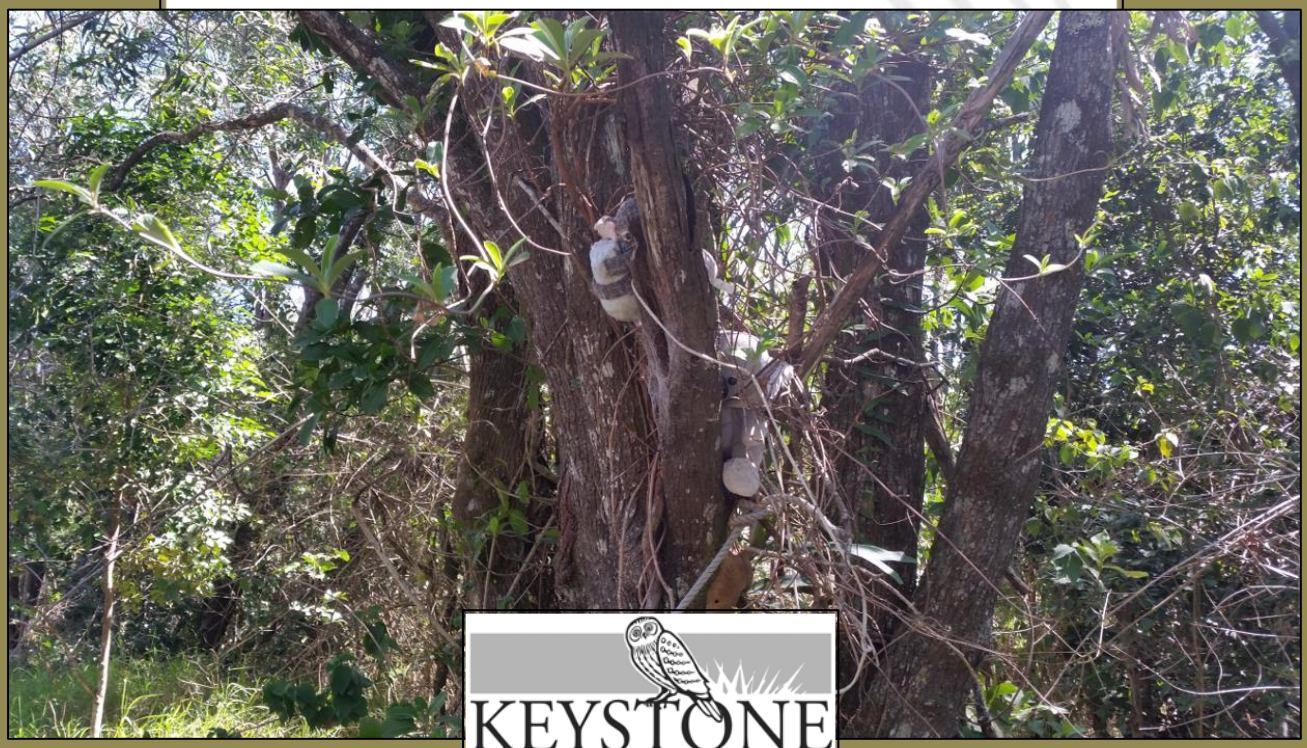
Updated Impact Assessment for Matters of National Environmental Significance

Lot 99 DP 823635
Hickey Street
Iluka
Clarence Valley LGA

For: Shellharbour Unit Trust (Stevens Group)

REF: CVC 14-695
July 2017



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REF: CVC 14 - 695
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Cover photograph: Toy Koalas placed in trees on the subject site by persons unknown.

Photo: E. Ashby, 14th February 2016

1 BACKGROUND

This Updated Impact Assessment for MNES (UIMNES) is provided as part of a package of assessment reports relevant to the proposed subdivision of residentially zoned land at Lot 99 DP 823635, Hickey Street, Iluka, in the Clarence Valley Local Government Area on the north coast of NSW. Other material that should be read in conjunction with this report include:

- Flora and Fauna Impact Assessment (Ashby and McTackett 2015) (FFIA);
- Additional Flora and Fauna Impact Assessment (Ashby and McTackett 2016) (AFFIA); and
- Addendum Impact Assessment (Ashby and McTackett 2017) (AIA)

Impact assessments are provided for Matters of National Environmental Significance (MNES) that have been recorded on or near the project area, or whose potential habitat may be impacted by works. These include one vulnerable species of fauna and two migratory species of birds:

- *Phascolarctos cinereus* Koala (Vulnerable)
- *Merops ornatus* Rainbow Bee-eater (Migratory)
- *Rhipidura rufifrons* Rufous Fantail (Marine/Migratory)

These impact assessments have been undertaken according to relevant guidelines (DEWHA 2009). The "significant impact criteria" applicable to each relevant category of MNES are discussed below.

