

**KOALA PLAN OF MANAGEMENT  
for a  
Proposed Caravan Park  
at  
Lot 105 DP 260058  
247 Mungo Brush Road,  
HAWKS NEST  
NSW**



Prepared by:

**WILDTHING**




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Job No: 12399

October 2024



Project Name	Updated Koala Plan of Management for a proposed caravan park at Lot 105 DP 260058 (No. 247) Mungo Brush Road, Hawks Nest NSW.	
Project Number	12399	
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#### Disclaimer

This report has been prepared in accordance with the proposal provided by the Client and outlined within this report. All findings, conclusions or recommendations contained within this report are based upon the data and results collected under the times and conditions specified in the report and are only applicable for the proposal considered within this report. This report has been prepared for use exclusively by the Client. No responsibility for its use by any other party is accepted by WILDTHING Environmental Consultants.

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## **1.0 INTRODUCTION**

Wildthing Environmental Consultants has been engaged by Hawks Nest Village Pty Ltd (the proponent) to prepare an updated Koala Plan of Management (KPoM) for a proposed caravan park at Lot 105 DP 260058 (No. 247) Mungo Brush Road, Hawks Nest NSW (Figure 1.1).

The purpose of this document is to provide an Individual Koala Plan of Management (IKPoM) for the site to satisfy the requirements of (SEPP Biodiversity and Conservation 2021 Chapter 4 'Koala habitat protection 2021') and the Approved Recovery Plan for the Hawks Nest and Tea Gardens Endangered Koala Population Recovery Plan – Hawks Nest and Tea Gardens Endangered Koala Population (DEC, 2003). The KPoM will provide suitable controls to ensure the proposal encourages the proper conservation and management of Koala Habitat within the site.

This KPoM has been initiated as a result of studies completed for the Draft Koala Plan of Management for North Hawks Nest (KPoM) (Biolink, 2005) which has identified areas of Core Koala Habitat within the study area and impact area. It is important to note that the provisions of the KPoM have not been finalised, endorsed or adopted. However, with respect to the context of the Draft Plan, a Koala Plan of Management has been undertaken for the proposal.

This report has been based on the guidelines for Individual Koala Plans of Management set out in the Department of Urban Affairs and Planning Circular No. B35.

## **1.1 AIMS OF THE KOALA PLAN OF MANAGEMENT**

This Koala Plan of Management aims to manage the Koala population that may occur within the study area (Figure 1.1) and minimise the proposal's contributions to threats faced by Koalas through:

- Increasing the Koala habitat linkage within the study area
- Minimising impacts of vehicle strike within the study area
- Retaining and managing Koala habitat within the study area
- Protecting Koalas and their habitat during construction
- Protecting Koalas from dog attack within the study area.

## **1.2 THE PROPOSED DEVELOPMENT**

The proposal is for a caravan park with 148 long term dwelling sites and 27 long term camping sites. The proposal also includes community facilities for use by the occupants of the park, roads and several drainage areas.

During the construction phase of the development, stormwater infiltration areas will be shaped into the ground to the north and west of the caravan park. These areas will be surrounded by berms / bunds (300mm high) to hold the water in this area to infiltrate. These areas are designed to control mounding of excess water from heavy rain events during the operational phase of the proposal.

Overall, there will be 'some' flow entering around twice a year on average, but the 300mm maximum storage depth will be sufficient to capture and hold water from a 100yr storm.

During the construction of the stormwater infiltration areas, topsoil containing the seedbank will be stripped and saved aside while the ground is shaped. Once shaping has been completed the saved topsoil with seedbank will be spread back over the infiltration area and tree species will be planted as outlined in the VMP (Wildthing Environmental Consultants 2024).

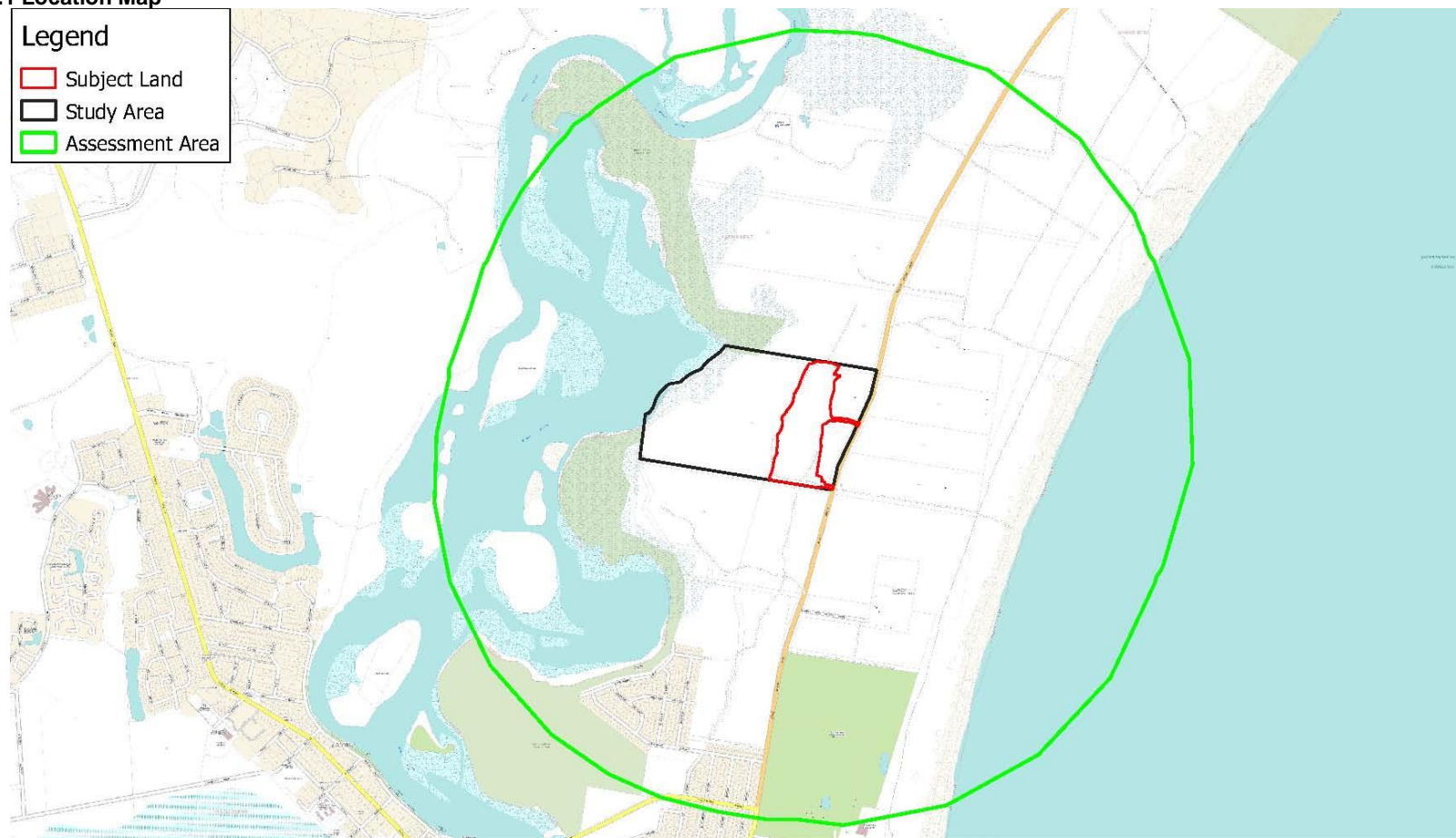
Biofiltration raingardens will be installed along the western and northern perimeter of the caravan park. These areas will also be planted with native species as outlined in the VMP (Wildthing Environmental Consultants 2024).

