydia repens* (Floyd's Grass)**
Conservation status in NSW: Endangered

Floyd's Grass is a creeping grass with a solitary flower head that appears during spring. The smooth, hairless leaves have a prominent white midrib. Floyd's Grass is found only in the Coffs Harbour area, it is known from Bongil Bongil National Park and on private property. Floyd's Grass is confined to coastal stands of Swamp Oak and Paperbark in peat-like soil edging the upper tidal areas of mangroves. It is known to grow on the banks of estuarine creeks. Floyd's Grass is the sole food plant for the caterpillar of the Endangered Black Grass-dart butterfly *Ocybadistes knightorum*.

***Arthraxon hispidus (*Hairy Jointgrass)**
Conservation status in NSW: Vulnerable

Hairy Jointgrass is a creeping grass with branching, erect to semi-erect purplish stems. Leaf-blades are 2–6 cm long, broad at the base and tapering abruptly to a sharp point. Long white hairs project around the edge of the leaf. The seed-heads are held above the plant on a long fine stalk. This grass is considered to be a perennial but it tends to die down in winter.

Occurs over a wide area in south-east Queensland, and on the northern tablelands and north coast of NSW, but is never common. Also found from Japan to central Eurasia. Moisture and shade-loving grass, found in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps.

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.

No examples of *Alexfloydia repens* or *Arthraxon hispidus* were noted. No adverse effect is likely such that a viable local population will be placed at risk of extinction.

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.

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.**

Not applicable.

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.**

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.
(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

Not applicable.

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

No recovery plan or threat abatement plan has been formulated for these species or Key Threatening Processes.

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.
The action is considered part of the following Key Threatening Processes;

- Clearing of native vegetation,
- Invasion of native plant communities by exotic perennial grasses,
- Removal of dead wood and dead trees,
- Invasion, establishment and spread of Lantana, and,
- Invasion and establishment of exotic vines and scramblers.

RUTACEAE
Acronychia littoralis* (Scented Acronychia*)
Conservation status in NSW: Endangered

Scented Acronychia is a small tree to 6 m high with 5 - 16 cm long oval-shaped glossy leaves on a short stalk. The lower surface of the leaves is paler than the upper surface and there are many oil dots visible. They have a pleasant aromatic smell when crushed. The small four-petalled yellowish flowers are produced in summer on a stalk growing from the junction of the leaf and stem. The fruit that follows is creamy-lemon in colour

and 10 - 20 mm in diameter. It is a flattened oval shape and has four lobes with shallow fissures between them.

Scented Acronychia is found between Fraser Island in Queensland and Port Macquarie on the north coast of NSW and grows in littoral rainforest on sand.

***Zieria prostrata* (Headland Zieria)**
Conservation status in NSW: Endangered

The Headland Zieria is a prostrate shrub forming mats about 0.5 m in diameter. The branches are ridged but not warted as in some other Zieria species. The leaves are paired and divided into three narrow-oval leaflets, all with blunt ends and the central one longer than the others. Both leaf-surfaces are of similar colour and are dotted with oil-glands. The flowers are small, white (pink in bud) and have four petals. The fruits are red-green and dotted with oil-glands. The Headland Zieria is restricted to four coastal headlands in the Coffs Harbour area of north-east NSW. It is found on low grassy heath on exposed sites and wind-pruned open to sparse shrub land on more sheltered aspects.

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.

No examples of *Acronychia littoralis* or *Zieria prostrata* were noted. No adverse effect is likely such that a viable local population will be placed at risk of extinction.

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.

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.

Not applicable.

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.
(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

Not applicable.

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

No recovery plan or threat abatement plan has been formulated for these species or Key Threatening Processes.

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.

The action is considered part of the following Key Threatening Processes;

- Clearing of native vegetation,
- Invasion of native plant communities by exotic perennial grasses,
- Removal of dead wood and dead trees,
- Invasion, establishment and spread of Lantana, and,
- Invasion and establishment of exotic vines and scramblers.

SANTALACEAE
***Thesium australe* (Austral Toadflax)**
Conservation status in NSW: Vulnerable

Austral Toadflax is a small, straggling herb to 40 cm tall. Leaves are pale green to yellow-green, somewhat succulent, 1 - 4 cm long and 0.5 - 1.5 mm wide. Flowers are minute and white, emerging where the leaves meet the stems and appearing in spring. The fruit is small and nut-like, developing in summer. This species is often hidden amongst grasses and herbs.

Austral Toad-flax is found in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. It is also found in Tasmania and Queensland and in eastern Asia. It occurs in grassland or grassy woodland and often found in damp sites in association with Kangaroo Grass (*Themeda australis*).

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.

No examples of *Thesium australe* were noted. No adverse effect is likely such that a viable local population will be placed at risk of extinction.

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.

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.

Not applicable.

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.
(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

Not applicable.

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

No recovery plan or threat abatement plan has been formulated for these species or Key Threatening Processes.

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.

The action is considered part of the following Key Threatening Processes;

- Clearing of native vegetation,
- Invasion of native plant communities by exotic perennial grasses,
- Removal of dead wood and dead trees,
- Invasion, establishment and spread of Lantana, and,
- Invasion and establishment of exotic vines and scramblers.

SIMAROUBACEAE
***Quassia sp. Mooney Creek* (Moonee Quassia)**
Conservation status in NSW: Endangered

Moonee Quassia is a slender or bushy shrub growing to about 1.5m tall. Its stems are often kinked, showing periodic halts to growth. Its tough leaves are very narrow, about 10cm long, and arranged alternatively along the stems. They are glossy dark green above and paler below, with numerous veins at the wide angle to the midrib. Flowers are small and green tinged reddish, developing into distinctive finely airy fruits made up of one to five radiating segments which are red when mature.

Scattered distribution from Moonee Creek area north of Coffs Harbour to north east of Grafton. The Moonee Quassia occurs within the shrubby layer below tall moist eucalypt forest, including forest edges, mostly at lower altitudes.

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.

No examples of *Quassia sp.* Mooney Creek were noted. No adverse effect is likely such that a viable local population will be placed at risk of extinction.

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.

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.

Not applicable.

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.
(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

Not applicable.

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

No recovery plan or threat abatement plan has been formulated for these species or Key Threatening Processes.

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.

The action is considered part of the following Key Threatening Processes;

- Clearing of native vegetation,
- Invasion of native plant communities by exotic perennial grasses,
- Removal of dead wood and dead trees,
- Invasion, establishment and spread of Lantana, and,
- Invasion and establishment of exotic vines and scramblers.

CONCLUSION

The proposed development will retain extensive areas of native vegetation. Where the riparian vegetation is to be removed along Jordan's Creek for the excavation of a flood bypass, the disturbed area will be replanted with native species after construction with additional compensatory planting in open areas to the south of Jordan's creek as recommended in the accompanying Vegetation Management Plan. The extent of habitat on the subject property will be significantly increased and/or enhanced as a result of this residential development. The proposed development is therefore unlikely to have a significant effect on any threatened flora species and consequently, a Species Impact Statement is not necessary.

5.1.5 FAUNA

One species was recorded through the site fauna survey, the Giant Barred Frog through call back response techniques. A separate 7 part test has been prepared for the Giant Barred Frog (refer Appendix 4).

The NPWS Wildlife Atlas search identified 41 threatened flora species occurring within a 10km radius of the subject site. Due to the lack of vegetation communities that provide suitable habitat for the following; Wallum Froglet, Sooty Oystercatcher, Pied Oystercatcher, Pied Oystercatcher, Collared Kingfisher, Little Tern, Sooty Tern, Painted Honeyeater, Yellow-bellied Sheathtail Bat; no 7 part test has been addressed for the above mentioned species.

HYLIDAE
Green-thighed Frog *(Litoria brevipalmata)*
New South Wales Legislative Status: Vulnerable

Green-thighed frogs are named for the bright green or blue-green colour on the groin and back of the thighs. They are small frog up to 40mm, rich brown to chocolate brown on the back, sometimes with smaller black flecks. A broad black stripe runs from the snout to the flank, ending as a serious of blotches. The call is a continuous series of "quack" or "wok" sounds. It is distributed in isolated localities along the coast and ranges from NSW central coast to south-east QLD.

Green-thighed frogs occur 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. Breeding occurs following heavy rainfall in late spring and summer, with frogs congregating around grassy semipermanent ponds and flood prone grassy areas. The frogs are thought to forage in leaf litter.

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.

No Green-thighed frog species is at risk of extinction by the 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.

This factor is essentially identical to factor (a) except that it refers only to endangered populations listed on Part 2 of Schedule 1 of the TSC Act and Part 2 of Schedule 4 of the FM Act, whereas factor (a) refers to species.

No Green-thighed frog populations were identified at the subject site; the area proposed for the development will not disturb any Green-thighed frog habitat, therefore no Green-thighed frogs populations will be at risk of extinction from the development.

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.

Not applicable

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.
(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

No critical habitat for any Green-thighed frogs was identified at the subject site; the areas of key vegetation occurring at the subject site will be retained, therefore the action proposed will not have an adverse effect on any critical habitat for the Green-thighed frog species.

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

Actions proposed at the subject site are not inconsistent with any objectives or actions approved within recovery or threat abatement plans for the Green-thighed frog.

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.

The proposed development will involve clearing native vegetation which is listed as a threatening process under Schedule 3 of the Threatened Species Conservation Act (1995).

AVES
***Lophoictinia isura* (Square-tailed Kite)**
Conservation status in NSW: Vulnerable

The Square-tailed Kite is a reddish, medium-sized, long-winged raptor, about the size of a Little Eagle or harrier. Adults have a white face with thick black streaks on the crown and finer streaks elsewhere. The saddle, rump and central upper tail coverts are blackish with grey-brown barring. The underparts are predominantly grey-brown with black tips on the grey, square-tipped tail and wing edges. A key character in flight is the long fingered, upswept wings with a large white patch at the base of the barred 'fingers'.

The Square-tailed Kite ranges along coastal and subcoastal areas from south-western to northern Australia, Queensland, NSW and Victoria. In NSW, scattered records of the species throughout the state indicate that the species is a regular resident in the north, north-east and along the major west-flowing river systems. It is a summer breeding migrant to the south-east, including the NSW south coast, arriving in
September and leaving by March.

The Square-tailed Kite is found in a variety of timbered habitats including dry woodlands and open forests and shows a particular preference for timbered watercourses. In arid north-western NSW and has been observed in stony country with a ground cover of chenopods and grasses, open acacia scrub and patches of low open eucalypt woodland. Is a specialist hunter of passerines, especially honeyeaters, and most particularly nestlings, and insects in the tree canopy, picking most prey items from the outer foliage. They occupy large hunting ranges of more than 100km2 and breeding is from July to February, with nest sites generally located along or near watercourses, in a fork or on large horizontal limbs.

***Pandion haliaetus* (Osprey)**
Conservation status in NSW: Vulnerable

The Osprey is a large, water-dependent bird of prey, distinctive in flight and when perched. Despite its wing-span of up to 1.7 m, it is noticeably smaller than the White-bellied Sea-eagle. In flight it can be recognised by its distinctly bowed wings that are dark brown above, and barred underneath, and with white underwing coverts. Perched, the upperparts are dark brown and the underparts are white. The female has a dark streaky collar. The head is mainly white with a blackish stripe through the eye.

Ospreys are found right around the Australian coast line, except for Victoria and Tasmania. They are common around the northern coast, especially on rocky shorelines,

islands and reefs. The species is uncommon to rare or absent from closely settled parts of south-eastern Australia. There are a handful of records from inland areas.

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.

No Square-tailed Kites or Osprey species is at risk of extinction by the 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.

This factor is essentially identical to factor (a) except that it refers only to endangered populations listed on Part 2 of Schedule 1 of the TSC Act and Part 2 of Schedule 4 of the FM Act, whereas factor (a) refers to species.

No Square-tailed Kites or Osprey populations were identified at the subject site; the area proposed for the development will not disturb any Square-tailed Kites or Osprey habitat, therefore no Square-tailed Kites or Osprey populations will be at risk of extinction from the development.

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.

Not applicable

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.
(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

No critical habitat for any Square-tailed Kites or Osprey was identified at the subject site; areas of vegetation occurring at the subject site will be retained, therefore the action proposed will not have an adverse effect on any critical habitat for the Square-tailed Kites or Osprey species.

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

Actions proposed at the subject site are not inconsistent with any objectives or actions approved within recovery or threat abatement plans for the Square-tailed Kites or Osprey.

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.

The proposed development will involve clearing native vegetation which is listed as a threatening process under Schedule 3 of the Threatened Species Conservation Act (1995).

ARDEIDAE
Ixobrychus flavicollis **Black Bittern**
Conservation status in NSW: Vulnerable

The Black Bittern is a heron, dark grey to black in colour, with buff streaks on the throat and a characteristic yellow streak on the sides of the head and down the neck. The female is paler than the male, with a more yellow wash on the underparts. The species has a characteristic booming call that is mainly heard during the breeding season, at day or night. The colour alone readily distinguishes it from the other two much paler bittern species.

The Black Bittern has a wide distribution, from southern NSW north to Cape York and along the north coast to the Kimberley region. The species also occurs in the south-west of Western Australia. In NSW, records of the species are scattered along the east coast, with individuals rarely being recorded south of Sydney or inland.

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.

No Black Bittern species is at risk of extinction by the 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.

This factor is essentially identical to factor (a) except that it refers only to endangered populations listed on Part 2 of Schedule 1 of the TSC Act and Part 2 of Schedule 4 of the FM Act, whereas factor (a) refers to species.

No Black Bittern populations were identified at the subject site; the area proposed for the development will not disturb any Black Bittern habitat, therefore no Black Bittern populations will be at risk of extinction from the development.

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.

Not applicable

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.
(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

No critical habitat for any Black Bittern was identified at the subject site; areas of vegetation occurring at the subject site will be retained, therefore the action proposed will not have an adverse effect on any critical habitat for the Black Bittern species.

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

Actions proposed at the subject site are not inconsistent with any objectives or actions approved within recovery or threat abatement plans for the Black Bittern.

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.

The proposed development will involve clearing native vegetation which is listed as a threatening process under Schedule 3 of the Threatened Species Conservation Act (1995).

CACATUIDAE
***Calyptorhynchus lathami* (Glossy Black-cockatoo)**
Conservation status in NSW: Vulnerable

The Glossy Black-cockatoo is a dusky brown to black cockatoo with a massive, bulbous bill and a broad, red band through the tail. The red in the tail is barred black and edged with yellow. The female usually has irregular pale-yellow markings on the head and neck and yellow flecks on the underparts and underwing. They are usually seen in pairs or small groups feeding quietly in she-oaks. They are smaller than other black-cockatoos (about 50 cm in length), with a smaller crest.
The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. An isolated population exists on Kangaroo Island, South Australia.

Inhabits open forest and woodlands of the coast and the Great Dividing Range up to 1000m in which stands of she-oak species, particularly Black She-oak (*Allocasuarina littoralis*), Forest She-oak (*A. torulosa*) or Drooping She-oak (*A. verticillata*) occur. In the Riverina area, inhabits open woodlands dominated by Belah (*Casuarina cristata*). Feeds almost exclusively on the seeds of several species of she-oak (Casuarina and Allocasuarina species), shredding the cones with the massive bill. Dependent on large hollow-bearing eucalypts for nest sites; one or two eggs are laid between March and August.

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.

No Glossy Black-cockatoo species is at risk of extinction by the 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.

This factor is essentially identical to factor (a) except that it refers only to endangered populations listed on Part 2 of Schedule 1 of the TSC Act and Part 2 of Schedule 4 of the FM Act, whereas factor (a) refers to species.

No Glossy Black-cockatoo populations were identified at the subject site; the area proposed for the development will not disturb any Glossy Black-cockatoo habitat, therefore no Glossy Black-cockatoo populations will be at risk of extinction from the development.

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.

Not applicable

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.
(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

No critical habitat for any Glossy Black-cockatoo was identified at the subject site; areas of vegetation occurring at the subject site will be retained, therefore the action proposed will not have an adverse effect on any critical habitat for the Glossy Black-cockatoo species.

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

Actions proposed at the subject site are not inconsistent with any objectives or actions approved within recovery or threat abatement plans for the Glossy Black-cockatoo.

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.

The proposed development will involve clearing native vegetation which is listed as a threatening process under Schedule 3 of the Threatened Species Conservation Act (1995).

CAMPEPHAGIDAE
***Coracina lineata* (Barred Cuckoo-shrike)**
Conservation status in NSW: Vulnerable

The Barred Cuckoo-Shrike is a medium-sized bird to 25 cm long. It is dark grey above and under the chin, with a front barred with strong horizontal stripes of white and very dark grey. A darker stripe runs from the base of the bill through the pale yellow eye. Distributed through coastal eastern Australia from Cape York to the Manning River in NSW. Barred Cuckoo-shrikes are generally uncommon in their range, and are rare in NSW. Occurs in Rainforest, eucalypt forests and woodlands, clearings in secondary growth, swamp woodlands and timber along watercourses. They are usually seen in pairs or small flocks foraging among foliage of trees for insects and fruit. They are active birds, frequently moving from tree to tree.