Vulnerable species

The significance of the impact of an action on a vulnerable species is judged by the degree impact on the following factors:

- Size, area of occupancy or fragmentation of an important population;
- Critical habitat;
- Breeding cycle of an important population;
- Availability or quality of habitat;
- Invasive species;
- Disease; and
- Recovery strategies.

A threshold question therefore is whether the subject population is part of an "important population". An "important population" is one that is necessary for a species' long-term survival and recovery. This may include populations that are:

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

Also, critical habitat requires further definition. Such habitat may be, but not limited to, habitat identified in a recovery plan for the species as critical for that species; and / or habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act. "Habitat critical to the survival" of a listed vulnerable species (DEWHA 2009) refers to areas that are necessary:

- for activities such as foraging, breeding, roosting, or dispersal;
- for the long-term maintenance of the species (including the maintenance of species essential to the survival of the species, such as pollinators);
- to maintain genetic diversity and long term evolutionary development; or
- for the reintroduction of populations or recovery of the species.

In addition to these general considerations, the Referral Guidelines specifically addressing *Phascolarctos cinereus* Koala[1] have been addressed

Migratory species

The significance of the impact of an action on a vulnerable species is judged by the degree impact on the following factors:

- Area of important habitat;
- Invasive species in important habitat; and
- Life cycle of an ecologically significant proportion of the population.

These factors require definition of three terms: "important habitat", "ecologically significant proportion" and "population".

An area of **important habitat** is:

- 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
- habitat that is of critical importance to the species at particular life-cycle stages; and/or
- habitat utilised by a migratory species which is at the limit of the species range; and/or
- habitat within an area where the species is declining.

The **population** of a migratory species is the entire population or any geographically separate part of the population.

An **ecologically significant proportion** varies according to the species in question, as it depends on life cycle characteristics and population sizes. It is to be evaluated on a case-by-case basis and should include consideration of *inter alia* its population status, genetic distinctiveness and species specific behavioural patterns (for example, site fidelity and dispersal rates).

[1] '*EPBC Act Referral Guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital Territory),* Commonwealth of Australia, 2014'.

2 IMPACT ASSESSMENT - *PHASCOLARCTOS CINEREUS* KOALA

2.1 Ecological Profile

The Koala is listed as Vulnerable under the Schedules of the Environment Protection and Biodiversity Conservation Act (1999). It is also listed as Vulnerable under Schedule 2 of the Threatened Species Conservation Act (1995).

Controls are also in place under the *Native Vegetation Act 2003* and the *Environment Planning and Assessment Act 1979*, including the subordinate planning instrument State Environmental Planning Policy No. 44— Koala Habitat Protection (NRMMC 2009).

The Koala is a medium sized marsupial with large rounded ears, dense woolly coat, long limbs with strong claws and a very short tail (Martin et al. 2008). It spends majority of its time in tress only coming to the ground to move between trees (Smith 1979a). They can gallop swiftly across the ground and, are also excellent swimmers (Martin 1995). This species has an extensive, but disjunct distribution ranging from north-eastern Queensland to the south-east corner of South Australia (Department of the Environment 2015, ANZECC 1998).

With very specific dietary ranges, Koalas are restricted to eucalypt forests and woodland bearing certain favoured feed tree species (Martin 1995). They feed on foliage of more than 70 species of eucalypt and 30 non-eucalypt species with preferred species selected (OEH 2017a). In south eastern Australia, up to 24 species of Eucalyptus are known to be eaten by Koalas (Lee and Carrick 1989) with regional preferences apparent. In the south, preferred species include *Eucalyptus viminalis* Manna Gum, *Eucalyptus ovatus* Swamp Gum and *Eucalyptus globulus* Tasmanian Blue Gum while in the north, red gums (*Eucalyptus tereticornis* Forest Red Gum and *Eucalyptus camaldulensis* River Red Gum), Grey Gums (*Eucalyptus punctata* Grey Gum and *Eucalyptus propinqua* Small-fruited Grey Gum) and *Eucalyptus microcorys* Tallowwood are important (Martin et al. 2008).

The suitability of habitat for Koalas is highly influenced by a number of variables including the size and species of trees, soil nutrients, climate, rainfall, and disturbance history (NSW NPWS 2003). There is considerable local and regional variation in preferences for feed tree species (Martin and Handasyde 1995) and the food preferences may also change with season (Lee and Carrick 1989).