The landscaping plan includes an east west movement corridor for native fauna species such as Koalas located to the north of the caravan park (overlapping with the northern stormwater infiltration area). Details of the planting and maintenance of this corridor has been outlined in the VMP (Wildthing Environmental Consultants 2024).

A combination of koala grids, koala friendly and koala excluding fencing has been designed to aid koala movement safely through and around the proposal. The proposal also includes a perimeter road and two entrance ways.

The proposal will be positioned predominantly on a highly modified area which has been subject to previous sand mining. however, 1.60ha of core Koala habitat will be required to be removed. Three specimens of the preferred koala feed trees are required to be removed for the proposal. The proposal includes an additional 344 preferred koala food tree plantings consisting of *Eucalyptus robusta* (Swamp Mahogany) and *Eucalyptus microcorys* (Tallowwood) to be planted within the east-west proposed corridor. The proposed development layout is shown in Figures 1.2 and 1.3.

Figure 1.1 Location Map



Job Ref	12399
A4 Scale	1:22,000
<p>Disclaimer: While all reasonable care has been taken to ensure the information contained on this map is up to date and accurate, no guarantee is given that the information portrayed is free from error or omission. In addition the spatial accuracy of the map is wholly dependant on source data. Please verify the accuracy of all information prior to use. Development footprint areas should be used for indicative areas only.</p>	

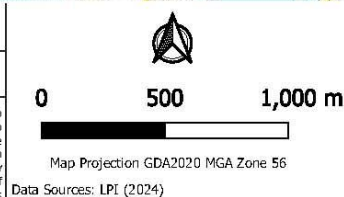


Figure 1.1

**Location Map**

247 Mungo Brush Road  
Hawks Nest, NSW  
21 October 2024

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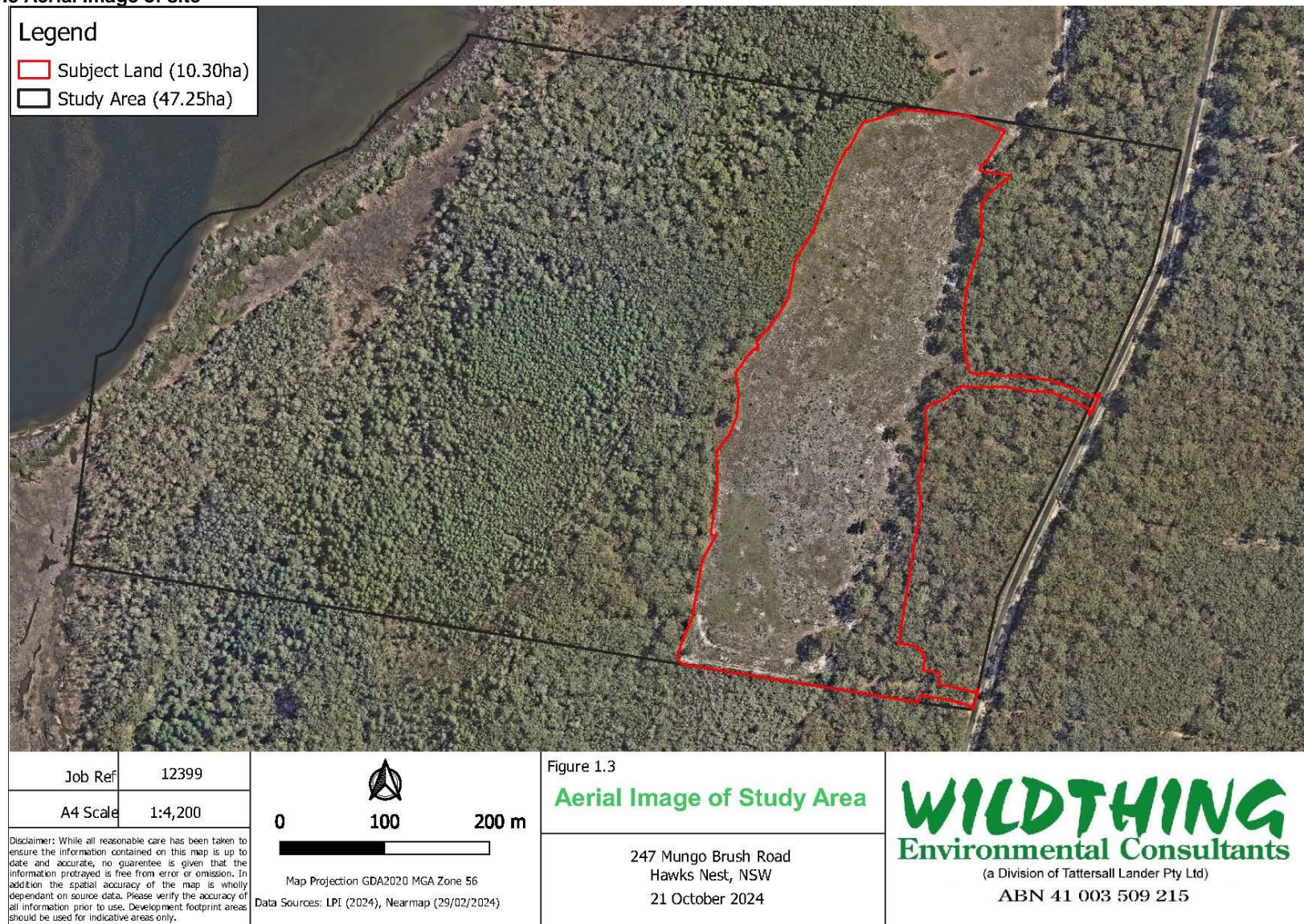


Figure 1.2 Development Plans





Figure 1.3 Aerial Image of site





## 2.0 NORTH HAWKS NEST KOALA PLAN OF MANAGEMENT WORKING DRAFT NO. 1

The Koala Plan of Management (KPoM) Draft No. 1 (Biolink, 2005) for the North Hawks Nest Area (approximately 700ha) included lands between the southern boundary of Myall Lakes National Park and the northern limits of the Hawks Nest village, bounded in the west by the Myall River and in the east by the Pacific Ocean. This area also formed part of the Endangered Hawks Nest and Tea Gardens Endangered Koala Population.