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.

No Barred Cuckoo-Shrike species is at risk of extinction by the 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.

This factor is essentially identical to factor (a) except that it refers only to endangered populations listed on Part 2 of Schedule 1 of the TSC Act and Part 2 of Schedule 4 of the FM Act, whereas factor (a) refers to species.

No Barred Cuckoo-Shrike populations were identified at the subject site; the area proposed for the development will not disturb any Barred Cuckoo-Shrike habitat, therefore no Barred Cuckoo-Shrike populations will be at risk of extinction from the development.

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.**

Not applicable

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.
(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

No critical habitat for any Barred Cuckoo-Shrike was identified at the subject site; areas of vegetation occurring at the subject site will be retained, therefore the action proposed will not have an adverse effect on any critical habitat for the Barred Cuckoo-Shrike species.

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

Actions proposed at the subject site are not inconsistent with any objectives or actions approved within recovery or threat abatement plans for the Barred Cuckoo-Shrike.

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.

The proposed development will involve clearing native vegetation which is listed as a threatening process under Schedule 3 of the Threatened Species Conservation Act (1995).

CICONIIDAE
***Ephippiorhynchus asiaticus* (Black-necked Stork)**
Conservation status in NSW: Endangered

The Black-necked Stork is the only stork species in Australia. It stands about 1.3 m tall, and has a wingspan of around 2 m, with a massive, strong, black bill. The head and neck are black with an iridescent green and purple gloss. Black panels are visible above and below the white wings. The tail is short and black, with the rest of the plumage white. The legs are long and red. The female has a yellow eye, and the male has a dark eye. Juvenile birds have a dark to pale brown plumage, gradually changing over several years to the black and white adult plumage.

The species is widespread across coastal northern and eastern Australia, becoming increasingly uncommon further south into NSW, and rarely south of Sydney. Some birds may move long distances and can be recorded well outside their normal range.

Inhabits permanent freshwater wetlands including margins of billabongs, swamps, shallow floodwaters, and adjacent grasslands and savannah woodlands; can also be found occasionally on inter-tidal shorelines, mangrove margins and estuaries. They feed in shallow, still water on a variety of prey including fish, frogs, eels, turtles, crabs and snakes.

Breeding is in late summer in the north, and early summer further south; Nests are large up to 2 m in diameter, and is made in a live or dead tree, in or near a freshwater swamp; two to four eggs are laid; incubation is by both parents.

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.

No Black-necked Stork species is at risk of extinction by the 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.

This factor is essentially identical to factor (a) except that it refers only to endangered populations listed on Part 2 of Schedule 1 of the TSC Act and Part 2 of Schedule 4 of the FM Act, whereas factor (a) refers to species.

No Black-necked Stork populations were identified at the subject site; the area proposed for the development will not disturb any Black-necked Stork habitat, therefore no Black-necked Stork populations will be at risk of extinction from the development.

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.

Not applicable

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.
(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

No critical habitat for any Black-necked Stork was identified at the subject site; areas of vegetation occurring at the subject site will be retained, therefore the action proposed will not have an adverse effect on any critical habitat for the Black-necked Stork species.

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

Actions proposed at the subject site are not inconsistent with any objectives or actions approved within recovery or threat abatement plans for the Black-necked Stork.

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.

The proposed development will involve clearing native vegetation which is listed as a threatening process under Schedule 3 of the Threatened Species Conservation Act (1995).

COLUMBIDAE
***Ptilinopus magnificus* (Wompoo Fruit-dove)**
Conservation status in NSW: Vulnerable

A large and dramatically beautiful rainforest pigeon, almost twice the size of other coloured fruit-doves. It is up to 56 cm long, with a pale grey head shading into rich green back and wings. There is a broken yellow band across each wing. The breast and belly are plum-purple and the underparts are yellow.

Wompoo Fruit Doves occur along the coast and coastal ranges from the Hunter River in NSW to Cape York Peninsula. It is rare south of Coffs Harbour. Three subspecies are recognised, with the most southerly in NSW and south-eastern Queensland. It once occurred in the Illawarra, though there are no recent records.

Is found near rainforests, low elevation moist eucalypt forest and brush box forests and feeds on a diverse range of tree and vine fruits and is locally nomadic - following ripening fruit; some of its feed trees rely on species such as this to distribute their seeds. Despite its plumage, it can be remarkably cryptic as it feeds; the call and falling fruit being an indication of its presence.

Their nest is a typical pigeon nest - a flimsy platform of sticks on a thin branch or a palm frond, often over water, usually 3 - 10 m above the ground. Breeding is in spring and early summer; a single white egg is laid.

Ptilinopus regina **(Rose-crowned Fruit-dove)**
Conservation status in NSW: Vulnerable

Rose-crowned Fruit-doves are small, colourful rainforest pigeons to 24 cm in length. Males have a rose crown edged with yellow, and the head and breast are blue-grey, spotted white. The upper parts are grey-green, the tail-tip yellow and the abdomen are orange. Females are mostly grey-green. The call is a loud, explosive, repeated 'hookcoo' which becomes faster and on declining notes as a rapid 'coocoocoocoocoo'.

These birds are distributed from the Coast and ranges of eastern NSW and Queensland, from Newcastle to Cape York. Vagrants are occasionally found further south to Victoria. Rose-crowned Fruit-doves occur mainly in sub-tropical and dry rainforest and occasionally in moist eucalypt forest and swamp forest, where fruit is plentiful. They are shy pigeons, not easy to see amongst the foliage, and are more often heard than seen. They feed entirely on fruit from vines, shrubs, large trees and palms, and are thought to be locally nomadic as they follow the ripening of fruits. Some populations are migratory in response to food availability - numbers in north-east NSW increase during spring and summer then decline in April or May.

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.

No Wompoo Fruit-Dove or Rose-crowned Fruit Dove species are at risk of extinction by the 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.

This factor is essentially identical to factor (a) except that it refers only to endangered populations listed on Part 2 of Schedule 1 of the TSC Act and Part 2 of Schedule 4 of the FM Act, whereas factor (a) refers to species.

No Wompoo Fruit-Dove or Rose-crowned Fruit Dove populations were identified at the subject site; the area proposed for the development will not disturb any Wompoo Fruit-Dove or Rose-crowned Fruit Dove habitat, therefore no Wompoo Fruit-Dove or Rose-crowned Fruit Dove populations will be at risk of extinction from the development.

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.

Not applicable

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.
(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

No critical habitat for any Wompoo Fruit-Dove or Rose-crowned Fruit Dove was identified at the subject site; areas of vegetation occurring at the subject site will be retained, therefore the action proposed will not have an adverse effect on any critical habitat for the Wompoo Fruit-Dove or Rose-crowned Fruit Dove species.

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

Actions proposed at the subject site are not inconsistent with any objectives or actions approved within recovery or threat abatement plans for the Wompoo Fruit-Dove or Rose-crowned Fruit Dove.

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.

The proposed development will involve clearing native vegetation which is listed as a threatening process under Schedule 3 of the Threatened Species Conservation Act (1995).

GRUIDAE
***Grus rubicunda* (Brolga)**
Conservation status in NSW: Vulnerable

Brolgas are large waterbirds, best known in Australia for their spectacular dancing displays. They stand 2-2.25m tall and are silvery grey with yellow eyes and dark grey legs. The bare skin of the face, cheek and back of the head is scarlet

with a small grey patch over the ears. A black haired dewlap hangs from the chin. The call is a far-carrying wooping trumpet, ending in a staccato cackling, or a hoarse croak.

They are found in northern and eastern Australia but generally uncommon and localised in the east. Brolgas inhabit shallow swamps and swamp margins, floodplains, grassland and pastoral lands, usually in pairs or parties and plunge their heads under water to dig for roots and corms of swamp vegetation. Their nest is usually made of grasses and plant stems on small islands in swamps or standing in water.

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.

No Brolga species are at risk of extinction by the 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.

This factor is essentially identical to factor (a) except that it refers only to endangered populations listed on Part 2 of Schedule 1 of the TSC Act and Part 2 of Schedule 4 of the FM Act, whereas factor (a) refers to species.

No Brolga populations were identified at the subject site; the area proposed for the development will not disturb any Brolga habitat, therefore no Brolga populations will be at risk of extinction from the development.

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.**

Not applicable

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.
(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

No critical habitat for any Brolga was identified at the subject site; areas of vegetation occurring at the subject site will be retained, therefore the action proposed will not have an adverse effect on any critical habitat for the Brolga species.

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

Actions proposed at the subject site are not inconsistent with any objectives or actions approved within recovery or threat abatement plans for the Brolga.

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.

The proposed development will involve clearing native vegetation which is listed as a threatening process under Schedule 3 of the Threatened Species Conservation Act (1995).

JACANIDAE
***Irediparra gallinacea* (Comb-crested Jacana)**
Conservation status in NSW: Vulnerable

The Comb-crested Jacana is small (up to 25 cm long), with huge toes - its feet are virtually as long as its entire body - to walk on floating vegetation. Brown above, it has a white face and throat and belly, separated by a broad dark breast-band, with a big red forehead comb and red bill. It is a busy and unmistakable walker on lily pads and other floating vegetation. Its strident chittery call is also distinctive.

It occurs throughout coastal Australia and well inland in the north from the Kimberley to Sydney. Vagrants occasionally appear further south, possibly in response to unfavourable conditions further north in NSW. Inhabits permanent wetlands with a good surface cover of floating vegetation, especially water-lilies. Pairs and family

groups forage across floating vegetation, walking with a characteristic bob and flick, or flying low with toes dangling behind. They feed primarily on insects and other invertebrates, as well as some seeds and other vegetation. Breeds in spring and summer in NSW, in a nest of floating vegetation. The male builds the nest, incubates the eggs and broods the young. Females defend up to four mated males and their territories (the floating vegetation around their nest) from other females. Young birds

will dive and stay submerged with just their nostrils exposed for a very long time. Adults will also dive for safety on occasion.

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.

No Comb-crested Jacana species are at risk of extinction by the 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.

This factor is essentially identical to factor (a) except that it refers only to endangered populations listed on Part 2 of Schedule 1 of the TSC Act and Part 2 of Schedule 4 of the FM Act, whereas factor (a) refers to species.

No Comb-crested Jacana populations were identified at the subject site; the area proposed for the development will not disturb any Comb-crested Jacana habitat, therefore no Comb-crested Jacana populations will be at risk of extinction from the development.

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.

Not applicable

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.
(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

No critical habitat for any Comb-crested Jacana was identified at the subject site; areas of vegetation occurring at the subject site will be retained, therefore the action proposed will not have an adverse effect on any critical habitat for the Comb-crested Jacana species.

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

Actions proposed at the subject site are not inconsistent with any objectives or actions approved within recovery or threat abatement plans for the Comb-crested Jacana.

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.

The proposed development will involve clearing native vegetation which is listed as a threatening process under Schedule 3 of the Threatened Species Conservation Act (1995).

MELIPHAGIDAE
***Xanthomyza phrygia* (Regent Honeyeater)**
Conservation status in NSW: Endangered

The Regent Honeyeater is a striking and distinctive, medium-sized, black and yellow honeyeater with a sturdy, curved bill. Adults weigh 35 - 50 grams, are 20 - 24 cm long and have a wings-pan of 30 cm. Its head, neck, throat, upper breast and bill are black and the back and lower breast are pale lemon in colour with a black scalloped pattern. Its flight and tail feathers are edged with bright yellow. There is a characteristic patch of dark pink or cream-coloured facial-skin around the eye. Sexes are similar, though males are larger, darker and have larger patch of bare facial-skin. The call is a soft metallic bell-like song; birds are most vocal in non-breeding season.

The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. Birds are also found in drier coastal woodlands and forests in some years. Once recorded between Adelaide and the central coast of Queensland, its range has contracted dramatically in the last 30 years to between north-eastern Victoria and south-eastern Queensland. There are only three known key breeding regions remaining: north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra-Barraba region. In NSW the distribution is very

patchy and mainly confined to the two main breeding areas and surrounding fragmented woodlands. In some years non-breeding flocks converge on flowering
coastal woodlands and forests.

Every few years non-breeding flocks are seen foraging in flowering coastal Swamp Mahogany and Spotted Gum forests, particularly on the central coast and occasionally on the upper north coast. Birds are occasionally seen on the south coast. In the last 10 years Regent Honeyeaters have been recorded in urban areas around Albury where woodlands tree species such as Mugga Ironbark and Yellow Box were planted 20 years ago.

The Regent Honeyeater is a generalist forager, which mainly feeds on the nectar from a wide range of eucalypts and mistletoes. Key eucalypt species include Mugga Ironbark, Yellow Box, Blakely's Red Gum, White Box and Swamp Mahogany. Also utilises: *E. microcarpa, E. punctata, E. polyanthemos, E. mollucana, Corymbia robusta, E. crebra, E. caleyi, Corymbia maculata*, *E. mckieana, E. macrorhyncha, E. laevopinea*, and *Angophora floribunda*. Nectar and fruit from the mistletoes *A. miquelii, A. pendula, and A. cambagei* are also eaten during the breeding season. When nectar is scarce lerp and honeydew comprise a large proportion of the diet. Insects make up about 15% of the total diet and are important components of the diet of nestlings. A shrubby understorey is an important source of insects and nesting material.

There are three known key breeding areas, two of them in NSW - Capertee Valley and Bundarra-Barraba regions. The species breeds between July and January in Box-Ironbark and other temperate woodlands and riparian gallery forest dominated by River Sheoak. Regent Honeyeaters usually nest in horizontal branches or forks in tall mature eucalypts and Sheoaks. Also nest in mistletoe haustoria.
An open cup-shaped nest is constructed of bark, grass, twigs and wool by the female. Two or three eggs are laid and incubated by the female for 14 days. Nestlings are brooded and fed by both parents at an average rate of 23 times per hour and fledge after 16 days. Fledglings fed by both parents 29 times per hour.

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.

No Regent Honeyeater species are at risk of extinction by the 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.

This factor is essentially identical to factor (a) except that it refers only to endangered populations listed on Part 2 of Schedule 1 of the TSC Act and Part 2 of Schedule 4 of the FM Act, whereas factor (a) refers to species.

No Regent Honeyeater populations were identified at the subject site; the area proposed for the development will not disturb any Regent Honeyeater habitat, therefore no Regent Honeyeater populations will be at risk of extinction from the development.

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.

Not applicable

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.
(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

No critical habitat for any Regent Honeyeater was identified at the subject site; areas of vegetation occurring at the subject site will be retained, therefore the action proposed will not have an adverse effect on any critical habitat for the Regent Honeyeater species.

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

Actions proposed at the subject site are not inconsistent with any objectives or actions approved within recovery or threat abatement plans for the Regent Honeyeater.

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.

The proposed development will involve clearing native vegetation which is listed as a threatening process under Schedule 3 of the Threatened Species Conservation Act (1995).

PSITTACIDAE
Cyclopsitta diophthalma coxeni* (*Double-eyed Fig-Parrot)
Conservation status in NSW: Endangered

Double-eyed Fig-Parrots, also known as Coxen's Fig-Parrots, are small, dumpy, green parrots with very short tails. The wings are blue-edged and appear to be set well back in flight. At rest there are two obvious red spots on the back. The head has distinctive red and blue markings with a prominent blue forehead in the adults. They can be distinguished from small lorikeets by their short tail and lack of underwing colour.

Limited to about five populations scattered between Bundaberg in Queensland and the Hastings River in NSW. The total number is thought to be less than 200 birds which make it one of Australia's most endangered birds. Usually recorded from drier rainforests and adjacent wetter eucalypt forest but rarely seen due to its small size and cryptic habits. Also found in the wetter lowland rainforests that are now largely cleared in NSW. The bird shows a decided preference for fig trees, but also feeds on other fruiting rainforest species.

***Lathamus discolor* (*Swift Parrot*)**
Conservation status in NSW: Endangered

The Swift Parrot is small parrot about 25 cm long. It is bright green with red around the bill, throat and forehead. The red on its throat is edged with yellow. Its crown is blue-purple. There are bright red patches under the wings. One of most distinctive features from a distance is its long (12 cm), thin tail, which is dark red. This distinguishes it from the similar lorikeets, with which it often flies and feeds. Can also be recognised by its flute-like chirruping or metallic "kik-kik-kik" call.

Breeds in Tasmania during spring and summer, migrating in the autumn and winter months to south-eastern Australia from Victoria and the eastern parts of South Australia to south-east Queensland. In NSW mostly occurs on the coast and south west slopes. Migrates to the Australian south-east mainland between March and October. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood *C. gummifera*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens*. Commonly used lerp infested trees include Grey Box *E. microcarpa*, Grey Box *E. moluccana* and Blackbutt *E. pilularis*.