A study by Lunney et al. (2002) identified a decline in the population of Koalas at Iluka in the Clarence Valley LGA. The study identified major causes for the decline in the species with threats of habitat loss, traffic and dogs being significantly due to urban development. Other threats included fire, feral pigs and disease which causes low fertility within the species (Lunney et al. 2002).

Due to the low nutritional value of their diet, Koalas are inactive for up to 20 hours a day (Menkhorst and Knight 2001). They spend most of the day resting in trees and are most active in the late afternoon and at night, which coincides with a peak in feeding behaviour (Hindell et al.

1985). They usually rest low in the fork of a tree and climb to the canopy at night to feed (Martin et al. 2008).

Breeding occurs between October and May with females potentially producing one offspring each year (McLean 2003). Cubs remain dependent on their mother until they become independent at 12 months of age (Department of the Environment 2015) but will still associate with her (such as feeding in the same tree) until dispersing to their own territory (Martin et al. 2008). Males may not set up a new territory until 2 or 3 years of age and females often breed in a home range adjacent to their natal site (Martin et al. 2008). Juveniles may continue to wander until up to 5 years of age (Eberhard 1978 quoted in Lee and Carrick 1989).

The effects of disease on Koalas are of growing concern with Chlamydia being the most well-known disease present in Koalas (Department of the Environment, 2015). Chlamydia may limit the reproductive potential of Koala populations and in turn can cause decline in the population. Other diseases that afflict this species include anaemia, tick infections, malignant blood disease and pneumonia (Dickens 1978, quoted in Lee and Carrick 1989). A new disease has also been recently discovered with Koala Retrovirus (KoRV) thought to be responsible for numerous conditions including leukaemia and an immunodeficiency syndrome (Tarlinton et al. 2005).
Historically, the principal predators of Koalas were likely to have been Aborigines and the dingo (Lee and Carrick 1989). Today, the only known predators are *Aquila audax* Wedge-tailed Eagle and *Ninox strenua* Powerful Owl, both of which are known to take juveniles (Eberhard 1978, quoted in Lee and Carrick 1989).

Threats to the conservation of this species (in order of their general importance throughout NSW) include habitat loss and fragmentation, habitat degradation, road kills, dog attacks, fire, logging, disease, severe weather conditions, swimming pools and overbrowsing (NSW NPWS 2003, DECC 2008a). Surveys across NSW indicate that, since 1949, Koala populations have been lost from many areas, particularly on the southern and western edges of their distribution (Reed et al. 1990, quoted in NSW NPWS 2003). Despite the presence of suitable habitat, Koalas still occur in fragmented populations perhaps demonstrating the difficulty of recovery of populations in fragmented habitats suffering ongoing threats (NSW NPWS 2003, DECC 2008a).

Food trees have been categorised as primary, secondary and supplementary based on the measured level of use by Koalas (NSW NPWS 2003, DECC 2008a). Further, the potential value of habitat to Koalas has been determined by the relative abundance of primary, secondary and supplementary food trees (NSW NPWS 2003, DECC 2008a).

2.2 Koalas and their habitat on the site

Suitable foraging habitat for this species is provided by the following 4 forage tree species scattered across the site:

- *Eucalyptus tereticornis* Forest Red Gum (Primary food tree) 80+ individuals recorded, most in the north eastern corner of the site and along the eastern boundary
- *Corymbia intermedia* Pink Bloodwood (Secondary food tree) 364 individuals recorded, concentrated in the western and eastern boundaries and scattered along in 3 narrow bands

in the centre of the site
- *Eucalyptus propinqua* Small-fruited Grey Gum (Secondary food tree) 3 individuals noted, in in the north eastern corner
- *Lophostemon confertus* Brush Box (Supplementary food tree) 181 individuals recorded, with a similar distribution to Pink Bloodwood

These food tree species occupy approximately 4.1 hectares of the site and their distribution is shown in Figure 1 overleaf.

No other potential food tree species as listed under State Environmental Planning Policy 44, the Approved Recovery Plan or the Koala Plan of Management (Clarence Valley Council 2015) were found on site.

A Koala was recorded on the subject site during survey in 2014. A single image of this species was captured on 14th October 2014 by a camera trap placed on the ground near an existing but overgrown track in the site's western half.

The animal was walking along the ground, heading from south to north. As it was not in the canopy, it was likely moving through the site. It is not known if it forages on site, but suitable forage trees are scarce in the area where it was detected (see Figure 1).