The study for the KPoM established that the feeding ecology of koalas in the North Hawks Nest study area is predominantly focused on *Eucalyptus robusta* (Swamp Mahogany). Other koala food tree species present in the study area include *Eucalyptus microcorys* (Tallowwood), *Eucalyptus tereticornis* (Forest Red Gum) and the naturally occurring *E. robusta* x *E. tereticornis* hybrid, and the threatened *Eucalyptus parramattensis* subsp. *decadens*. (Drooping Red Gum).

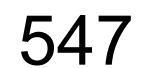
Swamp Sclerophyll Forest occurring within the western portion of the study area outside the proposed development footprint contained significant numbers of the preferred Koala feed tree species *Eucalyptus robusta* (Swamp Mahogany). Three specimens of *Eucalyptus robusta* were located within the development footprint. Only a small number of specimens of preferred Koala feed tree species in the form of *Eucalyptus microcorys* (Tallowwood) (16 specimens in total) were present in the strip of open forest in the east of the study area alongside Mungo Brush Road. Studies completed by a Koala expert Steve Phillips for the Draft Koala Plan of Management for North Hawks Nest (Draft KPoM) (Biolink, 2005) have mapped the area containing *E. microcorys* as High and Medium Use Core Koala Habitat. This area of Core Koala Habitat also extended further east over Mungo Brush Road where specimens of *E. microcorys* were also present. According to the Draft KPoM areas containing Tallowwood even if under 15% of tree species present would be regarded as Potential Koala Habitat. Given the assumed presence of the Koala within the subject site all treed areas were considered to constitute Core Koala Habitat. Part of the area of Swamp Sclerophyll Forest in the west of the study area has also been identified as High Use Core Koala Habitat in the KPoM. As the extent of Swamp Sclerophyll Forest containing specimens of *E. robusta* is significant then the extent of Core Koala Habitat may be larger than that indicated in the KPoM.

No evidence of Koala Activity was recorded within the site during fieldwork for the Biodiversity Development Assessment (BDAR) (Wildthing Environmental Consultants, 2024a). Previous assessment by Eco Logical Australia detected koala through acoustic recording (Eco Logical Australia 2023). A number of records of Koalas (NSW DCCEEW 2024) were present within the immediate local area with a small number of records dating back to around 2002 are present within the study area.

It is important to note that the provisions of the KPoM have not been finalised, endorsed or adopted. However, with respect to the context of the Draft Plan, an Individual Koala Plan of Management has been undertaken for this proposal.

The distribution of Potential Koala Habitat and Core Koala Habitat identified within the KPoM is shown in Figures 2.1 and 2.2 respectively.







### 3.0 SITE CONTEXT

The site wholly encompasses Lot 105 DP 260058 (approximately 47ha in size) and is located at 247 Mungo Brush Road, Hawks Nest, NSW within the Mid Coast Council Local Government Area (LGA). The site was bordered by the Myall River to the west and Mungo Brush Road to the east. Under the Great Lakes Environmental Plan (Great Lakes Council, 2014) the eastern portion is zoned RU2 Rural Landscape with the majority of the western portion zoned C2 Environmental Conservation. The development footprint covers a total area of 10.30ha and was contained within the area zoned RU2 Rural Landscape. The development layout has been predominantly restricted to areas of lower biodiversity value with some low maintained native vegetation (area previously subject to past sandmining), with the majority of intact native vegetation being retained. A total of 1.60ha of better-quality native vegetation in the form of Open Forest/Woodland will be impacted. The development also avoids the removal of any area of the Endangered Ecological Community; Swamp Sclerophyll Forest occurring to the west of the development footprint.

#### 3.1 RETAINED NATIVE VEGETATION

Five Plant Community Types (PCTs) were determined to be present within the site, being:

- PCT 3544 - Coastal Sands Apple-Blackbutt Forest (18.97ha);
- PCT 4006 - Northern Paperbark-Swamp Mahogany Saw-sedge Forest (16.08ha)
- PCT 4000 - Northern Estuarine Paperbark Sedge Forest (7.24ha)
- PCT 4026 - Estuarine Sea Rush Swamp Oak Forest (1.88ha);
- PCT 4091 - Grey Mangrove-River Mangrove Forest (2.63ha).

Plant Community Types within the site are shown in Figure 3.1 and 3.2. An overlay of Core Koala Habitat under the KPOM (Biolink, 2005) is shown in Figure 3.3. Note that the Core Koala Habitat as mapped by Biolink (2005) includes areas without canopy, hardstand (road) and does not include all the Tallowood trees considered by Biolink to be of importance to Koala in this area.

##### PCT3544 Coastal Sands Apple-Blackbutt Forest

PCT3544 Coastal Sands Apple-Blackbutt Forest occupied 18.97ha the eastern portion of the study area and occurred over the entirety of the development footprint (impact area) in various degrees of disturbance. The most common canopy species was *Eucalyptus pilularis* (Blackbutt), *Angophora costata* (Smooth-barked Apple) and *Corymbia gummifera* (Red Bloodwood). *Eucalyptus piperita* (Sydney Peppermint) was also present in lower numbers. Very small numbers of *Eucalyptus microcorys* (Tallowood) were also present in the far east. Common mid-storey species were *Banksia serrata* (Old Man Banksia) and *Nematolepis squamea* (Satinwood). The shrub layer was diverse and included species such as *Bossiaea rhombifolia*, *Leucopogon lanceolatus* (Lance Beard Heath), *Monotoca elliptica* (Tree Broom Heath) and *Leptospermum polygalifolium* subsp. *polygalifolium* (Teatree). Common groundcovers included *Pteridium esculentum*





**Legend**

- |              |   |   |
|--------------|---|---|
| Subject Land | PCT 3544 Coastal Sands Apple-Blackbutt Forest (18.97ha)               | PCT 4026 Estuarine Sea Rush Swamp Oak Forest (1.88ha) |
| Study Area   | PCT 4006 Northern Paperbark-Swamp Mahogany Saw-sedge Forest (16.08ha) | PCT 4091 Grey Mangrove-River Mangrove Forest (2.63ha) |
| Design Plans | PCT 4000 Northern Estuarine Paperbark Sedge Forest (7.24ha)           |   |

Job Ref	12399
A4 Scale	1:5,000

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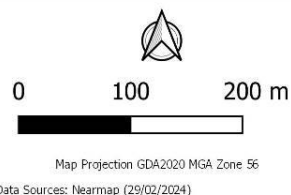


Figure 3.1

**Plant Community Types**


247 Mungo Brush Road  
Hawks Nest, NSW

2 August 2024

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Job Ref	12399	 0 100 200 m Map Projection: GDA2020 MGA Zone 56 Data Sources: Nearmap (29/02/2024)	Figure 3.2 Core Koala Habitat under the KPOM (Biolink, 2005)	<b>WILDTHING</b> Environmental Consultants (a Division of Tattersall Lander Pty Ltd) ABN 41 003 509 215
A4 Scale	1:5,000		247 Mungo Brush Road Hawks Nest, NSW 21 October 2024	

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(Bracken Fern), *Lomandra longifolia* (Spiny Mat Rush), *Pomax umbellata* (Pomax) and *Themeda australis* (Kangaroo Grass).