Return to home foraging sites on a cyclic basis depending on food availability.
Following winter they return to Tasmania where they breed from September to January, nesting in old trees with hollows and feeding in forests dominated by Tasmanian Blue Gum *E. globulus.*

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.

No Double-eyed Fig-Parrots or Swift Parrot species are at risk of extinction by the 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.

This factor is essentially identical to factor (a) except that it refers only to endangered populations listed on Part 2 of Schedule 1 of the TSC Act and Part 2 of Schedule 4 of the FM Act, whereas factor (a) refers to species.

No Double-eyed Fig-Parrots or Swift Parrot populations were identified at the subject site; the area proposed for the development will not disturb any Double-eyed Fig-Parrots or Swift Parrot habitat, therefore no Double-eyed Fig-Parrots or Swift Parrot populations will be at risk of extinction from the development.

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.

Not applicable

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.
(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

No critical habitat for any Double-eyed Fig-Parrots or Swift Parrot was identified at the subject site; areas of vegetation occurring at the subject site will be retained, therefore the action proposed will not have an adverse effect on any critical habitat for the Double-eyed Fig-Parrots or Swift Parrot species.

f) Whether the action proposed is consistent with the objectives or actions of a

recovery plan or threat abatement plan.

Actions proposed at the subject site are not inconsistent with any objectives or actions approved within recovery or threat abatement plans for the Double-eyed Fig-Parrots or Swift Parrot.

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.

The proposed development will involve clearing native vegetation which is listed as a threatening process under Schedule 3 of the Threatened Species Conservation Act (1995).

STRIGIDAE
Powerful Owl - *Ninox strenua*
New South Wales Legislative Status: Vulnerable

Powerful Owls are large, nocturnal birds up to 65cm in length. The upperparts are dark, greyish-brown with indistinct off-white bars. The underparts are whitish with dark greyish-brown V-shaped markings. Juveniles have white crown and underparts that contrasts with its small, dark streaks and dark eye patches. The call is slow, deep and resonant woo-woo, which can be heard over a great distance in the forest at night.

Powerful Owls are found throughout eucalypt forests and woodland in south-eastern Australia but are uncommon and occur at low densities. The eucalypt forest of North-East NSW now provides the stronghold for the species.

Powerful Owls have large home-ranges (more than 1000 hectares) and occupy a variety of vegetation types, from woodlands and open forest to tall moist forest and rainforest. They roost by day in dense vegetation, commonly along drainage lines and nest in large tree-hollows (at least 50cm deep) in large eucalypts. Adult birds appear to be faithful to nesting sites, remaining in one large home-range all their lives. The Powerful Owl's main prey is medium sized arboreal marsupials, particularly Greater Gliders, Common Ringtail Possums, Sugar Gliders and Flying Foxes.

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.

No Powerful Owl species are at risk of extinction by the 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.

This factor is essentially identical to factor (a) except that it refers only to endangered populations listed on Part 2 of Schedule 1 of the TSC Act and Part 2 of Schedule 4 of the FM Act, whereas factor (a) refers to species.

No Powerful Owl populations were identified at the subject site; the area proposed for the development will not disturb any Powerful Owl habitat, therefore no Powerful Owl populations will be at risk of extinction from the development.

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.

Not applicable

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.
(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

No critical habitat for any Powerful Owl was identified at the subject site; areas of vegetation occurring at the subject site will be retained, therefore the action proposed will not have an adverse effect on any critical habitat for the Powerful Owl species.

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

Actions proposed at the subject site are not inconsistent with any objectives or actions approved within recovery or threat abatement plans for the Powerful Owl.

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.

The proposed development will involve clearing native vegetation which is listed as a threatening process under Schedule 3 of the Threatened Species Conservation Act (1995).

TYTONIDAE
***Tyto capensis* (Grass Owl)**
Conservation status in NSW: Vulnerable

The Grass Owl is a small ground-dwelling owl to 38 cm long. The upperparts are a rich yellow-buff, heavily marbled with blue-black or dark grey and with fine silvery spots. Underparts are pale orange-buff to dull white with sparse dark spots. The facial disc is triangular and a pale buff colour. The legs are long and sparsely covered with short feathers in the upper part, bare in the lower part. When in flight Grass Owls have noticeably long trailing legs (longer than the tail) and appears large-headed. When roosting the posture is tall and upright. The call is similar to a Barn Owl - a hoarse, wavering reedy screech 'sk-air' or 'skee-air', also a thin, quavering whistle.

Grass Owls have been recorded occasionally in all mainland states of Australia but appear to be more commonly recorded in northern and north-eastern Australia. In NSW they are more likely to be found in the north-east. Grass Owl numbers often increase when rodent numbers increase.

Grass Owls are found in areas of tall grass, including grass tussocks in swampy areas, grassy plains, swampy heath, and cane grass, or sedges on flood plains. They rest by day in a 'form' - a trampled platform in a large tussock or other heavy growth. If disturbed they burst out of cover, flying rather slowly, before dropping straight down again into cover.

***Tyto novaehollandiae* (Masked Owl)**
Conservation status in NSW: Vulnerable

A medium-sized owl to 40 - 50 cm long, with dark eyes set in a prominent flat, heart-shaped facial disc that is encircled by a dark border. The feet are large and powerful, with fully feathered legs down to the toes. The owl exists in several colour forms, with wide variation in plumage. The upperparts are grey to dark brown with buff to rufous mottling and fine, pale spots. The wings and tail are well barred. The underparts are white to rufous-brown with variable dark spotting. The palest birds have a white face with a brown patch around each eye; the darkest birds have a chestnut face. The dark form of the Masked Owl is much browner than the Sooty Owl *Tyto tenebricosa*.

Distribution extends from the coast where it is most abundant to the western plains. Overall records for this species fall within approximately 90% of NSW, excluding the most arid north-western corner. There is no seasonal variation in its distribution. Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides. The typical diet consists of tree-dwelling and ground mammals, especially rats. Pairs have a large home-range of 500 to 1000 hectares. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.

Extends from the coast where it is most abundant to the western plains. Overall records for this species fall within approximately 90% of NSW, excluding the most arid north-

western corner. There is no seasonal variation in its distribution.

Lives in dry eucalypt forests and woodlands from sea level to 1100 m; a forest owl, but often hunts along the edges of forests, including roadsides. The typical diet consists of tree-dwelling and ground mammals, especially rats. Pairs have a large home-range of 500 to 1000 hectares. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.

***Tyto tenebricosa* (Sooty Owl)**
Conservation status in NSW: Vulnerable

A medium-sized owl to 45 cm long, with dark eyes set in a prominent flat, heart-shaped facial disc. Dark sooty-grey in colour, with large eyes in a grey face, fine white spotting above and below, and a pale belly. The plumage of the fledglings is similar to the adult, but has tufts of down on the head and underparts.
Occupies the easternmost one-eighth of NSW, occurring on the coast, coastal escarpment and eastern tablelands. There is no seasonal variation in its distribution. Occurs in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests. Roosts by day in the hollow of a tall forest tree or in heavy vegetation; hunts by night for small ground mammals or tree-dwelling mammals such as the Common Ringtail Possum (Pseudocheirus peregrinus) or Sugar Glider (Petaurus breviceps). Nests in very large tree-hollows.

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.

No Grass Owl, Masked Owl or Sooty Owl species are at risk of extinction by the 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.

This factor is essentially identical to factor (a) except that it refers only to endangered populations listed on Part 2 of Schedule 1 of the TSC Act and Part 2 of Schedule 4 of the FM Act, whereas factor (a) refers to species.

No Grass Owl, Masked Owl or Sooty Owl populations were identified at the subject site; the area proposed for the development will not disturb any Grass Owl, Masked Owl or Sooty Owl habitat, therefore no Grass Owl, Masked Owl or Sooty Owl populations will be at risk of extinction from the development.

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.

Not applicable

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.
(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

No critical habitat for any Grass Owl, Masked Owl or Sooty Owl was identified at the subject site; areas of vegetation occurring at the subject site will be retained, therefore the action proposed will not have an adverse effect on any critical habitat for the Grass Owl, Masked Owl or Sooty Owl species.

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

Actions proposed at the subject site are not inconsistent with any objectives or actions approved within recovery or threat abatement plans for the Grass Owl, Masked Owl or Sooty Owl.

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.

The proposed development will involve clearing native vegetation which is listed as a threatening process under Schedule 3 of the Threatened Species Conservation Act (1995).

DASYURIDAE
***Dasyurus maculatus* (Spotted-tailed Quoll)**
Conservation status in NSW: Vulnerable

The Spotted-tailed Quoll is about the size of a domestic cat, from which it differs most obviously in its shorter legs and pointed face. The average weight of an adult male is about 3500 grams and an adult female about 2000 grams. It has rich-rust to dark-brown

fur above, with irregular white spots on the back and tail, and a pale belly. The spotted tail distinguishes it from all other Australian mammals, including other quoll species. However, the spots may be indistinct on juvenile animals.

The range of the Spotted-tailed Quoll has contracted considerably since European settlement. It is now found on the east coast of NSW, Tasmania, eastern Victoria and north-eastern Queensland. Only in Tasmania is it still considered common.

The Spotted-tailed Quoll has been recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces as den sites. They are mostly nocturnal, although will hunt during the day; spends most of the time on the ground, although also an excellent climber and may raid possum and glider dens and prey on roosting birds.

The Spotted-tailed Quall consumes a variety of prey, including gliders, possums, small wallabies, rats, birds, bandicoots, rabbits and insects; also eats carrion and takes domestic fowl. Females occupy home ranges up to about 750 hectares and males up to 3500 hectares; usually traverse their ranges along densely vegetated creek lines. The average litter size is five; both sexes mature at about one year of age.

***Phascogale tapoatafa* (Brush-tailed Phascogale)**
Conservation status in NSW: Vulnerable

The Brush-tailed Phascogale is tree-dwelling marsupial carnivore. It has a characteristic, black, bushy 'bottlebrush' tail, with hairs up to 4 cm long. Its fur is grey above and pale cream below and it has conspicuous black eyes and large naked ears. Adults have a head and body length of about 20 cm, a tail length of about 20 cm and weigh 110 - 235 grams.

The Brush-tailed Phascogale has a patchy distribution around the coast of Australia. In NSW it is more frequently found in forest on the Great Dividing Range in the north-east and south-east of the State. There are also a few records from central NSW. Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter; also inhabit heath, swamps, rainforest and wet sclerophyll forest. The brush-tailed Phascogale is an agile climber foraging preferentially in rough barked trees of 25 cm DBH or greater and feeds mostly on arthropods but will also eat other invertebrates, nectar and sometimes small vertebrates. Females have exclusive territories of approximately 20 - 60 ha, while males have overlapping territories of up to 100 ha. Nest and shelter in tree hollows with entrances 2.5 - 4 cm wide and use many different hollows over a short time span. Mating occurs May - July; males die soon after the mating season whereas females can live for up to three years but generally only produce one litter.

***Planigale maculate* (Common Planigale)**
Conservation status in NSW: Vulnerable

Common Planigales are tiny marsupials with a body length of about 8 cm and a tail as long again. They differ from the common house mouse in having a long, pointed snout and large rounded ears. The head has a flattened appearance. Their fur is grey-brown above, sometimes with tiny white spots, and paler below.

Common Planigales are found in coastal north-eastern NSW, coastal east Queensland and Arnhem Land. The species reaches its southern distribution limit on the NSW lower north coast. Common Planigales inhabit rainforest, eucalypt forest, heath land, marshland, grassland and rocky areas where there is surface cover, and usually close to water. They are active at night and during the day shelter in saucer-shaped nests built in crevices, hollow logs, beneath bark or under rocks. Common Planigales are fierce carnivorous hunters and agile climbers, preying on insects and small vertebrates, some nearly their own size. They breed from October to January and the female builds a nest lined with grass, eucalypt leaves or shredded bark.

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.

No Spotted-tailed Quoll, Brush-tailed Phascogale or Common Planigale species are at risk of extinction by the 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.

This factor is essentially identical to factor (a) except that it refers only to endangered populations listed on Part 2 of Schedule 1 of the TSC Act and Part 2 of Schedule 4 of the FM Act, whereas factor (a) refers to species.

No Spotted-tailed Quoll, Brush-tailed Phascogale or Common Planigale populations were identified at the subject site; the area proposed for the development will not disturb any Spotted-tailed Quoll, Brush-tailed Phascogale or Common Planigale habitat, therefore no Spotted-tailed Quoll, Brush-tailed Phascogale or Common Planigale populations will be at risk of extinction from the development.

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.

Not applicable

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.
(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

No critical habitat for any Spotted-tailed Quoll, Brush-tailed Phascogale or Common Planigale was identified at the subject site; areas of vegetation occurring at the subject site will be retained, therefore the action proposed will not have an adverse effect on any critical habitat for the Spotted-tailed Quoll, Brush-tailed Phascogale or Common Planigale species.

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

Actions proposed at the subject site are not inconsistent with any objectives or actions approved within recovery or threat abatement plans for the Spotted-tailed Quoll, Brush-tailed Phascogale or Common Planigale.

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.
The proposed development will involve clearing native vegetation which is listed as a threatening process under Schedule 3 of the Threatened Species Conservation Act (1995).

MOLOSSIDAE
Eastern Freetail-bat - *Mormopterus norfolkensis*
Conservation status in NSW: Vulnerable

The Eastern Freetail-bat has dark brown to reddish brown fur on the back and is slightly paler below. Like other freetail-bats it has a long (3 - 4 cm) bare tail protruding from the tail membrane. Freetail-bats are also known as mastiff-bats, having hairless faces with wrinkled lips and triangular ears. They weigh up to 10 grams.

The Eastern Freetail-bat is found along the east coast from south Queensland to southern NSW. They occur in dry sclerophyll forest and woodland east of the Great Dividing Range and roost mainly in tree hollows but will also roost under bark or in man-made structures.

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.

No Eastern Freetail-bat species are at risk of extinction by the 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.

This factor is essentially identical to factor (a) except that it refers only to endangered populations listed on Part 2 of Schedule 1 of the TSC Act and Part 2 of Schedule 4 of the FM Act, whereas factor (a) refers to species.

No Eastern Freetail-bat populations were identified at the subject site; the area proposed for the development will not disturb any Eastern Freetail-bat habitat, therefore no Eastern Freetail-bat populations will be at risk of extinction from the development.

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.

Not applicable

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.
(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

No critical habitat for any Eastern Freetail-bat was identified at the subject site; areas of vegetation occurring at the subject site will be retained, therefore the action proposed will not have an adverse effect on any critical habitat for the Eastern Freetail-bat species.

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

Actions proposed at the subject site are not inconsistent with any objectives or actions approved within recovery or threat abatement plans for the Eastern Freetail-bat.

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.

The proposed development will involve clearing native vegetation which is listed as a threatening process under Schedule 3 of the Threatened Species Conservation Act (1995).

PETAURIDAE
***Petaurus australis* (Yellow-bellied Glider)**
Conservation status in NSW: Vulnerable

The Yellow-bellied Glider is a large, active, sociable and vocal glider. Adults weigh 450 - 700 grams; have a head and body length of about 30 cm and a large bushy tail that is about 45 cm long. It has grey to brown fur above with a cream to yellow belly, which is paler in young animals. The dark stripe down the back is characteristic of the group. It has a large gliding membrane that extends from the wrist to the ankle. It has a loud, distinctive call, beginning with a high-pitched shriek and subsiding into a throaty rattle.

The Yellow-bellied Glider is found along the eastern coast to the western slopes of the Great Dividing Range, from southern Queensland to Victoria.
Occurs in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south. Feed primarily on plant and insect exudates, including nectar, sap, honeydew and manna with pollen and insects providing protein.
Extract sap by incising (or biting into) the trunks and branches of favoured food trees, often leaving a distinctive 'V'-shaped scar. Live in small family groups of two - six individuals and are nocturnal. Den, often in family groups, in hollows of large trees.
Very mobile and occupies large home ranges of between 20 to 85 ha, to encompass dispersed and seasonally variable food resources.

***Petaurus norfolcensis* (Squirrel Glider)**
Conservation status in NSW: Vulnerable

Adult Squirrel Gliders have a head and body length of about 20 cm. They have blue-grey to brown-grey fur above, white on the belly and the end third of the tail is black. There is a dark stripe from between the eyes to the mid-back and the tail is soft and bushy averaging about 27 cm in length. Squirrel Gliders are up to twice the size of

Sugar Gliders, their facial markings are more distinct and they nest in bowl-shaped, leaf lined nests in tree hollows. Squirrel Gliders are also less vocal than Sugar Gliders.

The Squirrel Glider is widely though sparsely distributed in eastern Australia, from northern Queensland to western Victoria. It inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. The Squirrel Glider prefers mixed species stands with a shrub or Acacia midstorey and lives in family groups of a single adult male one or more adult females and offspring. They require abundant tree hollows for refuge and nest sites and their diet varies seasonally and consists of Acacia gum, eucalypt sap, nectar, honeydew and manna, with invertebrates and pollen providing protein.