The camera image initiated additional targeted survey for this species on site. All relevant survey activities included:

- Incidental searches for scats, tracks and signs; October 2014, November 2014, February 2016, May 2016, June 2016.
- Searches for and analysis of predator scats; October 2014, November 2014, February 2016, May 2016, June 2016.
- Camera traps; 240 camera trap hours October 2014, 12,288 camera trap hours November 2014.
- Koala Scat Counts; 14 counts using the Spot Assessment Technique of Phillips and Callaghan (2011).
- Call broadcast; 2 occasions October 2104.
- Spotlighting; 2 occasions October 2104.
- Forage tree mapping; October 2014, November 2014, February 2016, May 2016, June 2016, supplemented by resident survey (date unknown).

Other than the initial camera image, the Koala was not detected on site again, and no scats attributable to Koalas were found beneath trees.

Figure 1: Distribution of Koala food trees, the Koala recorded on site (K) and the proposed development.

2.3 Koala in the local area

Locals have posted recent Koala sightings on social media:

- In early January 2017, video was posted of a Koala being relocated by Essential Energy into bushland at the corner of Hogan and Elizabeth Street. This is 300m to the west of the proposed development area. This animal was reportedly chased by dogs when it took refuge up a power pole;
- In June 2017, a photograph was posted of a Koala in a tree, reportedly taken in April 2017 in Cypress Close. This is 460m north west of the development area.
- In May 2016, video was posted of a Koala climbing a tree in bushland, reportedly from "Frazer Reef Iluka". Presumably this is Frazers Reef Road, which is in Iluka Nature Reserve and between 920m and 1.5km north east of the development area.

It is unclear if these are multiple sightings of one individual, but the markings of the relocated animal and the one in the photograph are similar.

The presence of Koalas in the Iluka area more generally was investigated systematically by Koala experts (Biolink Ecological Consultants 2012) as part of Council's finalization of *the Comprehensive Koala Plan of Management for the Ashby, Woombah and Iluka localities in the Clarence Valley LGA* (Clarence Valley Council 2015). During that study, no evidence of koala activity was recorded beneath any trees during transect searches, nor were any koalas sighted. However, Koala scats were opportunistically observed beneath food trees in two locations: at the northern end of the golf course (920m north of the development area) and near the Old Ferry Crossing Picnic Area (1.7km north west of the development area).

The Biolink report concluded that the peninsula probably only supports a small number of animals (perhaps 5 to 10) that are highly dispersed. Its area of occurrence was defined as being from the southern tip of the peninsula to Shark Bay in the north. It was also reported that anecdotal evidence indicates the presence of at least one breeding female. Presumably, this arises from the 2007 record of Clarence Valley WIRES of a female and joey involved in a vehicle collision near Shark Bay; the joey died but the female was released. Notably, this location is at the northern extremity of the defined area of occurrence and 4km to the north of the development area.

The Biolink report concludes that, although Iluka sightings are encouraging, they do not allow for the conclusion that the population has recovered. They also highlight the role of repeated hot fires in suppressing the recovery of the local population of the Koala.

Fire was one of the processes identified by Lunney et al. (2002) as partially responsible for the demise of the local Koala population, which was considered common in Iluka prior to 1970. Habitat loss and direct mortality from repeated fires, together with clearing, plus vehicle strike, dog attack, and disease have all combined to result in a serious population decline. Most importantly, modelling in that study showed that, without enhanced immigration from the metapopulation, improvements in mortality and fertility are insufficient for recovery of the Iluka population.

Thus, the management of surrounding lands in Bundjalung National Park and the Woombah area are critical for the future of the Iluka Koala population. Biolink noted that the pattern of repeated fires in the Woombah area had prevented recovery of that population.

Therefore, in the absence of landscape-scale management (particularly of fire) that boosts immigration from the populations to the north, the functional extinction of the Iluka Koala population as predicted by Lunney et al. (2002) is not belied by the presence of a small number of animals in the Iluka area.

2.4 Referral Guidelines

Assessment against the habitat attributes as defined in the Referral Guidelines are provided in the table below.

Attribute	Score	Appraisal
Koala occurrence	+1	A single image of a Koala moving along the ground was captured during survey activities in 2014. Despite expert sampling around the site by Biolink in 2012, intensive follow-up survey in 2014, and vigilant local residents actively sampling the site from 2015 to 2017, there are no other records of Koala or Koala activity from the site
Vegetation structure and composition	+1 or +2	The site supports forest or woodland, and although it supports 4 species listed as used by Koalas, only one (Forest Red Gum) is a preferred food tree species. This led Koala expert Dr Steve Phillips of Biolink Environmental Consultants to assign a score of 1 for this attribute (as quoted in Clarence Environment Centre Submission to Clarence Valley Council, dated 10th February 2016). The habitat on site has been highly modified and degraded, and the distribution of the 4 food tree species is very uneven. The largest concentrations of the preferred trees (Forest Red Gum) are within the proposed parks in the north eastern corner, and along the eastern boundary. The largest concentrations of secondary and supplementary species occur along the western boundary, also within the proposed park. The development area will remove Koala food trees that occur in a series of narrow widely-separated bands.
Habitat connectivity	+1	The subject site is separated from vegetation in Iluka Nature Reserve to the east by Iluka Road, a main thoroughfare with high volume, high speed traffic. The records held by WIRES of mortality and injury to Koalas is testament to its deadly nature and absence of effective Koala passage measures.