PCT 3544 was broken down into zones based on vegetation condition. An area of 8.49ha of this community which was subject to past sand mining was void of tree and consisted of low maintained native groundcovers. Smaller areas of Moderate Condition had a remnant tree canopy and a modified understorey. Good quality areas were found to be generally intact.

PCT 4006 – Northern Paperbark-Swamp Mahogany Saw-sedge Forest

PCT 4006 – Northern Paperbark-Swamp Mahogany Saw-sedge Forest occupied 16.08ha in the western portion of the site to the west of the development footprint. This assemblage was intact and in very good condition. Common canopy species were *Eucalyptus robusta* (Swamp Mahogany) and *Melaleuca quinquenervia* (Broad-leaved Paperbark). Common mid-storey species included *Livistona australis* (Cabbage Tree Palm). Common ground covers were *Blechnum indicum* (Swamp Water Fern), *Baloskion tetraphyllum* subsp. *meiostachyum* (Plume Rush) and *Gahnia clarkei* (Sword Grass).

PCT 4000 - Northern Estuarine Paperbark Sedge Forest

PCT 4000 - Northern Estuarine Paperbark Sedge Forest occupied 7.24ha within the western portion of the site. This assemblage was intact and in very good condition. Common canopy species were *Casuarina glauca* (Swamp Oak) and *Melaleuca quinquenervia* (Broad-leaved Paperbark).

PCT 4026- Estuarine Sea Rush Swamp Oak Forest

PCT 4026 - Estuarine Sea Rush Swamp Oak Forest occupied 1.88ha in the far west of the site. This area was largely composed of a low ground cover of *Juncus kraussii* (Sea Rush) and *Baumea juncea* (Bunchy Sedge).

PCT 4091 - Grey Mangrove-River Mangrove Forest

PCT 4091 - Grey Mangrove-River Mangrove Forest occupied a 2.63ha narrow strip of land in the far west of the site. This assemblage was characterised by almost entirely by *Avicennia marina* (Grey Mangrove).



#### 4.0 KOALA PLAN OF MANAGEMENT

The SEPP44 Circular No. B35 - Individual Koala Plan of Management (Department of Urban Affairs and Planning 1995) provides a guideline as to the contents of an Individual Koala Plan of Management. These plans are required to accompany DAs which affect core koala habitat, in local government areas for which a comprehensive plan of management has not been completed.

Included below in Table 4.1 is a list of matters that should be considered when undertaking an individual plan of management.

**Table 4.1: Requirements for an Individual Koala Plan of Management and were addressed in this Plan**

Number	Criteria	Section in this report
i.	An estimate of population size	4.1.3
ii.	Identification of preferred feed tree species for the locality and extent of resource available	4.2
iii.	An assessment of the regional distribution of koalas and the extent of alternative habitat available to compensate for that to be affected by the actions	4.1.1, 4.1.2
iv.	Identification of linkages of core koala habitat to other adjacent areas of habitat and movement of koalas between areas of habitat. Provision of strategies to enhance and manage these corridors	4.3, 6.2
v.	Identification of major threatening processes such as disease, clearance of habitat, road kill and dog attack. Provision of methods for reducing these impacts	5.0
vi.	Provision of detailed proposals for amelioration of impacts on koala populations from any anticipated development within zones of core koala habitat	6.0
vii.	Identification of any opportunities to increase size or improve condition of existing core habitat, this should include lands adjacent to areas of identified core koala habitat	6.2
viii.	The plan should state clearly what it aims to achieve (for example, maintaining or expanding the current population size or habitat area)	1.1
ix.	The plan should state criteria against which achievement of these objectives is to be measured (for example, a specified population size in a specific time frame or the abatement of threats to the population)	8.0
x.	The plan should also have provisions for continuing monitoring, review and reporting. This should include an identification of who will undertake further work and how it will be funded	8.0, 9.0

#### **4.1 ESTIMATE OF POPULATION SIZE AND REGIONAL DISTRIBUTION**

##### **4.1.1 REGIONAL DISTRIBUTION**

In NSW, Koalas have declined such that the NSW Government has prepared several Koala Strategies. The latest Strategy (DPE 2022) indicates several 'strongholds' for Koala in the mid-north and north coast regions. The hotspots relevant to the region are located at Port Macquarie, Crescent Head and Coffs Harbour. Outside of the strongholds, Koalas are present in the Karuah-Manning IBRA subregion from Fern Bay to Manning Point and west to Gloucester, Dungog and Hexham. BioNet records show that the species' distribution is reasonably even across the IBRA subregion.

##### **4.1.2 DISTRIBUTION AND ABUNDANCE IN THE LGA**

Koalas occur across the whole of the MidCoast LGA. However, as identified in the MidCoast Koala Conservation Strategy (2024) the density of Koala varies across the LGA. For ten areas identified in the LGA, the populations range from high-very high density at Kirrawak to low densities at Comboyne, Hawks Nest and Wallingat NP (MidCoast Council 2024).

The NPWS study completed in 2024, and which informed the MidCoast Koala Conservation Strategy (2024) did not map Koala habitat occupancy across the whole LGA. That study mapped likely Koala habitat, which included large areas in the north and north-west of the LGA between Wingham, Mount Goerge and Upper Bowman, north to Nowendoc.

##### **4.1.3 LOCAL POPULATION**

According to the KPoM (Biolink, 2005) a small population of approximately 30 koalas occurs within the approximately 700ha North Hawks Nest study area. A Bionet Atlas database search (DPE, 2024), showed there were two additional koala sightings from within the site, one in 2004 and one in 2002 (Figure 4.1). There were also a number of koala sightings recorded within a close proximity to the site from between 1980-2004. The most recent and closest koala records to the site include a 2019 record approximately 400m to the south-east of the site, four 2017 records approximately 830m to the south of the site within residential Hawks Nest, and four 2015 and three 2016 records approximately 845m north within connected bushland to the site.

No Koalas were recorded within the site despite targeted searches for koala in accordance with the Biodiversity Assessment Method (BAM) for the Biodiversity Development Assessment Report (BDAR) (Wildthing Environmental Consultants, 2024). However, an assessment by Eco Logical detected the koala on site in November and December 2022 through acoustic recording within the site (Eco Logical Australia 2023).

Consistent with the conclusions of the MidCoast Koala Conservation Strategy (MidCoast Council 2024) and the Recovery Plan for the Hawks Nest and Tea Gardens Endangered Koala

(*Phascolarctos cinereus*) Population (NSW NPWS 2003), the Hawks Nest population is very low density. It is noted that since the Biolink studies (2005) and the Recovery Plan (NSW NPWS 2003), there has not been a comprehensive inventory or estimation of koala numbers in this part of the LGA. The recent Koala Conservation Strategy (MidCoast Council 2024) contained results of a study on the detectability of and plant community type preference of Koalas, however that study did not contain any estimate of the population size.

