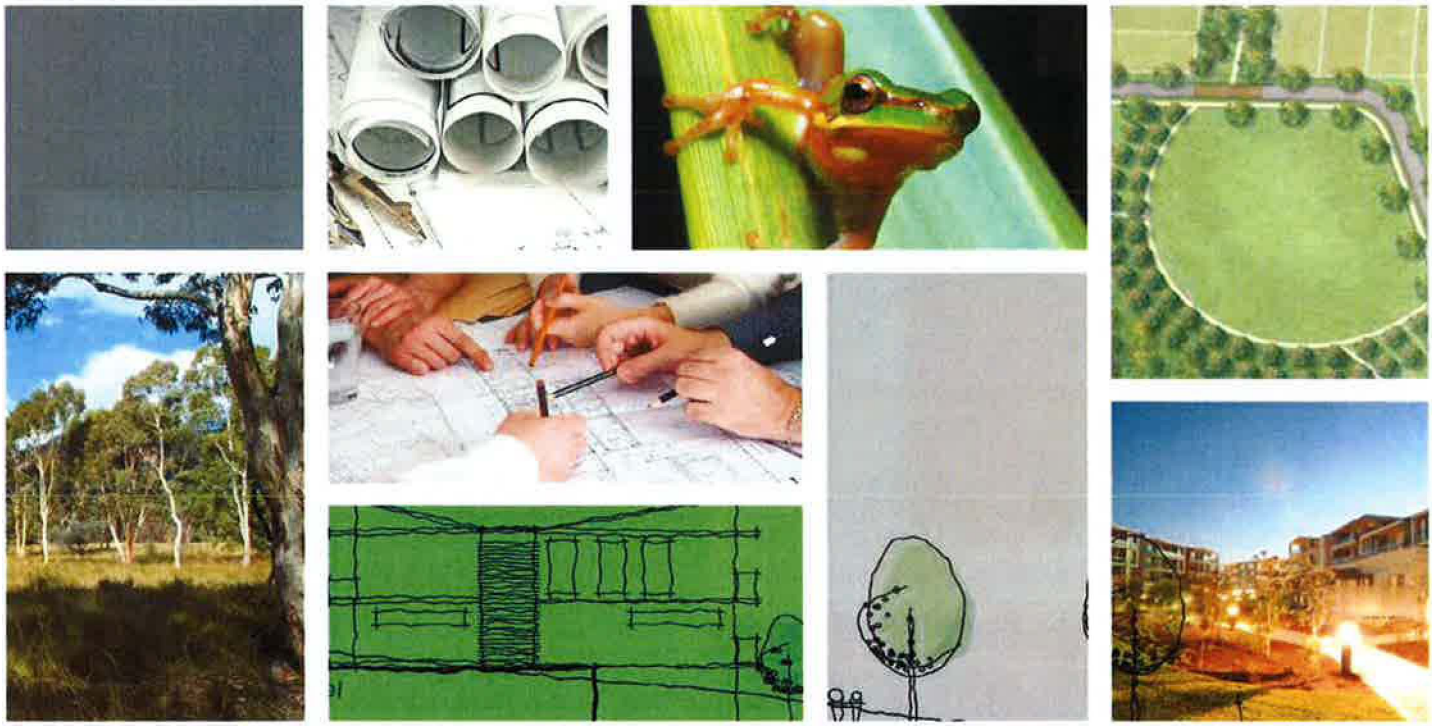
PLANIT CONSULTING

Terrestrial Flora and Fauna Assessment

Iron Gates Development, Evans Head

Prepared for Gold Coral Pty Ltd



Prepared by Planit Consulting Pty Ltd

August 2014

(As Amended July 2019 by JWA Pty Ltd)

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1.0 INTRODUCTION

Planit Consulting (Planit) was commissioned by Goldcoral Pty Ltd to prepare terrestrial flora and fauna assessment report relating to the proposed residential development located at Iron Gates, Evans Head as generally depicted in **Figure 1** (and **Attachment 1**).

The Flora and Fauna Assessment documents flora, fauna and habitat studies undertaken over the site, an analysis of ecologically significant areas (and subsequent constraints to development if present) and provides design and management recommendations to be implemented in association with the proposal.

JWA Pty Ltd (JWA) were subsequently engaged to amend the Planit report to accompany a revised Development Application (lodged 17th January 2019) and have now completed further amendments in response to requests for further information from Richmond Valley Council, Mr Malcolm Scott (Council's consulting Planner), and the NSW Department of Primary Industries (Fisheries). Tables detailing the further information requested, responses and the relevant Sections of the report that contain the requested additional information are provided in **Attachment 2.** A summary of the amendments made to the Planit (2014) report is contained in **Attachment 3.**

The revised proposal is for a residential subdivision as depicted in **Figure 2** (and **Attachment 1**) within areas zoned for residential development and includes:

- one hundred and seventy-five (175) residential lots;
- three (3) residue lots;
- four (4) public reserves;
- one (1) drainage reserve;
- one (1) sewer pump station lot (total lots 184);
- upgrading of Iron Gates Drive;
- demolition of existing structures onsite; and
- subdivision work including road works, drainage, water supply, sewerage, landscaping and embellishment work and street tree planting.

A separate Ecological Assessment report (JWA 2019) has been prepared for the proposed upgrades to Iron Gates Drive (external to the site - required to obtain a Bush Fire Safety Authority) and should be read in conjunction with this report.

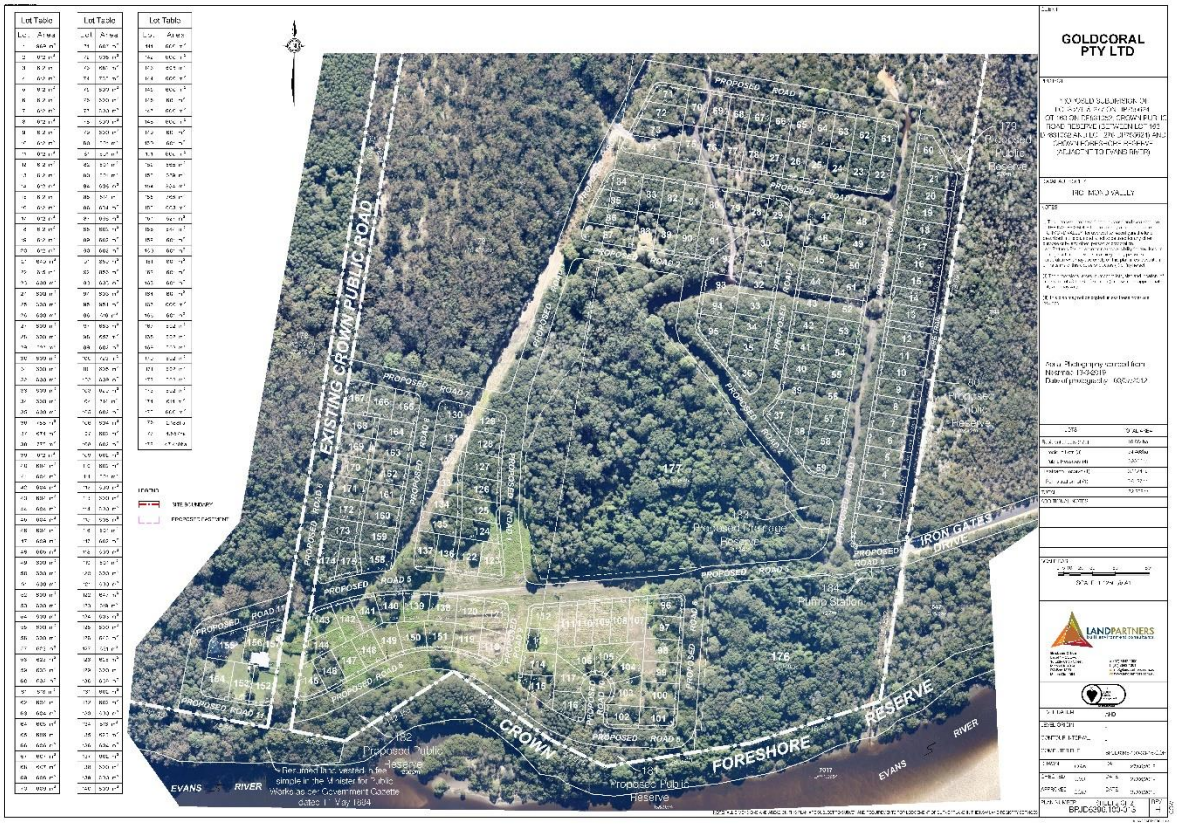

FIGURE 1 – SITE LOCATION (See Attachment 1)

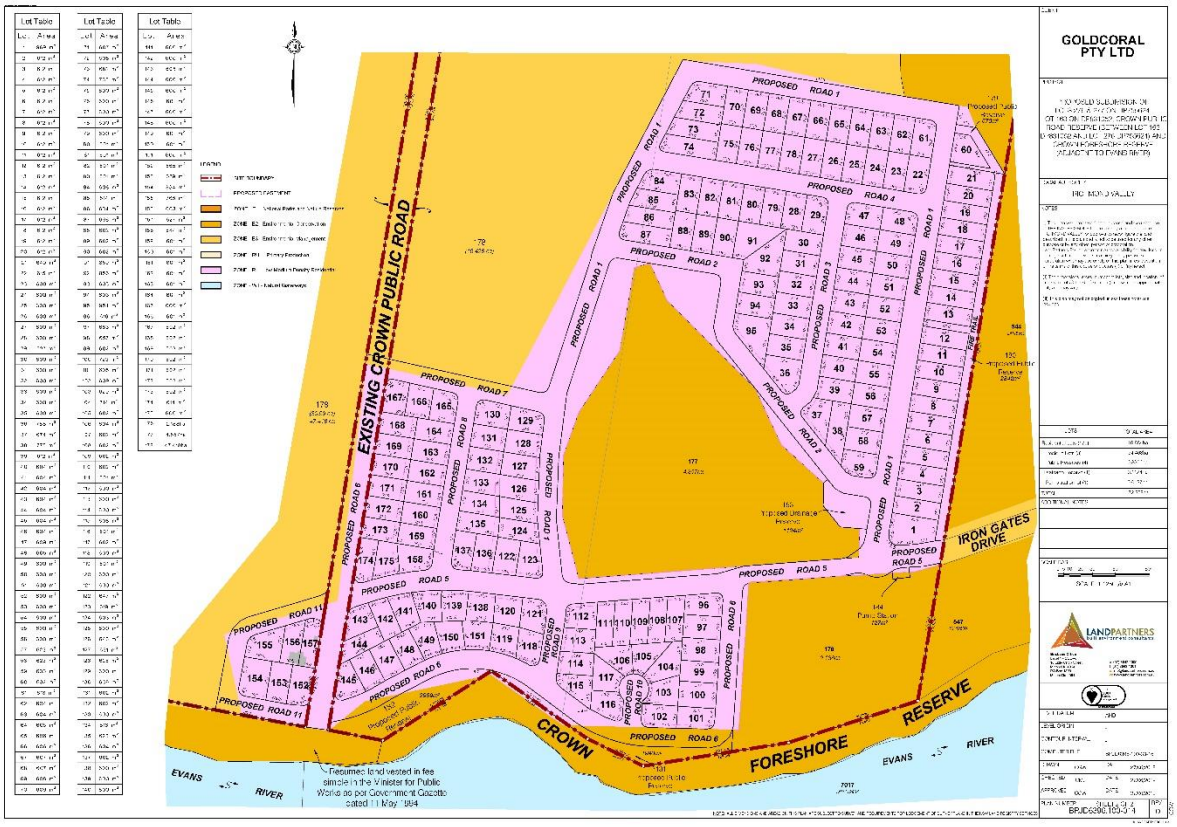

FIGURE 2 – SITE PLAN (See Attachment 1)

2.0 SITE DESCRIPTION & LOCATION

The development is situated within lots Lot 163 DP 831052, Lots 276 and 277 DP 755624, Crown Road Reserve between Lots 163 DP 831052 and Lot 276 DP 755724, and a Crown Foreshore Reserve, and is accessed from Iron Gates Road within the suburb of Evans Head. These allotments shall be hereafter referred to as '*the site*'.

The site is located within the 'General Residential' precinct of the Richmond Valley Local Environmental Plan 2012 and is surrounding by Environmental Conservation or Management zoning as illustrated in **Figure 3**. The development footprint areas are largely clear from vegetation as a result of historic land uses and site/bushfire maintenance. A portion of the development footprint is within an area of regrowth acacia.

The Iron Gates development site is situated on the north coast of New South Wales approximately 1 km west of the township of Evans Heads.

The Evans River forms the southern portion of the development site. To the south of the site is Bundjalung National Park where Nature Conservation is currently its primary land use. To the north, there is Crown Land supporting local native forest (Anne Clements & Associates, 1996).

In the Crown Land, there has been some quarry extraction in previous years (Tony McAteer, Richmond River Council, pers comm., 17 July 96). The site features two man-made drainage lines which occur along the eastern portions of the site. These drainage lines have a consent order to be filled in.

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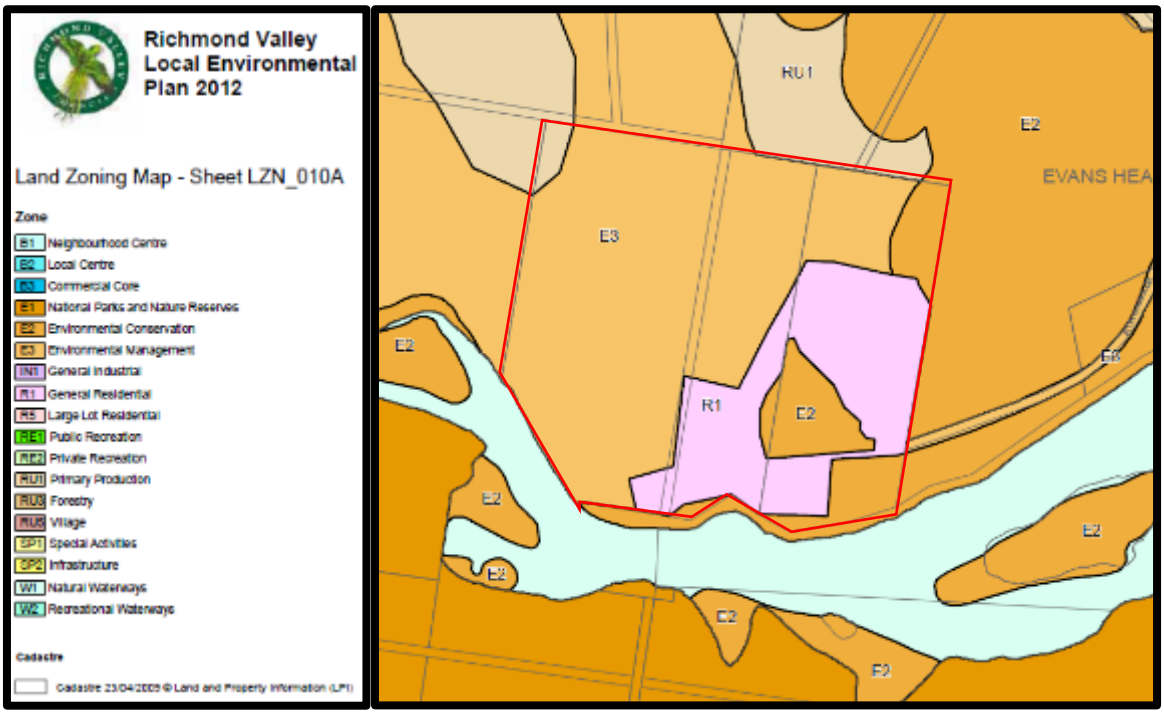


FIGURE 3 – LAND USE ZONING (SOURCE: RICHMOND VALLEY LEP 2012)

Geology & Topography

Triassic sediments rocks of the Clarence-Morton Basin from the central ridge of the Iron Gates property (Crown Lands Office 1986). Soils of the ridge have a higher clay content than those of surrounding Quaternary sandy soils.

Roy (1982) mapped the Quaternary geology of the area. The central area of the site is mapped as rock and the surrounding soils as Quaternary Deposits. Early Quaternary (Pleistocene age) barrier and beach ridge sand deposits occur in surrounding land with more recent Quaternary deposits (Holocene) back barrier washover tidal delta sands occurring along the Evans River. The Quaternary alluvial deposits along the river form floodplains and terraces. Soils range from clays to uniform silts and sands (Mckenzie 1983).

3.0 VEGETATION ASSESSMENT

3.1 METHODOLOGY

To identify and classify vegetation species and communities which occur on site, the following methodology was applied of the 20th – 25th May 2014:

- Desktop analysis including:
  - i. Review of Council's Planning Scheme Mapping & Associated Reporting (i.e. Richmond Valley Local Environmental Plan 2012 Mapping)
  - *ii.* Review of existing vegetation community documentation to confirm dominant elements, forest descriptions and conservation status of mapped forested remnants/ecosystems including:
    - Forestry Commission NSW (1989) *Research Note 17: Forest Types in NSW*.
    - National Parks and Wildlife Service (1999) *Forest ecosystem classification and mapping for the upper and lower north east cra regions*. CRA Unit-Northern Zone.
    - DECC (2008) *BioMetric: Terrestrial Biodiversity Tool for the NSW Property Vegetation Planning System: Definitions of Vegetation Types for CMA Areas* (online @ http://www.environment.nsw.gov.au/projects/Biometric Tool.htm)
    - Keith, D. (2004) *Ocean Shores to Desert Dunes*. The native vegetation of NSW. DECC, Hurstville.
    - Sheringham, P.R., Dr. Benwell, A., Gilmour, P., Graham, M.S., Westaway, J., Weber, L., Bailey, D., & Price, R. (2008). *Targeted Vegetation Survey of Floodplains and Lower Slopes on the Far North Coast*. A report prepared by the Department of Environment and Climate Change for the Comprehensive Coastal Assessment. Department of Environment and Climate Change (NSW), Coffs Harbour, NSW.
  - iii. Review of search of the Atlas of NSW Wildlife database within a search area 10 km surrounding the site to review threatened plant records
  - iv. Review of Environment Australia Protected Matters data within a search area 10 km surrounding the site to review threatened plant records
  - v. Review of SEPP Mapping (Coastal Wetlands, Littoral Rainforest) mapping to determine the indicative presence/absence of regional forest ecosystems reflective of wetland (marine, estuarine, riverine, lacustrine and/or palustrine) communities and/or Littoral Rainforests.
  - vi. Review of the following legislation to ensure the latest lists of threatened species and communities were noted as well as investigating the existence of any relevant recovery plans, threat abatement plans, key threatening processes or any preliminary determinations which may be applicable to the site and/or the proposed use/action:
    - *Threatened Species Conservation Act (1995)*

- *Environment Protection and Biodiversity Conservation Act (1999)*

- Site survey including:

    i. Random Meander/Diversity Searches: Random searches within each vegetation community were undertaken recording all species observed was undertaken in accordance with Cropper (1993) and DEC (2004). Knowledge of known habitat of protected and uncommon floral species was utilized to target such species. Observation also included recording crown cover, tree heights and DBH estimation, dominant species present and identification of ecologically dominant layer.

The above survey techniques were applied to determine the following:

- Validate or modify existing vegetation mapping;
- Meet minimum Council and State Government vegetation/survey requirements;
- Identify floral species existing within the site;
- Measure and/or estimate Crown Cover (Walker and Hopkins, 1998, Nelder, 2004. EPA, 2005) to determine vegetation structure designations;
- Identify average height of canopy trees;
- Identify the incidence of senescent trees;
- Determine species dominance within ecologically dominant layer;
- Determine incidence of weed invasion and disturbance over the site and within vegetation strata;
- Determine incidence of species listed as endangered, vulnerable or rare under the *Threatened Species Conservation Act;*
- Determine incidence of species listed as endangered or vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999*

In undertaking the site survey works focus was given to the development footprint and immediate surrounding areas (50 m) with a more general inspection of areas beyond these limits.

Structural Analysis

Canopy tree height (T1 layer) was determined occularly from the mean of three experienced observers. Height classes were then selected from classifications provided in Walker & Hopkins (in McDonald et al, 1998) (**Table 1**).

Crown cover % (**Table 2**) for the T1 layer was estimated using the mean of two experienced observers or measured via crown intercept method (Nelder et al, 2004, EPA, 2005).

Structural formation classes were determined via an assessment of growth form and crown cover % information as per Walker & Hopkins (1998) (**Table 3**).

Table 1: Height Classes & Names For Various Growth Forms (Sensu Walker & Hopkins, 1998: Table 15)

Height		Growth Form			
Height Class	**Height Range (m)**	**Trees, vines, palms**	**shrub, heath shrub, chenopod shrub, mallee (tree or shrub form), cycads**	**tussock grass, hummock grass, forbs, rushes, sedges, ferns, Xanthorrhoea**	**Sod grasses, mosses, lichens, liverworts**
9	>35.01	Extremely tall	N/A	N/A	N/A
8	20.01-35	Very Tall	N/A	N/A	N/A
7	12.01-20	Tall	N/A	N/A	N/A
6	6.01-12	Mid-high	Extremely tall	N/A	N/A
5	3.01-6	Low	Very tall	Extremely tall	N/A
4	1.01-3	Dwarf	Tall	Very tall	N/A
3	0.51-1	N/A	Mid-high	Tall	Extremely tall
2	0.26-0.5	N/A	Low	Mid-high	Tall
1	<0.25	N/A	Dwarf	Low	Low

Table 2: Structural Formation Classes Defined By Growth Form And Crown Separation (Walker & Hopkins, 1998: Tables 14a & 17)

CROWN SEPARATION	***D CLOSED OR DENSE***	***M MID-DENSE***	***S SPARSE***	***B VERY SPARSE***	***I ISOLATED PLANTS***	***L ISOLATED CLUMPS***
FIELD CRITERIA	***TOUCHING - OVERLAP***	***TOUCHING - SLIGHT SEPARATION***	***CLEARLY SEPARATED***	***WELL SEPARATED***	***ISOLATED***	***ISOLATED***
CROWN SEPARATION RATIO	<0	0-0.25	0.25-1	1-20	>20	>20
CROWN COVER %	81-100%	52-81%	20-52%	0.2-20%	<0.2%	<0.2%
GROWTH FORM	**STRUCTURAL FORMATION CLASSES**					
T TREE	CLOSED FOREST	OPEN FOREST	WOODLAND	OPEN WOODLAND	ISOLATED TREES	ISOLATED CLUMP OF TREES
M TREE MALLEE	CLOSED MALLEE FOREST	OPEN MALLEE FOREST	MALLEE WOODLAND	OPEN MALLEE WOODLAND	ISOLATED MALLEE TREES	ISOLATED CLUMP OF MALLEE TREES
S SHRUB	CLOSED SHRUBLAND	SHRUBLAND	OPEN SHRUBLAND	SPARSE SHRUBLAND	ISOLATED SHRUBS	ISOLATED CLUMP OF MALLEE SHRUBS
Y MALLEE SHRUB	CLOSED MALLEE SHRUBLAND	MALLEE SHRUBLAND	OPEN MALLEE SHRUBLAND	SPARSE MALLEE SHRUBLAND	ISOLATED MALLEE SHRUBS	ISOLATED CLUMP OF MALLEE SHRUBS
Z HEATH SHRUB	CLOSED HEATHLAND	HEATHLAND	OPEN HEATH	SPARSE HEATH	ISOLATED HEATH SHRUBS	ISOLATED CLUMP OF HEATH SHRUBS
C CHENOPOD SHRUB	CLOSED CHENOPOD SHRUBLAND	CHENOPOD SHRUBLAND	OPEN CHENOPOD SHRUBLAND	SPARSE CHENOPOD SHRUBLAND	ISOLATED CHENOPOD SHRUBS	ISOLATED CLUMP OF CHENOPOD SHRUBS

Table 3: Structural Formation Classes For Ground Covers

Structural formation classes for ground covers (Walker & Hopkins, 1998: Table 14b))						
CROWN CLASS	***D CLOSED OR DENSE***	***M MID-DENSE***	***S SPARSE***	***B VERY SPARSE***	***I ISOLATED PLANTS***	***L ISOLATED CLUMPS***
FOLIAGE COVER	>70	30-70	10-30	<10	<1	<1
GROWTH FORM	**STRUCTURAL FORMATION CLASSES**					
G TUSSOCK GRASS	CLOSED GRASSLAND	GRASSLAND	OPEN GRASSLAND	SPARSE GRASSLAND	ISOLATED GRASSES	ISOLATED CLUMP OF TUSSOCK GRASSES
H HUMMOCK GRASS	CLOSED HUMMOCK GRASSLAND	HUMMOCK GRASSLAND	OPEN HUMMOCK GRASSLAND	SPARSE HUMMOCK GRASSLAND	ISOLATED HUMMOCK GRASSES	ISOLATED CLUMP OF HUMMOCK GRASSES
D SOD GRASS	CLOSED SOD GRASSLAND	SOD GRASSLAND	OPEN SOD GRASSLAND	SPARSE SOD GRASSLAND	ISOLATED SOD GRASSES	ISOLATED CLUMP OF SOD GRASSES
V SEDGE	CLOSED SEDGELAND	SEDGELAND	OPEN SEDGELAND	SPARSE SEDGELAND	ISOLATED SEDGES	ISOLATED CLUMP OF SEDGES
R RUSH	CLOSED RUSHLAND	RUSHLAND	OPEN RUSHLAND	SPARSE RUSHLAND	ISOLATED RUSHES	ISOLATED CLUMP OF RUSHES
F FORB	CLOSED FORBLAND	FORBLAND	OPEN FORBLAND	SPARSE FORBLAND	ISOLATED FORBS	ISOLATED CLUMP OF FORBS
E FERN	CLOSED FERNLAND	FERNLAND	OPEN FERNLAND	SPARSE FERNLAND	ISOLATED FERNS	ISOLATED CLUMP OF FERNS
O MOSS	CLOSED MOSSLAND	MOSSLAND	OPEN MOSSLAND	SPARSE MOSSLAND	ISOLATED MOSSES	ISOLATED CLUMP OF MOSSES
L VINE	CLOSED VINELAND	VINELAND	OPEN VINELAND	SPARSE VINELAND	ISOLATED VINES	ISOLATED CLUMP OF VINES

It is noted that Qld EPA (2005) and Nelder et al (2004) have provided Structural formation Class Tables which vary slightly from Tables 1 and 2 above. This table is displayed below:

Structural formation classes for woody plant communities qualified by height: (classes defined by growth form, height and cover) [sensu EPA, 2005]				
Foliage projective cover	70-100%	30-70%	10-30%	<10%
Crown separation	closed or dense	mid-dense	sparse	very sparse
Field criteria	touching-overlap	touching - slight separation	clearly separated	well separated
Crown separation ratio	<0	0-0.25	0.25-1	1-20
Crown cover %	81-100%	52-81%	20-52%	0.2-20%
Growth form	Structural Formation Classes (qualified by height)			
Trees > 30m	tall closed-forest	tall open-forest	tall woodland	tall open-woodland
Trees 10 – 30m	closed-forest	open-forest	woodland	open-woodland
Trees < 10m	low closed-forest	low open-forest	low woodland	low open-woodland
Shrubs 2 – 8m	closed-scrub	open-scrub	Tall shrubland	Tall open-shrubland
Shrubs 1 – 2m	closed-heath	open-heath	shrubland	open-shrubland
shrubs <1m	-	-	dwarf shrubland	dwarf open-shrubland

The above methodology is considered to be reasonably consistent with the intent of the following documents:

- NSW Department of Infrastructure, Planning and Natural Resources (1997) *Interim Guidelines for Targeted and General Flora and Fauna Surveys under the Native Vegetation Conservation Act 1997*.
- NSWNPWS (2001) *The Community Biodiversity Survey Manual*. New South Wales National Parks & Wildlife Service.
- QLD Department of Environment and Heritage (1999) *Suggested Conservation Criteria for Development Assessment*.
- Gold Coast City Council (2004) *Guidelines for preparing Ecological Site Assessments during the Development Process (v1.1)*. G.C.C.C., Nerang.
- Shire of Maroochy (1997) *Flora and Fauna Assessment Requirements for Developments in Maroochy Shire*. M.S.C
- Brisbane City Council (1999) *Ecological Assessment Guidelines*. B.C.C.
- Walker, J. & Hopkins, M.S. (1998) Chapter 5: Vegetation in McDonald, R. C., Isbell, R.F., Speight, J.G., Walker, J. & Hopkins, M.S. *Australian Soil and Land Survey: Field Handbook Second Edition*. CSIRO Australia, Canberra.
- Nelder, V. J., Wilson, B.A., Thompson, E. J. & Dillewaard, H.A. (2004) *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland*. EPA, Brisbane.
- DEC (2004) *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities Working Draft*. DEC, NSW.

3.2 VEGETATION SURVEY RESULTS

As a result of flora surveying of the development footprint and the immediate surroundings the site has 4 broad vegetation categories. These being;

1. Disturbed
2. Heath;
3. Eucalypt Forest; and
4. Littoral Rainforest

The abovementioned broad vegetation categories have been divided into 8 vegetation communities.

In respect to the Disturbed Community this has 2 distinct forms/characteristics either cleared land / paddocks or previously cleared areas regenerating with acacia.

In regard to the Heath, this differentiation is based upon the presence or absence of a tree canopy layer and composition and results in 3 separable discernible types of heath communities.

The Eucalypt forest displays 2 distinct communities as a result of landform and species composition.

Additionally the SEPP 14 Wetland Mapping is also identified. A discrepancy with the mapping and onsite vegetation is discussed in **Section 6.3**.

These vegetation associations/assemblages are described separately below and illustrated in **Figure 4**.

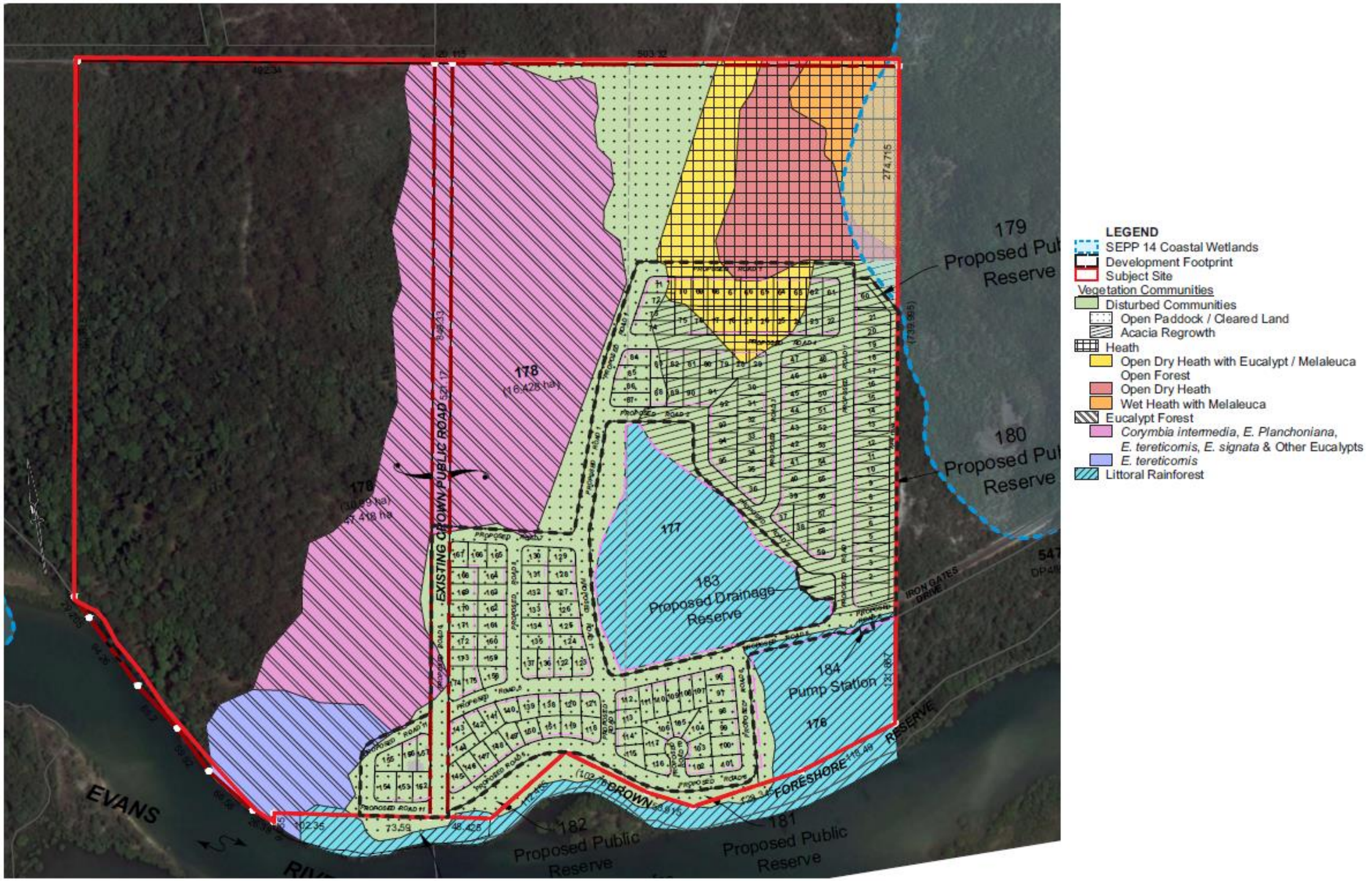


FIGURE 4 – IRON GATES BROAD VEGETATION COMMUNITIES

3.2.1 Disturbed Communities

DISTURBED/CLEARED AREAS WITH SCATTERED TREES, OPEN PADDOCK AND REGROWTH (*ACACIA AULACOCARPA*)

This vegetation community occupies the majority of the site and is approximately 14.5 ha in area. The community as mentioned has two distinct characteristics either cleared/pasture or regrowth acacia from previously cleared areas. Each of these have been separately mapped in the disturbed community mapping as Open Paddock/Cleared Land and Acacia Regrowth.

Acacia Regrowth

The disturbed acacia regrowth community occupies areas previously cleared with the former residential development of the site. The community is restricted to the previously cleared allotment areas. This regrowth consists almost exclusively of *Acacia disparrima* (Hickory Wattle) with a canopy height of approximately 8-10m and is approximately 7.2 ha in area.

Constructed roads and stormwater infrastructure are also a dominant feature of the community.

Other tree species noted within the canopy and sub-canopy layer include Bumpy Ash (*Flindersia schottiana*), Tuckeroo (*Cupaniopsis anacardiodes*), Swamp Box (*Lophostemon suaveolens*), Brushbox (*L. confertus*), Coast Banksia *(Banksia integrifolia*), Candlestick Banksia (*Banksia attenuate*), Willow Bottlebrush (*Callistemon salignus*), Soap Tree (*Alphitonia*

excelsa), Coast Wattle (*Acacia longifolia*), Broad-leaved Paperbark (*Melaleuca quinquenervia*), Umbrella Cheese Tree (*Glochidion sumatranum*), Geebung (*Persoonia virgata*) and Scentless Rosewood (*Synoum glandulosum*).

The shrub layer varied in density throughout the community which consisted of Spiny-head Mat-rush (*Lomandra longifolia*), Tall Sawsedge (*Gahnia clarkei*), Wallum Heath (*Epacris pulchella*), Grass Tree (*Xanthorrhoea fulva*), Swamp May (*Leptospermum liversidgei*), Paperbark Tea-tree (*L. trinervium*), Foxtails (*Caustis blakei*), Dodder Laurel (*Cassytha pubescens*), Curly Wig (*Caustis recurvata*), Bracken Fern (*Pteridium* spp.), *Homoranthus virgatus* and Mock Olive (*Notelaea longifolia*).

A variety of native and exotic grass species were present which included Blady Grass (*Imperata cylindrica*), Common Couch (*Cynodon dactylon*), Small-flowered Finger Grass (*Digitaria parviflora*), Winter Grass (*Poa annua*), Wiry Panic (*Entolasia stricta*), Kangaroo Grass (*Themeda triandra*), Whiskey Grass (*Andropogon virginicus*) and Blue Couch (*Digitaria didactyla*). Additional groundcovers are also common throughout (particularly proximate to the drainage lines) which included Knobby Club-rush (*Ficinia nodosa*), Bunchy Sedge (*Baumea articulata*), Didgery Sticks (*Baloskion pallens*), Common Rush (*Juncus effusus*), Grey Sedge (*Lepironia articulata*), Scrambling Lily (*Geitonoplesium cymosum*) and Sweet Sarsaparilla (*Smilax glyciphylla*), Tape Vine (*Stephania japonica*) and Monkey Rope (*Parsonsia straminea*).

This community is bound to the east and west by a drainage channels excavated as part of the prior residential development.

In respect to the drainage line along the eastern boundary of the site, this is tidally influenced south of the access road into the site.

It is noted the north eastern corner of this site is mapped as SEPP wetland, vegetation in this location does not reflect species associated with a wetland. The vegetation of this location comprises regrowth Acacia and dry heath immediately to the north. A fire trail exists along the sites eastern boundary and divides the acacia regrowth from the heath.

Open Paddock / Cleared land

The open paddock elements of this disturbed community occur adjacent to the existing house and the areas east of this. This area has retained cleared land status due to continuous slashing/maintenance and former agricultural pursuits. Notwithstanding this disturbance a number of occasional trees occur and or are associated with native and ornamental plantings around the dwelling.

This vegetation community occupies the developmental footprint. Within the cleared land adjacent to the house, tree species include Blackwood (*Acacia melanoxylon*), Tuckeroo (*Cupaniopsis anacardioides*), and Pink Bloodwood (*Corymbia intermedia*).

The groundcover within the cleared area exists as hard stand, exposed earth or is dominated by a mosaic of common pasture/exotic weeds and grasses. Exotic/native grasses include *Setaria sphacelata*, *Cynodon dactylon, Digitaria didactyla, Digitaria parviflora, Themeda triandra, Imperata cylindrical* and *Cymbopogon refractus*.

Pasture/environmental weed species present include Wild Tobacco (*Solanum mauritianum*), Blue Billygoat Weed (*Ageratum houstonianum*), Cobbler's Pegs (*Bidens pilosa*), Balloon Vine (*Cardiospermum grandiflorum*), Thickhead (*Crassocephalum crepidioides*), Easter Cassia (*Senna pendula var. glabrata*), Purpletop (*Verbena bonariensis*), Lantana (*Lantana camara*), Inkweed (*Phytolacca octandra*), Wandering Jew (*Commelina cyanea*), Flatweed (*Hypochaeris radicata*), Crofton Weed (*Ageratina adenophora*), White Clover (*Trifolium repens*), Tassel flower (*Emilia sonchfolia*) and Paddy's Lucerne (*Sida rhombifolia*).

Numerous ornamental/garden flora species are present proximate to the existing dwelling within established garden beds, planted in an ad-hoc manner or present as escapees. While not described exhaustively within this report species noted included Silky Oak (*Grevillea robusta*), Cocos Palm (*Syagrus romanzoffiana*), *Hibiscus spp.*, Common Couch (*Cynodon dactylon*) and Blue Couch (*Digitaria didactyla*).

Weed species were also relatively common and are as described within the cleared land section within this community.

The respective comparative nomenclature for this community is presented below.

Forest Types in NSW 1989: Wattle (214) / Cleared / Partially Cleared (220)

CRA Forest Ecosystems 1999: Wattle(151) / NA

Keith (2004) Ocean Shores-Desert Dunes: N/A

3.2.2 Heath

Heath dominated communities occur in the north eastern section of the site with only a small portion within the development footprint. This community displays structural and specie variation. The north and northeast portions of the site and has been previously sand mined in several sections and may be a factor in this diversity.

The heath community has been previously described as tall heath, wet heath and heath regenerating after fire and sand mining (Wrigley 1992). Ground truthing of the heath community notes that the community can be divided into three sub-communities.

The three sub-communities on site can be described as Low Closed Wet Heath with Mid-high to Tall Melaleuca Closed Forest, Tall – Very Tall Open Dry Heath and Tall – Very Tall Open Dry Heath with Eucalypt/Melaleuca Open Forest.

LOW CLOSED WET HEATH WITH MID-HIGH TO TALL MELALEUCA CLOSED FOREST.

This community occurs in the northern / north eastern concern of the site and extends into the property to the east. The vegetation community occurs around an overland flow path with ponded tannin stained water.

The canopy layer is 12-14 m in height as is of a monospecific nature consisting of Broad-leaved Paperbark (*Melaleuca quinquenervia*).

The wet heath layer is 1 -3 m in height and dominated by of Coast Banksia *(Banksia integrifolia*), Wallum Banksia (*B. aemula*), Heath-leaved Banksia (*B. ericifolia*), Candlestick Banksia (*B. attenuate*), Coastal Wattle (*Acacia longifolia*), Hickory Wattle (*A. aulacocarpa*), Sweet Wattle (*A. suaveolens*), Sieber's Paperbark (*Melaleuca sieberi*), Willow Bottlebrush (*Callistemon salignus*), Coast Beard-heath (*Leucopogon parviflorus*), Pink Beard-heath (*L. ericoides*), Pink Blunt-leaf heath (*Epacris obtusifolia*), Wallum Heath (*E. pulchella*), Blue Tongue (*Melastoma affine*), Midgen Berry (*Austromyrtus dulcis*), Weeping Baeckea (*Baeckea frutescens*), Zieria (*Zieria* spp.), Wallum Boronia (*Boronia falcifolia*), Wide Bay Boronia (*Boronia rivularis*), Swamp May (*Leptospermum liversidgei*), White's Tea Tree (*L. whitei*),

Yellow Tea Tree (*L. polygalifolium*), Paperbark Tea Tree (*L. trinervium*), Wallum Hakea (*Hakea actites*), Whitebeard (*Agiortia pedicellata*), *Sporadanthus interruptus*, Ground Berry (*Acrotriche aggregata*), Green Five Corners (*Styphelia viridis*), Golden Candlesticks (*Aotus lanigera*), Healthy Parrot Pea (*Dillwynia retorta*), Dogwood (*Jacksonia scoparia*) and Grass Tree (*Xanthorrhoea fulva*).

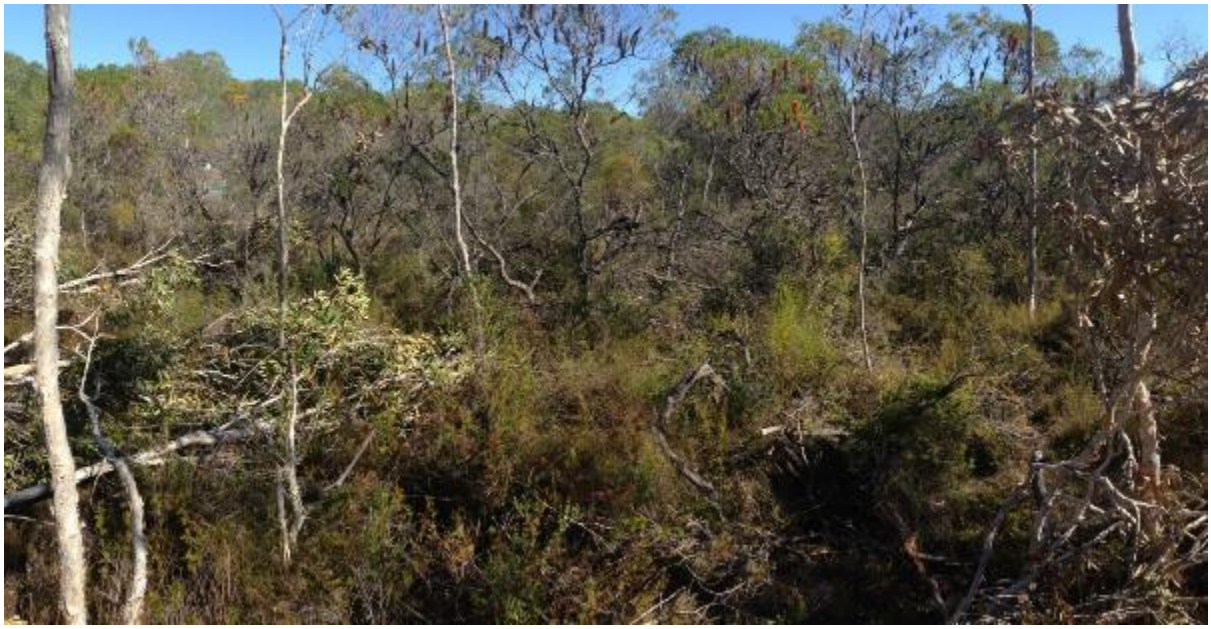
Various grasses, sedges and ferns i.e. *Gahnia clarkei, Baumea rubignosa, B. articulate, Lepironia articulata, Histiopteris incise, Caustis blakei, Caustis recurvate, Lepidosperma laterale* and *Lomandra longifolia*.

TALL – VERY TALL OPEN DRY HEATH

This community is located between the two other heath communities in the north-eastern portions of the site.

The shrub and small tree layer is 1-4 m in height and dominated by Swamp May (*Leptospermum liversidgei*), White's Tea Tree (*L. whitei*), Yellow Tea Tree (*L. polygalifolium*), Paperbark Tea Tree (*L. trinervium*), Candlestick Banksia (*B. attenuate*) and Sieber's Paperbark (*Melaleuca sieberi*).

Additional species recorded included Coast Banksia (*Banksia integrifolia*), Wallum Banksia (*B. aemula*), Whitebeard (*Agiortia pedicellata*), *Sporadanthus interruptus*, Ground Berry (*Acrotriche aggregata*), Green Five Corners (*Styphelia viridis*), Golden Candlesticks (*Aotus lanigera*), Healthy Parrot Pea (*Dillwynia retorta*), Dogwood (*Jacksonia scoparia*), Willow Bottlebrush (*Callistemon salignus*), Coast Beard-heath (*Leucopogon parviflorus*), Pink Beard-heath (*L. ericoides*), Pink Blunt-leaf heath (*Epacris obtusifolia*), Wallum Heath (*E. pulchella*), Blue Tongue (*Melastoma affine*), Weeping Baeckea (*Baeckea frutescens*), Zieria (*Zieria spp.*), *Caustis blakei (Foxtails)* and Wide Bay Boronia (*Boronia rivularis*),



TALL – VERY TALL OPEN DRY HEATH WITH EUCALYPT/MELALEUCA OPEN FOREST

This community is similar to the Tall –very Tall Open Dry Heath in composition, however this community also contains a tree layer. The canopy layer height varies considerable within this community, however is generally 12-16 m in height consisting of multiple species. Canopy species representing this community includes Broad-leaved Paperbark (*Melaleuca quinquenervia*), Rough Barked Apple (*Angophora floribunda*), Swamp Box (*Lophostemon suaveolens*) and Pink Bloodwood (*Corymbia intermedia*), and Needle-barked Stringybark.

The small tree and shrub layer generally consists of the same species noted within the Tall – very Tall Open Dry Heath community with only several additions which includes Coastal Wattle (Acacia longifolia), Hickory Wattle (A. aulacocarpa), Sweet Wattle (A. suaveolens), Midgen Berry (Austromyrtus dulcis) and Heath-leaved Banksia (B. ericifolia)

The groundcover consisted of species already mentioned within the previous two heath communities, however weed species were more frequent. Although not in abundance, environmental weed species were present and consisted of Scotch Thistle (*Onopordum acanthium*), Slash Pine (*Pinus elliottii*) and several other common species as previously stated within the Disturbed communities.

Additional strappy grass-like plants, small herbaceous groundcovers, vines and twining species included Tall Saw-sedge (*Gahnia clarkei*), Foxtails (*Caustis blakei*), Curly Wig (*C. recurvate*) Bunchy Sedge (*Cyperus polystachyos*), Sedges (*Schoenus spp.*), Dodder Laurel (*Cassytha pubescens*), Sweet Sarsaparilla (*Smilax glyciphylla*), Variable Sword-sedge (*Lepidosperma laterale*), Coral Fern (*Gleichenia dicarpa*), Tassel Cord-rush (*Baloskion tetraphyllum*) and Bracken (*Pteridium spp.*).

Although uncommon, environmental weed species were present and consisted of Scotch Thistle (*Onopordum acanthium*), Slash Pine (*Pinus elliottii*) and several other common species a previously stated.

Comparative nomenclature for this community is presented below.

Forest Types in NSW 1989: Heath (223)

CRA Forest Ecosystems 1999: Heath (65)

Keith (2004) Ocean Shores-Desert Dunes: Coastal Headland Heaths/Coastal Heath Swamps

3.2.3 Eucalypt Forest

Eucalypt forest communities occur in the western section of the site with only a small portion within the development footprint (~0.09 ha).

The Eucalypt Forest community has been previously described as Eucalypt Woodland, Eucalypt Woodland with Reduced Understorey, Eucalypt Woodland Mainly Bloodwood, and Forest Red Gum with Disturbed Understorey (Wrigley 1992). Ground truthing of the eucalypt community notes that the community can be divided into two sub-communities as a result of landform and dominant specie.

The two sub-communities on site can be described as Tall to Very Tall Eucalypt Open Forest to Woodland: *Corymbia intermedia, Eucalyptus planchoniana, E. tereticornis, E. signata and Other Eucalypts* [T8M] and Tall to Very Tall Eucalypt Open Forest to Woodland: *Eucalyptus tereticornis* [T8M].

TALL TO VERY TALL EUCALYPT OPEN FOREST TO WOODLAND: *CORYMBIA INTERMEDIA, EUCALYPTUS PLANCHONIANA, E. TERETICORNIS, E. SIGNATA AND OTHER EUCALYPTS* [T8M]

This community occupies the western slope on the site. The canopy generally ranges from 20-25 m in height although several trees exceed this height. For the most part canopy crowns are arranged in an open forest structure (per Walker & Hopkins) although several portions of the site contain less cover (due to lower mature tree stem density) and are more reflective of woodland cover.

Hollow-bearing trees are present in moderate densities and are generally abundant within the locality (Bundjalung National Park and Broadwater National Park).

Canopy trees are dominated by Pink Bloodwood (*Corymbia intermedia*), Needle-barked Stringybark (*Eucalyptus planchoniana*), Blue Gum (*E. tereticornis*) and Scribbly Gum (*E. signata*). Less commonly occurring trees are Tallowwood (*Eucalyptus microcorys*), Thick-leaved Mahogany (*E. carnea*), Rough-barked Apple (*Angophora floribunda*) and Swamp Box (*Lophostemon suaveolens*).

The small tree/shrub layer is mostly sparse and occupied by juvenile eucalypts/corymbias and Soap Tree (*Alphitonia excelsa*), Corkwood (*Duboisia myoporoides*), Coast Banksia (*Banksia integrifolia*), Wallum Banksia (*Banksia aemula*), Willow Bottlebrush (*Callistemon salignus*), Climbing Guinea Flower (*Hibbertia scandens*), Tangled Guinea Flower (*Hibbertia empetrifolia*), Hairy Bush Pea (*Pultenaea villosa*), Umbrella Cheese Tree (*Glochidion sumatranum*), Coastal Wattle (*Acacia longifolia*), Hickory Wattle (*A. aulacocarpa*), Grass Tree (*Xanthorrhoea spp.*), Coffee Bush (*Breynia oblongfolia*), Blueberry Ash (*Elaeocarpus reticulatus*), Rose Marara (*Pseudoweinmannia lachnocarpa*), and Bumpy Ash (*Flindersia schottiana*).

The ground layer varies throughout the community and ranges from a dense grassy ground layer to a deep leaf litter layer with minimal ground vegetation. Areas where the ground layer is typically grassy are dominated by common species (*Imperata cylindrical, Themeda triandra, Andropogon virginicus, Entolasia stricta, Cymbopogon refractus* and *Microlaena stipoides*). Additional strappy grass-like plants, small herbaceous groundcovers, vines and twining species were also noted including Tall Sawsedge (*Gahnia clarkei*) Wattle Matrush (*Lomandra filiformis*), Matrush (*Lomandra confertifolia*), Bracken Fern (*Pteridium spp.*), Variable Sword-sedge (*Lepidosperma laterale*), Feather Sedge (*Ptilothrix deusta*), Mock Olive (*Notelaea longifolia*) and Sweet Sarsaparilla (*Smilax glyciphylla*).

Environmental weed species were relatively scarce throughout this community and consisted of Lantana (*Lantana camara*), Wood Sorrel (*Oxalis corniculata*), Crofton Weed (*ageratina adenophora*), Cobbler's Pegs (*Bidens pilosa*), Corky Passionfruit (*Passiflora suberosa*) and Brazilian Nightshade (*Solanum seaforthianum*).
TALL TO VERY TALL EUCALYPT OPEN FOREST TO WOODLAND: *EUCALYPTUS TERETICORNIS* [T8M]

The southern portions of the eucalypt forest community near the house and close to the river changes from a mixed eucalypt dominant community to almost entirely of *Eucalyptus tereticornis*

Additional canopy species recorded included Scribbly Gum (*Eucalyptus signata*), Swamp Box (*Lophostemon suaveolens*), Brush Box (*L. confertus*), Pink Blood Wood (*Corymbia intermedia*) and Rough-barked Apple (*Angophora floribunda*).

The understorey and groundcover of this community is generally sparse due to on-going slashing/mowing, however several species mentioned in the previous eucalypt forest community were present. Areas unmaintained area was vastly dominated by exotic species such as Lantana (*Lantana camara*), Cobbler's Pegs (*Bidens pilosa*), Brazilian Nightshade (*Solanum seaforthianum*) and Corky Passionflower (*Passiflora suberosa*).

Respective nomenclature for these communities is presented below.

Forest Types in NSW 1989: Needlebark Stringybark (97) / Brushbox (53)

CRA Forest Ecosystems 1999: Heathy Scribbly Gum (65) / Northern Wet Tallow – Blue Gum(104)

Keith (2004) Ocean Shores-Desert Dunes: Coastal Dune Dry Sclerophyll Forests/ North Coast Dry Sclerophyll Forests

3.2.4 Littoral Rainforest

TALL TO VERY TALL CLOSED FOREST (LITTORAL RAINFOREST) CONTAINING A WIDE VARIETY OF RAINFOREST SPECIES

This vegetation community occupies the central portion of the development footprint as well as the southeast portion of the site. It is also found within the unconstructed road reserve along the sites southern boundary and adjacent to the Evans River. The approximate area of this community occurring on site and inclusive of the road reserve is 8.1 ha.

The canopy generally ranges from 15-20 m in height although a number of emergent exceed this canopy height. For the most part canopy crowns are arranged in a closed forest structure (per Walker & Hopkins) although several portions of the site contain less cover (mainly associated with the southeast and southern section) and are more reflective of open forest.

Tree species noted within this community include Brushbox (*Lophostemon confertus*), Bumpy Ash (*Flindersia schottiana*), Bennet's Ash (*F. bennettiana*), Kerosene Wood (*Halfordia kendack*), Quinine Bush (*Petalostigma pubescens*), Brown Kurrajong (*Commersenia bartramia*), Beach Acronychia (*Acronychia imperforata*), Jackwood (*Cryptocarya glaucescens*), Ribbonwood (*Euroschinus falcatus var. falcatus*), Celery Wood (*Polyscias elegans*), Coogara (*Arytera divaricata*), Tuckeroo (*Cupaniopsis anacardiodes*), Yellow Pear-fruit (*Mischocarpus pyriformis*), Swamp Box (*Lophostemon suaveolens*), Hard Corkwood (*Endiandra sieberi*), Wild Quince (*Alectryon subcinereus*), Swamp Oak (*Casuarina glauca*), Broad-leaved Paperbark (*Melaleuca quinquenervia*), Blueberry Ash (*Elaeocarpus reticulatus*), Grey Walnut (*Beilschmiedia elliptica*), Corkwood (*Duboisia myoporoides*) and Blue Lilly Pilly (*Syzygium oleosum*).

The smaller tree and shrub layer consisted of species such as Satinwood (*Nematolepis squamea*), Native Gardenia (*Atractocarpus benthamianus*), Cabbage Palm (*Livistona australis*), Narrow-leaved Palm Lily (*Cordyline stricta*), Peanut Tree (*Sterculia guadrifida*), Bollywood (*Litsea fawcettiana*), Beach Alectryon (*Alectryon loriaceus*), Pink Evodia (*Melicope elleryana*), Red Olive Plum (*Elaeodendron australe*), Scrub Cherry (*Exocarpos latifolius*), Soap Tree (*Alphitonia excelsa*), Blunt-leaved Coondoo (*Pouteria myrsinifolia*), Umbrella Cheese Tree (*Glochidion sumatranum*), Scentless Rosewood (*Synoum glandulosum*), Veiny Wilkiea (*Wilkiea huegeliana*), Bangalow Palm (*Archontophoenix cunninghamiana*), Brown Laurel (*Cryptocarya triplinervis*), Coffee Bush (*Breynia oblongifolia*), Muttonwood (*Myrsine variabillis*), Hickory Wattle (*Acacia aulacocarpa*), Native Guava (*Rhodomyrtus psidioides*), Bolwarra (*Eupomatia laurina*), Orange Boxwood (*Maytenus disperma*) and Coastal Geebung (*Persoonia adenantha*)

The groundlayer throughout this vegetation community was nearly entirely covered in a dense leaf litter layer with ground layer species relatively scarce.

Grass species were limited and consisted of common species such as *Imperata cylindrical* and *Themeda triandra*. Additional strappy grass-like plants, small herbaceous groundcovers, vines and twining species noted include Spiny-head Mat-rush (*Lomandra longifolia*), Large Mock-olive (*Notelaea longifolia*), Tall Saw-sedge (*Gahnia clarkei*), Wandering Jew (*Commelina cyanea*), Stag Horn Fern (*Platycerium superbum*), Bird's Nest Fern (*Asplenium australasicum*), Elk Horn Fern (*Platycerium bifurcatum*), Whip Vine (*Flagellaria indica*), Long-leaf Water Vine (*Cissus sterculiifolia*), Five-leaf Water Vine (*C. hypoglauca*), Kangaroo Vine (*C. antarctica*), Monkey Rope (*Parsonsia straminea*), Lawyer Vine (*Smilax australis*), Sweet Sarsaparilla (*S. glyciphylla*) and Whip Vine (*Flagellaria indica*).

Environmental weed species were scarce and mainly occurred along the edges and in particular the road reserve. Species included Lantana (*Lantana camara*), Crofton Weed (*Ageratina adenophora*), Cobbler's Pegs (*Bidens pilosa*), Easter Cassia (*Senna pendula var. glabrata*), Umbrella Tree (*Schefflera actinophylla*) and Cocos Palm (*Syagrus romanzoffiana*).

Equivalent Vegetation Mapping Descriptions are as follows:

Forest Types in NSW 1989: Tuckeroo (24)

CRA Forest Ecosystems 1999: Rainforest (168)

Keith (2004) Ocean Shores-Desert Dunes: Littoral Rainforests

3.3 REGIONAL SIGNIFICANCE & CONSERVATION STATUS

3.3.1 Endangered Ecological Communities

A discussion of potentially applicable endangered ecological communities (EECs) is provided below in the context of vegetation surveys undertaken within the study area and the relevant scientific determinations for EECs.

Endangered ecological communities are listed under Schedule 1, Part 3 of the Threatened Species Conservation Act 1995, while threatened ecological communities are listed under the Environment Protection and Biodiversity Conservation Act 1999 as critically endangered, endangered and vulnerable.

A review of the community would indicate that Vegetation Community 4 is representative of an endangered ecological community (EEC) as listed within schedules of the TSC Act (1995) and a Threatened Ecological Community (TEC) as listed within schedules of the EPBC Act (1999). The vast majority of this vegetation community will be retained within the development. The road extension between the eastern and western residential areas of the development will necessitate minor pruning of limbs on the edges of the Littoral rainforest. Furthermore, clearing of approximately 127 m^2 (0.15%) of highly degraded vegetation surrounding an existing sewer pump station well (refer **Section 7.2**) will be required for the construction of a sewer pump station.

The following is an extract from the DEH NSW Scientific Committee - final determination report. This outlines conservation status and significance of the community.

Littoral Rainforest in the NSW North Coast, Sydney Basin and South East Corner Bioregions

This EEC is described by the scientific committee (online @ http://www.environment.nsw.gov.au/determinations/littoralrainforest36a.htm) as follows:

> 1. Littoral Rainforest in the NSW North Coast, Sydney Basin and South East Corner Bioregions is generally a closed forest, the structure and composition of which is strongly influenced by proximity to the ocean. The plant species in this ecological community are predominantly rainforest species with evergreen mesic or coriaceous leaves. Several species have compound leaves, and vines may be a major component of the canopy. These features differentiate littoral rainforest from sclerophyll forest or scrub, but while the canopy is dominated by rainforest species, scattered emergent individuals of sclerophyll species, such as *Angophora costata*, *Banksia integrifolia, Eucalyptus botryoides* and *E. tereticornis* occur in many stands. Littoral Rainforest in NSW is found at locations along the entire NSW Coast in the NSW North Coast Bioregion, Sydney Basin Bioregion and South East Corner Bioregion. Bioregions are defined in Thackway and Cresswell (1995). The areas mapped for inclusion in State Environmental Planning Policy 26 Littoral Rainforest are examples of the Littoral Rainforest ecological communities, but the mapping for SEPP 26 is not exhaustive and stands of the Littoral Rainforest ecological community occur at locations not mapped under SEPP 26. Some stands may be regrowth or in the process of regenerating. The Sutherland Shire Littoral

Rainforest Endangered Ecological Community which was previously listed as an endangered ecological community is included within this Community.

2. Littoral rainforest occurs on both sand dunes and on soils derived from underlying rocks (McKinley *et al*. 1999). Stands on headlands exposed to strong wind action may take the form of dense windpruned thickets (for example the Bunga Head Rainforest illustrated by Keith & Bedward 1999, or MU5 Littoral Windshear Thicket in NPWS 2002). In more sheltered sites, and in hind dunes, the community is generally taller, although still with wind pruning on the windward side of stands. Floristically there is a high degree of similarity between stands on different substrates. Most stands of Littoral Rainforest occur within 2 km of the sea, but may occasionally be found further inland, but within reach of maritime influence.

6. Littoral Rainforest occurs in numerous, small stands and in total comprises less than 1% of the total area of rainforest in NSW. The largest known stand occurs in Iluka Nature Reserve, which is approximately 136 ha. Many, but not all, stands of Littoral Rainforest have been included in mapping for State Environmental Planning Policy 26 Littoral Rainforest, but degradation of the ecological community is still occurring.

8. Other threats include loss of canopy integrity arising from salt and wind damage as a result of clearing or damage to stand margins; clearing of understorey (including for firewood collection); grazing and physical disturbance of understorey including by feral deer; inappropriate collection of a range of plant species (including, but not restricted to, epiphytes); fire, particularly fire incursion along boundaries: visitor disturbance including soil compaction, soil disturbance, erosion from foot, cycle, trail bike and 4 wheel drive tracks, introduction of pathogens, and disturbance from creation of new planned and unplanned tracks; increased visitation and resulting increased demand for and use of, visitor facilities such as walking tracks, viewing platforms, toilet blocks, picnic areas etc; dumping of garden waste causing weed infestation; car and other rubbish dumping. Loss of fauna due to predation by feral animals, road kill, loss of habitat and feeding resources, disturbance from human visitation (faunal elements are essential to the ecological functioning of littoral rainforest and loss, or reduction, in pollinators and seed dispersal agents will adversely affect long term vegetation health); fragmentation resulting in loss of connectivity and possibly reduced genetic exchange between populations. For stands not protected by State Environmental Planning Policy 26, clearing and development remains a possibility. (Adam 1987, 1992; Floyd 1990; Mills 1996)

9. In view of the above the Scientific Committee is of the opinion that Littoral Rainforest in the NSW North Coast, Sydney Basin and South East Corner Bioregions is likely to become extinct in nature in New South Wales unless the circumstances and factors threatening its survival or evolutionary development cease to operate.

The following is an extract from the Littoral Rainforest and Coastal Vine Thickets of Eastern Australia Ecological Community Draft National Recovery Plan (Department of the Environment and Energy 2017) further outlining the conservation status and significance of the community:

Littoral Rainforest occurs primarily within two kilometres of the coast or adjacent to a large salt water body, such as an estuary. The ecological community is distributed as a series of scattered and fragmented patches from Princess Charlotte Bay on southern Cape York, Queensland to East Gippsland in Victoria, including on estuarine and offshore islands. Based on available mapping data, the historical, pre-clearing extent (circa 1750) of the ecological community is estimated to have been between approximately 35,000 ha and 67,000 ha (BAAM, 2013). However, current extent is estimated to be approximately 16,000 hectares (TSSC, 2008). The total area of occupancy in New South Wales is approximately 1600 ha (TSSC, 2008). Many, but not all, stands of Littoral Rainforest in NSW have been included in mapping within the State Environmental Planning Policy No 26—Littoral Rainforests.

3.3.2 Regional Significance

Eight separate communities have been described as occurring within the development footprint. As illustrated in **Figure 2** the development is largely contained to disturbed communities. The status of the various CRA communities as identified in the Richmond Valley biodiversity report indicates the following:

- Wattle (151) is highly inadequately reserved and the CRA target has not been met;
- Heath (64) is a Vulnerable community but the CRA target has been met;
- Heathy Scribbly Gum (65) has had its conservation target met;
- Northern Wet Tallowwood – Blue Gum has had its conservation target met;
- Rainforest (168) is an Endangered Community which has not achieved its conservation target.

As indicated the Wattle community is a disturbed / modified community the result of past clearing / seeding. The proposal will remove the majority of Wattle from within the development footprint. The area to be removed is 6.83 ha.

The development will remove approximately 1,175 m^2 of Open Dry Heath and 1.16 ha of Open Dry Heath with mixed Eucalypt. We note this community is vulnerable but locally well conserved in the surrounding conservation network.

The development will require the removal of approximately 1,195 m^2 of Heathy Scribbly Gum for roads and an additional 400 m^2 is proposed for removal with bushfire requirements and lots.

The proposal will result in very minor impacts on Littoral rainforest. As previously noted the road extension between the eastern and western residential areas of the development will necessitate minor pruning of limbs on the edges of the Littoral rainforest. Furthermore, clearing of approximately 127 m^2 (0.15%) of highly degraded vegetation surrounding an existing sewer pump station well (refer **Section 7.2**) will be required for the construction of a sewer pump station.

4.0 FAUNA ASSESSMENT

This section describes the study areas' fauna and associated habitat as identified through surveying. The methodology applied to arrive at the species list is outlined and significant species have been identified where relevant.

4.1 METHODOLOGY

- Desktop analysis including:
  i. Review of Council's Planning Scheme Mapping & Associated Reporting (i.e. Richmond Valley Local Environmental Plan 2012 Mapping)
  ii. Review of search of the Atlas of NSW Wildlife database within a search area 10 km surrounding the site to review threatened plant records
  iii. Review of the following legislation to ensure the latest lists of threatened species were noted as well as investigating the existence of any relevant recovery plans, threat abatement plans, key threatening processes or any preliminary determinations which may be applicable to the site and/or the proposed use/action:
    - *Threatened Species Conservation Act (1995)*
    - *Environment Protection and Biodiversity Conservation Act (1999)*
    - *Fisheries Management Act (1994)*
- Field survey of the flora communities located within and immediately adjacent to the study area (in accordance with **Section 3** above) to review habitat values. The following fauna field survey methods were implemented during May 2014 in general accordance with the following:
  - DEC (2004) *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities Working Draft*. DEC, NSW.
  - NSWNPWS (2001) *The Community Biodiversity Survey Manual*. New South Wales National Parks & Wildlife Service.
  - Gold Coast City Council (2006) Planning Scheme Policy 8: *Guidelines for Ecological Assessments*. G.C.C.C., Nerang.
  - Shire of Maroochy (1997) *Flora and Fauna Assessment Requirements for Developments in Maroochy Shire*. M.S.C
  - Department of Land and Water Conservation (1997) *Interim Guidelines for Targeted and General Flora and Fauna Surveys under the Native Vegetation Conservation Act 1997*. NSWDLWC, Parramatta.
  - Brisbane City Council (1999) *Ecological Assessment Guidelines*. B.C.C
  - Redland Shire's *Planning Scheme Policy 4-Ecological Impacts*

  Weather conditions were warm during the day and becoming cool at night (max of 26.4°C and min of 13.2°C as measured at the Evans Head RAAF Bombing Range AWS). Only 2 mm of rain fell (Saturday 24th) during the entire duration of the survey works.