Attribute	Score	Appraisal
		Surrounding habitats in other directions are variously fragmented by open paddocks, residential development, local roads and natural barriers such as unsuitable habitats (wetlands), and water bodies (Clarence River). However, the site is part of a large scale vegetated link from Iluka Nature Reserve on the east to other vegetation in the north west, and eventually to the north. It is estimated that the habitat on site is part of a more or less contiguous landscape between 300 and 500 hectares.
Key existing threats	+1	Lunney et al (2002) investigated the demise of the koala population at Iluka. The study of the Iluka population was conducted via radiotracking individuals over a two-year period. After the two-year period, 11 koalas were known to have died. After a ten-year period, there were 28 known deaths of koalas on the Iluka peninsula. The major causes of death in the area included disease and trauma through motor vehicle accidents. The high mortality rate was concurrent with observed low female fertility in the Iluka area. The study revealed that even with substantial improvements to mortality and fertility, the modelled population fell towards extinction. WIRES records from 1992 to 2015 provided by Council do not demonstrate a diminution in vehicle trauma over that period. There are no publicly-available statistics post-2015. Nevertheless, if there are fewer vehicle collisions, it would be more likely due to fewer Koalas, rather than a lessening of the threat posed by cars, given the continued that the number of registered vehicles in the Clarence Valley LGA continued to rise from 39,186 in 2015 to 39,905 in 2015 to 2016 (Australian Bureau of Statistics 2017). Evidence posted on social media by local residents demonstrated that dogs continue to pose a current threat.
Recovery value	+1	The site overall contains relatively meagre Koala habitat, with 80% of the site absent of food trees, and the vegetation generally in poor condition, with large infestations of serious weeds. Locally, other habitat is fragmented by clearing, development and unsuitable habitat. The site is directly connected to suitable habitat only to the west, separated in other directions by cleared paddocks, a golf course, fire breaks, and Iluka Road. Expert assessment concluded that the site is within an area likely to support only a very small population of Koalas, widely dispersed (Biolink 2012). Modelling has demonstrated that this

Attribute	Score	Appraisal
		population is on a downward trajectory to functional extinction, unless there is significant renewed immigration from the surrounding metapopulation, along with significant increase in fertility and decrease in mortality from disease and trauma (Lunney et al. 2002). Expert analysis has also shown that the population to the north from which immigrants would come has itself continued to decline (Biolink 2012). Biolink (2012) relied on a tentative anecdotal record of the presence of a single breeding female as evidence of a breeding population. The unavoidable conclusion therefore is that the Koala population in Iluka is not large or robust. Its disease status is unknown. While there may be breeding occurring, the numbers are very low, and still vulnerable to threats such as dogs and vehicle trauma (e.g. WIRES record of the death of a joey on Iluka Road from a vehicle collision in 2007). Despite the presence of barriers, threats and poor quality habitat, the site is part of a large-scale partially-fragmented vegetated link from east to habitats to the west, north west, and eventually north. The proposal will retain and manage for conservation the areas of best Koala habitat (i.e. the areas of highest concentration of preferred food trees) and the configuration of the reserved areas will maintain connectivity from east to west and north to south.
TOTAL	5 or 6	There is the potential for this to be important habitat for the Koala and requires consideration in the decision pathway shown in Figure 2 of the Referral Guidelines. As the proposal will remove only 1.5 hectares of such habitat, it is not necessary to refer the proposal to the Department of Environment and Energy.

2.5 Potential impact and mitigation

Although the area of Koala habitat to be removed is unlikely to impact on habitat critical to its survival and does not require referral, best practice dictates that this habitat deserves careful consideration. Therefore, the standard best environmental practice of avoiding, minimising and ameliorating impacts has been applied so that interference with the recovery of the Koala is avoided.

The proposal is consistent with these requirements in a number of ways:

- The habitat that is suitable for the Koala occurs in widely-separated bands of forage trees. The proposal will retain the best of these - those in the largest and densest clumps, and those recognised as primary food trees. The configuration of the retained vegetation in the parks on the western and eastern boundary and in the north eastern corner will also serve to retain the general pattern of connectivity available to the Koala in the existing landscape.