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.

No Yellow-bellied Glider or Squirrel Glider species are at risk of extinction by the 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.

This factor is essentially identical to factor (a) except that it refers only to endangered populations listed on Part 2 of Schedule 1 of the TSC Act and Part 2 of Schedule 4 of the FM Act, whereas factor (a) refers to species.

No Yellow-bellied Glider or Squirrel Glider species populations were identified at the subject site; the area proposed for the development will not disturb any Yellow-bellied Glider or Squirrel Glider species habitat, therefore no Yellow-bellied Glider or Squirrel Glider species populations will be at risk of extinction from the development.

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.

Not applicable

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.
(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

No critical habitat for any Yellow-bellied Glider or Squirrel Glider species will be removed or altered; areas of vegetation occurring at the subject site will be retained, therefore the action proposed will not have an adverse effect on any critical habitat for the Yellow-bellied Glider or Squirrel Glider species.

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

Actions proposed at the subject site are not inconsistent with any objectives or actions approved within recovery or threat abatement plans for the Yellow-bellied Glider or Squirrel Glider species.

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.

The proposed development will involve clearing native vegetation which is listed as a threatening process under Schedule 3 of the Threatened Species Conservation Act (1995).

PHASCOLARCTIDAE
***Phascolarctos cinereus* (Koala)**
Conservation status in NSW: Vulnerable

The Koala is an arboreal marsupial with fur ranging from grey to brown above, and is white below. It has large furry ears, a prominent black nose and no tail. It spends most of its time in trees and has long, sharp claws, adapted for climbing. Adult males weigh 6 - 12 kg and adult females weigh 5 - 8 kg. During breeding, males advertise with loud snarling coughs and bellows.

The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In NSW it mainly occurs on the central and north coasts with some populations in the western region. It was historically abundant on the south coast of NSW, but now occurs in sparse and possibly disjunct populations. Koalas are also known from several sites on the southern tablelands.

The Koala inhabits eucalypt woodlands and forests and feeds on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. They are inactive for most of the day, feeding and moving mostly at night and spend most of their time in trees, but will descend and traverse open ground to move between trees. Their range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size. Koalas are generally solitary, but have complex social hierarchies based on a dominant male with a

territory overlapping several females and sub-ordinate males on the periphery. Females breed at two years of age and produce one young per year.

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.

No Koala species are at risk of extinction by the 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.

This factor is essentially identical to factor (a) except that it refers only to endangered populations listed on Part 2 of Schedule 1 of the TSC Act and Part 2 of Schedule 4 of the FM Act, whereas factor (a) refers to species.

No Koala populations were identified at the subject site and hence no Koala populations will be at risk of extinction from the development.

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.

Not aplicable

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.
(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

No critical habitat for any Koala species was identified at the subject site; areas of vegetation occurring at the subject site will be retained, therefore the action proposed will not have an adverse effect on any critical habitat for the Koala species.

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

Actions proposed at the subject site are not inconsistent with any objectives or actions approved within recovery or threat abatement plans for the Koala species.

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.

The proposed development will involve clearing native vegetation which is listed as a threatening process under Schedule 3 of the Threatened Species Conservation Act (1995).

POTOROIDAE Long-nosed Potoroo - Potorous *tridactylus*
Conservation status in NSW: Vulnerable

Adult Long-nosed Potoroos weigh up to 1.6 kg (740 - 1640 grams) and have a head and body length of about 360 mm and a tail length between 200 - 260 mm. Its fur is greyish-brown above and light grey below. It is distinguished from the slightly larger, but very similar Long-footed Potoroo in a number of subtle ways including its shorter tail (less than 250 mm long) and smaller hind-foot (shorter than its head). Also, unlike the Long-footed Potoroo the Long-nosed Potoroo lacks a leathery pad on the sole of its foot, just behind the inner toe (a hallucal pad).

The Long-nosed Potoroo is found on the south-eastern coast of Australia, from Queensland to eastern Victoria and Tasmania, including some of the Bass Strait islands. There are geographically isolated populations in western Victoria. In NSW it is generally restricted to coastal heaths and forests east of the Great Dividing Range, with an annual rainfall exceeding 760 mm.

Inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a common feature. The fruit-bodies of hypogeous (underground-fruiting) fungi are

a large component of the diet of the Long-nosed Potoroo. They also eat roots, tubers, insects and their larvae and other soft-bodied animals in the soil. Individuals are mainly solitary, non-territorial and have home range sizes ranging between 2-5 ha.
Breeding peaks typically occur in late winter to early summer and a single young is born per litter. Adults are capable of two reproductive bouts per annum.

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.

No Long-nosed Potoroo species are at risk of extinction by the 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.

This factor is essentially identical to factor (a) except that it refers only to endangered populations listed on Part 2 of Schedule 1 of the TSC Act and Part 2 of Schedule 4 of the FM Act, whereas factor (a) refers to species.

No Long-nosed Potoroo were identified at the subject site; the area proposed for the development will not disturb any Long-nosed Potoroo species habitat, therefore no Long-nosed Potoroo species populations will be at risk of extinction from the development.

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.

Not applicable

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone

and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.
(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

No critical habitat for any Long-nosed Potoroo species was identified at the subject site; areas of vegetation occurring at the subject site will be retained, therefore the action proposed will not have an adverse effect on any critical habitat for the Long-nosed Potoroo species.

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

Actions proposed at the subject site are not inconsistent with any objectives or actions approved within recovery or threat abatement plans for the Long-nosed Potoroo species.

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.

The proposed development will involve clearing native vegetation which is listed as a threatening process under Schedule 3 of the Threatened Species Conservation Act (1995).

PTEROPODIDAE
***Pteropus poliocephalus* (Grey-headed Flying-fox)**
Conservation status in NSW: Vulnerable

The Grey-headed Flying-fox is the largest Australian bat, with a head and body length of 23 - 29 cm. It has dark grey fur on the body, lighter grey fur on the head and a russet collar encircling the neck. The wing membranes are black and the wingspan can be up to 1 m. It can be distinguished from other flying-foxes by the leg fur, which extends to the ankle.

Grey-headed Flying-foxes are found within 200 km of the eastern coast of Australia, from Bundaberg in Queensland to Melbourne in Victoria.

They occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Individual camps may have tens of thousands of animals and are used for mating, birth and the rearing of young.

Annual mating commences in January and a single young is born each October or November; site fidelity to camps is high with some caps being used for over a century.

***Syconycteris australis* (Common Blossom-bat)**
Conservation status in NSW: Vulnerable

Common Blossom-bats are small nectar-eating bats. They are around 6 cm long and have very soft fawn to reddish fur. They are highly specialised for a diet of nectar, having very pointed muzzles and long, thin brush-like tongues. They are distributed around coastal areas of north-east NSW and eastern Queensland.

Common Blossom-bats often roost in littoral rainforest and feed on flowers in adjacent heath land and paperbark swamps. They roost individually in foliage of the sub-canopy, changing roost sites daily, and return to favoured feeding sites on consecutive nights.

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.

No Common Blossom-bats species are at risk of extinction by the 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.

This factor is essentially identical to factor (a) except that it refers only to endangered populations listed on Part 2 of Schedule 1 of the TSC Act and Part 2 of Schedule 4 of the FM Act, whereas factor (a) refers to species.

No Common Blossom-bats were identified at the subject site; the area proposed for the development will not disturb any Common Blossom-bats species habitat, therefore no Common Blossom-bats species populations will be at risk of extinction from the development.

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.

Not applicable

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.
(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

No critical habitat for any Common Blossom-bats species was identified at the subject site; areas of vegetation occurring at the subject site will be retained, therefore the action proposed will not have an adverse effect on any critical habitat for the Common Blossom-bats species.

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

Actions proposed at the subject site are not inconsistent with any objectives or actions approved within recovery or threat abatement plans for the Common Blossom-bats species.

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.

The proposed development will involve clearing native vegetation which is listed as a threatening process under Schedule 3 of the Threatened Species Conservation Act (1995).

VESPERTILIONIDAE
***Kerivoula papuensis* (Golden-tipped Bat)**
Conservation status in NSW: Vulnerable

The Golden-tipped Bat has dark brown, curly fur with bright golden tips. The distinctively coloured fur extends along the wings, legs and tail. It has a short, pointed, over-hanging muzzle and pointy, funnel-shaped ears. Adults weigh about 6 grams and have a wingspan of about 25 cm.

The Golden-tipped Bat is distributed along the east coast of Australia in scattered locations from Cape York Peninsula in Queensland to Bega in southern NSW. Found in rainforest and adjacent sclerophyll forest. Roost in abandoned hanging Yellow-throated Scrubwren and Brown Gerygone nests located in rainforest gullies on small first- and second-order streams. Will fly up to two km from roosts to forage in rainforest and sclerophyll forest on upper-slopes. Specialist feeder on small web-building spiders.

***Miniopterus australis* (Little Bentwing-bat)**
Conservation status in NSW: Vulnerable

Little Bentwing-bats are small chocolate brown insectivorous bats with a body length of about 45 mm. The fur is long and thick, especially over the crown and around the neck. The tip of the wing is formed by a particularly long joint of the third finger. They are distributed along the coastal north-eastern NSW and eastern Queensland.

Little Bentwing-bats are found in moist eucalypt forest, rainforest or dense coastal Banksia scrub and roost in caves, tunnels and sometimes tree hollows during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats. They often share roosting sites with the Common Bentwing-bat and, in winter, the two species may form mixed clusters. In NSW the largest maternity colony is in close association with a large maternity colony of Common Bentwing-bats (M. schreibersii) and appears to depend on the large colony to provide the high temperatures needed to rear its young.

***Miniopterus schreibersii oceanensis Eastern* Bentwing-bat**
Conservation status in NSW: Vulnerable

The Eastern Bentwing Bat has chocolate to reddish-brown fur on its back and slightly lighter coloured fur on its belly. It has a short snout and a high 'domed' head with short round ears. The wing membranes attach to the ankle, not to the base of the toe. The last bone of the third finger is much longer than the other finger-bones giving the "bent wing" appearance. It weighs up to 20 grams, has a head and body length of about 6 cm and a wingspan of 30 - 35 cm. They are distributed occur along the east and north-west coasts of Australia.

Habitat and ecology

- Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures.
- Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young.
- Maternity caves have very specific temperature and humidity regimes.
- At other times of the year, populations disperse within about 300 km range of maternity caves.
- Cold caves are used for hibernation in southern Australia.
- Breeding or roosting colonies can number from 100 to 150,000 individuals.
- Hunt in forested areas, catching moths and other flying insects above the tree tops.

***Myotis adversus* (Large-footed Myotis)**
Conservation status in NSW: Vulnerable

This species is now most often referred to as *Myotis macropus* or the Southern Myotis. It has disproportionately large feet; more than 8 mm long, with widely-spaced toes which are distinctly hairy and with long, curved claws. It has dark-grey to reddish brown fur above and is paler below. It weighs up to 15 grams and has a wingspan of about 28 cm.

The Large-footed Myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km

inland, except along major rivers. They generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Large-footed Myotis forage over streams and pools catching insects and small fish by raking their feet across the water surface.

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.

No Golden-tipped bat, Little Bentwing-bat, Eastern Bentwing-bat or Large-footed Myotis species are at risk of extinction by the 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.

This factor is essentially identical to factor (a) except that it refers only to endangered populations listed on Part 2 of Schedule 1 of the TSC Act and Part 2 of Schedule 4 of the FM Act, whereas factor (a) refers to species.

No Golden-tipped bat, Little Bentwing-bat, Eastern Bentwing-bat or Large-footed Myotis were identified at the subject site; the area proposed for the development will not disturb any of the above mentioned species' habitat, therefore none of these species populations will be at risk of extinction from the development.

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.

Not applicable

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.

(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

No critical habitat for any Golden-tipped bat, Little Bentwing-bat, Eastern Bentwing-bat or Large-footed Myotis species were identified at the subject site; areas of vegetation occurring at the subject site will be retained, therefore the action proposed will not have an adverse effect on any critical habitat for the species.

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

Actions proposed at the subject site are not inconsistent with any objectives or actions approved within recovery or threat abatement plans for the Golden-tipped bat, Little Bentwing-bat, Eastern Bentwing-bat or Large-footed Myotis species.

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.

The proposed development will involve clearing native vegetation which is listed as a threatening process under Schedule 3 of the Threatened Species Conservation Act (1995).

ELAPIDAE
***Hoplocephalus stephensii* (Stephens' Banded Snake)**
Conservation status in NSW: Vulnerable

Stephens' Banded Snake is a medium-sized partly tree-dwelling snake up to one metre long. It is brown or yellow-brown above, with a series of irregular, broad, dark cross bands. The head is black with a brown crown and a brown or cream patch on either side of the nape and the lips are barred with black and cream.

They are distributed along the coast and ranges from Southern Queensland to Gosford in NSW and are found in Rainforest and eucalypt forests and rocky areas up to 950 m in altitude. The Stephens' Banded Snake is nocturnal, and shelters between loose bark and tree trunks, amongst vines, or in hollow trunks limbs, rock crevices or under slabs during the day. At night it hunts frogs, lizards, birds and small mammals.

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.

No Stephens' Banded Snake species are at risk of extinction by the 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.

This factor is essentially identical to factor (a) except that it refers only to endangered populations listed on Part 2 of Schedule 1 of the TSC Act and Part 2 of Schedule 4 of the FM Act, whereas factor (a) refers to species.

No Stephens' Banded Snake were identified at the subject site; the area proposed for the development will not disturb any Stephens' Banded Snake species habitat, therefore no Stephens' Banded Snake species populations will be at risk of extinction from the development.

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.

Not applicable

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.

(i) A narrow section of degraded and weed infested riparian vegetation will be removed for the excavation of a flood bypass; the area being approximately 2000m^2. This vegetation will be replanted with native species both within a Core Riparian Zone and throughout the Compensatory Planting Zone such that the extent of habitat will be significantly increased.
(ii) No area of habitat is to be fragmented,
(iii) The habitat within the study area that will be modified will not affect the long-term survival of the species.

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

No critical habitat for any Stephens' Banded Snake species was identified at the subject site; areas of vegetation occurring at the subject site will be retained, therefore the action proposed will not have an adverse effect on any critical habitat for the Stephens' Banded Snake species.

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

Actions proposed at the subject site are not inconsistent with any objectives or actions approved within recovery or threat abatement plans for the Stephens' Banded Snake species.

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.

The proposed development will involve clearing native vegetation which is listed as a threatening process under Schedule 3 of the Threatened Species Conservation Act (1995).

Conclusion
The proposed development will not involve the removal of native vegetation. The subject site is connected to native vegetation; all areas of native vegetation are to be retained and/or rehabilitated where possible at the subject site; the proposed development is unlikely to have a significant effect on any threatened fauna species. Consequently, a Species Impact Statement is not necessary.

5.2 SEPP 44

The State Environmental Planning Policy 44, Koala Habitat Protection aims to "encourage the proper conservation and management of area of natural vegetation that provide habitat for Koalas, to ensure permanent free-living populations over their present range and to reverse the current trend of population decline." The adoption of a Comprehensive Koala Plan of Management (CKPoM) by the Coffs Harbour City Council replaces the requirement under SEPP 44 for developments in the Coffs Harbour LGA to address koala issues individually. The CKPoM sets out a strategic planning framework for conserving koalas in the Coffs Harbour LGA. The proposed development site is identified as containing both Primary and Secondary Koala Habitat under the Coffs Harbour City Council Koala Plan of Management (Appendix 9) and hence consideration of the protection and amelioration measures recommended in that report must be addressed.

Koala Habitat
Removal of approximately 2000m^2 of riparian vegetation along the north bank of Jordan's Creek will occur as a result of the excavation of the flood bypass to alleviate flooding issues associated with this development. This vegetation is mapped as being Secondary Koala Habitat. The flora survey of the affected area confirmed that the vegetation can be separated into two communities. Upstream of where the power lines cross Jordan's Creek the vegetation is dominated by mature Camphor Laurel trees over a regenerating rainforest understorey; downstream the vegetation has been rehabilitated possibly 15 years ago during development of the sporting fields and facilities. This area is mainly semi-mature eucalypts surrounded by several Wattle species with an understorey of Lomandra. Two semi-mature Grey Gum (*Eucalyptus propinqua*) trees were recorded in this rehabilitated area; Grey Gum is listed in Schedule 2 of SEPP 44. Additionally, 2 Forest Oak trees were recorded with Forest Oak (*Allocasuarina torulosa*) being identified as a secondary Koala feed source for the Coffs region (Lunney *et al*., 1999).

In the Accompanying Vegetation Management Plan, the area excavated for the flood bypass will be revegetated using native species previously recorded from the subject property including a number of koala-preferred trees (Table 8). Furthermore, koala

friendly species will be planted extensively throughout the Compensatory Planting Zone along the southern bank of Jordan's Creek to enhance this fauna corridor such that there will be a significant increase in extent of habitat for the koala and other fauna as a result of this residential development.