- Furthermore, as it had been almost five (5) years since the previous survey work was undertaken, the Proponent engaged JWA to complete an assessment of Koala usage of the site using current best practice methods. Site surveys were completed on the 19th and 20th March 2019 by two (2) JWA ecologists utilising the Regularised Grid-based Spot Assessment Technique (RG-bSAT). **Attachment 4** describes the RG-bSAT methodology in detail and provides the results of the assessment.

4.1.2 Diurnal Survey

- Active searches were conducted for key habitat components and potential macro- and micro- habitat components for rare and threatened species
- Binocular search and identification of all fauna heard or sighted
- Opportunistic sightings/audible identifications were conducted and recorded whilst all survey works were being undertaken
- Bird identification surveys were conducted in association with dawn and dusk activity and comprised a combination of walked transects through each vegetation community and stationary observations within selected locations
- Detailed ground track/trace survey was performed including:
  - Scat/pellet examination
  - Scratch/trace examination of trees
  - Diggings, burrow, trace and track examination
  - Humus/crevice examination
  - Examination and assessment of tree hollows, hanging bark, termite mounds, flowering and nesting trees
- Oxleyan Pygmy Perch Survey (See **Section 5.4**)
- Diurnal frog-call recognition and identification during rainfall events and opportunistically performed during other survey works
- Trapping for fauna was performed in accordance with NSW DPI permits issued to Planit Consulting. Type 'A' & 'B' Elliot traps and open wire traps (hook baited and foot paddle spring-loaded) of various sizes were utilised. Traps were set at offset intervals of approximately 10 meters within the linear remnant.
- Trapping for fauna was performed in accordance with NSW DPI and NPWS permits issued to Planit Consulting. Type 'A' & 'B' Elliot traps of various sizes were utilised. Traps were set at offset intervals of approximately 10 metres.

  Trapping was undertaken over a 96 hour period, checked and emptied (where necessary) every morning. Baits utilized within the traps included rolled oats & golden syrup, rolled oats & peanut butter, dog biscuits, tuna and chicken.

Leaf litter and/or grass was placed within all traps to protect captured fauna from potential hypothermia and to provide nesting refuge during the period between trapping and release. All animals were released at the point of capture following positive species identification. In association with this survey no animals were needed to be taken as voucher specimens.

Table 4: Review Of Trapping Program

	Elliot Traps	Cage Traps	Camera Traps	Hair Funnels	Pitfall Traps
No. of trap lines	6	6	6	6	2
No. of nights per trap line	5	5	5	5	5
No. of traps per line	7	1	1	1	1
Total No. of trap nights	210	30	30	30	10

Image 1: Elliot and Cage Traps Deployed

- Ground strata searches and rock timber/leaf rolls and examination for reptiles and frogs.

  Duration 3 x 30 minutes during the middle of the day 21st & 23rd May 2014.

- Two pitfall traps were constructed to randomly capture small fauna moving throughout the site

- Hair funnels (Faunatech) were deployed in general accordance with DSEWPC (2011) 'Survey guidelines for Australia's threatened mammals: Guidelines for detecting mammals listed as threatened under the *Environment Protection and Biodiversity Conservation Act* 1999.' This included installing hair funnels (Faunatech large opening reducing to small) at least 40 m apart. The bait utilized included a mixture of sardines and tuna oil with flour utilized as a binding agent or a generic mixture of oats, peanut

butter and golden syrup. In addition, tuna oil or aniseed was sprayed in an approximate 2 m radius around each funnel to act as an attractant. Each hair funnel was marked in the field with a piece of flagging tape on a proximate tree (except where visible from nearby residences/roadways i.e. to avoid potential theft/vandalism) and the location recorded via hand-held GPS (to enable retrieval and mapping).

Following deployment, hair funnel wafers with positive results were sent to a private laboratory (Scats About P/L) for analysis.

Image 2: Deployed Hair Funnel

- Six motion triggered trail cameras (ScoutGuard SG550PV-31B) were placed within site between 20th – 25th May 2014 to digitally capture fauna activity. Passive camera traps were deployed in accordance with DSEWPC (2011) 'Survey guidelines for Australia's threatened mammals: Guidelines for detecting mammals listed as threatened under the *Environment Protection and Biodiversity Conservation Act* 1999. "Passive systems are single units that use heat and motion detectors to trigger the camera (Kelly & Holub 2008). Infrared sensors work better at cooler ambient temperatures and are less consistent in warm environments (Swann et al. 2004). Camera trapping has been found to be the most effective method of detecting species at low or moderate densities (Vine et al. 2009 in DSEWPC, 2011: 32)."

  DSEPWC (2011) note that "recent surveys have found remote cameras to be the most cost-effective technique and allow concurrent data to be collected on other carnivores, particularly cats and foxes." Cameras were fixed to trees (or a driven metal stake where no trees were available) approximately 75-100 cm from ground level and aimed at a bait station. Cameras were programmed to operate 24 hours and take 3-image bursts triggered by motion. A 60 second delay was programmed between bursts.

  Each bait station consisted of either fresh chicken pieces, a tuna/sardine mixture using flour as a binding agent (carnivore) or a mixture of oats, peanut butter and golden syrup (generalist). To reduce the bait was placed within a 50 mm PVC vent cowl which was secured via a tent peg (per Paull et al, 2011).

In addition, either tuna oil (carnivore) or golden syrup/aniseed mixture (generalist) was sprayed in an approximate 5 m radius around each bait station to act as an attractant. All fauna images were identified to genus or species level b experience ecologists/environmental planners.

Accipiter fasciatus

Dacelo novaeguineae

Canis lupus familiaris

Corvus orru

4.1.2 Nocturnal Survey

Nocturnal survey included the following survey techniques:

- Audible survey for calls, scratching and landings;
- Spotlighting utilising:
    - Short duration-long distance white light, and
    - Long duration-short distance red light

  Duration on foot: three researchers on three nights for 120 minutes
- Naked eye observation utilising dawn/dusk/moon light for bats and fauna returning to potential nest/shelter areas.

Duration: three researchers on two nights for 120 minutes per night 20th and 21st May 2014 (4 hours)

- Passive digital recording (for nocturnal birds, mammals and amphibians) was undertaken utilizing Songmeter TM. The recorder was programmed to 'wake up' and record continuously for 10 minutes, 'sleep' for 20 minutes and begin recording again for 10 minutes over a period of three hours (commencing at 6:00 am). Recordings were analyzed audibly by experienced ecologists and with Songscope Bioacoustics software. All avifauna reference calls were sourced from reputable organizations such as Naturesound and BOCA.

Duration: Five nights staggered recording for 70 minutes per night.

- Anabat detection system was utilized to record echolocation of microchirpteran bats at fixed points and along spotlighting transects. Recordings were undertaken in areas most likely to attract bat species including standing water, drainage lines, remnant edges, areas of flowering vegetation and sites of high insect activity. Calls were analyzed utilizing Analook 49j and accepted reference keys.

Duration: Five night's continuous recording between 1800 and 0600 hrs (60 recording hours).

- Six motion triggered trail cameras (ScoutGuard SG550PV-31B) were deployed as discussed in 'diurnal' above

Wallabia bicolor	*Perameles nasuta*

- Amplified call recording/playback for avifauna, mammals and amphibians. Playback of pre-recorded calls included the following threatened species:
    - Wallum Froglet
    - Olongburra Frog
    - Wompoo Fruit-dove
    - Black-necked Stork
    - Red Goshawk
    - Pale-vented Bush-hen
    - Bush Stone-curlew
    - Glossy Black-Cockatoo
    - Powerful Owl
    - Eastern Grass Owl
    - Masked Owl
    - Regent Honeyeater
    - White-eared Monarch
    - Spotted-tailed Quoll
    - Koala
    - Squirrel Glider

Each call playback session comprised of the following:

- A 15 min listening period for unelicited fauna calls
- 5 min call playback for relevant species on a 25W Toa Megaphone
- 10 min search/spotlight for fauna at the playback site

Depending on the targeted species playback was undertaken at dawn, dusk and/or after dark. All call files were obtained from BOCA or NATURESOUND.

4.1.3 Survey Limitations

Whilst the duration of flora surveys and inspections of the study area are considered appropriate, additional undetected threatened or other native flora species may be present on the property (particularly weed species within the pasture). Seasonal surveys would also be necessary to detect flora species that are dormant or inconspicuous for part of the year (i.e. from the Asteraceae, Orchidaceae, Cyperaceae, Poaceae etc). Some of these species (dormant or non-flowering) may have been undetected or under-represented within the survey period. Further ungerminated seed of various species may have been present within the soil seed bank.

Whilst the duration and sampling methodology of the fauna survey is considered appropriate, it is acknowledged that the entire seasonal fauna assemblage is unlikely to be recorded. It is also accepted that although assessments of habitat and species ecology does provide an additional measure to anticipate the presence of species (as a surrogate for its actual observation), there is no absolute certainty to the absence of a species from marginal or potential habitat.

Additionally, there may be some species that may utilise the habitats within the site but have remained undetected due to their rarity, elusive nature or the sporadic utilisation of the habitats (i.e. the Long-nosed Potoroo, Common Planigale and Dunnart are elusive species that are difficult to trap or observe directly; the Black-necked Stork, Powerful Owl, Spotted-tail Quoll and Red Goshawk may only visit an area occasionally within a much larger home-range; the Swift Parrot and Regent Honeyeater may only visit an area during peak flowering periods etc).

The conclusions of this report are therefore based upon data available at the time and the results of field works undertaken and are therefore indicative of the environmental condition of the site at the time of sampling, including the presence or otherwise of species. At should be acknowledged that site conditions, including the presence of threatened species, can change over time.

The above limitations have been taken into account and the likelihood of threatened such species occurring within the site assessed through habitat assessment, records of the species within the locality and aspects of species ecology.

4.1.4 Licencing

The following issued licences were held by the surveyors at the time of surveying:

Table 5: Relevant Licences

Authority	Licence/Permit	Title	Expiration	Permit No.
NSW DPI Animal Care & Ethics Committee	Animal Research Approval	Fauna Surveying, Trapping & Release	30 June 2014	08/6865
NSW DPI Animal Care & Ethics Committee	Animal Research Authority	Fauna Surveying, Trapping & Release	30 June 2014	08/6865
NSW National Parks & Wildlife Service	Scientific Licence	Ecological Survey	31 May 2014	S100142
QLD EPA/DEHP	Scientific Purposes Permit	Wildlife Research	11 June 2014	WISP06002009
QLD DEEDI Animal Ethics	Scientific Use Registration	Scientific Use Registration	14 February 2015	Reg No. 241
QLD DAAF Animal Ethics	Community Access AEC	Fauna Surveying	31 May 2014	CA 2012/06/615
QLD DEHP	Rehabilitation Permit NC(Administration)R 2006	Observe or relocate protected animals	16 May 2016	WIRP12736113

4.1.5 Habitat Assessment

Prior to the commencement of the abovementioned survey works on site a broad habitat assessment was conducted in association with vegetation survey works. The purpose of this overview was to determine which species were likely to be present based on available habitat components and to target areas for detailed surveying of protected fauna species.

The site incorporated the following broad habitat types as a result of previous land use, vegetation types (refer **Section 3**), surrounding uses and hydraulic regime:

Table 6: Habitat Elements

HABITAT ELEMENTS	
Habitat Element/Feature	**Comment**
Hollow bearing trees	Present. Hollow-bearing trees were present within the Eucalypt Forest (Vegetation Community 3)
Presence of koala habitat and/or favoured koala trees	Favoured koala trees present (Blue Gum, Tallowwood, Scribbly Gum, Bastard Tallowwood)
Presence of caves, culverts or disused buildings suitable for roosting of microchiropteran bat species	Sheds and dwelling present. No caves or culverts encountered.
Presence of scratches or feeding scars on tree trunks	Koala and Possum scratches were observed on several smooth barked eucalypts within eucalypt forest on the western portion of the site.
Presence of megabat roosting sites	Not recorded. A large roost does occur within the locality in association with the littoral rainforest near the Silver Sands Holiday Park.
Presence of creeklines, estuaries, mudflats, mangroves and/or riparian vegetation	Although not recorded on site, Evans River is immediately external to the site to the south.
Presence of dams, ponds, lakes and/or other natural or constructed permanent water sources	Two drainage lines occurs within the eastern portion of the site. The Heath community features several small drainage lines.
Presence of dense understory and ground cover vegetation	Abundant in association with the eucalypt forest and littoral rainforest.
Presence of deep leaf litter layer and/or debris (fallen logs etc.)	Abundant in association with the eucalypt forest and littoral rainforest.

HABITAT ELEMENTS	
Habitat Element/Feature	**Comment**
Presence of fruiting flora species	Present in association with the littoral rainforest. Species includes typical species such as Tuckeroo, Glochidion, Elaeocarpus etc..
Presence of flowering species	Typically, prolific flowing species such as melaleuca, eucalypt, acacia, banksia etc. are found throughout the entire site (with the exception of cleared areas)
Presence of large stick nests indicative of raptor presence	Known within the locality however not observed on site
Presence of rocky outcrops and/or extensive exposed rocky areas favouring reptile populations	Absent, although reptiles were noted basking on the abandoned roadways within the site.

4.2 SITE SURVEY RESULTS

The following section(s) list the fauna species recorded on the subject site during detailed surveying and lists the methods by which each species was identified. Results are grouped by the Class of species recorded. Those techniques utilized to record fauna are listed below and correlate with the acronyms included within the Survey Methods column of the grouped Survey Results tables. An element has also been incorporated into the table which quantifies the abundance of each species recorded on site.

Survey Method Codes:

O	Direct Observation
SL	Direct Observation with Spotlight
Sc	Scat
C	Call (Audible) Detection, Recording and/or response to playback
CAM	Passive Camera Trap
HT	Hair tube/funnel
Scr	Scrape
Scrt	Scratch
Sh	Shell/Shell Fragment/Skeleton
Trk	Track/Trace
T	Trapped/hand captured
Ana	ANABAT Detection
Rk	Road-kill
*	All birds were either directly observed through diurnal survey, spotlighting or call identification.
**	Introduced/feral species
***	Recorded in adjacent areas or circling overhead

BIRDS*

CLASS	FAMILY	SPECIES NAME	COMMON NAME
Birds	Acanthizidae	*Acanthiza pusilla*	Brown Thornbill
Birds	Acanthizidae	*Sericornis frontalis*	White-browed Scrubwren
Birds	Accipitridae	*Accipiter cirrocephalus*	Collared Sparrowhawk
Birds	Accipitridae	*Accipiter fasciatus*	Brown Goshawk
Birds	Accipitridae	*Circus approximans*	Swamp Harrier
Birds	Accipitridae	*Elanus axillaris*	***Black-shouldered Kite
Birds	Accipitridae	*Haliastur indus*	Brahminy Kite
Birds	Accipitridae	*Haliastur sphenurus*	***Whistling Kite
Birds	Alcedinidae	*Ceyx azureus*	Azure Kingfisher
Birds	Alcedinidae	*Dacelo novaeguineae*	Laughing Kookaburra
Birds	Alcedinidae	*Todiramphus sanctus*	Sacred Kingfisher
Birds	Anatidae	*Anas superciliosa*	Pacific Black Duck
Birds	Anatidae	*Chenonetta jubata*	Australian Wood Duck
Birds	Ardeidae	*Ardea modesta*	***Eastern Great Egret
Birds	Ardeidae	*Egretta garzetta*	Little Egret
Birds	Ardeidae	*Egretta novaehollandiae*	White-faced Heron
Birds	Artamidae	*Artamus leucorynchus*	White-breasted Woodswallow
Birds	Artamidae	*Cracticus nigrogularis*	Pied Butcherbird
Birds	Artamidae	*Cracticus tibicen*	Australian Magpie
Birds	Artamidae	*Cracticus torquatus*	Grey Butcherbird
Birds	Artamidae	*Strepera graculina*	Pied Currawong
Birds	Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike
Birds	Campephagidae	*Coracina tenuirostris*	Cicadabird
Birds	Campephagidae	*Lalage leucomela*	Varied Triller
Birds	Caprimulgidae	*Eurostopodus mystacalis*	White-throated Nightjar
Birds	Centropodidae	*Centropus phasianinus*	Pheasant Coucal
Birds	Charadriidae	*Vanellus miles*	Masked Lapwing
Birds	Climacteridae	*Cormobates leucophaea*	White-throated Treecreeper
Birds	Columbidae	*Geopelia humeralis*	Bar-shouldered Dove
Birds	Columbidae	*Geopelia striata*	Peaceful Dove
Birds	Columbidae	*Leucosarcia picata*	Wonga Pigeon
Birds	Columbidae	*Ocyphaps lophotes*	Crested Pigeon
Birds	Coraciidae	*Eurystomus orientalis*	Dollarbird
Birds	Corvidae	*Corvus orru*	Torresian Crow
Birds	Cuculidae	*Cacomantis flabelliformis*	Fan-tailed Cuckoo
Birds	Cuculidae	*Eudynamys orientalis*	Eastern Koel
Birds	Dicruridae	*Dicrurus bracteatus*	Spangled Drongo
Birds	Falconidae	*Falco cenchroides*	Nankeen Kestrel
Birds	Hirundinidae	*Hirundo neoxena*	Welcome Swallow
Birds	Laridae	*Chroicocephalus novaehollandiae*	Silver Gull
Birds	Maluridae	*Malurus cyaneus*	Superb Fairy-wren
Birds	Maluridae	*Stipiturus malachurus*	Southern Emu-wren
Birds	Megaluridae	*Megalurus timoriensis*	Tawny Grassbird
Birds	Meliphagidae	*Anthochaera carunculata*	Red Wattlebird
Birds	Meliphagidae	*Anthochaera chrysoptera*	Little Wattlebird

CLASS	FAMILY	SPECIES NAME	COMMON NAME
Birds	Meliphagidae	*Entomyzon cyanotis*	Blue-faced Honeyeater
Birds	Meliphagidae	*Lichenostomus chrysops*	Yellow-faced Honeyeater
Birds	Meliphagidae	*Lichmera indistincta*	Brown Honeyeater
Birds	Meliphagidae	*Manorina melanocephala*	Noisy Miner
Birds	Meliphagidae	*Meliphaga lewinii*	Lewin's Honeyeater
Birds	Meliphagidae	*Melithreptus albogularis*	White-throated Honeyeater
Birds	Monarchidae	*Grallina cyanoleuca*	Magpie-lark
Birds	Nectariniidae	*Dicaeum hirundinaceum*	Mistletoebird
Birds	Oriolidae	*Oriolus sagittatus*	Olive-backed Oriole
Birds	Pachycephalidae	*Colluricincla harmonica*	Grey Shrike-thrush
Birds	Pachycephalidae	*Pachycephala rufiventris*	Rufous Whistler
Birds	Pardalotidae	*Pardalotus striatus*	Striated Pardalote
Birds	Pelecanidae	*Pelecanus conspicillatus*	***Australian Pelican
Birds	Petroicidae	*Eopsaltria australis*	Eastern Yellow Robin
Birds	Phalacrocoracidae	*Microcarbo melanoleucos*	***Little Pied Cormorant
Birds	Phalacrocoracidae	*Phalacrocorax carbo*	***Great Cormorant
Birds	Phasianidae	*Coturnix ypsilophora*	Brown Quail
Birds	Podargidae	*Podargus strigoides*	Tawny Frogmouth
Birds	Psittacidae	*Trichoglossus chlorolepidotus*	Scaly-breasted Lorikeet
Birds	Psittacidae	*Trichoglossus haematodus*	Rainbow Lorikeet
Birds	Psophodidae	*Psophodes olivaceus*	Eastern Whipbird
Birds	Rallidae	*Fulica atra*	***Eurasian Coot
Birds	Rallidae	*Gallinula tenebrosa*	***Dusky Moorhen
Birds	Rallidae	*Porphyrio porphyrio*	Purple Swamphen
Birds	Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail
Birds	Threskiornithidae	*Threskiornis molucca*	Australian White Ibis
Birds	Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis
Birds	Timaliidae	*Zosterops lateralis*	Silvereye
Birds	Tytonidae	*Tyto javanica*	Eastern Barn Owl

MAMMALS

CLASS	FAMILY	SCIENTIFIC NAME	COMMON NAME	METHOD
Mammals	Canidae	***Canis lupus familiaris*	Dog	CAM
Mammals	Dasyuridae	*Antechinus flavipes*	Yellow-footed Antechinus	T, HT
Mammals	Felidae	***Felis catus*	Cat	SL, O
Mammals	Leporidae	***Lepus capensis*	Brown Hare	SL
Mammals	Macropodidae	*Macropus gigantus*	Eastern Grey Kangaroo	SL, O
Mammals	Macropodidae	*Wallabia bicolor*	Swamp Wallaby	O, CAM
Mammals	Molossidae	*Mormopterus sp.2*	A Free-tailed Bat	Ana
Mammals	Muridae	*Melomys burtoni*	Grassland Melomys	T

CLASS	FAMILY	SCIENTIFIC NAME	COMMON NAME	METHOD
Mammals	Muridae	**Mus musculus*	House Mouse	T
Mammals	Muridae	*Rattus fuscipes*	Bush Rat	T, HT
Mammals	Peramelidae	*Perameles nasuta*	Long-nosed Bandicoot	CAM
Mammals	Peramelidae	*Isoodon macrourus*	Northern Brown Bandicoot	CAM
Mammals	Petauridae	*Petaurus norfolcensis*	Squirrel Glider	SL
Mammals	Phalangeridae	*Trichosurus vulpecula*	Brushtail Possum	SL
Mammals	Phascolarctidae	*Phascolarctos cinereus*	Koala	Scrt
Mammals	Pseudocheiridae	*Pseudocheirus peregrinus*	Common Ringtail Possum	SL
Mammals	Pteropodidae	*Pteropus poliocephalus*	Grey-headed Flying Fox	SL
Mammals	Pteropodidae	*Pteropus alecto*	Black Flying Fox	SL
Mammals	Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat	Ana
Mammals	Vespertilionidae	*Chalinolobus nigrogriseus*	Hoary Wattled Bat	Ana
Mammals	Vespertilionidae	*Miniopterus australis*	Little Bent-wing Bat	Ana
Mammals	Vespertilionidae	*Myotis macropus*	Southern Myotis	Ana
Mammals	Vespertilionidae	*Vespadelus pumilus*	Eastern Forest Bat	Ana
Mammals	Vespertilionidae	*Scotorepens spp.*	A Broad-nosed Bat	Ana
Mammals	Molossidae	*Mormopterus sp2*	Eastern Freetail	Ana
Mammals	Rhinolophidae	*Rhinolophus megaphyllus*	Smaller Horseshoe Bat	Ana

REPTILES

CLASS	FAMILY	SCIENTIFIC NAME	COMMON NAME	METHOD
Reptiles	Agamidae	*Physiganthus lesueurii*	Eastern Water Dragon	O
Reptiles	Agamidae	*Pogona barbata*	Bearded Dragon	O
Reptiles	Boidae	*Morelia spilota*	Carpet Python	O
Reptiles	Colubridae	*Dendrelaphis punctulatus*	Common Tree Snake	SL
Reptiles	Elapidae	*Notechis scutatus*	Tiger Snake	O
Reptiles	Elapidae	*Psedonaja textilis*	Eastern Brown Snake	O
Reptiles	Scindae	*Cryptoblepharus pulcher*	Wall Skink	O

CLASS	FAMILY	SCIENTIFIC NAME	COMMON NAME	METHOD
Reptiles	Scincidae	*Lampropholis delicata*	Grass Skink	O, T

AMPHIBIANS

CLASS	FAMILY	SCIENTIFIC NAME	COMMON NAME	METHOD
Amphibians	Bufonidae	***Rhinella marina*	Cane Toad	O, SL, C
Amphibians	Hylidae	Litoria fallax	Eastern Sedgefrog	C
Amphibians	Myobatrachidae	Limnodynastes terraereginae	Northern Banjo Frog	SL
Amphibians	Myobatrachidae	*Crinia signifera*	Clicking Froglet	C
Amphibians	Myobatrachidae	*Crinia tinnula*	Wallum Froglet	C

4.3 DISCUSSION OF SURVEY RESULTS

4.3.1 Birds

Seventy-four (74) species of bird were recorded during surveys of the subject site. No species scheduled as endangered or vulnerable under the *Threatened Species Conservation Act 1995* or *Environment Protection and Biodiversity Conservation Act 1999* were recorded on the site during fauna survey works

The majority of bird species recorded from within and adjacent the site are diurnal species including:

- Insectivores which forage for invertebrates in the leaves, branches and bark of trees, in the air spaces provided by canopy gaps, and amongst litter, woody debris and groundcovers (i.e. fairy wrens, fantails, scrubwren etc)
- Nectar feeders (i.e. lorikeets, honeyeaters, miners etc)
- Large omnivores (i.e. butcherbirds, magpies, crows etc)
- Waterbirds (pelicans, gulls, egrets etc)
- Granivores (Doves, Pigeons)

A significant review of literature relating to the habitats and niche requirements of avifauna utilising eucalypt woodlands and forests was undertaken by McElhinny (2000) in association with NSW NPWS. This review notes that “the bird species occurring in eucalypt woodlands and forests belong to a variety of foraging groups, reflecting the diversity of resources which these vertebrates can utilise. A large proportion of birds are insectivorous, foraging for invertebrates in the leaves, branches and bark of eucalypts, in the air spaces provided by canopy gaps, and amongst litter and woody debris (Woinarski *et al.* 1997). There is also a diversity of bird species which feed on nectar and exudates such as manna, honeydew and sap (Recher *et al.* 1985). A small proportion of birds feed on eucalypt seeds, and only a very few species are capable of digesting pollen. Frugivorous birds are rare and there are no leaf

eating birds (Landsberg and Cork 1997). In addition to food resources, birds utilise sites for nesting and shelter, either in the form of suitable tree hollows, or appropriate foliage or ground cover arrangements (Recher *et al.* 1991).

The most productive habitats for birds appear to be those providing a range of resources which can support a variety of different foraging groups (Bauer *et al.* 2000). This is most likely to occur where there is a diversity of vegetation strata available as foraging substrates (Gilmore 1985, Loyn 1985, Recher 1969, MacArthur and MacArthur 1961). In Australian temperate forests and woodlands different strata tend to reflect differences at the levels of plant life form (forb, shrub or tree) and plant genus. This provides different kinds of food (nectar, fruit, seeds) and foliage thereby increasing the diversity of foraging opportunities for bird species (Recher 1985).

Six habitat components have been consistently identified as important resource bases for birds (Recher *et al.* 1998, Woinarski *et al.* 1997, Traill 1993, Recher 1991, Gilmore 1985):

- Foliage; a source of exudates and invertebrates;
- Flowers; a source of nectar and invertebrates
- Bark; a source of exudates and invertebrates
- The ground layer, including ground vegetation, litter, logs and coarse woody debris; - a source of invertebrates and small vertebrates;
- Air spaces; within and between canopy strata - a source of invertebrates;
- Hollow bearing trees; for nesting and shelter" (McElhinny, 2000: 20).

It is considered that the site exhibits habitat suitable for a wide variety of native bird species due to the different variety of vegetation communities and site characteristics.

The nectarivorous guild was well represented and is generally well established within local eucalypt, paperbark and coastal forests (incorporating heath species) favouring this avifauna group. Meliphagids were regularly encountered during survey works, in particularly within the heath community which featured flowering Melaleucas.

The expansive tracts of eucalypt forest and rainforest present within the locality incorporating moderate densities of hollow bearing trees provides potential habitat for a variety of nocturnal avifauna, although only the Barn Owl were encountered. Large forest owls (Masked, Eastern Grass, Powerful) are also known from the locality and must be considered potential occurrences within the areas given the abundance of suitable habitat for known prey species.

Suitable habitat for species associated with dense ground strata was abundant in association with the eucalypt forest and the littoral rainforest which contained a deep leaf litter layer, and groundcovers containing rushes, sedges and grasses and thick shrub layer in areas. A reasonable diversity of ground, low and shrub level foliage gleaners/pouncers and sallyers were recorded from these areas including Silvereyes, Fantails, Fairy-wrens, and Grassbird.

The nearby Evans River has resulted in the recording of common waterfowl such as Pelicans, Ducks, Egrets and Herons. Diurnal coastal raptors were also noted to be common in the locality and were regularly recorded circling over the site although no nests were observed.

The open grassland/modified areas adjacent to the existing house provides suitable habitat for common territorial species (Crow, Magpie, Minor) and edge-specialist species (Kookaburra, Butcherbird, Magpie) which were frequently recorded on site.

4.3.2 Mammals

A total of twenty-five (25) mammal species were recorded on the subject site during surveying works. Six species scheduled as Vulnerable under the *Threatened Species Conservation Act 1995* or *Environmental Protection and Biodiversity Conservation Act 1999* were recorded on the site during survey works. These species are discussed individually within the later sections of the report.

Ground-dwellings Mammals

All terrestrial mammals require vegetated cover for shelter and to facilitate movement. Small terrestrial mammals prefer areas within a complex vegetation structure which is dense within the lower strata and subsequently provides shelter/nesting sites and refuge from predators. Larger terrestrial mammals (larger wallabies, kangaroos) also generally require dense cover for refuge but tend to favour more open areas for grazing/feeding.

Suitable structural forest variation and dense understory components were generally present over the entire site (excluding the cleared areas and vehicles tracks) and are abundant within the locality including the Bundjalung National Park and Broadwater National Park. Common native and introduced ground dwelling mammals such as Bandicoots, Rats, Antechinus a mice were regularly trapped or recorded and a considered to occur in abundance within the locality. The Eastern Grey Kangaroo was regularly recorded within the cleared grassland/paddock areas adjacent to the existing house. Swamp wallabies were also encountered regularly on site. Several cats, a dog (uncollared) and hares were also recorded on site. A very small area of potential habitat for terrestrial mammals will be modified in association with the proposed development.

Arboreal Mammals

Arboreal mammals previously noted to occur within the vicinity of the site are all noted to be hollow dependent with the exception of the Koala and the Ringtail Possum (which does utilize hollows but will also construct leaf dreys) (Strahan eds, 2002; Gibbons and Lindenmayer, 2002). It is widely accepted that a reduction in senescent trees is a limiting factor in hollow dependent arboreal mammal populations (Smith and Lindenmayer, 1998; Gibbons and Lindenmayer, 2002; Lindenmayer, 2002; Lunney, 1987).

Within the study area and surrounding locality exists an abundance of hollow bearing trees (HBT) with associated Eucalypt forest also prevalent. The habitat value for hollow-dependent

arboreal mammals is accordingly considered to be high within the locality. The following species were encountered during nocturnal survey:

- Squirrel Glider (2 individuals recorded)
- Brush-tailed Possum (4 individuals recorded)

Koala foraging resources and associated eucalypt forest/woodland is present on site in association with the eucalypt forest (Vegetation Community 3). Koala scratches were observed on numerous Blue Gums and Scribbly Gums within this community in 2014. The assessment of current levels of Koala activity/usage over the site utilising the RG-bSAT in March 2019 (**Attachment 4)** identified areas of "low" level usage outside of the proposed development footprint (i.e. adjacent to the south-western corner). A small number of Koala faecal pellets were recorded under a total of three (3) trees in this portion of the site. As noted by Phillips and Callaghan (2011), where the results of a SAT site returns an activity level within the low use range, the level of use by the Koala is likely to be transitory. It is also noted that none of the faecal pellets recorded were considered to be fresh.

Based on the results of this assessment it is considered that the south-western portion of the subject site may be utilised occasionally by Koalas as they traverse the locality. The results indicate that a resident/sedentary population is not currently present on the site.

Koalas are addressed further in **Section 5.3** below.

Flying Mammals

Two species of flying fox (Grey-headed and Black) was recorded flying over the site. An individual Grey-headed Flying-fox was noted foraging on a Melaleuca within the Heath community during spotlighting events. No evidence of roosting colonies or camps were encountered on site, however, is present within the locality Since 2002 grey-headed and black flying-foxes have been roosting on a seasonal basis in the littoral rainforest remnant located near the village centre just 250 metres north east of the main street (Hallinan and Richmond Valley Council, 2008). Anabat detection survey also recorded the following bat species within the study area:

- Smaller Horseshoe Bat
- Gould's Wattled Bat
- Hoary Wattled Bat
- Little Bent-wing Bat
- Southern Myotis
- Eastern Forest Bat
- A Broad Nosed Bat (*Scotorepens spp.*)
- Freetail Bat (Mormopterus sp2)

The presence of extensive eucalypt forest and heathland habitats on site indicates that microchiropteran bats are likely to forage on site. The existing drainage lines on site also provides potential habitat for species which favour foraging over waterbodies for insects (e.g. Southern Myotis etc..), although more suitable habitats occur within the locality in association with Evans River and wetlands.

Table 7: Roosting Types Of Recorded Micro-Bats

SPECIES NAME	COMMON NAME	ROOST TYPE
Rhinolophus megaphyllus	Smaller Horseshoe Bat	Though characteristically cave-dwelling, substitute roosts have been provided by humans in the form of old railway tunnels, abandoned mines, stormwater drainpipes and culverts (Hall, Young & Spate 1974). Occasionally, rhinolophids are found in houses or a shed, and Eastern Horseshoe-bats have been found roosting amongst tree roots in undercut creek banks. Many roosts have a small, restricted entrance with access via narrow vertical drops (Dwyer 1966d). A variety of surfaces such as sloping walls, flat roofs, or indentations can be used for roosting. Flat vertical walls causing ventral body contact are never used, but deep ceiling domes are frequently occupied by single animals, groups of unclustered individuals, and, occasionally, by small clusters. Roost sites are typified by small dimensions, high temperatures and humidities, and frequently have a dirt floor (Hall et al. 1974).
Chalinolobus gouldii	Gould's Wattled Bat	Mostly within tree cavities although occasionally within other areas [tree stump, disused birds nests, building roofs, canvas roll, tractor exhaust] (Chruszcz and Barclay, 2002). Victoria studies conducted by Lumsden and Bennett (1995) and later by Lumsden (2004) found roost switching was common in individuals faithful to a roost area. Roosts used on successive days were usually within 300 m of each other. Lumsden (2004) showed a strong bias for roost trees within floodplain forests and preference toward large Blue Gum/River Red Gums. Colonies are generally small (up to 30) within individuals (primarily males) also roosting individually (Dixon and Lumsden in Van Dyck and Strahan, 2008).
Chalinolobus nigrogriseus	Hoary Wattled Bat	Tree cavities and occasionally buildings and rock crevices.
Miniopterus australis	Little Bent-wing Bat	Caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day (DECC 2005). DECC (2005) note the following additional particulars with regard to roosting of little bentwing bat: • Maternity colonies form in spring. Males and juveniles disperse in summer. • Only five nursery sites /maternity colonies are known in Australia. • They often share roosting sites with the Common Bentwing-bat and, in winter, the two species may form mixed clusters.

Table 7: Roosting Types Of Recorded Micro-Bats		
SPECIES NAME	**COMMON NAME**	**ROOST TYPE**
		• 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.
Myotis macropus	Southern Myotis	The Myotis roosts within caves, tunnels, hollow-bearing trees, bridges, buildings and dense tree foliage always in close proximity to permanent water (NPWS, 2002; Richards, 2002). Breeding colonies may consist of 10-15 individuals or occasionally up to several hundred. Within breeding colonies small clusters are made where a male establishes a territory from which other males are actively excluded and breeding females are protected. Outside of breeding males roost solitarily within a defended zone or established a small group of up to 20 males.
Vespadelus pumilis	Eastern Forest Bat	Tree hollows, favouring large hollow bearing trees, with maternity colonies up to 50 adult females (Law et al in Van Dyck & Strahan, 2008). Large hollow bearing trees proximate to riparian zones are particularly favoured (Land and Anderson, 2000). Males may also roost within understorey species such as Blackwood (Turbill et al, 2003)
Scotorepens spp.	A Broad Nosed Bat	Broad Nosed bats have been recorded roosting in tree hollows and roofs (Tidemann and Parnaby 2008,
Mormopterus sp2 (syn. M. ridei per Churchill, 20085).	Eastern Freetail	Eastern Freetail bats roost mainly in tree hollows but will also roost under bark, in buildings and cracks in posts. Colonies of several hundred have been recorded. They have been reported to share roost with Gould's wattled bats, *Chalinolobus gouldii,* and the eastern broad-nosed bat, *Scotorepens orion*

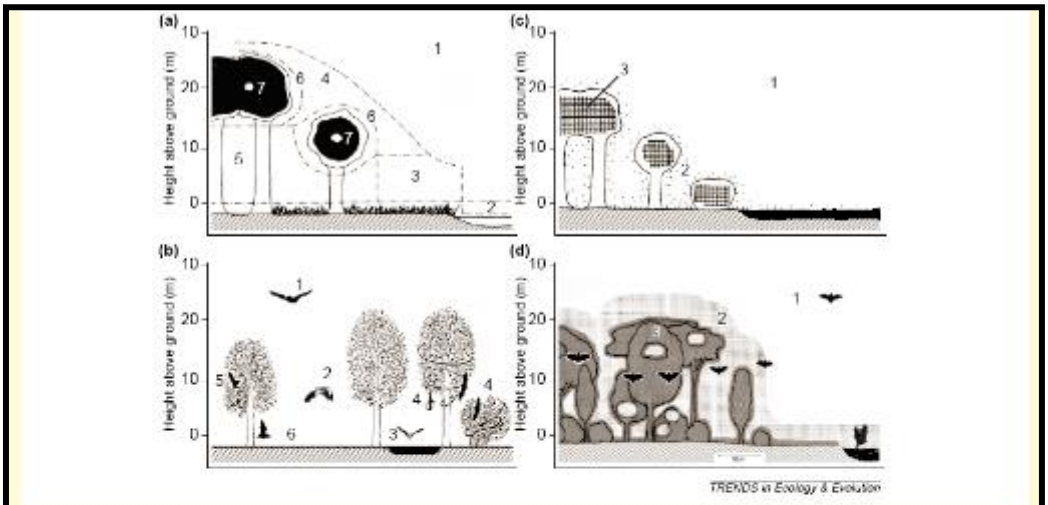


Fig. I. Characterization of foraging habitats of bats from key publications: (a) Aldridge and Rautenbach [16]; (b) Neuweiler [17]; (c) Fenton [18]; and (d) Schnitzler and Kalko [12,13]. The origins of the diagrams [12,13,16–18] and the names of the different habitat types (labeled by numbers) are presented in Table I. Adapted, with permission, from [12,13,16–18].

Table I. Characterization of the foraging habitats of bats[a]

(a) Aldridge and Rautenbach [16]	(b) Neuweiler [17]	(c) Fenton [18]	(d) Schnitzler and Kalko [12,13]
1 Open areas	1 Above canopy	1 Open habitat	1 Uncluttered or open space
2 0.5 m above water 3 Over pasture 4 0.5 m away from canopy 5 Between trees	2 Open spaces between canopy 3 Over water surfaces		2 Background cluttered space or edge space
6 Surface of vegetation 7 Within vegetation	4 Close to and within foliage 5 Foliage 6 Ground	2 Edge habitats 3 Closed habitats	3 Highly cluttered or narrow space

[a]See Fig. I for pictorial representation of the different foraging habitats of bats.

Figure 5: Review Of Micro-bat Foraging Habitats – Source: Schnizler *et al*. 2003)

A review of the bats recorded within the study area indicates that tree cavities and caves/crevices are necessary for roosting/breeding. In addition to providing shelter, maternity places and retreats for hibernation, roosts are also important places for social interactions among bats. The availability of suitable roosts is therefore critical for the survival of forest bats (Herr, 1998). Within the site it is considered that cave/mine potential breeding sites are absent, however hollow-bearing trees were present in association with the eucalypt community.

In addition to the above, it is noted that several bat species (i.e. Large-eared Pied Bat, Eastern Bentwing, Little Bentwing, Southern Myotis etc) may regularly roost in man-made structures such as bridges (Hoye, 2009; Bat Advisory Recovery Team, 2001; TSC, 2010). Such structures too are absent from this site.

4.3.3 Reptiles

A total of eight (8) reptile species were recorded on the subject site. No species listed as endangered or vulnerable under the *Threatened Species Conservation Act 1995* or *Environment Protection and Biodiversity Conservation Act 1999* were recorded on the site during fauna survey works.

Within the site, a variety of lizards were recorded all of which are considered to be common species. Several individuals were encountered within the ground layer of the eucalypt forest

and the acacia regrowth area which incorporates abundant fallen timber, logs and general organic debris. A bearded dragon was encountered utilising the abandoned roads for basking within the acacia regrowth section of the site. Additionally, a grass skink was trapped within the constructed pitfall traps located within the heathland community.

Several (4) snake species were encountered during surveying periods of the site. A large Carpet Python was found within the eucalypt forest adjacent to the existing house, while a Common Tree Snake was found within the Littoral Rainforest during spotlighting events. The cleared area/grassland in close proximity to the house recorded an Eastern Brown Snake and a Tiger Snake.

The presence of abundant eucalypt woodlands in the locality would indicate that common species such as the spotted python, whip snakes and red-bellied black snake may also occur.

Those encountered are considered to be common occurrences within the locality and will be minimally affected by the proposal via modification of the existing ground refuge within the small area occupied by the development envelope.

4.3.4 Amphibians

Four (4) species of native frog and one (1) introduced toad were recorded on the subject site. One species listed as vulnerable under the *Threatened Species Conservation Act 1995* was recorded on the site during fauna survey works.

The Eastern Sedge Frog, Wallum Froglet and Clicking Frog were recorded vocalising within the eastern drainage line along the property boundary and within the adjacent SEPP designated land . The Northern Banjo Frog was regularly observed during spotlight events throughout the site along with the introduced Cane Toad.

Amphibians typically require a series of permanently wet or damp habitats (streams, moist understorey, dams, depressions etc) to disperse (it is noted however that they will disperse across additional areas during prolonged wet weather) and require access to various breeding sites on a seasonal basis.

Negative impacts to continued amphibian survival within local and regional areas can occur when appropriate breeding sites and habitats are isolated, thus separating breeding individuals and access to alternate food resources. This is particularly relevant for rare and threatened species, which are usually already geographically isolated from similar populations. In this regard it is noted that the drainage lines of the site are connected to melaleuca dominated wetlands occurring to the northeast of the site.

Although the proposal will see the two drainage lines filled, more suitable habitat occurs directly to the northeast of the site in association with the melaleuca dominated wetlands. It is considered unlikely that potential significant amphibian sites will be impacted or isolated from existing connected breeding areas.

Table 8 - Frog Habitat Guilds			
Species	**Common Name**	**Adult Habitat**	**Breeding Habitat**
Litoria fallax	Eastern Sedgefrog	tree frog & ground	Permanent-temporary pools/lentic. Dams, ponds and swamps especially those with emergent reeds. Breeding: Spring-Summer
Crinia signifera	Clicking Frog	ground	Ephemeral pool/lentic. Temporary to permanent flooded ditches, streams, or permanent pools and dams. Highly adaptable.
Crinia tinnula	Wallum Froglet	ground	Breeding occurs in low nutrient, acidic (pH < 6), tannin-stained ephemeral ponds and swamps associated with coastal banksia, melaleuca, wet heath and/or adjacent eucalypt forest/woodland (Meyer et al., 2005).
Limnodynastes terraereginae	Northern Banjo Frog	ground	The species occurs in a variety of habitats along the edges of permanent streams, dams, swamps and other areas of static water including roadside depressions. There must be cover in the form of grass and other dense vegetation. Breeding commences about October and continues until May.

5.0 SCHEDULED COMMUNITIES, POPULATIONS AND SPECIES OF CONSERVATION SIGNIFICANCE

Following a review of the flora and fauna assessments, the following further discussions of ecological significance have been prepared:

5.1 ENDANGERED ECOLOGICAL COMMUNITIES

Endangered ecological communities are listed under Schedule 1, Part 3 of the *Threatened Species Conservation Act 1995*, while threatened ecological communities are listed under the *Environment Protection and Biodiversity Conservation Act 1999* as critically endangered, endangered and vulnerable.

One vegetation community representative of an endangered ecological community (listed within schedules of the TSC Act) and threatened ecological community (listed within schedules of the EPBC Act) has been recorded on the subject site:

Table 9 - Recorded Endangered/Threatened Ecological Communities

EEC (TSC Act)	TEC (EPBC Act)	SITE VEGETATION COMMUNITY
LITTORAL RAINFOREST IN THE NSW NORTH COAST, SYDNEY BASIN AND SOUTH EAST CORNER BIOREGIONS	LITTORAL RAINFOREST AND COASTAL VINE THICKETS OF EASTERN AUSTRALIA	VEGETATION COMMUNITY 4: TALL TO VERY TALL MIXED CLOSED FOREST CONTAINING A WIDE VARIETY OF RAINFOREST SPECIES

Endangered populations are listed under Schedule 1, Part 2 of the *Threatened Species Conservation Act 1995*. Although the region occurs within the 'Emu population in the New South Wales North coast Bioregion and Port Stephens local government area', no emus were recorded during surveying works.

5.2 THREATENED FLORA SPECIES

No flora species listed within schedules of the Commonwealth's *Environmental Protection and Biodiversity Conservation Act 1999* or NSW's *Threatened Species Conservation Act 1995* were observed.

A search of the *NPWS 'Atlas of NSW Wildlife' [2014]* has determined that eleven (11) species of threatened flora have been previously recorded within the locality (search area North: -29.07 West: 153.3599 East: 153.4599 South: -29.17). Active searches throughout the occurring vegetation communities throughout the site were undertaken to locate the presence or absence of these species which are tabulated below. Based on habitat assessment and the known distribution of these species within the NENSW bioregion, a number of these are considered unlikely to be present within the site. It is considered suitable habitat for these may be present but given the site conditions they do not occur and were not detected during field survey.

Table 10: Potentially Occurring Threatened Flora Species				
Family	**Species Name**	**Preferred Habitat**	**TSCA Status**	**Expected Impact**
Asteraceae	*Rutidosis heterogama*	Recorded from near Cessnock to Kurri Kurri with an outlying occurrence at Howes Valley. On the Central Coast it is located north from Wyong to Newcastle. There are north coast populations between Wooli and Evans Head in Yuraygir and Bundjalung National Parks. It also occurs on the New England Tablelands from Torrington and Ashford south to Wandsworth south-west of Glen Innes (OEH 2014). Grows in heath on sandy soils and moist areas in open forest and has been recorded along disturbed roadsides (OEH 2014).	V	Not recorded within the development site. No impact expected on the species.
Cyperaceae	*Cyperus aquatilis*	In NSW, known only from a few sites north from Grafton (OEH 2012) Grows in ephemerally wet sites, such as roadside ditches and seepage areas from small cliffs, in sandstone areas (OEH 2012)	E	Not recorded within the development site. No impact expected on the species.
Droseraceae	*Aldrovanda vesiculosa*	The species is more commonly found in northern Australia and tropical regions of Asia and Africa. Known in NSW only from lagoons in the Moruya area on the south coast, from the Evans Head area on the north coast and from north of Guyra on the New England Tablelands (OEH 2012). Found free-floating in near-coastal shallow freshwater lagoons that are rich in organic matter (OEH 2012)	E	Not recorded within the development site preferred habitat not present on site. No impact expected on the species.
Fabaceae (Caesalpinioideae)	*Senna acclinis*	*Senna acclinis* occurs in coastal districts and adjacent tablelands of NSW from the Illawarra in NSW to Queensland (OEH 2012). Grows in or on the edges of subtropical and dry rainforest (OEH 2012).	E	Not recorded within the development site. No impact expected on the species.
Fabaceae (Faboideae)	*Pultenaea maritima*	Within NSW, the species has been recorded from Newcastle north to Byron Bay on 16 headlands. Populations vary from a few plants to larger populations of many hundreds of individuals where the species is	V	Not recorded within the development site. No impact expected on the species.

Table 10: Potentially Occurring Threatened Flora Species				
Family	**Species Name**	**Preferred Habitat**	**TSCA Status**	**Expected Impact**
		a major component of the Kangaroo Grass Headland community (OEH 2013).		
Orchidaceae	*Dendrobium melaleucaphilum*	Grows frequently on *Melaleuca styphelioides*, less commonly on rainforest trees or on rocks in coastal districts; north from the lower Blue Mountains (OEH 2012).	E	Not recorded within the development site. No impact expected on the species.
Orchidaceae	*Oberonia complanata*	This species grows on trees and rocks in littoral rainforest, subtropical rainforest, dry rainforest, wet or dry eucalypt forests, dunes (including stabilised sands), stream-side areas, swampy forests and mangroves (OEH 2012), as well as coastal scrub and gorges in sclerophyll forest; north of Coffs Harbour (OEH 2012).	E	Not recorded within the development site. No impact expected on the species. Preferred habitat not affected by development
Orchidaceae	*Oberonia titania*	Red-flowered King of the Fairies occurs in littoral and subtropical rainforest and paperbark swamps, but it can also occur in eucalypt-forested gorges and in mangroves (OEH 2012).	V	Not recorded within the development site. No impact expected on the species. Preferred habitat not affected by development
Orchidaceae	*Peristeranthus hillii*	In NSW this orchid is restricted to coastal and near-coastal environments, particularly Littoral and Lowland Rainforest north from Port Macquarie (DEC, 2005)	V	Not recorded within the development site. No impact expected on the species. Preferred habitat not affected by development
Orchidaceae	*Phaius australis*	'The Lesser Swamp-orchid is commonly associated with coastal wet heath/sedgeland wetlands (Barry 2005), swampy grassland or swampy forest (NSW DECCW 2005iw) and often where Broad-leaved Paperbark or Swamp Mahogany are found (NH NSW 2006; Sparshott & Bostock	E	Not recorded within the development site. No impact expected on the species.

Table 10: Potentially Occurring Threatened Flora Species				
Family	**Species Name**	**Preferred Habitat**	**TSCA Status**	**Expected Impact**
		1993). Typically, the Lesser Swamp-orchid is restricted to the swamp-forest margins, where it occurs in swamp sclerophyll forest (Broad-leaved Paperbark/Swamp Mahogany/Swamp Box (*Lophostemon suaveolens*)), swampy rainforest (often with sclerophyll emergents), or fringing open forest. It is often associated with rainforest elements such as Bangalow Palm (*Archontophoenix cunninghamiana*) or Cabbage Tree Palm (*Livistona australis*) (Benwell 1994b; Bishop 1996; Weston in Harden 1993)' [DoE, 2013 online @ http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=5872]		
Orchidaceae	*Phaius tancarvilleae*	Swamp Lily occurs in north-east and south-east Queensland and north east NSW as well as globally from Papua New Guinea to China and Asia (Threatened Species Scientific Committee, 2008). Swamp Lily tends to occur in sunny positions in swamp forest ecotones. Associated vegetation includes swamp sclerophyll forest (*Melaleuca quinquenervia-Eucalyptus robusta-Lophostemon suaveolens*), swampy rainforest (often with sclerophyll emergents), or fringing open forest. It is often associated with rainforest elements *Archontophoenix cunninghamiana* or *Livistona australis* (Harden 1993; Benwell 1994; Bishop, 1996). Soil parent materials include marine Aeolian sand, alluvium, granite, metasediments and sandstone. On sand, soils range from shallow peat to humus or podzols (Harden 1993; Benwell 1994; Bishop 1996).	E	Not recorded within the development site. No impact expected on the species.
Polypodiaceae	*Belvisia mucronata*	In NSW, it is known from only five locations on the far north coast, north from Evans Head (OEH 2012) Forms small clumps on trees or rocks in dry rainforest or along creeks in moist open forest (OEH 2012)	E	Not recorded within the development site. No impact expected on the species.

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5.3 THREATENED FAUNA SPECIES

A search of the *NPWS 'Atlas of NSW Wildlife' [2014]* has determined that fifty-three (53) species of threatened flora have been previously recorded within the locality (search area North: -29.07 West: 153.3599 East: 153.4599 South: -29.17). During surveys of the subject site seven (7) of these species were recorded:

Table 11: Recorded Threatened Fauna Species

Species	Location Recorded
Grey-headed Flying-fox	Recorded flying over the site via spotlight
Hoary Wattled Bat	Recorded via anabat survey
Little Bentwing-bat	Recorded via anabat survey
Southern Myotis	Recorded via anabat survey
Koala	Trace recorded within the eucalypt forest on the western portion of the site in 2014 (i.e. scratches on Blue Gum and Scribbly Gum). "Low" level usage adjacent to the south-western corner of the proposed development in 2019 (i.e. a small number of Koala faecal pellets were recorded under a total of 3 trees outside the development footprint).
Squirrel Glider	Recorded via spotlight survey (two individuals recorded within the eucalypt forest on the western portion of the site).
Wallum Froglet	Recorded vocalising within the man-made drainage line along the eastern boundary line.

A review of available habitats and the ecology of the database listed species (i.e. range, preferred habitat, home range etc) indicate that it is unlikely that all of the previously recorded species in the region would rely on the habitats of the subject site or be significantly affected by the proposal.

Subsequently several such threatened species are considered unlikely to be significantly affected by the proposal for one or more of the following reasons:

- core habitats were not recorded in the study area
- resources used by the species are unlikely to be adversely affected or only likely to be minimally affected by the proposal.

Details of such species requirements and reasons for not considering impacts to these species further are contained within the below Table. A number of threatened species have been excluded from discussion in the below table where they are considered reasonably unlikely occurrences due to the following:

- Being a marine reptile or mammal (i.e. whale, turtle, seal)
- Being a pelagic seabird, wader bird or intertidal zone coastal bird (i.e. tern, godwit, oystercatcher)

For species considered a potential occurrence (based upon distribution, database recording, suitable habitat present etc) or which were recorded within or directly adjacent the site during either survey period and for which it is considered that the species may be significantly affected by the proposal (i.e. impact on feeding, roosting, nesting, behaviour and associated habitat), the seven-part test of significance has been performed in **Section 6.2** of this report.

Notwithstanding, all the species tabled below were targeted during the fauna survey or were reviewed in the context of documented ecology and available habitats.

Table 12: Potentially Occurring Threatened Fauna Species			
Species	**Potential occurrence**	**Notes**	**Potential for impacts**
Wallum Froglet (*Crinia tinnula*)	Possible	This species of wallum frog is found along drainage lines in sub-coastal wet heath, in acid paperbark (*Melaleuca*) swamps, and sedge swamps associated with sandy coastal plains (but rarely from around coastal lakes) and low slopes below 40 m altitude and above areas of tidal influence (Ehmann, 1997; Meyer et al, 2006). The habitats in which the wallum froglet species breed are typically oligotrophic (i.e. nutrient poor), tannin-stained and acidic ((pH 4.3-5.2) [QPWS 2001; Meyer et al. 2006; McDonald et al, 2009; Hines et al, 2004]. These attributes may render wallum frog breeding habitat unsuitable for related species (i.e. the common sedgefrog *Litoria fallax*, striped rocketfrog *L. nasuta*, clicking froglet *C. signifera* and beeping froglet *C. parinsignifera*). This could explain why wallum frog species and related species seldom occur together" (Ingram and Corben, 1975; Straughan, 1966 in Myer et al, 2006: 16). The coastal distribution occurs as far north as Litabella National Park on the southeast coast of Queensland south to Kurnell in mid-eastern New South and also upon a number of offshore islands including Fraser Island, Bribie Island, Moreton Island and North Stradbroke Island (BCC, 2010). Breeding usually occurs in autumn or early winter but has been recorded in all seasons following rain with males vocalising from the base of sedges near water or atop matted sedges (McDonald et al, 2009; Meyer et al, 2006). A regionally significant population of the species is noted to occur within a wide variety of habitats investigated in association with the Tugun Bypass SIS (PB, 2004; Hero et al, 2001). Known habitat broadly encompasses the following vegetation communities: Slashed Heathland, Wet Heathland, Swamp Mahogany Forest, Swamp Mahogany–Brushbox Forest, Littoral Rainforest, Swamp Paperbark Forest and other moist forest types. Breeding is confined to slow-moving water less than 1.5 metres deep within the pH range of 3.0 to 5.2 (PB 2004; 4.23). Significant areas of Melaleuca Forest are present within the adjacent Cudgen Reserve with the species known to occur there (NPWS, 1998). The species is known from swamp sclerophyll habitats to the north which were investigated as 'Block F' in association with the Tugun Bypass Compensatory Habitat Package (SMEC, 2009). Wallum Froglet habitat occurs on site in association with the two man-made drainage lines occurring in the eastern portions of the site, dense vegetation cover is scarce in comparison to the neighbouring melaleuca swamplands to the east.	Recorded 7-part test performed

Table 12: Potentially Occurring Threatened Fauna Species			
Species	**Potential occurrence**	**Notes**	**Potential for impacts**
		Wallum Froglet habitat occurs on site in association with the natural drainage line within the wet heath community in the north east of the site and mapped as SEPP 14 wetland. Dense vegetation cover is associated with this feature Marginal habitat also occurs within the Littoral Rainforest community and Eucalypt forest, however permanent standing water is absent. The specie was recorded in the eastern boundary constructed drainage line, the drainage line within the wet heath community and from the adjoining property to the east. Similar habitat is known to occur in abundance within the locality, in particularly the melaleuca wetland occurring directly to the northeast of the site. The proposal will remove the artificially constructed drainage line along the site's eastern boundary within the disturbed Acacia community. The proposal retains the drainage feature in the wet Heath community and is significantly buffered from the proposed development and will unlikely be significantly impact by the proposal. No Wallum Froglets were directly observed. A 7-part test was performed for the species.	
Wallum Sedge-frog (*Litoria olongburensis*)	Possible	This species is known from a variety of coastal sandy vegetation communities associated with wallum (banksia) including heathland, sedgeland, melaleuca forest/woodland and ephemeral wetlands with a preference for acidic (low pH) seasonally inundated sedge swamps for breeding. The known distribution includes such lowland coastal zones from Fraser Island (southeast QLD) to Yuraygir National Park (north-east NSW) including several offshore islands such as Fraser Island, Bribie Island, Moreton Island and North Stradbroke Island (DSEWPC, 2011; Meyer et al, 2006; BSC, 2010). A review of the modeled distribution of *Litoria olongburensis* (DSEWPC, 2011) notes that the species is neither mapped as 'known/likely to occur' nor 'may occur' on the mainland between approximately Tugun and Beerwah.	Modification of an insignificant area of potential habitat will occur. This species is considered unlikely to be significantly affected by the proposed development.

Table 12: Potentially Occurring Threatened Fauna Species			
Species	**Potential occurrence**	**Notes**	**Potential for impacts**
		At swamp sites, the Wallum Sedge Frog can be found sheltering amongst sedges, reeds and ferns all year round (Anstis 2002; Ehmann 1997; Ingram & Corben, 1975; James, 1996; Lewis & Goldingay, 2005; Liem & Ingram, 1977; Neilson, 2000 in DSEWPC, 2012). During wet periods the frog can be found on emergent vegetation (rushes, sedges, ferns) whilst during drier periods it may be found at the base of such vegetation (BSC, 2010). Breeding occurs after rain in spring, summer and autumn within acidic, permanent to ephemeral freshwater wetlands with emergent vegetation, most notably sedges, reeds or ferns in still water 0.5-1.5 m deep (Hines et al, 2004). These wetlands (wallum swamps, bogs, lakes or creeks), which are considered habitats critical to the survival of the species, typically overlie deep, low-nutrient, sandy soils where groundwater levels are characteristically high (Wallum Sedge Frog Workshop 2010 in DSEWPC, 2012; Meyer et al, 2006). Consequently, numerous survey guidelines indicate that searches for the species are best undertaken during the warmer months as activity may be increased. It is noted, however, that studies undertaken over a four-year period in northeastern NSW (Lewis and Goldingay, 2005) resulted in counts of individuals of *Litoria olongburensis* being higher in winter than in summer. Additional activity information obtained noted that counts of adults were negatively influenced by rain during the previous day, but positively influenced by rain the previous week. Counts of juveniles were influenced by rain during the previous three months (Lewis and Goldingay, 2005). A significant population of the species is noted to occur within restricted wallum habitats on Gold Coast airport lands investigated in association with the Tugun Bypass SIS (PB, 2004; Hero et al, 2001; BAAM, 2005). Breeding habitat is characterised by low pH and relatively deep pools with some capacity to retain water for longer periods with six ponds of breeding importance located proximate to the Gold Coast Airport (Hero et al, 2001). It is noted that purpose-built frog ponds established adjacent the airport site have been re-colinised by the wallum sedgefrog post construction of the Tugun Bypass (QDTMR, 2007). "The context of the Tugun population with respect to other populations of the frog is as follows: • It is an isolated population that is 30-40 km to the north of the nearest known population in the Pottsville Area, New South Wales and 45 km to the nearest known population in the north, North Stradbroke Island, Queensland.	

Table 12: Potentially Occurring Threatened Fauna Species			
Species	**Potential occurrence**	**Notes**	**Potential for impacts**
		• It also most likely occurs on South Stradbroke Island, which is about 16 km north of Tugun. • The nearest known mainland population in Queensland is at Beerwah about 100 km to the north. However, it is known from in between on the major Moreton Bay Islands of Bribie, Moreton and North Stradbroke. The Stradbroke Islands were apparently connected to each other and the mainland at Southport during European memory. Wallum Sedge-frog habitat occurs on site in association with the two man-made drainage lines occurring in the eastern portions of the site, however dense vegetation cover is scarce in comparison to the neighbouring melaleuca swamplands and drainage line in the wet heath community. Marginal habitat also occurs within the Littoral Rainforest community, however permanent standing water is absent. More suitable habitat occurs within the heath community which contains smaller drainage lines. Similar habitat is known to occur in abundance within the locality, in particularly the melaleuca wetland occurring directly to the northeast of the site. The drainage lines within the heath community will be significantly buffered from the proposed development and will unlikely be significantly impact by the proposal. Wallum Sedge-frog was not observed or recorded vocalising during survey works.	
Wompoo Fruit-dove (*Ptilinopus magnificus*)	Possible	This species is confined to mature rainforest and adjacent wet sclerophyll environments in eastern Australia from Cape York to around Coffs Harbour. As an obligate frugivore it requires a high availability of fruiting materials which it generally feeds on in the high canopy (Recher et al, 1995). Potential habitat occurs in association with the Littoral Rainforest (Vegetation Community 1) which contains large rainforest trees. The fruit dove was not, however, observed or recorded vocalising on the site during survey works.	All areas of potential habitat will be retained in association with the proposal. This species is considered unlikely to be significantly affected by the proposed development as no

Table 12: Potentially Occurring Threatened Fauna Species			
Species	**Potential occurrence**	**Notes**	**Potential for impacts**
			clearing of preferred habitat is proposed.
Black-necked Stork (*Ephippiorhynchus asiaticus*	Possible	The species is generally associated with wetlands, mudflats, mangroves, swamps and floodplains while it may also sometimes be found in open woodland environs where a grassy understorey is present (NPWS, 2002, Readers Digest, 2002; DEC, 2005). Irrigated lands are also occasionally a foraging resource and it has also been recorded foraging in artificial wetlands of sewerage treatment plants (ERM, 2001). The species has also been recorded foraging within grassed paddocks and pasture areas in Cedar Creek, Mudgeeraba and Coomera (pers. obs.). The breeding behaviour is poorly understood within information available for NSW (DEC, 2005) noting that breeding activity (from nest construction to fledging of young) occurs from May to January. Most activity, however, takes place between June and December, and clutches present May to September. In NSW, Jabirus usually nest in a tall, live and isolated paddock tree, but also in other trees, including paperbarks, or even lower shrubs within wetlands. The nest is a large platform, 1-2 m in diameter, made in a live or dead tree, in or near a freshwater swamp (DEC, 2005). The stork has been previously observed within Hastings Point foraging within a dredge pond by Planit (2006). Marginal habitat is considered to occur in the eastern portions of the site in association with the drainage lines, as well as the cleared paddock/grassland (Vegetation Community 2). The stork was not, however, observed on the site during survey works. The modification of potential stork habitat is only a small proportion in comparison to the existing habitat in the locality which is more preferable for the species.	Modification of an insignificant area of potential habitat will occur. This species is considered unlikely to be significantly affected by the proposed development.
Spotted Harrier (*Circus assimilis*)	Possible	'The Spotted Harrier occurs throughout the Australian mainland, except in densely forested or wooded habitats of the coast, escarpment and ranges, and rarely in Tasmania (Barrett *et al.* 2003). Individuals disperse widely in NSW and comprise a single population. The Spotted Harrier occurs in grassy open woodland including acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe (*e.g.* chenopods) (Marchant and Higgins 1993; Aumann 2001a). It is found mostly commonly in native grassland, but also occurs in agricultural land, foraging over open habitats	Modification of an insignificant area of potential habitat will occur. This species is considered unlikely to be

Table 12: Potentially Occurring Threatened Fauna Species			
Species	**Potential occurrence**	**Notes**	**Potential for impacts**
		including edges of inland wetlands. The species builds a stick nest in a tree and lays eggs in spring (or sometimes autumn), with young remaining in the nest for several months. The diet of the Spotted Harrier includes terrestrial mammals, birds and reptiles, occasionally large insects and rarely carrion (Marchant and Higgins 1993; Aumann 2001b). It was formerly heavily dependent on rabbits, but following the spread of rabbit calicivirus disease, and consequent decline in rabbit numbers by 65-85% in the arid and semi-arid zones (*e.g.* Falkenberg *et al.* 2000; Sharp *et al.* 2002), this harrier is increasingly dependent on native prey. Most of its former native mammalian prey species in inland NSW are extinct (*e.g.* bandicoots, bettongs and rodents: Van Dyck and Strahan 2008). Many of the remaining key prey species (*e.g.* terrestrial grassland birds such as quail, button-quail, pipits, larks and songlarks) require ground cover and are sensitive to habitat degradation from grazing (Marchant and Higgins 1993).' [DECC online @ http://npws.nsw.gov.au/determinations/spottedharrierpd.htm] Potential habitat occurs on the eastern portions of the site which contains drainage lines, as well as the cleared paddock/grassland (Vegetation Community 2). The harrier was not, however, observed or recorded vocalizing on the site during survey works. The modification of potential Spotted Harrier habitat is only a small proportion in comparison to the existing habitat in the locality which is more preferable for the species.	significantly affected by the proposed development.
Red Goshawk (*Erythrotriorchis radiatus*)	Possible	This raptor utilises coastal-subcoastal tall forests/woodlands, savanna traversed by forested rivers and rainforest fringes (Marchant & Higgins, 1993; NPWS, 2002; NPWS, 1999). In south-east Qld, *Araucaria* vine forests and open forests are a significant component of the vegetation mosaics frequented by Red Goshawks (Czechura 1997). In north-east NSW and south-east Qld, Red Goshawks are mainly found in rugged terrain (Debus 1993; Czechura 1996) as most suitable lowland forest has been cleared or modified. In northern Australia they nest in both rugged terrain and lowland sites (Aumann & Baker-Gabb 1991 in NPWS, 2002). The population size is difficult to estimate because the red goshawk has a very sparse and discontinuous distribution over a wide area — from the Kimberley in Western Australia across northern Australia, and down the east coast of Queensland to northern New South Wales. It is estimated there are between 100 and 200 breeding pairs in Queensland. Some researchers have suggested that the species is extinct in New South Wales, although there is evidence that some pairs	Modification of an insignificant area of potential habitat will occur. This species is considered unlikely to be significantly affected by the proposed development.