Based on the population estimates in the Biolink (2005) studies, the study area may support at most two Koalas. This estimate is supported by the MidCoast Council's Koala Conservation Strategy (2024) which indicates that home ranges for Koalas in low density populations would be about 30 to 40 ha. The study area is about 45 ha.

#### **4.2 IDENTIFICATION OF PREFERRED FEED TREE SPECIES FOR THE LOCALITY AND EXTENT OF THE RESOURCE AVAILABLE**

The study established that the feeding ecology of koalas in the North Hawks Nest study area is predominantly focused on *Eucalyptus robusta* (Swamp Mahogany). Other koala food tree species present in the study area include *Eucalyptus microcorys* (Tallowwood), *Eucalyptus tereticornis* (Forest Red Gum) and the naturally occurring *E. robusta* x *E. tereticornis* hybrid, and the threatened *Eucalyptus parramattensis* subsp. *decadens*. (Drooping Red Gum).

Relatively large numbers of *Eucalyptus robusta* (Swamp Mahogany) a listed Preferred Koala Feed Tree Species under SEPP (Biodiversity and Conservation) 2021, Ch 3 Koala Habitat Protection 2020 were present within the 16.08ha PCT 4006 - Northern Paperbark-Swamp Mahogany Saw-sedge Forest which was entirely located to the west of the development footprint. A total of 19 trees listed as Preferred Koala Feed Tree Species were present within the site to the east of the western boundary of the development footprint. These 19 species included 16 specimens of *Eucalyptus microcorys* (Tallowwood) and 3 specimens of *Eucalyptus robusta* (Swamp Mahogany). The proposal will result in the removal of all 3 specimens of *E. robusta*. The locations of the 19 trees in the east of the site is shown in Figure 4.2.

Appendix D of the MidCoast Council Koala Conservation Strategy (2024) provides a list of primary and secondary feed trees. This list includes a much broader range of species that can be preferred by Koalas in the LGA. No additional primary feed species identified in the list occur within the study area.

The Recovery Plan for the Endangered Population at Hawks Nest (NSW NPWS 2003) identifies that two species, *Eucalyptus microcorys* and *E. robusta* are important for this population. *E. robusta* may be more important, which is supported by historical studies in nearby populations which show a strong correlation between the presence of Koala and *E. robusta* (NSW NPWS 2003).



None of the SAT surveys in study area recorded any recent Koala use, as identified by the absence of scats and / or scratch marks.

**Legend**

- Subject Land
- Study Area
- Bionet Species Records

**Figure 4.1**

**Bionet Atlas Koala Records**

247 Mungo Brush Road  
Hawks Nest, NSW

31 July 2024

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Map Projection: GDA2020 MGA Zone 56  
Data Source: Nearmap (29/02/2024)  
Bionet Atlas (NSW DCCEEW 2024b)

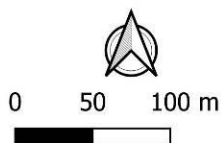


Figure 4.2 Vegetation Condition of PCT 3544 within the subject land



Job No.	12399
A4 Scale	1:3,800

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Map Projection: GDA2020 MGA Zone 56  
Data Source: Nearmap (29/02/2024)

Figure 4.2

**Vegetation Condition of PCT 3544 within Subject Land**

247 Mungo Brush Road  
Hawks Nest, NSW

2 August 2024

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ABN 41 003 509 215



#### 4.3 IDENTIFICATION OF CORE KOALA HABITAT AND HABITAT LINKAGES

Studies completed by a Koala expert Steve Phillips for the Draft Koala Plan of Management for North Hawks Nest (KPoM) (Biolink, 2005) have mapped the area containing *E. microcorys* in the far east of the site as High and Medium Use Core Koala Habitat (2.1, 2.2 & 3.2). This area of Core Koala Habitat also extended further east over Mungo Brush Road where specimens of *E. microcorys* were also present. According to the Draft KPoM areas containing Tallowwood even if under 15% of tree species present would be regarded as Potential Koala Habitat. As Koalas were recorded within this area during studies conducted in 2004 areas containing Tallowwood were considered to constitute Core Koala Habitat. Part of the area of Swamp Sclerophyll Forest in the west of the study area has also been identified as High Use Core Koala Habitat in the KPoM.

As the extent of Swamp Sclerophyll Forest containing specimens of *E. robusta* is significant then the extent of Core Koala Habitat may be larger than that indicated in the draft KPoM (Biolink 2005). Further, it should be noted that the Core Koala Habitat mapping by Biolink (2005):

- Included areas of vegetation with no canopy trees
- Included areas of hardstand on Mungo Brush Road
- Excluded areas of Swamp Mahogany
- Did not include all Tallowwoods present within the study area.

Areas of mapped Core Koala Habitat within the site are separated by an open area of land (past area of sand mining) that consists of low maintained ground covers with no trees. This gap ranges between 100 – 180m in width and is around 170m between the two areas of core Koala habitat either side. This gap would represent an unsafe crossing for Koalas given the numbers of Wild Dogs/Dingos recorded on site during the BDAR assessment (Wildthing Environmental Consultants, 2020). The proposal located predominantly over the cleared area will present an obstacle for Koalas crossing the open area of ground. The proposal includes the implementation of a 50m wide east-west habitat corridor in the far north of the subject land over the open area which would likely enhance the connection between the two areas of mapped Core Koala Habitat. The corridor will be composed of planted Koala Feed Tree Species *Eucalyptus robusta* (Swamp Mahogany) and *Eucalyptus microcorys* (Tallowwood) and naturally regenerating groundcover.

Koalas can move freely immediately south of the site to the east and west through native vegetation, however the cleared gap continues to the north of the site. Koalas can freely move north-south through the site as there are only narrow vehicle tracks as barriers. Access roads for the proposed development are relatively narrow and are unlikely to significantly impact the movement of Koalas.

## 5.0 IDENTIFICATION OF MAJOR THREATENING PROCESSES

The NSW Office of Environment and Heritage (OEH, 2014) and Commonwealth Department of the Environment (DoE, 2014) identify a series of threats to the Koala. These are:

- Loss, modification and fragmentation of habitat;
- Predation by feral and domestic dogs;
- Intense fires that scorch or kill the tree canopy;
- Road-kills;
- Human-induced climate change, particularly drought;
- Disease;
- Other threats to eucalypts such as Myrtle Rust.

All of the other threats have the potential to occur within the site. These threats, apart from Myrtle Rust, are consistent with the threats identified in the Hawks Nest Tea Gardens Endangered Koala (*Phascolarctos cinereus*) Population Recovery Plan (NSW NPWS 2003).