- The parks will be subject to conservation management, as part of an Approved Management Plan, to be funded and implemented as part of the Community title. Due to the proximity of residences, repeated hot fires will be excluded from the parks. This will prevent direct Koala mortality, and will also allow the existing food trees to mature and thus provide best quality browse.

- It is important that during all clearing activities and vegetation management, that disease is not spread that could impact on the Koala habitat (i.e. Phytophthora cinnamomi and Myrtle Rust). It is recommended that relevant best practice hygiene protocols are observed. This is considered to be highly effective in control of the accidental introduction of these pathogens. It is also recommended that all planting material is sourced from reputable suppliers, and only material certified free of these pathogens used for revegetation and landscaping.

- The retained vegetation in the north eastern corner provides a corridor of >100m width, which is considered to be moderately effective as a mitigation measure.

- The use of Water Sensitive Urban Design Principles are considered here as sufficient to protect the existing hydrological characteristics of the retained surrounding bushland. Moreover, other adverse indirect impacts are to be controlled as part of the Approved Management Plan.

- In line with Office of Environment and Heritage recommendations, yards are to be fenced so that Koalas are excluded, thus separating pet dogs and Koalas. This is considered by the Referral Guidelines as a highly effective mitigation measure. Dogs will also be prohibited from the parks.

- Although Koala-proof fencing should prevent Koalas from entering yards, it is recommended that tethered rope is provided as a means of escape from backyard pools in case of emergency.

- Wide verges are to be landscaped to facilitate Koala movement, according to best practice recommendations in McAlpine (2007). This will include planting of primary food tree species at appropriate spacings.

- It is noted that the major source of road trauma for Koalas is on Iluka Road, which is a busy thoroughfare with a high speed limit. The threat of high speed and high volume traffic in Iluka Road is not within the control of the development. However, the design of the internal road system is Koala-friendly, as it separates the development from bushland and minimises the crossing of wildlife corridors. The short distances of the internal roads and the use of

road-calming measures (e.g. speed bumps, speed limits), warning signs and a resident education package will serve to improve driver behaviour.

- Education package to be provided for residents regarding the Koala in their midst. Although this is considered to have low effectiveness as a mitigation tool, responsible driver behaviour and pet ownership are essential standards that can only be achieved by community education.

2.6 Impact Assessment

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

lead to a long-term decrease in the size of an important population of a species, or

Response:

The Iluka peninsula probably supports a very small (5-10 individuals) population of widely dispersed Koalas that may or may not be breeding (Biolink 2012). It has been suffering a long-term decrease since the 1970s, and has been declared functionally extinct unless significant reductions in mortality, significant increases in breeding success and significant increases of immigration from the surrounding metapopulation occur (Lunney et al. 2002). Biolink (2012) established that the surrounding metapopulation has not recovered (probably due to repeated hot fires). Although the small number of Koalas persisting in Iluka is encouraging, Dr Steve Phillips concluded that this is not yet evidence of its recovery (Biolink 2012).

The proposal will permanently remove approximately 14.11 hectares of highly modified vegetation, of which only 1.5 hectares is recognised Koala habitat. The proposed configuration of retained vegetation is likely to maintain connectivity and the rehabilitation of the retained parks will improve the habitat available.

The proposal is unlikely to lead to a long-term decrease in the size of an important population.

fragment an existing important population into two or more populations, or

Response:

The proposal will remove a small area of poor condition habitat, largely focused within the centre of the subject site. The proposal will retain 4.8 hectares of suitable, habitat of the best quality within bushland parks that will be managed for conservation purposes. The site will continue to provide movement corridors through the site to surrounding habitats with vegetation along the western boundary, along the eastern boundary and at the site's north eastern corner. The proposed landscaping through the development area is also intended to facilitate Koala movements.

The proposal is unlikely to fragment an existing important population into two or more populations.

adversely affect habitat critical to the survival of a species, or

Response:

The habitat assessment tool and the Referral Guidelines indicates that the proposal will not adversely affect habitat critical to the survival of the species.

disrupt the breeding cycle of an important population, or

Response:

Breeding cycle disruption is caused by interference with breeding habitat and / or mortality of breeding animals. There is only anecdotal evidence of the presence of a single breeding female in Iluka (Biolink 2012) while there is good evidence of the death of a joey in a vehicle collision on Iluka Road (WIRES record, 2007).

Breeding Koalas have not been recorded on site.

modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or

Response:

The small scale of habitat loss and disruption is unlikely to result in a decline in this species.

result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species´ habitat, or

Response:

The subject site contains many serious transformer weeds, including Lantana with the greatest infestations being in the Pink Bloodwood – Brush Box open forest vegetation. The proposed development will result in the suppression and control of these weeds, with the bushland parks to be managed under an approved management plan.