Table 12: Potentially Occurring Threatened Fauna Species			
Species	**Potential occurrence**	**Notes**	**Potential for impacts**
		do remain along the Queensland-New South Wales border (Ryan, 2006). Based on analysis during 2001, the distribution of the Red Goshawk in south-east Qld has been recorded from areas of different land tenure. Six pairs are centred in National Park lands and four pairs are recorded from either private land or other crown land (e.g. State Forests) (Stewart & Hobson 2002 in NPWS, 2002). Nesting is restricted to tall trees within proximity of a creek, river or wetland (NPWS, 1999; NT Parks & Wildlife Commission, 2002). Nests are usually built towards the outer edge of the canopy on a substantial live horizontal limb and braced against a vertical branch on the limb. Favoured nest trees are taller than 20 m and species in the genera *Eucalyptus, Melaleuca, Corymbia* and, less frequently, *Angophora*. Red goshawks commonly nest in the tallest and largest tree in a stand of tall trees, often directly beside but always within 1 km of a permanent waterway or wetland (Ryan, 2006). Potential Red Goshawk habitat occurs on site in association with the eucalypt forest and the fringes of the Littoral Rainforest. As the site is less than 1 km from permanent waterways and features favoured nesting trees (eucalypts, melaleucas and corymbias), potential nesting habitat is present on site (although no Red Goshawk nests were observed). It is noted that the surrounding vegetation communities and conservation networks contains similar habitat to the site's, however at a much larger scale. No Red Goshawks were observed or recorded vocalizing on site.	
Little Eagle (*Hieraaetus morphnoides*)	Possible	The Little Eagle occupies habitats rich in prey within open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used (Marchant and Higgins 1993; Aumann 2001a). For nest sites it requires a tall living tree within a remnant patch, where pairs build a large stick nest in winter and lay in early spring. Young fledge in early summer. It eats birds, reptiles and mammals, occasionally adding large insects and carrion (Marchant and Higgins 1993; Aumann 2001b; Debus *et al*. 2007). It was formerly heavily dependent on rabbits, but following the spread of rabbit calicivirus disease, and consequent decline in rabbit numbers by 65-85% in the arid and semi-arid zones (Sharp *et al*. 2002), the eagle is increasingly dependent on native prey. Most of its former native mammalian prey species in inland NSW are extinct (terrestrial mammals of rabbit size or smaller, *e.g*. large rodents, bandicoots, bettongs, juvenile hare-wallabies and nailtail wallabies: Van Dyck and Strahan 2008).	This species is considered unlikely to be significantly affected by the proposed development

Table 12: Potentially Occurring Threatened Fauna Species			
Species	**Potential occurrence**	**Notes**	**Potential for impacts**
		The Little Eagle is distributed throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment (Marchant and Higgins 1993). It occurs as a single population throughout NSW. The population in New Guinea is now classified as a separate species, the Papuan Booted Eagle *Hieraaetus weiskei* (Lerner and Mindell 2005). As the species utilises a wide variety of habitats, it is considered that the site potentially provides Little Eagle habitat. The proposal will remove only a small fraction of potential Little Eagle habitat in comparison to the locality and the surrounding conservation networks. The Little Eagle was not recorded during survey works.	
Eastern Osprey (*Pandion cristatus*)	Possible	This species is associated with water-based habitats including estuaries, coastal wetlands, rivers and streams. The Osprey is predominately a coastal raptor frequenting estuaries, bays, inlets, islands and rocky cliffs within all Australian states except for Tasmania and sporadically within Victoria (DEC, 2005; NPWS, 2002). It is noted however, that the species sometimes inhabits inland islands (Pizzey and Knight, 1997; Readers Digest, 2002). Within suitable environment it usually constructs a nest in an overhanging large tree or upon elevated man-made structures such as platforms or telegraph poles. The species preys almost exclusively on fish by usually hunting alone and traversing the water's surface for prey which it secures by swooping over the waters surface or plunging below (Readers Digest, 2002; Clancy, 2005). Studies of prey middens on Lizard Island within the Great Barrier Reef also noted that occasional Terns and crustaceans are sourced for food (Smith, 1985). Whilst expansive favoured habitat for the Osprey occurs in the locality (in association with the foreshore and Evans River), the species is unlikely to frequent the habitats of the site given the absence of habitat for prey species. Potential nesting habitat occurs in association with the eucalypt forest (Vegetation Community 3) which features large trees. No Ospreys or their nests were recorded on site.	This species is considered unlikely to be significantly affected by the proposed development.
Brolga (*Grus rubicund*)	Unlikely	The Brolga inhabits the large open swamplands/wetlands of coastal and subtropical coastal Australia where it may form flocks of several hundred individuals during the breeding season (Readers Digest, 2002). Studies conducted in southern NSW and Northern Victoria (Charles Sturt University, 2000) indicates that most Brolga breeding sites were large (>50 ha) remnant wetlands with extensive areas	This species is considered unlikely to be significantly affected by

Table 12: Potentially Occurring Threatened Fauna Species			
Species	**Potential occurrence**	**Notes**	**Potential for impacts**
		of water around 30 cm deep. More than 90% of breeding sites were dominated by Canegrass (*Eragrostis australasica*, *E. infecunda*) or Spike-rushes (*Eleocharis* species), with emergent vegetation cover usually around 25% and 90 cm in height. DEC (2005) notes that the species may also forage within grassed paddocks or ploughed fields. While it is noted that the site contains marginal habitat for the Brolga in association with the drainage lines, the species is considered an unlikely occurrence due to its small size. More preferable habitat is known to occur in the locality in association with the conservation networks to the south and north of the site. The species was not recorded during surveying periods.	the proposed development
Pale-vented Bush-hen (*Amaurornis moluccana*)	Unlikely	This species favors coastal rivers and inlets from the Clarence River, north. It prefers densely overgrown margins of permanent terrestrial freshwater wetlands such as creeks and rivers, billabongs, ponds, swamps, waterholes, dams, lakes and roadside ditches (Muranyi and Baverstock, 1996). Three Bush-hens were recorded from Swamp Mahogany Forest in areas NE of the Cobaki Broadwater in association with fauna survey works undertaken in association with the Tugan Bypass SIS (Ecopro, 2004). PB (2008) has also recorded the bush hen at Banora Point within early regrowth rainforest west of Martinelli Avenue. Whilst expansive favoured habitat for the Pale-vented Bush-hen occurs in the locality (in association with Evans River and wetlands associated with the surrounding conservation networks), the species is unlikely to frequent the site given the scarcity of wetland type habitat. The bush hen was not observed or recorded vocalising on the site during survey works.	This species is considered unlikely to be significantly affected by the proposed development
Bush Stone-curlew (*Burhinus grallarius*)	Possible	In NSW, Bush Stone-curlews occur in lowland grassy woodland and open forest. Habitat is described by broad ground and understorey structural features and is not necessarily associated with any particular vegetation communities. In general, habitat occurs in open woodlands with few, if any, shrubs, and short, sparse grasses of less than 15 cm in height, with scattered fallen timber, leaf litter and bare ground present. In coastal areas, structurally similar elements of tidal and estuarine communities provide suitable habitat, for example Bush Stone curlews are recorded within Casuarina woodlands, saltmarsh and mangroves (Price 2004). The important structural elements of Bush Stone-curlew habitat appear to be:	Modification of an insignificant area of potential habitat will occur. This species is considered unlikely to be significantly affected by the proposed development

Table 12: Potentially Occurring Threatened Fauna Species			
Species	**Potential occurrence**	**Notes**	**Potential for impacts**
		○ a low sparse ground cover ○ some fallen timber and leaf litter ○ a general lack of a shrubby understorey ○ open woodlands (DECC, 2006: 8) Foraging however, has been noted to occur over a broader spectrum of habitats including paddocks, grasslands, domestic areas (gardens, sports fields, [golf courses, residential areas pers. obs] etc.), estuarine areas (mudflats, saltmarsh, mangrove forest, swamp oak, melaleuca forest) (NPWS, 1999; 2006). The Bush Stone-curlew nests on the ground, near dead timber, usually under trees within open woodlands that have an understorey of short grass or among brushwood (Wilson 1989 in NPWS, 1999). The nest site is typically in or near the edge of open grassy woodland or within a cleared paddock where there is good visibility across the surrounding lands (Johnson and Baker-Gabb 1994 in DECC, 2006). In modified environments the species is also noted to nest within various areas where they are protected from dogs and cats (i.e. golf courses, garden beds, shade houses etc. pers. obs.). As the species utilises a wide variety of habitats (including modified residential areas) it is considered that the site potentially provides Bush Stone-curlew habitat. The proposal will remove only a small fraction of potential Bush Stone-curlew habitat in comparison to the locality and the surrounding conservation networks. The Bush Stone-curlew was not recorded during survey works.	
Beach Stone-curlew (*Esacus magnirostris*)	Unlikely	This species is distributed throughout coastal western, northern and eastern Australia from Norwest Cape to the Manning River (Readers Digest, 2002). Within this area it utilised open beaches, islands, reefs and sand/mudflats (NPWS, 2005; 1999; 2002) where it forages on crabs and other hard-shelled marine invertebrates (Readers Digest, 2002). Suitable habitat for the Beach Stone-curlew is considered to be absent from the site. The species was not recorded during survey events.	This species is considered unlikely to be significantly affected by the proposed development

Table 12: Potentially Occurring Threatened Fauna Species			
Species	**Potential occurrence**	**Notes**	**Potential for impacts**
Comb-crested Jacana (*Irediparra gallinacean*)	Unlikely	This species inhabits permanent wetlands with a good surface cover of floating vegetation, especially water-lilies It occurs throughout coastal Australia and well inland in the north from the Kimberley to Sydney (DEC, 2005). While it is noted that the site contains marginal habitat for the Comb-crested Jacana in association with the drainage lines, the species is considered an unlikely occurrence due to its small size and lack of dense floating vegetation. More preferable habitat is known to occur in the locality in association with the conservation networks to the south and north of the site. The species was not recorded during surveying periods.	This species is considered unlikely to be significantly affected by the proposed development
Glossy Black-Cockatoo (*Calyptorhynchus lathami*)	Possible	Glossy Black Cockatoos are uncommon parrots found in scattered localities in the forests and woodlands of eastern Australia and Kangaroo Island (Forshaw, 1981). The eastern subspecies of Glossy Black Cockatoos seems thinly distributed through its range with the highest densities occurring in south-eastern Queensland and north-eastern New South Wales (Forshaw, 1989). The main habitat of the eastern subspecies is *Eucalyptus* woodlands and forest with moderate-high densities of *Allocasuarina* which are required for feeding (Clout, 1989; Park & Borsboom, 1996; Forshaw & Cooper, 1989; Crome & Shields, 1992; Cleland & Sims, 1968; Garnett, 1992b; Blakers *et al*, 1984). Suitable senescent trees (large hollow within a live or dead Eucalypt: 10-20 m, Depth: 40-120 cm, Entry: ~21 cm: Inside Dia: ~23 cm (Forshaw, 1981; Gibbons & Lindenmayer, 2002)) are also required for nesting. No Glossy Black-Cockatoo feed trees were noted to occur on site. Potential nesting trees are present in association with the eucalypt forest (Vegetation Community 3) which contains numerous hollow-bearing trees. No hollow-bearing trees are expected to be removed for the development proposal. The species was not observed or recorded vocalising during site surveying.	All areas of potential habitat will be retained in association with the proposal. This species is considered unlikely to be significantly affected by the proposed development.
Little Lorikeet (*Glossopsitta pusilla*)	Possible	"The distribution of the Little Lorikeet extends from just north of Cairns, around the east coast of Australia, to Adelaide. In New South Wales Little Lorikeets are distributed in forests and woodlands from the coast to the western slopes of the Great Dividing Range, extending westwards to the vicinity of Albury, Parkes, Dubbo and Narrabri (Barrett *et al*. 2003). There is no evidence of regular migration, but Little Lorikeets are generally considered to be nomadic (Higgins 1999), with irregular large or small influxes of individuals occurring at any time of year, apparently related to food	This species is considered unlikely to be significantly affected by the proposed development

Table 12: Potentially Occurring Threatened Fauna Species			
Species	**Potential occurrence**	**Notes**	**Potential for impacts**
		availability. However, long term investigation of the breeding population on the north-western slopes indicates, that breeding birds are resident from April to December, and even during their non-resident period, they may return to the nest area for short periods if there is some tree-flowering in the vicinity (Courtney & Debus 2006). Potential habitat occurs on site in association with the eucalypt forest (Vegetation Community 3). This vegetation community will not be impacted and will be retained for the future development. The Little Lorikeet was not recorded during fauna survey works.	
Eastern Ground Parrot (*Pezoporus wallicus wallicus*)	Possible	In NSW, it is widespread at several sites in the southeast, from Barren Grounds Nature Reserve through to Nadgee Nature Reserve at the Victorian border. There is also a small population in north-eastern NSW between Broadwater National Park and Yuraygir National Park (Higgins 1999). It occurs mostly in heathlands or sedgelands with very dense cover (projective foliage cover usually greater than 60%) (McFarland 2005, pers. comm.; Meredith 1984a), and a high density of the parrot's food plants, such as one or more seeding sedges of families *Cyperaceae* or *Restionaceae*, or a diverse array of many seeding heath-plants. In some parts of northern NSW, it also occurs in more open heathlands. Four major habitat types are used: (1) temperate shrub heathland with high diversity of heath-plant species but structurally dominated by a number of shrubs such as *Banksia* and *Casuarina*; (2) temperate graminoid heathland, or grass-tree plains as they're known in NSW and Victoria, containing only a few plant species and dominated by graminoid plants such as sedges and grass-trees *Xanthorrhoea* with a few shrubs; (3) subtropical graminoid heathland typically dominated by *X. resinosa* over a ground layer of sedges and some shrubs; and (4) sedgeland consisting of swampy areas supporting a few shrubs and a very high abundance of one or a few sedges (Meredith 1984a, 1984b). It nests on the ground, usually in a dry, well-drained site such as a low ridge, slope or slight rise and sheltered by low, dense vegetation such as sedges, rushes, ferns and shrubs including *Xanthorrhoea, Banksia, Empodisma* and *Leptospermum* (Higgins 1999; McFarland 1991b; McFarland 2005, pers. comm.).	This species is considered unlikely to be significantly affected by the proposed development

Table 12: Potentially Occurring Threatened Fauna Species			
Species	**Potential occurrence**	**Notes**	**Potential for impacts**
		Potential habitat occurs for the species in association with the heath community on site (Vegetation Community 4) which contains a high diversity of heath-plant species. This vegetation community is proposed to be retained for the future development and as a result, will not be impacted. The Eastern Ground Parrot was not recorded during surveying works.	
Powerful Owl (*Ninox strenua*)	Possible	This species of Owl occupies a very large (800-1000 ha) permanent range within mostly wet sclerophyll forests and woodlands in southeastern Australia (NPWS, 2002; NPWS, 2005). Within this range its favoured prey include large arboreal mammals (greater glider, brushtail possum) although additional smaller prey (flying fox, sugar glider, ringtail possum, rabbit, birds) are also taken (NPWS, 1997; 2005). Kavanagh & Stanton (2002) note that small (<200 ha) fragments do not provide a significant reservoir for populations of large forest owl (Sooty, Powerful, Masked) species. Roosting occurs within 'groves of dense mid-canopy trees or tall shrubs in sheltered gullies, typically on wide creek flats and at the heads of minor drainage lines, but also adjacent to cliff faces and below dry waterfalls. Roosting sites are commonly among small groves of up to 2 ha of similar-sized trees with dense foliage in the height range 3-15 m. (Data from Kavanagh 1997, Kavanagh 2002b in DEC, 2005; 8). Nesting has been recorded in over-mature eucalypts within 100 m of streams/drainage lines in large hollows (>45 cm dia; 100 cm deep) surrounded by canopy trees and subcanopy or understorey trees or tall shrubs The owl is faithful to traditional nesting hollows, but also sometimes uses alternative hollows in the nesting gully (Data from Schodde and Mason 1980, McNabb 1996, Kavanagh 1997, Kavanagh 2002b, Higgins 1999 in DEC, 2005: 8). Potential habitat is considered to occur in association with the eucalypt forest (Vegetation Community 3) due to its dense understory where prey species may occur and potential nesting trees (hollow-bearing trees). Due to the size of the site in comparison to neighbouring vegetation networks, it is considered that the proposal's impact will be insignificant for the species. The species was not recorded during survey works.	This species is considered unlikely to be significantly affected by the proposed development
Eastern Grass Owl (*Tyto longimembris*)	Possible	This species is generally recorded within tussock-grasslands but has also been noted to occur within heathland, swamps, coastal dunes, tree-lined creeks, treeless plains, mangrove fringes, grassy gaps between trees and crops and sugar cane plantation (Garnett and Crowley 2000; Pizzey	This species is considered unlikely to be significantly affected by

Table 12: Potentially Occurring Threatened Fauna Species			
Species	**Potential occurrence**	**Notes**	**Potential for impacts**
		and Knight, 1997). Within these habitats it sources a wide range of prey including birds, insects and terrestrial mammals. However, it feeds predominately on rodents and its population numbers can fluctuate wildly with the rise and fall of prey populations (Olsend and Doran, 2002). The fall of primary prey species following plague events (during which owl breeding increases) can result in widespread dispersal by the Owls with starvation also noted as the forage base reduces (Debus et al, 1998). Potential habitat is considered to occur in association with the heath community (Vegetation Community 4) and the eucalypt forest (Vegetation Community 3) due to its dense understory where prey species may occur. Due to the size of the site in comparison to neighbouring vegetation networks, it is considered that the proposal's impact will be insignificant for the species. The species was not recorded during survey works.	the proposed development
Masked Owl (*Tyto novaehollandiae*)	Possible	The Masked Owl lives in eucalypt forests and woodlands from the coast, where it is most abundant, to the western plains (Kavanagh 2002b in NPWS, 2005). Within suitable habitat that species occupies a range of 5-10 km^2 where it forages mostly upon rodents and marsupials although this may be supplemented by bandicoots, arboreal mammals (Sugar Glider, Common Ringtail Possum) and some birds with introduced rodents and rabbits becoming important in disturbed environments (Debus, 1993, Kavanagh, 1996; NPWS, 2005). Habitats containing stands of large, hollow bearing eucalypts are also critical to roosting and nesting (NPWS, 2005; Kavanagh and Murray, 1996). Potential habitat is considered to occur in association with the eucalypt forest (Vegetation Community 3) due to its dense understory where prey species may occur and potential nesting trees (hollow-bearing trees). Due to the size of the site in comparison to neighbouring vegetation networks, it is considered that the proposal's impact will be insignificant for the species. The species was not recorded during survey works.	This species is considered unlikely to be significantly affected by the proposed development
Regent Honeyeater (*Anthochaera phrygia*)	Possible	The Regent Honeyeater is mostly recorded within box-ironbark eucalypt and riparian associations incorporating River She-oak on the inland slopes of the Great Dividing Range (Menkhorst et al, 1999; NPWS, 1999). Only three key breeding regions are known [north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra-Barraba region] although non-breeding flocks have	This species is considered unlikely to be significantly affected by the proposed development

Table 12: Potentially Occurring Threatened Fauna Species			
Species	**Potential occurrence**	**Notes**	**Potential for impacts**
		been recorded in flowering coastal Swamp Mahogany and Spotted Gum forests particularly on the central coast and occasionally on the upper north coast (DEC. 2005; Menkhorst et al, 1999). "Since the beginning of the current recovery effort several large aggregations have been found. During May 1994, 151 birds were present at Howes Valley, NSW (Menkhorst 1997, Oliver 1998a). At the same time there were 47 at Warrumbungle National Park, giving a total known population of about 200 birds. During spring 1997 at least 400 Regent Honeyeaters were present in the Capertee Valley, NSW and, based on the proportion of colour-banded birds present, the actual population may have been closer to 800 (D. Geering unpublished data). During the same breeding season population estimates for the Bundarra-Barraba region, based on the number of breeding pairs found, extrapolated across the available habitat, suggest a maximum of 520 birds (Oliver 1998b). Therefore, the total population may be close to or greater than the upper limit of 1500 suggested by Webster and Menkhorst (1992)" (online @ http://www.environment.gov.au /biodiversity/threatened/publications /recovery/regent-h-eater/index.html#section12. Diet is mostly reliant on nectar from 16 species of Eucalypt and two species of Mistletoe although the preferred sources are three species of eucalypt; Red Ironbark, White Box and Yellow box (Webster & Menkhorst 1992; NPWS, 1999; Menkhorst et al, 1999). At times of food shortage (e.g. when flowering fails in preferred habitats), Honeyeaters also use other woodland types and wet lowland coastal forest dominated by *Eucalyptus robusta* (Swamp Mahogany) or *E. maculata* (Spotted Gum) (Franklin et al. 1989b; Geering & French 1998; Ley & Williams 1992; Oliver et al. 1999; Webster & Menkhorst 1992). They sometimes use native pine *Callitris* woodlands, usually where mixed with eucalypts. They regularly occur in remnant trees or patches of woodland in farmland, partly cleared agricultural land and riverine forest of River Sheoak, usually infested by mistletoe, and sometimes mixed with eucalypts (Franklin et al. 1989; D. Geering 2005, pers. comm.; Geering 1997; Geering & French 1998; Ley et al. 1996; Ley & Williams 1994; Oliver et al. 1999). Regent Honeyeaters usually build their nests in rough-barked trees, mostly eucalypts such as ironbarks, stringybarks or River Sheoak, or sometimes in smooth or box-barked species (e.g. Blakely's Red Gum, White Box, Yellow Box) if rough-barked trees are not available (D. Geering 2005, pers. comm.; Geering 1997; Geering & French 1998; Geering & Herman 1999; Ley & Williams	

Table 12: Potentially Occurring Threatened Fauna Species			
Species	**Potential occurrence**	**Notes**	**Potential for impacts**
		1992, 1994; Oliver et al. 1998). Nests are often also built amongst mistletoes in trees (D. Geering 2005, pers. comm.; Geering & Herman 1999; Oliver et al. 1998; Webster & Menkhorst 1992). The site is considered to contain marginal habitat for the species (eucalypt forest species present although favoured eucalypt types are absent) which will be retained for the future development. Additionally, the surrounding conservation networks in the locality is known to feature similar eucalypt forest habitat types. Avifauna survey failed to generate any recordings of the Regent Honeyeater.	
Grey-crowned Babbler [eastern] *(Pomatostomus temporalis temporalis)*	Possible	'Grey-crowned Babblers occupy open woodlands dominated by mature eucalypts, with regenerating trees, tall shrubs, and an intact ground cover of grass and forbs. The species builds conspicuous dome-shaped nests and breeds co-operatively in sedentary family groups of 2-13 birds (Davidson and Robinson 1992). Grey-crowned Babblers are insectivorous and forage in leaf litter and on bark of trees. In NSW, the Grey-crowned Babbler occurs on the western slopes and plains but was less common at the higher altitudes of the tablelands. Isolated populations are known from coastal woodlands on the North Coast, in the Hunter Valley and from the South Coast near Nowra (Blakers et al. 1984, Schodde & Mason 1999)' in (DEH, 2011 online @ http://www.environment.nsw.gov.au/determinations/GreycrownedBabblerVulSpListing.htm). The extended family groups of babblers are essential for the cooperative rasing of young and avoidance of predators (King, 1980; Blackmore and Heinsohn, 2007). Potential habitat occurs for the Grey-crowned Babbler in association with the eucalypt forest (Vegetation Community 3). This community is expected to be retained in association with the future development. The species was not recorded during survey works.	This species is considered unlikely to be significantly affected by the proposed development
Barred Cuckoo-shrike (*Coracina lineata*)	Possible	This species has been recorded from a variety of habitats including rainforest, eucalypt forests and woodlands, clearings in secondary growth, swamp woodlands and timber along watercourses within Coastal NSW (NPWS, 2002). Foraging requirements include fruiting tree species within in rainforest, wet sclerophyll forest, vegetation remnants or isolated trees (DEC, 2005) and insects captured among foliage (NPWS, 2002).	Modification of an insignificant area of potential habitat will occur. This species is considered unlikely to be significantly affected by

Table 12: Potentially Occurring Threatened Fauna Species			
Species	**Potential occurrence**	**Notes**	**Potential for impacts**
		All forested areas of the site is considered potential habitat for the Barred Cuckoo-shrike. The modification of potential Barred Cuckoo-shrike habitat is only a small proportion in comparison to the existing habitat in the locality. The species was not recorded during survey works of the site.	the proposed development
White-eared Monarch (*Carterornis leucotis*)	Possible	This species generally occurs within Coastal/Subtropical/Littoral Rainforests and occasionally Eucalypt/Riparian Forest, Mangroves and Swamp Sclerophyll with mesomorphic understorey along the eastern coast of Australia from Cape York to the Tweed River (Readers Digest, 2002; DEC, 2005). In NSW, White-eared Monarchs occurs in rainforest, especially drier types, such as littoral rainforest, as well as wet and dry sclerophyll forests, swamp forest and regrowth forest. • They appear to prefer the ecotone between rainforest and other open vegetation types or the edges of rainforest, such as along roads. • They are highly active when foraging, characteristically sallying, hovering and fluttering around the outer foliage of rainforest trees. They are usually observed high in the canopy or subcanopy • They eat insects, but their diet is not well studied • They breed from about September to March, usually nesting high in the canopy, and often at the edge of patches of rainforest. (DEH, 2012 online@ http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10540) Potential White-eared Monarch foraging and nesting habitat occurs on site in association with the Littoral Rainforest (Vegetation Community 1) and the eucalypt forest (Vegetation Community 3). These communities are proposed to be retained for the future development and will not be modified. In addition, similar habitat at a much larger scale is known to occur within the locality. The species was not recorded during survey works.	This species is considered unlikely to be significantly affected by the proposed development
Spotted-tailed Quoll (*Dasyurus maculatus*)	Possible	The species has been recorded from a wide range of habitats such as rainforest, open forest, woodland, coastal heathland, and inland riparian forest (Edgar and Belcher, 2002; Forest Practices Board, 2002). Additional habitat requirements include suitable den sites (such as hollow	This species is considered unlikely to be significantly affected by

Table 12: Potentially Occurring Threatened Fauna Species			
Species	**Potential occurrence**	**Notes**	**Potential for impacts**
		logs, tree hollows, rock outcrops or caves) and an abundance of food (such as birds and small mammals) (NSWNPWS, 1999; Edgar & Belcher, 2001; Belcher, 2000; Jones & Ross, 1996). Habitat range for males has been estimated to be as large as 2000-2200 hectares per individual, while for females, which are more protective of their dens, this value is considerably less at between 700-850 hectares per individual (Belcher, 2000; NPWS, 1999). In addition, Quolls are known to frequently swap dens and disperse large distances on any one night. A radio-tracking survey performed by Andrew (2005) noted that quolls generally moved to a new den each day and 90% of stays for females and 76% of stays for males were for a single day. Population density is therefore naturally quite low and has been estimated at 1 individual per 3 km^2 even within optimal 'core' habitat (Jones & Rose, 1996). Whilst potential habitat is present in the form of the eucalypt forest, heathland and rainforests, rocky outcrops/caves providing potential denning were not encountered on site. Several hollow fallen logs are present within the eucalypt forest and littoral rainforest which were searched diurnally with high powered torches with no quolls encountered. Similarly, no quolls were encountered during nocturnal searches. As the quolls is identified as occurring within the locality (Atlas database records community wildlife survey) its traversal of the study area cannot be discounted due to typically large occupied ranges and high daily dispersal potential. Notwithstanding, the proposal will not modify these communities.	the proposed development
Brush-tailed Phascogale *(Phascogale tapoatafa)*	Possible	This species favours dry open eucalypt forest with a sparse groundcover (NPSW, 1999). Studies indicate that home range sizes of animals are very large (females 20-70 ha exclusive of other females; males up to 100 ha+ overlapping with other males and females) and subsequently individuals occur at low densities within suitable habitat (Soderquist in Strahan eds, 2002; NPWS, 1999; Soderquist et al, 2001; Rhind & Bradely, 2002). Despite male and female ranges overlapping both sexes are predominately solitary (Cuttle, 1982; Soderquist & Ealey, 1994) excluding during the breeding season. Following the annual breeding season all males die with the phascogale being the largest recorded animal to suffer from male semelparity (Scarff et al, 1998; Soderquiist et al, 2001; Rhind & Bradley, 2002). Within their home range individuals require multiple, large hollow bearing trees (DBH >80 cm) in which to nest (Soderquist et al, 2001; Gibbons & Lindenmayer, 2002). The diet of the species consists mainly of arthropods, such as spiders and centipedes, as well as small invertebrates	This species is considered unlikely to be significantly affected by the proposed development

Table 12: Potentially Occurring Threatened Fauna Species			
Species	**Potential occurrence**	**Notes**	**Potential for impacts**
		including cockroaches, beetles and bull ants (Cuttle 1982; Scarff et al, 1998). Phascogales will also forage on the ground and eucalypt nectar is extensively utilised when trees are flowering (Traill and Coates 1993; Scarff et al, 1998). Potential habitat occurs for the species in association with the eucalypt forest (Vegetation Community 3). It is noted that similar habitat occurs within the locality and nearby conservation networks. Notwithstanding, the favoured eucalypt forest will be retained for the proposed development and therefore, wont significantly impact the Brush-tailed Phascogale. Fauna survey works did not record the species on site.	
Common Planigale (*Planigale maculate*)	Possible	This species is known to 'inhabit a broad range of habitats incorporating a dense ground cover layer including rainforest, eucalypt forest, heathland, marshland, grassland and rocky areas (Redhead in Strahan, 2002; Lewis, 2005). In northern NSW, it has been suggested that their distribution often corresponds with the low lying flat and undulating areas of the coastal plains often near intensively settled areas (Gilmore and Parnaby 1994 in Lewis, 2005). *Planigale maculata* is an unspecialised predator foraging mainly on insects, other invertebrates, small vertebrates, and occasionally nectar (Callaghan *et al.* 2005 and references therein). *Planigale maculata* is generally most active from slightly before dusk to before sunrise, interspersed with rest periods and periods of high activity, and is capable of eating the equivalent of its own body weight in food daily (Van Dyck 1979). In contrast, Van Dyck (1979) also notes that *P. maculata* has the ability to enter torpor in response to cold weather or food deprivation. Introduced predators of *P. maculata* include cats (Redhead 1995) and dogs (Fleay 1981) with foxes also considered likely predators (Callaghan *et al* 2005). There is currently little movement data available for *P. maculata* although other members of this genus are widely recognised as having a shifting home range in response to local climatic conditions and food resources (Denny 1982; Read, 1982; 1988; and Miller 1998; in Lewis 2004)' (and in Hannah, 2007: 5) A small population of the species has been recently recorded on the northern banks of the Cobaki Broadwater in association with Swamp Mahogany/Brushbox Forest (Ecopro, 2004; Lewis Ecological Surveys, 2004). A population of Planigales is also known further south of the site within the Koala	Modification of an insignificant area of potential habitat will occur. This species is considered unlikely to be significantly affected by the proposed development

Table 12: Potentially Occurring Threatened Fauna Species			
Species	**Potential occurrence**	**Notes**	**Potential for impacts**
		Beach development where the species has been recorded within Brushbox Forest, Tall Eucalypt dominated Wet Sclerophyll Forest, Swamp Forest, Regrowth Eucalypt Forest and utilising artificial habitats within recorded habitats (AKF, 2005; TSC, 2007). Habitat features that appear most important to the local Planigale population include: i) Dense or scattered tree canopy-cover; ii) Dense ground-cover vegetation; and iii) Areas within or adjacent to low-lying sites subject to seasonally wet conditions, with occasional inundation for short periods (AKF, 2005: 7) As the Common Planigale is known to occur in a wide variety of habitat types, the entire site possesses potential habitat for the species. The proposal will remove only a small fraction (approx. 7 ha) of potential Common Planigale habitat which is insignificant in comparison to the locality and surrounding conservation networks (Bundjalung National Park and Broadwater National Park combine in over 20,000 ha of protected habitat). The Common Planigale was not recorded during fauna survey works.	
Koala (*Phascolarctos cinereus*)	Recorded	This species primarily occurs within Eucalypt Forest and Woodlands containing a suitable density of favoured food trees within coastal eastern and southeastern Australia. Preferred habitat generally contains a high percentage of primary food trees although underlying geology and soil type can be an important factor. Eucalypt Forests associated with drainage lines and floodplains of richer soil types (i.e. moisture and nutrients) can also be favoured due to feed trees containing higher levels of nutrients and less potential for toxicity (Hindell & Lee, 1990; Moore & Foley, 2000). Within SEQLD six primary foraging trees were identified by Pahl (1993); Tallowwood (*Eucalyptus microcorys*), Blue Gum (*E. tereticornis*), Scribbly Gum (*E. racemosa*), Grey Gum (*E. propinqua*), Red Mahogany (*E. resinifera*) and White Stringybark (*E. tindaliae*). Further research undertaken by Phillips & Callaghan (1996) in Tweed Shire indicates that Swamp Mahogany (*E. robusta*) and Blue Gum (*E. tereticornis*) [including hybrids of the two] on alluvial deposits and Quaternary and Neranleigh-Fernvale Group geomorphologies were considered to be primary habitats. Areas with	Recorded 7-part test performed

Table 12: Potentially Occurring Threatened Fauna Species

Species	Potential occurrence	Notes	Potential for impacts

sub-dominance of these species on Neranleigh-Fernvale alliances supporting Blue Gum (*E. tereticornis*), Tallowwood (*E. microcorys*) and/or Grey Gum (*E. propinqua*) comprise secondary habitat or primary habitat depending on the density of the latter two species. Phillips & Callaghan (1998) also noted Tallowwood to be a primary browse species and two types of Grey Gum (*E. propinqua, E. biturbinata)* to be secondary browse species in Currumbin.

Recent studies (Biolink, 2007) indicate that *Eucalyptus tereticornis, E. microcorys* and *E. propinqua/E. biturbinata* are the most preferred koala food trees throughout the Gold Coast LGA. Within the Tweed Coast Swamp Mahogany *Eucalyptus robusta* and Forest Red Gum *E. tereticornis* are the most preferred tree species with Tallowwood *E. microcorys* and Grey Gum *E. propinqua* being the next most preferred (Biolink, 2011).

Within utilized Eucalypt Forest habitat the koala spends most of its time in distinct home-ranges which may overlap if available habitat area is reduced. Males are territorial but a dominance-hierarchy exists and they may attack during the summer breeding season. Home ranges of the species are considered to be large and can vary dependent upon habitat quality and extent. Studies have shown various home range sizes exist with the males usually larger than the female (Male 135 ha, Female: 110 ha [Ellis et al, 2002], Male: 34.4 ha, Female: 15 ha [White, 1999]).

A review of a number of published scientific reports notes that Koala density generally ranges between 0.02 and 1.26 animals per hectare. Densities are considered to vary dependent upon habitat quality, size, connectivity, presence of impediments to movement (stock fences, dogs, roads etc.).

Source	Study Location	Habitat Type	Additional Comments	Koala/ha
Dique et al, 2003	Southeast QLD Pine Rivers Shire	Tall shrubby open forest (Tertiary surfaces) and Tall open forest upon metamorphics	Stratified by two habitat descriptions 'urban' and 'bushland'	0-0.76

<table>
<tr><th colspan="8">Table 12: Potentially Occurring Threatened Fauna Species</th></tr>
<tr><th>Species</th><th>Potential occurrence</th><th colspan="5">Notes</th><th>Potential for impacts</th></tr>
<tr><td></td><td></td><td colspan="5"><table>
<tr><td>Dique et al, 2004</td><td>Southeast QLD Koala Coast ~375 sqm of Redland, Logan and Brisbane City shires</td><td>Eucalypt Forests. Predominately RE

12.9-10.4 & 12.11.5</td><td>Study stratified by habitat descriptions: ‘urban’, ‘remnant bushland’, ‘bushland’ and ‘other’. Remnant and bushland areas further stratified by proximity to the centre of the study area (high density=close to centre, low density=further away)</td><td>Range 0.02-1.26
Urban: 0.17 +/- 0.013
High remnant: 0.70 +/- 0.023
Low remnant: 0.20 +- /0.014
High bushland: 0.30+/-0.006
Low bushland: 0.11

+/-0.007

Other: 0</td></tr>
<tr><td>White and Kunst 1990</td><td>Southeast QLD

Sheldon</td><td>Eucalypt Forest</td><td></td><td>0.4 (0.3-0.46)</td></tr>
<tr><td>Sullivan et a 2004</td><td>Southwest QLD</td><td>Eucalypt Forest/woodland within the mulgalands</td><td>Habitat stratified by floristics and landzone.</td><td>0.0007-2.513</td></tr>
<tr><td>Biolink 2007</td><td>Coombabah Koala Habitat Area</td><td>Mapped gold coast city vegetation (per Ryan et al, 2003) filtered to exclude communities not containing eucalypts</td><td>Spot assessment technique for koala faecal pellets. Not based upon koala observation transects per Dique, 2003;

EPA, 2005.</td><td>0.22+/-0.04</td></tr>
<tr><td>Biolink 2007</td><td>Coomera-Pimpama Koala Habitat Area</td><td>Mapped gold coast city vegetation (per</td><td>Spot assessment technique for koala</td><td>0.23+/-0.03</td></tr>
</table></td><td></td></tr>
</table>

Table 12: Potentially Occurring Threatened Fauna Species			
Species	**Potential occurrence**	**Notes**	**Potential for impacts**
		<table><tr><td></td><td></td><td>Ryan et al, 2003) filtered to exclude communities not containing eucalypts</td><td>faecal pellets. Not based upon koala observation transects per *Dique, 2003;* *EPA, 2005.*</td><td></td></tr></table> While no traces of koalas occurred within the development footprint in 2014, numerous smooth barked eucalypts within the eucalypt forest contained koala scratches, although no koalas were observed. No koalas responded to the amplified call playback for the species. The assessment of current levels of Koala activity/usage over the site utilising the RG-bSAT in March 2019 (**Attachment 3**) identified areas of "low" level usage adjacent to the south-western corner of the proposed development. A small number of Koala faecal pellets were recorded under a total of three (3) trees in this portion of the site. As noted by Phillips and Callaghan (2011), where the results of a SAT site returns an activity level within the low use range, the level of use by the Koala is likely to be transitory. It is also noted that none of the faecal pellets recorded were considered to be fresh. Based on the results of this assessment it is considered that the south-western portion of the subject site may be utilised occasionally by Koalas as they traverse the locality. The results indicate that a resident/sedentary population is not currently present on the site. It is expected that the proposal will not impact the species as the eucalypt forest will be retained. Additionally, the locality provides thousands of hectares of koala habitat.	
Yellow-bellied Glider (*Petaurus australis*)	Possible	The southern species of yellow-bellied glider favours tall open eucalypt forests containing sufficient resources of hollow bearing trees generally in areas with high rainfall and nutrient rich soils (DECC, 2005: NPWS, 2003; Goldingay, 2008). This species of glider is an exudivore that forages predominately upon phloem from eucalypts and acacias, nectar and pollen, invertebrates and honeydew and manna. Phloem sap is obtained by gliders incising into the bark in a v-shale and licking the exudates the pools at the bottom of the V (Brown, 2006; DECC, 2005; Lindenmayer, 2003). Home ranges of the glider are very large (20-85 ha) with high numbers (up to 19) of den trees utilized by pairs and small social groups within a range (Lindenmayer, 2003; Hume, 2004; Brown, 2006).	Modification of an insignificant area of potential habitat will occur. This species is considered unlikely to be significantly affected by the proposed development

Table 12: Potentially Occurring Threatened Fauna Species			
Species	**Potential occurrence**	**Notes**	**Potential for impacts**
		Modeled population viability analysis undertaken by Goldingay and Possingham (1995) indicate that 9750 ha of appropriate forest habitat would be necessary to support a minimum viable population size of 150 gliders assuming all habitat is occupied. When assuming that proportions of the habitat is occupied (28-54%) this necessary habitat size increases to between 18000 ha and 35000 ha (Goldingay and Possingham, 1995). Potential Yellow-bellied Glider habitat occurs in the form of the western eucalypt forest which contains numerous hollow-bearing trees. As the Brush-tailed Possum and Squirrel Glider were recorded on site, the Yellow-bellied Glider (which utilises similar habitats) is likely to also occur. Potential foraging materials also occur within the acacia regrowth portion of the site (Vegetation Community 2), although it's unlikely the species would occur there as the eucalypt forest contains similar species of acacias. The removal of 7.2 ha (Acacia regrowth section) is only a small proportion of habitat in comparison to the surrounding environment. The Yellow-bellied Glider was not recorded during fauna survey works.	
Squirrel Glider (*Petaurus norfolcensis*)	Recorded	This species of Glider is associated with dry sclerophyll forest and woodlands although in northern NSW and Qld it has been recorded from wet sclerophyll environments (Suckling in Strahan eds, 2002; Lindenmayer 2002). It is considered to be most abundant in associations containing winter flowering Eucalypts and/or environments with a high abundance of Acacia, Banksia species in the lower layers (Smith & Murray, 2003; Menkhorst et al, 1998; Quinn, 1995). Within the canopy of the preferred habitat numerous trees bearing hollows are critical habitat values required to support populations of the species (Quinn, 1995; Smith & Murray, 2003; Lindenmayer, 2002). Gliders are known to regularly swap den trees and utilise a number of such dens (between 6 and 19 den trees per Glider) within their home range (van der Ree, 2000). These results are supported by survey work undertaken by Southern Cross University (June/July 2002) which indicated that 12 radio tracked gliders utilised 37 den trees incorporating live hollow bearing trees and stags (Cited in Warren, 2004). Favoured Squirrel Glider habitat occurs on site in association with the eucalypt forest occurring on the western portions of the site. Spotlighting events recorded two individuals occurring within the eucalypt forest community. It is expected that the proposal will not impact the species as the eucalypt	Recorded. 7-part test performed

Table 12: Potentially Occurring Threatened Fauna Species			
Species	**Potential occurrence**	**Notes**	**Potential for impacts**
		forest will be retained for the future development. Additionally, the locality provides thousands of hectares of Squirrel Glider habitat.	
Grey-headed Flying-fox (*Pteropus poliocephalus*)	Recorded	The Grey-headed Flying-fox inhabits subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps (Eby, 1995). Urban gardens and cultivated fruit crops also provide habitat for this species (NSW NPWS 1999c). Grey-headed Flying-foxes forage on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca, Banksia (Eby, 2000) and fruits of rainforest trees and vines (NSW NPWS 1999c). During periods when native food is limited, Grey-headed Flying-foxes disperse from colonial roosts, often foraging in cultivated gardens and fruit crops (NSW NPWS 1999c). This species roosts in large aggregations or camps in close proximity (20 km or less) to a regular food source, often in stands of riparian rainforest, Paperbark or Casuarina forest (Eby, 1995). This species is a canopy-feeding frugivore, blossom-eater and nectarivore of rainforests, open forests, woodlands, Melaleuca swamps and Banksia woodlands. As such, it plays an important ecosystem function by providing a means of seed dispersal and pollination for many indigenous tree species (Eby 1996; Pallin 2000). Potential feed trees are present on site in association with Eucalypts, Melaleucas and Banksias and are considered a likely occurrence during flowering and fruiting periods. This species was well known from the locality and is known to roost within the Littoral Rainforest adjacent to the Silver Sand Caravan Park at Evans Head. An individual was recorded foraging on a Melaleuca within the Heath Community during spotlighting surveying of the site. A large number of individuals were also recorded flying above the sight.	Recorded. 7-part test performed
Common Blossom-bat (*Syconycteris australis*)	Possible	This species is one of the smallest members of the flying fox family (Pteropodidae) and is considered to be a specialist pollen feeder favouring Banksia, Melaleuca, Callistemon and certain species of Eucalypt (Strahan eds, 2002). Required habitats include Coastal rainforest, heathlands and Melaleuca swamps. Roosting is noted to occur in Littoral Rainforest with foraging occurring in proximate heathland and melaleuca forest primarily on the flowers of *Banksia integrifolia* (Law, 1993; 1994; 1996)	Modification of an insignificant area of potential habitat will occur. This species is considered unlikely to be significantly affected by

Table 12: Potentially Occurring Threatened Fauna Species			
Species	**Potential occurrence**	**Notes**	**Potential for impacts**
		Potential habitat occurs on site for the species as favoured foraging trees are present (Banksia, Melaleuca, Callistemon and Eucalypts). These species of trees are not restricted to the subject site and are known to occur in abundance within the locality and surrounding conservation networks. Potential roosting habitat occurs on site in association with the Littoral Rainforest, however no individuals were observed during diurnal and nocturnal survey works. The removal of Vegetation Community 2 for the proposal will not significantly impact the species as preferred feed trees are scarce within this community, The Common Blossom-bat was not recorded during fauna survey works of the site.	the proposed development
Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*)	Possible	This species of bats utilises most habitats across its wide distribution and hunts over the canopy in forested areas and lower within mallee or open country (DECC, 2005). Roosting may occur within hollow trees and buildings and also within caves and derelict mines (NPWS, 2004; Richards in Van Dyck and Strahan, 2008). DECC (2005) notes that in treeless areas the sheathtail bat is known to utilise mammal burrows. As the species utilises most habitats, the entire site possesses potential Yellow-bellied Sheathtail-bat habitats. Potential roosting habitat also occurs within the eucalypt forest with the abundance of hollow-bearing trees. As the sheathtail -bat is known to utilise a wide variety of habitats, and the proposal will remove only a small portion of habitat in comparison to the locality, no significant impact is expected on the species. The species was not recorded during survey works.	Modification of an insignificant area of potential habitat will occur. This species is considered unlikely to be significantly affected by the proposed development
Large-eared Pied Bat (*Chalinolobus dwyeri*)	Possible	The Large-eared Pied Bat occurs within drier habitats, including dry sclerophyll forests and woodlands (Hoye and Schulz in Van Dyck and Strahan, 2008) although it has been recorded within a range of habitats, including wet and dry sclerophyll forest, Cyprus pine dominated forest, tall open eucalypt forest with a rainforest sub-canopy, sub-alpine woodland, but typically in association with sandstone relief. In south-eastern Queensland it has been noted primarily within higher altitude moist tall open forest adjacent to rainforest (Schulz et al. 1999) including Main Range National Park and land west of Mt Barney (Hoye 2005). 'Little is known about the habitat and roosting requirements of the Large-eared Pied Bat, but natural roosts may depend heavily on sandstone outcrops. It has been found roosting in disused mine shafts, caves, overhangs and disused Fairy Martin (*Hirundo ariel*) nests for shelter and to raise young (Hoye & Dwyer 1995; Schulz 1998). It also possibly roosts in the hollows of trees (Duncan et al.	Modification of an insignificant area of potential habitat will occur. This species is considered unlikely to be significantly affected by the proposed development

Table 12: Potentially Occurring Threatened Fauna Species			
Species	**Potential occurrence**	**Notes**	**Potential for impacts**
		1999).' [in DEWHA, 2009 online @ http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=183.] Similarly, to the Yellow-bellied sheathtail-bat, the Large-eared Pied Bat is known to utilise a wide variety of habitat types. As the proposal will remove a small portion of potential habitat (Vegetation Community 2) in comparison to the available habitat in the surrounding environment, no significant impact is expected to occur for the species. The Large-eared Pied Bat was not recorded during survey works of the site.	
Hoary Wattled Bat (*Chalinolobus nigrogriseus*)	Recorded	In NSW the Hoary Wattled Bat occurs in dry open eucalypt forests, favouring forests dominated by Spotted Gum, boxes and ironbarks, and heathy coastal forests where Red Bloodwood and Scribbly Gum are common. Because it flies fast below the canopy level, forests with naturally sparse understorey layers may provide the best habitat (DEH, 2012 online @ http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10158). This species is a continuous flight forager that primarily searches for a variety of insects close above the canopy and within openings in forested habitat (Fenton 1982, Allison 1995, Churchill 1998). It also forages over open ground adjacent to forested habitat (McKenzie and Rolfe 1986). The presence of insects, such as wingless ants, in scats suggests that some gleaning off foliage and other surfaces occurs (Vestjens and Hall 1977, Allison 1995) in Lumsden et al, 2005: 131). Roosting has been recorded in tree hollows and rock crevices (Kutt et al in Van Dyck and Strahn, 2008). Potential Hoary Wattled Bat habitat occurs in association with the eucalypt forest and the open ground adjacent to the forest. Potential roosting habitat is also available on site in association with the hollow-bearing trees occurring within the eucalypt forest, although none were recorded utilising any. This species was recorded via anabat within the heathland community (Vegetation Community 4). A 7-part test was performed for this species.	Recorded. 7-part test performed
Little Bentwing-bat (*Miniopterus australis*)	Recorded	This species utilises well-timbered habitats including rainforest, *Melaleuca* swamps and dry sclerophyll forests where it feeds on insects within the canopy and requires caves, mines, stormwater drains and/or tree hollows to roost (Strahan eds, 2002). DECC (2005) note the following additional particulars with regard to the little bentwing bat: • Maternity colonies form in spring. Males and juveniles disperse in summer.	Recorded. 7-part test performed

Table 12: Potentially Occurring Threatened Fauna Species			
Species	**Potential occurrence**	**Notes**	**Potential for impacts**
		• Only five nursery sites /maternity colonies are known in Australia. • Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas. • Little Bentwing-bats roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings 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. The entire site provides potential Little Bentwing-bat habitat with the exception of the cleared areas (Vegetation Community 2). Potential roosting habitat also occurs in association with hollow-bearing trees occurring within the eucalypt forest. This species was recorded via anabat within the heathland community (Vegetation Community 4). A 7-part test was performed for this species.	
Southern Myotis (*Myotis macropus*)	Recorded	The Myotis roosts within caves, tunnels, hollow-bearing trees, bridges, buildings and dense tree foliage always in close proximity to permanent water (NPWS, 2002; Richards, 2002). It forages over waterbodies where it scoops insects and small fish from the water surface or catches insects aerially (DEH, 2005; Menkhorst, 1996; Richards, 2002). It has been recorded foraging over small creeks, coastal rivers, estuaries, lakes and inland rivers (Law & Anderson, 1999) and other smaller waterbodies including farm dams (Law et al, 1998). Potential foraging habitat occurs on site in association with the drainage lines within the eastern portion of the site. More suitable and larger foraging habitats occurs within the locality in association with Evans River and the surrounding wetlands and creeklines. Potential roosting habitat also occurs for the species in association with the hollow-bearing trees occurring within the eucalypt forest in the west sections of the site. The site also compromises of dense tree foliage which may provide a	Recorded. 7-part test performed

Table 12: Potentially Occurring Threatened Fauna Species			
Species	**Potential occurrence**	**Notes**	**Potential for impacts**
		roosting habitat for the species. The species was recorded on site via anabat. A 7-part test was conducted on the species.	
Eastern Long-eared Bat (*Nyctophilus bifax*)	Possible	This species of bat inhabits lowland subtropical rainforest and wet and swamp eucalypt forest, extending into adjacent moist eucalypt forest with coastal rainforest and patches of coastal scrub particularly favoured (DEC, 2005; NPWS, 2002). Roosting occurs within tree-hollows, under bark and/or palm fronds and within dense foliage with a seasonal shift in roost sites from rainforest edges (summer) to the rainforest interior (winter) (NPWS, 2002; Parnaby in Strahan, 2002; Lunney et al, 1995). Churchill (2008) notes that northern NSW the species is restricted to rainforest. Potential habitat occurs for the Eastern Long-eared Bat in the form of eucalypt forest, littoral rainforest and heathland. Potential roosting trees also occur on site in association with hollow-bearing trees located within the eucalypt forest. Given the small size of the development footprint in comparison to the surrounding vegetation communities and conservation networks, the proposal will not significantly impact the species. The species was not recorded on site during fauna survey works.	This species is considered unlikely to be significantly affected by the proposed development
Greater Broad-nosed Bat (*Scoteanax reuppellii*)	Possible	This species of bat favours the gullies and river systems that drain the Great Dividing Range, from north-eastern Victoria to the Atherton Tableland but also extends to the coast over much of its range (DEC, 2005, Hoye & Richards in Strahan eds, 2002). Within this range it favours tall wet forest including creek/river corridors although it will also utilise a variety of other habitats such ranging from dry eucalypt woodlands to rainforest ((DEC, 2005, Hoye & Richards in Strahan eds, 2002). This species is noted to favour roosts within tree hollows although it has also been recorded within buildings (DEC, 2005, Hoye & Richards in Strahan eds, 2002). Radiotracking within Bundjalung National Park noted the species to roost exclusively within Melaleuca quinquenervia (Campbell, 2001). Marginal habitat occurs on site for the Greater Broad-nosed Bat in association with the drainage lines within the eastern portion of the site, although more suitable waterways exist within the locality in association with Evans Rivers and creeklines within the locality. Marginal habitat also occurs in association with the eucalypt forest and littoral rainforest, however the absence of permanent waterways may deter the species from these areas. Potential roosting habitat for the species	This species is considered unlikely to be significantly affected by the proposed development

Table 12: Potentially Occurring Threatened Fauna Species			
Species	**Potential occurrence**	**Notes**	**Potential for impacts**
		occurs within the heathland community (Vegetation Community 4) in association with the *Melaleuca quinquenervia* abundance occupying this community. It is noted that this community will not be impacted by the future development. The species was not recorded during fauna survey works.	

5.4 OXLEYAN PYGMY PERCH (*NANNOPERCA OXLEYANA*)

The Oxleyan Pygmy Perch is listed as Endangered under both Commonwealth's *Environment Protection and Biodiversity Act 1999* and NSW's *Fisheries Management Act 1994*.

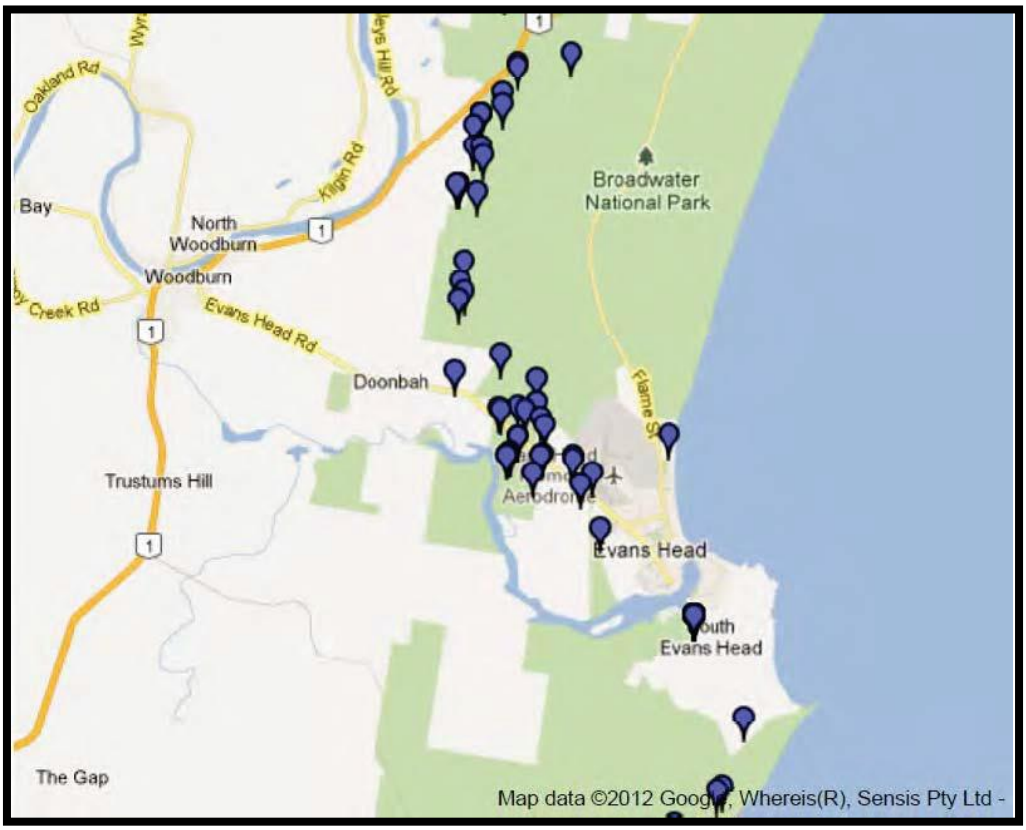


FIGURE 6 – I&I NSW RESEARCH RECORDS FOR OXLEYAN PYGMY PERCH AT EVANS HEAD (SOURCE: http://www.dpi.nsw.gov.au/fisheries/species-protection/records/viewer)

Oxleyan Pygmy Perch are usually light brown to olive in colour (darkest on back, sides paler) and mottled, with three to four patchy, dark brown bars extending from head to tail, and a whitish belly (Department of the Environment, 2014). The gill cover (opercular) has a blue iridescence and there is a conspicuous dark round spot with an orange margin at the base of the tail. The scales have dusky margins and the fins are mainly clear. There is a blue ring around the eye (Department of the Environment, 2014). During breeding the dorsal, pelvic and anal fins darken and the lateral stripes and tail turn scarlet (Arthington & Marshall 1996; Kuiter et al. 1996; Thompson et al. 2000). They can grow to about 60 mm in length, but are more commonly around 35 mm (Allen 1989a; McDowall 1996).

The Oxleyan pygmy perch appears only to be found in the swamps, streams and dune lakes that lie in the lowland, coastal 'wallum' heaths between north-eastern NSW and south-eastern Queensland (including Fraser, Stradbroke and Moreton islands). Their specific habitat requirements include fresh, acidic waters and abundant aquatic vegetation (NSW DPI 2005).

In northern NSW, Oxleyan Pygmy Perch have been recorded in the Wooli area from Lake Minnie Water in 1995 (Lawrence 1998), and again in 2001. Furthermore, surveys undertaken by ANGFA (Australian & New Guinea Fishes Association), and Southern Cross University have located four additional waterbodies containing Oxleyan Pygmy Perch in the Wooli area, with a new record from Haleys Creek, near Brooms Head. An intensive survey of the Evans Head area (northern NSW) in 2000 resulted in the capture of 566 perch from 25 water bodies in and around Broadwater National Park (Knight 2000). This makes the Evans Head area one of the most important known habitats for the species (NSW DPI 2005j).

While little information exists on their tolerance to disturbance, habitat degradation or pollution (NSW DPI 2005j), Oxleyan Pygmy Perch were found within shallow artificially constructed drains in northern NSW, suggesting that they may be capable of surviving in more degraded areas (Knight 2000). However, the species is mainly restricted to unpopulated or isolated areas where human interference is absent or minimal (Leggett 1990).

The Oxleyan Pygmy Perch feeds primarily on aquatic insects and their larvae (Allen 1989a).

The reproductive biology of the Oxleyan Pygmy Perch is poorly known. It is thought that most populations spawn between October and December (Arthington & Marshall 1993; Arthington et al. 1996). Spawning is probably stimulated by rising water temperatures (NSW DPI 2005j).

Targeted surveying for the species occurred on site in association with the man-made drainage lines occurring on the eastern portions of the site. Survey works were conducted in accordance with *EPBCA's Survey Guidelines for Australia's Threatened Fishes* for trapping over two days.

The two days of trapping events resulted in no Oxleyan Pygmy Perch being trapped. Although potential habitat for the species occurs within both drainage lines, it is considered that the Oxleyan Pygmy Perch is an unlikely occurrence. I&I NSW research records for Oxleyan Pygmy Perch at Evans Head illustrates that no records occur on the subject site (**Figure 6**). Both drainage lines lack dense vegetation and is restricted from external waterbodies. Water is supplied to both drainage lines via the water table and varies in salinity the further away from Evans River you occur. As mentioned the drainage line along the eastern boundary is tidally influenced in the southern extents.

As previously stated, it is proposed that the drainage lines within the acacia community is to be filled.

The drainage feature in the wet heath community is not affected by the proposal. The retention of the majority of the heath communities additionally buffers preferred habitat areas to the north east.

It is considered that the proposal will not significantly impact the Oxleyan Pygmy Perch.

5.5 CRITICAL HABITAT

Critical habitats in the NSW which are listed under the *Threatened Species Conservation Act 1995* include:

- Bomaderry zieria (*Zieria baeuerlenii*) within the Bomaderry bushland;
- Eastern Suburbs Banksia Scrub Endangered Ecological Community;
- Wollemia nobilis (the Wollemi pine);
- Gould's Petrel;
- Little penguin population in Sydney's North Harbour; and
- Mitchell's Rainforest Snail in Stotts Island Nature Reserve

The proposed development is unlikely to impact upon any of these declared critical habitats.

5.6 FAUNA CORRIDORS/LINKAGES

Wildlife corridors can be defined as 'retained and/or restored systems of (linear) habitat which, at a minimum enhance connectivity of wildlife populations and may help them overcome the main consequences of habitat fragmentation' (Wilson & Lindenmayer, 1995). Corridors can assist ecological functioning at a variety of spatial and temporal scales from daily foraging movements of individuals, to broad-scale genetic gradients across biogeographical regions (Parsons Brinkerhoff, 2005).

Corridors serve a number of functions in terms of biodiversity conservation including:

- providing increased foraging area for wide-ranging species
- providing cover for movement between habitat patches, particularly for cover dependent species and species with poor dispersal ability and enhancing the movement of animals through sub-optimal habitats
- reducing genetic isolation by maintaining continuity between sub-populations in a metapopulation and thereby preventing and /or reversing localised extinction
- facilitating access to a mix of habitats and successional stages to those species which require them for different activities (for example, foraging or breeding)
- providing refuge from disturbances such as fire
- providing habitat in itself (Wilson, A. & Lindenmayer 1995; Lindenmayer, 1994; Bennett, 1999).

How species use the corridor network will depend largely on the home and activity ranges of the species, their habitat requirements and the ecological characteristics of the corridor. For example, some large or mobile species may make direct movements through the corridor network, moving from one patch of habitat to another. These direct movements may be on the scale of a foraging expedition or a migration (Bennett 1990b).

Other species may have movements by single individuals punctuated by pauses in the corridor, which can last anything from a small foraging or resting bout to weeks and even months. If the corridor contains sufficient resources to maintain a population, then continuity through the corridor may be through gene flow through the resident population (Bennett 1990b; Wilson, A. & Lindenmayer 1995).

For example, a mobile species with a large home range (i.e. koala) may regularly traverse a corridor to move between favoured feeding grounds or in attempt to access mates, whereas a species with a comparably minor home range (i.e. antechinus) may spend its entire life within a portion of the same corridor.

Reviewing the land use of the site and surrounding locality it is considered that the residual vegetation communities/habitats are highly connected and form an expansive contiguous corridor of remnant habitat (**Figure 7**). Notwithstanding, it is considered that the proposal will not introduce a new significant terrestrial fauna dispersal barrier. Existing vegetation will still remain around the entire development, allowing easy fauna movement.

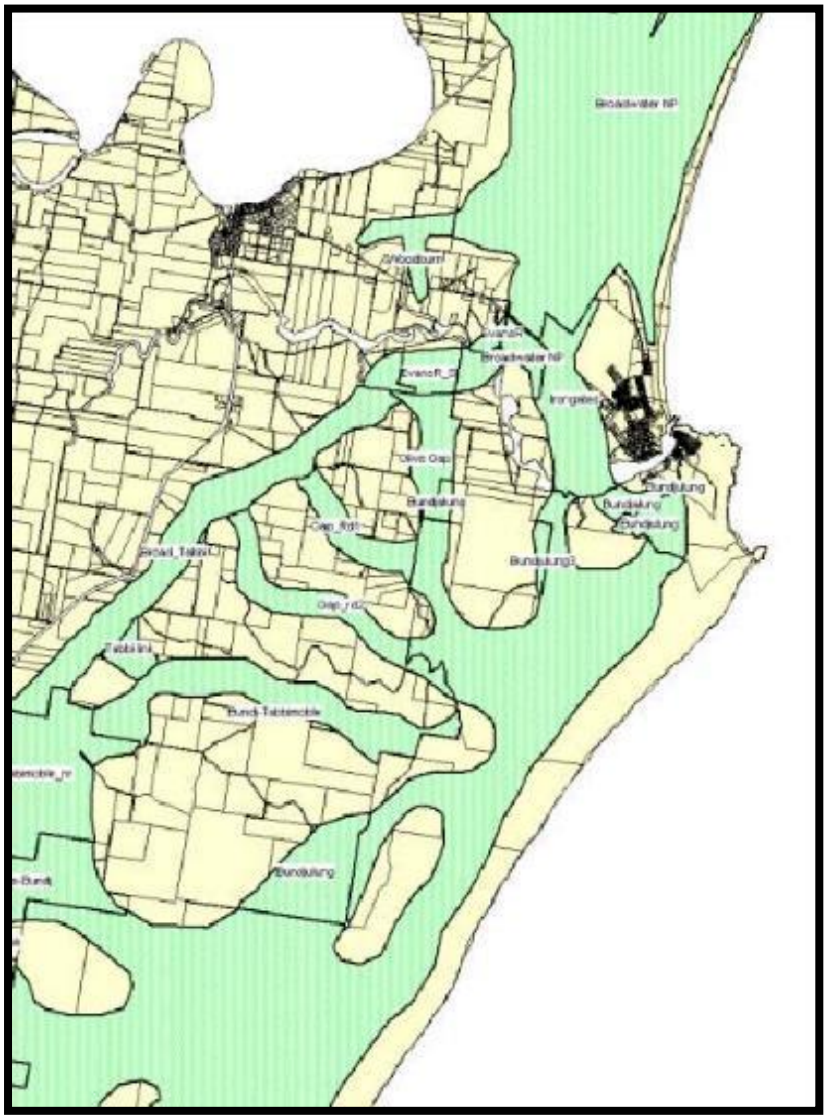


FIGURE 7 – NPWS KEY CORRIDORS IN EVANS RIVER VICINITY

5.7 RICHMOND VALLEY LOCAL ENVIRONMENTAL PLAN 2012

5.7.1 Terrestrial Biodiversity

FIGURE 8 – RICHMOND VALLEY LEP 2012 TERRESTRIAL BIODIVERSITY MAP

In accordance with the Richmond Valley Local Environmental Plan 2012 maps, the entire site is mapped as containing Terrestrial Biodiversity (**Figure 8**). The LEP states the following for Terrestrial Biodiversity:

(1) The objective of this clause is to maintain terrestrial biodiversity by:

(a) protecting native fauna and flora, and

(b) protecting the ecological processes necessary for their continued existence, and

(c) encouraging the conservation and recovery of native fauna and flora and their habitats.

(2) This clause applies to land identified as "Biodiversity" on the Terrestrial Biodiversity Map.

(3) Before determining a development application for development on land to which this clause applies, the consent authority must consider:

(a) whether the development:

(i) is likely to have any adverse impact on the condition, ecological value and significance of the fauna and flora on the land, and

(ii) is likely to have any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna, and

(iii) has any potential to fragment, disturb or diminish the biodiversity structure, function and composition of the land, and

(iv) is likely to have any adverse impact on the habitat elements providing connectivity on the land, and

(b) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.

(4) Development consent must not be granted for development on land to which this clause applies unless the consent authority is satisfied that:

(a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or

(b) if that impact cannot be reasonably avoided by adopting feasible alternatives—the development is designed, sited and will be managed to minimise that impact, or

(c) if that impact cannot be minimised—the development will be managed to mitigate that impact.

Although the entire site has been mapped as Terrestrial Biodiversity, ground truthing of the site identified that large portions of the site is cleared or has been previously cleared. The proposal will only directly impact areas which is, or has been previously cleared.

The environmental values of the proposed modified areas of the site represents low ecological values. The environment surrounding the site provides much higher ecological values to the area and will be retained for the development. The development will not significantly impact fauna corridors for the locality.

It is concluded that the proposed development will not create any significant adverse impact on terrestrial biodiversity in the locality.

As indicated the Wattle community is a disturbed / modified community the result of past clearing / seeding. The proposal will remove the majority of Wattle from within the development footprint. The area to be removed is 6.83 ha.

The development will remove approximately 1,175 m^2 of Open Dry Heath and 1.16 ha of Open Dry Heath with mixed Eucalypt. We note this community is vulnerable but locally well conserved in the surrounding conservation network.

The development will require the removal of approximately 1,195 m^2 of Heathy Scribbly Gum for roads, bushfire requirements and lots.

The proposal will result in very minor impacts on Littoral rainforest. As previously noted the road extension between the eastern and western residential areas of the development will necessitate minor pruning of limbs on the edges of the Littoral rainforest. Furthermore, clearing of approximately 127 m^2 (0.15%) of highly degraded vegetation surrounding an existing sewer pump station well (see photo plates below) will be required for the construction of a sewer pump station.

Given the minor scale of clearing and the type of vegetation to be removed it is anticipated no decrease in species diversity would be occasioned through the development.