Table 8. Koala-preferred species planted within and surrounding the flood bypass.

Broad-leaved Paperbark	Melaleuca quinquenervia
Flooded Gum	Eucalyptus grandis
Tallowwood	Eucalyptus microcorys
Grey Gum	Eucalyptus propinqua
Swamp Mahogany	Eucalyptus robusta
Forest Oak	Allocasuarina torulosa
Brushbox	Lophostemon confertus

The proposed development will not remove any native vegetation that is identified as Primary or Secondary Koala Habitat during the construction of the residential areas, access roads, driveways, associated infrastructure or Asset Protection Zones for bushfire protection. A number of amelioration measures that will mitigate any threats to koalas that may be incurred as a result of this development are listed below. These measures will allow the free movement of wildlife within the proposed development and provide a connection with vegetated areas both to the east and west of the development site.

Koala Road Risk

The stretch of Pacific Highway between the Big Banana and Bruxner Park Road is recognised as a minor koala "black spot" with koala mortalities. Recent koala activity both east and west of the Pacific Highway would indicate that this area is a corridor of regional significance (as mapped on the Biodiversity Conservation Lands spatial layer by the Department of Planning). As a consequence, the following amelioration measures will be incorporated into the concept plan for the development.

i) A fauna underpass is proposed beneath the access road to the Western Precinct of the development. This underpass will adopt similar strategies to that undertaken by the RTA for the Bonville Pacific Highway Reconstruction (Photograph 1). The underpass will have the dimensions of 6 x 4m; contain elevated horizontal poles allowing travel through the underpass; and refuge poles are each entrance. It will include koala-exclusion fencing to the road and native planting to encouraging movement of koala species. This underpass will connect the Primary Koala Habitat in the central portion of the subject property with a regionally-significant fauna corridor along Bruxner Park Road.

Photograph 1. Koala-friendly structures to encourage movement through this underpass, Pacific Highway Reconstruction, Bonville (Photograph, S. Cotter)

ii) Planting of koala-preferred species along the north and north eastern boundaries of the property will be implemented. It is hoped that this planting will encourage wildlife to move through this vegetation and cross the Pacific Highway via an existing underpass that links this development with the Pacific Bay Resort to the east of the Pacific Highway rather than as present across the 4 lane highway with frequent road deaths. It is not feasible to include koala-friendly structures within this existing underpass as it will remain as a service road providing access for maintenance vehicles from the Pacific Bay Resort. However, the planting of native vegetation in combination with exclusion fencing will funnel wildlife through this underpass rather than across the Pacific Highway.

iii) The vegetated corridor through the Eastern Precinct will cross three internal access roads. It is proposed that surface wildlife crossings, similar to the concept design presented as Figure A4 in the CKPoM (Lunney *et al*., 1999), will be constructed at these locations. These crossings will include: warning signs, appropriate lighting and rumble strips on the road to alert both drivers and wildlife. A 40km/h speed restriction is proposed within the residential areas. It is not envisaged that Koala movement through the Eastern residential precinct be encouraged, but rather a habitat link be established such that movement is possible along the fauna corridor of Bruxner Park Road to the north, through the retained native vegetation in the central portion of the subject property and thence along Jordan's Creek, continuing under the Pacific Highway through the existing underpass and linking with areas of native vegetation to the east. Nevertheless, the measures proposed above will assist the movement of koalas within the residential areas of the development.

iv) Appropriate koala exclusion fencing will be placed along the Pacific Highway frontage and Bruxner Park Road so as to encourage the use of the proposed underpasses

and eliminate the existing high koala road mortality. This fencing will also exclude koalas from entering the Sediment Retention Basin.

Koalas and Dogs
Dog attack on koalas represents a significant threat to individuals and populations in urban and rural areas. Dogs may kill, injure or stress koalas by chasing, barking or restricting normal ranging behaviour. The problem of savage attacks on koalas is exacerbated when dogs have the opportunity to form pairs or packs, when dogs can roam widely outside their home property and when large and aggressive breeds are common. The management of dogs needs broad community support to achieve any meaningful goals (Coffs Harbour City Council, 2000). Within the restrictions of this proposed development, all future purchasers will be advised about the possibility of koalas temporarily inhabiting the area, such that they may review their own strategies for maintaining companion animals, including providing dog-proof fencing.

Koala Health and Welfare
Koalas which are found sick, injured, orphaned or otherwise distressed in the Coffs Harbour LGA can often be rehabilitated to the wild. The local Koala carer group WIRES is the only wildlife care group currently accredited for Koala care in Coffs Harbour in accordance with the NPWS Policy *Koala Care in NSW – Guidelines and Conditions, 1997*. The most pressing health issue for Koalas that come into care is related to *Chlamydia* infection, and that symptoms may be instigated or exacerbated by additional stresses related to a number of factors including habitat clearing and disturbance (Lunney *et al*., 1999).

Bushfires
High intensity fires, particularly those which affect the tree canopy (crown fires), can directly kill or injure Koalas either by radiant heat or by inhalation of smoke and ash (Lunney *et al*., 1999). The development proposal will comply with the requirements for bushfire protection (RFS, 2006) such that the likelihood of extreme fires occurring is greatly reduced. All recommended asset protection zones are located outside vegetation identified as being either Primary or Secondary Koala Habitat. It is paramount that any additional planting of koala feeding trees be sited such that the potential bushfire risks that have already been accounted for in the Bushfire Risk Management Plan are not increased.

Landscaping
The use of preferred koala feeding trees will be adopted in street landscaping and within the wildlife corridor to encourage movement of koalas within the development. This will be complimented by koala-friendly fencing. In addition, prospective residents will be encouraged to plant appropriate species. However, consideration of the potential hazards associated with large Eucalyptus trees (*e.g*. Tallowwood trees) within a residential area during storm events must be addressed by the occupants of each allotment. It may not be appropriate to comply with this goal.

5.3 COMMONWEALTH ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT (1999)

5.3.1 INTRODUCTION
Under the Commonwealth Environment Protection and Biodiversity Conservation Act (1999), 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 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 under the EPBC Act (1999);
(d) Listed Ecological Communities under the EPBC Act (1999);
(e) Listed migratory species (JAMBA and CAMBA)

5.3.2 SITE ASSESSMENT

Commonwealth Assessment will be required for proposed activities on the site if they affect any matter of NES. The subject site is not a Declared World Heritage Area nor does it contain any Declared Ramsar Wetlands. No threatened species listed under the EPBC Act (1999) may possibly occur at the subject site.

5.3.3 LISTED ECOLOGICAL COMMUNITIES IN NSW

One of the ecological communities currently listed in the EPBC Act (1999) occurs at the subject site; an area of vegetation along the fringes of Jordan's Creek within the south-east portion of the subject property was identified as having the characteristics of a Lowland Rainforest in NSW North Coast and Sydney Basin Bioregions.

5.3.4 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).

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 are 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.

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.

No CAMBA or JAMBA species are known to occur or in view of the absence of wetlands likely to occur at the site. The proposed development is therefore unlikely to have a significant impact on any CAMBA or JAMBA species.

5.3.5 REQUIREMENT FOR COMMONWEALTH ASSESSMENT

In light of the considerations discussed above, Commonwealth Assessment is not required for the proposed development of the site.

6.0 SUMMARY

Bushfiresafe was engaged by Thackral Pty Ltd to complete a Flora and Fauna Assessment for lot 1 DP 592173, lot 2 DP 226560, lot 3 DP 820652, lot 4 DP 820652, lot 5 DP 820652, lot 23 DP 716144, Coffs Harbour.

The assessment involved the following:

- Determining the threatened flora species recorded from the locality
- Assessing the nature and condition of vegetation at the site, and searching for threatened flora species
- Determining the threatened fauna species occurring in the locality
- Searching for threatened fauna species
- Assessing the habitat value of the site for threatened species
- Addressing statutory requirements including State Environmental Planning Policy No. 44 (SEPP 44 – Koala Habitat Protection), Section 5A of the Environmental Planning & Assessment Act (1979) and the Commonwealth Environment Protection and Biodiversity Act (1999)

The proposal is to develop the subject property to accommodate 200 residential dwellings; areas within the property that are zoned 7(a) Environmental Protection Habitat & Catchment shall not be developed and will undergo rehabilitation by the removal of weeds, replanting using a seed collection that is indigenous to the area.

The nature and condition of vegetation at the subject site was assessed, and all threatened and non threatened flora and fauna species were recorded. A site survey was carried out in January, March, July and September 2007 which consisted of 4 set transects and one random meander. Two threatened species were found, the *Mixophyes iterates* (Giant Barred Frog) located near the fish weir and *Amorphospermum whitei* (Rusty Plum) located within the forest area to be retained. An Endangered Ecological Community (Lowland Rainforest in NSW North Coast and Sydney Basin Bioregions) was identified within the south-east portion of the property.

Based on an assessment of the type and condition of habitat present, it was concluded that out of 15 threatened flora species listed on the NPWS Atlas Search, 12 may possibly occur at the subject site; out of 41 threatened fauna species listed on the NPWS Atlas Search, 33 are possible.

An assessment of significance under Section 5A of the NSW EP&A (1979) was completed for the 12 threatened flora species assumed to occur, and the 33 threatened fauna species assumed to occur at the subject site. The assessment concluded that the proposed development is unlikely to have a significant effect on any of these species, therefore no Species Impact Statements (SIS) are required.

A SEPP 44 assessment concluded that the subject site does not support core Koala populations, therefore a Plan of Management for Core Koala Habitat document is not required.

6.1 CONCLUSION

Through the implementation of the Vegetation Management Plan, there will be no net loss of riparian vegetation under this development proposal and hence there will be no disruption to the existing vegetation connectivity along Jordan's Creek and no barriers to fauna movements within this vegetation community. Significant areas of retained native vegetation are proposed, such that there will be no impact upon the Rusty Plum population or the Lowland Rainforest in NSW North Coast and Sydney Basin Bioregions Endangered Ecological Community identified during the survey. The provision of a 30m buffer zone to the freshwater lagoon will provide suitable protection for the Giant Barred Frog (only threatened fauna species recorded during surveys) to enable its continued existence.

Keys areas of Primary and Secondary Koala Habitat will not be affected by the development with improved connection between areas of vegetation proposed along the western boundary of the property. This will be achieved through the planting of koala-preferred species in a 10m wide buffer zone that separates the proposed development from the adjoining banana-growing property.

The proposed weed management strategy will: remove the existing Camphor Laurel trees from within the riparian vegetation over a 5 year interval; manage any Lantana present within this vegetation; and, after construction of the proposed allotments, manage herbaceous weeds within the developable areas. On-going maintenance will be provided by the ground staff of the Pacific Bay Resort with opportunities for community groups such as Landcare to be involved to enhance the retained vegetation.

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8.0 COMMERCIAL IN CONFIDENCE

Appendix 1: Flora Species Recorded During Site Survey

Native Taxa

Tree species

Family	Binomial Name	Common Name
Anacardiaceae	*Euroschinus falcata var, falcata*	Chinaman's Cedar
Araliaceae	*Polyscias elegans*	Celerywood
Araucariaceae	*Araucaria cunninghamii*	Hoop Pine
Arecaceae	*Archontophoenix cunninghamiana*	Bangalow Palm
	Livistona australis	Cabbage Palm
Casuarinaceae	*Allocasuarina torulosa*	Forest Oak
	Casuarina glauca	Swamp Oak
Celastraceae	*Cassine australis*	Red Olive Berry
Cunoniaceae	*Caldcluvia paniculosa*	Corkwood
	Schizomeria ovata	Crabapple
Elaeocarpaceae	*Elaeocarpus reticulatus*	Blueberry Ash
Epacridaceae	*Trochocarpa laurina*	Waddy Wood
Escalloniaceae	*Cuttsia viburnea*	Native Elderberry
Euphorbiaceae	*Baloghia inophylla*	Scrub Bloodwood
	Cleistanthus cunninghamii	Omega
	Glochidion ferdinandi	Cheese Tree
Fabaceae (Mimosoideae)	*Acacia fimbriata*	Fringed Wattle
	Acacia floribunda	Sally Wattle
	Acacia irrorata	Green Wattle
	Acacia melanoxylon	Black Wattle
Flacourtiaceae	*Scolopia braunii*	Flintwood
Lauraceae	*Cryptocarya glaucescens*	Jackwood
	Cryptocarya microneura	Murrogun
	Cryptocarya obovata	Pepperberry
	Cryptocarya rigida	Rose Maple
	Cryptocarya triplinervis	Three-veined Laurel
	Endiandra muelleri	Mueller's Walnut
	Endiandra sieberi	Hard Corkwood
	Neolitsea dealbata	Hairy-leaved Bolly Gum
Meliaceae	*Dysoxylum muelleri*	Red Bean
	Synoum glandulosum	Scentless Rosewood
Moraceae	*Ficus coronata*	Creek Sandpaper Fig
	Ficus obliqua	Small-leaved Fig
	Ficus rubiginosa	Port Jackson Fig
Myrsinaceae	*Rapanea howittiana*	Muttonwood
Myrtaceae	*Acmena smithii*	Lily Pilly
	Angophora costata	Smooth-barked Apple
	Backhousia myrtifolia	Grey Myrtle
	Corymbia intermedia	Pink Bloodwood
	Eucalyptus grandis	Flooded Gum
	Eucalyptus microcorys	Tallowwood
	Eucalyptus pilularis	Blackbutt
	Eucalyptus propinqua	Grey Gum
	Eucalyptus resinifera	Red Mahogany
	Eucalyptus siderophloia	Northern Grey Ironbark
	Lophostemon confertus	Brush Box
	Rhodamnia rubescens	Scrub Turpentine
	Rhodomyrtus psidioides	Native Guava
	Syncarpia glomulifera	Turpentine
	Syzygium luehmannii	Riberry
	Syzygium oleosum	Blue Lily Pilly

	Tristaniopsis laurina	Water Gum
Oleaceae	*Notelaea longifolia*	Mock Olive
	Olea paniculata	Native Olive
Pittosporaceae	*Hymenosporum flavum*	Native Frangipanni
	Pittosporum undulatum	Pittosporum
Rhamnaceae	*Alphitonia excelsa*	Red Ash
Rubiaceae	*Hodgkinsonia ovatiflora*	Hodgkinsonia
Rutaceae	*Acronychia oblongifolia*	White Lilly Pilly
Sapindaceae	*Alectryon subcinereus*	Bird's Eye
	Castanospora alphandii	Brown Tamarind
	Cupaniopsis anacardioides	Tuckeroo
	Diploglottis australis	Native Tamarind
	Guioa semiglauca	Guioa
	Jagera pseudorhus f, pseudorhus	Foambark
	Mischocarpus pyriformis ssp. pyriformis	Pear-fruited Tamarind
Sapotaceae	*Amorphospermum whitei*	Rusty Plum
Sterculiaceae	*Brachychiton acerifolius*	Flame Tree
	Commersonia bartramia	Brown Kurrajong
Verbenaceae	*Clerodendrum floribundum*	Smooth Clerodendrum
	Gmelina leichhardtii	White Beech

Shrub species

Family	**Binomial Name**	**Common Name**
Apocynaceae	*Tabernaemontana pandacaqui*	Banana Bush
Araliaceae	*Astrotricha longifolia*	Star Hairs
	Polyscias sambucifolia	Elderberry
Asteliaceae	*Cordyline petiolaris*	Broad-leaved Cordyline
	Cordyline stricta	Cordyline
Asteraceae	*Ozothamnus diosmifolius*	Native Daisy
		Narrow-leaved Orange
Celastraceae	*Maytenus silvestris*	Bark
Cyathaceae	*Cyathea cooperi*	Straw Treefern
	Cyathea leichhardtiana	Prickly Treefern
Euphorbiaceae	*Croton verreauxii*	Croton
	Omalanthus populifolius	Bleeding Heart
Eupomatiaceae	*Eupomatia bennettii*	Small Bolwarra
	Eupomatia laurina	Bolwarra
Fabaceae (Mimosoideae)	*Acacia longifolia*	Coast Wattle
Malvaceae	*Abutilon oxycarpum*	Flannel Weed
Monimiaceae	*Wilkiea huegeliana*	Veiny Wilkea
Myrtaceae	*Archirhodomyrtus beckleri*	Rose Myrtle
Pittosporaceae	*Pittosporum revolutum*	Hairy Pittosporum
Sambucaceae	*Sambucus gaudichaudiana*	White Elderberry
Sapindaceae	*Alectryon coriaceus*	Beach Bird's Eye
Zamiaceae	*Lepidozamia peroffskyana*	Burrawang Palm