### Loss, Modification and Fragmentation of Habitat

Clearing of Koala habitat was considered by the MidCoast Council's Koala Conservation Strategy (2024) to be the largest threat to Koala. The strategy lists many sources of habitat clearing from local development to State Significant Developments and the harvesting operations carried out on public and private native forests. Private native forests in the LGA approved for operations between 2007 and 2015 ranged from <1 ha to over 24,000 ha, with a cumulative total not listed (MidCoast Council 2024). The strategy further states that about 11% of the LGA is covered by private native forestry agreements.

Approximately 1.60ha of Koala habitat is required to be removed for the proposal. Three preferred Koala feed trees (*Eucalyptus robusta*) would be removed as part of the proposal. By contrast, about 16 ha of forest containing *E. robusta* would be retained in the land to the west of the development footprint. In the eastern portion of the study area, forest which provides a north-south connection to other habitat areas would also be retained, and this forest contains the preferred koala feed tree *Eucalyptus microcorys*. All these trees would be retained and the locations of the 19 trees in the east of the site is shown in Figure 4.2.

Considering the above, the overwhelming majority of Koala food trees would be retained within the study area, and would be subject to management under the VMP (Wildthing 2024). Further, an additional suite of Koala feed trees would be planted in the 50 m wide wildlife corridor on the northern boundary of the study area. The number of trees proposed to be installed is 344, with the majority being *Eucalyptus microcorys* (Wildthing 2024). The installation of 344 Koala feed trees represents a 114:1 compensatory ratio.

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Predation by Feral and Domestic Dogs

A number of Wild Dogs/Dingos were recorded within the site during the BDAR assessment for the development (Wildthing Environmental Consultants, 2020). These dogs would present a threat to any Koala present within the site. The management of wild dogs is beyond the scope of the proposed development.

Domestic dogs do kill and injure Koalas. MidCoast Council lists domestic dog attack as one of the leading causes of Koala mortality on the MidCoast LGA (MidCoast Council 2024). The proposed development would ban the keeping of domestic dogs within the development. Therefore, the risk of domestic dog attack is reduced but not eliminated. Local residents can, and do, walk dogs on the study area, and there is nothing preventing the roaming of domestic dogs onto the proposed development. In these circumstances, LGA animal compliance measures would apply to any roaming or stray dog.

Road-Kills

Collision with vehicles is a significant cause of Koala mortality across their entire distribution. Extensive measures have been put in place in some parts of the State to eliminate the risk of vehicle strike on Koalas. The Hawks Nest Tea Gardens Endangered Koala (*Phascolarctos cinereus*) Population Recovery Plan (NSW NPWS 2003) lists three key 'blackspots' for Koala deaths arising from vehicle strike. These were at the Singing Bridge over the Myall River, Kingfisher Avenue and Mermaid Avenue both in Hawks Nest.

Mungo Brush Road, adjacent to the proposed development is a dual carriage semi-rural road, with a speed limit of 80km hr<sup>-1</sup>. There are no measures on the existing roadway to limit the risk of vehicle strike.

There would be two entry/exit points from the proposed development onto Mungo Brush Road and several internal roads. All roads would be limited to 15 km hr<sup>-1</sup>. At this speed, even during the night, there would be enough stopping distance to significantly limit the risk of vehicle collision with Koalas that may be traversing the vegetation in the east of the study area.

Human-induced climate change, particularly drought:

Koalas are subject to a number of health concerns from more severe weather conditions as a result of climate change, including starvation, dehydration and heat stress. Eliminating or managing the risks of climate change and drought are beyond the scope of the proposed development. However, the retention of native vegetation in the west and east of the study area and the proposed installation of 344 Koala food trees would assist in providing refuges during drought.



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Disease

Many Koalas are infected with chlamydia, a disease that plagues koala populations. The Hawks Nest Tea Gardens Endangered Koala (*Phascolarctos cinereus*) Population Recovery Plan (NSW NPWS 2003) does not identify whether the population is indeed infected. Similarly, the MidCoast Council's Koala Conservation Strategy (2024) does not clearly identify whether any or all the Koala populations in the LGA are infected.

The proposed development is not considering any specific biosecurity measures to counter the prevalence or spread of disease within the Koala population. However, the proposal seeks to minimise stress to Koalas through retention of habitat, prohibiting domestic dogs, limiting vehicle strike risk and providing a safer corridor connecting the forests in the east and the west of the study area.

Other threats to eucalypts such as Myrtle Rust.

Myrtle Rust has the potential to impact to affect Koala Feed Tree Species. The proposed development is not considering any specific biosecurity measures to counter the prevalence or spread of disease within the Myrtaceous species present. However, plantings will be sourced from stock without Myrtle Rust.

## 6.0 PROVISIONS OF METHODS FOR REDUCING THESE IMPACTS ON SITE

This will include:

- Protection of Koalas during construction activities;
- Installation of wildlife corridor;
- Avoidance of vehicle collision;
- Fencing;
- Protection from drowning;
- Protection of habitat within the remainder of habitat within the site.

### 6.1 PROTECTION OF KOALAS DURING CONSTRUCTION ACTIVITIES

Protection of Koalas during construction activities must include:

- A qualified, licenced and experienced fauna ecologist is to be present during vegetation clearance operations;
- Immediately prior to removal the fauna ecologist is to thoroughly inspect all areas to be cleared for fauna, particularly species such as Koala;
- Impact areas will be clearly defined on the ground. Trees requiring removal are to be clearly marked before any works are undertaken to prevent any unnecessary clearing.
- If a Koala is observed within the site, then a 100m radius exclusion zone is to be implemented and a spotter to be stationed observing the koala's movements. The koala is to leave on its own accord.
- Any sightings of koalas exhibiting signs of symptoms of disease are to be reported to the local Koala Preservation Society for capture and treatment.

### 6.2 INSTALLATION OF WILDLIFE CORRIDOR

Consistent with the MidCoast Council's Koala Conservation Strategy (2024) and Objective 5 of the Recovery Plan (NSW NPWS), the development proposes a corridor to connect areas of Koala habitat between the east and west of the study area. The area proposed for the corridor currently does not contain any trees and would pose a hostile environment for Koalas to traverse because there are no readily available escape structures (e.g., poles or trees).

The Koala habitat restoration guidelines (DPE 2022) state that viable Koala populations can be maintained where 40-60% of the landscape is forest or woodland, and where patches are 50-100 ha or more in size. If the patches are smaller, connectivity between patches is important. Connecting habitat patches is therefore important.

The landscaping plan includes a 50m wide east west movement corridor for native fauna species such as Koala between the two areas of mapped Core Koala Habitat. The corridor will be composed of planted Koala Feed Tree Species *Eucalyptus robusta* (Swamp Mahogany) in the west, *Eucalyptus microcorys* (Tallowwood) and naturally regenerating groundcover. Where the ground surface is lower



and toward the west of the corridor, the Swamp Mahogany trees will be installed. Where there are increases in site elevation, the Tallowwood trees will be installed. Because soils will be stripped and stockpiled, it is anticipated that there would be regeneration of native species to provide some level of infill between the trees.

The Koala habitat restoration guidelines (DPE 2022) indicate that vegetated corridors should be at least 20 m wide, and that any increase in connectivity is valuable. The proposed wildlife corridor is consistent with the guidelines and would result in the connection of the 6.7 ha in the east to the 30 ha in the west of the site. While these patches together do not exceed the 50 ha, there is native vegetation adjacent to the study area and is about 563 ha (Figure 4.3 of the BDAR, Wildthing 2024).

### **6.3 FENCING AND GRIDS TO DIRECT KOALA MOVEMENT AND PROTECT KOALA HABITAT**

Koala grids will be strategically positioned at the end of each access road leading into the development to discourage koala from entering the development via the roads. This will minimise vehicle and koala interactions. The Koala fence is to be installed within the designated areas, which have been designed to funnel koala away from the entry points but will not exclude koala from the site. While Koalas are not encouraged within the proposed development, they may on occasion enter the site. If a Koala proof fence was erected around the entire development, this would require further tree and shrub removal and may result in instances where Koalas are unable to exit the site of their own accord. Limiting vehicle strike and prohibiting dogs, while providing some connectivity through the site is a reasonable solution, given the low-density population present.

Aesthetically pleasing rural fencing (i.e. post and rail or 5 strand plain wire) is to be installed within the designated areas as per Figure 6.1. This will allow permeability of the site by fauna, provide a visual and physical barrier to humans, and allow any fauna within the site to escape, and not be pushed hard up against a solid/impermeable fence. The fencing is to be installed and maintained in perpetuity.



Figure 6.1 Koala fencing layout

**Legend**

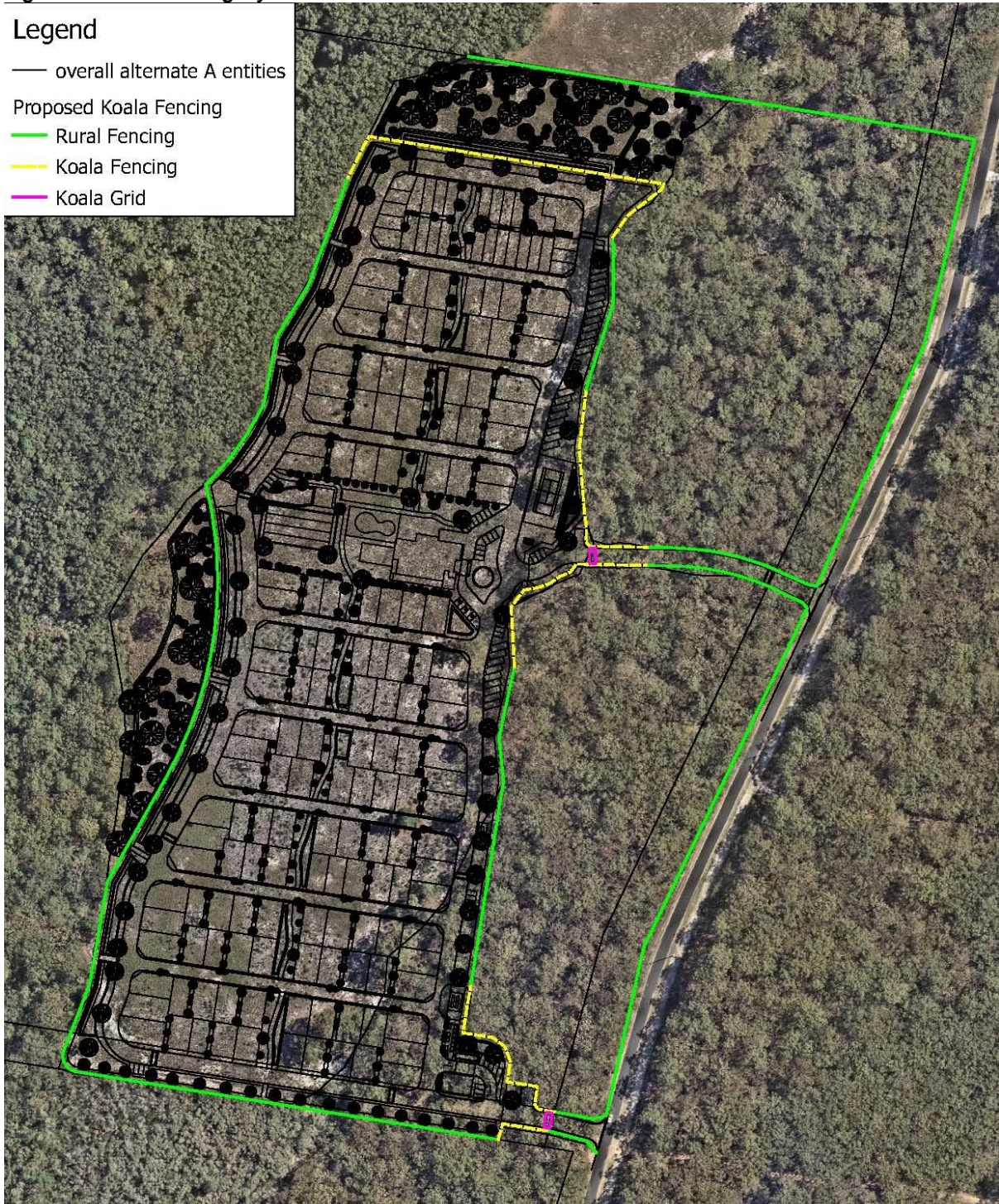
— overall alternate A entities



Proposed Koala Fencing

— Rural Fencing

— Koala Fencing

— Koala Grid



Job No.	12399	 0 50 100 m	Figure 6.1	 (a Division of Tattersall Lander Pty Ltd) ABN 41 003 509 215
A4 Scale	1:2,500		Proposed Koala Fencing	
<small>Disclaimer: While all reasonable care has been taken to ensure the information contained on this map is up to date and accurate, no guarantee is given that the information portrayed is free from error or omission. In addition the spatial accuracy of the map is wholly dependant on source data. Please verify the accuracy of all information prior to use. Development footprint areas should be used for indicative areas only.</small>		Map Projection GDA2020 MGA Zone 56 Data Source: Nearmap (29/02/2024)	247 Mungo Brush Road Hawks Nest, NSW 22 October 2024	



#### **6.4 EDUCATIONAL SIGNAGE**

Signage is to be installed at key locations along the fencing with the primary aim to alert residents of the environmental significance of the retained vegetation and activities that are prohibited in this area. The text, design and location of the signs are to be identified in consultation with Council. If signs are damaged or removed, they must be replaced within 30 days of notification to the park manager.

#### **6.5 TRAFFIC CALMING DEVICES TO AVOID VEHICLE COLLISION**

A total of 10 raised thresholds have been integrated into the design to slow vehicle traffic movement within the development. Two raised thresholds have been included within the primary access road and one in the secondary southern access road. This will effectively slow traffic traversing the eastern vegetated corridor in the areas Koalas have been funnelled with fencing to cross the road. Koala warning signage is also to be installed at both entry points to the proposal and along the internal roads. A speed limit of 15km/h will be established within the entire development.

#### **6.6 PROTECTION FROM DOG ATTACK**

Domestic dogs must be prohibited from the caravan park. Feeding of Wild Dogs/Dingos must be prevented to help reduce their activity in the area.

#### **6.7 PROTECTION FROM DROWNING**

The following measures are to be undertaken for the proposed swimming pool within the development:

- Install a fence to keep koalas out of the pool area (e.g. transparent glass, perspex or steel).
- Install a rope. Attach one end of a thick rope (5 cm in diameter and 2 m long—marine rope is ideal) to a float (like an empty milk bottle) in the pool and tie the other end securely to a tree, post or fence. This can save a koala from drowning by giving it something to help it climb out of the pool.
- beach-type access where the water is level with part of the pavement so koalas can get out easily
- steps that are big enough to allow koalas to climb out.

#### **6.8 PROTECTION OF HABITAT WITHIN THE REMAINDER OF THE SITE IN PERPETUITY**

The preferred approach to offset the residual impacts of the project is to offset by establishing a Biodiversity Stewardship site over the remainder of Lot 105 DP 260058 occurring outside the development footprint. This will protect the remainder of habitat within the site for perpetuity. Alternatively, documents such as a Section 88B Instrument are to be put into place to protect the retained vegetation from future impacts.

## **7.0 MAINTENANCE PROGRAM**

### **7.1 GENERAL MAINTENANCE**

The completion of the works will be considered the date of the Practical Completion of tree planting within east west corridor and will signal the commencement of six-monthly maintenance program for a period of two years then annually for a further two years. General maintenance will involve monitoring survival rates and installing replacement trees.

### **7.2 WATERING**

All trees are to be well watered on installation. They will then receive a further two applications of water during the first two months to assist in establishment. Depending on the soil moisture at the time a further watering may be required.

### **7.3 INSTALLING REPLACEMENT PLANTS**

Tree losses discovered during maintenance visits are to be replaced within three months. All plantings within the wildlife corridor are to be maintained in perpetuity.

### **7.4 FENCE MAINTENANCE**

Fencing installed for the development is to be maintained in perpetuity. The fence line is to be inspected and repaired wherever damage has occurred.

### **7.5 INAPPROPRIATE PRACTICES**

The following practices must be observed to ensure the continued viability of the area of mapped Core Koala Habitat:

- No domestic dogs to enter the area;
- No rubbish or lawn clippings are to be discarded into surrounding habitat the area;
- No wood collection is to occur within retained vegetation.

Signage attached to the fence line will help prevent these practices.

## 8.0 MAINTENANCE/MONITORING AND REPORTING

A maintenance/monitoring period of every 6 months for 2 years and then biennially for a period of 10 years is required with an agreed commencement date between the proponent and Mid Coast Council.

Monitoring will address the following:

- Tree losses
- Tree replacement
- Evidence of Koala utilisation of the area (SAT Sites)
- Performance of the fencing
- Performance of the drowning prevention measures
- Protection of the retained vegetation.

See Table 8.1 for monitoring implementation plan.



**Table 8.1: Monitoring Implementation Plan**

Item to be monitored	What is monitored	Monitoring frequency	Trigger for action	Remedial action	Responsible party for monitoring	Responsible party for remedial action
Trees	Number of trees dead or dying	Each six months for two years, then annually for up to 10 years	Any dead tree observed	Install replacement trees within three months of observed losses	Ecologist or bush regenerator	Bush regenerator under instruction from Park Management
Fencing	Koala proof fence is intact	Each six months for two years, then annually for up to 10 years	Areas of fence not operating to limit Koala accessing the site Fence damaged	Repair fence within 30 days of observed damage or non-performance	Ecologist	Fencing contractor under instruction from Park Management and Ecologist
Fencing	Rural fence is intact	Each six months for two years, then annually for up to 10 years	Areas of fencing impeding fauna movement or facilitating unauthorised access Fence damaged	Repair fence within 30 days of observed damage or non-performance	Ecologist	Fencing contractor under instruction from Park Management and Ecologist
Pool	Drowning prevention mechanism is in place and operable	Each six months for two years, then annually for up to 10 years	Drown prevention mechanism is inoperable or damaged	Repair mechanism within 30 days of observed damage or non-performance	Ecologist	Contractor under instruction from Park Management and Ecologist
Signs	Educational and warning signs are intact and in place	Each six months for two years, then annually for up to 10 years	Signs damaged or missing	Replace signs within 30 days of observed damage	Ecologist	Contractor under instruction from Park Management and Ecologist
Dogs	Presence of dogs	Daily	Presence of dog(s) detected	If a resident dog, seek that the dog must be removed from the park If a stray dog, seek assistance from Council's Animal	Park Manager	Park Manager Council

Item to be monitored	What is monitored	Monitoring frequency	Trigger for action	Remedial action	Responsible party for monitoring	Responsible party for remedial action
				Compliance		
Koala	Injured Koala	As need arises	Presence of injured Koala detected	Seek assistance from registered wildlife carer to manage and assist the injured Koala consistent with the relevant animal welfare and licensing requirements held by the carer	Park Manager	Park Manager Wildlife Carer
Koala	Dead Koala	As need arises	Presence of dead Koala detected	Seek assistance from registered wildlife carer to manage the dead Koala consistent with the relevant animal welfare and licensing requirements held by the carer	Park Manager	Park Manager Wildlife Carer

Key performance criteria are:

- A net increase in the food trees present within the study area, with losses in Koala feed trees to be replaced within 3 months
- Enhancement of the connectivity between the west and eastern forests, with the corridor to be maintained in perpetuity
- No Koala deaths due to domestic dog attack, drowning or vehicle strikes within the proposed development.

If a biodiversity stewardship agreement under the *Biodiversity Conservation Act 2016* put in place for the remainder of the site it will include mandatory monitoring of habitat outside the development.

The KPOM must be reviewed against the key performance criteria annually for two years and then a strategic review every five years for a period of 10 years. This would ensure that the KPOM is tracking against the objectives and criteria.

## **9.0 IMPLEMENTATION PLAN**

The owner will be responsible for the initial fencing, tree plantings, maintenance and monitoring. Inappropriate maintenance techniques and inequitable resource levels can lead to unsustainable management practices within the site. Technical advice pertaining to planting and ongoing management of the vegetation on site can be obtained from a number of agencies and organisations. These providers would include:

- Mid Coast Council;
- Hunter Local Land Services;

## **10.0 CONCLUSION**

Given the implementation of the actions in this Koala Plan of Management the Koala population that may occur within the study area will be managed and the proposal's contributions to threats faced by Koalas will be minimised because:

- the Koala habitat linkage within the study area would be increased
- the impacts of vehicle strike within the study area would be minimised
- the Koala habitat within the study area would be retained and managed consistent with the VMP
- Koalas and their habitat would be protected during construction
- Koalas within the study area would be protected from dog attack and drowning.



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