5.7.2 Wetlands & Riparian Land and Waterways

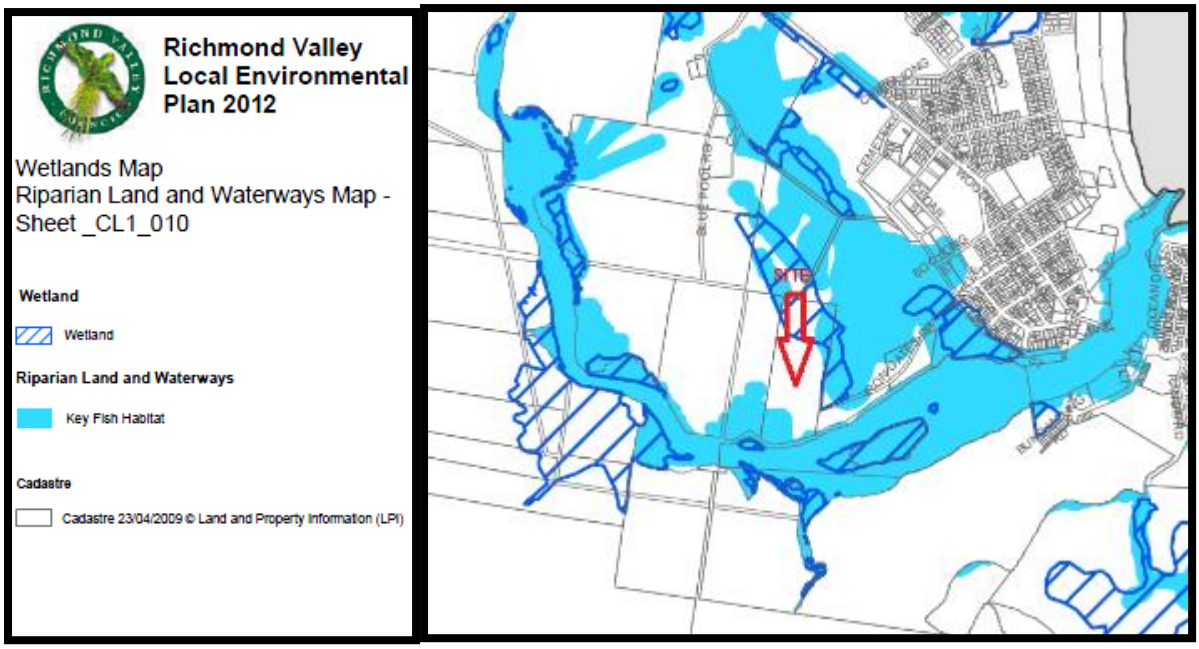


FIGURE 9 – RICHMOND VALLEY LEP 2012 WETLANDS & RIPARIAN LAND AND WATERWAYS MAP

In accordance with the Richmond Valley Local Environmental Plan 2012 maps (**Figure 9**), small portions the site is mapped as containing Wetlands, as well as Riparian Land and Waterways. The LEP states the following for these:

Wetlands

(1) The objective of this clause is to ensure that wetlands are preserved and protected from the impacts of development.

(2) This clause applies to land identified as "Wetland" on the Wetlands Map.

(3) Before determining a development application for development on land to which this clause applies, the consent authority must consider:

(a) whether or not the development is likely to have any significant adverse impact on the following:

(i) the condition and significance of the existing native fauna and flora on the land,

(ii) the provision and quality of habitats on the land for indigenous and migratory species,

(iii) the surface and groundwater characteristics of the land, including water quality, natural water flows and salinity, and

(b) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.

(4) Development consent must not be granted for development on land to which this clause applies unless the consent authority is satisfied that:

(a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or

(b) if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or

(c) if that impact cannot be minimised—the development will be managed to mitigate that impact.

Figure 9 above notes that the site contains Wetlands in the north-eastern portions of the site. While it is acknowledged that a small portion of the developmental footprint is located in this area, ground truthing of the site noted that the wetland habitat is slightly further northeast than as mapped and that the development footprint is not associated with any natural wetlands.

Although the areas immediately to the north and east of the development footprint contain Wetlands (Melaleuca Swampland), the proposed development will not directly impact these areas. The proposed subdivision layout seeks to maintain the natural stormwater drainage regime across the site. Bio-retention areas, ponds and gross pollutant traps are proposed to collect and manage stormwater before leaving the site. The Engineering Impact Assessment prepared to accompany the development application includes plans and commentary regarding the proposed stormwater management strategy for the site. It is understood that further detail will form part of the future Construction Certification applications. A Stormwater Management Plan should be prepared prior to commencement of construction to ensure that there are no indirect impacts on nearby wetland areas as a result of the proposed development.

Riparian Land and Waterways

(1) The objective of this clause is to protect and maintain the following:

(a) water quality within watercourses,

(b) the stability of the bed and banks of watercourses,

(c) aquatic and riparian habitats,

(d) ecological processes within watercourses and riparian areas.

(2) This clause applies to land identified as “Key Fish Habitat” on the Riparian Land and Waterways Map.

(3) Before determining a development application for development on land to which this clause applies, the consent authority must consider:

(a) whether or not the development is likely to have any adverse impact on the following:

(i) the water quality and flows within the watercourse,

(ii) aquatic and riparian species, habitats and ecosystems of the watercourse,

(iii) the stability of the bed and banks of the watercourse,

(iv) the free passage of fish and other aquatic organisms within or along the watercourse,

(v) any future rehabilitation of the watercourse and its riparian areas, and

(b) whether or not the development is likely to increase water extraction from the watercourse, and

(c) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.

(4) Development consent must not be granted for development on land to which this clause applies unless the consent authority is satisfied that:

(a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or

(b) if that impact cannot be avoided by adopting feasible alternatives—the development is designed, sited and will be managed to minimise that impact, or

(c) if that impact cannot be minimised—the development will be managed to mitigate that impact.

In accordance to the **Figure 9** above, the northeast portion of the site associated with the Heath Community is mapped as containing wetlands.

In addition, the site is mapped as containing Riparian Land and Waterways (Key Fish Habitat) in the southern and northeaster sections of the site. Ground truthing of the site notes that it is highly unlikely that the southern portion of the site provides any Key Fish Habitat as mapped as the site is significantly elevated from the river. The site is elevated approximately 1.0 m above the Highest Astronomical Tide (HAT) for the river. While is it noted that the mangroves and saltmarsh located along the site's riverfront provides Key Fish Habitat, the proposal will not impact these areas.

In relation to the Key Fish Habitat located on the north-eastern portion of the site, it is highly unlikely that the proposal will impact these areas as the only Riparian Land & Waterways located within the development footprint occur within the man-made drainage lines. Fish trapping of these drainage lines (in association with Oxleyan Pygmy Perch surveys) did not result in any species of fish being trapped.

The proposed subdivision layout seeks to maintain the natural stormwater drainage regime across the site. The drainage feature in the north east of the site and occurring within the mapped wetland designation is retained and buffered from development. Bio-retention areas, ponds and gross pollutant traps are proposed to collect and manage stormwater before leaving the site. The Engineering Impact Assessment prepared to accompany the development application includes plans and commentary regarding the proposed stormwater management strategy for the site. It is understood that further detail will form part of the future Construction Certification applications. A Stormwater Management Plan should be prepared prior to commencement of construction to ensure that there are no indirect impacts on nearby riparian land and waterways as a result of the proposed development.

It is therefore concluded that the proposed development will not create any significant adverse impact on Wetlands & Riparian Land and Waterways in the locality.

6.0 STATUTORY CONSIDERATIONS

6.1 ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT (1999)

6.1.1 Introduction

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

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

b) the ecological character of a declared Ramsar wetland;

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

d) a migratory species listed under the Act; or

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

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

a) a nuclear action; or

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

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

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

Relevant matters of NES are:

- Listed Threatened Species;
- Listed Ecological Communities in New South Wales;
- Listed migratory species (JAMBA and CAMBA).

6.1.2 Occurrence of Matters of NES on Subject Site

6.1.2.1 Background

A Commonwealth Assessment will be required for proposed activities on the subject site if they affect a matter of NES. Matters of NES in NSW were identified in the previous section.

There are no declared World Heritage Areas or Ramsar Wetlands in the Locality, Study area or Subject site.

6.1.2.2 Listed Threatened species

No Commonwealth Threatened flora species were recorded in the Study Area.

Seven (7) species of Threatened fauna listed within schedules of the EPBC Act were either recorded on the site or are considered potential occurrences within the area based upon available habitat components:

- Grey-headed Flying-fox (*Pteropus poliocephalus*)
- Koala (*Phascolarctos cinereus*)
- Wallum Sedge-frog (*Litoria olongburensis*)
- Red Goshawk (*Erythrotriorchis radiatus*)
- Regent Honeyeater (*Anthochaera phrygia*)
- Spotted-tailed Quoll (*Dasyurus maculatus*)
- Large-eared Pied Bat (*Chalinolobus dwyeri*)

6.1.2.3 Listed Ecological Communities

One (1) Commonwealth Threatened Ecological Communities was recorded on the Subject site - Littoral Rainforest and Coastal Vine Thickets of Eastern Australia.

6.1.2.4 Listed Migratory Species

The list of migratory species established under section 209 of the EPBC Act comprises:

- migratory species which are native to Australia and are included in the appendices to the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals Appendices I and II);
- migratory species included in annexes established under the Japan-Australia Migratory Bird Agreement (JAMBA) and the China-Australia Migratory Bird Agreement (CAMBA); and
- native, migratory species identified in a list established under, or an instrument made under, an international agreement approved by the Minister, such as the Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).

Listed migratory species include Migratory Marine Birds, Migratory Marine Species (including mammals, reptiles and fish), Migratory Terrestrial Species and Migratory Wetland Species. Migratory Marine Species and the majority of Migratory Marine Birds do not occur within the study area. Migratory Terrestrial Species and Migratory Wetland Species include a range of bird species, many of which are known from the wider locality.

6.1.3 Assessment against EPBC Act Principal Significant Impact Guidelines

6.1.3.1 Background

The Assessment against the requirements of the EPBC Act is completed by using the Principal Significant Impact Guidelines 1.1 (DEH 2006). The guidelines outline a self-assessment process to assist in determining whether an action should be referred to the Commonwealth for a decision on whether Commonwealth assessment and approval is required under the Act. The following sections assess the proposed development (the action) against these guidelines.

Extinct in the Wild Species

An action is likely to have a significant impact on extinct in the wild species if there is a real chance or possibility that it will:

- adversely affect a captive or propagated population or one recently introduced/reintroduced to the wild; or
- interfere with the recovery of the species or its reintroduction into the wild.

Critically Endangered or Endangered Species

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

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

Vulnerable Species

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

- lead to a long-term decrease in the size of an important population of a species;
- reduce the area of occupancy of an important population;

- fragment an existing important population into two or more populations;
- adversely affect habitat critical to the survival of a species;
- disrupt the breeding cycle of an important population;
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;
- result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;
- introduce disease that may cause the species to decline; or
- interfere substantially with the recovery of the species.

Critically Endangered and Endangered Ecological Communities

An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:

- reduce the extent of an ecological community;
- fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines;
- adversely affect habitat critical to the survival of an ecological community;
- modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns;
- cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting;
- cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:
    - assisting invasive species, that are harmful to the listed ecological community, to become established, or
    - causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or
- interfere with the recovery of an ecological community.

Listed Migratory Species

An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species;

- result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species; or
- seriously disrupt the life cycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

An area of 'important habitat' for a migratory species is:

a) habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species; and/or

b) habitat that is of critical importance to the species at particular life-cycle stages; and/or

c) habitat utilised by a migratory species which is at the limit of the species range; and/or

d) habitat within an area where the species is declining.

Listed migratory species cover a broad range of species with different life cycles and population sizes. Therefore, what is an 'ecologically significant proportion' of the population varies with the species (each circumstance will need to be evaluated). Some factors that should be considered include the species' population status, genetic distinctiveness, and species-specific behavioural patterns (for example, site fidelity and dispersal rates)

'Population', in relation to migratory species, means the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries including Australia.

6.1.3.2 Assessment of Proposed Action

Whilst the Koala and Grey-headed flying fox have been recorded from the site, and a number of other listed species are considered "possible" occurrences based on the availability of potentially suitable habitat, the proposed development is considered highly unlikely to result in any of the above listed impacts on any Commonwealth listed threatened species.

Furthermore, it is considered that the Study Area does not support an "important population" of any species (as defined within the EPBC Act) and a significant impact on these species will not be incurred.

With regards to the Littoral Rainforest and Coastal Vine Thickets of Eastern Australia Ecological Community, very minor impacts are proposed which relate to the pruning of limbs adjacent to an existing access road, and the clearing of approximately 127 m^2 (0.15%) of highly degraded vegetation surrounding an existing sewer pump station well (refer **Section 7.2**) for the construction of a sewer pump station. The retained community will be rehabilitated in accordance with an appropriate plan of management and protected in perpetuity under a stewardship agreement (under the Biodiversity Conservation Act 2016) entered into by the proponent.

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

6.1.4 Requirement for Commonwealth Referral

Based on the assessment provided above, Referral to the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) is not required. The proposed action is unlikely to result in a significant impact on any matter of NES. It is concluded that Commonwealth Assessment is not required for the proposed development of the subject site.

6.2 THE 7-PART TEST OF SIGNIFICANCE

Further to the provisions of Schedules 1 and 2 of the *Threatened Species Conservation Act 1995*, Section 5A of the *Environmental Planning and Assessment Act 1979* (the '7-Part Test') is applied to assess any potentially adverse impacts of the site-proposal on threatened species, populations and/or communities occurring within the site or surrounding locality.

The Assessment of Significance is not a 'pass/fail' test or technique based on a scoring system. Instead, the outcome of each factor needs to be considered as to whether effects are likely and whether they are significant (NPWS 1996a).

It is further noted that a positive finding in respect of one or more factors of the 7-part test of significance does not necessarily lead to the conclusion that an SIS is then required (Talbot in Gales Holdings Pty Ltd v Tweed Shire Council [2006] NSWLEC 212). Rather it allows consideration as to whether a particular effect may be present or occur as a result of the development and whether that effect is likely to be significant.

The 7-Part Test is applied to scheduled flora, fauna, populations and communities (where applicable) to assess potentially adverse impacts of the proposal on threatened species, populations or communities identified on or likely to utilise the site based on available habitat components, geography and local environmental conditions.

Note that threatened species, populations and/or communities have been excluded from this assessment where:

- No direct observations of threatened species, populations or communities were made on the site during survey works;
- No previous sightings of threatened species, populations or communities within a 10-kilometre radius of the site have been registered within the NPWS database and scheduled under the *Threatened Species Conservation Act 1995*; and
- An abundance of primary habitat requirements for said species are not located on or within the locality of the proposal (refer previous sections)

- Potential habitat (feeding, roosting, nesting or refuge) will not be or will be minimally affected by the proposal (refer previous sections)

As such it is considered that, of the scheduled species, populations and/or communities described previously within this report, the following ten species of threatened fauna and one endangered ecological communities were recorded on the site or are considered potential occurrences within the area based upon available habitat components and may have the potential to be significantly affected through any development of the site.

Table 13: Threatened Species and Communities Subject To 7-Part Test	
Ecological Communities	VEGETATION COMMUNITY 1: TALL TO VERY TALL MIXED CLOSED FOREST CONTAINING A WIDE VARIETY OF RAINFOREST SPECIES [LITTORAL RAINFOREST IN THE NSW NORTH COAST, SYDNEY BASIN AND SOUTH EAST CORNER BIOREGIONS]
Populations	N/A
Flora	N/A
Fauna	Grey-headed Flying-fox (*Pteropus poliocephalus*)
	Hoary Wattled Bat (*Chalinolobus nigrogriseus*)
	Little Bentwing-bat (*Miniopterus australis*)
	Southern Myotis (*Myotis macropus*)
	Koala (*Phascolarctos cinereus*)
	Squirrel Glider (Petaurus norfolcensis)
	Wallum Froglet (*Crinia tinnula*)

6.2.1 Factors of Assessment 7-Part Test

(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 National Parks and Wildlife Service (NPWS) describe a local population as one *"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."*

DECC (2007) & DPI (2008) further expands the local population definition to include:

- The *local population* of a threatened *plant* species comprises those individuals occurring in the study area or the cluster of individuals that extend into habitat adjoining and contiguous with the study area that could reasonably be expected to be cross-pollinating with those in the study area.
- The *local population* of *resident fauna* species comprises those individuals known or likely to occur in the study area, as well as any individuals occurring in adjoining areas (contiguous or otherwise) that are known or likely to utilise habitats in the study area.

- The *local population* of *migratory or nomadic fauna* species comprises those individuals that are likely to occur in the study area from time to time.

DECC (2007) & DPI (2008) further states that the key assessment for this component is the "risk of extinction of the local population. The risk of extinction will increase if any factor operates to reduce population size or reproduction success." It is further noted that any known or presumed local population should be assumed to be viable for the purpose of this assessment unless otherwise proven.

Megachiropterans (Grey-headed Flying-fox)

Local Population

As the noted mega-bat species are considered to be wide ranging in the region, it is considered that they are not genetically isolated on the subject site and form part of populations within the wider region. This species was well known from the locality and is known to roost within the littoral rainforest near the Silver Sands Holiday Park. The forests of the Iluka Peninsula are used as temporary summer camps by the Grey-headed Fly-fox (NPWS 1997).

This species was recorded flying over the site during dusk survey works. An individual (1) was recorded within the Heath community (Vegetation Community 4) foraging on a *Melaleuca quinquenervia* during spotlight search. The NPWS database contains thirty-five (35) records of this species within 10 kilometres of the site.

Stages of lifecycle potentially affected by development

Habitat Preference	Roosting/Breeding
The Grey-headed Flying-fox inhabits subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps (Eby, 1995). Urban gardens and cultivated fruit crops also provide habitat for this species (NSW NPWS 1999c). Grey-headed Flying-foxes forage on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca, Banksia (Eby, 2000) and fruits of rainforest trees and vines (NSW NPWS 1999c). During periods when native food is limited, Grey-headed Flying-foxes disperse from colonial roosts, often foraging in cultivated gardens and fruit crops (NSW NPWS 1999c). This	This species roosts in large aggregations or camps in close proximity (20 km or less) to a regular food source, often in stands of riparian rainforest, Paperbark or Casuarina forest (Eby, 1995). Camps provide resting habitat, sites of social interactions and refuge for animals during significant phases of their annual cycle, such as birth, lactation and conception (Parry-Jones and Augee 1992, 2001). "Roosting habitat critical to survival: Grey-headed Flying-foxes roost in large aggregations in the exposed branches of canopy trees (Ratcliffe 1931, Nelson 1965a, Parry-Jones and Augee 1992). The locations of camps are generally stable through time, and several sites have documented histories that exceed 100 years (Lunney and Moon 1997). Camps provide resting habitat, sites of social interactions and refuge for animals during significant phases of their annual cycle, such as birth, lactation and conception (Parry-Jones and Augee 1992, 2001). On the basis of current knowledge, roosting habitat that meets at least one of the following criteria can be explicitly identified as habitat critical to survival, or essential habitat, for Grey headed Flying-foxes. Roosting habitat that: 1. is used as a camp either continuously or seasonally in > 50% of years

Habitat Preference	Roosting/Breeding
species is a canopy-feeding frugivore, blossom-eater and nectarivore of rainforests, open forests, woodlands, Melaleuca swamps and Banksia woodlands. As such, it plays an important ecosystem function by providing a means of seed dispersal and pollination for many indigenous tree species (Eby 1996; Pallin 2000).	2. has been used as a camp at least once in 10 years (beginning in 1995) and is known to have contained > 10 000 individuals, unless such habitat has been used only as a temporary refuge, and the use has been of limited duration (i.e. in the order of days rather than weeks or months) 3. has been used as a camp at least once in 10 years (beginning in 1995) and is known to have contained > 2 500 individuals, including reproductive females during the final stages of pregnancy, during lactation, or during the period of conception (i.e. September to May) (in DECCW, 2009)

A review of the available habitats of the site indicates that general potential foraging habitats (flowering and fruiting trees) are available within the majority of the site (with the exception of the cleared areas). Although the site features foraging habitat for the Grey-headed Flying-fox, it must also be considered that the majority of the locality also provides foraging habitat.

The combination of Bundjalung National Park and Broadwater National Park consists of approximately 20800 ha of protected areas which features preferable foraging and roosting habitat for the species.

The proposal will remove approximately 7.2 ha of marginal Grey-headed flying fox habitat in association with the Acacia Regrowth within Vegetation Community 2. The clearing and removal of forage resource is insignificant in comparison to the surrounding conservation networks available. Furthermore, as no roost sites were recorded within the site, it is considered that breeding requirements will not be disturbed as part of the proposal. It is highly unlikely that the removal of this vegetation will significantly impact the Grey-headed Flying-fox population within the locality.

Likelihood of Local Extinction

Reviewing the above, it is considered unlikely that the proposal will disrupt the lifecycle of the local population of the discussed megabat to the point that they are at risk of extinction.

Threatened Microchiropteran Bats

As the noted micro-bat species are considered to be wide ranging, it is considered that they are not genetically isolated on the subject site and form part of populations within the wider region.

Hoary Wattled Bat

This species was recorded via anabat detection north of the site foraging within the Melaleuca Heath within the study area. The NPWS database contains 5 records of this species within 10 kilometres of the site.

Little Bentwing-bat

This species was recorded via anabat detection north of the site foraging within the Melaleuca Heath within the study area. The NPWS database contains 21 records of this species within 10 kilometres of the site.

Southern Myotis

This species was recorded via anabat detection north of the site foraging within the Melaleuca Heath within the study area. The NPWS database contains 3 records of this species within 10 kilometres of the site.

Species	Habitat Preference	Roosting/Breeding
Hoary Wattled Bat	In NSW the Hoary Wattled Bat occurs in dry open eucalypt forests, favouring forests dominated by Spotted Gum, boxes and ironbarks, and heathy coastal forests where Red Bloodwood and Scribbly Gum are common. Because it flies fast below the canopy level, forests with naturally sparse understorey layers may provide the best habitat (DEH, 2012 online @ http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10158). This species is a continuous flight forager that primarily searches for a variety of insects close above the canopy and within openings in forested habitat (Fenton 1982, Allison 1995, Churchill 1998). It also forages over open ground adjacent to forested habitat (McKenzie and Rolfe 1986). The presence of insects, such as wingless ants, in scats suggests that some gleaning off foliage and other surfaces occurs (Vestjens and Hall 1977, Allison 1995) in Lumsden et al, 2005: 131).	Roosting has been recorded in tree hollows and rock crevices (Kutt et al in Van Dyck and Strahn, 2008).
Little Bentwing-bat	This species utilises well-timbered habitats including rainforest, *Melaleuca* swamps and dry sclerophyll forests where it feeds on insects within the canopy.	DECC (2005) note the following particulars with regard to the little bentwing bat: • Maternity colonies form in spring. Males and juveniles disperse in summer. • Only five nursery sites /maternity colonies are known in Australia. • Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas. • Little Bentwing-bats roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts,

Species	Habitat Preference	Roosting/Breeding
		bridges and sometimes buildings during the day • 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.
Southern Myotis	It forages over waterbodies where it scoops insects and small fish from the water surface or catches insects aerially (DEH, 2005; Menkhorst, 1996; Richards, 2002). It has been recorded foraging over small creeks, coastal rivers, estuaries, lakes and inland rivers (Law & Anderson, 1999) and other smaller waterbodies including farm dams (Law et al, 1998).	The Myotis roosts within caves, tunnels, hollow-bearing trees, bridges, buildings and dense tree foliage always in close proximity to permanent water (NPWS, 2002; Richards, 2002).

A review of existing habitats indicates that the site provides potential habitat (Eucalypt Forest) for the Hoary Wattled Bat, potential habitat (Eucalypt Forest, Heathland and Littoral Rainforest) for the Little Bentwing-bat and potential habitat (Drainage Lines associated with the Acacia Regrowth) for the Southern Myotis.

A review of the above species indicates that tree cavities and caves/crevices are necessary for roosting/breeding. In addition to providing shelter, maternity places and retreats for hibernation, roosts are also important places for social interactions among bats. The availability of suitable roosts is therefore critical for forest bat survival (Herr, 1998). Within the site it is considered that cave/mine potential breeding sites are absent, although hollow bearing trees are abundant. These hollow-bearing trees associated with the Eucalypt Forest will not be removed for the future development.

As all three species are wide ranging and the proposal will result in only a minor modification of potential foraging habitat it is considered unlikely that a significant impact to any of species will be occasioned by the development proposal

Likelihood of Local Extinction

Reviewing the above, it is considered unlikely that the proposal will disrupt the lifecycle of the local population of the discussed micro-bats to the point that they are at risk of extinction.

Koala

As the Koala is wide ranging in the region, it is considered that it is not genetically isolated on the subject site and would form part of a population within the wider region.

Although the Koala was not directly observed, scratches on several smooth barked eucalypts were noted within Vegetation Community 3 (eucalypt forest) during the 2014 survey. The NPWS database contains 19 records of this species within 10 kilometres of the site.

The assessment of current levels of Koala activity/usage over the site utilising the RG-bSAT in March 2019 (**Attachment 4)** identified areas of "low" level usage outside of the proposed development footprint (i.e. adjacent to the south-western corner). A small number of Koala faecal pellets were recorded under a total of three (3) trees in this portion of the site. As noted by Phillips and Callaghan (2011), where the results of a SAT site returns an activity level within the low use range, the level of use by the Koala is likely to be transitory. It is also noted that none of the faecal pellets recorded were considered to be fresh.

Based on the results of this assessment it is considered that the south-western portion of the subject site may be utilised occasionally by Koalas as they traverse the locality. The results indicate that a resident/sedentary population is not currently present on the site.

Stages of lifecycle potentially affected by development

The Koala primarily occurs within Eucalypt Forest and Woodlands containing a suitable density of favoured food trees within coastal eastern and southeastern Australia. Preferred habitat generally contains a high percentage of primary food trees although underlying geology and soil type can be an important factor. Eucalypt Forests associated with drainage lines and floodplains of richer soil types (i.e. moisture and nutrients) can also be favoured due to feed trees containing higher levels of nutrients and less potential for toxicity (Hindell & Lee, 1990; Moore & Foley, 2000).

Within SEQLD six primary foraging trees were identified by Pahl (1993); Tallowwood (*Eucalyptus microcorys*), Blue Gum (*E. tereticornis*), Scribbly Gum (*E. racemosa*), Grey Gum (*E. propinqua*), Red Mahogany (*E. resinifera*) and White Stringybark (*E. tindaliae*). Further research undertaken by Phillips & Callaghan (1996) in Tweed Shire indicates that Swamp Mahogany (*E. robusta*) and Blue Gum (*E. tereticornis*) [including hybrids of the two] on alluvial deposits and Quaternary and Neranleigh- Fernvale Group geomorphologies were considered to be primary habitats. Areas with sub-dominance of these species on Neranleigh-Fernvale alliances supporting Blue Gum (*E. tereticornis*), Tallowwood (*E. microcorys*) and/or Grey Gum (*E. propinqua*) comprise secondary habitat or primary habitat depending on the density of the latter two species. Phillips & Callaghan (1998) also noted Tallowwood to be a primary browse species and two types of Grey Gum (*E. propinqua, E. biturbinata)* to be secondary browse species in Currumbin.

Recent studies (Biolink, 2007) indicate that *Eucalyptus tereticornis, E. microcorys* and *E. propinqua/E. biturbinata* are the most preferred koala food trees throughout the Gold Coast LGA. Within the Tweed Coast Swamp Mahogany *Eucalyptus robusta* and Forest Red Gum *E. tereticornis* are the most preferred tree species with Tallowwood *E. microcorys* and Grey Gum *E. propinqua* being the next most preferred (Biolink, 2011).

Within utilized Eucalypt Forest habitat the koala spends most of its time in distinct home-ranges which may overlap if available habitat area is reduced. Males are territorial but a dominance-hierarchy exists and they may attack during the summer breeding season. Home ranges of the species are considered to be large and can vary dependent upon habitat quality and extent. Studies have shown various home range sizes exist with the males usually larger than the female (Male 135 ha, Female: 110 ha [Ellis et al, 2002], Male: 34.4 ha, Female: 15 ha [White, 1999]).

A review of a number of published scientific reports notes that Koala density generally ranges between 0.02 and 1.26 animals per hectare. Densities are considered to vary dependent upon habitat quality, size, connectivity, presence of impediments to movement (stock fences, dogs, roads etc.).

Source	Study Location	Habitat Type	Additional Comments	Koala/ha
Dique et al, 2003	Southeast QLD Pine Rivers Shire	Tall shrubby open forest (Tertiary surfaces) and Tall open forest upon metamorphics	Stratified by two habitat descriptions 'urban' and 'bushland'	0-0.76
Dique et al, 2004	Southeast QLD Koala Coast ~375 sqm of Redland, Logan and Brisbane City shires	Eucalypt Forests. Predominately RE 12.9-10.4 & 12.11.5	Study stratified by habitat descriptions: 'urban', 'remnant bushland', 'bushland' and 'other'. Remnant and bushland areas further stratified by proximity to the centre of the study area (high density=close to centre, low density=further away)	Range 0.02-1.26 Urban: 0.17 +/-0.013 High remnant: 0.70 +/-0.023 Low remnant: 0.20 +-/0.014 High bushland: 0.30+/-0.006 Low bushland: 0.11 +/-0.007 Other: 0
White and Kunst	Southeast QLD Sheldon	Eucalypt Forest		0.4 (0.3-0.46)
Sullivan et a 2004	Southwest QLD	Eucalypt Forest/woodland within the mulgalands	Habitat stratified by floristics and landzone.	0.0007-2.513
Biolink 2007	Coombabah Koala Habitat Area	Mapped gold coast city vegetation (per Ryan et al, 2003) filtered to exclude communities not containing eucalypts	Spot assessment technique for koala faecal pellets. Not based upon koala observation transects per *Dique, 2003; EPA, 2005.*	0.22+/-0.04
Biolink 2007	Coomera-Pimpama Koala Habitat Area	Mapped gold coast city vegetation (per Ryan et al, 2003) filtered to	Spot assessment technique for koala faecal pellets. Not based upon koala	0.23+/-0.03

Source	Study Location	Habitat Type	Additional Comments	Koala/ha
		exclude communities not containing eucalypts	observation transects per *Dique, 2003; EPA, 2005.*	

In association with the proposal, no areas of potential koala habitat (Eucalypt Forest) will be modified for the proposed development. No trees within the impact zone were observed to contain koalas, koala trace or scats.
Vegetation communities within the locality and the adjacent conservation networks (Bundjalung National Park and Broadwater National Park) provide over 20,000 ha of similar habitat types located on site.

PREDATION/DISRUPTION BY FERAL/DOMESTIC ANIMALS

Mortality of koalas as a result of dog attacks is considered to be a key conservation concern for koala management with some studies reporting that dog attacks account for between 5% and 40% of total recorded mortalities (McAlpine et al, 2007). Within the 'koala coast' of SEQLD an average of 300 koalas each year die as a result of dog attacks (EPA, 2006). Studies into dispersal patterns of koalas undertaken by Dique et al (2003) indicates that in addition to mortality the presence of dogs within or proximate to koala habitats is likely to disrupt behaviour and associated dispersal options which can lead to those impacts discussed in 5.2 above.

While not as widely studied it is considered that presence of feral species such as dingoes or foxes within utilised habitat may have a similar impact to koala mortality and dispersal behaviour as domestic dogs. The recovery plan for koalas (NPWS, 2003) lists the key threatening process 'Predation by the Red Fox *Vulpes vulpes*' as being relevant to the koala.

To mitigate the potential impact of domestic animals on resident fauna the following measures are recommended:

- Imposition of a 'dog and cat restriction' covenant as follows:
    - Dogs and cats on the allotment shall not be permitted unrestrained in areas external to the designated dwelling envelope
    - Dog and cat containment fencing shall only be permitted on the boundaries of the proposed dwelling envelope. Containment fencing shall not be permitted throughout areas external to the designated building envelope

MORTALITY ASSOCIATED WITH BUSHFIRE

High-intensity wildfires pose a threat to koalas, particularly where refuge habitat is not available. High-intensity fires burn the canopy and can cause the death or injury of koalas and a reduction in the availability of foraging habitat. In addition, fast-moving fires fanned by strong winds reduce the ability for koalas to escape to refuge areas (NPWS, 2003: 23).

To reduce the potential risk of fire spread from inappropriate burning of waste/garden refuse following measures are proposed:

- Prohibition of lighting of fires external to the dwelling envelope

MORTALITY ASSOCIATED WITH ROADWAYS

It is widely accepted that koala mortality associated with vehicle strike on roadways intersecting or proximate to habitat represents a serious through to the ongoing viability of populations (Dique et al, 2003; NPWS, 2003; McAlpine et al, 2007; EPA, 2006). Vehicle strikes are heightened where arterial and other roads bisect bushland, remnant bushland or urban habitat areas, resulting in high mortality of resident koalas, or limited success of dispersing animals that must cross roads to reach suitable habitat and mates (Dique *et al*. 2003 in EPA, 2007). NPWS (2003) note that habitat bisecting roadways are particularly likely to lead to increased vehicle strike on koalas where traffic volume is high, speeds exceed 60 km/hr, where visibility of road edges is reduced and/or where lighting is absent.

In this instance it is considered that whilst additional daily vehicle movements will occur on the site. It is recommended that speed limits within the developmental site should not exceed 50 km/h and koala road signs are to be erected to warn drivers of their presence in the locality.

Likelihood of Local Extinction

Reviewing the above, it is considered unlikely that the proposal will disrupt the lifecycle of koala populations to the point that they are at risk of extinction.

Squirrel Glider

As the Squirrel Glider is considered to be wide ranging in the locality, it is considered that it is not genetically isolated on the subject site and form part of a population within the wider region. Two individuals were recorded within the Eucalypt Forest (Vegetation Community 3) during spotlighting events. The NPWS database contains 4 records of this species within 10 km of the site.

Stages of lifecycle potentially affected by development

This species of Glider is associated with dry sclerophyll forest and woodlands although in northern NSW and Qld it has been recorded from wet sclerophyll environments (Suckling in Strahan eds, 2002; Lindenmayer 2002). It is considered to be most abundant in associations containing winter flowering Eucalypts and/or environments with a high abundance of Acacia, Banksia species in the lower layers (Smith & Murray, 2003; Menkhorst et al, 1998; Quinn, 1995).

Within the canopy of the preferred habitat numerous trees bearing hollows are critical habitat values required to support populations of the species (Quinn, 1995; Smith & Murray, 2003; Lindenmayer, 2002). Gliders are known to regularly swap den trees and utilise a number of such dens (between 6 and 19 den trees per Glider) within their home range (van der Ree, 2000). These results are supported by survey work undertaken by Southern Cross University (June/July 2002) which indicated that 12 radio tracked gliders utilised 37 den trees incorporating live hollow bearing trees and stags (Cited in Warren, 2004).

In association with the proposal minor clearing of potential habitat (<1600 m) habitat (Eucalypt Forest) will be modified for the proposed development.

Vegetation communities within the locality and the adjacent conservation networks (Bundjalung National Park and Broadwater National Park) provide over 20,000 ha of similar habitat types located on site.

Recommendations on the design of the development to mitigate Squirrel Glider impacts are as described within the koala section above.

Likelihood of Local Extinction

Reviewing the above, it is considered unlikely that the proposal will disrupt the lifecycle of Squirrel Glider populations to the point that they are at risk of extinction.

Wallum Froglet

As the Wallum Froglet is considered to be wide ranging in the locality, it is considered that it is not genetically isolated on the subject site and form part of a population within the wider region. The species was recorded vocalising within the drainage line along the eastern boundary line during survey events. The species was also recorded within the melaleuca swamps, adjacent to the site to the east. The NPWS database contains 44 records of this species within 10 km of the site.

Stages of lifecycle potentially affected by development

The Wallum Froglet is one of four wallum-dependent 'acid' frog species that specifically breed in acidic (low pH) waters along the central eastern coast of Australia. The Wallum Froglet is the only species of acid frog to continue breeding throughout the winter months. Breeding occurs in low nutrient, acidic (pH < 6), tannin-stained ephemeral ponds and swamps associated with coastal banksia, melaleuca, wet heath and/or adjacent eucalypt forest/woodland (Meyer et al., 2005). Male frogs call from secluded positions at the bases of sedges near water or atop matted sedges (Meyer et al., 2005). Female frogs attach their eggs to submerged vegetation, and lay an average of 80 eggs per clutch. Tadpoles may take between two to six months to develop into frogs (Straughan & Main, 1966; Anstis, 2002; Meyer et al., 2005).

During non-breeding periods, wallum froglets may disperse into nearby eucalypt forest. During the day, wallum froglets can be found sheltering in crayfish burrows as well as under leaf litter, sometimes well away from water (Straughan & Main, 1966; Cogger, et al., 1983; Baker et al., 1995; McFarland, 2007).

An adult Wallum Froglet's diet consists of several species of arthropods, whereas the tadpole diet consists of sediment and algae (Cogger et al., 1983; Anstis, 2002).

In regards with the proposal, minor Wallum Froglet will be removed in association with the man-made drainage lines, which has a consent order to be filled.

The proposal will unlikely significantly impact the local population of the species as preferred habitat occurs within the Heathland Community drainage lines and the Melaleuca Swampland (mapped as SEPP 14).

Prior to the fill works, a qualified fauna spotter-catcher will remove and relocate all Wallum Froglets into suitable habitats within the locality.

Likelihood of Local Extinction

Reviewing the above, it is considered unlikely that the proposal will disrupt the lifecycle of Wallum Froglet populations to the point that they are at risk of extinction. The proposal does retain a natural drainage feature within the wet Heath community in the north which would constitute preferred habitat and is connected to areas to the east where the specie was heard vocalizing.

(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,

N/A

No endangered fauna populations listed under Part 2 Schedule 1 of the *Threatened Species Conservation Act 1995* are located on or within the proximity of the site. As such, the proposed activity is unlikely to disrupt the lifecycle of any species constituting an endangered population or the viability of such a population. The endangered populations currently listed include the following:

- Tusked Frog population in the Nandewar and New England Tablelands Bioregions
- Emu population in the New South Wales North Coast Bioregion and Port Stephens local government area
- Gang-gang Cockatoo population in the Hornsby and Ku-ring-gai Local Government Areas
- Glossy Black-Cockatoo, Riverina population
- Little Penguin in the Manly Point Area (being the area on and near the shoreline from Cannae Point generally northward to the point near the intersection of Stuart Street and Oyama Cove Avenue, and extending 100 metres offshore from that shoreline)
- White-browed Treecreeper population in Carrathool local government area south of the Lachlan River and Griffith local government area
- Broad-toothed Rat at Barrington Tops in the local government areas of Gloucester, Scone and Dungog
- Long-nosed Bandicoot, North Head
- Squirrel Glider in the Wagga Wagga Local Government Area
- Squirrel Glider on Barrenjoey Peninsula, north of Bushrangers Hill

- Koala, Hawks Nest and Tea Gardens population
- Koala in the Pittwater Local Government Area
- Long-nosed Potoroo, Cobaki Lakes and Tweed Heads West population

(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,

DEC (2007) notes the following with regard to EECs:

Ecological communities are usually defined by two major components – the geographical distribution and the species composition which influences the physical structure and ecological function of the ecological community. The relative importance of the geographical distribution and the species composition varies according to the specific listed ecological community. Hence this factor provides for consideration of two criteria:

i. local occurrence of the ecological community
ii. modification of the ecological community's composition.

Interpretation of key terms used in this factor:

Local occurrence: the ecological community that occurs within the study area. However the local occurrence may include adjacent areas if the ecological community on the study area forms part of a larger contiguous area of that ecological community and the movement of individuals and exchange of genetic material across the boundary of the study area can be clearly demonstrated.

Risk of extinction: similar to the meaning set out in factor (a), this is the likelihood that the local occurrence of the ecological community will become extinct either in the short-term *or* in the long-term as a result of direct or indirect impacts on the ecological community, and includes changes to ecological function.

Composition: both the plant and animal species present, and the physical structure of the ecological community. Note that while many ecological communities are identified primarily by their vascular plant composition, an ecological community consists of all plants and animals as defined under the TSC and FM Acts that occur in that ecological community.

LITTORAL RAINFOREST IN THE NSW NORTH COAST, SYDNEY BASIN AND SOUTH EAST CORNER BIOREGIONS

It is considered that Community 4 is reflective of the above listed EEC as described by the Scientific Committee (Determination to make a minor amendment to Part 3 of Schedule 1 of the Threatened Species Conservation Act).

It is concluded that approximately 8.1 ha of Littoral Rainforest occurs on site. The proposal will result in very minor impacts on Littoral rainforest. As previously noted the road extension between the eastern and western residential areas of the development will necessitate minor pruning of limbs on the edges of the Littoral rainforest. Furthermore, clearing of approximately 127 m^2 (0.15%) of highly degraded vegetation surrounding an existing sewer pump station well (refer **Section 7.2**) will be required for the construction of a sewer pump station. The retained community will be rehabilitated in accordance with an appropriate plan of management and protected in perpetuity under a stewardship agreement (under the Biodiversity Conservation Act 2016) entered into by the proponent.

The very minor impacts on this vegetation community will not result in a changed ecological function or values for fauna.

(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,

Habitat for a given threatened species, community or population is considered to be an area containing similar known (documented) habitat preferences for that species within the species' geographic distribution.

In assessing whether a significant area of the habitat of a threatened species, population or ecological community is to be modified or removed the following should be considered:

- The geographic range of the threatened species, population or ecological community and its known or documented occurrence within the region and locality;
- The relative scale and value of the habitat within the region and locality;
- The importance of the habitat (i.e. relationship to life cycle, reproductive success etc)

DEC (2005) indicates that a "quantitative and qualitative approach to assessing the extent to which habitat is likely to be removed or modified/degraded should consist of the following steps:

- an assessment of the amount of habitat of the threatened species, population or ecological community that occurs within the locality;
- an assessment of the amount of habitat of the threatened species, population or ecological community that occurs within the study area;
- an estimation of the area and quality that the habitat of the study area represents in relation to the local distribution of that habitat;
- An estimation of the area and quality of the habitat of the study area which is to be removed or modified by the proposed development or activity;
- a calculation of the amount of the habitat of the region that will be removed or modified by the proposed development, activity or action or indirectly by longer term impacts from the proposed development such as increased predation weed invasion, salinity etc;
- An estimation of the area and quality of the habitat of the region that will be removed or modified by the proposed development, activity or action; and
- an assessment of the ecological integrity of the habitat to be affected and of the habitat which will remain"

As discussed within this report it is considered that the site and study area represents potential and recorded habitat for the threatened species subject to this 7-part test.

The proposal seeks to remove/modify approximately 21.3 ha of Vegetation Community 2 (entire community from site). Survey works concluded that this vegetation community features marginal fauna habitat and is not significant within the region. No hollow-bearing trees are proposed to be removed to facilitate the development.

The proposal seeks to offset the proposed clearing by revegetation works. The site will be landscaped with introduced and native species which will provide additional forage areas for common avifauna.

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

N/A. To date the only 'Critical Habitat Areas' within the state declared pursuant to the *Threatened Species Conservation Act 1995* are the Mitchell's Rainforest Snail Habitat of Stott's Island NR and Little Penguin Population habitat in Sydney's North Harbour (NPWS, 2005). The proposal is unlikely to affect 'critical habitat' areas. The proposal is also considered unlikely to affect nominated 'critical habitat' areas which are pending determination by the Scientific Committee

- Bomaderry zieria within the Bomaderry bushland
- Eastern Suburbs Banksia Scrub Endangered Ecological Community
- Wollemia nobilis (the Wollemi pine)

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

Section 69(1) of the TSC Act requires that a public authority implement actions for which they are responsible and "must not make decisions that are inconsistent with the provisions in a recovery plan". In this regard it is considered important that the proposed development does not conflict with the objectives or actions listed within the recovery plan(s) for recorded or potentially occurring threatened species, populations or communities (as discussed within this report). Recovery plans associated with such threatened species or communities as discussed in this report include:

- Grey-headed Flying Fox (National) Recovery Plan
- Koala Recovery Plan
- Oxleyan Pygmy Perch Recovery Plan

It is noted that under the EP&A Act, it is the responsibility of the consent or determining authority to form a view as to whether a proposed development or activity is likely to significantly affect threatened species, communities, populations or their habitat. This is achieved by undertaking an Assessment of Significance under Section 5A of the EP&A Act. In this regard, an assessment of significance has been conducted for the proposal which concludes that a species impact statement is not required. It is further concluded within this report that the proposal is unlikely to have a significant impact on recorded or potentially occurring threatened species, communities and their associated habitat.

As such, it is considered that the proposal is not in conflict with the objectives or actions of the listed recovery plans.

"Any process can be listed as a key threatening process (KTP) under schedule 3 of the NSW *Threatened Species Conservation Act 1995* (TSC Act), provided the process and its nomination meet the specific requirements and criteria established under the Act. A threat abatement plan or TAP is a statutory document prepared in accordance with the TSC Act, for a KTP listed under the Act. The TAP's principle aim is to reduce, abate or ameliorate the threat posed by the KTP to threatened species and ecological communities, or those species which may become threatened as a result of the KTP (DEC, 2004: vii). Existing TAPs include:

- Invasion of native plant communities by bitou bush/boneseed (2004)
- Predation by the red fox (2001)
- Predation by Gambusia holbrooki (plague minnow) (2003)

None of these species were recorded within the study area although the red fox is encountered in the locality (pers. obs.). The proposal is unlikely to exacerbate the impacts of the red fox on native wildlife and as such is not considered to be in conflict with the objectives or actions of the TAP.

As such, it is considered that the proposal is not in conflict with the objectives or actions of the listed threat abatement plans.

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 *Threatened Species Conservation Act 1995* defines a 'threatening process' as 'a process that threatens, or may have the capability to threaten, the survival or evolutionary development of species, populations or ecological communities.' Accordingly Key Threatening Processes are nominated within Schedule 3 of the Act and include the following (online @ http://www.threatenedspecies .environment.nsw.gov.au/tsprofile/home_threats.aspx):

THREATENING PROCESS	COMMENT
Alteration of habitat following subsidence due to longwall mining	Not applicable
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	Not applicable
Anthropogenic climate change	Not applicable
Bushrock removal	Not applicable
Clearing of native vegetation	The proposal will involve clearing of some native vegetation (including clearing of one or more strata within a stand of native vegetation). The NSW Scientific Committee notes in their final determination that 'clearing of native vegetation' is recognised as a major factor contributing to the loss of biological diversity and includes impacts such as the following: • Destruction of habitat results in loss of local populations of individual species • Fragmentation • Expansion of dryland salinity • Riparian zone degradation • Increased greenhouse gas emissions • Increased habitat for invasive species • Loss of leaf litter layer • Loss or disruption of ecological function • Changes to soil biota (NSW Scientific Committee, 2001) However, a review of this report notes that clearance will be restricted to areas of minor ecological significance and the level of clearing proposed is unlikely to significantly impact upon the viability of threatened fauna species and habitat values available within the site and surrounding locality. As indicated the Wattle community is a disturbed / modified community the result of past clearing / seeding. It is not proposed to be retained and the proposal will remove all Wattle from within the

THREATENING PROCESS	COMMENT
	development footprint. The area to be removed is 7.23 ha. The development will remove approximately 2000 m2 of Open Dry Heath and 1.18 ha of Open Dry Heath with mixed Eucalypt. We note this community is vulnerable but locally well conserved in the surrounding conservation network. The development will require the removal of approximately 1200 m2 of Heathy Scribbly Gum for roads and an additional 400 m is proposed for removal with bushfire requirements and lots. The very minor impacts on Littoral rainforest i.e. pruning of overhanging branches and clearing of 127 m^2 (0.15%) do not represent a significant impact.
Competition and grazing by the feral European rabbit (*Oryctolagus cuniculus*)	Not applicable
Competition and habitat degradation by feral goats (*Capra hircus*)	Not applicable
Competition from feral honey bees (*Apis mellifera*)	Not applicable
Death or injury to marine species following capture in shark control programs on ocean beaches	Not applicable
Entanglement in or ingestion of anthropogenic debris in marine and estuarine environments	Not applicable
Forest Eucalypt dieback associated with over-abundant psyllids and bell miners	Not applicable
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	Not applicable
Herbivory and environmental degradation caused by feral deer	Not applicable
Importation of red imported fire ants (*Solenopsis invicta*)	Not applicable
Infection by psittacine circoviral (beak and feather) disease affecting endangered psittacine species and populations	Not applicable
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	Not applicable
Infection of native plants by *Phytophthora cinnamomi*	Not applicable
Introduction and Establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae	Not applicable
Introduction of the large earth bumblebee (*Bombus terrestris*)	Not applicable
Invasion and establishment of exotic vines and scramblers	Several exotic vines were recorded onsite. These species should be removed in association with the proposal where they occur within the work zone.
Invasion and establishment of Scotch broom (*Cytisus scoparius*)	Not applicable

THREATENING PROCESS	COMMENT
Invasion and establishment of the cane toad (*Bufo marinus*)	The cane toad was recorded onsite. The proposal is unlikely to increase the impacts of this listed threatening process.
Invasion of native plant communities by African Olive *Olea europaea* L. subsp. *cuspidata*	Not applicable
Invasion, establishment and spread of *Lantana camara*	Lantana was recorded on site. The species should be removed in association with the proposal where it occurs within the works zone.
Invasion of native plant communities by *Chrysanthemoides monilifera* (bitou bush and boneseed)	Not applicable
Invasion of native plant communities by exotic perennial grasses	Not applicable
Invasion of the yellow crazy ant (*Anoplolepis gracilipes* (Fr. Smith)) into NSW	Not applicable
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	Not applicable
Loss of hollow-bearing trees	Not applicable
Loss or degradation (or both) of sites used for hill-topping by butterflies	Not applicable
Predation and hybridisation of feral dogs (*Canis lupus familiaris*)	A dog was recorded onsite within the heath community. The proposal is unlikely to increase the impacts of this listed threatening process.
Predation by the European red fox (*Vulpes vulpes*)	Not applicable
Predation by the feral cat (*Felis catus*)	Several cats were recorded throughout the site. The proposal is unlikely to increase the impacts of this listed threatening process
Predation by *Gambusia holbrooki* Girard, 1859 (plague minnow or mosquito fish)	Not applicable
Predation by the ship rat (*Rattus rattus*) on Lord Howe Island	Not applicable
Predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*)	Not applicable
Removal of dead wood and dead trees	Not applicable

CONCLUSION

Based upon the above assessments, it is considered that a Species Impact Statement (SIS) is not required.

6.3 SEPP 14 COASTAL WETLAND PROTECTION

State Environmental Planning Policy No. 14 aims to preserve and protect coastal wetlands in the environmental and economic interest of the State. It does this by defining any development that involves clearing, draining or filling wetlands, or constructing levees on wetlands to be designated development (EDO, 2007).

Mapping of the site (**Figure 10**) indicates that the northeast portion is designated a SEPP 14 Coastal Wetland Protection. As outlined in the report the extent affected by the wetland mapping does not reflect the site vegetation. The area noted as occurring within the allotment as illustrated is regenerating acacia and or cleared land. No permanent water exists in this location. The area does not display characteristics of a wetland in either physical conditions or vegetation communities. An area to the north of this which is also designated as part of the SEPP wetland is reflective of this designation and is mapped as wet heath with Melaleuca over storey. This community intergrades with Dry Heath. The mapped wet heath with Melaleuca over storey in **Figure 4** is considered a better reflection of the SEPP area.

The proposal does not impact on the SEPP wetland and the proposed filling of the eastern drainage line may assist in reducing draw down of the water table from within the mapped SEPP area.

FIGURE 10 – SEPP 14 COASTAL WETLAND PROTECTION MAPPING and VEGETATION COMMUNITY MAPPING

6.4 SEPP 26 LITTORAL RAINFOREST

State Environmental Planning Policy No. 26 relates to development applications likely to damage or destroy littoral rainforest (rainforests in coastal areas) (EDO, 2007). The site is not mapped as containing SEPP 26 Littoral Rainforest.

6.5 SEPP 44 KOALA HABITAT ASSESSMENTS

In February 1995 the NSW Department of Infrastructure, Planning and Natural Resources enacted the *State Environmental Planning Policy No. 44: Koala Habitat Protection*. This Policy 'aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline.'

In association with development applications and in areas where the policy applies a number of criteria are to be addressed to determine levels of assessment and to govern management considerations. The steps are as follows:

1. Does the Policy Apply?

Is the land greater than 1 ha in size and located within one of the Local Government areas listed within Schedule 1 of SEPP 44?

Yes. The land is greater than 1 ha in area and located within the Richmond Valley Council Local Government Area which is listed in Schedule 1.

2. Is the land potential koala habitat?

The SEPP defines 'potential koala habitat' as 'areas of native vegetation where the trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component.' The trees within Schedule 2 are tabulated below:

Scientific Name	Common Name
Eucalyptus tereticornis	Forest red gum
Eucalyptus microcorys	Tallowwood
Eucalyptus punctata	Grey Gum
Eucalyptus viminalis	Ribbon or manna gum
Eucalyptus camaldulensis	River red gum
Eucalyptus haemastoma	Broad leaved scribbly gum
Eucalyptus signata	Scribbly gum
Eucalyptus albens	White box
Eucalyptus populnea	Bimble box or poplar box
Eucalyptus robusta	Swamp mahogany

Although eucalypt forest in association with Vegetation Community 3 contains koala trees as listed in the above table, and these trees constitute at least 15% of the total number of trees in the upper or lower strata of the tree component, the extent of clearing is minimal. The area to be cleared is approximately 1,400 m^2 and would require the removal of approximately 10 - 15 trees. These are offset through plantings in the open space and or street trees.

3. Is the land core koala habitat?

The SEPP defines 'core koala habitat' means 'an area of land with a resident population of koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population.'

Whilst the Koala is noted to be present in the locality and scratch marks were present on several eucalypts immediately external to the development footprint, no individuals were recorded within the works zone. With the exception of the scratch marks recorded from the site in 2014, two (2) other records occur from the vicinity of the development footprint (BioNet Atlas of NSW Wildlife 2019):

1. A record to the north of the development footprint from 1990, however this record has a listed accuracy of +/- 1,000 m; and
2. A record to the west of the development footprint from 1989, however this record also has a listed accuracy of +/- 1,000 m.

The assessment of current levels of Koala activity/usage over the site utilising the RG-bSAT in March 2019 (**Attachment 4)** identified areas of "low" level usage outside of the proposed development footprint (i.e. adjacent to the south-western corner). A small number of Koala faecal pellets were recorded under a total of three (3) trees in this portion of the site. As noted by Phillips and Callaghan (2011), where the results of a SAT site returns an activity level within the low use range, the level of use by the Koala is likely to be transitory. It is also noted that none of the faecal pellets recorded were considered to be fresh. The results indicate that a resident/sedentary population is not currently present on the site.

It is considered that koalas may occasionally traverse the site as they move or disperse through the broader locality. However, there are no recent sightings of koalas from the subject site, and the historical records are not considered likely to suggest that a "resident population" of koalas occurs. As such, it is considered that the proposal with respect to its definition under SEPP 44 is not located within land that is core koala habitat.

4. Is there a requirement to prepare a Plan of Management for land containing core koala habitat?

No. It is considered that the site does not contain core Koala habitat as described.

6.6 FISHERIES MANAGEMENT ACT (1994)

6.6.1 Introduction

The *Fisheries Management Act 1994* came into force on the 16th January 1995. The objectives of the Act are to conserve, develop and share the fishery resources of the State for the benefit of present and future generations. In particular, the objectives of the Act include:

a) to conserve fish stocks and key fish habitats; and

b) to conserve threatened species, populations and ecological communities of fish and marine vegetation; and

c) to promote ecologically sustainable development, including the conservation of biological diversity; and

consistently with those objectives :

d) to promote viable commercial fishing and aquaculture industries; and

e) to promote quality recreational fishing opportunities; and

f) to appropriately share fisheries resources between the users of those resources; and

g) to provide social and economic benefits for the wider community of New South Wales; and

h) to recognise the spiritual, social and customary significance to Aboriginal persons of fisheries resources and to protect, and promote the continuation of, Aboriginal cultural fishing.

Under the 'integrated development' provisions of the NSW EP&A Act, DPI is an 'approval body' for local development that requires one or more of the following permits under the FM Act:

- Section 144 - aquaculture permit, i.e. cultivating fish or marine vegetation for sale/commercial purposes;
- Section 201 - permit to carry out works of dredging or reclamation, i.e. any excavation within or filling of water land;
- Section 205 - permit to harm (cut, remove, damage, destroy, shade etc) marine vegetation (mangroves, seagrass and seaweeds); and
- Section 219 - permit to obstruct the free passage of fish.

Impacts to Threatened species, Key fish habitats and marine plants are potentially applicable to the proposed works. The Oxleyan pygmy perch is a Threatened species listed under the FM Act that potentially occurs on site and has been addressed in **Section 5.4.** Key fish habitats and marine plants are addressed below.

6.6.2 Key fish habitats

A policy definition of the term 'Key Fish Habitat' (KFH) was developed by the Department in 2007 to guide a state-wide mapping project to define and identify KFH – those aquatic habitats that are important to the sustainability of the recreational and commercial fishing industries, the maintenance of fish populations generally and the survival and recovery of threatened aquatic species. Essentially KFH was defined to include all marine and estuarine habitats up to highest astronomical tide level (that reached by 'king' tides) and most permanent and semi-permanent freshwater habitats including rivers, creeks, lakes, lagoons, billabongs, weir pools and impoundments up to the top of the bank. Small headwater creeks and gullies (known as first and second order streams), that only flow for a short period after rain are generally excluded, as are farm dams constructed on such systems. Wholly artificial waterbodies such as irrigation channels, urban drains and ponds, salt and evaporation ponds are also excluded except where they are known to support populations of threatened fish or invertebrates.

It is understood that the DPI has an arrangement in circumstances where the Office of Water issues controlled activity approvals for earthworks within 40 metres of a waterway. As the

proposed development will not involve any works that will directly impact upon the riverbank, or land within the intertidal zone (with an elevation less than 1 metre AHD), DPI does not deem the works area to be KFH for the purposes of s.201 of the FM Act and the works will therefore not be integrated development.

6.6.3 Marine vegetation

Marine vegetation, such as saltmarsh, mangroves, seagrasses, and macroalgae (seaweeds) are protected under the FM Act. Harming of any marine vegetation will trigger integrated development under s.205 of the FM Act, irrespective of where it is located. Any development that may affect marine vegetation by cutting, removing, destroying, transplanting, shading or damaging in any way (e.g. trimming mangroves) is classed as integrated development and will require a permit from DPI.

No mangroves or saltmarsh vegetation, or any other marine plants, are proposed to be cleared or trimmed. These works will therefore not trigger an integrated development application.

7.0 SITE IMPACTS

This section of the report reviews the development proposal and likely resultant impact to flora, fauna and habitat value.

7.1 SIGNIFICANCE OF IMPACTS TO THREATENED SPECIES AND/OR COMMUNITIES

DEC (2005 & 2007) outline assessments relating to the significance of impacts of actions to threatened species, communities and populations. DEC (2005) notes that evaluation of impacts should involve not only the magnitude and extent of impacts, but also the significance of the impacts as related to the conservation importance of the habitat, individuals and populations likely to be affected.

Impacts are considered more significant if:

- Areas of high conservation value are affected.
- Individual animals and/or plants and/or subpopulations that are likely to be affected by a proposal play an important role in maintaining the long-term viability of the species, population or ecological community.
- Habitat features that are likely to be affected by a proposal play an important role in maintaining the long-term viability of the species, population or ecological community.
- The impacts are likely to be long-term in duration.
- The impacts are likely to be permanent and irreversible.

Seven (7) threatened species have been within the study area and individuals of these species may be impacted through the removal of vegetation or disturbance to habitat. Significance assessments for these threatened species have been undertaken in **Section 6.2**. The significance assessments indicate that the proposed action is unlikely to have a significant impact on any EECs, endangered populations, critical habitats, threatened plants or threatened animals (as summarized below).

Table 14: SUMMARY OF SPECIES FOR WHICH SIGNIFICANCE TESTS WERE UNDERTAKEN

Type	TSC Act	Likely to Be Significantly Affected by Proposed Action?
Endangered Ecological Community		
LITTORAL RAINFOREST IN THE NSW NORTH COAST, SYDNEY BASIN AND SOUTH EAST CORNER BIOREGIONS	E	No
Threatened Animals		
Grey-headed Flying Fox	V	No
Hoary Wattled Bat	V	No
Little Bentwing-bat	V	No
Southern Myotis	V	No
Koala	V	No
Squirrel Glider	V	No
Wallum froglet	V	No

7.2 IMPACTS DUE TO VEGETATION CLEARING

Clearing of vegetation (native and exotic) will be the major direct impact associated with the intended establishment of the dwelling envelope. Clearing is recognised as a key threatening process under the TSCA 1995.

The proposal will remove the majority of Acacia regrowth from within the development footprint. The area to be removed is 6.83 ha.

The development will remove approximately 1,175 m^2 of Open Dry Heath and 1.16 ha of Open Dry Heath with mixed Eucalypt. We note this community is vulnerable but locally well conserved in the surrounding conservation network.

The development will require the removal of approximately 1,195 m^2 of Heathy Scribbly Gum for roads, bushfire requirements and lots.

In relation to bushfire Asset Protection Zone (APZ) requirements, appropriate setbacks to achieve Bushfire Attack Level 29 (BAL-29) construction standards will be provided in the majority of cases by construction of proposed roads. The exceptions are proposed Lots 1 – 21 and 60 which will require the construction of a fire trail along the eastern boundary of the subject site (Bushfire Risk 2019). Minimum bushfire APZ setbacks to achieve BAL-29 are depicted in **Figure 11.** Vegetation clearing required for the construction of this fire trail have been included in impact calculations.

The proposal will result in very minor impacts on Littoral rainforest. As previously noted the road extension between the eastern and western residential areas of the development will necessitate minor pruning of limbs on the edges of the Littoral rainforest. Furthermore, clearing of approximately 127 m^2 (0.15%) of highly degraded vegetation surrounding an existing sewer pump station well (see photo plates below) will be required for the construction of a sewer pump station.

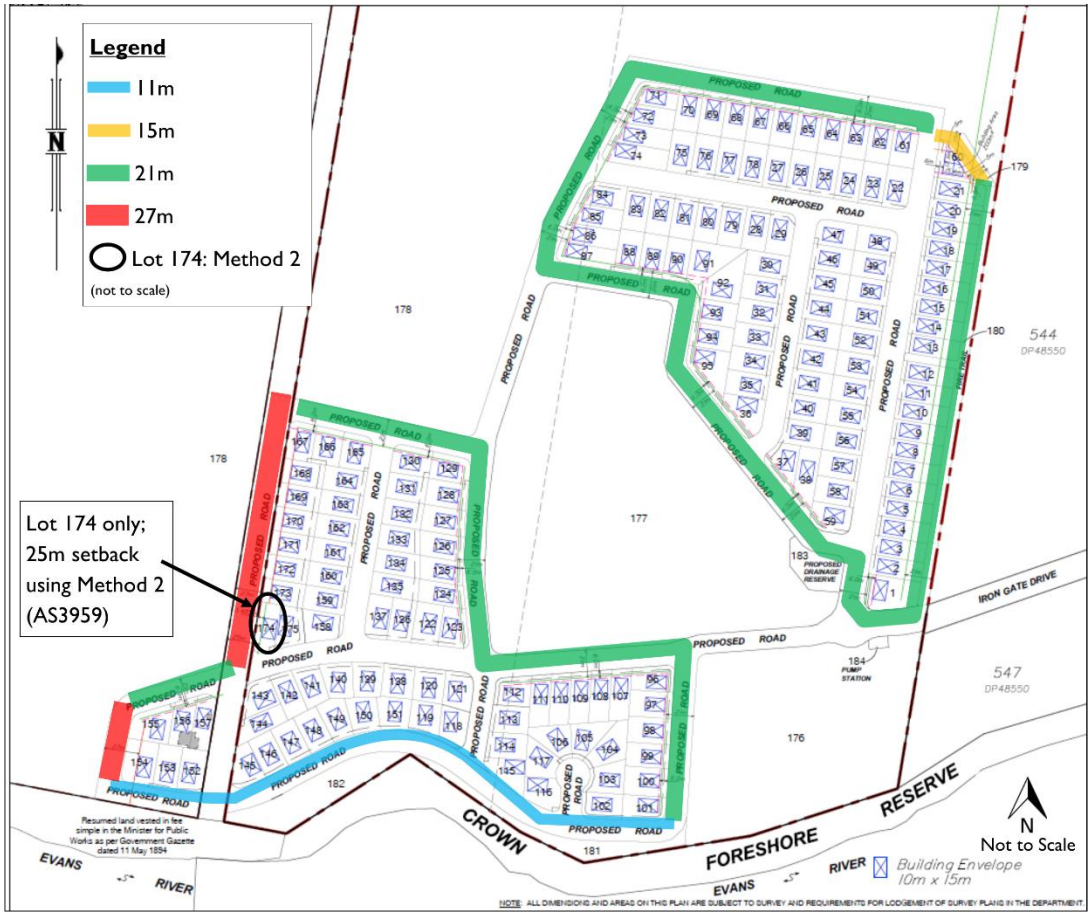


FIGURE 11 – MINIMUM BUSHFIRE APZ SETBACKS TO ACHIEVE BAL-29

As discussed in this report it is considered that these works will not have a significant environmental impact due to the highly modified nature of the areas to be affected. The clearing does not result in fragmentation or increased edge effects given the existing configuration of the remnants.

In total, 92% of the land to be impacted is comprised of either disturbed/cleared areas or regrowth vegetation **Figure 12**. A summary of the proposed clearing rates for described communities associated with the dwelling envelope is s tabulated below:

Table 15: Clearing of Vegetation Communities As a Result of the Proposal

Mapped Community	EEC?	Approx. extent to be cleared (HA)
VEGETATION COMMUNITY 4: TALL TO VERY TALL MIXED CLOSED FOREST CONTAINING A WIDE VARIETY OF RAINFOREST SPECIES [T8M]	YES	0.01
VEGETATION COMMUNITY 1: DISTURBED/CLEARED AREAS WITH SCATTERED TREES, OPEN PADDOCK AND REGROWTH (*ACACIA AULACOCARPA*)	NO	16.37
VEGETATION COMMUNITY 3: TALL TO VERY TALL EUCALYPT OPEN FOREST TO WOODLAND: *CORYMBIA INTERMEDIA, EUCALYPTUS PLANCHONIANA, E.TERETICORNIS, E. SIGNATA AND OTHER EUCALYPTS* [T8M]	NO	0.14
VEGETATION COMMUNITY 2: TALL-VERY TALL OPEN HEATH SHRUB (HEATHLAND) DOMINATED BY *MELALEUCA* QUINEQUENERVIA WITH OTHER HEATH SPECIES	NO	1.27
TOTAL		17.79

FIGURE 12 – VEGETATION WITHIN PROPOSED CLEARING ZONE

FIGURE 13 – IRON GATES AERIAL FROM 1998

The aerial provided within **Figure 13** illustrates that the developmental footprint has been previously cleared and that the majority of today's vegetation occurring is regrowth.

FIGURE 14 – AERIAL OF THE IRON GATES LOCALITY (2014)

The aerials provided within **Figure 13** and **Figure 14** above illustrate the abundance of vegetation within the locality and that the removal of disturbed/cleared habitat (Vegetation Community 1) will not significantly impact fauna species within the area. The aerials also illustrates that the proposal will not significantly impact fauna corridors and that species are easily able to disperse in the area. The above aerials do not incorporate the full extent of the Bundjalung National Park and Broadwater National Park which is significantly larger than pictured.

7.3 IMPACTS TO FAUNA HABITAT

The proposal involves minor clearing of vegetation which it is considered does not constitute core or critical habitat for threatened species recorded in the locality. The minor forage area lost is insignificant to that found in the locality and is offset by revegetation works. Following stabilization and development a modified habitat zone (i.e. residential areas with gardens beds, lawn, buildings etc) will be restored within the disturbance area.