Herb species

Family	**Binomial Name**	**Common Name**
Acanthaceae	*Pseuderanthemum variabile*	Pastel Flower
Adiantaceae	*Adiantum formosum*	Giant Maidenhair
	Adiantum hispidulum	Rough Maidenhair
Araceae	*Alocasia brisbanensis*	Cunjevoi
Aspleniaceae	*Asplenium australasicum*	Bird's Nest Fern
Blechnaceae	*Blechnum cartilagineum*	Gristle Fern
	Doodia aspera	Prickly Rasp Fern
	Doodia caudata	Small Rasp Fern
Commelinaceae	*Commelina cyanea*	Scurvy Weed

Convulvulaceae	*Dichondra repens*	Kidney Weed
Cyperaceae	*Carex polyantha*	Carex Sedge
	Cyperus filipes	A Sedge
	Gahnia sieberiana	A Saw Sedge
Davalliaceae	*Nephrolepis cordifolia*	Fishbone Fern
Dennstaedtiaceae	*Dennstaedtia davallioides*	Lacy Ground Fern
	Pteridium esculentum	Bracken Fern
Dicksoniaceae	*Calochlaena dubia*	Common Ground Fern
Euphorbiaceae	*Phyllanthus gasstroemii*	A Phyllanthus
	Phyllanthus virgatus	A Phyllanthus
Lomandraceae	*Lomandra hystrix*	A Lomandra
	Lomandra longifolia	A Lomandra
	Lomandra multiflora ssp. *multiflora*	A Lomandra
Phormiaceae	*Dianella caerulea*	Dianella
Poaceae	*Entolasia stricta*	Wiry Panic
	Microlaena stipoides	Microlaena
	Oplismenus aemulus	Basket Grass
	Themeda australis	Kangaroo Grass
Polypodiaceae	*Pyrrosia confluens*	Horseshoe Felt Fern
Thelypteridaceae	*Christella dentata*	Binung
Uvuvlariaceae	*Tripladenia cunninghamii*	Kreysegia Lily
Violaceae	*Viola hederacea form d*	Native Violet
Zingiberaceae	*Alpinia caerulea*	Native Ginger

Vine species

Family	**Binomial Name**	**Common Name**
Amaranthaceae	*Deeringia arborescens*	Deeringia
Apocynaceae	*Melodinus australis*	Southern Melodinus
	Parsonsia induplicata	Thin-leaved Silkpod
	Parsonsia straminea	Ivy Silkpod
Arecaceae	*Calamus muelleri*	Lawyer Vine
Asclepidiaceae	*Marsdenia rostrata*	Common Milk Vine
Bignonaceae	*Pandorea pandorana*	Wonga Vine
Dilleniaceae	*Hibbertia scandens*	Twining Guinea Flower
Dioscoraceae	*Dioscorea transversa*	Native Yam
Flagelliariaceae	*Flagellaria indica*	Whip Vine
Luzuriagaceae	*Eustrephus latifolius*	Wombat Berry
	Geitonoplesium cymosum	Scrambling Lilly
Menispermaceae	*Legnephora moorei*	Round-leaf Vine
	Stephania japonica var. *discolor*	Snake Vine
Monimiaceae	*Palmeria scandens*	Anchor Vine
Moraceae	*Malaisia scandens*	Burny Vine
Myrsinaceae	*Embelia australiana*	Embelia
Pittosporaceae	*Billardiera scandens*	Common Apple-berry
Ripogonaceae	*Ripogonum album*	White Supplejack
	Ripogonum elseyanum	Hairy Supplejack
	Ripogonum fawcettianum	Small Supplejack
Rosaceae	*Rubus moorei*	Molucca Bramble
	Rubus nebulosus	Thorny Bramble
	Rubus rosifolius	Rose-leaf Bramble
Rubiaceae	*Morinda jasminoides*	Morinda
Smilacaceae	*Smilax australis*	Austral Sarsaparilla
	Smilax glyciphylla	Sweet Sarsaparilla
Vitaceae	*Cissus antarctica*	Water Vine
	Cissus hypoglauca	Five-leaf Water Vine

Parasitic plant species

Family	Binomial Name	Common Name
Loranthaceae	*Dendrophthoe vitellina*	A Mistletoe

Non-native Taxa

Trees

Family	Binomial	Name
Araliaceae	*Schefflera actinophylla*	Umbrella Tree
Arecaceae	*Syagrus romanzoffiana*	Cocos Palm
Lauraceae	*Cinnamomum camphora*	Camphor Laurel
Moraceae	*Morus alba*	Mulberry
Pinaceae	*Pinus elliotii*	Slash Pine
Rutaceae	*Citrus limonia*	Lemon
Ulmaceae	*Celtis occidentalis*	Hackberry

Shrubs

Family	Binomial	Name
Asteraceae	*Chrysanthemoides monilifera* ssp. *rotunda*	Bitou Bush
	Tithonia diversifolia	Mexican Sunflower
Faboideae (Ceasalpinoideae)	*Senna pendula var. glabrata*	Senna
Myrsinaceae	*Ardisia crenata*	Red Coral Berry
Ochnaceae	*Ochna serrulata*	Mickey Mouse Plant
Phytolaccaceae	*Phytolacca americana*	Indian Pokeweed
Solanaceae	*Solanum mauritianum*	Tobacco Bush
Verbenaceae	*Lantana camara*	Lantana

Vines

Family	Binomial	Name
Asclepiadaceae	*Araujia hortorum*	Moth Vine
Convulvulaceae	*Ipomoea cairica*	Morning Glory Vine
Passifloraceae	*Passiflora edulis*	Passionfruit
	Passiflora subpeltata	White Passionflower
Scrophulariaceae	*Lophospermum erubescens*	Maurandia
Solanaceae	*Solanum seaforthianum*	Brazilian Nightshade

Herbs

Family	Binomial	Name
Araceae	*Calocasia esculenta*	Taro
Asparagaceae	*Protasparagus aethiopicus*	Climbing Asparagus Fern
	Protasparagus plumosus	Asparagus Fern
Asteraceae	*Ageratina adenophora*	Crofton Weed
	Ageratum houstonianum	Goatweed
	Bidens pilosa	Farmer's Friend
	Senecio madagascadensis	Fireweed
	Tagetes minuta	Stinking Roger
Commelinaceae	*Tradescantia albiflora*	Wandering Jew
Dracaenaceae	*Sansevieria trifasciata*	Mother-in-law's Tongue
Euphorbiaceae	*Phyllanthus tenellus*	A Phyllanthus
Faboideae	*Macroptilium atropurpureum*	Siratro
Malvaceae	*Sida rhombifolia*	Paddys' Lucerne
Plantaginaceae	*Plantago lanceolata*	Plantago
Poaceae	*Axonopus affinis*	Narrow-leaved Carpet Grass
	Chloris gayana	Rhodes Grass
	Paspalum wetsteinii	Broad-leaved Paspalum

	Pennisetum clandestinum	Kikuyu
	Sporobolus fertilis	Parramatta Grass
Polygonaceae	*Rumex crispus*	Curled Dock
Solanaceae	*Lycopersicon esculentum*	Tomato
	Solanum aviculare	Blackberry Nightshade

Appendix 2: Fauna Species Recorded During Site Survey

Family	Species	Common Name	Method of Detection
	Alectura lathami	Australian Brush Turkey	Seen
Artamidae	*Gymnorhina tibicen*	Australian Magpie	Seen
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike	Seen
	Entomyzon cyanotis	Blue Faced Honeyeater	Seen
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater	Seen
Acanthizidai	*Acanthiza Pusilla*	Brown Thornbill	Seen
Anhingdae	*Anhinga Melanogaster*	Common Darter	Seen
	Phasianus colchicus	Common Pheasant	Seen
Psittacidae	*Platycercus eximius*	Eastern Rosella	Seen
Pachycephalidae	*Falcunculus frontatus*	Eastern Shrike-tit	Seen
Meliphagidae	*Acanthorhynchus tenuirostris*	Eastern Spinebill	Seen
	Physignathus lesueurii	Eastern Waterdragon	Seen
	Psophodes olivaceus	Eastern Whip Bird	Heard
	Sphecotheres viridis	Fig Bird	Seen
Myobatrachidae	*Mixophyes iterates*	Giant Barred Frog	Heard
		Goat	Tracks/Scats
Dicruridae	*Rhipidura Albiscapa*	Grey Fantail	Seen
Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra	Heard
	Grallina cyanoleuca	Magpie-lark	Seen
Charadriidae	*Vanellus Miles*	Masked Lapwing	Heard
Meliphagidae	*Philemon corniculatus*	Noisy Friarbird	Seen
Meliphagidae	*Manorina melanocephala*	Noisy Miner	Seen
Artamidae	*Cracticus nigrogularis*	Pied Butcherbird	Seen
Artamidae	*Serepera graculina*	Pied Currawong	Seen
	Trichoglossus haematodus	Rainbow Lorikeet	Seen
	Neochmia temporalis	Red Browed Finch	Seen
Passeridae	*Neochmia temporalis*	Red-browed Firetail	Seen
Pachycephalidae	*Pachycephala rufiventris*	Rufous Whistler	Heard
Meliphagidae	*Myzomela sanguinolenta*	Scarlet Honeyeater	Seen
Maluridae	*Malurus cyaneus*	Superb Fairy-wren	Seen
Corvidae	*Corvus orru*	Torresian Crow	Seen
Hirundinidae	*Hirundo neoxena*	Welcome Swallow	Seen
Apodidae	*Hirundadus Cavdacutus*	White Throated Needletail	Seen
Meliphagidae	*Melithreptus albogularis*	White-throated Honeyeater	Seen
Dicruridae	*Rhipidura leucophrys*	Willy Wagtail	Seen
Columbidae	*Leucosarcia melanoleuca*	Wonga Pigeon	Seen
Pardalotidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill	Heard
	Calyptorhynchus funereus	Yellow-tailed Black Cockatoo	Heard
Muridae	*Mus musculus*	Mouse	Trapped
Phalangeridae	*Trichosurus vulpecular*	Common Brushtail Possum	Trapped
Peramelidae	*Perameles nasuta*	Long-nosed Bandicoot	Trapped /Tracks
	Rattus rattus	Black Rat	Trapped
	Rattus norvegicus	Brown Rat	Trapped
	Rattus fuscipes	Bush Rat	Trapped

Appendix 3: Night Survey Results

STAG WATCHES

None of the hollow-bearing trees watched were being used by any fauna species on the night of observation Table 7.

Table 7: Details of Trees Watched and Results of Stag Watching.

Tree(s)	Description of location	Observer	Fauna observed entering/exiting hollows
3 Blackbutt species	South of Property Adjacent to West Korora Road	Kimberly Stewart & Wayne Hadaway	-

SPOTLIGHTING/CALL PLAYBACK

The results of spotlighting/call playback surveys are presented in Table 8. The most notable record is that of a Giant Barred Frog, which was heard during call playbacks on the nights of the January, March and July 2007.

Table8: Fauna species recorded during spotlighting and call playback surveys on 8th June, 2006

Class	Species	Method of Detection	Comments
Amphibian	Giant Barred Frog	Heard	Individual responded near fish weir on Jordan's Creek

BIRD SURVEY

No threatened species were recorded during the bird surveys, species recorded during the bird survey are presented in Appendix 2.

Appendix 4 Assessment of Significance (7 Part Test) Giant Barred Frog

One species of threatened fauna was identified at the subject site; Giant Barred Frog.

MYOBATRACHIDAE
Mixophyes iteratus **Giant Barred Frog**
Conservation status in NSW: Endangered

Description

Giant Barred Frogs are large frogs, up to 115 mm in length. They are olive to dark brown above with paler or darker blotches, and cream to pale yellow below. The skin is finely granular. The pupil of the eye is vertical and the iris is pale golden in the upper half and brown in the lower half. The call is a deep 'ork' breaking into a series of 'orks' and grunts. The Giant Barred Frog can be most easily distinguished from other barred frog species by the black thighs with smaller yellow spots, distinct barring on the limbs, dark blotches on the sides, absence of a creamy stripe on the upper lip and the distinctive eye colour.

Distribution
Coast and ranges from south-eastern Queensland to the Hawkesbury River in NSW. North-eastern NSW, particularly the Coffs Harbour-Dorrigo area, is now a stronghold.

Habitat and ecology

- 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.
- Females lay eggs onto moist creek banks or rocks above water level, from where tadpoles drop into the water when hatched.
- Tadpoles grow to a length of 80 mm and take up to 14 months before changing into frogs. When not breeding the frogs disperse hundreds of metres away from streams. They feed primarily on large insects and spiders.

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.

The area of vegetation suitable for habitat for the Giant Barred Frog species occurring at the subject site will be retained; therefore no Giant Barred Frog species will be at risk of extinction by the 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.

This factor is essentially identical to factor (a) except that it refers only to endangered populations listed on Part 2 of Schedule 1 of the TSC Act and Part 2 of Schedule 4 of the FM Act, whereas factor (a) refers to species.

No Giant Barred Frogs populations were identified at the subject site; the area proposed for the development will not disturb any Giant Barred Frog habitat, therefore no Giant Barred Frog endangered populations will be at risk of extinction from the development.

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.

No

In relation to the regional distribution of habitat, no native vegetation suitable for the habitat of the Giant Barred Frog species will be removed or modified; it is unlikely that the proposal would have an adverse effect on any Giant Barred Frogs endangered or critically 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, 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.

The area of suitable habitat vegetation for the Giant Barred Frogs species occurring at the subject site will be retained; therefore development will not isolate any Giant Barred Frogs species from adjoining areas of native vegetation.

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

No critical habitat for any Giant Barred Frogs species was identified at the subject site; the area of suitable habitat for the Giant Barred Frogs species occurring at the subject site will be retained, therefore the action proposed will not have an adverse effect on any critical habitat for the Giant Barred Frogs species.

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

Actions proposed at the subject site are not inconsistent with any objectives or actions approved within recovery or threat abatement plans for the Giant Barred Frog species.

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.

The proposed development will not involve clearing vegetation, as listed as a threatening process under Schedule 3 of the Threatened Species Conservation Act (1995).

Conclusion

The Giant Barred Frog (*Mixophyes iteratus*) is listed as Endangered under Part 1 of Schedule 1 of the Threatened Species Conservation Act under the Scientific Committee established by the Threatened Species Conservation Act 1995.

The Giant Barred Frog is known to occur in Rainforests and to a lesser extent Wet Sclerophyll forests and cleared land. Adults are often found in Riparian areas where vegetation cover is present. The Giant Barred Frog is known to occur in the Dorrigo Plateau, the western ranges of Coffs Harbour and Washpool National Park.

A decline in the Giant Barred Frog populations occurred in the late 1970's and 1980's. The greatest decline was within the Blue Mountains and the southern limits of the Central Coast. The reason for the decline is not known; mortality of the species within Queensland in recent years suggests an impact of a pathogen. It is predicted by the Scientific Committee that the *Mixophyes iteratus Straughan* species may become extinct in NSW unless circumstances and factors of threatening its survival or evolutionary development cease to operate.

Areas of vegetation are to be retained and improved where possible and the proposed development is unlikely to have a significant effect on the Giant Barred Frog. No habitat resources or potential impacts to the Giant Barred Frog will be degraded or altered from to the proposed development; therefore a Species Impact Statement is not required.