The proposal will not further increase the likelihood of such invasive species becoming established, as it will implement weed control measures in areas where no such controls are currently being undertaken.

introduce disease that may cause the species to decline

Response:

The most prevalent health condition for this species is Chlamydia, which has been found in all local populations of Koalas studied (Clarence Valley Council 2015).

Despite this dearth of information, it is unlikely that the development will influence the level of disease in this species.

Vegetation works have the potential to introduce plant pathogens (such as *Phytophthora cinnamomi* and Myrtle Rust) that have the potential to damage Koala habitat. Such risks will be managed by observation of best practice hygiene protocols.

interferes substantially with the recovery of the species.

Response:

The National Koala Conservation and Management Strategy (2009-2014) identifies a number of primary threats to the survival of this species and their populations, as habitat loss, fragmentation and degradation of habitat. Other threats include over-browsing of foraging resources, disease, natural disaster, vehicle collisions, predation by dogs and climate change. The impact of climate change is already apparent. Changes known include:

- Changes to structure and chemical composition of koala food trees;
- Changes to composition of plant communities and the range of important habitat species, including food and shelter trees;
- Increased frequency and intensity of drought;
- Increase frequency and intensity of wildfire;
- Sea level changes which may affect habitats of coastal and island populations;
- Changes in average temperature, rainfall and humidity levels with consequent impacts on the extent of areas capable of sustaining koalas; and
- Contractions in the distribution of koala populations.

The Approved Recovery Plan (DECC 2008) has identified that the overarching objective is to reverse the decline of the koala in NSW, ensure adequate protection, management and restoration of koala habitat and to maintain healthy breeding populations of koalas throughout their current range.

The proposal will require the removal of approximately 1.5 hectares of suitable habitat made up of 4 species of food trees. The best areas will be retained.

The threats of dogs will be controlled by fencing of yards that excludes Koalas.

Local traffic will be slow, and the local roads are short. Traffic calming measures will be introduced.

Connectivity between habitat patches will be maintained.

However, the major threats to the survival of Iluka Koalas – high speed, high volume traffic on Iluka Road and repeated hot fires in surrounding lands preventing immigration – are outside of the control of the development.

The proposed development will not interfere with the recovery objectives.

A referral to the Department of Environment and Energy is considered unnecessary.

3 IMPACT ASSESSMENT - *MEROPS ORNATUS* RAINBOW BEE-EATER

3.1 Ecological Profile

The Rainbow Bee-eater is listed as a Migratory species under the Schedules of the Environment Protection and Biodiversity Conservation Act (1999), arising from Japan Australia Migratory Bird Agreement. Its conservation status across its range in Australia is secure.

This species is a distinctive and colourful medium sized bird, with a long slim curved bill and a long tail.

It is found throughout mainland Australia, as well as eastern Indonesia, New Guinea and, rarely, the Solomon Islands. In Australia it is widespread, except in desert areas, and breeds throughout most of its range, although southern birds move north to breed. Birds in temperate and sub-tropical Australia migrate as far north as New Guinea to breed.

When breeding, both males and females select a suitable nesting site in a sandy bank and dig a long tunnel (average length: 89.4 cm) leading to a nesting chamber, which is often lined with grasses. Both parents incubate the eggs and both feed the young, sometimes with the assistance of auxiliaries.

Its habitat requirements are simply an elevated perch from which to watch for prey and a ground substrate in which to dig their breeding burrow. Because their prey is entirely caught on the wing they are not dependent on any vegetation type: most often found in open forests, woodlands and shrublands, and cleared areas, usually near water, but also on farmland with remnant vegetation and in orchards and vineyards. It will use disturbed sites such as quarries, cuttings and mines to build its nesting tunnels.

This species was observed foraging along the open forest edges of the site and entering a breeding burrow in the intact sand dune along the northern boundary.

3.2 Impact Assessment

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;

Response:

This species habitat requirements are simply an elevated perch from which to watch for prey and a ground substrate in which to dig their breeding burrow. Because their prey is entirely caught on the wing they are not dependent on any vegetation type: most often found in open forests, woodlands and shrublands, and cleared areas, usually near water, but also on farmland with remnant vegetation and in orchards and vineyards. It will use disturbed sites such as quarries, cuttings and mines to build its nesting tunnels.

This species was observed foraging along the open forest edges of the site and entering a breeding burrow in the intact sand dune along the northern boundary The extent of suitable habitat on site will be retained within conservation bushland and parks. Adequate area of habitat, particularly breeding habitat will be retained.

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

Response:

European Red Foxes dig up the breeding burrows of this species. This invasive species was recorded on site during survey. Management of this feral predator will be explicit within the Approved Management Plan.

seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

Response:

This species was observed entering a breeding burrow in the intact sand dune along the northern boundary of the subject site. This area of habitat and surrounding vegetation will be retained within a bushland park for conservation purposes. It is therefore considered that a significant negative impact is unlikely to occur in accordance with the criteria set out by the Department of the Environment and Energy.

A referral to the Department is considered unnecessary for this species.

4 IMPACT ASSESSMENT - *RHIPIDURA RUFIFRONS* RUFOUS FANTAIL

4.1 Ecological Profile

Rhipidura rufifrons Rufous Fantail is a Terrestrial Migratory species listed under the Schedules of the Environment Protection and Biodiversity Conservation Act (1999). It is not listed under the Threatened Species Conservation Act (1995).

This species occurs in wet sclerophyll forests, often in gullies that are dominated by eucalypts, including *Eucalyptus microcorys* Tallowwood, *Eucalyptus cypellocarpa* Mountain Grey Gum, *Eucalyptus radiata* Narrow-leaved Peppermint, *Eucalyptus pilularis* Blackbutt and *Eucalyptus resinifera* Red Mahogany (Department of the Environment 2016).

Important habitat features for this species include moist, dense habitats, including mangroves, rainforest, riparian forests and thickets, and wet eucalypt forests with a dense understorey. When on passage a wider range of habitats are used including dry eucalypt forests and woodlands and Brigalow shrublands (Department of the Environment 2015).

Foraging occurs mostly within the low to middle layers in forest and sometimes in or below the canopy or on the ground (Higgins et al. 2006). Foraging is done mostly aerially by sallying but can also glean from foliage and fallen debris. Their food source is predominantly insects with spiders also sometimes consumed (Cameron 1985).

This species was observed foraging across the site in pairs and as individuals. It was also observed nesting in the vegetation at the western end of the site. The proposal will require the removal of 14.11 hectares of highly degraded vegetation. The area of vegetation to be removed by the proposal is small and in poor condition, in regards to what is available, and what will remain available within the local area.

4.2 Impact Assessment

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;

Response:

The proposed development will remove 14.11 hectares of poor quality habitat for the proposal. The area in which this species was observed nesting will be retained within a bushland park for conservation purposes. The extent of suitable to remain on site will be rehabilitated and managed for weeds under an Approved Management Plan.

It is noted these species are highly mobile. The proposal will retain nesting sites and vegetated areas, it is also proposed there will be planting of locally native trees within the street scape verge areas – this will minimise the total loss of foraging habitat with the subject site.
Suitable habitat for this highly mobile species is largely available within the local area as protected lands, including Bundjalung National Park and Iluka Nature Reserve. The loss of poor condition vegetation is unlikely to place further significant stress to these migratory species within the locality.

The habitat to be removed by the proposal is judged not to be important for this 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

Response:

The occurrence of *Rattus rattus* Black Rat and invasive vine species are known to be harmful to this species. The habitat modification that will result from this development is not likely to introduce or favour invasive species that will be harmful to this species or its habitat. The proposal will remove several exotic weeds along the pathway (such as *Lantana camara* Lantana) thus, reducing the probability of invasive weeds establishing.

seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

Response:

The ecologically significant proportion of a population for this species is defined in the relevant guideline (Department of Environment 2015) as 48,000 individuals. The same guidelines propose that a significant impact will probably be triggered if 3,400 individuals are affected.

The suitable vegetation to be removed represents a small area of what is widely available in the local area.

The vegetation to be modified by the proposal is unlikely to disrupt an ecologically significant proportion of the population.

A referral to the Department is considered unnecessary for this species.

5 CONCLUSION

The potential impact of the proposed subdivision on the three Matters of National Environmental Significance found on site has been undertaken:

- *Phascolarctos cinereus* Koala (Vulnerable species)
- *Merops ornatus* Rainbow Bee-eater (Migratory species)
- *Rhipidura rufifrons* Rufous Fantail (Migratory species)

The assessment attributes detailed in the Referral Guidelines for Koala indicate that while the site probably contains important habitat, the scale of loss is too small to require referral to the Department of Environment and Energy.

Similarly, the assessments of impact on the migratory birds *Merops ornatus* Rainbow Bee-eater and *Rhipidura rufifrons* Rufous Fantail concluded that the action does not require referral to the Department.

However, given the controversy and interest generated by the proposal, it is to be referred to the Department for determination.

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