This zone however is likely to only favour common species ((i.e. common animals tolerant to human proximity). The remaining vegetation communities will be maintained in their existing state to retain fauna habitat across the site. No hollow-bearing trees are proposed to be removed for the development.

An evaluation of the clearing on threatened species is provided in **Section 6.2.**

7.4 FAUNA MORTALITY/INJURY

Any level of vegetation clearing, construction or earthworks modification undertaken has the potential to kill or injure fauna species. The surveying work has identified that the majority of species recorded are highly mobile and with an appropriate fauna management plan it is unlikely impacts would arise.

7.5 HABITAT FRAGMENTATION, BARRIER EFFECTS AND EDGE EFFECTS

Habitat fragmentation is considered to be the division of a single area of habitat into two or more smaller habitats separated by a new habitat type in the area between the remaining fragments (PB, 2007). Often the dividing habitat is anthropogenic (i.e. crop, roadway, residential development etc) which limits continued interaction and movement of individuals between the new patches to varying degrees (i.e. birds may be still able to move between patches). Additionally the dividing habitat tends to favour a different assemblage of animals typically described as generalist and/or aggressive (i.e. crows, noisy minors, black rat). This is particularly relevant to urban development where domestic and feral species (cats, foxes, dogs) are favoured by the new habitat to the exclusion of native species.

The resultant habitat fragments or patches are also impacted as a result of a reduction in patch size, reduction in the 'interior' area and creation or expansion of the habitat 'edge.' Edge areas also typically favour aggressive and generalist species particularly in relation to exotic flora.

Dominance of exotic flora or weeds can threatened the integrity of the 'interior' habitat thus expanding the edge further. Weed dominance also typically simplifies the structural and floristic diversity to the exclusion of numerous 'niches' and the fauna that occupy such spaces.

Many wildlife studies have shown how the relative abundance of fauna species changes with habitat fragment size (e.g. Ambuel and Temple 1983; Lynch and Whigham 1984; Robinson *et al.* 1997) with some species showing a greater abundance in smaller remnants, while others decrease or even disappear from remnants due to habitat fragmentation (Berry, 2001).

"Species can be grouped according to their response to edges. 'Edge' species are those that increase in abundance at habitat edges. Typically, these are habitat generalist or open-country species, and often they are species also found in greater numbers in small habitat remnants. In contrast, 'interior' species decrease in abundance or are absent from habitat edges; these are typically specialists, have large home ranges, inhabit large forest areas, and are rare or absent from small habitat remnants (Ambuel and Temple 1983; Ford *et al.* 1995; Canady 1997; Luck *et al.* 1999). For example, Catterall *et al.* (1991) found that in forest–suburb boundaries in Brisbane, forest-interior birds were typically smaller and insectivorous, while forest-edge species were usually larger and fed on open ground" (Berry, 2001: 240).

Some of the above and more commonly discussed impacts are summarized below:

Barrier effects "result when severed habitat connections restrict the movement of species (Yahner 1988). Barrier effects can result from relatively small-scale anthropogenic disjunction of habitat and may preclude dispersal or migration and disrupt population processes (e.g. Mansergh and Scotts 1989). The distance over which such effects operate may vary among species. For example, many bird species may be able to readily cross discontinuities in suitable habitat by using small remnants as stepping stones (e.g. Date *et al.* 1991). In contrast, forest-dependent mammals may be reluctant to cross relatively small areas of open habitat (e.g. Burnett 1992)" (Goldingay & Whelan, 1997:24-25)

Genetic isolation may occur when individuals from a previously connected population can no longer interbreed due to the creation of fragments and barrier effects. Such isolation can result in problems associated with inbreeding (and associated loss of genetic diversity and risk of disease, mutation, population crash), divergence and genetic drift.

"Edge effects may occur when a new boundary is established within an existing habitat, producing a change in the remaining habitat (Harris 1984). Abiotic and biotic factors may be responsible for an edge effect (Murcia 1995). Abiotic factors include changes in microclimate such as altered temperature regimes, increased light levels and greater wind speeds (e.g. Scougall *et al.* 1993). Changes in the nutrient status of the soil surrounding an edge may occur when remnant habitat occurs adjacent to agricultural land. Biotic factors include changes in the abundance of animals and plants. These may occur in response to the abiotic factors or because particular species are favoured by the close association of two different habitat types. Edges may promote access by predators to existing habitat, particularly those that favour boundaries between open and remnant habitat (Harris 1988). This may increase the vulnerability of species and

lead to a decline in their abundance near the edge (Yahner 1988; Marini *et al.* 1995)" (Goldingah & Whelan, 1997:24)

As discussed in **Section 5.6** above it is considered that the works are of a minor nature in the context of the regional terrestrial corridors in the locality and will remove modified/cleared areas which does not represent significant fauna habitats.

The proposal including revegetation ensures that the existing vegetation remnants will not be further fragmented.

Additionally, it is considered that the proposal will not introduce a new terrestrial fauna dispersal barrier or intensify an existing barrier as the works proposed are not constructing barriers such as fences between vegetation communities. The existing corridor value of the locality is therefore unlikely to be reduced by the proposal.

7.6 MORTALITY ASSOCIATED WITH ROADWAYS/VEHICLE STRIKE

Roads and traffic are widely accepted as having impacts upon terrestrial wildlife. "Roads cut across landscape features and divide wildlife habitats. Consequently, they are one of the main obstacles to the movement of land vertebrates (Yanes *et al.* 1995).

The implications of movement barriers to wildlife populations are considerable. Barriers tend to create metapopulations (subpopulations) where a road divides a large continuous population into smaller, partially isolated local populations (Forman and Alexander 1998). Small populations fluctuate in size more widely and have a higher probability of extinction than do large populations (van der Zande *et al.* 1980). In addition, disruption of population dispersal (Mansergh and Scotts 1989) and recolonisation (Mader 1984; Andrews 1990) may result from the barrier-effect of roads.

Roads also result in vehicle collisions with wildlife (road-kill) and can represent a significant source of mortality for declining populations of some wildlife species (Harris and Gallagher 1989; Saunders 1990; Sheridan 1991; Scott *et al.* 1999).

It is widely accepted that terrestrial fauna (in particular koala) mortality associated with vehicle strike on roadways intersecting or proximate to habitat represents a serious through to the ongoing viability of populations (Dique et al, 2003; NPWS, 2003; McAlpine et al, 2007; EPA, 2006). Vehicle strikes are heightened where arterial and other roads bisect bushland, remnant bushland or urban habitat areas, resulting in high mortality of resident koalas, or limited success of dispersing animals that must cross roads to reach suitable habitat and mates (Dique *et al*. 2003 in EPA, 2007). NPWS (2003) note that habitat bisecting roadways are particularly likely to lead to increased vehicle strike where traffic volume is high, speeds exceed 60 km/hr, where visibility of road edges is reduced and/or where lighting is absent.

Larger species or species with restricted distributions, or those regularly in contact with roads (e.g. migration paths or home ranges), are those most affected by road-kill (Bennett 1991; Forman and Alexander 1998) [in Taylor and Goldingay, 2003]". Morality rates can also be particularly high for species which are slow moving (i.e. arboreal mammals), those which

become distracted by vehicle lights (i.e. kangaroos) and those which require many individual movements to cross the roadway (i.e. small reptiles and amphibians).

In this instance it is considered that whilst additional daily vehicle movements will occur on the site. It is recommended that speed limits within the developmental site should not exceed 50 km/h and wildlife road signs are to be erected to warn drivers of their presence in the locality.

7.7 ESTABLISHMENT OF WEEDS

Weed invasion occurs when unwanted or exotic plants become established in native bushland via natural dispersal vectors such as wind, water, insects, birds and other animals, however, humans are by far the most effective and efficient vector of plants (Coutts-Smith and Downey, 2006; Randall, 2007 in TSSC, 2010). Humans may facilitate the direct introduction weeds by inappropriate garden dumping, via vehicles, imported agricultural products and stock rotation/movement. The potential impacts of weed invasion in Australia are well documented and summarized in TSSC (2010) including:

Genetic effects
Environmental weeds cause a decline in the number of genetically distinct sub-populations that make up a native species. It is reasonable to conclude that an associated reduction in the genetic diversity of the affected species is likely to result. The invasion of weeds may also affect the genetic diversity of native species through cross breeding or hybridisation, whereby foreign genes are introduced into local plant populations

Introduction of diseases
The introduction of weeds often results in the introduction of pathogens (fungi, nematodes, bacteria and viruses) that are associated with these plants in their natural range (ILDA, 2009).

Competition for resources
Competition between species is inevitable when more than one species occupy the same niche and have similar requirements for a limited resource (Cadotte, 2007). Weeds are known to compete with native plants for limited resources such as moisture, nutrients, sunlight, pollinators and space (Csurches and Edwards, 1998; Blood, 2001; Brunskill, 2002).

Prevention of recruitment
Growth of weeds can be sufficiently vigorous to reduce or prevent the establishment of native plant species (Csurches and Edwards, 1998)

Alteration of ecosystem processes
Invasive weeds are also capable of altering various ecosystem processes such as geomorphological processes, hydrological cycles, nutrient dynamics and disturbance regimes (Csurches and Edwards, 1998). Alterations to ecosystem processes can potentially influence many if not all species within a community (Vranjic et al., 2000).

Changes to abundance of indigenous fauna
Weeds that become invasive can both directly and indirectly change the abundance of indigenous fauna. Fauna such as the Richmond Birdwing Butterfly and *Petrogale persephone*

(Proserpine Rock Wallaby) are directly impacted by escaped garden plants, Dutchman's Pipe (*Aristolochia elegans*) and Pink Periwinkle (*Catharanthus roseus*), respectively, both of which are attractive as a food source and yet toxic to them when consumed (Watts and Vidler, 2006). Indirectly, weeds impact indigenous fauna by altering the availability of suitable habitat, including food and shelter, and by creating habitats that harbour other pest species that can, in turn, have a detrimental effect.

As discussed in this report, weeds are abundant within the site, in particularly Community 2 which is proposed to be cleared/modified. To minimise the potential future impact of unmitigated continued spread of this species it is considered appropriate that the existing infestation be eradicated in association with this proposal.

7.8 PREDATION/DISRUPTION BY CATS AND DOGS

Pest/domestic animals (i.e. foxes, dogs and cats) are noted to be established within the locality. Mortality of fauna (especially koalas) as a result of dog attacks is considered to be a key conservation concern for koala management with some studies reporting that dog attacks account for between 5% and 40% of total recorded mortalities (McAlpine et al, 2007). Within the 'koala coast' of SEQLD an average of 300 koalas each year die as a result of dog attacks (EPA, 2006).

Studies into dispersal patterns of koalas undertaken by Dique et al (2003) indicates that in addition to mortality the presence of dogs within or proximate to habitats is likely to disrupt behaviour and associated dispersal options which can lead to those impacts discussed in 7.5 above. The risk of predation can strongly alter the behaviour and activity of potential prey (Lima and Dill 1990). In assessing predation hazards, many species use remote cues of risk because of the dangers of direct encounters with predators, including avoidance of open areas (e.g. Banks et al. 1999) or changing the time that they forage (in Banks et al, 2003; 406). Wild dogs may also potentially carry diseases such as distemper and an array of parasites e.g. hydatids).

Cats also have direct impacts on native fauna through predation. 'They can kill vertebrates weighing as much as 3 kg (Dickman 1996), but preferentially kill mammals weighing less than 220 g and birds less than 200 g. They also kill and eat reptiles, amphibians and invertebrates (Dickman 1996). Cats can also have indirect effects on native fauna by carrying and transmitting infectious diseases (DEH 2004). They are thought to have contributed to the extinction of many small to medium-sized mammals and ground-nesting birds in the arid zone, and to have seriously affected populations of bilby, mala and numbat (DEH 2004)'(DEWHA, 2008).

The development proposal will introduce the incremental risk of domestic fauna impact upon native fauna species although such risks are well established within the locality and an isolated ban on domestic animals at this location would be unreasonable. It is noted that dogs and cats would not be permitted to free roam within the proposed open space areas to be an on-leash area only to minimise harassment of residual fauna.

8.0 MEASURES TO AVOID AND MINIMISE ECOLOGICAL IMPACTS

8.1 PROTECTION & AVOIDANCE

The proposal seeks to avoid tree clearing through locating development in cleared areas and thus protecting the sites habitat. The design into these disturbed cleared spaces reduces fragmentation. These as well as a general locally endemic landscape requirement would ensure the sites values are protected.

The proposed vegetation to be removed are of a disturbed/cleared nature and do not provide significant ecological values.

As discussed in this report, the proposed works are considered unlikely to significantly impact upon any threatened flora/fauna species or endangered ecological communities occurring elsewhere within the locality.

8.2 MITIGATION MEASURES

The following measures are proposed to mitigate potential impacts associated with site development:

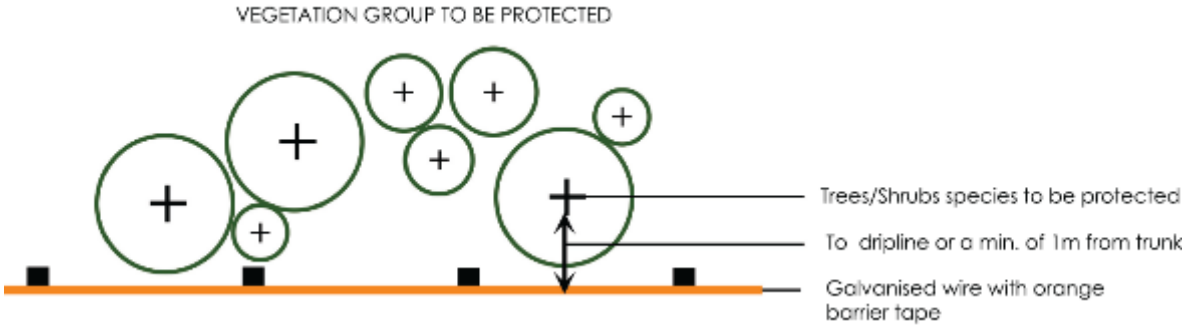
8.2.1 Impact of Vegetation and Habitat Clearing

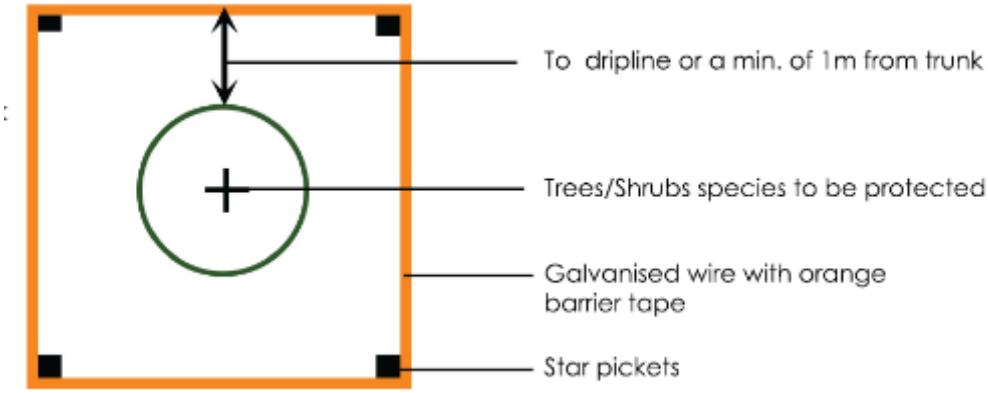
Disturbance to areas of native and exotic vegetation as described in this report will be unavoidable to deliver the proposal. In total, 92% of the land to be impacted is comprised of either disturbed/cleared areas or regrowth vegetation. To ensure that clearing impacts do not occur outside of the designated construction zone it will be necessary to clearly identify and mark the boundaries the works zones onsite prior to construction. Such boundaries are to be protected via high visibility fencing, sediment fencing and/or signage identifying that no construction activities (including temporary storage, stockpiling, vehicle movement etc) are permitted beyond.

Any areas to be cleared are to be pre-assessed by an experienced ecologist and wildlife spotter/catcher. This pre-assessment shall allow for an inventory of trees bearing bird nests and/or other trees representing fauna habitat to be undertaken prior to felling works. A wildlife spotter catcher is to be utilised during all phases of clearing of the site to ensure safe dispersal and relocation of native fauna.

Salvageable habitat components such as hollow stems or ground logs shall also be stockpiled and randomly dispersed throughout the retained bushland external to the proposal site.

Any pruning works to be supervised by a suitably qualified arborist.





INDIVIDUAL TREE TO BE PROTECTED

FIGURE 15 – EXAMPLES OF VEGETATION PROTECTION FENCING

8.2.2 Impacts Associated With Edge Effects & Weed Management

The following design and management initiatives are proposed in association with site development to progressively reduce the impact of 'edge effects' on the retained, interconnected native vegetation remnants:

8.2.3 Terrestrial Fauna Dispersal Barriers, Barrier Effects

As discussed in the previous sections the following measures are proposed to reduce the potential impact of the proposal on continued terrestrial fauna dispersal within the locality:

- Limited clearing of habitat which represents low ecological values to a to a small area at the edge of the existing semi-contiguous remnant.

8.2.4 Protection of wetlands, riparian land and watercourses

There will be no direct impacts on wetlands, riparian land or watercourses (or associated key fish habitats) as a result of the proposed development. The proposed subdivision layout seeks to maintain the natural stormwater drainage regime across the site. The drainage feature in the north east of the site and occurring within the mapped wetland designation is retained and buffered from development. Bio-retention areas, ponds and gross pollutant traps are proposed to collect and manage stormwater before leaving the site. The Engineering Impact Assessment prepared to accompany the development application includes plans and commentary regarding the proposed stormwater management strategy for the site. It is understood that further detail will form part of the future Construction Certification applications. A Stormwater Management Plan should be prepared prior to commencement of construction to ensure that there are no indirect impacts on nearby riparian land and waterways as a result of the proposed development.

8.3 ENHANCEMENT & RESTORATION

The following actions are aimed at providing a level of enhancement to retained habitats and restoration of degraded areas of the site. These actions focus upon bush regeneration activities, replacing fauna habitats and restoring native vegetation biomass following construction:

8.3.1 Revegetation & Restoration of Disturbed Areas

A 6.25 m high crib wall will be constructed as part of the proposed development. To minimise the visual impact and use the wall as a feature, it is proposed to create a green wall. The open web construction and use of free draining material will allow planting of the following native plant species, many of which are suitable for the Richmond Birdwing Butterfly:

- Richmond Birdwing vine (*Pararistolochia praevenosa*)
- Headache vine (*Clematis glycinoides*)
- Slender grape (*Cayratia clematidea*)

- Mountain aristolochia (*Pararistolochia laheyana*)
- Wonga vine (*Pandorea pandorana*)
- Boobialla (*Myoporum elipticum*)
- Barbed-wire vine (*Smilax australis*)

Further details are provided in the Iron Gates Cribb Wall Landscape Details (Planit 2016) provided as **Attachment 5.**

Additional revegetation and regeneration works are proposed as part of the biodiversity offset strategy for the project endorsed by OEH (refer **Section 8.4**).

8.3.2 Weed Management

It is recommended that treatment of weeds within the site (in particular within the retained vegetation) be undertaken.

Control techniques will vary depending upon the species being targeted and its location. In areas of low significance (i.e. weed thickets external to bushland or drainage lines etc) broad scale application of herbicide or mechanical removal will be appropriate. Within the proximity to areas of native floral species dominance more selective removal techniques (i.e. cut stump, stem application, hand removal etc) and spot application of a non-residual herbicide (i.e. roundup bioactive) would be necessary.

In addition, a general weed propagule protocol should also be applied whereby vehicles and machinery is checked for vegetative material (particularly in tyres or chassis) prior to entry to the site. An exit inspection should also be undertaken to ensure material is not removed from the site to an external bushland location.

8.4 BIODIVERSITY OFFSETS

It should be noted that the proposed development does not specifically require offsets under the (now superseded) *Threatened Species Conservation Act 1995* or the (current) *Biodiversity Conservation Act 2016*.

However, in addition to the above proposed measures to avoid and minimise ecological impacts, direct and potential indirect impacts of the development on the retained Littoral rainforest (including minor pruning/clearing works) and other native vegetation communities will be offset in accordance with requirements of the Biodiversity Offsets Scheme (i.e. under the current *Biodiversity Conservation Act 2016*).

The Biodiversity Offset Package will include:

<u>Rehabilitation works</u>

- The proponent proposes to rehabilitate the littoral rainforest patches and associated buffers (including site preparation, weed control and planting locally endemic

species) at an estimated cost of $80,000 in accordance with an approved Management Plan.

- Fencing will be installed (post and rail/bollards) on the periphery of the Littoral rainforest patches to reduce potential impacts to the area at an estimated cost of $48,000.

Protection in Perpetuity

- The rehabilitated Littoral rainforest patches (totalling 8.83 ha) will be secured and managed under a stewardship agreement (under the Biodiversity Conservation Act 2016) entered into by the proponent.
- This will include a Total Fund Deposit of $371,538.

Acquittal of additional offset credits

- The rehabilitation works, and stewardship agreement discussed above will acquit 86 credits.
- The remaining 157 credits (243 credits- 86 credits) will be acquitted via payment to the Biodiversity Conservation Trust Fund by the proponent in an amount of $274,593.

Table 16 below indicates the current calculated credits for direct and indirect impacts of the proposed development, utilising the BioBanking Assessment Methodology as requested by the NSW Office of Environment & Heritage (OEH). Calculations of offset credits and relevant correspondence with OEH are provided as **Attachment 6**. The table also includes the proponents proposed method for acquitting these credits. OEH have provided correspondence accepting this arrangement (see **Attachment 7**).

Table 16: Agreed Biodiversity Offsets

PCT	Direct impact (ha)	Indirect impacts (ha	Credit requirement	Proposal
NR152	7.53	-	243	1. Rehabilitation of retained Littoral rainforest to a high quality (86 credits generated); and 2. Protection in perpetuity of this area under a stewardship agreement in accordance with requirements of the Biodiversity Offsets Scheme (i.e. under the current Biodiversity Conservation Act 2016); and 3. Payment of $274,593 into the Biodiversity Conservation Trust Fund.
NR152	-	0.38	10	Indirect impacts of the proposal will be offset through onsite mitigation measures and have also been considered in previous amendments to the development layout.
NR153	-	0.28	7	
NR161	-	0.11	5	
NR273	-	0.93	74	
TOTAL	7.53	1.70	339	

9.0 SUMMARY & CONCLUSIONS

Planit Consulting was commissioned by Gold Coral Pty Ltd to prepare terrestrial flora and fauna assessment report relating to the proposed residential development located at Iron Gates, Evans Head. The development footprint incorporates Part Lot 277 DP755624, Part Lot 276 DP755624 and Part Lot 163 DP831052 which is accessed by Iron Gates Road within the suburb of Evans Head. The assessment has included the following:

- Survey, ground truthing and mapping of vegetation communities and determining conservation status reflective of reference reports and onsite condition
- Survey for faunal species including an assessment of the site's habitat value
- Survey for threatened flora species
- Providing an flora and fauna assessment report identifying development constraints, impacts and mitigation methods for proposed activities
- Addressing statutory requirements including Section 5A of the Environmental Planning and Assessment Act and the required SEPP assessments.

JWA Pty Ltd (JWA) were subsequently engaged to amend the Planit report to accompany a revised Development Application (lodged 17th January 2019) and have now completed further amendments in response to requests for further information from Richmond Valley Council, Mr Malcolm Scott (Council's consulting Planner), and the NSW Department of Primary Industries (Fisheries). A separate Ecological Assessment report (JWA 2019) has been prepared for the proposed upgrades to Iron Gates Drive (external to the site - required to obtain a Bush Fire Safety Authority) and should be read in conjunction with this report.

Furthermore, as it had been almost five (5) years since the previous survey work was undertaken, the Proponent engaged JWA to complete an assessment of Koala usage of the site using current best practice methods. Site surveys were completed on the 19th and 20th March 2019 by two (2) JWA ecologists utilising the Regularised Grid-based Spot Assessment Technique (RG-bSAT).

The flora survey of the study area identified four vegetation communities occurring. One Endangered Ecological Community (Littoral Rainforest) was recorded on site and had a mapped area of approximately 8.1 ha. The proposal will result in very minor impacts on Littoral rainforest. The road extension between the eastern and western residential areas of the development will necessitate minor pruning of limbs on the edges of the Littoral rainforest. Furthermore, clearing of approximately 127 m^2 (0.15%) of highly degraded vegetation surrounding an existing sewer pump station well will be required for the construction of a sewer pump station.

The proposal will remove the majority of Wattle from within the development footprint. The area to be removed is 6.83 ha.

The development will remove approximately 1,175 m^2 of Open Dry Heath and 1.16 ha of Open Dry Heath with mixed Eucalypt. We note this community is vulnerable but locally well conserved in the surrounding conservation network.

The development will require the removal of approximately 1,195 m^2 of Heathy Scribbly Gum for roads, bushfire requirements and lots.

In total, 92% of the land to be impacted is comprised of either disturbed/cleared areas or regrowth vegetation. As discussed in this report it is considered that these works will not have a significant environmental impact due to the highly modified nature of the areas to be affected. The clearing does not result in fragmentation or increased edge effects given the existing configuration of the remnants.

The fauna survey of the study area (and immediately adjacent areas) resulted in the recording of 74 species of bird, 8 reptiles, 5 amphibians and 26 mammals (or evidence of their previous presence). Of these species 7 (Grey Headed Flying-fox, Hoary Wattled Bat, Little Bentwing-bat, Southern Myotis, Koala, Wallum Froglet and Squirrel Glider) are scheduled under the *Threatened Species Conservation Act 1995.*

The assessment of current levels of Koala activity/usage over the site utilising the RG-bSAT in March 2019 identified areas of "low" level usage outside of the proposed development footprint (i.e. adjacent to the south-western corner). A small number of Koala faecal pellets were recorded under a total of three (3) trees in this portion of the site. Based on the results of this assessment it is considered that the south-western portion of the subject site may be utilised occasionally by Koalas as they traverse the locality. The results indicate that a resident/sedentary population is not currently present on the site.

An assessment against the requirements of the EPBC Act using the Principal Significant Impact Guidelines 1.1 (DEH 2006) was completed and has determined that referral to the Commonwealth for assessment under the Act is not required. With the implementation of proposed mitigation and amelioration measures the proposed action is considered unlikely to result in a significant impact on any matter of NES.

A Section 5A of the *Environmental Planning and Assessment Act 1979* (the '7-Part Test of Significance') was conducted for the seven recorded fauna species to determine whether the proposal may have the potential to impact the species. Section 5A was also conducted for the recorded Endangered Ecological Community (Littoral Rainforest).

The assessment concludes that the impacts of the proposed development are unlikely to threaten the viability of any local populations of the nominated species/communities and the proposal did not result in a significant impact. A species impact is therefore not required.

Although the proposed development does not specifically require offsets under the (now superseded) *Threatened Species Conservation Act 1995* or the (current) *Biodiversity Conservation Act 2016*, in addition to the proposed measures to avoid and minimise ecological impacts, direct and potential indirect impacts of the development on the retained Littoral rainforest (including minor pruning/clearing works) and other native vegetation communities will be offset in accordance with requirements of the Biodiversity Offsets Scheme (i.e. under the current *Biodiversity Conservation Act 2016*).

The Biodiversity Offset Package (accepted by OEH) will include:

- Rehabilitation of the retained Littoral rainforest including site preparation, weed control, planting locally endemic species and fencing;
- Protection of the retained Littoral rainforest in perpetuity and continued management under a stewardship agreement (under the Biodiversity Conservation Act 2016); and
- Acquittal of remaining offset credits via payment to the Biodiversity Conservation Trust Fund.

A SEPP 44 assessment was also conducted which concludes that the site does not contain core koala habitat. A Koala Management Plan is therefore not required.

An assessment against the requirements of the Fisheries Management Act 1994 has determined that the proposed development does not constitute an integrated development. No listed Threatened species or Key Fish Habitats will be impacted, and no marine vegetation will be removed or damaged.

Whilst the Iron Gates development proposal is considered unlikely to significantly affect native flora, fauna or associated habitat, it will result in the minor loss of local habitat for native species through tree removal/vegetation removal.

In this regard recommendations have been included in this report regarding the management of works to minimize disruption to native fauna, minimize damage to retained vegetation and local weed management and revegetation to compensate for minor habitat losses.

10.0 ATTACHMENTS

ATTACHMENT 1: SUBDIVISION PLANS

ATTACHMENT 2: RESPONSES TO INFORMATION REQUESTS

ATTACHMENT 3: SUMMARY OF AMENDMENTS TO THE PLANIT (2014) REPORT

ATTACHMENT 4: KOALA ASSESSMENT UTILISING THE REGULARISED GRID-BASED SPOT ASSESSMENT TECHNIQUE (JWA 2019)

ATTACHMENT 5: IRON GATES CRIBB WALL LANDSCAPE DETAILS (PLANIT 2016)

ATTACHMENT 6: BIODIVERSITY OFFSET CALCULATIONS AND RELEVANT CORRESPONDENCE

ATTACHMENT 7: OEH CONFIRMATION OF PROPOSED BIODIVERSITY OFFSET PACKAGE

ATTACHMENT 1 – SUBDIVISION PLANS

Lot Table	
Lot	Area
1	969 m²
2	612 m²
3	612 m²
4	612 m²
5	612 m²
6	612 m²
7	612 m²
8	612 m²
9	612 m²
10	612 m²
11	612 m²
12	612 m²
13	612 m²
14	612 m²
15	612 m²
16	612 m²
17	612 m²
18	612 m²
19	612 m²
20	612 m²
21	649 m²
22	615 m²
23	600 m²
24	600 m²
25	600 m²
26	600 m²
27	600 m²
28	600 m²
29	627 m²
30	600 m²
31	600 m²
32	600 m²
33	600 m²
34	600 m²
35	600 m²
36	788 m²
37	674 m²
38	775 m²
39	612 m²
40	604 m²
41	604 m²
42	604 m²
43	604 m²
44	604 m²
45	604 m²
46	604 m²
47	609 m²
48	605 m²
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52	600 m²
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54	600 m²
55	600 m²
56	600 m²
57	623 m²
58	623 m²
59	633 m²
60	632 m²
61	618 m²
62	604 m²
63	604 m²
64	605 m²
65	606 m²
66	606 m²
67	607 m²
68	607 m²
69	608 m²
70	609 m²

Lot Table	
Lot	Area
71	607 m²
72	608 m²
73	682 m²
74	766 m²
75	600 m²
76	600 m²
77	600 m²
78	600 m²
79	600 m²
80	601 m²
81	601 m²
82	601 m²
83	601 m²
84	608 m²
85	614 m²
86	634 m²
87	696 m²
88	602 m²
89	602 m²
90	602 m²
91	859 m²
92	856 m²
93	603 m²
94	603 m²
95	954 m²
96	616 m²
97	663 m²
98	657 m²
99	602 m²
100	723 m²
101	605 m²
102	609 m²
103	620 m²
104	714 m²
105	602 m²
106	604 m²
107	602 m²
108	602 m²
109	602 m²
110	602 m²
111	601 m²
112	600 m²
113	600 m²
114	608 m²
115	601 m²
116	600 m²
117	602 m²
118	600 m²
119	601 m²
120	600 m²
121	600 m²
122	647 m²
123	619 m²
124	603 m²
125	600 m²
126	646 m²
127	661 m²
128	626 m²
129	600 m²
130	639 m²
131	602 m²
132	602 m²
133	600 m²
134	618 m²
135	623 m²
136	604 m²
137	602 m²
138	600 m²
139	600 m²
140	600 m²

Lot Table	
Lot	Area
141	600 m²
142	600 m²
143	605 m²
144	600 m²
145	600 m²
146	601 m²
147	600 m²
148	600 m²
149	601 m²
150	601 m²
151	600 m²
152	665 m²
153	629 m²
154	834 m²
155	765 m²
156	603 m²
157	627 m²
158	644 m²
159	601 m²
160	601 m²
161	601 m²
162	601 m²
163	601 m²
164	601 m²
165	600 m²
166	601 m²
167	602 m²
168	602 m²
169	602 m²
170	602 m²
171	602 m²
172	602 m²
173	602 m²
174	614 m²
175	600 m²
176	2.188ha
177	4.857ha
178	47.418ha

LEGEND:

SITE BOUNDARY

PROPOSED EASEMENT

CLIENT

GOLDCORAL PTY LTD

PROJECT

PROPOSED SUBDIVISION OF LOTS 276 & 277 ON DP755624, LOT 163 ON DP831052, CROWN PUBLIC ROAD RESERVE (BETWEEN LOT 163 DP831052 AND LOT 276 DP755624) AND CROWN FORESHORE RESERVE (ADJACENT TO EVANS RIVER)

LOCAL AUTHORITY

RICHMOND VALLEY

NOTES

(i) This plan was prepared for the purpose and exclusive use of THE INGLES GROUP to accompany an application to RICHMOND VALLEY for approval to reconfigure the land described in this plan and is not to be used for any other purpose or by any other person or corporation. LandPartners Pty Ltd accepts no responsibility for any loss or damage suffered howsoever arising to any person or corporation who may use or rely on this plan in contravention of the terms of this clause or clauses (ii) or (iii) hereof.

(ii) The dimensions, areas, number of lots, size and location of improvements & flood information (if shown) are approximate only and may vary.

(iii) This plan may not be copied unless these notes are included.

Aerial Photography sourced from Nearmap 13-3-2019.
Date of photography - 03/07/2012

LOTS	TOTAL AREA
Residential Lots (175)	16.884ha
Residue Lots (3)	54.463ha
Public Reserves (4)	0.8366ha
Drainage Reserve (1)	0.1124ha
Pump station lot (1)	0.0127ha
TOTAL	72.309ha
ADDITIONAL NOTES	

SCALE BAR

0 5 10 20 30 50 80m

SCALE 1:1250 @ A1

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ISO 9001 Quality Management

LEVEL DATUM	AHD		
LEVEL ORIGIN	-		
CONTOUR INTERVAL	-		
COMPUTER FILE	BRJD6396-100-33-16-COPY		
DRAWN	CGW	DATE	27/06/2019
CHECKED	CMJ	DATE	27/06/2019
APPROVED	CGW	DATE	27/06/2019
PLAN NUMBER	SHEET 2 OF 2 BRJD6396.100-013	REV	H

CGW

NOTE: ALL DIMENSIONS AND AREAS ON THIS PLAN ARE SUBJECT TO SURVEY AND REQUIREMENTS FOR LODGEMENT OF SURVEY PLANS IN THE NSW LAND REGISTRY SERVICES

Lot Table	
Lot	Area
1	969 m²
2	612 m²
3	612 m²
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5	612 m²
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7	612 m²
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14	612 m²
15	612 m²
16	612 m²
17	612 m²
18	612 m²
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20	612 m²
21	649 m²
22	615 m²
23	600 m²
24	600 m²
25	600 m²
26	600 m²
27	600 m²
28	600 m²
29	627 m²
30	600 m²
31	600 m²
32	600 m²
33	600 m²
34	600 m²
35	600 m²
36	788 m²
37	674 m²
38	775 m²
39	612 m²
40	604 m²
41	604 m²
42	604 m²
43	604 m²
44	604 m²
45	604 m²
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54	600 m²
55	600 m²
56	600 m²
57	623 m²
58	623 m²
59	633 m²
60	632 m²
61	618 m²
62	604 m²
63	604 m²
64	605 m²
65	606 m²
66	606 m²
67	607 m²
68	607 m²
69	608 m²
70	609 m²

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103	620 m²
104	714 m²
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106	604 m²
107	602 m²
108	602 m²
109	602 m²
110	602 m²
111	601 m²
112	600 m²
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114	600 m²
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116	608 m²
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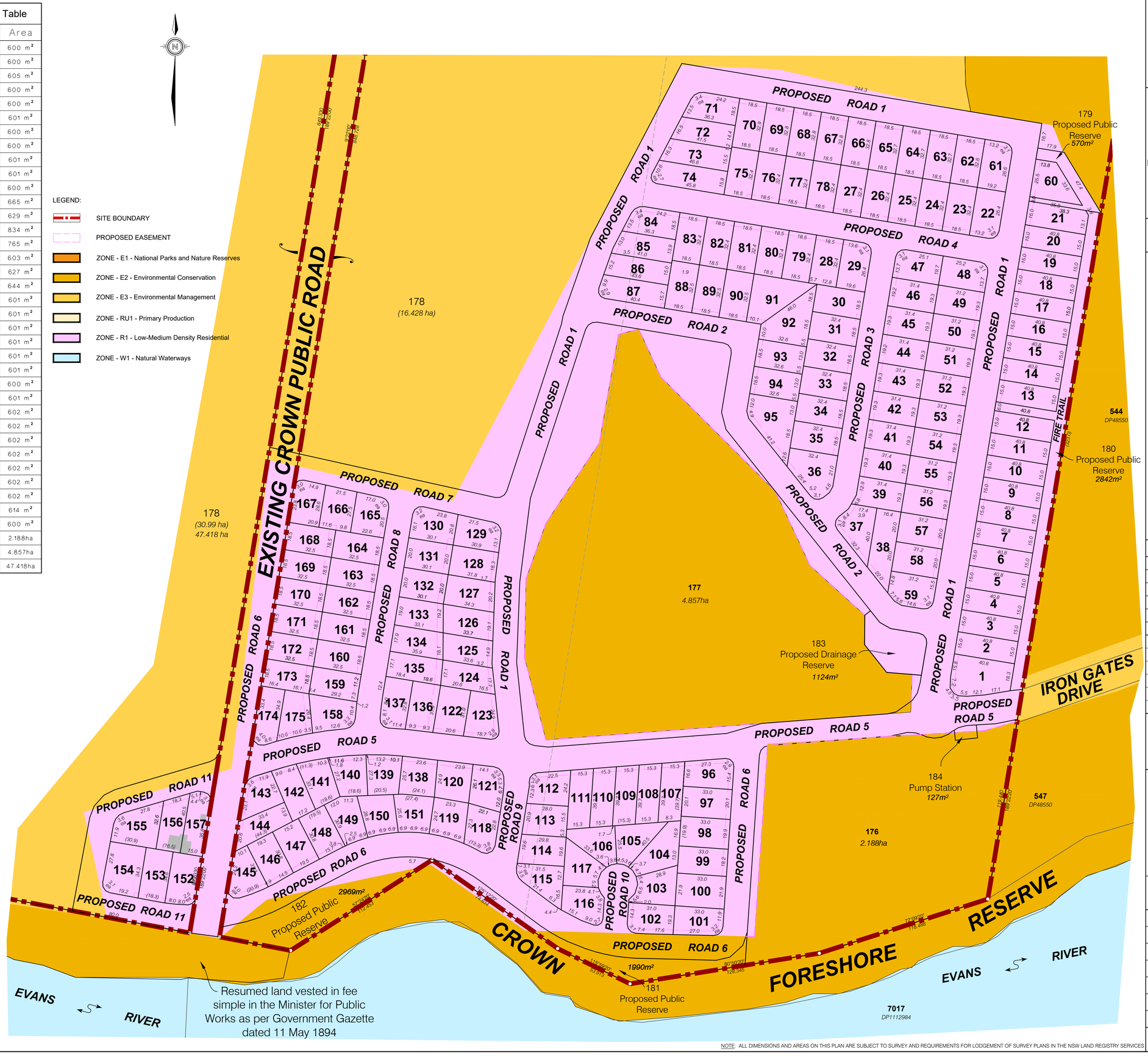
119	601 m²
120	600 m²
121	600 m²
122	647 m²
123	619 m²
124	603 m²
125	600 m²
126	646 m²
127	661 m²
128	626 m²
129	600 m²
130	639 m²
131	602 m²
132	602 m²
133	600 m²
134	618 m²
135	623 m²
136	604 m²
137	602 m²
138	600 m²
139	600 m²
140	600 m²

Lot Table	
Lot	Area
141	600 m²
142	600 m²
143	605 m²
144	600 m²
145	600 m²
146	601 m²
147	600 m²
148	600 m²
149	601 m²
150	601 m²
151	600 m²
152	665 m²
153	629 m²
154	834 m²
155	765 m²
156	603 m²
157	627 m²
158	644 m²
159	601 m²
160	601 m²
161	601 m²
162	601 m²
163	601 m²
164	601 m²
165	600 m²
166	601 m²
167	602 m²
168	602 m²
169	602 m²
170	602 m²
171	602 m²
172	602 m²
173	602 m²
174	614 m²
175	600 m²
176	2.188ha
177	4.857ha
178	47.418ha



CLIENT

GOLDCORAL PTY LTD

PROJECT

PROPOSED SUBDIVISION OF LOTS 276 & 277 ON DP755624, LOT 163 ON DP831052, CROWN PUBLIC ROAD RESERVE (BETWEEN LOT 163 DP831052 AND LOT 276 DP755624) AND CROWN FORESHORE RESERVE (ADJACENT TO EVANS RIVER)

LOCAL AUTHORITY

RICHMOND VALLEY

NOTES

(i) This plan was prepared for the purpose and exclusive use of THE INGLES GROUP to accompany an application to RICHMOND VALLEY for approval to reconfigure the land described in this plan and is not to be used for any other purpose or by any other person or corporation. LandPartners Pty Ltd accepts no responsibility for any loss or damage suffered howsoever arising to any person or corporation who may use or rely on this plan in contravention of the terms of this clause or clauses (ii) or (iii) hereof.

(ii) The dimensions, areas, number of lots, size and location of improvements & flood information (if shown) are approximate only and may vary.

(iii) This plan may not be copied unless these notes are included.

LOTS	TOTAL AREA
Residential Lots (175)	16.884ha
Residue Lots (3)	54.463ha
Public Reserves (4)	0.8366ha
Drainage Reserve (1)	0.1124ha
Pump station lot (1)	0.0127ha
TOTAL	72.309ha
ADDITIONAL NOTES	

SCALE BAR

0 5 10 20 30 50 80m

SCALE 1:1250 @ A1

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ISO 9001 Quality Management
SAI Global No. 31 5260

LEVEL DATUM	AHD		
LEVEL ORIGIN	-		
CONTOUR INTERVAL	-		
COMPUTER FILE	BRJD6396-100-33-16		
DRAWN	CGW	DATE	27/06/2019
CHECKED	CMJ	DATE	27/06/2019
APPROVED	CGW	DATE	27/06/2019
PLAN NUMBER	SHEET 2 OF 2 BRJD6396.100-014	REV	O

CGW

NOTE: ALL DIMENSIONS AND AREAS ON THIS PLAN ARE SUBJECT TO SURVEY AND REQUIREMENTS FOR LODGEMENT OF SURVEY PLANS IN THE NSW LAND REGISTRY SERVICES

ATTACHMENT 2: RESPONSES TO INFORMATION REQUESTS

TABLE 1 – RESPONSES TO RELEVANT RICHMOND VALLEY COUNCIL COMMENTS

Council Comment	Response	Section
4. Statement of Amendments/Variations		
Clause 55 of the EP&A Reg. requires an amended/varied application to be accompanied by a written statement outlining all the amendments/variations made to the original DA. This will include all amendments/variations made up to, and including, those of 17 January 2019.	Amendments made to the August 2014 version are detailed in **Attachment 3.**	**Attachment 3**
5. Subdivision Plan		
Different versions of the subdivision plan have been used throughout the application, including support documents. Inconsistencies have been found within a number of documents including the Draft Master Plan (Appendix N), Ecological Report (Appendix D), Bushfire Report (Appendix C), Landscaping Intent Plan (Appendix E), Waterfront Layout (Appendix U), Aerial Photography (Appendix K), NSW Office of Water (email) and Riparian Offset Plan (Appendix W).	Relevant DA plans included in the Terrestrial Flora and Fauna Assessment (as Amended July 2019) have been updated.	-
7. Ecological Assessment		
7.1 Species Impact Statement v Biobanking Statement		
7.1.1 Appendix D consists of an Ecological Assessment for the proposal. This assessment includes a Section 5A Test of Significance under the EP&A Act and concludes a Species Impact Statement (SIS) is not required.	Correct.	-
7.1.2 Council is aware of negotiates with the NSW Office of Environment and Heritage to offset the development's biodiversity impacts by securing Biobanking credits under Part 7A of the Threatened Species Conservation Act 1995. This being the case, it is acknowledged that Part 7A	Noted.	

Council Comment	Response	Section
does not require assessment of the development in accordance with the threatened species protection measures provided for by Parts 4 & 5 of the EP&A Act.		
7.1.3 A Biobanking Statement must be obtained and submitted with the application for these exceptions to apply. Failing the lodgment of a Biobanking Statement it is most likely that a Species Impact Statement will be required by Council.	Offset requirements of the proposed development have been the subject of extensive negotiations with the NSW Office of Environment and Heritage (OEH) over the past 18 months and are provided in a new **Section 8.4**. Relevant correspondence and calculations are provided in **Attachment 6** and **Attachment 7**.	**8.4, Attachments 6 & 7**
7.1.4 Support documents, especially those relating to ecological assessments of the development site, should be updated to reference obtaining a Biobanking Statement, and explain the exception provisions provided by Part 7A of the TSC Act.	See above response.	-
7.1.5 The body of work carried out by James Warren & Associates (JWA), including calculations of Biobanking offset credits, should also be submitted with the application.	See above response.	-
7.2 Environmental Protection and Biodiversity Conservation Act 1999 (Commonwealth) (EPBC Act)		
7.2.1 It is the responsibility of a proponent, proposing to take an action, to refer a matter to the Commonwealth Environment Minister if it will, or is likely to, have a significant impact on any of the matters of environmental significance, or other protected matters.	A new **Section 6.1** has been added to the report and includes an assessment against the requirements of the EPBC Act using the Principal Significant Impact Guidelines 1.1 (DEH 2006). The assessment has determined that referral to the Commonwealth for assessment under the Act is not required. With the implementation of proposed mitigation and amelioration measures the proposed	**6.1**

Council Comment	Response	Section
	action is considered unlikely to result in a significant impact on any matter of NES.	
7.2.2 While the Ecological Assessment references the EPBC Act throughout, it fails to provide a conclusion on whether the proposal will, or is likely to, have a significant impact.	See above response.	-
7.3 SEPP44 - Koala Habitat Protection		
The ecological assessment identifies Potential Koala Habitat on the residue lot (primarily within Lot 163 DP831052), but concludes there is no Core Koala Habitat as no breeding females were located. The presence of Core Koala Habitat is the trigger for preparing a Koala Plan of Management. Concerns have been raised with the adequacy of the impact assessment and conclusions, especially given that previous applications were conditioned to prepare a Koala Plan of Management.	SEPP No. 44 – Koala Habitat Protection is addressed in **Section 6.5.** Furthermore, as it has been almost five (5) years since the previous survey work was undertaken, the Proponent has engaged JWA to complete an assessment of Koala usage of the site using current best practice methods (**Attachment 4**).	**6.5, Attachment 4**

TABLE 2 – RESPONSES TO MR MALCOM SCOTT'S RELEVANT COMMENTS

Mr Malcom Scott's Comment	Response	Section
SECTION 8 – DA LEGISLATIVE PLANNING CONTROLS		
Whether or not the Commonwealth's *Environmental Protection and Biodiversity Conservation Act 1999* applies to the proposed development needs to be clarified as there is potential for adverse impact on threatened species and their habitats.	A new **Section 6.1** has been added to the report and includes an assessment against the requirements of the EPBC Act using the Principal Significant Impact Guidelines 1.1 (DEH 2006). The assessment has determined that referral to the Commonwealth for assessment under the Act is not required. With the implementation of proposed mitigation and amelioration measures the proposed action is considered unlikely to result in a significant impact on any matter of NES.	**6.1**
SECTION 11 – WHAT CURRENTLY COMPRISES THE DA		
11.4 The 2nd / 2nd Amendment to the DA – Not Yet Accepted by RVC		
The amended Terrestrial Flora and Fauna Assessment by Planit Consulting, August 2014 as amended by JWA Pty Ltd, November 2018 (Appendix D): • does not clearly identify the amendments made to the Aug. 2014 version and has appeared to have only replaced the plans of the proposed subdivision (Appendix A)	Amendments made to the August 2014 version are detailed in **Attachment 3.**	**Attachment 3**
• is missing a Table of Contents and Appendices referred to in the report	Table of Contents and Appendices are now provided.	-
• appears to only have changes the plan of the proposed subdivision	Amendments made to the August 2014 version are detailed in **Attachment 3.**	**Attachment 3**
• has not provided a calculation of the biobanking offset credits need to be retired to offset biodiversity impacts of the proposal and	Offset requirements of the proposed development are provided in a new **Section 8.4.**	**8.4**

Mr Malcom Scott's Comment	Response	Section
• does not articulate whether or not 'biodiversity certification' or a 'biobanking statement' is required in accordance with Parts 7AA and/or 7A of the *Threatened Species Conservation Act 1995* is required to be assessed in accordance with threatened species protection measures provided by Parts 4 and 5 of the EP&A Act. If a 'biobanking statement' is issued by NSW OE&H the development is taken, to be development that is not likely to significantly affect any threatened species, population or ecological community under this Act, or its habitat.	Offset requirements of the proposed development are provided in a new **Section 8.4.**	**8.4**
SECTION 16 – DA ISSUES		
16.5 Social Impact		
The Settlement Strategy identifies the following limitations / constraints at Iron Gates: • Environmental protection • SEPP No. 71 • Provisions of bushfire asset protection zones • Airfield runway and safety and • Pygmy perch habitat.	Noted.	-
16.10 Ecology – Fauna and Flora		
The land contains threatened fauna and flora species and provides habitat for a range of fauna and flora threatened species.	Noted.	-
The environmental significance of the land is reflected in the E2 – environmental conservation and E3 – environmental management zones within it and the E1 – environmental	Noted.	-

Mr Malcom Scott's Comment	Response	Section
national parks and nature reserves, E2 – environmental conservation and E3 – environmental management zones on adjoining land and land in the locality.		
An assessment of the impact of the DA on terrestrial flora and fauna has been undertaken in the Terrestrial Flora and Fauna Assessment, prepared by Planit Consulting Pty Ltd (Aug. 2014) and provided with the DA. The surveys for the Terrestrial Flora and Fauna Assessment were limited and appear only to be undertaken between 20 and 25 May 2014.	Any flora and fauna survey is likely to be of limited duration due to time and costs constraints. The Threatened Species Survey and Assessment: Guidelines for developments and activities (working draft) (DEC 2004) provides details on the minimum survey effort required for any conclusions to be reasonably reached, however the guidelines also recognise that this level of effort may not be appropriate or necessary in all circumstances. The guidelines state that ideally, surveys would be undertaken during optimal climatic and seasonal conditions but note that in many cases this will not be possible. Therefore, to comply with legislation, consideration must also be given to the presence in the survey area (or surrounding land) of the known or likely habitat components for the species. An assessment of the habitat types available on site compared to the known habitat requirements of Threatened flora and fauna species recorded from the broader locality allows a determination of whether these species are likely, possible or unlikely to occur on the subject site.	-
Many of the submissions of objection to the DA raised issues in regard the rigour of the fauna and flora assessment, potential	See response above in relation to survey effort.	**7.0, 8.4**

Mr Malcom Scott's Comment	Response	Section
for direct and indirect adverse impacts on the fauna and flora and threated fauna and flora species and their habitat and for alleged illegal clearing on the land to be developed.	Direct and indirect impacts of the proposed development have been discussed in **Section 7.0** and offsets proposed (**Section 8.4**) for any residual impacts.	
Several of the submissions were prepared by local specialist/ expert ecological consultancies and a range of environmental conservation and protection community organisations.	Noted.	-
Planit Consulting Pty Ltd provided with the 1st amendment of the DA a commentary prepared by Mr B Sargeant who prepared the Terrestrial Flora and Fauna Assessment. The commentary provided a response only to comments by the Office of Environment and Heritage and Dept. of Primary Industries and only to the submission prepared by Mr D Milledge of Landmark Ecological Services Pty Ltd.	Noted.	-
Mr Milledge has extensive knowledge of the site and its history, provided a response to the commentary prepared by Mr Sargeant and recommended a Species Impact Statement (SIS) be prepared for the DA.	Noted.	-
The commentary by Mr Sargeant states that; *"The proposal involved minor filling, but no excavation works with areas immediately adjacent to the EEC which is not considered to significantly impact the drainage of these areas."*	Noted.	-
The DA proposes substantial earthworks on the land and in close proximity to the E2 zone over the central littoral rainforest and it is not readily evident how internal roads and drainage changes will impact on adjoining the endangered ecological communities with the land.	All direct and indirect impacts of the proposed development have been discussed in **Section 7.0** and offsets proposed (**Section 8.4**) for any residual impacts.	**7.0, 8.4**

Mr Malcom Scott's Comment	Response	Section
The riparian buffer requirements of the biting midges assessment needs to be addressed in the fauna and flora assessment for the DA.	The Iron Gates Revised Biting Insect Impact Assessment (Mosquito Consulting Services Pty Ltd 2019) concludes that no specific riparian buffer requirements are necessary.	-
The proposed landscaping of the crib wall by planting of vegetation between the concrete cribs suited to the Richmond Birdwing Butterfly needs to be addressed in the fauna and flora assessment for the DA.	Details have been added to **Section 8.3.1** and the relevant Iron Gates Cribb Wall Landscape Details (Planit 2016) are provided as **Attachment 5**.	**8.3.1, Attachment 5**
The Terrestrial Flora and Fauna Assessment, prepared by Planit Consulting Pty Ltd (Aug. 2014) is a very limited 'snap-shot', as a consequence of the short survey period which appears to have been undertaken in May following the alleged illegal clearing in April / May 2014.	See response above in relation to survey effort.	-
The NSW OE&H has indicated that the offset proposal has not been quantified and justified and is poorly considered, recommending further consideration to redesigning to avoid direct and indirect impacts and that an offset package be prepared in accordance with accepted principles.	Offset requirements of the proposed development have been the subject of extensive negotiations with OEH over the past 18 months and are provided in a new **Section 8.4.**	**8.4**
There is potential for direct and indirect adverse impacts on the fauna and flora of the land and to threatened fauna and flora species and their habitats.	All direct and indirect impacts of the proposed development have been discussed in **Section 7.0** of the report and offsets proposed (**Section 8.4**) for any residual impacts.	**7.0**
The amendment to the Terrestrial Flora and Fauna Assessment by Planit Consulting Pty Ltd (Aug. 2014) prepared by JWA Pty Ltd, Nov 2018 appears to only have changed the plan of the proposed subdivision and has not.	Amendments made to the August 2014 version are detailed in **Attachment 3.**	**Attachment 3**

Mr Malcom Scott's Comment	Response	Section
None of the biobanking documentation has been provided in the amended Terrestrial Flora and Fauna Assessment prepared by JWA Pty Ltd , Nov. 2018, nor is there reference to biobanking offsets in the revised SEE (Oct. 2018).	Offset requirements of the proposed development have been the subject of extensive negotiations with OEH over the past 18 months and are provided in a new **Section 8.4**. Relevant correspondence and calculations are provided in **Attachment 6** and **Attachment 7**.	**8.4, Attachments 6 & 7**
Parts 7AA and/or 7A of the *Threatened Species Conservation Act 1995* will not require the development to be assessed in accordance with the threatened species protection measures provided by Parts 4 and 5 of the EP&A Act, if 'biodiversity certification' or a biobanking statement is issued by NSW OE&H. If a 'biobanking statement' is issued by NSW OE&H the development is taken, to be development that is not likely to significantly affect any threatened species, population or ecological community under this Act, or its habitat.	See above response.	-
Whether or not 'biodiversity certification' and 'biobanking statement' is sought or required is not articulated in the DA.	See above response.	-
Whether or not the Commonwealth's *Environmental Protection and Biodiversity Conservation Act 1999* applies to the proposed development needs to be clarified as there is potential for adverse impact on threatened species and their habitats.	A new **Section 6.1** has been added to the report and includes an assessment against the requirements of the EPBC Act using the Principal Significant Impact Guidelines 1.1 (DEH 2006). The assessment has determined that referral to the Commonwealth for assessment under the Act is not required. With the implementation of proposed mitigation and amelioration measures the proposed action is considered unlikely to result in a significant impact on any matter of NES.	**6.1**

Mr Malcom Scott's Comment	Response	Section
Knowing what are and satisfying the relevant standards required by the NSW RFS for the development is a key important issue and needs to be clearly documented in both the fauna and flora impact assessment, bushfire threat assessment and engineering assessment for the DA.	The requirements of the Bushfire report (Bushfire Risk 2019) have been added to **Section 7.2** and with the inclusion of a new **Figure 11.**	**7.2, Figure 11**
16.11 Bushfire		
The bushfire and fauna and flora assessment should address the requirements and impacts of the collector road between west and east residential areas in the adjoining littoral rainforest zoned E2.	An assessment of direct and indirect impacts of the proposed development is provided in **Section 7.0** of the report. As stated in **Section 7.2** the road extension between the eastern and western residential areas of the development will necessitate minor pruning of limbs on the edges of the Littoral rainforest, however it is considered that these works will not have a significant environmental impact. Furthermore, direct and potential indirect impacts of the development on the retained Littoral rainforest (including minor pruning/clearing works) will be offset in accordance with requirements of the Biodiversity Offsets Scheme (i.e. under the current Biodiversity Conservation Act 2016) (**Section 8.4**).	**7.0, 7.2, 8.4**
The bushfire and fauna and flora assessments for the DA should verify that the proposed fire trail can be managed to be free of obstructions created by falling trees on land immediately to the east.	As noted in the bushfire report (Bushfire Risk 2019), public access roads and fire trails shall become the ongoing responsibility of and be maintained by Council as an Inner Protection Area.	-
16.12 Riparian Zone and Fisheries – Evans River		
There has been no detailed investigation of the riparian zone and fishery habitat of the Evans River adjoining the land in order to make an informed assessment of the relevant	There will be no encroachment into the riparian zone and associated fish habitat of the Evans River.	**5.7.1, 5.7.2, 8.2.4**

Mr Malcom Scott's Comment	Response	Section
considerations of cl. 6.6, cl. 6.8 and cl. 6.10 of the RVLEP 2012 which should be provided in the DA.	Clause 6.6 (Terrestrial biodiversity) of the RVLEP 2012 has previously been addressed in **Section 5.7.1.** Clause 6.8 (Riparian land and watercourses) has previously been addressed in **Section 5.7.2.** Clause 6.10 (Wetlands) has also previously been addressed in **Section 5.7.2.** The proposed subdivision layout seeks to maintain the natural stormwater drainage regime across the site. Bio-retention areas, ponds and gross pollutant traps are proposed to collect and manage stormwater before leaving the site. The Engineering Impact Assessment prepared to accompany the development application includes plans and commentary regarding the proposed stormwater management strategy for the site. It is understood that further detail will form part of the future Construction Certification applications. A new **Section 8.2.4** has been added to the report and requires the preparation of a Stormwater Management Plan prior to commencement of construction to ensure that there are no indirect impacts on nearby wetlands, riparian land and waterways as a result of the proposed development.	
16.13 Roads and Traffic Generation		

Mr Malcom Scott's Comment	Response	Section
The landscape plans shows fire trails to be 6m wide with gravel and turf surfaces + 1m wide shoulders. The engineering, bushfire and fauna and flora assessments for the DA should verify that the proposed fire trails are trafficable in all-weather, do not traverse land subject to inundation, can be constructed to the standards of planning for bushfire protection and managed to be free of obstructions created by falling trees on land immediately to the east.	This is not considered relevant to the Terrestrial Flora and Fauna Assessment and has been addressed in the Bushfire report (Bushfire Risk 2019).	-
16.16 Infrastructure – Stormwater Drainage and Flooding		
The stormwater assessment and investigation of the riparian zone and fishery habitat should consider the potential impacts of the discharge of water on the mapped fishery habitat and wetland areas adjoining the land.	There will be no encroachment into the riparian zone and associated fish habitat of the Evans River. The proposed subdivision layout seeks to maintain the natural stormwater drainage regime across the site. Bio-retention areas, ponds and gross pollutant traps are proposed to collect and manage stormwater before leaving the site. The Engineering Impact Assessment prepared to accompany the development application includes plans and commentary regarding the proposed stormwater management strategy for the site. It is understood that further detail will form part of the future Construction Certification applications. A Stormwater Management Plan should be prepared prior to commencement of construction to ensure that there are no indirect impacts on nearby wetlands, riparian land and waterways as a result of the proposed development.	
16.19 Land Use Planning – Buffers		

Mr Malcom Scott's Comment	Response	Section
The NSW Dept. of Primary Industries has published guidelines for identifying and managing land use conflict issues on the NSW North Coast. The 'land use conflict resolution assessment' guidelines (LUCRA guidelines), prepared in 2007 by Learmonth, Whitehead and Fletcher at the Centre of Coastal Agricultural Landscapes in partnership with the Northern Rivers Catchment Management Authority are titled: Living and Working in Rural Areas A handbook for managing land use conflict issues on the NSW North Coast. The LUCRA guidelines: • identify a range of most common issues and situations that can result in neighbourhood disputes • recommend buffer separation distances between primary industries and development and sensitive environments and • a process of land use conflict risk assessment. The minimum buffer separation distances between environmentally sensitive land and 'residential areas and urban development' recommended in the guidelines are identified below: Native vegetation / habitat 50m Ecosystem and wildlife corridors 50m	The LUCRA guidelines refer to conflict resolution between competing land uses and are not relevant to the assessment of a development application. There are no current guidelines for appropriate setbacks/buffers to retained ecological values. However, the proponent has undertaken extensive negotiations with OEH over the past 18 months in relation to appropriate offsets for the both the direct and indirect impacts (in lieu of providing additional setbacks/buffers) of the proposed development. Details of the agreed offset package are provided in a new **Section 8.4.** Relevant correspondence and calculations are provided in **Attachment 6** and **Attachment 7**.	**8.4, Attachments 6 & 7**

Mr Malcom Scott's Comment	Response	Section
Estuaries and major waterways 100m Wetlands 100m SEPP No. 26 Littoral rainforest 100m The DA does not achieve compliance with the recommended buffer distances and no information by way of justification to vary the distances or measures to mitigate potential for adverse environmental impact identified. This is a key important issue and needs to be clearly documented in both the fauna and flora impact assessment and bushfire threat assessment for the DA.		
16.20 Land Use Planning – Staging of Development		
The subdivision is now proposed in 1 stage. Neither the timing of the development infrastructure to be provided, management of the littoral rainforest (including any stewardship agreements relating to offset credits) nor provision of compensatory revegetation, bushfire asset protection, facilities and services are provided in the DA.	The timing of appropriate management arrangements will be negotiated and included in any Consent Conditions.	-
17 ISSUES DA DOCUMENTATION		
17.2 The DA as Lodged		
The following makes brief comments in regards the various reports (identified in *italics*) which previously comprised the DA. • *Appendix D – Terrestrial Flora and Fauna Assessment, Aug. 2014, prepared by Planit Consulting Pty Ltd*	Addressed in above responses.	-

Mr Malcom Scott's Comment	Response	Section
○ Determination if SIS required, review, address amendments, relevant Section 16.10, 16.11, 17.2, 17.3, 17.4 and 17.5 issues, co-ordinate up-dated specialist reports (bushfire, engineering, biting insects and stormwater), masterplan, Iron Gates Dr		
○ Draft plan of management of E2 zoned allotments and ownership arrangements in perpetuity	Not considered necessary at this stage. The appropriate plan of management should be conditioned and will then be prepared at the appropriate stage.	-
○ Draft plan of management for 'assisted natural regeneration' area	Not considered necessary at this stage. The appropriate plan of management should be conditioned and will then be prepared at the appropriate stage.	-
○ Land description incorrect, DA plans to be up-dated.	Relevant DA plans included in the Terrestrial Flora and Fauna Assessment (as Amended July 2019) have been updated.	-
17.4 The 1st / 2nd Amendments to the DA		
The following makes brief comments in regards the various reports (identified in *italics*) which potentially comprised the DA in the 1st / 2nd amendment to it. • *Annexure G – Ecological Assessment of Iron Gates Drive Evans Head, Version RW6 – JWA Pty Ltd, 5 September 2018* ○ As above Section 16.10, 16.11, 17.2, 17.3, 17.4 and 17.5 issues not resolved ○ Co-ordinate up-dated specialist fauna and flora report / potential SIS	The Ecological Assessment of Iron Gates Drive is a separate document (JWA 2019) and should be read in conjunction with this Terrestrial Flora and Fauna Assessment (as Amened April 2019).	-

Mr Malcom Scott's Comment	Response	Section
○ Land description incorrect, DA plans to be up-dated.		
17.5 The 2nd / 2nd Amendments to the DA		
The following makes brief comments in regards the various reports (identified in *italics*) which currently potentially comprise the DA in the 2nd / 2nd amendment to it. • *Appendix D – Terrestrial Flora and Fauna Assessment – Planit Consulting, August 2014 as amended by JWA Pty Ltd, November 2018* ○ Determination if SIS required, review, address amendments, relevant Section 16.10, 16.11, 17.2, 17.3, 17.4 and 17.5 issues not resolved ○ Co-ordinate up-dated specialist reports (bushfire, engineering, biting insects and stormwater), masterplan, Iron Gates Dr ○ Draft plan of management of E2 zoned allotments and ownership arrangements in perpetuity ○ Draft plan of management for 'assisted natural regeneration' area ○ Land description incorrect, DA plans to be up-dated.	Addressed in above responses.	
• *Appendix O – Ecological Assessment – JWA Pty Ltd, September 2018* ○ As above Section 16.10, 16.11, 17.2, 17.3, 17.4 and 17.5 issues not resolved	The Ecological Assessment of Iron Gates Drive is a separate document (JWA 2019) and should be read in conjunction with this Terrestrial Flora and Fauna Assessment (as Amened April 2019).	-

Mr Malcom Scott's Comment	Response	Section
○ Co-ordinate up-dated specialist reports fauna and flora report / potential SIS ○ Land description incorrect, DA plans to be up-dated.		
18 ISSUES STATUTORY PLANNING CONTROLS		
18.1 *Environmental Protection and Biodiversity Conservation Act 1999*		
Fauna and flora / SIS assessment – insufficient information issues and considerations not resolved.	A new **Section 6.1** has been added to the report and includes an assessment against the requirements of the EPBC Act using the Principal Significant Impact Guidelines 1.1 (DEH 2006). The assessment has determined that referral to the Commonwealth for assessment under the act is not required. With the implementation of proposed mitigation and amelioration measures the proposed action is considered unlikely to result in a significant impact on any matter of NES.	**6.1**
18.2 s5A Environmental Planning and Assessment Act 1979		
Fauna and flora / SIS assessment – insufficient information issues and considerations not resolved.	Section 5A of the *Environmental Planning and Assessment Act 1979* (the '7-Part Test') is addressed in **Section 6.2.**	**6.2**
18.3 State Planning Policies		
SEPP No. 14 – Coastal Wetlands Fauna and flora / SIS assessment – insufficient information issues and considerations not resolved.	SEPP No. 14 – Coastal Wetlands is addressed in **Section 6.3.**	**6.3**
SEPP No. 44 – Koala Habitat Protection Fauna and flora / SIS assessment – insufficient information issues and considerations not resolved.	SEPP No. 44 – Koala Habitat Protection is addressed in **Section 6.5.**	**6.5**
18.4 Richmond Valley Local Environmental Plan 2012 (RVLEP 2012)		

Mr Malcom Scott's Comment	Response	Section
The following commentary seeks to identify in summary key assessments required for the DA to address the relevant provisions of the RVLEP 2012. The provisions of the RVLEP 2012 have been edited to highlight relevant clauses and those are in *italics*. *Land use zones - objectives* *Zone E2 Environmental Conservation* • *To protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values.* • *To prevent development that could destroy, damage or otherwise have an adverse effect on those values.* <u>Comment</u> Sections of the internal road system encroach into the E2 zone adjoining the Evans River. The DA is not consistent with the objectives of the zone. Whilst ancillary to the subdivision, and roads are a permissible development (with consent) in the E2 zone, it is difficult to opine that the construction and use of an urban road protects, manages and restores areas of high ecological, scientific, cultural or aesthetic values. The implications of the issuing of a 'biobanking statement' needs to be clarified in regard road in the E2 zone.	All direct and indirect impacts of the proposed development have been discussed in **Section 7.0** of the report and offsets proposed (**Section 8.4**) for any residual impacts.	**7.0, 8.4**
Land use zones - objectives *Zone E3 Environmental Management*	All direct and indirect impacts of the proposed development have been discussed in **Section 7.0** of the	**7.0, 8.4**