APPENDIX 5: ONSITE WEATHER SUMMARY

DATE: 22/01/2007 TIME:18:00hrs TEMP: 29˚ HUMIDITY 32%

WIND: (Strong/Moderate/Mild/Calm) DIRECTION: S/E

CLOUD COVER %: 30 COMMENT:

DATE: 23/01/2007 TIME: 21:30hrs TEMP: 25˚ HUMIDITY 38%

WIND: (Strong/Moderate/Mild/Calm) DIRECTION: S/E

CLOUD COVER %: 10 COMMENT:

DATE: 3/03/2007 TIME:17:00hrs TEMP: 25˚ HUMIDITY 75%

WIND: (Strong/Moderate/Mild/Calm) DIRECTION: S/E

CLOUD COVER %: 90 COMMENT:

DATE: 4/03/2007 TIME: 21:30hrs TEMP: 22˚ HUMIDITY 100%

WIND: (Strong/Moderate/Mild/Calm) DIRECTION: S/E

CLOUD COVER %: 100 COMMENT: Heavy rain started later in the evening

---

DATE: 12/07/2007 TIME:17:00hrs TEMP: 24˚ HUMIDITY 52%

WIND: (Strong/Moderate/Mild/Calm) DIRECTION: N

CLOUD COVER %: 50 COMMENT:

DATE: 13/07/2007 TIME: 17:30hrs TEMP: 19˚ HUMIDITY 53%

WIND: (Strong/Moderate/Mild/Calm) DIRECTION: N/E

CLOUD COVER %: 60 COMMENT:

Appendix 6: TRAP SUMMARY

JOB NAME: Pacific Bay West DATE: 22-23/01/2007 SHEET No: 1

TRAP TYPE	#	LOCATION-G/R	HABITAT TYPE	SET TIME	CHECK TIME	CHECK TIME	CHECK TIME	CHECK TIME	RESULTS
Sm Elliot	701	See Map		18:00	23:00			06:00	1)
"	702	"							2)
"	703	"							3)
"	704	"			*Ratus ratus*				4)
"	705	"							1)
"	706	"							2)
"	707	"							3)
"	708	"							4)
"	709	"						Rattus norvegicus	1)
"	710	"							2)
"	711	"							3)
"	712	"							4)
"	713	"						*Mus musculus*	1)
"	714	"							2)
"	715	"							3)
"	716	"						*Rattus rattus*	4)
"	717	"							1)
"	718	"							2)
"	719	"							3)
"	720	"							4)
"	721	"							1)
"	722	"							2)
"	723	"							3)
"	724	"							4)
"	725	"							1)

JOB NAME: Pacific Bay West DATE: 22-23/01/2007 SHEET No:2

TRAP TYPE	#	LOCATION-G/R	HABITAT TYPE	SET TIME	CHECK TIME	CHECK TIME	CHECK TIME	CHECK TIME	RESULTS
Lg Elliot	61	See Map		18:30	22:00	05:00			1)
"	62	"							2)
"	63	"							3)
"	64	"							4)
"	65	"				*Perameles nasuta*			1)
"	66	"			*Trichosurus vulpecular*				2)
"	67	"							3)
"	68	"							4)
"	69	"							1)
"	70	"							2)
"	11	"							1)
"	12	"							2)
"	13	"							3)
"	14	"			*Rattus Rattus*				4)
"	15	"							1)
"	16	"							2)
"	17	"							1)
"	18	"							2)
"	19	"							3)
"	20	"							4)

TRAP SUMMARY

JOB NAME: Pacific Bay West DATE: 03-04/03/2007 SHEET No: 1

TRAP TYPE	#	LOCATION-G/R	HABITAT TYPE	SET TIME	CHECK TIME	CHECK TIME	CHECK TIME	CHECK TIME	RESULTS
Elliot	701	See Map		17:00			24:00	06:30	1)
"	702	"							2)
"	703	"							3)
"	704	"						Rattus fuscipes	4)
"	705	"							1)
"	706	"					*Rattus rattus*		2)
"	707	"							3)
"	708	"							4)
"	709	"							1)
"	710	"							2)
"	711	"							3)
"	712	"							4)
"	713	"							1)
"	714	"							2)
"	715	"						Rattus fuscipes	3)
"	716	"							4)
"	717	"							1)
"	718	"						*Mus musculus*	2)
"	719	"							3)
"	720	"							4)
"	721	"							1)
"	722	"							2)
"	723	"							3)
"	724	"							4)
"	725	"							1)

JOB NAME: Pacific Bay West DATE: 03-04/03/2007 SHEET No:2

TRAP TYPE	#	LOCATION-G/R	HABITAT TYPE	SET TIME	CHECK TIME	CHECK TIME	CHECK TIME	CHECK TIME	RESULTS
Lg Elliot	61	See Map		18:30	23:30	06:00			1)
"	62	"							2)
"	63	"							3)
"	64	"							4)
"	65	"				*Perameles nasuta*			1)
"	66	"							2)
"	67	"							3)
"	68	"							4)
"	69	"							1)
"	70	"							2)
"	11	"							1)
"	12	"							2)
"	13	"							3)
"	14	"			*Rattus Rattus*				4)
"	15	"							1)
"	16	"							2)
"	17	"							1)
"	18	"							2)
"	19	"							3)
"	20	"							4)
"	721	"							1)
"	722	"							2)
"	723	"							3)
"	724	"							4)
"	725	"							1)

TRAP SUMMARY

JOB NAME: Pacific Bay West DATE: 12-13/07/2007 SHEET No:1

TRAP TYPE	#	LOCATION-G/R	HABITAT TYPE	SET TIME	CHECK TIME	CHECK TIME	CHECK TIME	CHECK TIME	RESULTS
Lg Elliot	61	See Map		18:30		01:00	05:00		1)
"	62	"							2)
"	63	"							3)
"	64	"							4)
"	65	"					Rattus norvegicus		1)
"	66	"							2)
"	67	"							3)
"	68	"							4)
"	69	"				Rattus fuscipes			1)
"	70	"							2)
"	11	"							1)
"	12	"							2)
"	13	"							3)
"	14	"					*Rattus Rattus*		4)
"	15	"							1)
"	16	"							2)
"	17	"							1)
"	18	"							2)
"	19	"							3)
"	20	"							4)

TRAP SUMMARY

JOB NAME: Pacific Bay West DATE: 12-13/07/2007 SHEET No: 2

TRAP TYPE	#	LOCATION-G/R	HABITAT TYPE	SET TIME	CHECK TIME	CHECK TIME	CHECK TIME	CHECK TIME	RESULTS
Elliot	701	See Map		18:00		24:00		05:00	1)
"	702	"							2)
"	703	"							3)
"	704	"							4)
"	705	"						*Rattus Rattus*	1)
"	706	"							2)
"	707	"							3)
"	708	"							4)
"	709	"							1)
"	710	"				*Trichosurus vulpecular*			2)
"	711	"							3)
"	712	"							4)
"	713	"							1)
"	714	"							2)
"	715	"							3)
"	716	"						*Perameles nasuta*	4)
"	717	"							1)
"	718	"							2)
"	719	"							3)
"	720	"							4)
"	721	"							1)
"	722	"							2)
"	723	"							3)
"	724	"							4)
"	725	"							1)

TRAP SUMMARY

JOB NAME: Pacific Bay West DATE: 22-23/09/2007 SHEET No:1

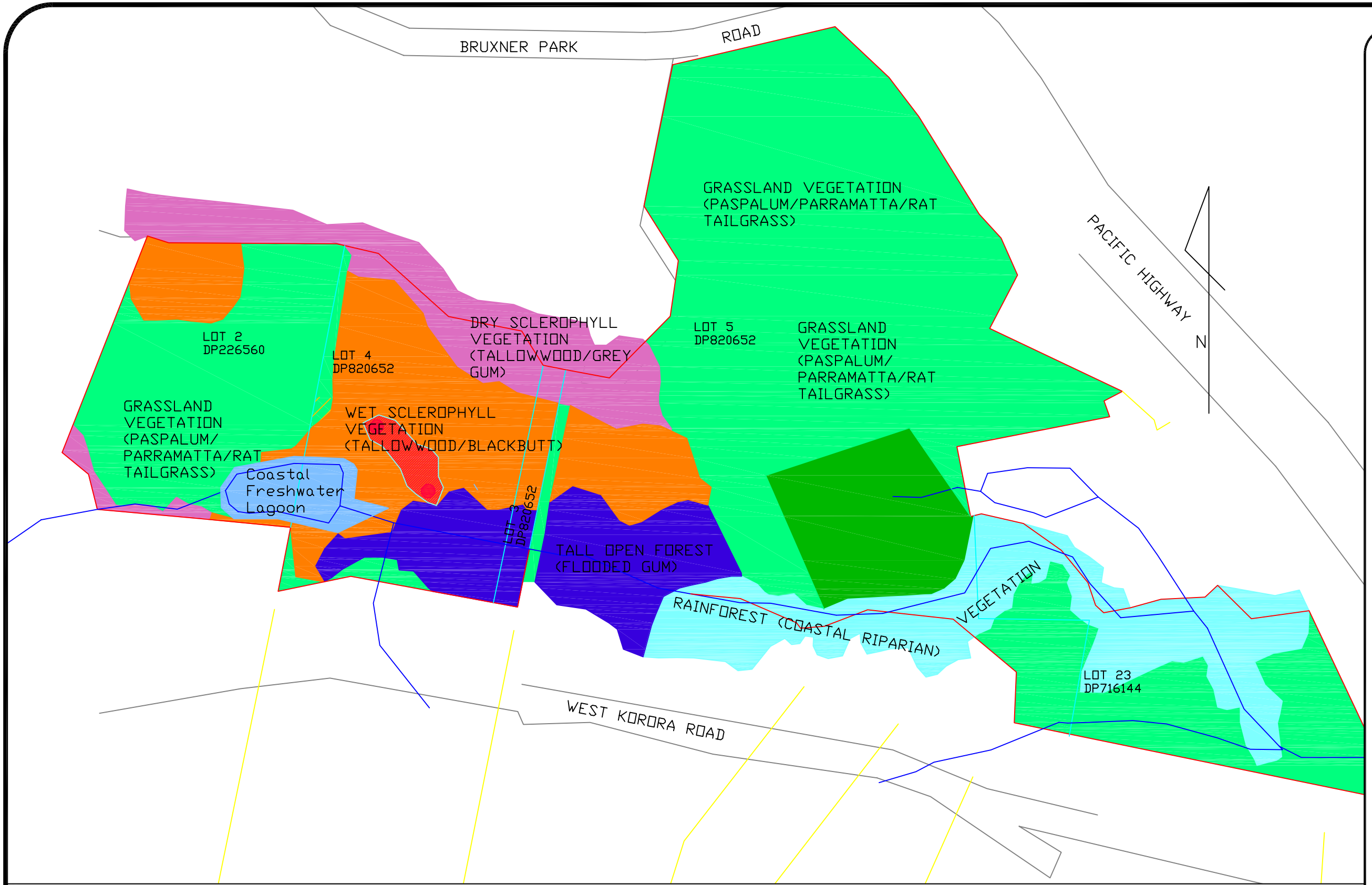
TRAP TYPE	#	LOCATION-G/R	HABITAT TYPE	SET TIME	CHECK TIME	CHECK TIME	CHECK TIME	CHECK TIME	RESULTS
Lg Elliot	61	See Map		18:30		23:00		05:00	1)
"	62	"							2)
"	63	"							3)
"	64	"							4)
"	65	"							1)
"	66	"							2)
"	67	"							3)
"	68	"							4)
"	69	"				Rattus fuscipes			1)
"	70	"							2)
"	11	"							1)
"	12	"							2)
"	13	"							3)
"	14	"							4)
"	15	"							1)
"	16	"							2)
"	17	"							1)
"	18	"							2)
"	19	"							3)
"	20	"							4)

TRAP SUMMARY

JOB NAME: Pacific Bay West DATE: 22-23/09/2007 SHEET No: 2

TRAP TYPE	#	LOCATION-G/R	HABITAT TYPE	SET TIME	CHECK TIME	CHECK TIME	CHECK TIME	CHECK TIME	RESULTS
Elliot	701	See Map		18:00		24:00		06:00	1)
"	702	"							2)
"	703	"							3)
"	704	"							4)
"	705	"							1)
"	706	"							2)
"	707	"							3)
"	708	"							4)
"	709	"							1)
"	710	"							2)
"	711	"							3)
"	712	"							4)
"	713	"							1)
"	714	"							2)
"	715	"							3)
"	716	"							4)
"	717	"							1)
"	718	"							2)
"	719	"							3)
"	720	"							4)

Rattus
Rattus



LEGEND

- SUBJECT PROPERTY BOUNDARY
- EXISTING PROPERTY BOUNDARIES
- ADJOINING PROPERTY BOUNDARIES
- JORDANS CK
- EXISITNG ACCESS ROADS
- WET SCLEROPHYLL VEGETATION (TALLOWWOOD/BLACKBUTT)
- DRY SCLEROPHYLL VEGETATION (TALLOWWOOD/GREY GUM)
- RAINFOREST (COASTAL RIPARIAN) VEGETATION (TALLOWWOOD/FLOODED GUM/BRUSHBOX/ TUCKEROO/CK SANDPAPER FIG/ DOUGHWOOD)
- OPEN SPACE RECREATION AREA (PLAYING FIELDS)
- GRASSLAND VEGETATION (PASPALUM/PARRAMATTA/RAT TAILGRASS)
- Coastal Freshwater Lagoon
- TALL OPEN FOREST VEGETATION (FLOODED GUM)

General Notes

This drawing was prepared by Bushfiresafe (Aust) P/L to demonstrate the identified vegetation communities present within the development property and should not be used for any other purpose.

APPENDIX 7

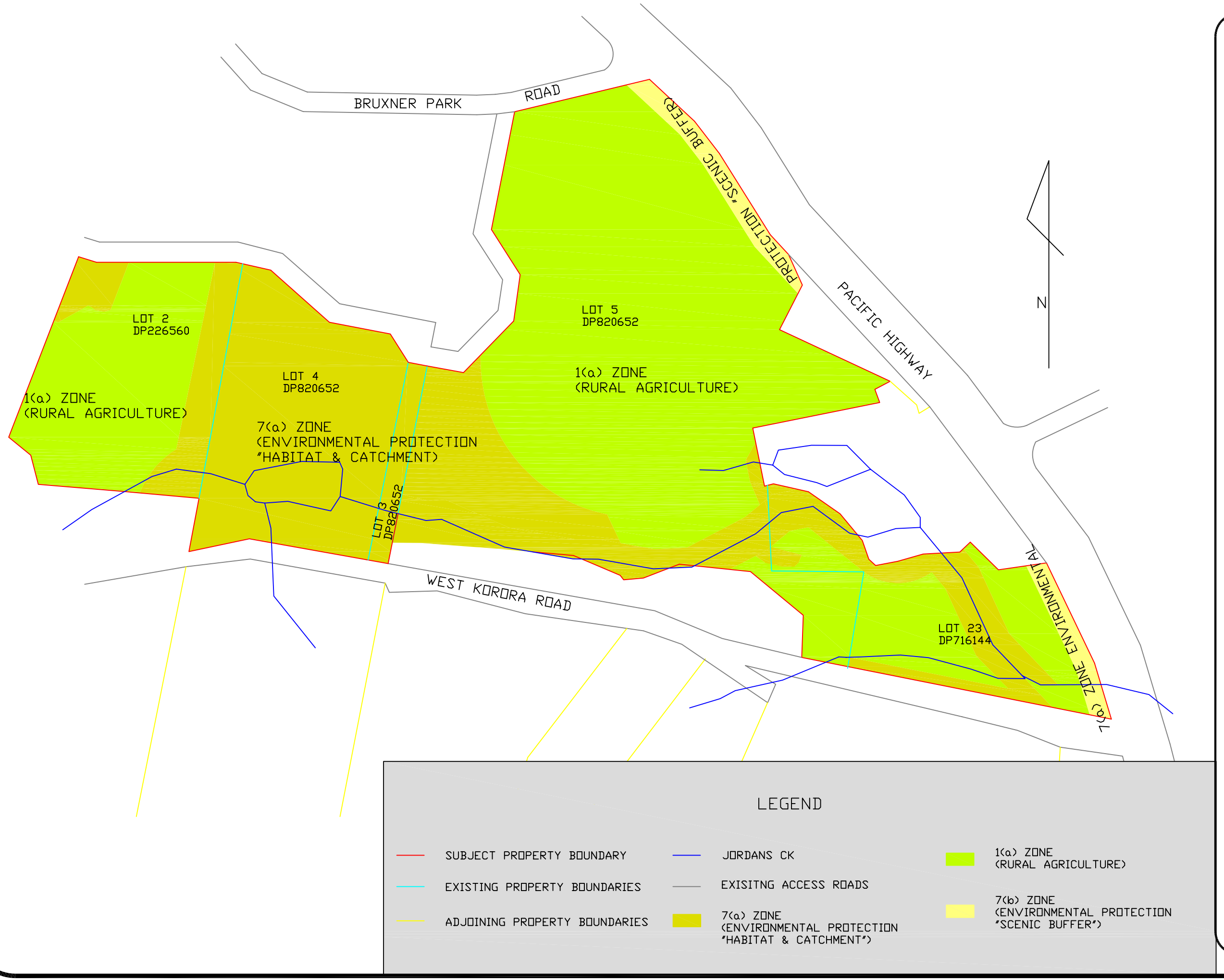
VEGETATION COMMUNITIES

Bushfiresafe
(Aust) P/L
20 McLachlan St
Maclean NSw 2463
02) 66451088

CLIENT:
Thakral Holdings P/L
George Street
Sydney

Project
Flora & Fauna survey for proposed residential subdivision of Pacific Bay West, Coffs Harbour

Date: July 2007
Scale:
Ref# 7016



General Notes

This drawing was prepared by Bushfiresafe (Aust) P/L to demonstrate the identified LEP Zones present within the development property and should not be used for any other purpose.

APPENDIX 8

LEP ZONES

Bushfiresafe
(Aust) P/L
20 McLachlan St
Maclean NSw 2463
02) 66451088

CLIENT:
Thakral Holdings P/L
George Street
Sydney

Project
Flora & Fauna survey for proposed residential subdivision of Pacific Bay West, Coffs Harbour

Date:

Scale:

Ref# 7016

BRUXNER PARK ROAD

PACIFIC HIGHWAY

LOT 2
DP226560

INSIGNIFICANT KOALA HABITAT

LOT 4
DP820652

PRIMARY KOALA HABITAT

LOT 5
DP820652

INSIGNIFICANT KOALA HABITAT

LOT 3
DP820652

SECONDARY KOALA HABITAT

WEST KORORA ROAD

LOT 23
DP716144

INSIGNIFICANT KOALA HABITAT

N

LEGEND

- SUBJECT PROPERTY BOUNDARY
- EXISTING PROPERTY BOUNDARIES
- ADJOINING PROPERTY BOUNDARIES
- JORDANS CK
- EXISITNG ACCESS ROADS
- SECONDARY KOALA HABITAT
- INSIGNIFICANT KOALA HABITAT
- PRIMARY KOALA HABITAT

General Notes

This drawing was prepared by Bushfiresafe (Aust) P/L to demonstrate the identified Primary & Secondary Koala Habitat present within the development property and should not be used for any other purpose.