Mr Malcom Scott's Comment	Response	Section
• *To protect, manage and restore areas with special ecological, scientific, cultural or aesthetic values.* • *To provide a limited range of development that does not have an adverse effect on those values.* <u>Comment</u> Sections of the internal road system encroach into the E3 zone to the west of the SW residential area. The DA is not consistent with the objectives of the zone. Whilst ancillary to the subdivision, and roads are a permissible development (with consent) in the E3 zone, it is difficult to opine that the construction and use of an urban road protects, manages and restores areas of high ecological, scientific, cultural or aesthetic values and does not have an adverse impact, particularly when it is intended to excavate approx. 6.5m – 7m within parts of the road reserve between Lot 276 DP 755624 and Lot 277 DP 755624. There will be considerable earthworks in the zone for the western and northern perimeter roads of the SW residential area. The implications of the issuing of a 'biobanking statement' needs to be clarified in regard road in the E3 zone.	report and offsets proposed (**Section 8.4**) for any residual impacts.	
Land use zones - objectives *Zone W1 Natural Waterways* • *To protect the ecological and scenic values of natural waterways.*	There will be no encroachment into the riparian zone and associated fish habitat of the Evans River.	**5.7.1, 5.7.2, 8.2.4**

Mr Malcom Scott's Comment	Response	Section
• *To prevent development that would have an adverse effect on the natural values of waterways in this zone.* • *To provide for sustainable fishing industries and recreational fishing.* <u>Comment</u> The engineering stormwater assessment and detailed investigation of the riparian zone and fishery habitat should demonstrate that the DA will be consistent with the objectives of the zone. It is critical that the management of potential acid sulfate soils, groundwater and the water table, stormwater and flooding be comprehensively assessed. The DA is not consistent with the objectives of the zone.	Clause 6.6 (Terrestrial biodiversity) of the RVLEP 2012 has previously been addressed in **Section 5.7.1.** Clause 6.8 (Riparian land and watercourses) has previously been addressed in **Section 5.7.2.** Clause 6.10 (Wetlands) has also previously been addressed in **Section 5.7.2.** The proposed subdivision layout seeks to maintain the natural stormwater drainage regime across the site. Bio-retention areas, ponds and gross pollutant traps are proposed to collect and manage stormwater before leaving the site. The Engineering Impact Assessment prepared to accompany the development application includes plans and commentary regarding the proposed stormwater management strategy for the site. It is understood that further detail will form part of the future Construction Certification applications. A new **Section 8.2.4** has been added to the report and requires the preparation of a Stormwater Management Plan prior to commencement of construction to ensure that there are no indirect impacts on nearby wetlands, riparian land and waterways as a result of the proposed development.	
Development standards *5.7 Development below mean high water mark*	There will be no encroachment into the riparian zone and associated fish habitat of the Evans River.	**5.7.1, 5.7.2, 8.2.4**

Mr Malcom Scott's Comment	Response	Section
(1) The objective of this clause is to ensure appropriate environmental assessment from development carried out on land covered by tidal waters. *(2) Development consent is required to carry out development on any land below the mean high water mark of any body of water subject to tidal influence (including the bed of any such water).* <u>Comment</u> Unknown engineering stormwater drainage and investigation of the riparian zone and fishery habitat – insufficient information issues and considerations not resolved.	Clause 6.6 (Terrestrial biodiversity) of the RVLEP 2012 has previously been addressed in **Section 5.7.1.** Clause 6.8 (Riparian land and watercourses) has previously been addressed in **Section 5.7.2.** Clause 6.10 (Wetlands) has also previously been addressed in **Section 5.7.2.** The proposed subdivision layout seeks to maintain the natural stormwater drainage regime across the site. Bio-retention areas, ponds and gross pollutant traps are proposed to collect and manage stormwater before leaving the site. The Engineering Impact Assessment prepared to accompany the development application includes plans and commentary regarding the proposed stormwater management strategy for the site. It is understood that further detail will form part of the future Construction Certification applications. A new **Section 8.2.4** has been added to the report and requires the preparation of a Stormwater Management Plan prior to commencement of construction to ensure that there are no indirect impacts on nearby wetlands, riparian land and waterways as a result of the proposed development.	
Development standards *6.2 Essential services*	The Ecological Assessment of Iron Gates Drive is a separate document (JWA 2019) and should be read in	-

Mr Malcom Scott's Comment	Response	Section
Development consent must not be granted for development unless the consent authority is satisfied that any of the following services that are essential for the proposed development are available or that adequate arrangements have been made to make them available when required: *(e) suitable road access* <u>Comment</u> Legal issues, engineering assessment / traffic impact / bushfire impact / ecological impact - insufficient information issues and considerations not resolved.	conjunction with this Terrestrial Flora and Fauna Assessment (as Amened April 2019).	
Development standards *6.3 Earthworks* *(1) The objectives of this clause are as follows:* *(a) to ensure that earthworks for which development consent is required will not have a detrimental impact on environmental functions and processes, neighbouring uses, cultural or heritage items or features of the surrounding land* <u>Comment</u> Engineering and planning assessments - insufficient information issues and considerations not resolved.	All direct and indirect impacts of the proposed development have been discussed in **Section 7.0** of the report and offsets proposed (**Section 8.4**) for any residual impacts.	**7.0, 8.4**
Development standards *6.3 Earthworks* (3) Before granting development consent for earthworks, the consent authority must consider the following matters:	All direct and indirect impacts of the proposed development have been discussed in **Section 7.0** of the report and offsets proposed (**Section 8.4**) for any residual impacts.	**7.0, 8.4**

Mr Malcom Scott's Comment	Response	Section
(g) the proximity to and potential for adverse impacts on any watercourse, drinking water catchment or environmentally sensitive area. Comment Engineering, acid sulfate soils, groundwater, riparian and fishery investigations / assessment and geotechnical assessments - insufficient information issues and considerations not resolved.		
Development standards *6.6 Terrestrial biodiversity* *(1) The objective of this clause is to maintain terrestrial biodiversity by:* *(a) protecting native fauna and flora, and* *(b) protecting the ecological processes necessary for their continued existence, and* *(c) encouraging the conservation and recovery of native fauna and flora and their habitats.* Comment Engineering, bushfire, fauna and flora / SIS, riparian and fishery investigations / assessment - insufficient information issues and considerations not resolved.	Clause 6.6 (Terrestrial biodiversity) of the RVLEP 2012 has previously been addressed in **Section 5.7.1.** All direct and indirect impacts of the proposed development have been discussed in **Section 7.0** of the report and offsets proposed (**Section 8.4**) for any residual impacts**.**	**5.7.1, 7.0, 8.4**
(2) This clause applies to land identified as "Biodiversity" on the Terrestrial Biodiversity Map. Comment	Noted.	-

Mr Malcom Scott's Comment	Response	Section
Clause applies to the land.		
(3) Before determining a development application for development on land to which this clause applies, the consent authority must consider: *(a) whether the development:* *(i) is likely to have any adverse impact on the condition, ecological value and significance of the fauna and flora on the land, and* <u>Comment</u> Engineering, bushfire and fauna and flora / SIS assessment - insufficient information issues and considerations not resolved. *(ii) is likely to have any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna, and* <u>Comment</u> Engineering, bushfire and fauna and flora / SIS assessment / Koala Plan of Management - insufficient information issues and considerations not resolved. *(iii) has any potential to fragment, disturb or diminish the biodiversity structure, function and composition of the land, and*	Clause 6.6 (Terrestrial biodiversity) of the RVLEP 2012 has previously been addressed in **Section 5.7.1.** All direct and indirect impacts of the proposed development have been discussed in **Section 7.0** of the report and offsets proposed (**Section 8.4**) for any residual impacts.	**5.7.1, 7.0, 8.4**

Mr Malcom Scott's Comment	Response	Section
Comment Fauna and flora / SIS assessment / Koala Plan of Management - insufficient information issues and considerations not resolved. *(iv) is likely to have any adverse impact on the habitat elements providing connectivity on the land, and* Comment Fauna and flora / SIS assessment / Koala Plan of Management - insufficient information issues and considerations not resolved.		
(b) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development. Comment Fauna and flora / SIS assessment / Koala Plan of Management - insufficient information issues and considerations not resolved.	All proposed amelioration measures have been discussed in **Section 8.0.**	**8.0**

Mr Malcom Scott's Comment	Response	Section
(4) Development consent must not be granted for development on land to which this clause applies unless the consent authority is satisfied that: *(a) the development is designed, sited and will be managed to avoid any significant adverse impact, or* <u>Comment</u> Insufficient information considerations not resolved. *(b) if that impact cannot be reasonably avoided by adopting feasible alternatives – the development is designed, sites and will be managed to minimise that impact, or* <u>Comment</u> Insufficient information issues and considerations not resolved. *(c) if that impact cannot be minimised – the development will be managed to mitigate that impact.* <u>Comment</u> Insufficient information issues and considerations not resolved.	All direct and indirect impacts of the proposed development have been discussed in **Section 7.0** of the report and offsets proposed (**Section 8.4**) for any residual impacts.	**7.0, 8.4**
Development standards *6.8 Riparian land and watercourses* *(1) The objective of this clause is to protect and maintain the following:* *(a) water quality within watercourses,* *(b) the stability of the bed and banks of watercourses,*	The Ecological Assessment of Iron Gates Drive is a separate document (JWA 2019) and should be read in conjunction with this Terrestrial Flora and Fauna Assessment (as Amened April 2019).	-

Mr Malcom Scott's Comment	Response	Section
(c) aquatic and riparian habitats, *(d) ecological processes within watercourses and riparian areas.* Comment A mapped wetland under SEPP No. 14 occurs in part of the residual allotment. Iron Gates Dr traverses the wetland. The location of the wetland long Iron Gates Dr should be accurately determined. Engineering, bushfire and fauna and flora / SIS, riparian and fishery investigation / assessments - insufficient information issues and considerations not resolved.		
(2) This clause applies to land identified as "Key Fish Habitat" on the Riparian Land and Waterways Map. Comment Land in immediately vicinity of mapped fish habitat.	Noted.	-
(3) Before determining a development application for development on land to which this clause applies, the consent authority must consider: *(a) whether or not the development is likely to have any adverse impact on the following:* *(i) the water quality and flows within the watercourse,* Comment	Clause 6.8 (Riparian land and watercourses) has previously been addressed in **Section 5.7.2.** All direct and indirect impacts of the proposed development have been discussed in **Section 7.0** of the report and offsets proposed (**Section 8.4**) for any residual impacts.	**5.7.2, 7.0, 8.4**

Mr Malcom Scott's Comment	Response	Section
Engineering, bushfire and fauna and flora / SIS, riparian and fishery investigation / assessments - insufficient information issues and considerations not resolved. *(ii) aquatic and riparian species, habitats and ecosystems of the watercourse,* <u>Comment</u> Engineering, bushfire and fauna and flora / SIS, riparian and fishery investigation / assessments - insufficient information issues and considerations not resolved. *(iii) the stability of the bed and banks of the watercourse,* <u>Comment</u> Engineering, bushfire and fauna and flora / SIS, riparian and fishery investigation / assessments - insufficient information issues and considerations not resolved. *(iv) the free passage of fish and other aquatic organisms within or along the watercourse,* <u>Comment</u> Riparian and fishery investigation / assessments - insufficient information issues and considerations not resolved. *(v) any future rehabilitation of the watercourse and its riparian areas, and* <u>Comment</u> Riparian and fishery investigation / assessments - insufficient information issues and considerations not resolved.		

Mr Malcom Scott's Comment	Response	Section
(c) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development. Comment Engineering, bushfire, fauna and flora / SIS / Koala Plan of Management, riparian and fishery investigation / assessments - insufficient information issues and considerations not resolved.	All direct and indirect impacts of the proposed development have been discussed in **Section 7.0** of the report and offsets proposed (**Section 8.4**) for any residual impacts.	**7.0, 8.4**
(4) Development consent must not be granted for development on land to which this clause applies unless the consent authority is satisfied that: *(a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or* Comment Engineering, bushfire, fauna and flora / SIS / Koala Plan of Management, riparian and fishery investigation / assessments - insufficient information issues and considerations not resolved.	All direct and indirect impacts of the proposed development have been discussed in **Section 7.0** of the report and offsets proposed (**Section 8.4**) for any residual impacts.	**7.0, 8.4**
(b) if that impact cannot be avoided by adopting feasible alternatives—the development is designed, sited and will be managed to minimise that impact, or Comment	All proposed amelioration measures have been discussed in **Section 8.0.**	**8.0**

Mr Malcom Scott's Comment	Response	Section
Engineering, planning, bushfire, fauna and flora / SIS / Koala Plan of Management, riparian and fishery investigation / assessments - insufficient information issues and considerations not resolved.		
(c) if that impact cannot be minimised—the development will be managed to mitigate that impact. Comment Engineering, planning, bushfire, fauna and flora / SIS assessment / Koala Plan of Management, riparian and fishery investigation / assessments - insufficient information issues and considerations not resolved.	All proposed amelioration measures have been discussed in **Section 8.0.**	**8.0**
Development standards *6.10 Wetlands* *(1) The objective of this clause is to ensure that wetlands are preserved and protected from the impacts of development.* Comment Engineering, planning, bushfire, fauna and flora / SIS assessment, riparian and fishery investigation / assessments - insufficient information issues and considerations not resolved.	Clause 6.10 (Wetlands) has previously been addressed in **Section 5.7.2.** All direct and indirect impacts of the proposed development have been discussed in **Section 7.0** of the report and offsets proposed (**Section 8.4**) for any residual impacts.	**5.7.2, 7.0, 8.4**
(2) This clause applies to land identified as "Wetland" on the Wetlands Map. Comment Clause applies to the land.	Noted.	-

Mr Malcom Scott's Comment	Response	Section
(3) Before determining a development application for development on land to which this clause applies, the consent authority must consider: *(a) whether or not the development is likely to have any significant adverse impact on the following:* *(i) the condition and significance of the existing native fauna and flora on the land,* <u>Comment</u> Fauna and flora / SIS, riparian and fishery investigation / assessments - insufficient information issues and considerations not resolved. *(ii) the provision and quality of habitats on the land for indigenous and migratory species,* <u>Comment</u> Fauna and flora / SIS, riparian and fishery investigation / assessments - insufficient information issues and considerations not resolved. *(iii) the surface and groundwater characteristics of the land, including water quality, natural water flows and salinity, and* <u>Comment</u> Engineering, geotechnical, groundwater, fauna and flora / SIS, riparian and fishery investigation / assessment – insufficient information issues and considerations not resolved.	Clause 6.10 (Wetlands) has previously been addressed in **Section 5.7.2.** All direct and indirect impacts of the proposed development have been discussed in **Section 7.0** of the report and offsets proposed (**Section 8.4**) for any residual impacts.	**5.7.2, 7.0, 8.4**

Mr Malcom Scott's Comment	Response	Section
(b) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development. Comment Engineering, planning, bushfire, fauna and flora / SIS, riparian and fishery investigation / assessment – insufficient information issues and considerations not resolved.	All proposed amelioration measures have been discussed in **Section 8.0.**	**8.0**
(4) Development consent must not be granted for development on land to which this clause applies unless the consent authority is satisfied that: *(a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or'* Comment Engineering, planning, bushfire, fauna and flora / SIS, riparian and fishery investigation / assessment – insufficient information issues and considerations not resolved.	All direct and indirect impacts of the proposed development have been discussed in **Section 7.0** of the report and offsets proposed (**Section 8.4**) for any residual impacts.	**7.0, 8.4**
(b) if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or Comment Engineering, planning, bushfire, fauna and flora / SIS, riparian and fishery investigation / assessment – insufficient information issues and considerations not resolved.	All proposed amelioration measures have been discussed in **Section 8.0.**	**8.0**

Mr Malcom Scott's Comment	Response	Section
18.5 Richmond Valley Development Control Plan 2012 (RVDCP 2012)		
The following provides summary comments in regard the relevant parts of the RVDCP 2018.	Noted.	-
Part G – Subdivisions		
Neither the DA nor the 2 amendments to it provide the required detail site analysis plan to identify land constraints / limitations and opportunities.	Various ecological maps are provided in the report including overlays/impact plans.	-
The road design of the subdivision does not sufficiently account for the proposed modifications of landform, potential Koala habitat, acid sulfate soils or bushfire hazard.	The road design of the proposed development will not impact on any areas currently occupied by Koalas (**Attachment 4**).	**Attachment 4**
The subdivision design has not been designed to minimise impacts on the natural environment and retention of significant landscape features.	On the contrary, the vast majority of significant vegetation and habitat areas are proposed to be retained, enhanced and, in the case of the Littoral rainforest EEC – protected in perpetuity, as part of the proposed development. In total, 92% of the land to be impacted is comprised of either disturbed/cleared areas or regrowth vegetation.	-
Part H – Environmental Sensitivity and Hazards		
The DA does not demonstrate that it reasonably complies with the requirements and recommendations of Part H relating to: • natural resources in regard to native vegetation, key fish habitat, habitat corridors and wetlands.	All direct and indirect impacts of the proposed development have been discussed in **Section 7.0** of the report and offsets proposed (**Section 8.4**) for any residual impacts.	**7.0, 8.4**
18.7 s.79C DA Evaluation Environmental Planning and Assessment Act		
The following provides summary evaluation comments in regard the DA and s.4.15 (identified in *italics*).	All direct and indirect impacts of the proposed development have been discussed in **Section 7.0** of the report and offsets proposed (**Section 8.4**) for any residual impacts.	**7.0, 8.4**

Mr Malcom Scott's Comment	Response	Section
(1) Matters for consideration – general in determining a development application, a consent authority is to take into consideration such of the following mattes as are of relevance to the development the subject of the development application: *(a) the provisions of:* *(iv) the regulations (to the extent that they prescribe matters for the purposes of this paragraph),* <u>Comment</u> *NSW Government Coastal Policy 1997* The DA was lodged prior to the commencement of *SEPP – Coastal Management 2018* and as a consequence of the savings provisions of cl. 21 is still subject to the provisions of *SEPP No. 71*. I have assumed that the NSW Coastal Policy still applies to the land, though I cannot find a document that specifically repeals it, it may not apply. RVC has advised it understands that *Coastal Management Act 2016* repeals the Policy, though in 2014 when the DA was lodged cl. 92 of the Environmental Planning and Assessment Regulation 2000 required consideration of it. The following (in *italics*) identifies and comments on the strategic actions of the Policy that are relevant to control of development in the coastal zone. *Natural Environment* *Clause 1.2.5 Threatened species*		

Mr Malcom Scott's Comment	Response	Section
Fauna and flora / SIS, riparian and fishery investigation / assessments – insufficient information issues and considerations not resolved – NSW OE&H advice that surveys show that threatened species exist on the land. *Clause 1.2.7 Threatening processes* Fauna and flora / SIS, riparian and fishery investigation / assessments – insufficient information issues and considerations not resolved. *Nature Processes and climate change* *Clause 2.1.3 Physical and ecological processes* Fauna and flora / SIS, riparian and fishery investigation / assessments and engineering, stormwater and flooding assessments – insufficient information issues and considerations not resolved. *Cultural heritage* *Clause 4.2.3 Aboriginal heritage* DA description of development, DA notification, Aboriginal cultural heritage assessment and consultation, AHIP, and investigation of the riparian zone and fishery habitat - insufficient information issues and considerations not resolved. *(b) the likely impacts of that development, including environmental impacts on both the natural and built*		

Mr Malcom Scott's Comment	Response	Section
environments, and social and economic impacts in the locality, Comment Having regard to the information supplied with the DA in my opinion the development DA is likely to have an adverse impact on the natural environment. I am particularly concerned about potential for adverse direct and indirect impacts on threatened species within and adjoining the land. *(c) the suitability of the site for the development,* Comment Having regard to the information supplied with the DA, in my opinion the site is not suitable for the proposed development. I am particularly concerned about the provision for bushfire protection and safety having regard the bushfire threat assessments undertaken for the DA to-date, the type of vegetation and its fuel loading with the land, on immediately adjoining land and in the locality and what asset protection zones are currently provided at the perimeter of Evans Head.		
18.8 Ecologically sustainable development Protection of the Environment Administration Act 1991		
The following provides summary evaluation comments in regard the DA and the principles of ecological sustainable development established by the objectives of the *Environmental Planning and Assessment Act 1979* and defined	All direct and indirect impacts of the proposed development have been discussed in **Section 7.0** of the report. The vast majority of significant vegetation and habitat areas are proposed to be retained, enhanced and,	**7.0, 8.4**

Mr Malcom Scott's Comment	Response	Section
by the *Protection of the Environment Administration Act 1991* (identified in *italics*). *(2) For the purposes of subsection (1) (a), ecologically sustainable development requires the effective integration of social, economic and environmental considerations in decision-making processes. Ecologically sustainable development can be achieved through the implementation of the following principles and programs:* *(b) inter-generational equity – namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,* <u>Comment</u> The DA does not demonstrate that the environment of the land will be maintained and enhanced for the benefit of future generations. *(c) conservation of biological diversity and ecological integrity – namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,* <u>Comment</u> The DA proposes significant and irreversible damage to the environment of the land and has the potential to have direct	in the case of the Littoral rainforest EEC – protected in perpetuity, as part of the proposed development. In total, 92% of the land to be impacted is comprised of either disturbed/cleared areas or regrowth vegetation. Offsets are proposed (**Section 8.4**) for any residual impacts.	

Mr Malcom Scott's Comment	Response	Section
and indirect impact on the biodiversity of threatened species and their habitats.		
19 CONCLUSION		
Is should be determined also whether or not a Species Impact Statement and Koala Plan of Management should be prepared for the DA and whether or not the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* applies to the proposed development.	As previously discussed in **Section 6.2** of the report, based on the results of the application of Section 5A of the *Environmental Planning and Assessment Act 1979* (the '7-Part Test') it is considered that a Species Impact Statement (SIS) is not required. As previously discussed in **Section 6.5** of the report, based on an assessment in accordance with requirements of *State Environmental Planning Policy No. 44: Koala Habitat Protection* the site does not contain core Koala habitat and a Koala Plan of Management is not required. A more recent assessment of Koala activity over the site utilising current best practice methods (**Attachment 4**) has confirmed that a resident/sedentary population is not currently present on the site and that the proposal with respect to its definition under SEPP 44 is not located within land that is core koala habitat. A new **Section 6.1** has been added to the report and includes an assessment against the requirements of the EPBC Act using the Principal Significant Impact Guidelines 1.1 (DEH 2006). The assessment has determined that referral to the Commonwealth for assessment under the Act is not required. With the implementation of proposed	**6.1, 6.2, 6.5, Attachment 4**

Mr Malcom Scott's Comment	Response	Section
	mitigation and amelioration measures the proposed action is considered unlikely to result in a significant impact on any matter of NES.	

TABLE 3 – RESPONSES TO PATRICK DWYER (FISHERIES) COMMENTS

Council Comment	Response	Section
Harming of any marine vegetation will trigger integrated development under s.205, irrespective of where it is located. Harm includes prune. I need confirmation of the tree species to be pruned in the SEPP14 to determine if this will trigger an Integrated Application.	Pruning of vegetation within the SEPP 14 wetland area is addressed within the Ecological Assessment of Iron Gates Drive (JWA 2019) - a separate document which should be read in conjunction with this Terrestrial Flora and Fauna Assessment (as Amened April 2019).	-
Oxlyean Pygmy Perch (OPP) is a threatened fish species that is present in waterways around Evans Head. An ecologist specialising in freshwater fish should evaluate the habitat value of the open drains, and assess whether there are OPP present. A Species Impact Statement would be needed if the proposal will impact upon OPP. This is not an Integrated Development process.	The presence/absence of the Oxleyan pygmy perch has previously been addressed in **Section 5.4** of the report. Survey works were completed in accordance with EPBC Act Survey Guidelines for Australia's Threatened Fishes and resulted in no Oxleyan pygmy perch being trapped. A Species Impact Statement is therefore not considered necessary.	**5.4**

ATTACHMENT 3: SUMMARY OF AMENDMENTS TO THE PLANIT (2014) REPORT

JWA PTY LTD
Ecological Consultants
ABN 56 066 448 879

REPLY TO: BALLINA OFFICE

Ref: AM/N16006/Lw2

16th April 2019

Ingles Group
PO Box 3441
Australia Fair QLD 4215

Attention: Graeme Ingles

Dear Graeme,

RE: Amended Terrestrial Flora and Fauna Assessment (Planit Consulting Pty Ltd, August 2014) – Iron Gates Development, Evans Head

I refer to your proposed Iron Gates development, Evans Head and in particular to amendments to the Subdivision Layout Plan. It is understood that Richmond Valley Council, Mr Malcolm Scott (Council's consulting Planner), and the NSW Department of Primary Industries (Fisheries) have issued information requests requiring you to prepare a consolidated revised Statement of Environmental Effects and consolidated revised Specialist Reports. In this regard, I refer to Annexure D of the original Statement of Environmental Effects which comprised a Terrestrial Flora and Fauna Assessment prepared by Planit Consulting Pty Ltd (Planit) dated August 2014.

JWA Pty Ltd (JWA) have been engaged to make amendments to the Planit (2014) report to reflect the revised layout. It is understood that Planit have given their express permission for JWA to amend the 2014 document. The following amendments have been made:

1. **Section 1.0** has been amended to include an updated description of the proposed development;
2. **Figure 1 – Site Location** has been updated to show a recent aerial photograph of the site;
3. **Figure 2 – Site Plan** has been replaced with the revised development layout;
4. **Figure 4 – Iron Gates Broad Vegetation Communities** has been amended to show the revised development layout;
5. References to records of "Swamp orchids" (*Phaius australis* or *P. tankervilliae*) have been removed from **Section 3.1**, **Section 5.2**, **Section 6.0, Section 6.1.1, Section 7.1** and

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Section 9.0 of the document. Recent searches for this species in the recorded locations have revealed these records to be a misidentification of the common species Christmas orchid (*Calanthe triplicata*).

6. Impact calculations in **Section 3.2.2, Section 5.7, Section 7.2** and **Section 9.0** have been amended to reflect the revised development layout.
7. References to the Threatened Ecological Community (TEC) - Littoral Rainforest and Coastal Vine Thickets of Eastern Australia - as listed within schedules of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) have been added to **Section 3.3.1, Section 5.1** and **Section 6.1.**
8. As it had been almost five (5) years since the previous survey work was undertaken, the Proponent engaged JWA to complete an assessment of Koala usage of the site using current best practice methods. Details of the site surveys utilising the Regularised Grid-based Spot Assessment Technique (RG-bSAT) and the results are discussed briefly in **Section 4.1, Section 4.3.2, Section 5.3, Section 6.2.1** and **Section 6.4**. The complete assessment is provided as **Attachment 4**.
9. Additional information on the proposed stormwater treatment and management has been added to **Section 5.7.2** and a new **Section 8.2.4.**
10. A more thorough assessment of compliance with the requirements of the EPBC Act in accordance with the Significant Impact Guidelines 1.1 has been added as **Section 6.1.**
11. Additional information on local koala records have been added to the SEPP 44 assessment in **Section 6.4.**
12. A new **Section 6.6** has been added to address requirements of the *Fisheries Management Act 1994*.
13. Further discussion of the requirements of the Bushfire Report (Bushfire Risk 2019) has been added to **Section 7.2** including the addition of a new **Figure 11** showing minimum bushfire Asset Protection Zone setbacks across the site.
14. Details of proposed revegetation works to minimise visual impacts of the proposed 6.25 m high crib wall have been added to **Section 8.3.1.** Furthermore, the Iron Gates Cribb Wall Landscape Details (Planit 2016) has been included as **Attachment 5**.
15. A new **Section 8.4** has been added to address proposed biodiversity offsets in accordance with requirements of the Biodiversity Offsets Scheme (i.e. under the current *Biodiversity Conservation Act 2016*). Calculations of offset credits and relevant correspondence with OEH are provided as **Attachment 6**. Evidence of the NSW Office of Environment and Heritage (OEH) acceptance of the proposed Biodiversity Offset Package is provided as **Attachment 7**.
16. The Summary and Conclusions of the report (**Section 9.0**) have been updated to include discussion of the recent assessment of Koala usage of the site, the assessment against the requirements of the EPBC Act using the Principal Significant Impact Guidelines 1.1, the proposed biodiversity offset package, and the assessment against the requirements of the *Fisheries Management Act 1994*.
17. **Attachment 1** includes revised development layout plans.

18. **Attachment 2** has been added and includes responses to information requests from Richmond Valley Council, Mr Malcolm Scott (Council's consulting Planner), and the NSW Department of Primary Industries (Fisheries).
19. Minor grammatical errors/spelling mistakes have been corrected throughout the document.

Please do not hesitate to contact me if you require any further clarification with regards to the above advice.

Yours faithfully,
JWA Pty Ltd

Adam McArthur
Director / Principal Ecologist

ATTACHMENT 4: KOALA ASSESSMENT UTILISING THE REGULARISED GRID-BASED SPOT ASSESSMENT TECHNIQUE (JWA 2019)

JWA PTY LTD
Ecological Consultants
ABN 56 066 448 879

KOALA ASSESSMENT UTILISING THE REGULARISED GRID-BASED SPOT ASSESSMENT TECHNIQUE (RG-bSAT)

Iron Gates Development
Evans Head

A Report Prepared for
Goldcoral Pty Ltd

APRIL 2019

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DOCUMENT CONTROL

Document

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Client Issue

Version	Date	Author		Approved by	
		Name	Initials	Name	Initials
RW2	01.04.19	Adam McArthur / Belinda Whyburn	AM / BW	Adam McArthur	AM
RW3	18.04.19	Adam McArthur / Belinda Whyburn	AM / BW	Adam McArthur	AM

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1 INTRODUCTION

JWA Pty Ltd (JWA) has been engaged by Goldcoral Pty Ltd (the Proponent) to complete an assessment of Koala usage of land proposed to be developed as the Iron Gates Estate at Iron Gates Road, Evans Head. The usage of the site by the Koala was previously the subject of assessment as part of a broader flora and fauna study completed by Planit Consulting between 20th – 25th May 2014. This study revealed:

- Koala foraging resources and associated eucalypt forest/woodland are present on site in association with the eucalypt forest in the western portion of the site; and
- Koala scratches were observed on Blue gums and Scribbly gums within this community.

As it has been almost five (5) years since the previous survey work was undertaken, the Proponent has engaged JWA to complete an assessment of Koala usage of the site using current best practice methods.

2 METHODOLOGY

2.1 Introduction

The Regularised Grid-based Spot Assessment Technique (RG-bSAT) (Phillips and Hopkins 2007, Allen *et al*. 2010, Tweed Shire Council 2014) was utilised as the primary assessment method to determine the current levels of Koala activity/usage on the subject site. RG-bSAT is a tree-based sampling method which provides presence/absence data for koalas as well as data regarding habitat usage/preference. It is a variation of the standard Spot Assessment Technique (SAT) (Phillips and Callaghan 2011) that utilises grid intersect points to identify the centre of each SAT plot.

RG-bSAT is recognised as an appropriate technique for surveying for koala across a range of habitat types and is endorsed by the EPBC Act referral guidelines for the vulnerable koala: combined populations of Queensland, New South Wales and the Australian Capital Territory (Australian Government 2014).

Site surveys were completed on the 19th and 20th March 2019 by one (1) JWA ecologist. The following sections describe the RG-bSAT methodology in detail and how it was employed on the subject site.

2.2 Determining Appropriate Sampling Intervals

The RG-bSAT requires a grid to be superimposed over the survey area enabling the systematic yet random selection of sites to be assessed using the SAT approach. Tweed Shire Council (2014) have developed appropriate sampling intervals for assessment of Koala activity across sites (**TABLE 1**).

TABLE 1: SAMPLING INTERVALS FOR KOALA ACTIVITY ASSESSMENT (EXTRACT FROM TWEED COAST COMPREHENSIVE KOALA PLAN OF MANAGEMENT – APPENDIX E)

Area of Land Subject of Development Proposal	Sampling Interval A	Sampling Interval B
< 15 ha	150 m	75 m
15 – 50 ha	250 m	125 m
> 50 ha	350 m	175 m

Determining appropriate sampling intervals essentially involves a desktop exercise utilising GIS software and recent aerial photography whereby:

1. The subject site is overlaid with a square grid with dimensions according to "sampling interval B" specified in the **TABLE 1** above. When overlaying the grid, ensure that adjoining areas of land are included to the extent that an overlap consistent with the relevant sampling interval B has been achieved (i.e. provision is made to sample adjoining areas of habitat and so place the site into a broader koala management context).

2. The resulting grid-cell intersections are used to identify potential "A" and "B" sampling sites. A potential sampling site is any point that is located where 30 trees could theoretically be sampled within a reasonable distance. A reasonable distance is considered approximately half of the distance between sampling points (e.g. 38 m when the sampling interval is 75 m; 73 m when the sampling interval is 125 m etc.).
3. Each potential sampling site is identified with a unique number for future reference purposes.

As the development footprint covers a total area of 17.9 ha, a sampling interval A of 250 m and a sampling interval B of 125 m was applicable to the site. The sampling grid was overlaid on a recent aerial photograph in a manner that ensured an overlap onto adjoining areas of habitat consistent with the relevant sampling interval B was achieved (**FIGURE 1**).

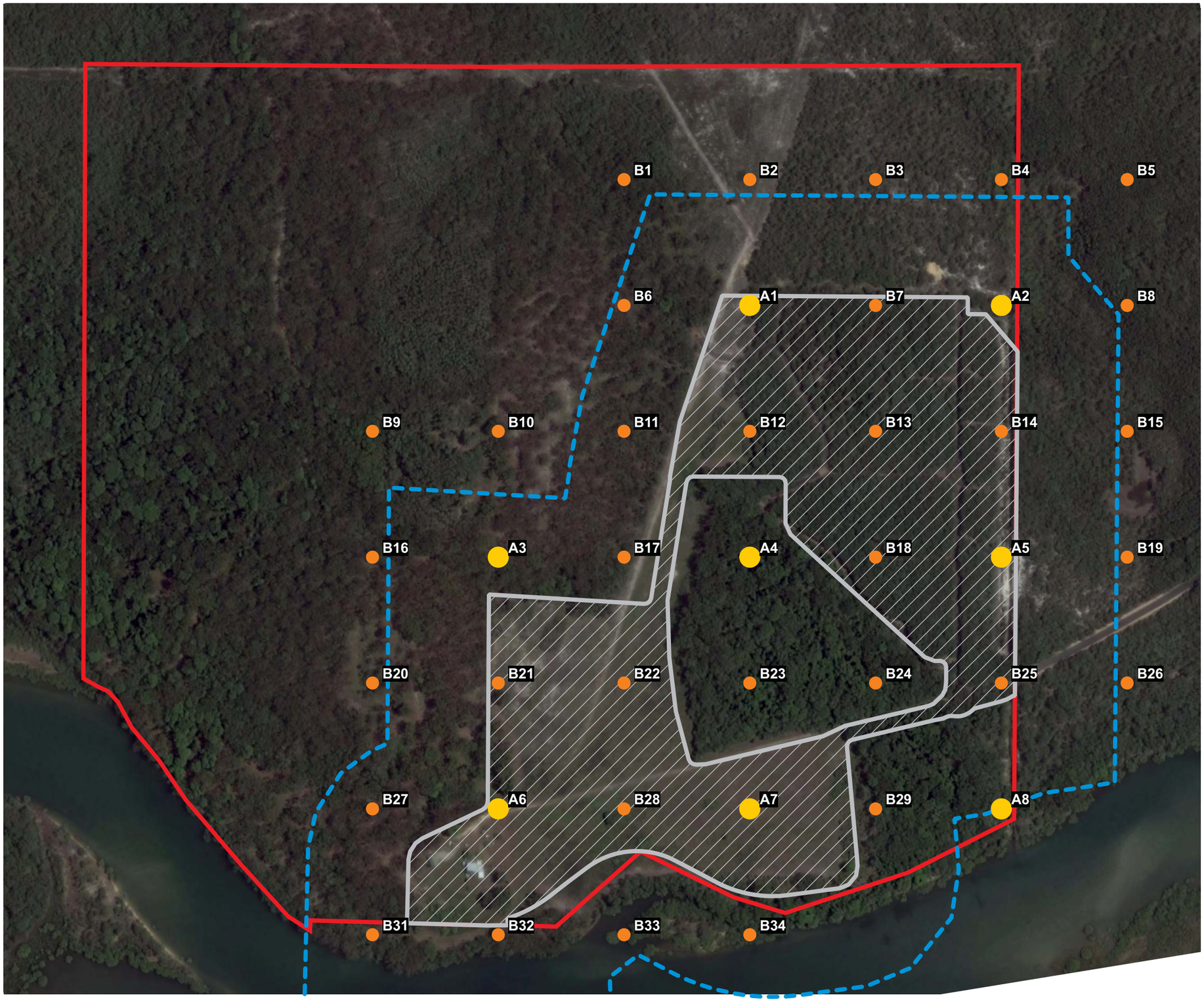
2.3 Applying the RG-bSAT

The RG-bSAT involves a radial assessment of Koala "activity" within the immediate area surrounding a SAT site. In the field, the technique is applied as follows:

1. Locate the SAT "A" site;
2. Identify and uniquely mark the thirty (30) nearest trees to the SAT site;
3. Undertake a search for Koala faecal pellets beneath each of the thirty (30) marked trees based on a cursory inspection of the undisturbed ground surface within a distance of 100 centimetres around the base of each tree, followed (if no faecal pellets are initially detected) by a more thorough inspection involving disturbance of the leaf litter and ground cover within the prescribed search area.
4. In the event that koala activity is recorded at any of the "A" sampling sites, sampling is to be undertaken at each "B" site adjacent to any "A" site in which koala activity was recorded.

For assessment purposes, a tree is defined as "a live woody stem of any plant species (excepting palms, cycads, tree ferns and grass trees) which has a diameter at breast height (dbh) of 100 mm or greater" (Phillips et al. 2000). In the case of multi-stemmed trees, at least one of the live stems must have a dbh of 100 millimetres or greater in order to qualify.

Strict adherence to the 100 cm search area is a fundamental component of the SAT methodology. It is this distance that both optimises the probability of success in terms of actually finding faecal pellets, while at the same defining a workable search area (Phillips and Callaghan, 2011). In terms of search effort, an average of approximately two (2) person minutes per tree should be dedicated to the faecal pellet search. For assessment purposes, the search should be concluded once a single faecal pellet has been detected or when the maximum search time has expired, whichever happens first. This process should be repeated until each of the 30 trees in the site has been



SOURCE: Google Earth 2017 Aerial SCALE: 1 : 4000 @ A3 JWA PTY LTD Ecological Consultants	CLIENT Ingles Group PROJECT Koala Assessment Lots 277 & 276 DP755624 & Lots 163 & 164 DP831052; 240 Iron Gates Drive, Evans Head Richmond Valley Council LGA	**FIGURE 1** PREPARED: BW DATE: 18 March 2019 FILE: N16006_SAT Grid.cdr	TITLE **KOALA SAT ANALYSIS**

assessed. Where the location of faecal pellets falls within overlapping search areas due to two (2) or more trees growing in close proximity to each other, both should be scored for pellet(s).

2.4 Calculation and Interpretation of Koala Activity Levels

The activity level for a SAT site is simply expressed as the percentage equivalent of the proportion of surveyed trees within the site that had a Koala faecal pellet recorded within the prescribed search area. For example, given a sample of 30 trees, 12 of which had one (1) or more faecal pellets recorded – the resulting activity level would be determined as 12/30 = 0.4 = 40 per cent. Phillips and Callaghan (2011) opted for a precautionary approach by proposing use of mean activity levels ± 99 per cent confidence intervals to define the limits of "normal" Koala activity. Based on the threshold values that result, three (3) categories of activity – "low", "medium (normal)" and "high" can thus be determined for each of the three (3) area/population density categories detailed in Phillips and Callaghan (2011), as indicated in **TABLE 2**.

For the purposes of this assessment, the subject site is considered to occur within the East Coast (med-high) Activity Category Area.

TABLE 2: CATEGORISATION OF KOALA ACTIVITY (EXTRACT FROM PHILLIPS AND CALLAGHAN, 2011)

Activity Category Area (Density)	Low Use	Medium (Normal) Use	High Use
East Coast (low)[1]	-	≥ 3.33% but ≤ 12.59%	>12.59%
East Coast (med–high)[2]	<22.52%	≥ 22.52% but ≤ 32.84%	>32.84%
Western Plains (med-high)	<35.84%	≥ 35.84% but ≤ 46.72%	>46.72%

[1] Pooled from South-east forests and Campbelltown data and defined as ≤ 0.1 Koalas/ha
[2] Pooled from Port Stephens and Noosa data and considered to be representative of med-high density populations of the tablelands and areas east of the Great Dividing Range.

Where the results of a SAT site return an activity level within the low use range, the level of use by the Koala is likely to be transitory. Conversely, where a given SAT site returns an activity level within the prescribed range for medium (normal) to high use - the level of use is indicative of more sedentary ranging patterns and is thus within an area of major activity (Phillips and Callaghan, 2011).

3 KOALA ACTIVITY ASSESSMENT RESULTS

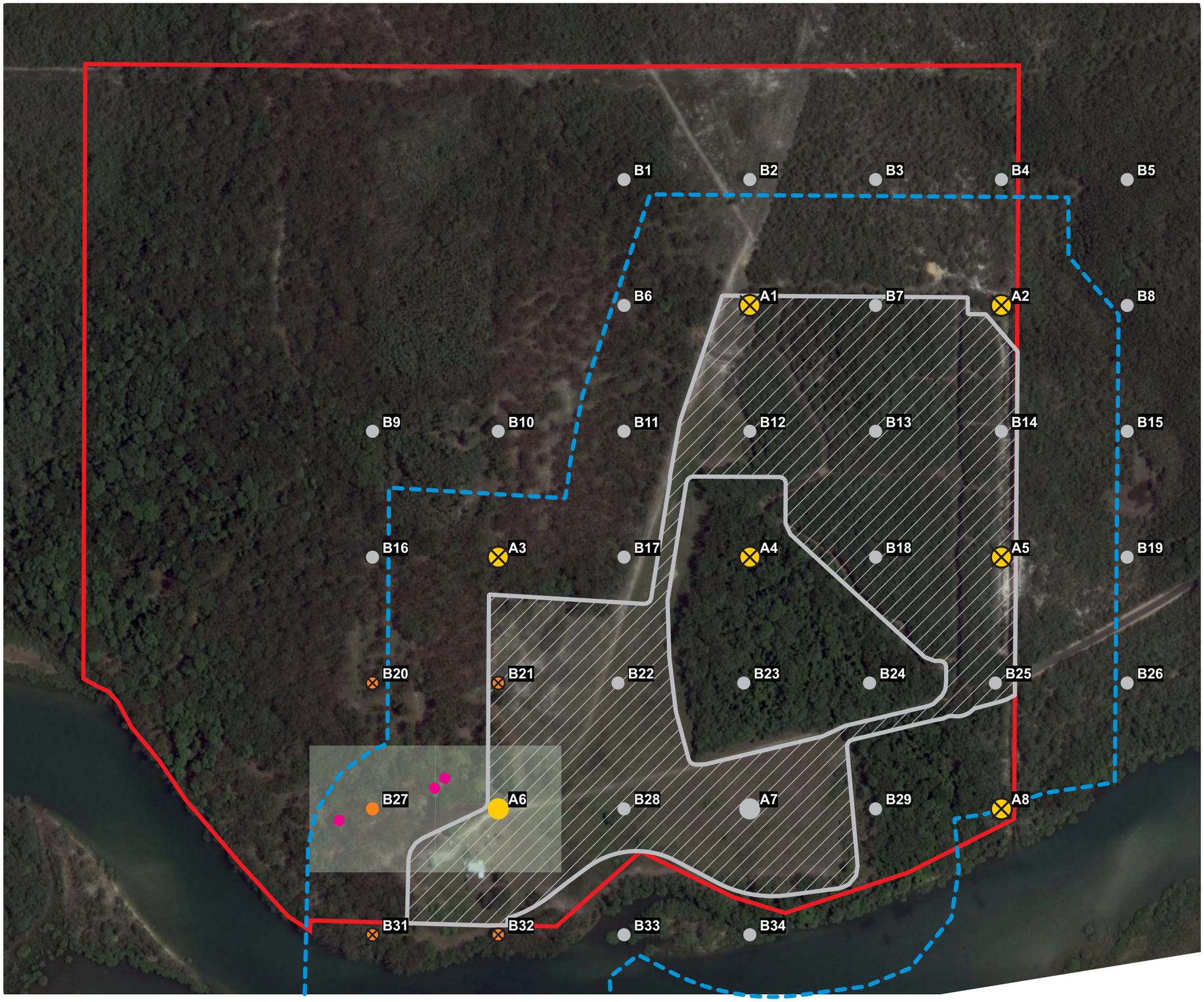
A small number of Koala faecal pellets were recorded under two (2) trees at survey site A6 and one (1) tree at survey site B27 (**FIGURE 2**). These locations occur outside of the proposed development footprint (**FIGURE 3**).

The results of the SAT at each survey site are summarized in **TABLE 3** below. Complete data sheets are provided in **APPENDIX 1.**

TABLE 3: SUMMARY OF SAT RESULTS

Survey Site	SAT Results	Usage	Notes
A1	Nil	Nil	
A2	Nil	Nil	
A3	Nil	Nil	
A4	Nil	Nil	
A5	Nil	Nil	
A6	**2/30 = 6.67%**	**Low use**	**Small number of old faecal pellets found under two (2) trees.**
A7	n/a	n/a	Not surveyed as 30 trees could not be sampled within a reasonable distance.
A8	Nil	Nil	
B1	n/a	n/a	Not required to be surveyed as no Koala activity recorded in any adjacent "A" site.
B2	n/a	n/a	
B3	n/a	n/a	
B4	n/a	n/a	
B5	n/a	n/a	
B6	n/a	n/a	
B7	n/a	n/a	
B8	n/a	n/a	
B9	n/a	n/a	
B10	n/a	n/a	
B11	n/a	n/a	
B12	n/a	n/a	
B13	n/a	n/a	
B14	n/a	n/a	
B15	n/a	n/a	
B16	n/a	n/a	
B17	n/a	n/a	
B18	n/a	n/a	
B19	n/a	n/a	
B20	Nil	Nil	
B21	Nil	Nil	
B22	n/a	n/a	Not surveyed as 30 trees could not be sampled within a reasonable distance.
B23	n/a	n/a	Not required to be surveyed as no Koala activity recorded in any adjacent "A" site.
B24	n/a	n/a	

Survey Site	SAT Results	Usage	Notes
B25	n/a	n/a	
B26	n/a	n/a	
B27	**1/30 = 3.34%**	**Low use**	**Small number of old faecal pellets found under one (1) tree.**
B28	n/a	n/a	Not surveyed as 30 trees could not be sampled within a reasonable distance.
B29	n/a	n/a	Not required to be surveyed as no Koala activity recorded in any adjacent "A" site.
B30	n/a	n/a	Removed from plan as located in Evans River
B31	Nil	Nil	
B32	Nil	Nil	
B33	n/a	n/a	Not surveyed as 30 trees could not be sampled within a reasonable distance.
B34	n/a	n/a	Not required to be surveyed as no Koala activity recorded in any adjacent "A" site.



N

LEGEND

- Surveyed SAT 'A' Sites
- Surveyed SAT 'B' Sites
- Low Usage
- GPS'd Scat Locations
- No Scats Found
- Non-surveyed SAT 'A' and 'B' Sites
- Development Footprint
- 100m Buffer to Development Footprint
- Subject Site

0 50m 100m

1 : 4000

SOURCE: JWA Site Investigations; Google Earth 2017 Aerial

SCALE: 1 : 4000 @ A3

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PROJECT
Koala Assessment
Lots 277 & 276 DP755624 & Lots 163 & 164 DP831052; 240 Iron Gates Drive, Evans Head
Richmond Valley Council LGA

FIGURE 2

PREPARED: BW
DATE: 01 April 2019
FILE: N16006_SAT Results.cdr

TITLE

KOALA SAT ANALYSIS - RESULTS

LEGEND
- GPS'd Scat Locations
- Subject Site

0 50m 100m

1 : 4000

SOURCE: JWA Site Investigations; Land Partners (Ref: 6396100H7_EXT.dwg); Google Earth 2017 Aerial
SCALE: 1 : 4000 @ A3

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PROJECT
Koala Assessment
Lots 277 & 276 DP755624 & Lots 163 & 164 DP831052; 240 Iron Gates Drive, Evans Head
Richmond Valley Council LGA

FIGURE 3

PREPARED: BW
DATE: 01 April 2019
FILE: N16006_Scat Layout.cdr

TITLE

KOALA SAT ANALYSIS - SCAT RECORDS

4 DISCUSSION

The assessment of current levels of Koala activity/usage over the site utilising the RG-bSAT has identified areas of "low" level usage outside of the proposed development footprint (i.e. adjacent to the south-western corner). As noted by Phillips and Callaghan (2011), where the results of a SAT site returns an activity level within the low use range, the level of use by the Koala is likely to be transitory.

It is also noted that none of the faecal pellets recorded were considered to be fresh (**PLATES 1 AND 2**). Fresh pellets have a strong eucalypt smell, a moist or dry shiny mucus coating, are bright green or yellow inside and are solid to the touch. Fresh pellets would suggest that a Koala may still be nearby or has been present within the last two (2) to four (4) weeks (weather depending) (Sullivan *et al*. 2004)**.** Conversely, older faecal pellets typically have a dull surface, do not have much color contrast between the surface and the inside, and feel crumbly to the touch (OWAD Environment 2017). Research has shown that pellets can be detectable for anywhere from 75 to 1,650 days depending on a variety of factors including humidity, temperature and rainfall, and that this has the potential to result in false-positive errors because faecal pellets remain present at sites that are no longer occupied (Rhodes *et al*. 2011).

Based on the results of this assessment it is considered that the south-western portion of the subject site may be utilised occasionally by Koalas as they traverse the locality. A small number of Koala faecal pellets were recorded under a total of three (3) trees outside of the proposed development footprint (**FIGURE 3**). The results indicate that a resident/sedentary population is not currently present on the site.

PLATE 1 – Faecal pellets recorded at SAT Site A6

PLATE 2 – Faecal pellet recorded at SAT Site B27

5 SUMMARY AND CONCLUSIONS

JWA were engaged by Goldcoral Pty Ltd to complete an assessment of Koala usage of land proposed to be developed as the Iron Gates Estate at Iron Gates Road, Evans Head.

The 'Regularised Grid-based Spot Assessment Technique' (RG-bSAT) was utilised as the primary assessment method. The RG-bSAT is a tree-based sampling method which provides presence/absence data for koalas as well as data regarding habitat usage/preference. RG-bSAT is recognised as an appropriate technique for surveying for koala across a range of habitat types and is endorsed by the EPBC Act referral guidelines for the vulnerable koala: combined populations of Queensland, New South Wales and the Australian Capital Territory (Australian Government 2014).

The assessment of current levels of Koala activity/usage over the site utilising the RG-bSAT has identified areas of "low" level usage outside of the proposed development footprint (i.e. adjacent to the south-western corner). A small number of Koala faecal pellets were recorded under a total of three (3) trees in this portion of the site. As noted by Phillips and Callaghan (2011), where the results of a SAT site returns an activity level within the low use range, the level of use by the Koala is likely to be transitory. It is also noted that none of the faecal pellets recorded were considered to be fresh.

Based on the results of this assessment it is considered that the south-western portion of the subject site may be utilised occasionally by Koalas as they traverse the locality. The results indicate that a resident/sedentary population is not currently present on the site.

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APPENDIX 1 – SAT DATA SHEETS

SAT SITE A1

No.	Species	Height (m)	DBH (cm)	Koala	Scats
1	*Eucalyptus planchoniana*	13	32 (x3)	x	x
2	*Eucalyptus planchoniana*	12	34	x	x
3	*Leptospermum trinervium*	5	10	x	x
4	*Acacia disparrima*	6	10	x	x
5	*Leptospermum trinervium*	4	11	x	x
6	*Leptospermum trinervium*	4	10	x	x
7	*Banksia aemula*	3	11 (x2)	x	x
8	*Leptospermum trinervium*	3	10	x	x
9	*Banksia aemula*	3	10	x	x
10	*Eucalyptus planchoniana*	9	23	x	x
11	*Banksia aemula*	3	12 (x3)	x	x
12	*Banksia aemula*	2.5	10 (x2)	x	x
13	*Leptospermum polygalifolium*	5	10	x	x
14	*Leptospermum trinervium*	4	10	x	x
15	*Melaleuca quinquenervia*	6	14	x	x
16	*Melaleuca quinquenervia*	7	11	x	x
17	*Leptospermum polygalifolium*	5	10 (x4)	x	x
18	*Leptospermum trinervium*	6.5	15	x	x
19	*Leptospermum trinervium*	5	11	x	x
20	*Leptospermum trinervium*	4.5	11	x	x
21	*Leptospermum trinervium*	5	12	x	x

SAT SITE A1					
No.	**Species**	**Height (m)**	**DBH (cm)**	**Koala**	**Scats**
22	*Leptospermum trinervium*	4	13	x	x
23	*Melaleuca quinquenervia*	8	23	x	x
24	*Melaleuca quinquenervia*	8	19	x	x
25	*Eucalyptus planchoniana*	11	28	x	x
26	*Acacia disparrima*	7	17	x	x
27	*Leptospermum trinervium*	5	12	x	x
28	*Leptospermum trinervium*	5	10 (x2)	x	x
29	*Acacia disparrima*	6	12	x	x
30	*Leptospermum polygalifolium*	5	12	x	x

SAT SITE A2

No.	Species	Height (m)	DBH (cm)	Koala	Scats
1	*Melaleuca quinquenervia*	9	22	x	x
2	*Melaleuca quinquenervia*	7	20	x	x
3	*Melaleuca quinquenervia*	6	14 (x2)	x	x
4	*Melaleuca quinquenervia*	6	10	x	x
5	*Melaleuca quinquenervia*	7	10	x	x
6	*Melaleuca quinquenervia*	9	21	x	x
7	*Melaleuca quinquenervia*	7	11	x	x
8	*Melaleuca quinquenervia*	8	11	x	x
9	*Melaleuca quinquenervia*	11	21	x	x
10	*Melaleuca quinquenervia*	14	30	x	x
11	*Melaleuca quinquenervia*	5	11	x	x
12	*Melaleuca quinquenervia*	5.5	11	x	x
13	*Melaleuca quinquenervia*	7	15	x	x
14	*Melaleuca quinquenervia*	7	14	x	x

No.	Species	Height (m)	DBH (cm)	Koala	Scats
15	*Leptospermum trinervium*	5.5	11	x	x
16	*Melaleuca quinquenervia*	8	17	x	x
17	*Melaleuca quinquenervia*	6	12 (x3)	x	x
18	*Melaleuca quinquenervia*	8	18 (x3)	x	x
19	*Melaleuca quinquenervia*	8	14	x	x
20	*Melaleuca quinquenervia*	8	18 (x2)	x	x
21	*Banksia ericifolia*	4	10	x	x
22	*Melaleuca quinquenervia*	4	10	x	x
23	*Melaleuca quinquenervia*	6.5	37	x	x
24	*Banksia ericifolia*	3	11	x	x
25	*Leptospermum trinervium*	3.5	11	x	x
26	*Acacia disparrima*	6	12	x	x
27	*Persoonia virgata*	4	14	x	x
28	*Acacia disparrima*	5	12	x	x
29	*Leptospermum trinervium*	5	10 (x3)	x	x
30	*Leptospermum trinervium*	4	10	x	x

SAT SITE A3

No.	Species	Height (m)	DBH (cm)	Koala	Scats
1	*Eucalyptus microcorys*	19	61	x	x
2	*Eucalyptus microcorys*	21	80	x	x
3	*Eucalyptus racemosa*	16	47	x	x
4	*Eucalyptus racemosa*	14	35	x	x
5	*Eucalyptus planchoniana*	15	42	x	x
6	*Eucalyptus planchoniana*	16	81	x	x
7	*Eucalyptus planchoniana*	19	71	x	x
8	*Eucalyptus racemosa*	16	40 (x2)	x	x
9	*Callistemon salignus*	4	10	x	x
10	*Eucalyptus racemosa*	15	37	x	x
11	*Eucalyptus microcorys*	18	66	x	x
12	*Acacia disparrima*	6	10	x	x
13	*Eucalyptus planchoniana*	18	52	x	x
14	*Corymbia intermedia*	8	14	x	x

No.	Species	Height (m)	DBH (cm)	Koala	Scats
15	*Eucalyptus racemosa*	19	38	x	x
16	*Corymbia intermedia*	18	32	x	x
17	*Eucalyptus racemosa*	16	31	x	x
18	*Eucalyptus racemosa*	17	51	x	x
19	*Acacia disparrima*	9	25	x	x
20	*Eucalyptus racemosa*	18	60	x	x
21	*Eucalyptus racemosa*	17	56	x	x
22	*Eucalyptus racemosa*	17	54	x	x
23	*Acacia disparrima*	6	10	x	x
24	*Acacia disparrima*	6	13	x	x
25	*Eucalyptus racemosa*	18	50	x	x
26	*Acacia disparrima*	7	11	x	x
27	*Acacia disparrima*	7	10 (x2)	x	x
28	*Acacia disparrima*	6.5	11	x	x
29	*Eucalyptus racemosa*	17	52	x	x
30	*Eucalyptus microcorys*	20	90	x	x

SAT SITE A4

No.	Species	Height (m)	DBH (cm)	Koala	Scats
1	*Eucalyptus resinifera*	23	72	x	x
2	*Lophostemon confertus*	15	28	x	x
3	*Mischocarpus pyriformis*	13	21	x	x
4	*Mischocarpus pyriformis*	9	10	x	x
5	*Mischocarpus pyriformis*	14	24 (x2)	x	x
6	*Lophostemon confertus*	16	56	x	x
7	*Eucalyptus resinifera*	25	54	x	x
8	*Lophostemon confertus*	20	45 (x2)	x	x
9	*Corymbia intermedia*	23	51	x	x
10	*Bridelia exaltata*	7	15	x	x
11	*Elaeocarpus reticulatus*	6	10	x	x
12	*Callistemon salignus*	4	10	x	x
13	*Acacia disparrima*	8	13	x	x
14	*Notelaea longifolia*	4	10	x	x

No.	Species	Height (m)	DBH (cm)	Koala	Scats
15	*Eucalyptus resinifera*	16	32	x	x
16	*Mischocarpus pyriformis*	8	14	x	x
17	*Notelaea longifolia*	6	13	x	x
18	*Corymbia intermedia*	18	24	x	x
19	*Halfordia kendack*	7	11	x	x
20	*Halfordia kendack*	6	12 (x3)	x	x
21	*Halfordia kendack*	12	17 (x2)	x	x
22	*Callistemon salignus*	10	30 (x2)	x	x
23	*Mischocarpus pyriformis*	5	10	x	x
24	*Myrsine variabillis*	6	10	x	x
25	*Acacia disparrima*	7	25	x	x
26	*Lophostemon confertus*	23	69	x	x
27	*Corymbia intermedia*	23	62	x	x
28	*Myrsine variabillis*	6	11	x	x
29	*Rhodomyrtus psidioides*	4	10	x	x
30	*Halfordia kendack*	6	11	x	x

SAT SITE A5

No.	Species	Height (m)	DBH (cm)	Koala	Scats
1	*Acacia disparrima*	5	16	x	x
2	*Acacia disparrima*	6	13	x	x
3	*Acacia disparrima*	5	12	x	x
4	*Acacia disparrima*	6	11	x	x
5	*Acacia disparrima*	6	11	x	x
6	*Acacia disparrima*	6.5	11 (x2)	x	x
7	*Acacia disparrima*	6.5	10 (x4)	x	x
8	*Leptospermum trinervium*	3	10 (x2)	x	x
9	*Acacia disparrima*	4.5	10 (x2)	x	x
10	*Acacia disparrima*	5	11	x	x
11	*Acacia disparrima*	5	10 (x2)	x	x
12	*Acacia disparrima*	5	10	x	x
13	*Acacia disparrima*	6	12 (x3)	x	x
14	*Acacia disparrima*	6	10	x	x

No.	Species	Height (m)	DBH (cm)	Koala	Scats
15	*Acacia disparrima*	6	12	x	x
16	*Acacia disparrima*	5	10 (x3)	x	x
17	*Acacia disparrima*	5	10 (x2)	x	x
18	*Acacia disparrima*	7	14	x	x
19	*Acacia disparrima*	5	10	x	x
20	*Acacia disparrima*	5	11	x	x
21	*Acacia disparrima*	6	13 (x2)	x	x
22	*Acacia disparrima*	7	14 (x2)	x	x
23	*Acacia disparrima*	5	10	x	x
24	*Acacia disparrima*	5	11	x	x
25	*Acacia disparrima*	5	10 (x2)	x	x
26	*Persoonia virgata*	5	10	x	x
27	*Acacia disparrima*	6	10 (x3)	x	x
28	*Acacia disparrima*	6	10 (x2)	x	x
29	*Acacia disparrima*	6	13	x	x
30	*Acacia disparrima*	6	10 (x2)	x	x

SAT SITE A6

No.	Species	Height (m)	DBH (cm)	Koala	Scats
1	*Eucalyptus microcorys*	16	59	x	x
2	*Eucalyptus tereticornis*	19	105 (x2)	x	x
3	*Eucalyptus tereticornis*	21	74	x	x
4	*Eucalyptus tereticornis*	14	24	x	x
5	*Eucalyptus tereticornis*	18	36	x	x
6	*Eucalyptus tereticornis*	22	50 (x2)	x	x
7	*Eucalyptus tereticornis*	17	44	x	x
8	*Eucalyptus tereticornis*	18	66	x	x
9	*Lophostemon confertus*	13	52	x	x
10	*Eucalyptus tereticornis*	23	62 (x3)	x	x
11	*Ficus watkinsiana*	14	110	x	x
12	*Corymbia intermedia*	23	51 (x2)	x	x
13	*Lophostemon confertus*	14	30	x	x
14	*Eucalyptus microcorys*	15	36	x	✓
15	*Corymbia intermedia*	20	42	x	✓
16	*Eucalyptus microcorys*	15	23 (x3)	x	x
17	*Eucalyptus tereticornis*	22	54	x	x
18	*Lophostemon confertus*	15	32 (x2)	x	x
19	*Corymbia intermedia*	21	62	x	x
20	*Lophostemon confertus*	17	56	x	x
21	*Corymbia intermedia*	16	88	x	x

No.	Species	Height (m)	DBH (cm)	Koala	Scats
22	*Eucalyptus microcorys*	15	40	x	x
23	*Lophostemon confertus*	15	46	x	x
24	*Corymbia intermedia*	20	36 (x2)	x	x
25	*Corymbia intermedia*	17	43	x	x
26	*Eucalyptus carnea*	20	67	x	x
27	*Eucalyptus carnea*	21	65	x	x
28	*Eucalyptus carnea*	21	49	x	x
29	*Eucalyptus carnea*	20	37 (x2)	x	x
30	*Lophostemon confertus*	15	130	x	x

SAT SITE A8

No.	Species	Height (m)	DBH (cm)	Koala	Scats
1	*Eucalyptus resinifera*	16	84	x	x
2	*Corymbia intermedia*	15	50	x	x
3	*Halfordia kendack*	6	10	x	x
4	*Acronychia imperforata*	7	13	x	x
5	*Petalostigma pubescens*	6.5	11	x	x
6	*Corymbia intermedia*	20	79	x	x
7	*Acacia disparrima*	9	29	x	x
8	*Petalostigma pubescens*	7	12	x	x
9	*Halfordia kendack*	8	16	x	x
10	*Petalostigma pubescens*	7	14	x	x
11	*Petalostigma pubescens*	6	14	x	x
12	*Petalostigma pubescens*	6	13	x	x
13	*Corymbia intermedia*	22	65	x	x
14	*Halfordia kendack*	12	23	x	x

No.	Species	Height (m)	DBH (cm)	Koala	Scats
15	*Acacia disparrima*	14	37	x	x
16	*Acacia disparrima*	13	26 (x3)	x	x
17	*Halfordia kendack*	12	18	x	x
18	*Halfordia kendack*	10	14	x	x
19	*Acacia disparrima*	15	27	x	x
20	*Petalostigma pubescens*	5.5	10	x	x
21	*Acacia disparrima*	13	26	x	x
22	*Endiandra sieberi*	11	23	x	x
23	*Halfordia kendack*	4	10	x	x
24	*Acronychia imperforata*	9	20	x	x
25	*Syzygium oleosum*	4.5	14	x	x
26	*Notelaea longifolia*	6	10	x	x
27	*Acronychia imperforata*	6	12	x	x
28	*Acacia disparrima*	13	38 (x2)	x	x
29	*Acacia disparrima*	13	19	x	x
30	*Elaeocarpus reticulatus*	9	25	x	x

SAT SITE B20

No.	Species	Height (m)	DBH (cm)	Koala	Scats
1	*Eucalyptus microcorys*	16	59	x	x
2	*Eucalyptus tereticornis*	19	105 (x2)	x	x
3	*Eucalyptus tereticornis*	21	74	x	x
4	*Eucalyptus tereticornis*	14	24	x	x
5	*Eucalyptus tereticornis*	18	36	x	x
6	*Eucalyptus tereticornis*	22	50 (x2)	x	x
7	*Eucalyptus tereticornis*	17	44	x	x
8	*Eucalyptus tereticornis*	18	66	x	x
9	*Lophostemon confertus*	13	52	x	x
10	*Eucalyptus tereticornis*	23	62 (x3)	x	x
11	*Ficus watkinsiana*	14	110	x	x
12	*Corymbia intermedia*	23	51 (x2)	x	x
13	*Lophostemon confertus*	14	30	x	x
14	*Eucalyptus microcorys*	15	36	x	x
15	*Corymbia intermedia*	20	42	x	x
16	*Eucalyptus microcorys*	15	23 (x3)	x	x
17	*Eucalyptus tereticornis*	22	54	x	x
18	*Lophostemon confertus*	15	32 (x2)	x	x
19	*Corymbia intermedia*	21	62	x	x
20	*Lophostemon confertus*	17	56	x	x
21	*Corymbia intermedia*	16	88	x	x

No.	Species	Height (m)	DBH (cm)	Koala	Scats
22	*Eucalyptus microcorys*	15	40	x	x
23	*Lophostemon confertus*	15	46	x	x
24	*Corymbia intermedia*	20	36 (x2)	x	x
25	*Corymbia intermedia*	17	43	x	x
26	*Eucalyptus carnea*	20	67	x	x
27	*Eucalyptus carnea*	21	65	x	x
28	*Eucalyptus carnea*	21	49	x	x
29	*Eucalyptus carnea*	20	37 (x2)	x	x
30	*Lophostemon confertus*	15	130	x	x

SAT SITE B21

No.	Species	Height (m)	DBH (cm)	Koala	Scats
1	*Eucalyptus microcorys*	17	51	x	x
2	*Eucalyptus microcorys*	14	31	x	x
3	*Eucalyptus planchoniana*	17	41	x	x
4	*Eucalyptus microcorys*	17	33	x	x
5	*Eucalyptus racemosa*	14	32 (x2)	x	x
6	*Eucalyptus racemosa*	16	56	x	x
7	*Eucalyptus racemosa*	5	11	x	x
8	*Eucalyptus racemosa*	16	42	x	x
9	*Eucalyptus racemosa*	18	51	x	x
10	*Corymbia intermedia*	13	26	x	x
11	*Eucalyptus microcorys*	17	38	x	x
12	*Eucalyptus planchoniana*	16	34 (x2)	x	x
13	*Corymbia intermedia*	19	40	x	x
14	*Eucalyptus microcorys*	18	44	x	x

No.	Species	Height (m)	DBH (cm)	Koala	Scats
15	*Eucalyptus planchoniana*	19	49	x	x
16	*Corymbia intermedia*	18	42	x	x
17	*Eucalyptus planchoniana*	16	50	x	x
18	*Eucalyptus planchoniana*	17	41	x	x
19	*Eucalyptus planchoniana*	17	39	x	x
20	*Eucalyptus planchoniana*	19	37	x	x
21	*Eucalyptus planchoniana*	20	70	x	x
22	*Corymbia intermedia*	18	41	x	x
23	*Eucalyptus microcorys*	19	44	x	x
24	*Eucalyptus planchoniana*	17	32	x	x
25	*Eucalyptus planchoniana*	16	39	x	x
26	*Eucalyptus planchoniana*	16	38	x	x
27	*Eucalyptus microcorys*	16	56	x	x
28	*Eucalyptus planchoniana*	17	34	x	x
29	*Eucalyptus planchoniana*	16	42	x	x
30	*Eucalyptus planchoniana*	15	29	x	x

SAT SITE B27

No.	Species	Height (m)	DBH (cm)	Koala	Scats
1	*Eucalyptus tereticornis*	23	71	x	x
2	*Cupaniopsis anacardiodes*	11	27	x	x
3	*Eucalyptus resinifera*	20	155	x	x
4	*Corymbia intermedia*	16	35	x	x
5	*Eucalyptus tereticornis*	19	41	x	x
6	*Eucalyptus tereticornis*	16	29 (x2)	x	x
7	*Acacia disparrima*	4	10	x	x
8	*Acacia disparrima*	5.5	11	x	x
9	*Eucalyptus tereticornis*	18	52	x	✓
10	*Acacia disparrima*	6	21	x	x
11	*Acacia disparrima*	7	15	x	x
12	*Acacia disparrima*	10	29	x	x
13	*Eucalyptus tereticornis*	22	59	x	x
14	*Eucalyptus tereticornis*	23	49	x	x

No.	Species	Height (m)	DBH (cm)	Koala	Scats
15	*Eucalyptus tereticornis*	22	40	x	x
16	*Eucalyptus tereticornis*	23	45	x	x
17	*Eucalyptus tereticornis*	19	31 (x2)	x	x
18	*Eucalyptus tereticornis*	22	52	x	x
19	*Eucalyptus tereticornis*	19	44	x	x
20	*Eucalyptus tereticornis*	19	43	x	x
21	*Eucalyptus tereticornis*	20	40	x	x
22	*Eucalyptus tereticornis*	9	25	x	x
23	*Eucalyptus tereticornis*	20	49	x	x
24	*Eucalyptus tereticornis*	19	56	x	x
25	*Corymbia intermedia*	20	52	x	x
26	*Eucalyptus resinifera*	18	68	x	x
27	*Acacia disparrima*	10	14	x	x
28	*Eucalyptus resinifera*	19	51	x	x
29	*Acacia disparrima*	9	25	x	x
30	*Eucalyptus resinifera*	17	55	x	x

SAT SITE B31

No.	Species	Height (m)	DBH (cm)	Koala	Scats
1	*Eucalyptus tereticornis*	23	61	x	x
2	*Acacia disparrima*	9	31	x	x
3	*Cupaniopsis anacardiodes*	7	25	x	x
4	*Casuarina glauca*	14	30	x	x
5	*Eucalyptus tereticornis*	24	41	x	x
6	*Casuarina glauca*	22	30	x	x
7	*Casuarina glauca*	24	46	x	x
8	*Casuarina glauca*	21	40	x	x
9	*Lophostemon suaveolens*	8	19	x	x
10	*Lophostemon suaveolens*	12	36	x	x
11	*Casuarina glauca*	15	33	x	x
12	*Euroschinus falcatus* var. *falcatus*	10	34	x	x
13	*Lophostemon suaveolens*	11	30	x	x

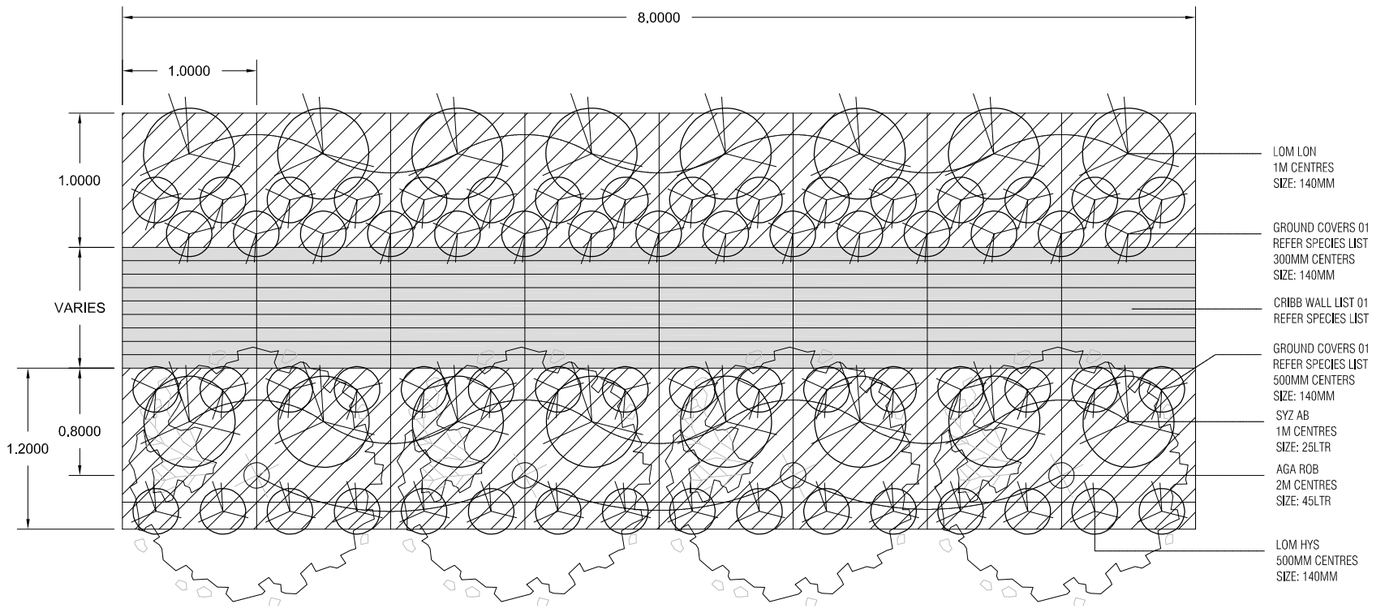
No.	Species	Height (m)	DBH (cm)	Koala	Scats
14	*Cupaniopsis anacardiodes*	6	26	x	x
15	*Lophostemon suaveolens*	7	27	x	x
16	*Cupaniopsis anacardiodes*	5	17	x	x
17	*Eucalyptus tereticornis*	20	45	x	x
18	*Corymbia intermedia*	6	13	x	x
19	*Casuarina glauca*	15	30	x	x
20	*Casuarina glauca*	16	33	x	x
21	*Lophostemon confertus*	17	45	x	x
22	*Eucalyptus tereticornis*	22	60	x	x
23	*Cupaniopsis anacardiodes*	4	11	x	x
24	*Eucalyptus tereticornis*	21	56	x	x
25	*Corymbia intermedia*	22	61	x	x
26	*Acacia disparrima*	5	14	x	x
27	*Cupaniopsis anacardiodes*	5	15	x	x
28	*Acacia disparrima*	9	23	x	x
29	*Corymbia intermedia*	22	46 (x2)	x	x
30	*Eucalyptus tereticornis*	23	71	x	x

SAT SITE B32

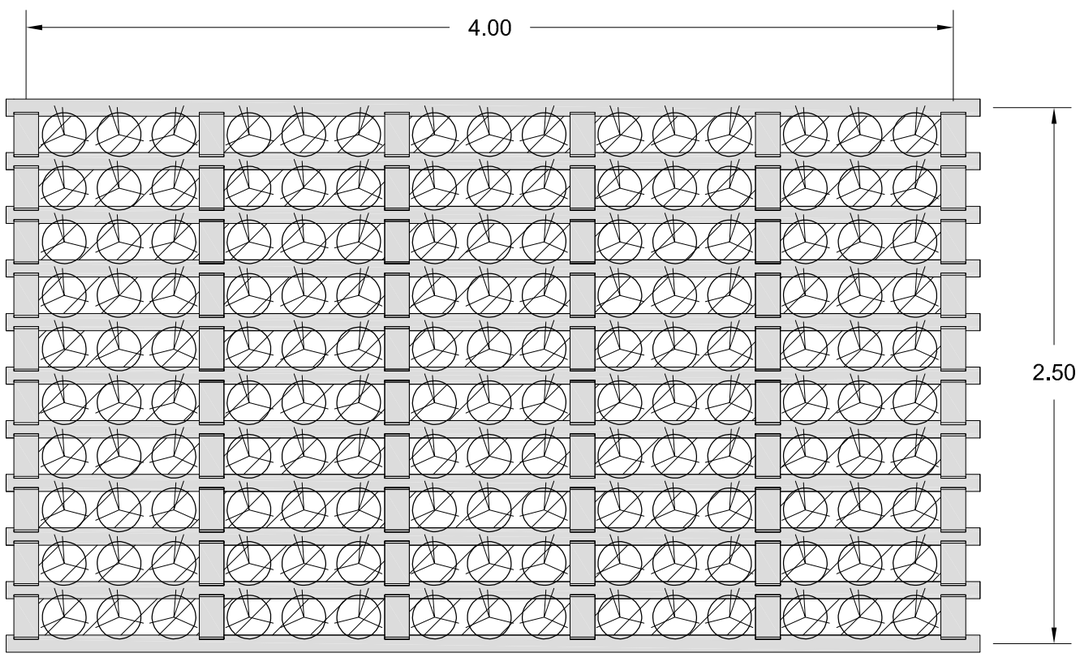
No.	Species	Height (m)	DBH (cm)	Koala	Scats
1	*Eucalyptus microcorys*	17	61	x	x
2	*Cupaniopsis anacardiodes*	6	13	x	x
3	*Eucalyptus carnea*	16	41	x	x
4	*Eucalyptus carnea*	13	37	x	x
5	*Eucalyptus microcorys*	7	16	x	x
6	*Eucalyptus microcorys*	8	20	x	x
7	*Corymbia intermedia*	16	39	x	x
8	*Eucalyptus carnea*	7	13	x	x
9	*Eucalyptus carnea*	16	40	x	x
10	*Eucalyptus carnea*	15	30	x	x
11	*Eucalyptus carnea*	15	31	x	x
12	*Eucalyptus carnea*	16	42	x	x
13	*Corymbia intermedia*	15	36	x	x
14	*Eucalyptus microcorys*	6	15	x	x

No.	Species	Height (m)	DBH (cm)	Koala	Scats
15	*Eucalyptus carnea*	12	22	x	x
16	*Eucalyptus carnea*	14	40	x	x
17	*Eucalyptus carnea*	9	17	x	x
18	*Corymbia intermedia*	13	30	x	x
19	*Eucalyptus microcorys*	15	39	x	x
20	*Eucalyptus carnea*	14	35	x	x
21	*Eucalyptus carnea*	15	36 (x2)	x	x
22	*Corymbia intermedia*	14	30	x	x
23	*Eucalyptus carnea*	13	40	x	x
24	*Eucalyptus carnea*	13	37	x	x
25	*Corymbia intermedia*	10	31	x	x
26	*Eucalyptus microcorys*	17	50	x	x
27	*Eucalyptus microcorys*	19	52	x	x
28	*Eucalyptus microcorys*	17	77	x	x
29	*Eucalyptus microcorys*	19	49	x	x
30	*Lophostemon confertus*	17	41 (x2)	x	x

ATTACHMENT 5 – IRON GATES CRIBB WALL LANDSCAPE DETAILS (PLANIT 2016)



1 PLANTING MODULE 01
PLAN VIEW REFER TO MODULE 1 PLANTING LIST THIS SHEET



2 PLANTING MODULE 02 (10M2 PER MODULE)
CRIB WALL ELEVATION VIEW REFER TO MODULE 2 PLANTING LIST THIS SHEET

1.0 SOIL CULTIVATION
CULTIVATE BY RIPPING TO THE DEPTHS SPECIFIED THIS SHEET TO LOOSEN AND AERATE GROUND. DO NOT DISTURB EXISTING SERVICES. REMOVE UNWANTED MATTER INCLUDING STONES, RUBBISH AND RUBBLE EXCEEDING 20MM IN DIAMETER AND STICKS AND WEEDS BROUGHT TO THE SURFACE DURING CULTIVATION. FINELY CULTIVATE THE SURFACE AND RAKE FREE OF CLODS.

TREE PLANTING AREAS: CULTIVATE TO THE DEPTH OF ROOT BALL PLUS A FURTHER DEPTH OF 300MM.

1.1 TOPSOIL - TREE PLANTING AREAS
IMPORTED TOPSOIL/SUPPLIMENTED SITE SOIL SHALL BE TO THE AUSTRALIAN STANDARD 4419 AND CERTIFIED FIRE ANT FREE IF REQUIRED.

1.2 COMPOST
COMPOST SHALL BE SPENT MUSHROOM COMPOST OR MILLED COW MANURE. IT SHALL HAVE A NEUTRAL PH VALUE AND BE FREE OF WEEDS, SEEDS AND DISEASE.

1.3 TOPSOIL MIXTURE
TOPSOIL MIXTURE SHALL BE A 3:1 MIX OF TOPSOIL/COMPOST.

1.4 TOPSOIL MIXTURE INSTALLATION
AS PER PLANTING DETAIL. INSTALL TOPSOIL BACKFILL TO TREE PLANTING AREAS BOTH BENEATH TO 300MM AND AROUND ROOT BALL.

2.00 PLANTING

2. 1 THE WORKS

PLANTING WORK COMPRISES:

- SUPPLY AND INSTALLATION OF ALL PLANTS AND TREES
- MULCHING OF ALL TREE PLANTING AREAS
- MULCHING OF AL GARDEN AREAS
- STAKING OF ALL TREES

2. 2 PLANTS
PLANTS SHALL BE VIGOROUS, WELL ESTABLISHED, OF GOOD FORM, NOT SOFT OR FORCED, HARDENED OFF, FREE FROM DISEASE AND PESTS WITH LARGE HEALTHY ROOT SYSTEMS AND NOT POT BOUND. THE ROOT SYSTEM SHALL BE WELL BALANCED IN RELATION TO THE SIZE OF THE PLANT.

TREES SHALL HAVE A SINGLE LEADING SHOOT.

PLANT CONTAINERS SHALL BE OF AN APPROPRIATE SIZE AND FREE FROM WEEDS. PLANTS SHALL NOT EXHIBIT SIGNS OF BEING STRESSED AT ANY STAGE DURING THEIR DEVELOPMENT DUE TO INADEQUATE WATERING, EXCESSIVE SUNLIGHT, PHYSICAL DAMAGE OR HAVE RESTRICTED GROWTH DUE TO NURSERY ROWS. NO SUBSTITUTIONS SHALL BE MADE UNLESS APPROVED BY THE LANDSCAPE ARCHITECT.

KEEP PLANTS IN GOOD CONDITION DURING STORAGE. PREVENT DRYING OUT OR DAMAGE FROM ANY CAUSE INCLUDING FROST, WIND, SUN, THEFT, VERMIN ETC.

2. 3 PLANTING

IF PLANTING IS TO BE EXECUTED DURING *COUNCIL WATER RESTRICTION PERIODS* ENSURE PLANTS CAN BE WATERED IN AT TIME OF PLANTING. DO NOT ALLOW PLANTS TO BE INSTALLED ON A DAY THEY CAN'T BE WATERED.

PLANTING TO BE EXECUTED IN ACCORDANCE WITH THE PLANTING DETAIL. DO NOT PLANT INTO DRY OR MUDDY SOIL OR IN EXTREME WEATHER CONDITIONS. ENSURE PLANT ROOT SYSTEMS ARE MOIST WHEN REMOVED FROM CONTAINER AND NOT ALLOWED TO DRY OUT AND PLANTING AREA HAS BEEN THOROUGHLY WATERED. PLANT OUT WITH MINIMUM DISTURBANCE TO ROOT BALL ENSURING FINISHED COMPACTED SOIL LEVELS COINCIDE WITH THE NATURAL SOIL LEVEL OF THE PLANT. PLANT, STAKE, TIE AND MULCH ACCORDING TO DETAIL DRAWINGS AND THEN DEEP SOAK THE WHOLE OF THE PLANTING AREA.

2.4 CULTIVATION
CULTIVATE SUBGRADE TO MIN 200MM DEPTH SUPPLY AND PLACE MIN 300MM DEPTH IMPORTED SOIL MIX TO BEDS IN GENERAL.

2.5 WATER SAVING GRANULES
SUPPLY AND IMPLEMENT FYOTGREEN HYDROCELL OR APPROVED EQUIVALENT.

ONCE THE BACK FILLING SOIL MIX HAD BEEN CREATED, MIX IN HYDROCELL OR APPROVED EQUIVALENT AT THE RATE RECOMMENDED BY MANUFACTURER AND PROCEED TO BACKFILL AROUND THE ROOT BALL.

WHEN THE PLANT IS IN ITS FINAL POSITION IN ITS HOLE THE TOP SOIL LEVEL OF THE PLANT ROOT BALL SHALL BE LEVEL WITH THE FINISHED SURFACE OF THE SOIL SURROUNDING THE HOLE, TEST THE DEPTH BY MEASURING THE SIDES OF CONTAINERS. IF BACKFILLING IS REQUIRED TO CORRECT THE DEPTH USE TOPSOIL MIX.

2. 6 PLANTING FERTILIZER

'OSMOCOTE' SUSTAINED RELEASE FERTILISER IN GRANULE FORM OR APPROVED EQUIVALENT SHALL BE ADDED TO THE TOPSOIL AS PER MANUFACTURERS DIRECTION.

2. 7 MULCHING
MULCH TO BE 'FOREST MULCH' AS DETAILED, FREE OF WEEDS, TERMITES AND OTHER FOREIGN MATTER, SPREAD MULCHES EVENLY TO A DEPTH OF 100MMTO ALL PLANTING AREAS REDUCING AROUND PLANT BASE. TAPER MULCH AT EDGES TO MAINTAIN FINISHED LEVEL WITH ADJACENT SURFACES. MULCH TO BE PINNED WITH JUTE NETTING TO ANY AREAS OVER 1:4 GRADE.

3.0 CRIB WALL
CRIB WALL PLANTING CAVITIES TO BE CULTIVATED / TOP SOILED / MULCHED AS PER TYPICAL SPECIFICATIONS 1-2. WORKS TO ENSURE ADEQUATE PLANTING MEDIA IS PROVIDED. FINISHED LEVEL OF PLANTING MEDIA TO BE SET BACK MINIMUM 100MM FROM FRONT WALL FACE

PLANTING MODULE 01

NOTE: QTYS STATED ARE PER MODULE, TOTALS TO BE DETERMINED POST DETAILED DESIGN PHASE

TREES

CODE	PLANT SPECIES	COMMON NAME	SIZE	PER MOD
AGA ROB	Agathus robusta	QLD Kauri Pine	45LTR	4

SHRUBS

CODE	PLANT SPECIES	COMMON NAME	SIZE	PER MOD
SYZ AB	Syzygium Aussie Southern	Aussie Southern	25LTR	8

GROUND COVERS

CODE	PLANT SPECIES	COMMON NAME	SIZE	PER MOD
LOM HYS	Lomandra hystrix	Creek Matrush	140MM	16
LOM LON	Lomandra longifolia	Matrush	140MM	8

GROUND COVERS 01

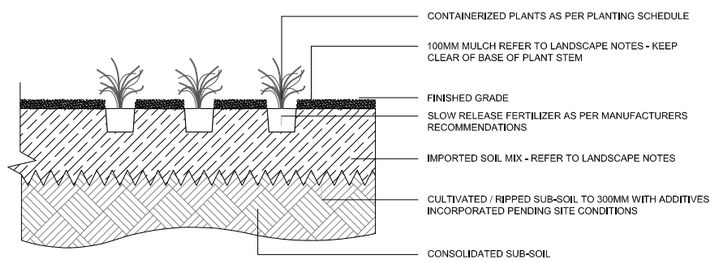
CODE	PLANT SPECIES	COMMON NAME	SIZE	PER MOD
CIS ANT	Cissus antarctica	Kangaroo Vine	140MM	4
MYO ELI	Myoporum ellipticum	Boobialla	140MM	6
CAY CLE	Cayratia clematidea	Slender Grape	140MM	4
KEN RUB	Kennedia rubicunda	Dusky Coral Pea	140MM	4
HOY AUS	Hoya australis	Wax Flower	140MM	4
PAR PRA	Pararistolochia praevenosa	Birdwing Vine	140MM	6
PAR LAH	Pararistolochia laheyana	Mountain aristolochia	140MM	6

PLANTING MODULE 02

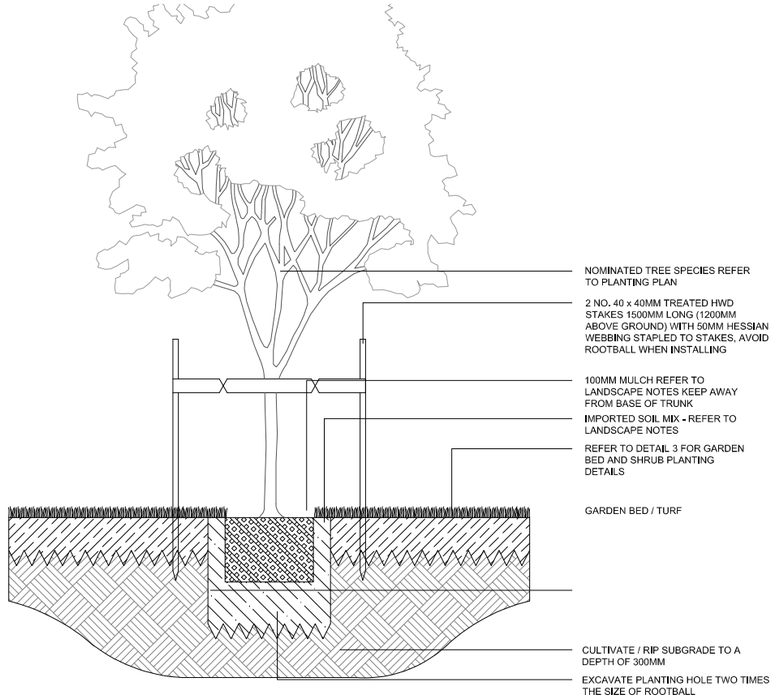
NOTE: QTYS STATED ARE PER MODULE, TOTALS TO BE DETERMINED POST DETAILED DESIGN PHASE

CRIBB WALL PLANTING LIST

CODE	PLANT SPECIES	COMMON NAME	SIZE	PER MOD
PAR PRA	Pararistolochia praevenosa	Birdwing Vine	140MM	30
CLE GLY	Clematis glycinoides	Headache Vine	140MM	10
CAY CLE	Cayratia clematidea	Slender Grape	140MM	10
PAR LAH	Pararistolochia laheyana	Mountain aristolochia	140MM	30
PAN PAN	Pandorea pandorana	Wonga Vine	140MM	10
MYO ELI	Myoporum ellipticum	Boobialla	140MM	50
SMI AUS	Smilax australis	Barbwire Vine	140MM	10



3 TYPICAL DETAIL - PLANTING



4 TYPICAL DETAIL TREE PLANTING

NAME - PROJECT TITLE
IRON GATES
CRIB WALL LANDSCAPE DETAILS

REVISIONS

NO	DATE	REVISION	BY

SCALE: NA
DATE: APRIL 2016
DESIGN: JB
CHECKED: BS
DRAWN: JB
DRAWING NO: IRONGATES_LS_01

CLIENT
GOLD CORAL PTY LTD

Level 1 2247 Gold Coast Hwy
Nobby Beach
PO Box 206 Nobby Beach QLD 4218
Telephone: 07 5526 1500
Fax: 07 5526 1502
admin@planitconsulting.com.au
PLANIT CONSULTING

NORTH

ATTACHMENT 6 – BIODIVERSITY OFFSET CALCULATIONS AND RELEVANT CORRESPONDENCE

JWA PTY LTD
Ecological Consultants
ABN 56 066 448 879

REPLY TO: BALLINA OFFICE

Ref: AM/N16006/Lw3

8th January 2018

Dimitri Young
Senior Team Leader Planning, North East Region
Regional Operations
Office of Environment and Heritage
Locked Bag 914
Coffs Harbour, NSW 2450

Dear Dimitri,

RE: Biodiversity Offsets – Iron Gates Offset Calculations

I refer to the information required as a result of the meeting with representatives from the NSW Office of Environment and Heritage (OEH), Richmond Valley Council and the NSW Department of Planning and Environment (DoPE), held in Coffs Harbour on Wednesday the 18th October 2017. As a result of this meeting we reached an in-principle agreement on the outstanding information required to support the development. In summary, further calculations and data were required in relation to proposed biodiversity offsets.

Ingles Group has requested that JWA Pty Ltd address the relevant items raised at the above-mentioned meeting. A response to each relevant item is provided below.

Rework the Biobanking calculations for the direct impact credits using the lowest possible quality heath vegetation and liaise with Krister in relation to this if necessary.

Subject to discussions with Krister, we have re-calculated the offset requirements at Iron Gates using NR152 - Coastal heath on sands of the NSW North Coast Bioregion as the relevant PCT. **TABLE 1** below provides the amended calculations and credit requirements.

A credit report is attached as requested (**Attachment 1**). The relevant calculations and data have been submitted to Krister by Matt Jenkins.

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TABLE 1
AMENDED CALCULATIONS AND CREDIT REQUIRMENTS AT IRON GATES

PCT	Direct impact (ha)	Indirect impact (ha)	Credits required
NR152	**7.53**	**-**	**187**
NR152	**-**	**0.38**	**10**
NR153	-	0.28	7
NR161	-	0.11	5
NR273	-	0.93	74
TOTAL	**7.53**	**1.70**	**283**

The required Credits for the direct impacts on the Acacia community are obviously reduced and in our opinion now represent a more reasonable quantum of offsets for the proposed removal of this low-quality regrowth vegetation.

Provide an updated plan showing polygons & calculations of areas assessed.

Refer to **Attachment 2.**

Calculate the area of land adjacent to the Evans River that is vegetated or can be revegetated

The area in hectares of the southern side of the riverfront that is vegetated or can be revegetated are shown in **TABLE 2** and **Attachment 2** (Note: the shell midden scatter cannot be revegetated, and it is assumed that the road reserve can be revegetated).

TABLE 2
AVAILABLE RIVERFRONT AREAS

Vegetation Type	Area (ha)
Available Riverfront - Vegetated	0.98
Available Riverfront - Non-vegetated	0.25
TOTAL	**1.23**

Estimate the initial revegetation costs and any other works that would be required to bring the rainforest patches up to the required standard, prior to handover to Council

- Estimated regeneration/revegetation costs = approx. $80,000.00 (includes site preparation, weeding, planting and 3 years maintenance)
- Estimated fencing costs = approx. $48,000.00 (post and rail/bollards @ $40/m installed)
- Estimated boardwalk costs = approx. $190,000.00 (1.5m wide PermaTrack modular boardwalk with cast-in-place shallow concrete footings @ approx. $455/$m^2$ installed)

TOTAL = **$318,000.00**

Estimate the ongoing annual maintenance cost for Council to maintain the rainforest patches after this initial period of time

- Ongoing vegetation maintenance = approx. $5,000.00/year
- Fence maintenance = approx. $1,000.00 - $2,000.00/year
- Boardwalk maintenance = nil (PermaTrack modular boardwalks are a nil maintenance cost precast structure with a 50-plus year design life)

TOTAL = **$6,000.00 - $7,000.00/year**

Estimate the upfront contribution that would be required under a stewardship agreement for the two rainforests

A Total Fund Deposit (TFD) of approx. **$690,000.00** would be required as an upfront contribution under a stewardship agreement (**Attachment 3**).

As a comparison, estimate the required Financial offset requirement

Financial offset requirements (using the publicly available version of the current biodiversity offset payment calculator) have been calculated as follows (**Attachment 4**):

PCT	Price Per Credit	No. of Credits	Final Credit Price
NR152	$1,681.72	197	$331,299.06
NR153	$1,681.72	7	$11,772.05
NR161	$1,681.72	5	$8,408.61
NR273	$1,681.72	74	$124,447.36
		TOTAL	**$475,927.08**

Also, estimate the likely credits created from proposed revegetation works on site

It has been estimated (via extrapolating data collected on site) that the Littoral rainforest patches to be retained in/adjacent to the development footprint offer approx. 75 offset credits.

Using the publicly available version of the BAM Calculator, it is estimated that:

- based on data collected for calculating direct impacts, the 0.41 ha of acacia regrowth proposed to be rehabilitated around the existing rainforest patches (**Attachment 2**) would provide 2 credits (Note: only Ecosystem Credits have been determined – assumed to be rehabilitated to 75% benchmark level. Refer **Attachment 5**).
- the 0.77 ha of cleared land proposed to be rehabilitated around the existing rainforest patches (**Attachment 2**) would provide 2 credits (Note: only Ecosystem Credits have been determined – assumed to be rehabilitated to 50% benchmark level. Refer **Attachment 5**).
- the 0.98 ha of vegetated land proposed to be rehabilitated along the Evans River foreshore (**Attachment 2**) would provide 6 credits (Note: only Ecosystem Credits have been determined - data entered as half Littoral rainforest benchmark amounts assumed to be rehabilitated to 75% benchmark level, and the 0.25 ha of cleared land – assumed to be rehabilitated to 50% benchmark level. Refer **Attachment 6**).

- the 0.25 ha of cleared land proposed to be rehabilitated along the Evans River foreshore (**Attachment 2**) would provide 1 credit (Note: only Ecosystem Credits have been determined – assumed to be rehabilitated to 50% benchmark level. Refer **Attachment 7**).

TOTAL Credits Created = **86 credits**

With consideration of the above information, and all previous discussions/negotiations with OEH, DoPE and Richmond Valley Council, Goldcoral Pty Ltd propose to offset direct and indirect impacts of the proposed development as follows:

1. Rehabilitation of the littoral rainforest patches and associated buffers, covering a total of 7.6 ha, and 3 years of maintenance (in accordance with an approved Management Plan) prior to handover to Council including:
    a. regeneration/revegetation as necessary, including buffers;
    b. installation of appropriate fencing (i.e. post and rail/bollards); and
    c. construction of a raised boardwalk through the northern rainforest patch.
2. Rehabilitation of approximately 1.23 ha of foreshore land and 3 years maintenance (in accordance with an approved Management Plan) prior to handover to Council.

In summary, it is proposed to offset the loss of 7.53 ha of degraded regrowth vegetation and potential indirect impacts of the proposed development by rehabilitating/revegetating a total of **8.83 ha of littoral rainforest vegetation** to a high quality, providing facilities to ensure public access is provided in a manner that will prevent degradation of this retained ecological community, and transferring the land to Council ownership for protection/management in perpetuity (subject to Council approval).

I trust that the information provided satisfies the Department's requests. Please feel free to contact me if you have any queries or require further information.

Yours faithfully,
JWA Pty Ltd

Adam McArthur
Director / Principal Ecologist

Attachment 1

BioBanking credit report

This report identifies the number and type of credits required at a DEVELOPMENT SITE.

Date of report: 15/12/2017 Time: 4:47:46PM Calculator version: v4.0

Development details

Proposal ID:	202/2017/4703D
Proposal name:	Iron Gates Evans Head 3
Proposal address:	Iron Gates Drive Evans Head NSW 2473
Proponent name:	Ingles Group
Proponent address:	Suite 1104, Level One, Southport Central Tower One Southport QLD 4215
Proponent phone:	07 55714900
Assessor name:	Matthew Jenkins
Assessor address:	PO Box 1465 Ballina NSW 2478
Assessor phone:	02 6686 3858
Assessor accreditation:	202

Improving or maintaining biodiversity

An application for a red flag determination is required for the following red flag areas

Red flag	Reason
Tuckeroo - Riberry - Yellow Tulipwood littoral rainforest of the NSW North Coast Bioregion	Vegetation type being > 70% cleared; or it contains an endangered ecological community;
Coastal mallee of the NSW North Coast Bioregion	Vegetation type being > 70% cleared; or it contains an endangered ecological community;
Forest Red Gum - Swamp Box of the Clarence Valley lowlands of the NSW North Coast Bioregion	Vegetation type being > 70% cleared; or it contains an endangered ecological community;
Coastal mallee of the NSW North Coast Bioregion	Vegetation type being > 70% cleared; or it contains an endangered ecological community;
Coastal heath on sands of the NSW North Coast Bioregion	Vegetation type being > 70% cleared; or it contains an endangered ecological community;
Coastal heath on sands of the NSW North Coast Bioregion	Vegetation type being > 70% cleared; or it contains an endangered ecological community;
Coastal heath on sands of the NSW North Coast Bioregion	Vegetation type being > 70% cleared; or it contains an endangered ecological community;

The application for a red flag determination should address the criteria set out in the BioBanking Assessment Methodology. Please note that a biobanking statement cannot be issued unless the determination is approved.

Additional information required for approval:

☐ Change to percent cleared for a vegetation type/s

☐ Use of local benchmark

☐ Change negligible loss

☐ Expert report...

☐ Request for additional gain in site value

☐ Predicted threatened species not on site

Barking Owl	Ninox connivens
Barred Cuckoo-shrike	Coracina lineata
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis subsp. gularis
Brown Treecreeper (eastern subspecies)	Climacteris picumnus subsp. victoriae
Bush Stone-curlew	Burhinus grallarius
Common Blossom-bat	Syconycteris australis
Diamond Firetail	Stagonopleura guttata
Eastern Freetail-bat	Mormopterus norfolkensis
Eastern Grass Owl	Tyto longimembris
Flame Robin	Petroica phoenicea
Glossy Black-Cockatoo	Calyptorhynchus lathami
Golden-tipped Bat	Kerivoula papuensis
Greater Broad-nosed Bat	Scoteanax rueppellii
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis subsp. temporalis
Hoary Wattled Bat	Chalinolobus nigrogriseus
Hooded Robin (south-eastern form)	Melanodryas cucullata subsp. cucullata
Little Eagle	Hieraaetus morphnoides
Little Lorikeet	Glossopsitta pusilla
Long-nosed Potoroo	Potorous tridactylus
Masked Owl	Tyto novaehollandiae
New Holland Mouse	Pseudomys novaehollandiae
Northern Free-tailed Bat	Mormopterus lumsdenae
Powerful Owl	Ninox strenua
Red-legged Pademelon	Thylogale stigmatica
Rose-crowned Fruit-dove	Ptilinopus regina
Scarlet Robin	Petroica boodang
Sooty Owl	Tyto tenebricosa
Spotted Harrier	Circus assimilis
Spotted-tailed Quoll	Dasyurus maculatus
Square-tailed Kite	Lophoictinia isura
Superb Fruit-dove	Ptilinopus superbus
Swift Parrot	Lathamus discolor
Turquoise Parrot	Neophema pulchella
Varied Sittella	Daphoenositta chrysoptera
Wompoo Fruit-dove	Ptilinopus magnificus
Yellow-bellied Glider	Petaurus australis
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris

☐ Change threatened species response to gain (Tg value)

Ecosystem credits summary

Plant Community type	Area (ha)	Credits required	Red flag
Coastal heath on sands of the NSW North Coast Bioregion	7.91	196.79	No
Coastal mallee of the NSW North Coast Bioregion	0.28	6.89	No
Forest Red Gum - Swamp Box of the Clarence Valley lowlands of the NSW North Coast Bioregion	0.11	4.89	Yes
Tuckeroo - Riberry - Yellow Tulipwood littoral rainforest of the NSW North Coast Bioregion	0.93	74.07	Yes
Total	9.23	283	

Credit profiles

1. Tuckeroo - Riberry - Yellow Tulipwood littoral rainforest of the NSW North Coast Bioregion, (NR273)

Number of ecosystem credits created 74

IBRA sub-region Clarence Lowlands

Offset options - vegetation types	Offset options - CMA sub-regions
Tuckeroo - Riberry - Yellow Tulipwood littoral rainforest of the NSW North Coast Bioregion, (NR273)	Clarence Lowlands and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

2. Forest Red Gum - Swamp Box of the Clarence Valley lowlands of the NSW North Coast Bioregion, (NR161)

Number of ecosystem credits created 5

IBRA sub-region Clarence Lowlands

Offset options - vegetation types	Offset options - CMA sub-regions
Forest Red Gum - Swamp Box of the Clarence Valley lowlands of the NSW North Coast Bioregion, (NR161) Cabbage Gum - Broad-leaved Apple open forest of the eastern escarpment, NSW North Coast Bioregion and South Eastern Queensland Bioregion, (NR145) Cabbage Gum open forest or woodland on flats of the North Coast, (NR286)	Clarence Lowlands and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

3. Coastal heath on sands of the NSW North Coast Bioregion, (NR152)

Number of ecosystem credits created 197

IBRA sub-region Clarence Lowlands

Offset options - vegetation types	Offset options - CMA sub-regions
Coastal heath on sands of the NSW North Coast Bioregion, (NR152) Bell-fruited Mallee tall heath on granite of the Gibraltar Range area of the eastern New England Tableland Bioregion, (NR108)	Clarence Lowlands and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

4. Coastal mallee of the NSW North Coast Bioregion, (NR153)

Number of ecosystem credits created 7

IBRA sub-region Clarence Lowlands

Offset options - vegetation types	Offset options - CMA sub-regions

Coastal mallee of the NSW North Coast Bioregion, (NR153) Coastal headland heaths of the NSW North Coast Bioregion, (NR151)	Clarence Lowlands and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

Species credits summary

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REPLY TO: BALLINA OFFICE

Ref: AM/N16006/Lw2

14th March 2018

Dimitri Young
Senior Team Leader Planning, North East Region
Regional Operations
Office of Environment and Heritage
Locked Bag 914
Coffs Harbour, NSW 2450

Dear Dimitri,

Re: Draft Master Plan Iron Gates - Biodiversity Offsets

I refer to the NSW Office of Environment and Heritage (OEH) letter dated 13th February 2018 in relation to the above project. In this letter it is stated that there are still two key matters which are outstanding for the OEH regarding the biodiversity offset proposal, being:

1. Accurate BioBanking calculations for the proposed biodiversity impacts; and
2. A suitable mechanism to manage and secure the rainforest areas for conservation purposes.

In the letter the OEH makes three (3) recommendations to finalise the offset package. Each of these recommendations are addressed below.

1. ***Step 2 of section 6.3 of the BBAM must be adequately addressed before ecosystem-credit species can be removed from the credit calculations. This step and revised calculations must be submitted to the OEH for review.***

The latest BBAM calculations have excluded certain ecosystem credit species after numerous discussions/negotiations with OEH as follows:

- In a letter from JWA to OEH (dated 4th September 2017) it was indicated that Goldcoral Pty Ltd was of the opinion that use of the BBAM and associated calculators were likely to result in a significantly biased and unfair offset obligation for the removal of 7.53 ha of degraded Acacia regrowth (313 credits at the time);

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- In a meeting at OEH on 18th October 2017, it was agreed that the lowest possible quality heath vegetation ecosystem (PCT) should be used and ecosystem-credit species should be removed from the calculator to assess impacts on the credit requirement;
- As agreed, the lowest possible quality heath vegetation ecosystem (PCT) was used and ecosystem-credit species were removed, and this resulted in an offset credit requirement of 187 credits. The results were conveyed to OEH in an email to Krister Waern on the 18th December 2017, and subsequently in a letter from JWA to OEH dated 8th January 2018. The letter also indicated that Goldcoral Pty Ltd were of the opinion that this more accurately and fairly represented the offset requirement for clearing 7.53 ha of degraded Acacia regrowth;
- During a subsequent telephone conversation between Adam McArthur (JWA) and Krister Waern (OEH), Krister indicated that OEH were of the opinion that 187 credits for the direct impacts of the development was not sufficient. Krister suggested that "around 230 – 240 credits" would be a more reasonable result. Krister suggested the addition of ecosystem-credit species back into the calculator to reach this amount.
- The BBAM calculator was rerun with the inclusion of Masked owl, Spotted-tail quoll, Hoary wattled bat, Spotted harrier, Grey-crowned babbler and Varied sittella. The majority of these species are not predicted to occur in PCT – NR152 and therefore resulted in no change to the offset credit calculation. The inclusion of the Spotted harrier however resulted in a credit requirement for the direct impacts of the development of 243 credits.
- OEH are now asking for Step 2 of section 6.3 of the BBAM to be "adequately addressed before ecosystem-credit species can be removed from the credit calculations".
- It is not proposed to address Step 2 of section 6.3 of the BBAM until agreement can be reached on the relevant ecosystem-credit species and resulting number of credits required. As previously noted, the BBAM is not specifically applicable to the project and the associated calculations were only intended to be used as a guideline. Once an agreement is reached on the relevant ecosystem-credit species and the resulting number of credits required, we will provide the information on Step 2 of section 6.3 of BBAM.

2. ***Appropriate mechanisms must be identified to:***
    a. ***secure the proposed vegetation management and rehabilitation works for offsetting indirect impacts on the littoral rainforest.***
    b. ***secure the ongoing management and protection of the littoral rainforest areas***

    These must be provided to the OEH for review.

The OEH correspondence advocates the use of a stewardship agreement (under the *Biodiversity Conservation Act 2016*) to secure and manage proposed offset areas, and also identifies Richmond Valley Council (RVC) taking ownership as a second option. RVC have subsequently confirmed that they are not prepared to take ownership of the proposed offset sites.

I refer to previous correspondence from Krister Waern to Mike Perkins of Richmond Valley Council (in an email dated 29th January 2018) which Krister suggested that OEH would be willing to consider alternatives (i.e. to those discussed above) for securing and ongoing management and

protection of the offset areas in perpetuity. It would be appreciated if you could identify these alternatives to allow a full assessment of all options to be completed.

3. ***The installation costs of a boardwalk within the rainforest patches must not be included as a part of the biodiversity offsets. All offsets must comply with the OEH offsetting principles. The amended offset package must be submitted to the OEH for review.***

The proposed boardwalk has now been removed from the proposal. Initial revegetation costs (~$80k) and fencing costs (~$48k) would be met by Goldcoral Pty Ltd outside of the stewardship site program and have also been removed. A revised Total Fund Deposit calculation is provided as **ATTACHMENT 1.**

In addition to the above recommendations, the OEH correspondence raises a number of points, some of which require further discussion/negotiation. Each of these additional points are discussed below.

- The OEH correspondence requests that a detailed vegetation management and rehabilitation plan be prepared for the retained rainforest. This will obviously be completed (or can be conditioned) once we reach agreement on the offset proposal.
- The OEH correspondence states that *"the current proposal appears to require further biodiversity offsets than available within the development proposal"*. Further discussion is required with regards to this point and with consideration of the following:
    - The total credit requirement (using the BBAM as a "guide") is currently 339 credits (subject to further negotiation). Goldcoral Pty Ltd are proposing to offset the loss of 7.53 ha of degraded regrowth Acacia vegetation, and potential indirect impacts of the proposed development, by rehabilitating/revegetating a total of 8.83 ha of littoral rainforest vegetation to a high quality, and other revegetation works, which will generate a total of 86 credits.
    - It would appear that the OEH correspondence suggests that the other 253 credits will need to be satisfied/retired/purchased. For your consideration, a financial offset for 253 credits would amount to approx. $425k. This would be in addition to any costs associated with proposed revegetation works on site (i.e. ~$80k revegetation costs + ~$48k fencing costs + TFD estimated at approx. $371.5k).
    - As you are aware, the Iron Gates Master Planned development does not specifically require offsets under the superseded *Threatened Species Conservation Act 1995* or the current *Biodiversity Conservation Act 2016,* and Goldcoral Pty Ltd have legal advice confirming this. However, Graeme Ingles has agreed to provide some form of reasonable offset for direct and indirect impacts of the development.
    - During initial and subsequent discussions with OEH it was suggested that as a "starting point" OEH would utilise the BBAM as "a guide" to get a "gut-feel" of what a reasonable offset would be for the proposed development. Goldcoral Pty Ltd are of the opinion that the implementation of the BBAM, and the resulting credit requirements and/or costs are unreasonable in this instance. It is hoped that further discussion/negotiation may result in an outcome agreeable to all.

In the hope of finalising all outstanding issues, I would like to request a meeting as soon as possible at a time and day convenient to you. I look forward to hearing from you.

Yours faithfully,
JWA Pty Ltd

Adam McArthur
Director / Principal Ecologist

Attachment 1

Total Fund Deposit worksheet (Part A costs)

This template should be used for estimating the Total Fund Deposit and preparation of the payment schedule

Biobank site location	Iron Gates
Biobank site owner	Ingels Group
Are you registered for GST/do you have an ABN?	Yes
ABN	
(OFFICE USE ONLY: BIMS REFERENCE NUMBER):	
(OFFICE USE ONLY: SAP BTF WBS):	

Add row for **management action cost**

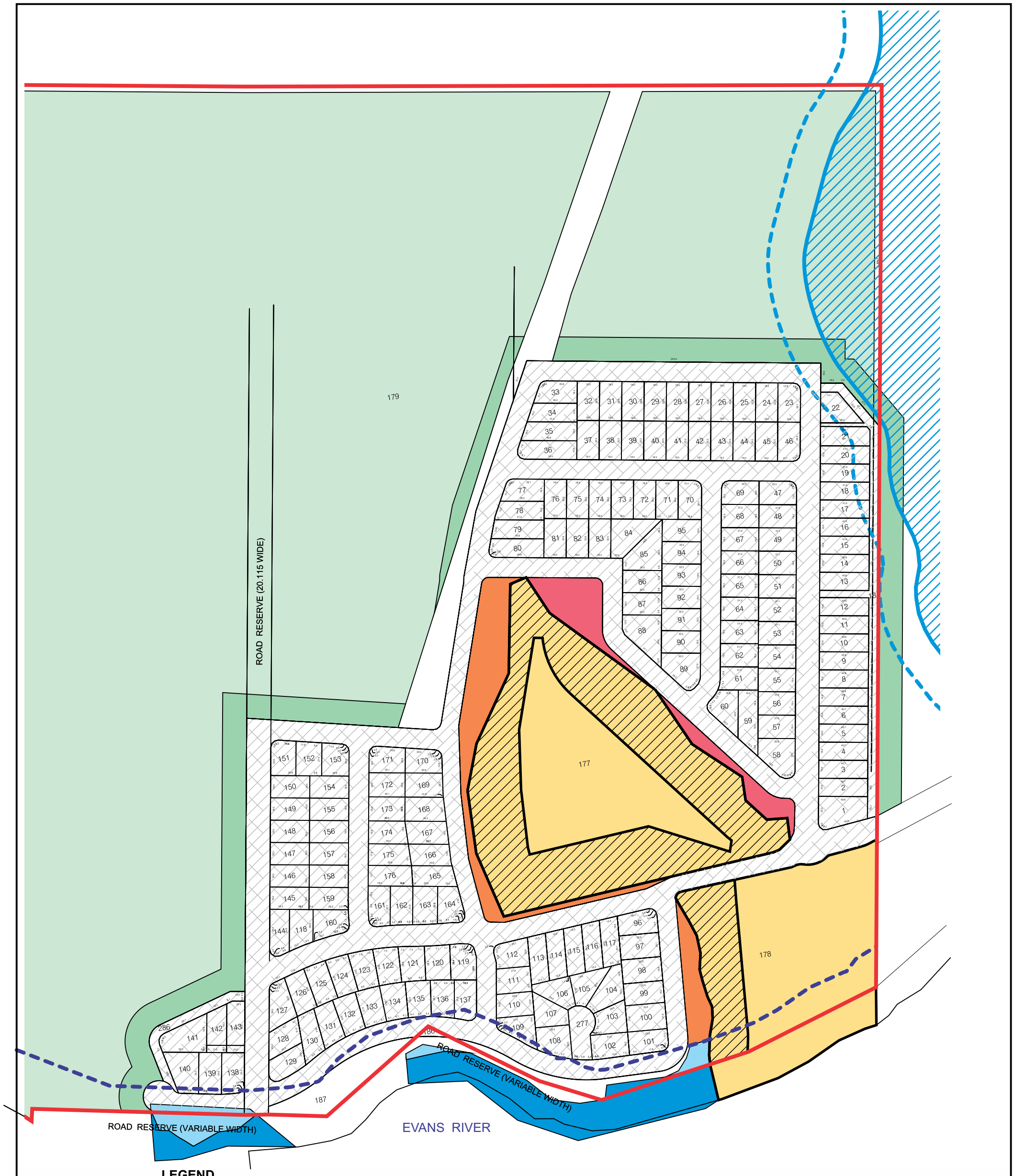
Add row for **other recurring cost**

Real discount rate
3.50%

Management action costs	Timing			Estimated annual cost ($)	Year																		Present value of payments for first 20 yrs	Present value of payments after 20 yrs	Present value of all payments
	Start year	End year	Frequency		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Weed control – ongoing	4		1	5,000	0	0	0	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	59,051	74,308	133,359
Vertebrate pest control – intensive					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vertebrate pest control – ongoing					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ecological fire management					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fence maintenance	2		1	2,000	0	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	27,420	29,723	57,143
					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other recurring costs																											
Annual reporting fee	1		1	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	16,504	16,675	33,179
Annual ecological reporting fee	1		1	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	73,549	74,308	147,857
					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Biobank site management cost in today's value					6,122	8,122	8,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122			Total Trust Fund Deposit
Present Value (PV) of the biobank site management cost					6,122	7,847	7,582	11,835	11,435	11,048	10,675	10,314	9,965	9,628	9,302	8,988	8,684	8,390	8,107	7,832	7,568	7,312	7,064	6,825	176,524	195,014	**371,538**
Discount factors					100%	97%	93%	90%	87%	84%	81%	79%	76%	73%	71%	68%	66%	64%	62%	60%	58%	56%	54%	52%			

	Year																				Present value of payments during first 20 yrs	Present value of payments after 20 yrs	Present value of all payments
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
Annual biobank site management costs in today's values	$6,122	$8,122	$8,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$176,524	$195,014	$371,538
Annual reporting fee	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$16,504	$16,675	$33,179
Total amount payable to landowner (excluding GST)	$5,000	$7,000	$7,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$160,020	$178,339	$338,359
GST payable to landowner	$500	$700	$700	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$16,002	$17,834	$33,836
Total amount payable to landowner (including GST)	$5,500	$7,700	$7,700	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$176,022	$196,173	$372,195

Attachment 2



LEGEND

Subject Site

Development footprint

Evans River

50m buffer to Evans River

Available Riverfront - Vegetated Area (0.98ha)

Available Riverfront - Non-vegetated Area (0.25ha)

Buffer Areas to be Revegetated

Acacia Regrowth (0.41ha)

Cleared Areas (0.77ha)

SEPP14 Coastal Wetlands

SEPP 14 coastal wetlands

30m buffer to SEPP 14 coastal wetlands

Littoral Rainforest

Littoral rainforest

Indirect impacts on littoral rainforest based on 50m buffer to proposed development and excluding the road west of the roundabout at the entrance to the property (3.11ha)

Other Native Vegetation

Indirect impacts on other native vegetation based on 50m buffer to Evans River, 30m buffer to other EEC's and 20m buffer to native vegetation (2.55ha)

Other native vegetation to be retained

N

0 100m

1 : 3000

SOURCE: JWA Site Investigations Dec 2016; Planit Consulting (639600E0_EXT.dwg & 2014 FFA Fig4); Google Earth 2017 Aerial

SCALE: 1 : 3000 @ A3

JWA PTY LTD
Ecological Consultants

CLIENT
Goldcoral Pty Ltd

PROJECT
Lots 277 & 276 DP755624, Lot 163 DP831052 & Part of Lot 164 DP831052
240 Iron Gates Drive, Evans Head NSW
Richmond Valley Council LGA

ATTACHMENT 2

PREPARED: BW
DATE: 23 October 2017
FILE: N16006_Buffers.cdr

TITLE

IMPACT & REVEGETATION AREAS

Attachment 3

Total Fund Deposit worksheet (Part A costs)

This template should be used for estimating the Total Fund Deposit and preparation of the payment schedule

Biobank site location	**Iron Gates**
Biobank site owner	**Ingels Group**
Are you registered for GST/do you have an ABN?	**Yes**
ABN	
(OFFICE USE ONLY: BIMS REFERENCE NUMBER):	
(OFFICE USE ONLY: SAP BTF WBS):	

Add row for **management action cost**

Add row for **other recurring cost**

Real discount rate
3.50%

Management action costs	**Timing**			**Estimated annual cost ($)**	**Year**																		**Present value of payments for first 20 yrs**	**Present value of payments after 20 yrs**	**Present value of all payments**
	Start year	**End year**	**Frequency**		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**			
Weed control – intensive	1	1	1	80,000	80,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80,000	0	80,000
Weed control – ongoing	4		1	5,000	0	0	0	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	59,051	74,308	133,359
Vertebrate pest control – intensive					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vertebrate pest control – ongoing					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ecological fire management					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boardwalk construction	1	1	1	190,000	190,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	190,000	0	190,000
Fence erection	1	1		48,000	48,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48,000	0	48,000
Fence maintenance	2		1	2,000	0	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	27,420	29,723	57,143
Other recurring costs																											
Annual reporting fee	1		1	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	16,504	16,675	33,179
Annual ecological reporting fee	1		1	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	73,549	74,308	147,857
					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Biobank site management cost in today's value					324,122	8,122	8,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122			**Total Trust Fund Deposit**
Present Value (PV) of the biobank site management cost					324,122	7,847	7,582	11,835	11,435	11,048	10,675	10,314	9,965	9,628	9,302	8,988	8,684	8,390	8,107	7,832	7,568	7,312	7,064	6,825	494,524	195,014	**689,538**
Discount factors					100%	97%	93%	90%	87%	84%	81%	79%	76%	73%	71%	68%	66%	64%	62%	60%	58%	56%	54%	52%			

	Year																				**Present value of payments during first 20 yrs**	**Present value of payments after 20 yrs**	**Present value of all payments**
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
Annual biobank site management costs in today's values	$324,122	$8,122	$8,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$494,524	$195,014	$689,538
Annual reporting fee	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$16,504	$16,675	$33,179
Total amount payable to landowner (excluding GST)	$323,000	$7,000	$7,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$478,020	$178,339	$656,359
GST payable to landowner	$32,300	$700	$700	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$47,802	$17,834	$65,636
Total amount payable to landowner (including GST)	$355,300	$7,700	$7,700	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$525,822	$196,173	$721,995

Attachment 4

Biodiversity Offset Payment Calculator

Version: 1.1.1.01
Last updated: 16/11/2017 14:0

() Credit Offset Payment Calculator () Payments ()

Message!

If you would like to meet your offset obligation by making a payment to the Biodiversity Conservation Fund, please contact the BCT team at **bct@environment.nsw.gov.au (mailto:bct@environment.nsw.gov.au)**

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

IBRA sub region	PCT common name	Baseline price per credit	Dynamic coefficient	Market coefficient	Risk premium	Administrative cost	Methodology adjustment factor	Price per credit	No. of ecosystem credits	Final credits price
Clarence Lowlands	**785 -** Coastal heath on sands of the NSW North Coast Bioregion ***Warning: This PCT has NO trades recorded***	$1,373.32	0.1972676	5.79973306	21.00%	$20.00	1.0000	$1,681.72	197	$331,299.06
Clarence Lowlands	**786 -** Coastal mallee of the NSW North Coast Bioregion ***Warning: This PCT has NO trades recorded***	$1,373.32	0.1972676	5.79973306	21.00%	$20.00	1.0000	$1,681.72	7	$11,772.05
Clarence Lowlands	**837 -** Forest Red Gum - Swamp Box of the Clarence Valley lowlands of the NSW North Coast Bioregion ***Warning: This PCT has NO trades recorded***	$1,373.32	0.1972676	5.79973306	21.00%	$20.00	1.0000	$1,681.72	5	$8,408.61
Clarence Lowlands	**1275 -** Tuckeroo - Riberry - Yellow Tulipwood littoral rainforest of the NSW North Coast Bioregion ***Warning: This PCT has NO trades recorded***	$1,373.32	0.1972676	5.79973306	21.00%	$20.00	1.0000	$1,681.72	74	$124,447.36
									Subtotal (excl. GST)	**$475,927.08**
									GST	**$47,592.71**
									Total ecosystem credits (incl. GST)	**$523,519.79**

Calculated as on: **19-12-2017 15:34:25** **Grand total** **$523,519.79**

Attachment 5

BAM Calculator

Version:1.2.0.00 () Last updated: 20/10/2017 13:00

() | 1. Assessment details () | 2. Site context () | 3. Vegetation () | 4. Habitat suitability () | 5. Habitat survey () | 6. Credits () | 7. Credit classes () | 8. Price ()

All fields marked with an asterisk (*) are mandatory

Message!

You have selected *'Stewardship (for offset sites)'* as the *'Assessment Type'* so we now have enough information to proceed to the 'Site Context'.

Assessment type *: Stewardship (for offset sites)

Proposal name: Iron Gates - Rainforest buffer

Assessment ID:

Assessment Revision: 0

NEXT

BAM Calculator

Version:1.2.0.00 () Last updated: 20/10/2017 13:00

() 1. Assessment details () 2. Site context () 3. Vegetation () 4. Habitat suitability () 5. Habitat survey () 6. Credits () 7. Credit classes () 8. Price ()

All fields marked with an asterisk (*) are mandatory

Message!

You have selected *'South Eastern Queensland'* as the *'IBRA Region'* so we now have enough information to proceed.

Interim Biogeographic Regionalisation for Australia (IBRA) *	South Eastern Queensland
IBRA Sub Region *	Clarence Lowlands
NSW Landscape	
% Native vegetation cover *	51

Landscape features

Feature *	Name *	Part of development footprint	Action

Add another landscape feature

NEXT

BAM Calculator

Version:1.2.0.00 () Last updated: 20/10/2017 13:00

1. Assessment details () | 2. Site context () | 3. Vegetation () | 4. Habitat suitability () | 5. Habitat survey () | 6. Credits () | 7. Credit classes () | 8. Price ()

All fields marked with an asterisk (*) are mandatory

Plant community types (PCT) & ecological communities

Delete	Formation *	Class *	Plant community type *	PCT % cleared	Associated TEC *	Listing status	Action
✖	Rainforests	Littoral Rainforests	1275 - Tuckeroo - Riberry - Yellow Tulipwood littoral rainforest of the NSW North Coast Bioregion	90	Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion	Endangered Ecological Community	ADD VEG ZONE Modify default benchmarks

ADD ANOTHER PCT | SEARCH PCT OUTSIDE IBRA

IMPORT SITE

Vegetation zones (Current vegetation integrity score)

Delete	Import	Number	PCT code	Condition class *	Patch Size *	Vegetation zone name	Area (ha) *	High risk lands	Location	Composition condition score	Structure condition score	Function condition score	Current vegetation integrity score
✖		1	1275	Acacia_Regrowth	10	1275_Acacia_Regrowth	0.41			33.2	59.9	37.6	42.1
✖		2	1275	Cleared	10	1275_Cleared	0.77			13.7	6.5	15.6	11.1

Vegetation zones (Future vegetation integrity score, without management)

Number	PCT code	Condition class	Patch Size	Vegetation zone name	Area (ha)	Composition condition score	Structure condition score	Function condition score	Vegetation integrity score	Change in vegetation integrity score
1	1275	Acacia_Regrowth	10	1275_Acacia_Regrowth	0.41	32.5	59.4	37.6	41.7	-0.4
2	1275	Cleared	10	1275_Cleared	0.77	13.3	6.2	15.6	10.9	-0.3

Vegetation zones (Future vegetation integrity score, with management)

Number	PCT code	Condition class	Patch Size	Vegetation zone name	Area (ha)	Composition condition score	Structure condition score	Function condition score	Vegetation integrity score	Security Benefit Score	Change in vegetation integrity score
1	1275	Acacia_Regrowth	10	1275_Acacia_Regrowth	0.41	63.6	88.2	45.5	63.4	0	21.7
2	1275	Cleared	10	1275_Cleared	0.77	23.6	18.1	23	21.5	0	10.6

CLEAR NEXT

BAM Calculator

Version:1.2.0.00 () Last updated: 20/10/2017 13:00

() 1. Assessment details () 2. Site context () 3. Vegetation () 4. Habitat suitability () 5. Habitat survey () 6. Credits () 7. Credit classes () 8. Price ()

Predicted threatened species (Ecosystem credits)

Species	Habitat constraints	Geographic limitations	Veg Zone - Confirmed predicted species *		Sensitivity to gain class	NSW listing status	National listing status. ()
Amaurornis moluccana (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10042) Pale-vented Bush-hen	*1275_Acacia_Regrowth* Waterbodies Dense vegetation, within 300m of, or in shallows of streams or other natural or artificial wetlands *1275_Cleared* Waterbodies Dense vegetation, within 300m of, or in shallows of streams or other natural or artificial wetlands	--	1275_Acacia_Regrowt 1275_Cleared	No No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Coracina lineata (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10176) Barred Cuckoo-shrike	--	--	1275_Acacia_Regrowt 1275_Cleared	No No	Moderate Sensitivity to Potential Gain	Vulnerable	Not Listed
Dasyurus maculatus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10207) Spotted-tailed Quoll	--	--	1275_Acacia_Regrowt 1275_Cleared	No No	High Sensitivity to Potential Gain	Vulnerable	Endangered
Kerivoula papuensis (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10444) Golden-tipped Bat	--	--	1275_Acacia_Regrowt 1275_Cleared	No No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Miniopterus australis (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10533) Little Bentwing-bat (Foraging)	--	--	1275_Acacia_Regrowt 1275_Cleared	No No	High Sensitivity to Potential Gain	Vulnerable	Not Listed

Species	Habitat constraints	Geographic limitations	Veg Zone - Confirmed predicted species *		Sensitivity to gain class	NSW listing status	National listing status. ()
Mormopterus lumsdenae (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10543) Northern Free-tailed Bat	--	--	1275_Acacia_Regrowt 1275_Cleared	No No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Miniopterus schreibersii oceanensis (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10534) Eastern Bentwing-bat (Foraging)	--	--	1275_Acacia_Regrowt 1275_Cleared	No No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Ptilinopus superbus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10709) Superb Fruit-Dove	--	--	1275_Acacia_Regrowt 1275_Cleared	No No	Moderate Sensitivity to Potential Gain	Vulnerable	Not Listed
Saccolaimus flaviventris (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10741) Yellow-bellied Sheathtail-bat	--	--	1275_Acacia_Regrowt 1275_Cleared	No No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Scoteanax rueppellii (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10748) Greater Broad-nosed Bat	--	--	1275_Acacia_Regrowt 1275_Cleared	No No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Syconycteris australis (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10785) Common Blossom-bat	--	--	1275_Acacia_Regrowt 1275_Cleared	No No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Thylogale stigmatica (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10805) Red-legged Pademelon	--	--	1275_Acacia_Regrowt 1275_Cleared	No No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Mormopterus norfolkensis (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10544) Eastern Freetail-bat	--	--	1275_Acacia_Regrowt 1275_Cleared	No No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Ninox strenua (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10562) Powerful Owl (Foraging)	--	--	1275_Acacia_Regrowt 1275_Cleared	No No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Nyctophilus bifax (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10567) Eastern Long-eared Bat	--	--	1275_Acacia_Regrowt 1275_Cleared	No No	High Sensitivity to Potential Gain	Vulnerable	Not Listed

Species	Habitat constraints	Geographic limitations	Veg Zone - Confirmed predicted species *	Sensitivity to gain class	NSW listing status	National listing status. ()
Pandion cristatus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10585) Eastern Osprey (Foraging)	--	--	1275_Acacia_Regrowt No 1275_Cleared No	Moderate Sensitivity to Potential Gain	Vulnerable	Not Listed
Potorous tridactylus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10662) Long-nosed Potoroo	*1275_Acacia_Regrowth* Other Dense shrub layer or alternatively high canopy cover exceeding 70% (i.e. to capture populations inhabiting wet sclerophyll and rainforest)) *1275_Cleared* Other Dense shrub layer or alternatively high canopy cover exceeding 70% (i.e. to capture populations inhabiting wet sclerophyll and rainforest))	--	1275_Acacia_Regrowt No 1275_Cleared No	High Sensitivity to Potential Gain	Vulnerable	Vulnerable
Pteropus poliocephalus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10697) Grey-headed Flying-fox (Foraging)	--	--	1275_Acacia_Regrowt No 1275_Cleared No	High Sensitivity to Potential Gain	Vulnerable	Vulnerable
Ptilinopus magnificus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10707) Wompoo Fruit-Dove	--	--	1275_Acacia_Regrowt No 1275_Cleared No	Moderate Sensitivity to Potential Gain	Vulnerable	Not Listed
Ptilinopus regina (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10708) Rose-crowned Fruit-Dove	--	--	1275_Acacia_Regrowt No 1275_Cleared No	Moderate Sensitivity to Potential Gain	Vulnerable	Not Listed
Haliaeetus leucogaster (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20322) White-bellied Sea-Eagle (Foraging)	--	--	1275_Acacia_Regrowt No 1275_Cleared No	High Sensitivity to Potential Gain	Vulnerable	Not Listed

SEARCH PREDICTED SPECIES

Candidate threatened species (Species credits)

Species	Habitat constraints	Geographic limitations	Confirmed candidate species	Sensitivity to gain class	NSW listing status	National listing status. ()
Acalypha eremorum (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10029) Acalypha	--	--	No	High Sensitivity to Potential Gain	Endangered	Not Listed
Acronychia littoralis (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10030) Scented Acronychia	--	within 5 km of coast	No	High Sensitivity to Potential Gain	Endangered	Endangered
Archidendron hendersonii (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10062) White Lace Flower	--	--	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Argynnis hyperbius (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10064) Laced Fritillary	N/A|Other - Arrowhead Violet (Viola betonicifolia))	within 15 km of the coast	No	High Sensitivity to Potential Gain	Endangered	Critically Endangered
Arthraxon hispidus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10066) Hairy Jointgrass	--	--	No	High Sensitivity to Potential Gain	Vulnerable	Vulnerable
Belvisia mucronata (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10090) Needle-leaf Fern	--	--	No	Moderate Sensitivity to Potential Gain	Endangered	Not Listed
Cercartetus nanus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10155) Eastern Pygmy-possum	--	--	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Clematis fawcettii (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10169) Northern Clematis	--	--	No	N/A	Vulnerable	Vulnerable

Species	Habitat constraints	Geographic limitations	Confirmed candidate species	Sensitivity to gain class	NSW listing status	National listing status. ()
Cryptocarya foetida (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10186) Stinking Cryptocarya	--	within 30 km of coast	No	Moderate Sensitivity to Potential Gain	Vulnerable	Vulnerable
Cynanchum elegans (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10196) White-flowered Wax Plant	--	--	No	High Sensitivity to Potential Gain	Endangered	Endangered
Davidsonia jerseyana (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10208) Davidson's Plum	--	north of Ballina	No	High Sensitivity to Potential Gain	Endangered	Endangered
Davidsonia johnsonii (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10209) Smooth Davidson's Plum	--	north of Lennox Head	No	Very High Sensitivity to Potential Gain	Endangered	Endangered
Dendrobium melaleucaphilum (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10213) Spider orchid	--	--	No	High Sensitivity to Potential Gain	Endangered	Not Listed
Desmodium acanthocladum (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10218) Thorny Pea	--	--	No	High Sensitivity to Potential Gain	Vulnerable	Vulnerable
Diploglottis campbellii (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10231) Small-leaved Tamarind	--	north of Ballina	No	High Sensitivity to Potential Gain	Endangered	Endangered
Dromaius novaehollandiae - endangered population (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10250) Emu population in the New South Wales North Coast Bioregion and Port Stephens local government area	--	--	No	Moderate Sensitivity to Potential Gain	Endangered Population	Not Listed
Drynaria rigidula (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10253) Basket Fern	--	--	No	High Sensitivity to Potential Gain	Endangered	Not Listed
Endiandra floydii (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10269) Crystal Creek Walnut	--	north of Ballina	No	High Sensitivity to Potential Gain	Endangered	Endangered

Species	Habitat constraints	Geographic limitations	Confirmed candidate species	Sensitivity to gain class	NSW listing status	National listing status. ()
Endiandra hayesii (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10270) Rusty Rose Walnut	--	--	No	High Sensitivity to Potential Gain	Vulnerable	Vulnerable
Endiandra muelleri subsp. bracteata (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10271) Green-leaved Rose Walnut	--	--	No	High Sensitivity to Potential Gain	Endangered	Not Listed
Fontainea oraria (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10334) Coastal Fontainea	--	north of Ballina	No	High Sensitivity to Potential Gain	Critically Endangered	Endangered
Gossia fragrantissima (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10079) Sweet Myrtle	--	north of Evans Head	No	High Sensitivity to Potential Gain	Endangered	Endangered
Haliaeetus leucogaster (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20322) White-bellied Sea-Eagle (Breeding)	--	--	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Hoplocephalus bitorquatus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10412) Pale-headed Snake	--	--	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Litoria brevipalmata (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10485) Green-thighed Frog	--	--	No	Moderate Sensitivity to Potential Gain	Vulnerable	Not Listed
Macadamia tetraphylla (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10499) Rough-shelled Bush Nut	--	north of Coraki	No	High Sensitivity to Potential Gain	Vulnerable	Vulnerable
Marsdenia longiloba (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10507) Slender Marsdenia	--	--	No	High Sensitivity to Potential Gain	Endangered	Vulnerable
Miniopterus australis (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10533) Little Bentwing-bat (Breeding)	--	--	No	Very High Sensitivity to Potential Gain	Vulnerable	Not Listed

Species	Habitat constraints	Geographic limitations	Confirmed candidate species	Sensitivity to gain class	NSW listing status	National listing status. ()
Miniopterus schreibersii oceanensis (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10534) Eastern Bentwing-bat (Breeding)	--	--	No	Very High Sensitivity to Potential Gain	Vulnerable	Not Listed
Mixophyes iteratus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10538) Giant Barred Frog	Other Land within 50m of semi permanent and permanent drainages	--	No	Moderate Sensitivity to Potential Gain	Endangered	Endangered
Myotis macropus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10549) Southern Myotis	Hollow bearing trees Within 200 m of riparian zone|Other Bridges, caves or artificial structures within 200 m of riparian zone	--	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Niemeyera whitei (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10044) Rusty Plum, Plum Boxwood	--	--	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Ninox strenua (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10562) Powerful Owl (Breeding)	--	--	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Oberonia titania (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10571) Red-flowered King of the Fairies	--	--	No	Moderate Sensitivity to Potential Gain	Vulnerable	Not Listed
Pandion cristatus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10585) Eastern Osprey (Breeding)	--	--	No	Moderate Sensitivity to Potential Gain	Vulnerable	Not Listed

Species	Habitat constraints	Geographic limitations	Confirmed candidate species	Sensitivity to gain class	NSW listing status	National listing status. ()
Peristeranthus hillii ***(http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10868)*** Brown Fairy-chain Orchid	--	within 5 km of coast	No	Moderate Sensitivity to Potential Gain	Vulnerable	Not Listed
Phaius australis ***(http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10610)*** Southern Swamp Orchid	--	--	No	Moderate Sensitivity to Potential Gain	Endangered	Endangered
Planigale maculata ***(http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10635)*** Common Planigale	--	--	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Pteropus poliocephalus ***(http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10697)*** Grey-headed Flying-fox (Breeding)	--	--	No	High Sensitivity to Potential Gain	Vulnerable	Vulnerable
Randia moorei ***(http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10726)*** Spiny Gardenia	--	--	No	Very High Sensitivity to Potential Gain	Endangered	Endangered
Senna acclinis ***(http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10753)*** Rainforest Cassia	--	--	No	High Sensitivity to Potential Gain	Endangered	Not Listed
Sophora fraseri ***(http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10764)*** Brush Sophora	--	north of Richmond River	No	High Sensitivity to Potential Gain	Vulnerable	Vulnerable
Thersites mitchellae ***(http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10801)*** Mitchell's Rainforest Snail	--	--	No	High Sensitivity to Potential Gain	Endangered	Critically Endangered
Tinospora tinosporoides ***(http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10809)*** Arrow-head Vine	--	north of the Richmond River	No	Moderate Sensitivity to Potential Gain	Vulnerable	Not Listed

Species	Habitat constraints	Geographic limitations	Confirmed candidate species	Sensitivity to gain class	NSW listing status	National listing status. ()
Vespadelus troughtoni (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10829) Eastern Cave Bat	Caves Within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, crevices or boulder piles, or within two kilometres of old mines, tunnels, old buildings or sheds."|N/A	--	No	Very High Sensitivity to Potential Gain	Vulnerable	Not Listed

SEARCH CANDIDATE SPECIES

CLEAR NEXT

BAM Calculator

Version:1.2.0.00 () Last updated: 20/10/2017 13:00

() 1. Assessment details () 2. Site context () 3. Vegetation () 4. Habitat suitability () 5. Habitat survey () 6. Credits () 7. Credit classes () 8. Price ()

All fields marked with an asterisk (*) are mandatory

Message!

If Species presence *'Yes'*, Please select the survey of month, for particular species.

Candidate threatened species (Species credits)

Species	Species presence	Survey timetable	UOM	Veg Zone & Value

CLEAR NEXT

BAM Calculator

Version:1.2.0.00 () Last updated: 20/10/2017 13:00

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	Vegetation integrity gain	Area	Ecosystem credits
Tuckeroo - Riberry - Yellow Tulipwood littoral rainforest of the NSW North Coast Bioregion				
1	1275_Acacia_Regrowth	21.7	0.4 hectares	2
1	1275_Cleared	10.6	0.8 hectares	2
			Subtotal	4
			Total	4

Species credits for threatened species

Vegetation zone name	Habitat condition (vegetation integrity) gain	Area / Count	Species credits

BAM Calculator

Version:1.2.0.00 () Last updated: 20/10/2017 13:00

Ecosystem credit classes

Ecosystem credit summary

PCT	TEC	Area	Credits
1275-Tuckeroo - Riberry - Yellow Tulipwood littoral rainforest of the NSW North Coast Bioregion	Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion	1.2	4

Credit classes for 1275

Any PCT with the below TEC	Containing HBT	In the below IBRA subregions
Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion	No	Clarence Lowlands

Any PCT in the below formation	And in any of below trading groups	Containing HBT	In the below IBRA regions/subregions
Rainforests	Tier 2	No	IBRA region: South Eastern Queensland

Species credit classes

Species credit summary

Species	Area	Credits

Attachment 6

BAM Calculator

Version:1.2.0.00 () Last updated: 20/10/2017 13:00

() | 1. Assessment details () | 2. Site context () | 3. Vegetation () | 4. Habitat suitability () | 5. Habitat survey () | 6. Credits () | 7. Credit classes () | 8. Price ()

All fields marked with an asterisk (*) are mandatory

Message!

You have selected *'Stewardship (for offset sites)'* as the *'Assessment Type'* so we now have enough information to proceed to the 'Site Context'.

Assessment type *: Stewardship (for offset sites)

Proposal name: Iron Gates - Riverfront Land_Vegetated

Assessment ID:

Assessment Revision: 0

NEXT

BAM Calculator

Version:1.2.0.00 () Last updated: 20/10/2017 13:00

() 1. Assessment details () 2. Site context () 3. Vegetation () 4. Habitat suitability () 5. Habitat survey () 6. Credits () 7. Credit classes () 8. Price ()

All fields marked with an asterisk (*) are mandatory

Message!

You have selected *'South Eastern Queensland'* as the *'IBRA Region'* so we now have enough information to proceed.

Interim Biogeographic Regionalisation for Australia (IBRA) *	South Eastern Queensland
IBRA Sub Region *	Clarence Lowlands
NSW Landscape	
% Native vegetation cover *	60

Landscape features

Feature *	Name *	Part of development footprint	Action
Rivers and streams	Evans River	☐	

Add another landscape feature

NEXT

BAM Calculator

Version:1.2.0.00 () Last updated: 20/10/2017 13:00

1. Assessment details () | 2. Site context () | 3. Vegetation () | 4. Habitat suitability () | 5. Habitat survey () | 6. Credits () | 7. Credit classes () | 8. Price ()

All fields marked with an asterisk (*) are mandatory

Plant community types (PCT) & ecological communities

Delete	Formation *	Class *	Plant community type *	PCT % cleared	Associated TEC *	Listing status	Action
✖	Rainforests	Littoral Rainforests	1275 - Tuckeroo - Riberry - Yellow Tulipwood littoral rainforest of the NSW North Coast Bioregion	90	Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion	Endangered Ecological Community	ADD VEG ZONE Modify default benchmarks

ADD ANOTHER PCT | SEARCH PCT OUTSIDE IBRA

IMPORT SITE

Vegetation zones (Current vegetation integrity score)

Delete	Import	Number	PCT code	Condition class *	Patch Size *	Vegetation zone name	Area (ha) *	High risk lands	Location	Composition condition score	Structure condition score	Function condition score	Current vegetation integrity score
✖		1	1275	Low-Moderate	10	1275_Low-Moderate	0.98			56.7	61.1	49.5	55.5

Vegetation zones (Future vegetation integrity score, without management)

Number	PCT code	Condition class	Patch Size	Vegetation zone name	Area (ha)	Composition condition score	Structure condition score	Function condition score	Vegetation integrity score	Change in vegetation integrity score
1	1275	Low-Moderate	10	1275_Low-Moderate	0.98	55.9	60.5	48.5	54.8	-0.8

Vegetation zones (Future vegetation integrity score, with management)

Number	PCT code	Condition class	Patch Size	Vegetation zone name	Area (ha)	Composition condition score	Structure condition score	Function condition score	Vegetation integrity score	Security Benefit Score	Change in vegetation integrity score
1	1275	Low-Moderate	10	1275_Low-Moderate	0.98	92.1	89	60.7	79.3	0	24.5

BAM Calculator

Version:1.2.0.00 () Last updated: 20/10/2017 13:00

Predicted threatened species (Ecosystem credits)

Species	Habitat constraints	Geographic limitations	Veg Zone - Confirmed predicted species *		Sensitivity to gain class	NSW listing status	National listing status. ()
Dasyurus maculatus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10207) Spotted-tailed Quoll	--	--	1275_Low-Moderate	No	High Sensitivity to Potential Gain	Vulnerable	Endangered
Miniopterus australis (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10533) Little Bentwing-bat (Foraging)	--	--	1275_Low-Moderate	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Miniopterus schreibersii oceanensis (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10534) Eastern Bentwing-bat (Foraging)	--	--	1275_Low-Moderate	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Ptilinopus superbus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10709) Superb Fruit-Dove	--	--	1275_Low-Moderate	No	Moderate Sensitivity to Potential Gain	Vulnerable	Not Listed
Mormopterus norfolkensis (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10544) Eastern Freetail-bat	--	--	1275_Low-Moderate	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Pandion cristatus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10585) Eastern Osprey (Foraging)	--	--	1275_Low-Moderate	No	Moderate Sensitivity to Potential Gain	Vulnerable	Not Listed
Pteropus poliocephalus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10697) Grey-headed Flying-fox (Foraging)	--	--	1275_Low-Moderate	No	High Sensitivity to Potential Gain	Vulnerable	Vulnerable

Species	Habitat constraints	Geographic limitations	Veg Zone - Confirmed predicted species *		Sensitivity to gain class	NSW listing status	National listing status. ()
Haliaeetus leucogaster (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20322) White-bellied Sea-Eagle (Foraging)	--	--	1275_Low-Moderate	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Amaurornis moluccana (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10042) Pale-vented Bush-hen	*1275_Low-Moderate* Waterbodies Dense vegetation, within 300m of, or in shallows of streams or other natural or artificial wetlands	--	1275_Low-Moderate	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Coracina lineata (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10176) Barred Cuckoo-shrike	--	--	1275_Low-Moderate	No	Moderate Sensitivity to Potential Gain	Vulnerable	Not Listed
Kerivoula papuensis (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10444) Golden-tipped Bat	--	--	1275_Low-Moderate	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Mormopterus lumsdenae (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10543) Northern Free-tailed Bat	--	--	1275_Low-Moderate	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Saccolaimus flaviventris (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10741) Yellow-bellied Sheathtail-bat	--	--	1275_Low-Moderate	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Scoteanax rueppellii (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10748) Greater Broad-nosed Bat	--	--	1275_Low-Moderate	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Syconycteris australis (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10785) Common Blossom-bat	--	--	1275_Low-Moderate	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed

Species	Habitat constraints	Geographic limitations	Veg Zone - Confirmed predicted species *		Sensitivity to gain class	NSW listing status	National listing status. ()
Thylogale stigmatica (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10805) Red-legged Pademelon	--	--	1275_Low-Moderate	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Ninox strenua (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10562) Powerful Owl (Foraging)	--	--	1275_Low-Moderate	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Nyctophilus bifax (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10567) Eastern Long-eared Bat	--	--	1275_Low-Moderate	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Potorous tridactylus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10662) Long-nosed Potoroo	*1275_Low-Moderate* Other Dense shrub layer or alternatively high canopy cover exceeding 70% (i.e. to capture populations inhabiting wet sclerophyll and rainforest))	--	1275_Low-Moderate	No	High Sensitivity to Potential Gain	Vulnerable	Vulnerable
Ptilinopus magnificus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10707) Wompoo Fruit-Dove	--	--	1275_Low-Moderate	No	Moderate Sensitivity to Potential Gain	Vulnerable	Not Listed
Ptilinopus regina (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10708) Rose-crowned Fruit-Dove	--	--	1275_Low-Moderate	No	Moderate Sensitivity to Potential Gain	Vulnerable	Not Listed

SEARCH PREDICTED SPECIES

Candidate threatened species (Species credits)

Species	Habitat constraints	Geographic limitations	Confirmed candidate species	Sensitivity to gain class	NSW listing status	National listing status. ()

Species	Habitat constraints	Geographic limitations	Confirmed candidate species	Sensitivity to gain class	NSW listing status	National listing status. ()
Acalypha eremorum (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10029) Acalypha	--	--	No	High Sensitivity to Potential Gain	Endangered	Not Listed
Acronychia littoralis (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10030) Scented Acronychia	--	within 5 km of coast	No	High Sensitivity to Potential Gain	Endangered	Endangered
Archidendron hendersonii (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10062) White Lace Flower	--	--	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Argynnis hyperbius (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10064) Laced Fritillary	N/A|Other Arrowhead Violet (Viola betonicifolia))	within 15 km of the coast	No	High Sensitivity to Potential Gain	Endangered	Critically Endangered
Arthraxon hispidus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10066) Hairy Jointgrass	--	--	No	High Sensitivity to Potential Gain	Vulnerable	Vulnerable
Belvisia mucronata (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10090) Needle-leaf Fern	--	--	No	Moderate Sensitivity to Potential Gain	Endangered	Not Listed
Cercartetus nanus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10155) Eastern Pygmy-possum	--	--	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Clematis fawcettii (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10169) Northern Clematis	--	--	No	N/A	Vulnerable	Vulnerable
Cryptocarya foetida (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10186) Stinking Cryptocarya	--	within 30 km of coast	No	Moderate Sensitivity to Potential Gain	Vulnerable	Vulnerable
Cynanchum elegans (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10196) White-flowered Wax Plant	--	--	No	High Sensitivity to Potential Gain	Endangered	Endangered

Species	Habitat constraints	Geographic limitations	Confirmed candidate species	Sensitivity to gain class	NSW listing status	National listing status. ()
Davidsonia jerseyana (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10208) Davidson's Plum	--	north of Ballina	No	High Sensitivity to Potential Gain	Endangered	Endangered
Davidsonia johnsonii (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10209) Smooth Davidson's Plum	--	north of Lennox Head	No	Very High Sensitivity to Potential Gain	Endangered	Endangered
Dendrobium melaleucaphilum (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10213) Spider orchid	--	--	No	High Sensitivity to Potential Gain	Endangered	Not Listed
Desmodium acanthocladum (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10218) Thorny Pea	--	--	No	High Sensitivity to Potential Gain	Vulnerable	Vulnerable
Diploglottis campbellii (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10231) Small-leaved Tamarind	--	north of Ballina	No	High Sensitivity to Potential Gain	Endangered	Endangered
Dromaius novaehollandiae - endangered population (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10250) Emu population in the New South Wales North Coast Bioregion and Port Stephens local government area	--	--	No	Moderate Sensitivity to Potential Gain	Endangered Population	Not Listed
Drynaria rigidula (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10253) Basket Fern	--	--	No	High Sensitivity to Potential Gain	Endangered	Not Listed
Endiandra floydii (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10269) Crystal Creek Walnut	--	north of Ballina	No	High Sensitivity to Potential Gain	Endangered	Endangered
Endiandra hayesii (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10270) Rusty Rose Walnut	--	--	No	High Sensitivity to Potential Gain	Vulnerable	Vulnerable
Endiandra muelleri subsp. bracteata (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10271) Green-leaved Rose Walnut	--	--	No	High Sensitivity to Potential Gain	Endangered	Not Listed

Species	Habitat constraints	Geographic limitations	Confirmed candidate species	Sensitivity to gain class	NSW listing status	National listing status. ()
Fontainea oraria ***(http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10334)*** Coastal Fontainea	--	north of Ballina	No	High Sensitivity to Potential Gain	Critically Endangered	Endangered
Gossia fragrantissima ***(http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10079)*** Sweet Myrtle	--	north of Evans Head	No	High Sensitivity to Potential Gain	Endangered	Endangered
Haliaeetus leucogaster ***(http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20322)*** White-bellied Sea-Eagle (Breeding)	--	--	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Hoplocephalus bitorquatus ***(http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10412)*** Pale-headed Snake	--	--	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Litoria brevipalmata ***(http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10485)*** Green-thighed Frog	--	--	No	Moderate Sensitivity to Potential Gain	Vulnerable	Not Listed
Macadamia tetraphylla ***(http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10499)*** Rough-shelled Bush Nut	--	north of Coraki	No	High Sensitivity to Potential Gain	Vulnerable	Vulnerable
Marsdenia longiloba ***(http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10507)*** Slender Marsdenia	--	--	No	High Sensitivity to Potential Gain	Endangered	Vulnerable
Miniopterus australis ***(http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10533)*** Little Bentwing-bat (Breeding)	--	--	No	Very High Sensitivity to Potential Gain	Vulnerable	Not Listed
Miniopterus schreibersii oceanensis ***(http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10534)*** Eastern Bentwing-bat (Breeding)	--	--	No	Very High Sensitivity to Potential Gain	Vulnerable	Not Listed

Species	Habitat constraints	Geographic limitations	Confirmed candidate species	Sensitivity to gain class	NSW listing status	National listing status. ()
***Mixophyes iteratus* (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10538)** Giant Barred Frog	☐ Other ☐ Land within 50m of semi permanent and permanent drainages	--	No	Moderate Sensitivity to Potential Gain	Endangered	Endangered
***Myotis macropus* (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10549)** Southern Myotis	☐ Hollow bearing trees ☐ Within 200 m of riparian zone|Other ☐ Bridges, caves or artificial structures within 200 m of riparian zone	--	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
***Niemeyera whitei* (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10044)** Rusty Plum, Plum Boxwood	--	--	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
***Ninox strenua* (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10562)** Powerful Owl (Breeding)	--	--	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
***Oberonia titania* (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10571)** Red-flowered King of the Fairies	--	--	No	Moderate Sensitivity to Potential Gain	Vulnerable	Not Listed
***Pandion cristatus* (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10585)** Eastern Osprey (Breeding)	--	--	No	Moderate Sensitivity to Potential Gain	Vulnerable	Not Listed
***Peristeranthus hillii* (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10868)** Brown Fairy-chain Orchid	--	☐ within 5 km of coast	No	Moderate Sensitivity to Potential Gain	Vulnerable	Not Listed
***Phaius australis* (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10610)** Southern Swamp Orchid	--	--	No	Moderate Sensitivity to Potential Gain	Endangered	Endangered

Species	Habitat constraints	Geographic limitations	Confirmed candidate species	Sensitivity to gain class	NSW listing status	National listing status. ()
Planigale maculata (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10635) Common Planigale	--	--	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Pteropus poliocephalus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10697) Grey-headed Flying-fox (Breeding)	--	--	No	High Sensitivity to Potential Gain	Vulnerable	Vulnerable
Randia moorei (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10726) Spiny Gardenia	--	--	No	Very High Sensitivity to Potential Gain	Endangered	Endangered
Senna acclinis (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10753) Rainforest Cassia	--	--	No	High Sensitivity to Potential Gain	Endangered	Not Listed
Sophora fraseri (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10764) Brush Sophora	--	north of Richmond River	No	High Sensitivity to Potential Gain	Vulnerable	Vulnerable
Thersites mitchellae (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10801) Mitchell's Rainforest Snail		--	No	High Sensitivity to Potential Gain	Endangered	Critically Endangered
Tinospora tinosporoides (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10809) Arrow-head Vine	--	north of the Richmond River	No	Moderate Sensitivity to Potential Gain	Vulnerable	Not Listed

Species	Habitat constraints	Geographic limitations	Confirmed candidate species	Sensitivity to gain class	NSW listing status	National listing status. ()
Vespadelus troughtoni (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10829) Eastern Cave Bat	Caves Within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, crevices or boulder piles, or within two kilometres of old mines, tunnels, old buildings or sheds."|N/A	--	No	Very High Sensitivity to Potential Gain	Vulnerable	Not Listed

SEARCH CANDIDATE SPECIES

CLEAR NEXT

BAM Calculator

Version:1.2.0.00 () Last updated: 20/10/2017 13:00

() 1. Assessment details () 2. Site context () 3. Vegetation () 4. Habitat suitability () 5. Habitat survey () 6. Credits () 7. Credit classes () 8. Price ()

All fields marked with an asterisk (*) are mandatory

Message!

If Species presence *'Yes'*, Please select the survey of month, for particular species.

Candidate threatened species (Species credits)

Species	Species presence	Survey timetable	UOM	Veg Zone & Value

CLEAR NEXT

BAM Calculator

Version:1.2.0.00 () Last updated: 20/10/2017 13:00

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	Vegetation integrity gain	Area	Ecosystem credits
Tuckeroo - Riberry - Yellow Tulipwood littoral rainforest of the NSW North Coast Bioregion				
1	1275_Low-Moderate	24.5	1 hectares	6
			Subtotal	6
			Total	6

Species credits for threatened species

Vegetation zone name	Habitat condition (vegetation integrity) gain	Area / Count	Species credits

BAM Calculator

Version:1.2.0.00 () Last updated: 20/10/2017 13:00

Ecosystem credit classes

Ecosystem credit summary

PCT	TEC	Area	Credits
1275-Tuckeroo - Riberry - Yellow Tulipwood littoral rainforest of the NSW North Coast Bioregion	Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion	1	6

Credit classes for 1275

Any PCT with the below TEC	Containing HBT	In the below IBRA subregions
Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion	No	Clarence Lowlands

Any PCT in the below formation	And in any of below trading groups	Containing HBT	In the below IBRA regions/subregions
Rainforests	Tier 2	No	IBRA region: South Eastern Queensland

Species credit classes

Species credit summary

Species	Area	Credits

BAM Calculator

Version:1.2.0.00 () Last updated: 20/10/2017 13:00

() 1. Assessment details () 2. Site context () 3. Vegetation () 4. Habitat suitability () 5. Habitat survey () 6. Credits () 7. Credit classes () 8. Price ()

Message!

If you would like to meet your offset obligation by making a payment to the Biodiversity Conservation Fund, please contact the BCT team at **bct@environment.nsw.gov.au (mailto:bct@environment.nsw.gov.au)**

IBRA subregion: Clarence Lowlands

PCT list

Include	PCT common name	Credit
☑	**1275 -** Tuckeroo - Riberry - Yellow Tulipwood littoral rainforest of the NSW North Coast Bioregion	**6**

Species list

Include	Species	Credit

CALCULATE

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

IBRA sub region	PCT common name	Baseline price per credit	Dynamic coefficient	Market coefficient	Risk premium	Administrative cost	Methodology adjustment factor	Price per credit	No. of ecosystem credits	Final credits price
Clarence Lowlands	**1275 -** Tuckeroo - Riberry - Yellow Tulipwood littoral rainforest of the NSW North Coast Bioregion ***Warning: This PCT has NO trades recorded***	$1,373.32	0.1683239	6.151896	25.00%	$20.00	1.0000	$2,000.64	6	$12,003.87
									Subtotal (excl. GST)	**$12,003.87**
									GST	**$1,200.39**
									Total ecosystem credits (incl. GST)	**$13,204.26**

Calculated as on: **09-11-2017 10:22:31**

Grand total **$13,204.26**

Attachment 7

BAM Calculator

Version:1.2.0.00 () Last updated: 20/10/2017 13:00

1. Assessment details ()
2. Site context ()
3. Vegetation ()
4. Habitat suitability ()
5. Habitat survey ()
6. Credits ()
7. Credit classes ()
8. Price ()

All fields marked with an asterisk (*) are mandatory

Message!

You have selected *'Stewardship (for offset sites)'* as the *'Assessment Type'* so we now have enough information to proceed to the 'Site Context'.

Assessment type *: Stewardship (for offset sites)

Proposal name: Iron Gates - Riverfront Land_Cleared

Assessment ID:

Assessment Revision: 0

NEXT

BAM Calculator

Version:1.2.0.00 () Last updated: 20/10/2017 13:00

() 1. Assessment details () 2. Site context () 3. Vegetation () 4. Habitat suitability () 5. Habitat survey () 6. Credits () 7. Credit classes () 8. Price ()

All fields marked with an asterisk (*) are mandatory

Message!

You have selected *'South Eastern Queensland'* as the *'IBRA Region'* so we now have enough information to proceed.

Interim Biogeographic Regionalisation for Australia (IBRA) *	South Eastern Queensland
IBRA Sub Region *	Clarence Lowlands
NSW Landscape	
% Native vegetation cover *	0

Landscape features

Feature *	Name *	Part of development footprint	Action
Rivers and streams	Evans River	☐	

Add another landscape feature

NEXT

BAM Calculator

Version:1.2.0.00 () Last updated: 20/10/2017 13:00

1. Assessment details () | 2. Site context () | 3. Vegetation () | 4. Habitat suitability () | 5. Habitat survey () | 6. Credits () | 7. Credit classes () | 8. Price ()

All fields marked with an asterisk (*) are mandatory

Plant community types (PCT) & ecological communities

Delete	Formation *	Class *	Plant community type *	PCT % cleared	Associated TEC *	Listing status	Action
✖	Rainforests	Littoral Rainforests	1275 - Tuckeroo - Riberry - Yellow Tulipwood littoral rainforest of the NSW North Coast Bioregion	90	Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion	Endangered Ecological Community	ADD VEG ZONE Modify default benchmarks

ADD ANOTHER PCT | SEARCH PCT OUTSIDE IBRA

IMPORT SITE

Vegetation zones (Current vegetation integrity score)

Delete	Import	Number	PCT code	Condition class *	Patch Size *	Vegetation zone name	Area (ha) *	High risk lands	Location	Composition condition score	Structure condition score	Function condition score	Current vegetation integrity score
✖		1	1275	Cleared	10	1275_Cleared	0.25			28	19.2	23.9	23.4

Vegetation zones (Future vegetation integrity score, without management)

Number	PCT code	Condition class	Patch Size	Vegetation zone name	Area (ha)	Composition condition score	Structure condition score	Function condition score	Vegetation integrity score	Change in vegetation integrity score
1	1275	Cleared	10	1275_Cleared	0.25	27.5	18.7	23.9	23	-0.4

Vegetation zones (Future vegetation integrity score, with management)

Number	PCT code	Condition class	Patch Size	Vegetation zone name	Area (ha)	Composition condition score	Structure condition score	Function condition score	Vegetation integrity score	Security Benefit Score	Change in vegetation integrity score
1	1275	Cleared	10	1275_Cleared	0.25	66.2	29.3	29.3	38.4	0	15.4

BAM Calculator

Version:1.2.0.00 () Last updated: 20/10/2017 13:00

Predicted threatened species (Ecosystem credits)

Species	Habitat constraints	Geographic limitations	Veg Zone - Confirmed predicted species *		Sensitivity to gain class	NSW listing status	National listing status. ()
Dasyurus maculatus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10207) Spotted-tailed Quoll	--	--	1275_Cleared	No	High Sensitivity to Potential Gain	Vulnerable	Endangered
Miniopterus australis (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10533) Little Bentwing-bat (Foraging)	--	--	1275_Cleared	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Miniopterus schreibersii oceanensis (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10534) Eastern Bentwing-bat (Foraging)	--	--	1275_Cleared	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Ptilinopus superbus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10709) Superb Fruit-Dove	--	--	1275_Cleared	No	Moderate Sensitivity to Potential Gain	Vulnerable	Not Listed
Mormopterus norfolkensis (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10544) Eastern Freetail-bat	--	--	1275_Cleared	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Pandion cristatus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10585) Eastern Osprey (Foraging)	--	--	1275_Cleared	No	Moderate Sensitivity to Potential Gain	Vulnerable	Not Listed
Pteropus poliocephalus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10697) Grey-headed Flying-fox (Foraging)	--	--	1275_Cleared	No	High Sensitivity to Potential Gain	Vulnerable	Vulnerable

Species	Habitat constraints	Geographic limitations	Veg Zone - Confirmed predicted species *		Sensitivity to gain class	NSW listing status	National listing status. ()
Haliaeetus leucogaster (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20322) White-bellied Sea-Eagle (Foraging)	--	--	1275_Cleared	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed

SEARCH PREDICTED SPECIES

Candidate threatened species (Species credits)

Species	Habitat constraints	Geographic limitations	Confirmed candidate species	Sensitivity to gain class	NSW listing status	National listing status. ()
Acalypha eremorum (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10029) Acalypha	--	--	No	High Sensitivity to Potential Gain	Endangered	Not Listed
Acronychia littoralis (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10030) Scented Acronychia	--	within 5 km of coast	No	High Sensitivity to Potential Gain	Endangered	Endangered
Archidendron hendersonii (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10062) White Lace Flower	--	--	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Argynnis hyperbius (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10064) Laced Fritillary	N/A|Other - Arrowhead Violet (Viola betonicifolia))	within 15 km of the coast	No	High Sensitivity to Potential Gain	Endangered	Critically Endangered
Arthraxon hispidus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10066) Hairy Jointgrass	--	--	No	High Sensitivity to Potential Gain	Vulnerable	Vulnerable
Belvisia mucronata (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10090) Needle-leaf Fern	--	--	No	Moderate Sensitivity to Potential Gain	Endangered	Not Listed
Clematis fawcettii (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10169) Northern Clematis	--	--	No	N/A	Vulnerable	Vulnerable

Species	Habitat constraints	Geographic limitations	Confirmed candidate species	Sensitivity to gain class	NSW listing status	National listing status. ()
Cryptocarya foetida (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10186) Stinking Cryptocarya	--	within 30 km of coast	No	Moderate Sensitivity to Potential Gain	Vulnerable	Vulnerable
Cynanchum elegans (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10196) White-flowered Wax Plant	--	--	No	High Sensitivity to Potential Gain	Endangered	Endangered
Davidsonia jerseyana (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10208) Davidson's Plum	--	north of Ballina	No	High Sensitivity to Potential Gain	Endangered	Endangered
Davidsonia johnsonii (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10209) Smooth Davidson's Plum	--	north of Lennox Head	No	Very High Sensitivity to Potential Gain	Endangered	Endangered
Dendrobium melaleucaphilum (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10213) Spider orchid	--	--	No	High Sensitivity to Potential Gain	Endangered	Not Listed
Desmodium acanthocladum (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10218) Thorny Pea	--	--	No	High Sensitivity to Potential Gain	Vulnerable	Vulnerable
Diploglottis campbellii (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10231) Small-leaved Tamarind	--	north of Ballina	No	High Sensitivity to Potential Gain	Endangered	Endangered
Dromaius novaehollandiae - endangered population (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10250) Emu population in the New South Wales North Coast Bioregion and Port Stephens local government area	--	--	No	Moderate Sensitivity to Potential Gain	Endangered Population	Not Listed
Drynaria rigidula (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10253) Basket Fern	--	--	No	High Sensitivity to Potential Gain	Endangered	Not Listed
Endiandra floydii (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10269) Crystal Creek Walnut	--	north of Ballina	No	High Sensitivity to Potential Gain	Endangered	Endangered

Species	Habitat constraints	Geographic limitations	Confirmed candidate species	Sensitivity to gain class	NSW listing status	National listing status. ()
Endiandra hayesii (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10270) Rusty Rose Walnut	--	--	No	High Sensitivity to Potential Gain	Vulnerable	Vulnerable
Endiandra muelleri subsp. bracteata (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10271) Green-leaved Rose Walnut	--	--	No	High Sensitivity to Potential Gain	Endangered	Not Listed
Fontainea oraria (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10334) Coastal Fontainea	--	north of Ballina	No	High Sensitivity to Potential Gain	Critically Endangered	Endangered
Gossia fragrantissima (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10079) Sweet Myrtle	--	north of Evans Head	No	High Sensitivity to Potential Gain	Endangered	Endangered
Haliaeetus leucogaster (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20322) White-bellied Sea-Eagle (Breeding)	--	--	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Litoria brevipalmata (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10485) Green-thighed Frog	--	--	No	Moderate Sensitivity to Potential Gain	Vulnerable	Not Listed
Macadamia tetraphylla (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10499) Rough-shelled Bush Nut	--	north of Coraki	No	High Sensitivity to Potential Gain	Vulnerable	Vulnerable
Marsdenia longiloba (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10507) Slender Marsdenia	--	--	No	High Sensitivity to Potential Gain	Endangered	Vulnerable
Miniopterus australis (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10533) Little Bentwing-bat (Breeding)	--	--	No	Very High Sensitivity to Potential Gain	Vulnerable	Not Listed

Species	Habitat constraints	Geographic limitations	Confirmed candidate species	Sensitivity to gain class	NSW listing status	National listing status. ()
Miniopterus schreibersii oceanensis (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10534) Eastern Bentwing-bat (Breeding)	--	--	No	Very High Sensitivity to Potential Gain	Vulnerable	Not Listed
Mixophyes iteratus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10538) Giant Barred Frog	☐ Other ☐ Land within 50m of semi permanent and permanent drainages	--	No	Moderate Sensitivity to Potential Gain	Endangered	Endangered
Myotis macropus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10549) Southern Myotis	☐ Hollow bearing trees ☐ Within 200 m of riparian zone|Other ☐ Bridges, caves or artificial structures within 200 m of riparian zone	--	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Niemeyera whitei (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10044) Rusty Plum, Plum Boxwood	--	--	No	High Sensitivity to Potential Gain	Vulnerable	Not Listed
Oberonia titania (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10571) Red-flowered King of the Fairies	--	--	No	Moderate Sensitivity to Potential Gain	Vulnerable	Not Listed
Pandion cristatus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10585) Eastern Osprey (Breeding)	--	--	No	Moderate Sensitivity to Potential Gain	Vulnerable	Not Listed
Peristeranthus hillii (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10868) Brown Fairy-chain Orchid	--	☐ within 5 km of coast	No	Moderate Sensitivity to Potential Gain	Vulnerable	Not Listed
Phaius australis (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10610) Southern Swamp Orchid	--	--	No	Moderate Sensitivity to Potential Gain	Endangered	Endangered

Species	Habitat constraints	Geographic limitations	Confirmed candidate species	Sensitivity to gain class	NSW listing status	National listing status. ()
Pteropus poliocephalus (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10697) Grey-headed Flying-fox (Breeding)	--	--	No	High Sensitivity to Potential Gain	Vulnerable	Vulnerable
Randia moorei (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10726) Spiny Gardenia	--	--	No	Very High Sensitivity to Potential Gain	Endangered	Endangered
Senna acclinis (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10753) Rainforest Cassia	--	--	No	High Sensitivity to Potential Gain	Endangered	Not Listed
Sophora fraseri (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10764) Brush Sophora	--	north of Richmond River	No	High Sensitivity to Potential Gain	Vulnerable	Vulnerable
Thersites mitchellae (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10801) Mitchell's Rainforest Snail		--	No	High Sensitivity to Potential Gain	Endangered	Critically Endangered
Tinospora tinosporoides (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10809) Arrow-head Vine	--	north of the Richmond River	No	Moderate Sensitivity to Potential Gain	Vulnerable	Not Listed

SEARCH CANDIDATE SPECIES

CLEAR NEXT

BAM Calculator

Version:1.2.0.00 () Last updated: 20/10/2017 13:00

() 1. Assessment details () 2. Site context () 3. Vegetation () 4. Habitat suitability () 5. Habitat survey () 6. Credits () 7. Credit classes () 8. Price ()

All fields marked with an asterisk (*) are mandatory

Message!

If Species presence *'Yes'*, Please select the survey of month, for particular species.

Candidate threatened species (Species credits)

Species	Species presence	Survey timetable	UOM	Veg Zone & Value

CLEAR NEXT

BAM Calculator

Version:1.2.0.00 () Last updated: 20/10/2017 13:00

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	Vegetation integrity gain	Area	Ecosystem credits
Tuckeroo - Riberry - Yellow Tulipwood littoral rainforest of the NSW North Coast Bioregion				
1	1275_Cleared	15.4	0.3 hectares	1
			Subtotal	1
			Total	1

Species credits for threatened species

Vegetation zone name	Habitat condition (vegetation integrity) gain	Area / Count	Species credits

BAM Calculator

Version:1.2.0.00 () Last updated: 20/10/2017 13:00

Ecosystem credit classes

Ecosystem credit summary

PCT	TEC	Area	Credits
1275-Tuckeroo - Riberry - Yellow Tulipwood littoral rainforest of the NSW North Coast Bioregion	Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion	0.3	1

Credit classes for 1275

Any PCT with the below TEC	Containing HBT	In the below IBRA subregions
Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion	No	Clarence Lowlands

Any PCT in the below formation	And in any of below trading groups	Containing HBT	In the below IBRA regions/subregions
Rainforests	Tier 2	No	IBRA region: South Eastern Queensland

Species credit classes

Species credit summary

Species	Area	Credits

BAM Calculator

Version:1.2.0.00 () Last updated: 20/10/2017 13:00

() 1. Assessment details () 2. Site context () 3. Vegetation () 4. Habitat suitability () 5. Habitat survey () 6. Credits () 7. Credit classes () 8. Price ()

Message!

If you would like to meet your offset obligation by making a payment to the Biodiversity Conservation Fund, please contact the BCT team at **bct@environment.nsw.gov.au (mailto:bct@environment.nsw.gov.au)**

IBRA subregion: Clarence Lowlands

PCT list

Include	PCT common name	Credit
☑	**1275 -** Tuckeroo - Riberry - Yellow Tulipwood littoral rainforest of the NSW North Coast Bioregion	**1**

Species list

Include	Species	Credit

CALCULATE

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

IBRA sub region	PCT common name	Baseline price per credit	Dynamic coefficient	Market coefficient	Risk premium	Administrative cost	Methodology adjustment factor	Price per credit	No. of ecosystem credits	Final credits price
Clarence Lowlands	**1275 -** Tuckeroo - Riberry - Yellow Tulipwood littoral rainforest of the NSW North Coast Bioregion ***Warning: This PCT has NO trades recorded***	$1,373.32	0.1683239	6.151896	25.00%	$20.00	1.0000	$2,000.64	1	$2,000.64
									Subtotal (excl. GST)	**$2,000.64**
									GST	**$200.06**
									Total ecosystem credits (incl. GST)	**$2,200.70**

Calculated as on: **09-11-2017 10:14:10**

Grand total **$2,200.70**

REPLY TO: BALLINA OFFICE

Ref: AM/N16006/Lw2

14th March 2018

Dimitri Young
Senior Team Leader Planning, North East Region
Regional Operations
Office of Environment and Heritage
Locked Bag 914
Coffs Harbour, NSW 2450

Dear Dimitri,

Re: Draft Master Plan Iron Gates - Biodiversity Offsets

I refer to the NSW Office of Environment and Heritage (OEH) letter dated 13th February 2018 in relation to the above project. In this letter it is stated that there are still two key matters which are outstanding for the OEH regarding the biodiversity offset proposal, being:

1. Accurate BioBanking calculations for the proposed biodiversity impacts; and
2. A suitable mechanism to manage and secure the rainforest areas for conservation purposes.

In the letter the OEH makes three (3) recommendations to finalise the offset package. Each of these recommendations are addressed below.

1. ***Step 2 of section 6.3 of the BBAM must be adequately addressed before ecosystem-credit species can be removed from the credit calculations. This step and revised calculations must be submitted to the OEH for review.***

The latest BBAM calculations have excluded certain ecosystem credit species after numerous discussions/negotiations with OEH as follows:

- In a letter from JWA to OEH (dated 4th September 2017) it was indicated that Goldcoral Pty Ltd was of the opinion that use of the BBAM and associated calculators were likely to result in a significantly biased and unfair offset obligation for the removal of 7.53 ha of degraded Acacia regrowth (313 credits at the time);

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- In a meeting at OEH on 18th October 2017, it was agreed that the lowest possible quality heath vegetation ecosystem (PCT) should be used and ecosystem-credit species should be removed from the calculator to assess impacts on the credit requirement;
- As agreed, the lowest possible quality heath vegetation ecosystem (PCT) was used and ecosystem-credit species were removed, and this resulted in an offset credit requirement of 187 credits. The results were conveyed to OEH in an email to Krister Waern on the 18th December 2017, and subsequently in a letter from JWA to OEH dated 8th January 2018. The letter also indicated that Goldcoral Pty Ltd were of the opinion that this more accurately and fairly represented the offset requirement for clearing 7.53 ha of degraded Acacia regrowth;
- During a subsequent telephone conversation between Adam McArthur (JWA) and Krister Waern (OEH), Krister indicated that OEH were of the opinion that 187 credits for the direct impacts of the development was not sufficient. Krister suggested that "around 230 – 240 credits" would be a more reasonable result. Krister suggested the addition of ecosystem-credit species back into the calculator to reach this amount.
- The BBAM calculator was rerun with the inclusion of Masked owl, Spotted-tail quoll, Hoary wattled bat, Spotted harrier, Grey-crowned babbler and Varied sittella. The majority of these species are not predicted to occur in PCT – NR152 and therefore resulted in no change to the offset credit calculation. The inclusion of the Spotted harrier however resulted in a credit requirement for the direct impacts of the development of 243 credits.
- OEH are now asking for Step 2 of section 6.3 of the BBAM to be "adequately addressed before ecosystem-credit species can be removed from the credit calculations".
- It is not proposed to address Step 2 of section 6.3 of the BBAM until agreement can be reached on the relevant ecosystem-credit species and resulting number of credits required. As previously noted, the BBAM is not specifically applicable to the project and the associated calculations were only intended to be used as a guideline. Once an agreement is reached on the relevant ecosystem-credit species and the resulting number of credits required, we will provide the information on Step 2 of section 6.3 of BBAM.

2. ***Appropriate mechanisms must be identified to:***
    a. ***secure the proposed vegetation management and rehabilitation works for offsetting indirect impacts on the littoral rainforest.***
    b. ***secure the ongoing management and protection of the littoral rainforest areas***

    These must be provided to the OEH for review.

The OEH correspondence advocates the use of a stewardship agreement (under the *Biodiversity Conservation Act 2016*) to secure and manage proposed offset areas, and also identifies Richmond Valley Council (RVC) taking ownership as a second option. RVC have subsequently confirmed that they are not prepared to take ownership of the proposed offset sites.

I refer to previous correspondence from Krister Waern to Mike Perkins of Richmond Valley Council (in an email dated 29th January 2018) which Krister suggested that OEH would be willing to consider alternatives (i.e. to those discussed above) for securing and ongoing management and

protection of the offset areas in perpetuity. It would be appreciated if you could identify these alternatives to allow a full assessment of all options to be completed.

3. ***The installation costs of a boardwalk within the rainforest patches must not be included as a part of the biodiversity offsets. All offsets must comply with the OEH offsetting principles. The amended offset package must be submitted to the OEH for review.***

The proposed boardwalk has now been removed from the proposal. Initial revegetation costs (~$80k) and fencing costs (~$48k) would be met by Goldcoral Pty Ltd outside of the stewardship site program and have also been removed. A revised Total Fund Deposit calculation is provided as **ATTACHMENT 1.**

In addition to the above recommendations, the OEH correspondence raises a number of points, some of which require further discussion/negotiation. Each of these additional points are discussed below.

- The OEH correspondence requests that a detailed vegetation management and rehabilitation plan be prepared for the retained rainforest. This will obviously be completed (or can be conditioned) once we reach agreement on the offset proposal.
- The OEH correspondence states that *"the current proposal appears to require further biodiversity offsets than available within the development proposal"*. Further discussion is required with regards to this point and with consideration of the following:
    - The total credit requirement (using the BBAM as a "guide") is currently 339 credits (subject to further negotiation). Goldcoral Pty Ltd are proposing to offset the loss of 7.53 ha of degraded regrowth Acacia vegetation, and potential indirect impacts of the proposed development, by rehabilitating/revegetating a total of 8.83 ha of littoral rainforest vegetation to a high quality, and other revegetation works, which will generate a total of 86 credits.
    - It would appear that the OEH correspondence suggests that the other 253 credits will need to be satisfied/retired/purchased. For your consideration, a financial offset for 253 credits would amount to approx. $425k. This would be in addition to any costs associated with proposed revegetation works on site (i.e. ~$80k revegetation costs + ~$48k fencing costs + TFD estimated at approx. $371.5k).
    - As you are aware, the Iron Gates Master Planned development does not specifically require offsets under the superseded *Threatened Species Conservation Act 1995* or the current *Biodiversity Conservation Act 2016,* and Goldcoral Pty Ltd have legal advice confirming this. However, Graeme Ingles has agreed to provide some form of reasonable offset for direct and indirect impacts of the development.
    - During initial and subsequent discussions with OEH it was suggested that as a "starting point" OEH would utilise the BBAM as "a guide" to get a "gut-feel" of what a reasonable offset would be for the proposed development. Goldcoral Pty Ltd are of the opinion that the implementation of the BBAM, and the resulting credit requirements and/or costs are unreasonable in this instance. It is hoped that further discussion/negotiation may result in an outcome agreeable to all.

In the hope of finalising all outstanding issues, I would like to request a meeting as soon as possible at a time and day convenient to you. I look forward to hearing from you.

Yours faithfully,
JWA Pty Ltd

Adam McArthur
Director / Principal Ecologist

Attachment 1

Total Fund Deposit worksheet (Part A costs)

This template should be used for estimating the Total Fund Deposit and preparation of the payment schedule

Biobank site location	Iron Gates
Biobank site owner	Ingels Group
Are you registered for GST/do you have an ABN?	Yes
ABN	
(OFFICE USE ONLY: BIMS REFERENCE NUMBER):	
(OFFICE USE ONLY: SAP BTF WBS):	

Add row for **management action cost**

Add row for **other recurring cost**

Real discount rate
3.50%

Management action costs	Timing			Estimated annual cost ($)	Year																		Present value of payments for first 20 yrs	Present value of payments after 20 yrs	Present value of all payments
	Start year	End year	Frequency		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Weed control – ongoing	4		1	5,000	0	0	0	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	59,051	74,308	133,359
Vertebrate pest control – intensive					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vertebrate pest control – ongoing					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ecological fire management					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fence maintenance	2		1	2,000	0	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	27,420	29,723	57,143
					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other recurring costs																											
Annual reporting fee	1		1	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	1,122	16,504	16,675	33,179
Annual ecological reporting fee	1		1	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	73,549	74,308	147,857
					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Biobank site management cost in today's value					6,122	8,122	8,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122	13,122			Total Trust Fund Deposit
Present Value (PV) of the biobank site management cost					6,122	7,847	7,582	11,835	11,435	11,048	10,675	10,314	9,965	9,628	9,302	8,988	8,684	8,390	8,107	7,832	7,568	7,312	7,064	6,825	176,524	195,014	**371,538**
Discount factors					100%	97%	93%	90%	87%	84%	81%	79%	76%	73%	71%	68%	66%	64%	62%	60%	58%	56%	54%	52%			

	Year																				Present value of payments during first 20 yrs	Present value of payments after 20 yrs	Present value of all payments
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
Annual biobank site management costs in today's values	$6,122	$8,122	$8,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$13,122	$176,524	$195,014	$371,538
Annual reporting fee	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$1,122	$16,504	$16,675	$33,179
Total amount payable to landowner (excluding GST)	$5,000	$7,000	$7,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$160,020	$178,339	$338,359
GST payable to landowner	$500	$700	$700	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$16,002	$17,834	$33,836
Total amount payable to landowner (including GST)	$5,500	$7,700	$7,700	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200	$176,022	$196,173	$372,195

ATTACHMENT 7 – OEH CONFIRMATION OF PROPOSED BIODIVERSITY OFFSET PACKAGE

NSW GOVERNMENT | Office of Environment & Heritage

Our Ref: DOC18/303379
Your Ref: Iron Gates Draft Master Plan

Department of Planning and Environment
PO Box 949
Tamworth NSW 2340

Attention: Mr Jon Stone – Regional Planning Officer

Dear Mr Stone

Re: Draft Master Plan Iron Gates – Biodiversity Assessment and Offsets

The Office of Environment and Heritage (OEH) has been liaising with the applicant of the draft Master Plan for Iron Gates regarding biodiversity matters. As you are aware from recent correspondence, the OEH and the applicant have reached in-principle agreement on the proposed measures to address the biodiversity impacts of the proposal, including a biodiversity offset package.

The OEH wrote to Mr Graeme Ingles of Goldcoral Pty Ltd on 2 May 2018 in response to his letter of 29 March 2018, providing suggested changes to address biodiversity impacts. Mr Ingles responded in writing to our letter on 14 May 2018 indicating that Goldcoral Pty Ltd accepted our suggested changes to the biodiversity offset package and committing to its implementation. Mr Ingles' first letter, the OEH letter, and Mr Ingles' response are attached for your information.

If the measures that Goldcoral Pty Ltd is indicating will be undertaken for the proposal in its letter of 14 May 2018 are included in the proposal and implemented, then the OEH has no further comments in relation to this proposal or the draft Master Plan.

The OEH is happy to work with the Department of Planning and Environment to ensure that the intended biodiversity measures are adequately incorporated into the proposal.

If you have any further questions about this issue, Mr Krister Waern Senior Operations Officer, Regional Operations, OEH, can be contacted on (02) 6640 2503 or at krister.waern@environment.nsw.gov.au.

Yours sincerely

29 May 2018

DIMITRI YOUNG
Senior Team Leader Planning, North East Region
Regional Operations

cc: Mr Graeme Ingles, Director Goldcoral Pty Ltd, PO Box 3441, Australia Fair QLD 4215

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WITHOUT PREJUDICE

29th March 2018

Dimitri Young
Senior Team Leader Planning, North East Region
Regional Operations
Office of Environment and Heritage
Via email – Dimitri.young@environment.nsw.gov.au
Cc – Krister.waern@environment.nsw.gov.au

Dear Dimitri,

Further to our telephone discussions today, we provide the following offer to settle all remaining issues raised by the OEH in relation the proposed Iron Gates Development.

The table below indicates the current calculated credits for direct and indirect impacts of the proposed development, utilising the BBAM as requested by OEH. The table also contains Goldcoral Pty Ltd's proposed method for acquitting these credits.

PCT	Direct impact (ha)	Indirect impact (ha)	Credits	Proposal
NR152	7.53	-	243	1. Rehabilitation of 8.83ha of littoral rainforest to a high quality (86 credits generated); and 2. Protection in perpetuity of this area under a stewardship agreement; and 3. Payment of $274,593 into the Biodiversity Conservation Trust Fund.
NR152	-	0.38	10	Indirect impacts of the proposal will be offset through onsite mitigation measures and have also been considered in previous amendments to the development layout.
NR153	-	0.28	7	
NR161	-	0.11	5	
NR273	-	0.93	74	
TOTAL	7.53	1.70	339	

Direct Impacts

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Rehabilitation works

- Goldcoral Pty Ltd proposes to rehabilitate the Littoral rainforest patches and associated buffers (including site preparation, weed control and planting locally endemic species) at an estimated cost of $80,000 in accordance with an approved Management Plan.
- Fencing will be installed (post and rail/bollards) on the periphery of the Littoral rainforest patches to reduce potential impacts to the area at an estimated cost of $48,000.

Protection in Perpetuity

- The rehabilitated Littoral rainforest patches (totalling 8.83ha) will be secured and managed under a stewardship agreement (under the Biodiversity Conservation Act 2016) entered into by Goldcoral Pty Ltd.
- This will include a Total Fund Deposit of $371,538.

Acquittal of additional offset credits

- The rehabilitation works, and stewardship agreement discussed above will acquit 86 credits.
- The remaining 157 credits (243 credits – 86 credits) will be acquitted via payment to the Biodiversity Conservation Trust Fund by Goldcoral Pty Ltd in an amount of $274,593.

Indirect Impacts

- The current layout (attached) has been progressively amended to provide additional buffer areas where possible.
- Specific mitigation measures will be implemented on site during and after construction to minimise indirect impacts on retained vegetation.

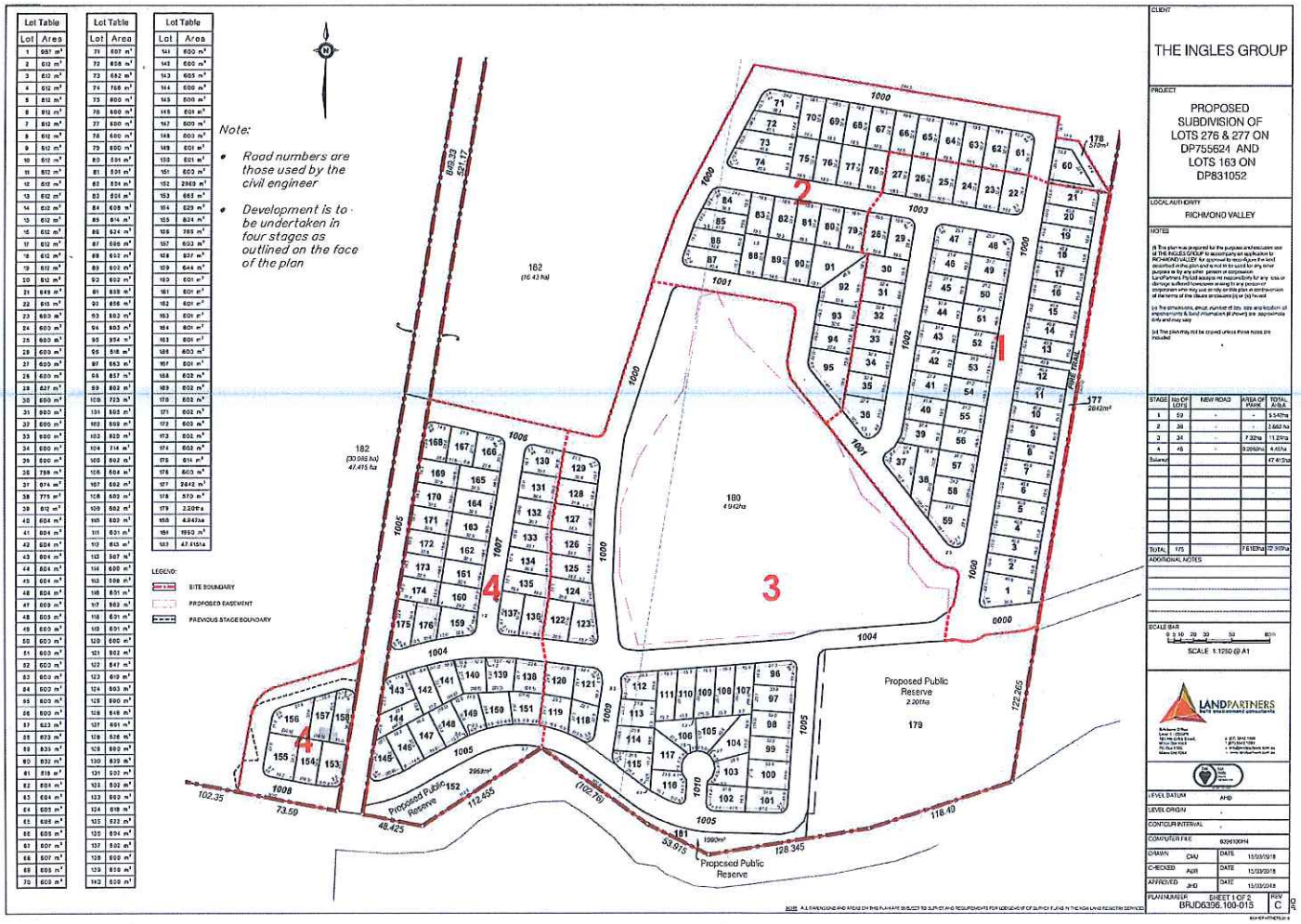
The above offer amounts to a total monetary contribution from Goldcoral Pty Ltd of $774,131 to acquit offset credits. We consider that this offer is more than generous given that the Iron Gates masterplan development does not specifically require offsets under the superseded Threatened Species Conservation Act 1995 or the current Biodiversity Conservation Act 2016.

We look forward to finalising this matter at your earliest convenience.

Kind Regards,

Graeme Ingles
Director
Goldcoral Pty Ltd

COPY


Lot Table
Lot Area
1 687 m²
2 613 m²
3 613 m²
4 612 m²
5 612 m²
6 612 m²
7 612 m²
8 612 m²
9 612 m²
10 612 m²
11 612 m²
12 612 m²
13 612 m²
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15 612 m²
16 612 m²
17 612 m²
18 612 m²
19 612 m²
20 612 m²
21 649 m²
22 613 m²
23 603 m²
24 603 m²
25 603 m²
26 603 m²
27 603 m²
28 603 m²
29 627 m²
30 600 m²
31 600 m²
32 600 m²
33 600 m²
34 600 m²
35 600 m²
36 759 m²
37 974 m²
38 775 m²
39 612 m²
40 604 m²
41 604 m²
42 604 m²
43 604 m²
44 604 m²
45 604 m²
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56 603 m²
57 623 m²
58 623 m²
59 633 m²
60 632 m²
61 618 m²
62 604 m²
63 604 m²
64 605 m²
65 605 m²
66 605 m²
67 607 m²
68 601 m²
69 603 m²
70 603 m²
Lot Table
Lot Area
71 607 m²
72 608 m²
73 662 m²
74 768 m²
75 600 m²
76 600 m²
77 600 m²
78 600 m²
79 600 m²
80 591 m²
81 591 m²
82 594 m²
83 591 m²
84 608 m²
85 614 m²
86 624 m²
87 606 m²
88 602 m²
89 602 m²
90 602 m²
91 609 m²
92 602 m²
93 603 m²
94 603 m²
95 594 m²
96 618 m²
97 657 m²
98 602 m²
99 723 m²
100 602 m²
101 602 m²
102 603 m²
103 602 m²
104 714 m²
105 602 m²
106 604 m²
107 602 m²
108 603 m²
109 602 m²
110 603 m²
111 631 m²
112 613 m²
113 607 m²
114 600 m²
115 599 m²
116 601 m²
117 603 m²
118 631 m²
119 601 m²
120 600 m²
121 602 m²
122 647 m²
123 619 m²
124 603 m²
125 600 m²
126 618 m²
127 601 m²
128 606 m²
129 603 m²
130 629 m²
131 602 m²
132 602 m²
133 619 m²
134 623 m²
135 604 m²
137 602 m²
138 600 m²
139 619 m²
140 608 m²
Lot Table
Lot Area
141 600 m²
142 600 m²
143 605 m²
144 600 m²
145 604 m²
146 601 m²
147 600 m²
148 603 m²
149 601 m²
150 601 m²
151 603 m²
152 2969 m²
153 665 m²
154 629 m²
155 624 m²
156 785 m²
157 603 m²
158 627 m²
159 644 m²
160 601 m²
161 601 m²
162 601 m²
163 601 m²
164 601 m²
165 601 m²
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168 602 m²
169 602 m²
170 603 m²
171 602 m²
172 602 m²
173 603 m²
174 614 m²
175 603 m²
176 603 m²
177 2642 m²
178 570 m²
179 2.209Ha
180 4.843ha
181 1990 m²
182 47.4151a
Note:
Road numbers are those used by the civil engineer
Development is to be undertaken in four stages as outlined on the face of the plan
LEGEND:
SITE BOUNDARY
PROPOSED EASEMENT
PREVIOUS STAGE BOUNDARY
868.33
521.17
182
(16.43 ha)
182
(30.0ha ha)
41.415 ha
180
4.912ha
Proposed Public Reserve
2.201ha
179
Proposed Public Reserve
Proposed Public Reserve
2958m²
102.35
73.59
48.425
112.435
(102.76)
53.913
1990m²
128.345
118.49
122.265
177
3842m²
178
570m²
CLIENT
THE INGLES GROUP
PROJECT
PROPOSED SUBDIVISION OF LOTS 276 & 277 ON DP755624 AND LOTS 163 ON DP831052
LOCAL AUTHORITY
RICHMOND VALLEY
NOTES
(i) This plan was prepared for the purpose and exclusive use of THE INGLES GROUP to accompany an application to RICHMOND VALLEY for approval to reconfigure the land described in the plan and is not to be used for any other purpose or by any other person or corporation. LandPartners Pty Ltd accepts no responsibility for any loss or damage suffered howsoever arising to any person or corporation who may use or rely on this plan in contravention of the terms of the clause or clauses (ii) or (iv) hereof.
(ii) The dimensions, areas, number of lots, size and location of easements & land information (if shown) are approximate only and may vary.
(iii) This plan may not be copied unless these notes are included.
STAGE | No OF LOTS | NEW ROAD | AREA OF PARK | TOTAL AREA
1 | 59 | - | - | 5.542ha
2 | 38 | - | - | 3.662 ha
3 | 32 | - | 7.22ha | 11.21ha
4 | 46 | - | 9.206ha | 4.461ha
Balance | | | | 47.415ha
TOTAL | 175 | | 7.61Ha | 72.349ha
ADDITIONAL NOTES
SCALE BAR
0 5 10 20 30 50 80m
SCALE 1:1250 @ A1
LANDPARTNERS
LEVEL DATUM AHD
LEVEL ORIGIN -
CONTOUR INTERVAL -
COMPUTER FILE 8096100H4
DRAWN CMJ DATE 15/03/2018
CHECKED AdR DATE 15/03/2018
APPROVED JHD DATE 15/03/2018
PLAN NUMBER BRJD6396.100-015
SHEET 1 OF 2 SHEETS
REV C
DWG

NSW GOVERNMENT | Office of Environment & Heritage

COPY

Our Ref: DOC18/218021
Your Ref: letter dated 29/03/18

Mr Graeme Ingles
Director Goldcoral Pty Ltd
PO Box 3441
Australia Fair QLD 4215

Dear Mr Ingles

Re: Draft Master Plan Iron Gates – Proposed Biodiversity Offsets Package

Thank you for your letter of 29 March 2018 responding to the further information requested by the Office of Environment and Heritage (OEH). I appreciate the opportunity to provide further input and apologise for the delay in responding.

In your letter you outline your proposed Biodiversity Offsets Package to address the biodiversity impacts of the proposed development.

The OEH generally agrees with your proposed Biodiversity Offsets Package (BOP) subject to the following points:

1. The proposed BOP indicates that 243 credits are required for the direct impacts to the existing vegetation, however the previous biobanking calculations submitted by the proponent to the OEH indicated that 313 credits were required. The OEH considers that the figure of 313 credits is an accurate calculation and these credits should be used for the BOP instead of the 243 credits proposed.

2. The proposed BOP indicates that rehabilitation works will be undertaken (in accordance with an approved plan) within the nominated 8.83ha of rainforest area to be protected on site, which we understand includes the crown foreshore area. This will include rehabilitating degraded areas and undertaking weed control and fencing. The OEH generally agrees with this, however the exact area will also need to be agreed. Further, the OEH would seek for a management plan to be approved for these works, either outside of, or included in, a biodiversity stewardship agreement.

3. The proposed BOP identifies that 86 credits would be generated by the rehabilitation of the degraded parts of the 8.83ha rainforest area and as such the proposal seeks to reduce the final credit requirement for the direct impacts of the proposed development by 86 credits. The OEH would agree to this reduction if the final credit requirement for the BOP following this reduction is 227 credits of Banksia shrubland (i.e. 313-86 =227).

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www.environment.nsw.gov.au

4. The 8.83ha rainforest area is proposed to be secured and managed under a biodiversity stewardship agreement. The OEH agrees with this approach, however the proponent would need to retire all credits generated from the biodiversity stewardship agreement site and pay the Total Fund Deposit (TFD) in full.

5. The proposed BOP identifies the potential indirect impacts of the proposed development on the adjoining retained vegetation in terms of biodiversity credits, but addresses these indirect impacts through onsite mitigation measures and previous amendments to the development layout to increase buffers. Accounting for and retiring indirect impact credits is best practice, however the OEH considers that the biodiversity conservation measures in points 1 – 4 above, other onsite mitigation measures, and the development layout changes will adequately address these indirect impacts of the development.

6. The proposal refers to costing for the TFD, and the costs for retiring credits and rehabilitation. The TFD and the cost of retiring credits will need to be determined by the Biodiversity Conservation Trust. The rehabilitation costs will either be determined through an approved management plan or incorporated into the TFD.

If the proposed Biodiversity Offsets Package for the proposed development accords with points 1 – 6 above, then we would be able to finalise the OEH response on the Draft Master Plan for the proposed development based on the outstanding biodiversity issues having been satisfactorily addressed.

If you have any further questions about this issue, Mr Krister Waern Senior Operations Officer, Regional Operations, OEH, can be contacted on (02) 6640 2503 or at krister.waern@environment.nsw.gov.au.

Yours sincerely

Dimitri Young 2 May 2018

DIMITRI YOUNG
Senior Team Leader Planning, North East Region
Regional Operations

Contact officer: KRISTER WAERN
(02) 6640 2503

cc: Mr Jon Stone, Department of Planning and Environment, PO Box 949, Tamworth NSW 2340; General Manager, Richmond Valley Council, Locked Bag 10, Casino NSW 2470

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14th May 2018

Dimitri Young
Senior Team Leader Planning, North East Region
Regional Operations
Locked Bag 914
COFFS HARBOUR NSW 2450

Dear Dimitri Young,

Re: Draft Master Plan Iron Gates – Proposed Biodiversity Offsets Package

We are responding to your letter dated 2nd May 2018, which acknowledges that the OE & H agrees with our proposed Biodiversity Offsets Package set out in our letter dated 29th March 2018 subject to the following points 1-6.

We are now responding to the 6 points set out in your letter dated 2nd May 2018.

1. Goldcoral accepts the OE & H figure of 313 credits to offset the direct impacts of the proposed development.

2. A plan showing the exact areas of the site to be protected, rehabilitated and fenced as part of the Biodiversity Offset Package are shown in the attached plan. A Rehabilitation Plan will be prepared and lodged for approval in due course.

3. Goldcoral accepts the OE & H calculation of 227 credits of Banksia shrub land that will remain after proposed rehabilitation works.

4. Goldcoral accepts that securing and managing the rehabilitation areas under a Biodiversity Stewardship Agreement will require that all credits generated need to be retired, and the Total Fund Deposit (TFD) paid in full.

5. Goldcoral agrees that the indirect impacts of the development are adequately addressed through biodiversity measures in points 1-4, other onsite mitigation measures, and the development layout changes that have occurred.

6. It is understood that the TFD and the cost of retiring credits will need to be determined by the Biodiversity Conservation Trust. It is also understood that the rehabilitation costs will either be determined through an approved management plan or incorporated in the TFD.

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With consideration of the above, it is noted that the proposed Biodiversity Offset Package accords with points 1-6 of the OE & H letter (dated 2nd May 2018) and is therefore requested that you finalise your response on the DRAFT Master Plan for the Iron Gates development at your earliest convenience.

The Draft Master Plan number BRJD6396.100-015 to be approved is the attached plan dated 6th April 2018 which has been amended slightly to accommodate matters raised by the OE & H.

Yours sincerely,

Graeme Ingles
Sole Director
Goldcoral Pty Ltd

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