APPENDIX 9

KOALA HABITAT

Bushfiresafe
(Aust) P/L
20 McLachlan St
Maclean NSw 2463
02) 66451088

CLIENT:
Thakral Holdings P/L
George Street
Sydney

Project
Flora & Fauna survey for proposed residential subdivision of Pacific Bay West, Coffs Harbour

Date:

Scale:

Ref# 7016

BRUXNER PARK ROAD

LOT 2
DP226560

LOT 4
DP820652

LOT 5
DP820652

LOT 3
DP820652

PACIFIC HIGHWAY

WEST KORORA ROAD

LOT 23
DP716144

N

70 60 50 40 30 20 10

LEGEND

- SUBJECT PROPERTY BOUNDARY
- EXISTING PROPERTY BOUNDARIES
- ADJOINING PROPERTY BOUNDARIES
- JORDANS CK
- EXISITNG ACCESS ROADS
- 10m CONTOUR LINES

General Notes

This drawing was prepared by Bushfiresafe (Aust) P/L to demonstrate the identified contours present within the development property and should not be used for any other purpose.

APPENDIX 10

10m CONTOURS

Bushfiresafe
(Aust) P/L
20 McLachlan St
Maclean NSw 2463
02) 66451088

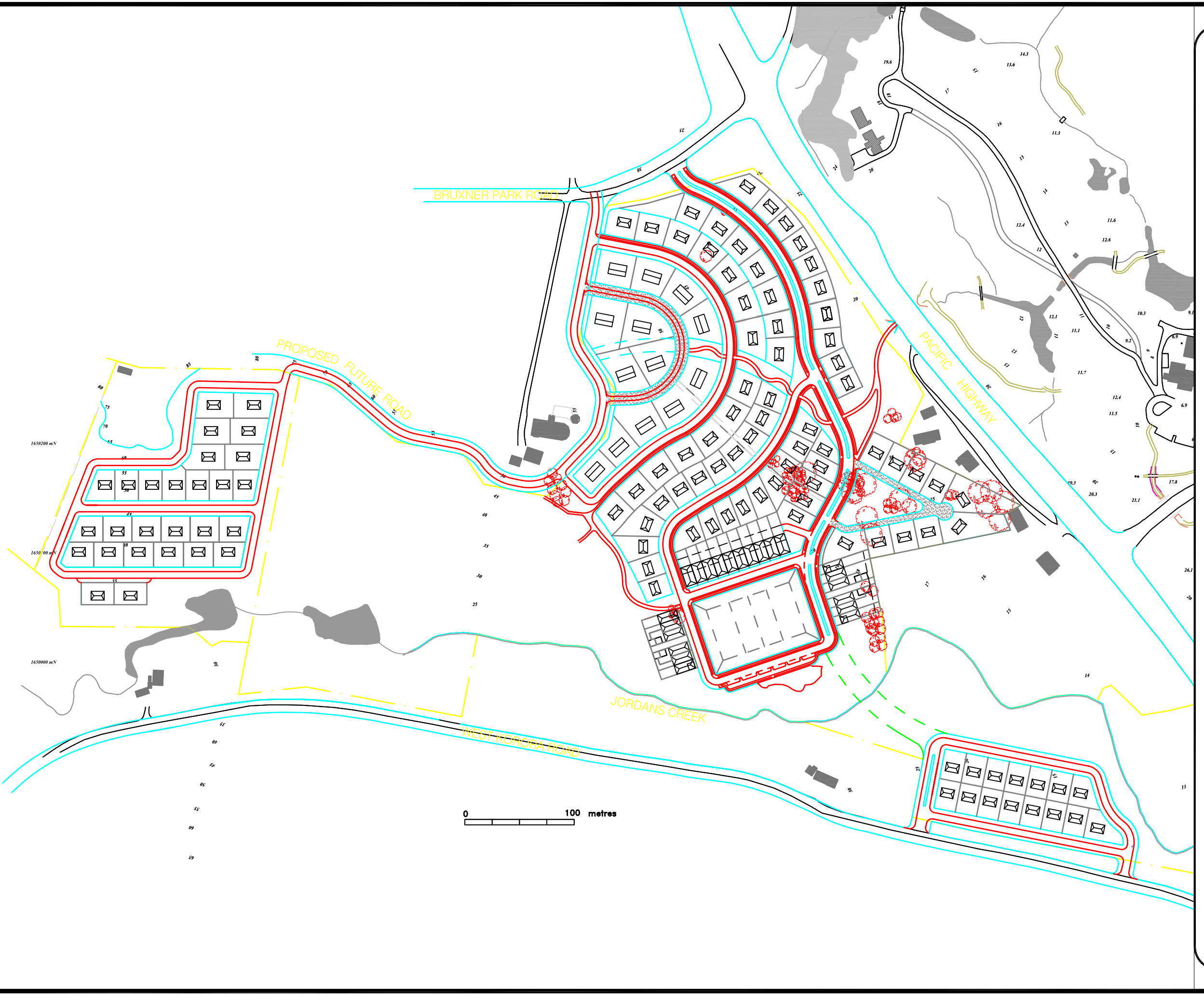
CLIENT:
Thakral Holdings P/L
George Street
Sydney

Project
Flora & Fauna survey for proposed residential subdivision Pacific Bay West, Coffs Harbour

Date:

Scale:

Ref# 7016



General Notes

This drawing was prepared by Bushfiresafe (Aust) P/L to demonstrate the identified contours present within the development property and should not be used for any other purpose.

APPENDIX 11

SITE LAYOUT

Bushfiresafe
(Aust) P/L
20 McLachlan St
Maclean NSw 2463
02) 66451088

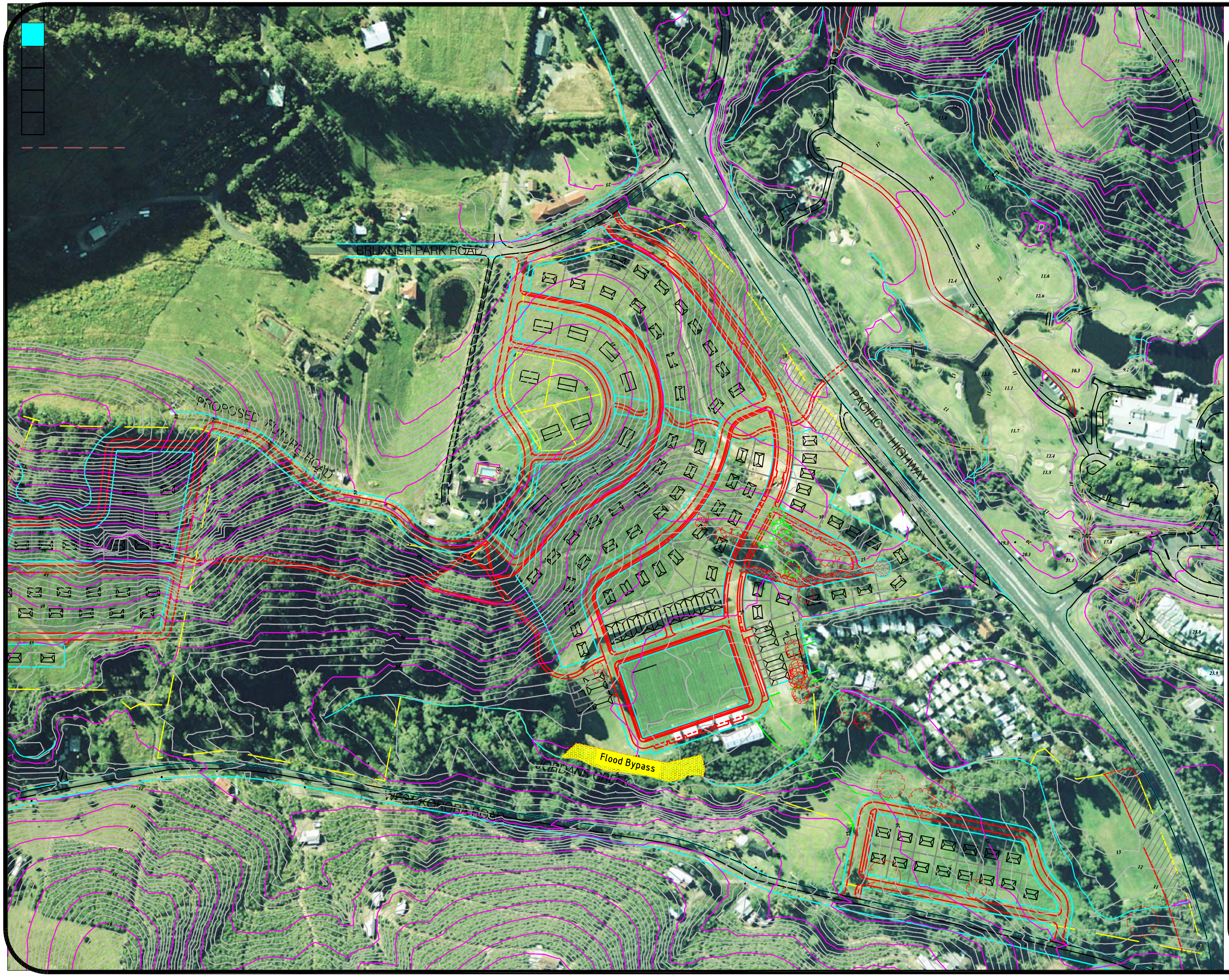
CLIENT:
Thakral Holdings P/L
George Street
Sydney

Project
Flora & Fauna survey for proposed residential subdivision Pacific Bay West, Coffs Harbour

Date: July 2008

Scale:

Ref# 7016



General Notes

This drawing was prepared by Bushfiresafe (Aust) P/L to demonstrate the identified vegetation communities present within the development property and should not be used for any other purpose.

ATTACHMENT 12

SITE LAYOUT

and

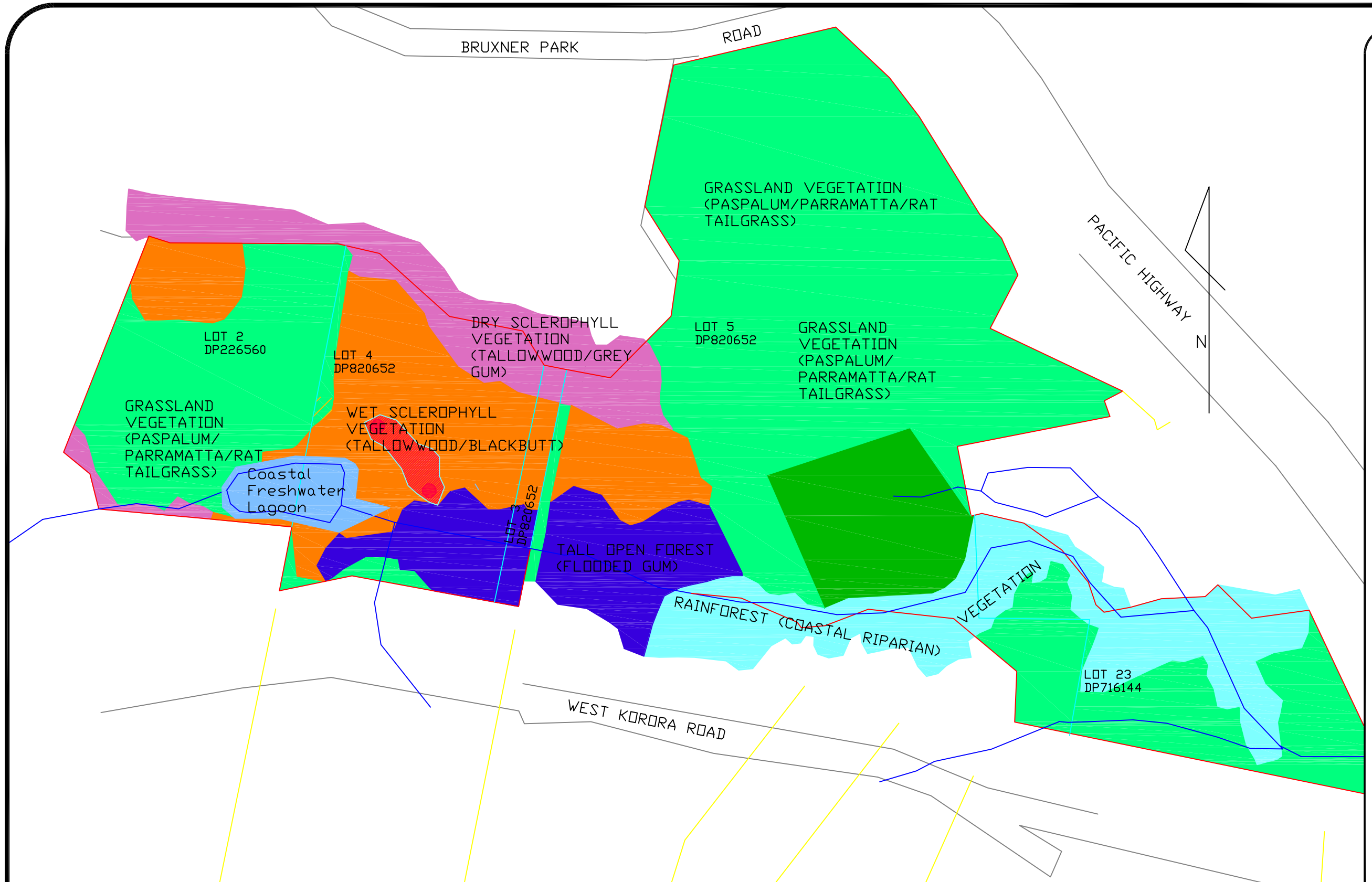
FLOOD BYPASS EXCAVATION AREA

Bushfiresafe
(Aust) P/L
20 McLachlan St
Maclean NSw 2463
02) 66451088

CLIENT:
Thakral Holdings P/L
George Street
Sydney

Project
Flora and Fauna Assessment
Pacific Bay West Residential Development

Date: Feb 2009
Scale:
Ref# 7016



LEGEND

- SUBJECT PROPERTY BOUNDARY
- EXISTING PROPERTY BOUNDARIES
- ADJOINING PROPERTY BOUNDARIES
- JORDANS CK
- EXISITNG ACCESS ROADS
- WET SCLEROPHYLL VEGETATION (TALLOWWOOD/BLACKBUTT)
- DRY SCLEROPHYLL VEGETATION (TALLOWWOOD/GREY GUM)
- RAINFOREST (COASTAL RIPARIAN) VEGETATION (TALLOWWOOD/FLOODED GUM/BRUSHBOX/ TUCKEROO/CK SANDPAPER FIG/ DOUGHWOOD)
- OPEN SPACE RECREATION AREA (PLAYING FIELDS)
- GRASSLAND VEGETATION (PASPALUM/PARRAMATTA/RAT TAILGRASS)
- Coastal Freshwater Lagoon
- TALL OPEN FOREST VEGETATION (FLOODED GUM)

General Notes

This drawing was prepared by Bushfiresafe (Aust) P/L to demonstrate the identified vegetation communities present within the development property and should not be used for any other purpose.

APPENDIX 7

VEGETATION COMMUNITIES

Bushfiresafe (Aust) P/L
20 McLachlan St
Maclean NSw 2463
02) 66451088

CLIENT:
Thakral Holdings P/L
George Street
Sydney

Project
Flora & Fauna survey for proposed residential subdivision of Pacific Bay West, Coffs Harbour

Date: July 2007
Scale:
Ref# 7016

EASTERN PRECINCT

SOUTHERN PRECINCT

PACIFIC HIGHWAY

Existing Pacific Bay Resort

Existing Caravan Park

WEST KORORA ROAD

N

0 100m

LEGEND

- Subject Property Boundaries
- Allotment Boundary
- Access Roads
- Jordan's Creek
- Building Envelope
- Flood By-pass channel

General Notes

This drawing was prepared by Bushfiresafe (Aust) P/L to demonstrate the identified vegetation communities present within and adjacent to the development property and should not be used for any other purpose.

Vegetation line has not been surveyed and has been assumed for demonstration purposes

ATTACHMENT 11

SITE LAYOUT

Bushfiresafe (Aust)
20 Maclachlan St
Maclean NSW 2463
(02) 6645 1099

CLIENT:
Thakral Holdings P/L
George Street
Sydney 2000

Project
Flora and Fauna Assessment
Pacific Bay West residential subdivision
West Korora Road, Coffs Harbour

Date: MARCH 2010
Ref# 7016
Scale: