

# Offset Management Plan (EPBC 2024/09844)

Blue Rock Quarry Expansion Project, Cedar Creek,  
Queensland  
(Little Kipper Creek Road Offset Area)

Prepared for Fulton Hogan Quarries Pty Ltd and KFF1 Pty Ltd ATF  
KFF1 Sub Trust as the offset provider  
8 April 2026

**Saunders  
Havill**

PATHWAYS TO SUCCESS



## Document Information

This Offset Management Plan (EPBC 2024/09844) has been prepared by Saunders Havill Group on behalf of the proponent Fulton Hogan Quarries Pty Ltd and implemented by KFF1 Pty Ltd ATF KFF1 Sub Trust, dated 8 April 2026.

### Issue

<b>Issue</b>	<b>Date</b>	<b>Prepared By</b>	<b>Checked By</b>
Draft	7.04.2025	LS	LB
Issue A	12.06.2025	LB	SM
Issue B	18.11.2025	LS	LB
Issue C	11.03.2026	LB	SM
Issue D	8.04.2026	LB	SM



## Executive Summary

Fulton Hogan Quarries Pty Ltd, the proponent, has engaged KFF1 Pty Ltd ATF KFF1 Sub Trust as offset provider to coordinate and deliver a biodiversity offset to compensate for significant impacts to Matters of National Environmental Significance (MNES) as part of a quarry expansion project at Blue Rock Quarry Cedar Creek, Queensland (herein referred to as the Project). The Project was referred under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) (EPBC 2024/09844). The Department of Climate Change, Energy, the Environment and Water (DCCEEW) has assessed that biodiversity offsets are required for Koala (*Phascolarctos cinereus*).

The purpose of this Offset Management Plan (OMP) is to provide the objectives, key commitments including milestones and measurables (performance targets) and completion criteria necessary to fulfil a statutory requirement for the provision of an offset for *Phascolarctos cinereus* (Koala) under the EPBC Act.

Habitat quality within both the impact and offset areas was quantified in accordance with the *Guide to Determining Terrestrial Habitat version 1.2* (DEHP, 2017) in conjunction with the Modified Habitat Quality Assessment (MHQA) method. Baseline habitat quality metrics and scores for the offset area were established which formed the basis for proposed increases to be achieved as part of the offset delivery. These are summarised in **Table ES1** and **Table ES2** below.

**Table ES1: Impact area Koala habitat quality scores – summary**

AU	Area (ha)	Koala Habitat Quality Score
1	3.5	6.35
2	1.1	5.00
3	1.3	4.68
	<b>5.9</b>	<b>Weighted score 5.73 (rounded to 6)</b>

**Table ES2: Offset area Koala habitat quality baseline and future scores – summary**

AU	Area (ha)	Koala Habitat Quality Score	
		Baseline	Future
1	40	6	8

Six management actions are proposed to deliver the offset and proposed environmental outcomes over a 20-year period which includes proposed actions, completion criteria and monitoring actions. The management actions consist of:

1. Legal securement of the offset area
2. Non-Native Vertebrate Pest Management
3. Management of Weeds of National Significance
4. Develop and implement Bushfire Management Plan
5. Habitat Creation and Regeneration; and
6. Fencing and signage



Interim milestone targets have been created for proposed environmental outcomes for Koala to provide an indication of the relative success of management measures. A monitoring and reporting schedule has been prepared to assist in achieving these outcomes. Additionally, an adaptive management framework and corrective action triggers are proposed whereby it is demonstrated that management measures are not effective in achieving results.

The Proponent plans to acquit **151.32%** of its MNES offset requirement through direct land-based offsets. Overall, the proposed offset is considered suitable in accordance with the EPBC Act and utilising the Offset Assessment Guide (OAG) (DCCEEW, 2023).



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## Acronyms

ACR	Annual Compliance Report
ATF	As Trustee For
AU	Assessment Unit
BMP	Bushfire Management Plan
DAWE	Department of Agriculture, Water and Environment (Commonwealth, former)
DCCEEW	Department of Climate Change, Energy, the Environment and Water (Commonwealth)
DEHP	Department of Heritage and Protection (Qld, former)
DETSI	Department of Environment, Tourism, Science and innovation
EDL	Ecologically Dominant Layer
EOP	EPBC Act Environmental Offset Policy (2012)
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
GPS	Global Positioning System
ha	hectare
KFF	Koala Farmland Fund
km	kilometres
LGA	Local Government Area
m	metre
MHQA	Modified Habitat Quality Assessment
mm	millimetres
MNES	Matters of National Environmental Significance
OAG	Offset Assessment Guide
OAAR	Offset Area Annual Report
OMP	Offset Management Plan
OMU	Operational Management Unit
QI	Quantum Impact
RAI	Relative Abundance Index
RE	Regional Ecosystem
RVPDA	Ripley Valley Priority Development Area
SAT	Spot Assessment Technique
SEQ	South East Queensland
SEQERF	Southeast Queensland Ecological Restoration Framework
SPP	Used when referring to multiple species within a genus
SRC	Somerset Regional Council
SSR	Species Stocking Rate
VDEC	Voluntary Declaration
VMA	<i>Vegetation Management Act 1999</i>
WONS	Weeds of National Significance



## Definitions

**Proponent** – Fulton Hogan Quarries Pty Ltd

**Offset Provider** – KFF1 Pty Ltd ATF KFF1 Sub Trust

**Impact area** – The area where clearing will occur. This is located on part of Lot 89 on WD739 and Lot 1 on SP238024

**Milestone Report** – A report prepared by a suitably qualified person before the end of Years 5, 10, 15 and 20 of the offset assessing against the interim milestone achievements and completion criteria.

**Offset area** – The 40 ha area within the offset property where the specific offset will be implemented and consists of a single assessment unit

**Offset property** – Means 'Little Kipper Offset Property,' Kipper Creek Road, Biarra Qld 4313

**Year 1 of the offset:** the 12 month period following legal securement of the offset area

**Years 2 to 20 of the offset** – The 12-month period following each anniversary of the legal securement of the offset area.



### Declaration of Accuracy

In making this declaration, I am aware that section 491 of the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) makes it an offence in certain circumstances to knowingly provide false or misleading information or documents to specified persons who are known to be performing a duty or carrying out a function under the EPBC Act or the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth). The offence is punishable on conviction by imprisonment or a fine, or both. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.



Principle Environmental Scientist

### Offset Provider Consent

The Offset Provider agrees to the offset being undertaken over the land identified in Section 6 of this Offset Management Plan, and in the manner outlined in Section 9.

Offset Provider



# 1. Introduction

## 1.1. Background

Saunders Havill Group (SHG) have prepared this Offset Management Plan (OMP) on behalf of the proponent, Fulton Hogan Quarries Pty Ltd, to be implemented by the offset provider, KFF1 Pty Ltd ATF KFF 1 Sub Trust, in accordance with the Preliminary Documentation Request provided for EPBC Application 2024/09844. The OMP has been prepared to address the impacts associated with the quarry expansion project to the existing Blue Rock Quarry at Cedar Creek, Queensland. The expansion area was referred under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and subsequently declared a "Controlled Action" on the 24 July 2024 by the Department of Climate Change, Energy, the Environment and Water (DCCEEW), requiring assessment by "Preliminary Documentation" pursuant to section 18 and 18A (listed threatened species and communities) (EPBC 2024/09844).

The Offset Provider will deliver the overall '*conservation gain*' for Koala as part of a single site offset solution located as part of Lot 112 on CA311003 at Little Kipper Creek Road, Biarra, Queensland (referred to as the 'offset area'). The proposed offset area is within the northern portion of the wider Little Kipper Creek Offset Property (referred to as the 'offset property'), which contains a range of approved Federal offsets for the Koala and other species managed by the Offset Provider. The proposed offset area will combine with these surrounding approved and commenced offsets in the Little Kipper Creek Offset Property to consolidate a larger conservation outcome.

The impact area is a total of 5.9 hectares (ha) which is all considered a Matter of National Environmental Significance (MNES) as it provides critical habitat for the Koala as defined under the EPBC Act. The OMP includes the dedication and rehabilitation of a total of 40 ha of land. The offset area as proposed will acquit the required impacts and provide additional benefit for the species. Details of the offset area are provided in **Section 4**.

## 1.2. Purpose of the Management Plan

The purpose of this OMP is to provide the objectives of the plan, key commitments including milestones and measurables (performance targets) and completion criteria to compensate for significant residual impacts on Koala. The plan must include (but is not limited to):

- i. the ecological outcomes of the offset area (including baseline survey results);
- ii. management measures proposed to achieve the ecological outcomes;
- iii. for each management action and monitoring outcome, detail how and when performance will be quantified, measured and monitored; and
- iv. detail contingency measures to be implemented if some or all of the specified are not achieved.

## 1.3. Report Structure

This OMP contains the following sections:

- Section 2: Roles and Responsibilities
- Section 3: Overview of Impact area
- Section 4: Overview of Offset Area
- Section 5: Offset Area Suitability
- Section 6: Baseline Surveys
- Section 7: Environmental Outcomes



- Section 8: Monitoring and Reporting Schedule
- Section 9: Management Framework
- Section 10: Adaptive Management
- Section 11: References
- Section 12: Appendices
  - Appendix A – Impact area – MHQA (Koala) results
  - Appendix B – Offset area – MHQA (Koala) baseline result and raw data
  - Appendix C – Offset Area – raw weed mapping data
  - Appendix D – RE 12.9-10.2 technical description (Ryan 2001)
  - Appendix E – Offset area – baseline raw SAT data
  - Appendix F – Offset Assessment Guide Calculator Results and Justification
  - Appendix G - Risk Assessment



## 2. Roles and Responsibilities

Excluding the regulatory role completed by the Commonwealth Government for the assessment and approval of the offset and the Queensland Government for registering and declaring the Voluntary Declaration and covenant the following people and entities retain key responsibilities for the implementation of this OMP.

A list of key contacts for the project is contained in **Table 1** and responsibilities/cost assignment.

**Table 1: Key personnel and responsibilities**

Role	Nominated Person	Company / Entity	Contact details
Proponent/Approval Holder	Andrew Lyndon	Fulton Hogan Quarries Pty Ltd	<a href="mailto:andrew.lyndon@fultonhogan.com.au">andrew.lyndon@fultonhogan.com.au</a>
Offset Provider	Rob Martyn	KFF1 Pty Ltd	<a href="mailto:rob.martyn@koalafarmlandfund.com.au">rob.martyn@koalafarmlandfund.com.au</a>
Administering Authority	N/A	DCCEEW Compliance Monitoring Branch	<a href="mailto:EPBCMonitoring@dcceew.gov.au">EPBCMonitoring@dcceew.gov.au</a>
Suitably qualified person/contractor	Appointed as required by either the proponent or the Offset Provider	Appointed as required by either the proponent or the Offset Provider	Appointed as required by either the proponent or the Offset Provider

Action	Description	Responsibility & Cost Assignment	
Preparation of documents	Offset Management Plan (OMP)	Drafted for the offset site, specific to the Proponent's project	Proponent
	Review OMP before finalisation	Any plan to be implemented onsite must be reviewed and approved by KFF	KFF (offset provider)
	Draft & Execute Offset Agreement	Draft Offset Agreement supplied by KFF and negotiated by both parties	Each party at their own cost
Management Plan Actions	Legally binding mechanism	Secure legally binding mechanism over offset area (VDEC and/or amendment order under EOPA)	KFF (offset provider)
	Preparation of other management plans as required by OMP	Weed management plan, pest management plan and bushfire management plan	KFF (offset provider)
	Review Management Plans before finalisation	Any plan to be implemented onsite must be reviewed and approved by KFF	KFF (offset provider)
	Undertake general on-ground management activities in accordance with the various Management Plans	Includes fencing, access tracks, signage, fire management, weed control, pest control and revegetation	KFF (offset provider)



	Installation, management and monitoring of habitat specific features	Some management plans include additional actions to those listed above. For example, DCCEEW may require the installation of greater glider nest boxes, koala poles or coarse woody debris	KFF (offset provider)
Audits/Monitoring and Reporting	Undertake annual or periodic ecological monitoring activities in accordance with the various Management Plans and produce associated mapping and reporting	Includes baseline and annual/periodic surveys such as (but not limited to): targeted species surveys, weeds, pests and habitat quality assessments. Also includes mapping and reporting associated with ecological monitoring activities	KFF (offset provider)
	Provide Annual Offset Report (or on-ground management actions)	Provide an annual report outlining management activities undertaken in the reporting year including fencing, fire management, weed control, pest control and revegetation activities	KFF (offset provider)
	Offset Management Plan audits	Every 5 years	Proponent
	Annual Compliance Report (EPBC Approval conditions)	Prepare annual report outlining compliance with EPBC approval conditions (i.e., not just limited to offset conditions)	Proponent



# 3. Overview of Impact Area

## 3.1. Project and Site

The project at Blue Rock Quarry, Cedar Creek Road, Cedar Creek (described as part of Lot 89 on WD739 and Lot 1 on SP238024) is located approximately 12 kilometres (km) south of Beenleigh. The impact area is a largely vegetated, steep south facing slope immediately south of the current Blue Rock Quarry footprint (refer **Figure 1** and **Figure 2**). The impact area is located within an area zoned as 'extractive industry' with an existing state environmental authority.

The entire 5.9 ha referral area is proposed to be cleared for the quarry expansion area. Therefore, the project will include 5.9 ha impact to MNES, specifically Koala habitat. **Table 2** provides details on the impact area.

**Table 2: Details of impact area**

<b>Address</b>	<b>Cedar Creek Road, Cedar Creek</b>
<b>Impact area</b>	5.9 ha
<b>MNES impact area</b>	5.9 ha (refer <b>Plan 1</b> )





- LEGEND**
- Qld DCDB
  - Site Boundary
  - Referral Area [5.9 ha]
  - Quarry Expansion Area

**FIGURE 1**  
IMPACT SITE AERIAL



PROJECT  
CEDAR CREEK, QLD

COORDINATE SYSTEM  
GDA 2020 MGA Z56

SCALE (A4)  
1:11,419

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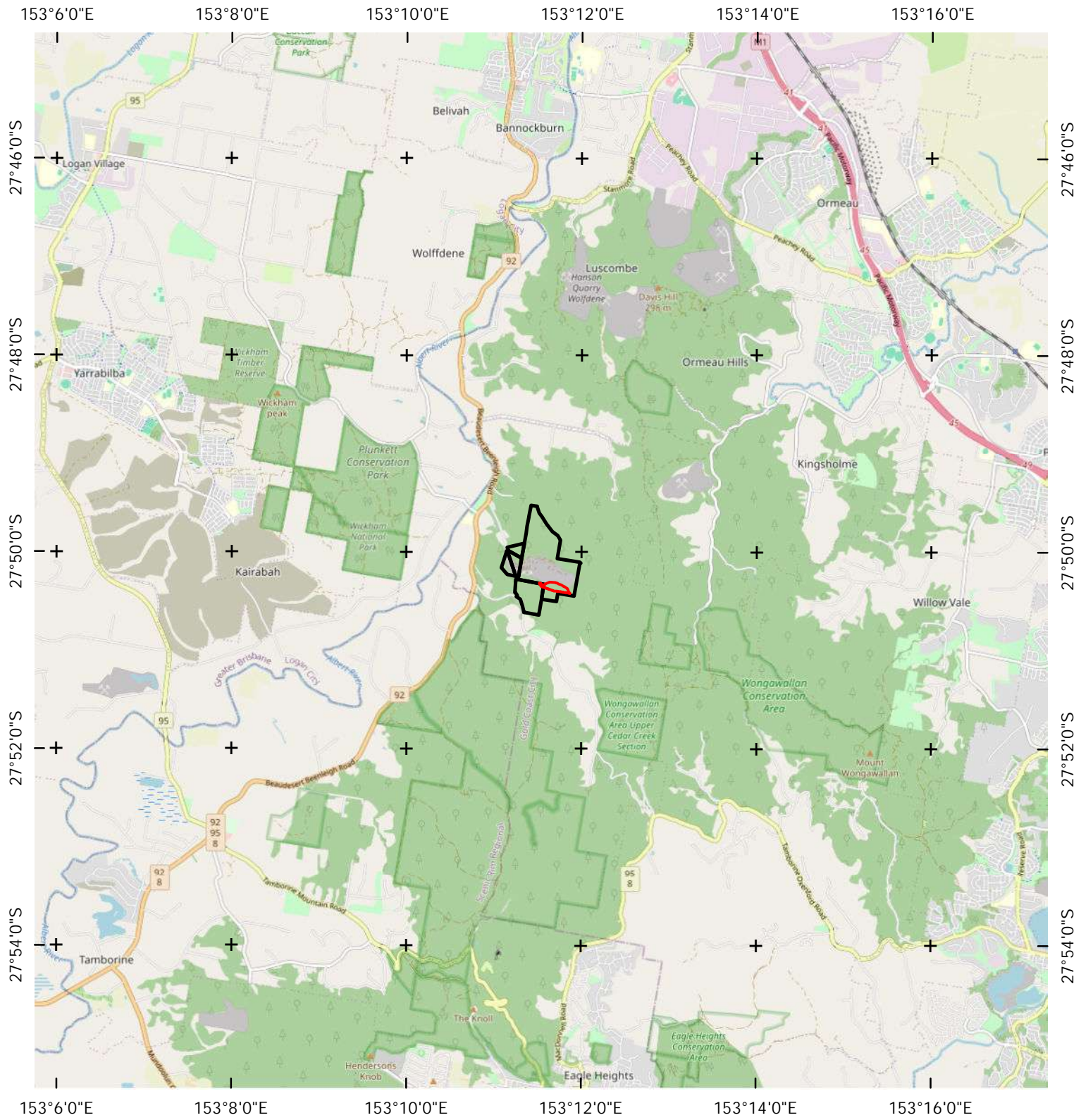
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11390 E Figure 1 Impact Aerial D\_SHG

**DATE** 9/10/2025



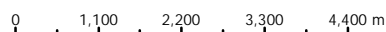
**LEGEND**

-  Site Boundary
-  Referral Area [5.9 ha]
-  Quarry Expansion Area

**FIGURE 2**

IMPACT SITE CONTEXT

PROJECT  
CEDAR CREEK, QLD  
COORDINATE SYSTEM  
GDA 2020 MGA Z56  
SCALE (A4)  
1:100,000



CLIENT



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11390 E Figure 2 Impact Context D\_SHC

DATE 9/10/2025

## 3.2. Summary of Matters Requiring Offset

The impact area involves directly impacting 5.9 ha of critical Koala habitat. Vegetation communities within the impact area are summarised below

### 3.2.1 Vegetation communities impacted

The habitat quality and quantum of the 5.9 ha area has been assessed. Vegetation within the impact area was observed to be varying in value and composition. Vegetation containing known Koala habitat in the form of Eucalypt and Corymbia trees is mapped as Category B (remnant) RE12.11.3 (AU1) Queensland *Vegetation Management Act 1999* (VMA). The balance of the site is mapped as Category X (non-remnant) vegetation with pre-clear indicating part of the area as regrowth RE12.11.10 (AU2) and part as highly disturbed regrowth of pre-clear RE12.11.3 (AU3).

The mapped and pre-clear vegetation communities located within the MNES impact area is described in **Table 3**.

**Table 3: Mapped pre-clear regional ecosystem present within MNES impact area**

Pre-clear RE	VMA status	Description
12.11.3	Least Concern	<i>Eucalyptus siderophloia</i> , <i>E. propinqua</i> +/- <i>E. microcorys</i> , <i>Lophostemon confertus</i> , <i>Corymbia intermedia</i> , <i>E. acmenoides</i> open forest on metamorphics +/- interbedded volcanics
12.11.10	Least Concern	<i>Notophyll</i> and <i>notophyll/microphyll</i> vine forest +/- <i>Araucaria cunninghamii</i> . Characteristic species include <i>Argyrodendron trifoliolatum</i> , <i>Argyrodendron</i> sp. (Kin Kin W.D.Francis AQ81198), <i>Backhousia subargentea</i> , <i>Dissiliaria baloghioides</i> , <i>Brachychiton discolor</i> , <i>Beilschmiedia obtusifolia</i> , <i>Diospyros pentamera</i> , <i>Grevillea robusta</i> , <i>Gmelina leichhardtii</i> and <i>Ficus macrophylla</i> forma <i>macrophylla</i> . Occurs on Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. Not a Wetland. (BVG1M: 2a).

## 3.3. Habitat Quality Scoring Methods

### 3.3.1 Koala – Modified Habitat Quality Assessment methodology

The quantum and quality of habitat for the Koala within the impact area was assessed using a modified version of the Queensland State Governments *Guide to determining terrestrial habitat quality: A toolkit for assessing land based offsets under the Queensland Environmental Offsets Policy Version 1.2 April 2017* (herein referred to as the 'Habitat Quality Guideline'). This assessment approach utilises the site condition assessment method framework established under the *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland Version 2.2 February 2015* (Eyre et al. 2015) combined with site context and species stocking rate assessments to determine the habitat quality of the impact area. The guideline is a step-by-step methodology explaining how to measure habitat quality for land-based offsets. This methodology has been adopted and tailored/modified to assess the impacts and offsets relating to MNES.

The traditional terrestrial habitat quality assessment assesses three (3) core indicators:



1. site condition – a general condition assessment of vegetation compared to a benchmark;
2. site context – an analysis of the site in relation to the surrounding environment; and
3. species habitat index – the ability of the site to support a species.

The MHQA for Koala combines the three (3) core indicators into two (2) (site condition and site context) with each attributed an equal weighting of 30% of the final score. The balance of the weighting (40%) has been attributed to the third indicator – Species Stocking Rate (SSR) – which is independent of the traditional habitat quality assessment. The species stocking rate has been added to the MHQA to better incorporate MNES, and for the purpose of this project, the endangered-listed Koala MNES. The following subsections detail the methodology utilised to assess the site condition, site context, and SSR under the MHQA.

**Site Condition (30%)**

Assessing site condition is an integral step in determining specific quantification of impacts, while also determining whether an offset site is suitable to establish a desired capacity to support the prescribed environmental matters being offset. The on-site condition is a key element of habitat quality and has a direct influence on the biodiversity it supports. Site condition is assessed using a suite of attributes to describe the structure and function of the vegetation community and is benchmarked against the expected range for a relatively undisturbed community.

The site condition assessment under the MHQA is assessed using fifteen (15) condition characteristics being:

**Table 4: Koala site condition scoring attributes (BioCondition Manual)**

Site condition attribute	Scoring and benchmark percentage				
(1) Recruitment of woody perennial species in ecologically dominant layer in EDL*	Score	0	3	5	
	Benchmark	<20%	≥20-75%	≥75%	
(2) Native plant species richness – trees	Score	0	2.5	5	
	Benchmark	<25%	≥25-90%	≥90%	
(3) Native plant species richness – shrubs	Score	0	2.5	5	
	Benchmark	<25%	≥25-90%	≥90%	
(4) Native plant species richness – grasses	Score	0	2.5	5	
	Benchmark	<25%	≥25-90%	≥90%	
(5) Native plant species richness – forbs	Score	0	2.5	5	
	Benchmark	<25%	≥25-90%	≥90%	
(6) Tree canopy height	Score	0	3	5	
	Benchmark	<25%	≥25-70%	≥70%	
(7) Tree canopy cover	Score	0	2	3	5
	Benchmark	<10%	≥10%-<50%	≥200%	≥50-200%
(8) Shrub canopy cover	Score	0	3	5	
	Benchmark	<10%	≥10%-<50% or ≥200%	≥50-<200%	
(9) Native perennial grass cover	Score	0	1	3	5
	Benchmark	<10%	≥10-50%	≥50-90%	≥90%
(10) Organic litter	Score	0	3	5	
	Benchmark	<10%	≥10%-50% or ≥200%	≥50-<200%	
(11) Large trees	Score	0	5	10	15
	Benchmark	0%	0-50%	≥50-100%	≥100%



<i>Site condition attribute</i>	<i>Scoring and benchmark percentage</i>				
<i>(12) Coarse woody debris</i>	Score	0	2	5	
	Benchmark	<10%	<50% or ≥200%	≥50% or <200%	
<i>(13) Non-native plant cover</i>	Score	0	3	5	10
	Benchmark	>50%	≥25-50%	≥5-25%	<5%

Assessment methodology of the above condition characteristics mostly do not differ from the traditional terrestrial habitat quality assessment. In developing the MHQA to better incorporate MNES, two (2) species habitat index characteristics, being (1) 'quality and availability of food and foraging habitat', and (2) 'quality and availability of shelter', have been added to the site condition indicator.

*Quality and Availability of Food and Foraging Habitat*

Food-tree availability is consistently identified as one of the most important determinants of koala population dynamics, owing to their highly specialised folivorous diet and dependence on a narrow subset of Eucalyptus species (Kavanagh et al., 2007).

To reflect the importance of food trees to koala habitat, the quality and availability of foraging habitat has been assessed using two parameters:

- Abundance of koala food trees
- Tree canopy cover

These two parameters provide an indication of the number of trees available for koalas to forage in and the amount of resource available from those trees. Weighting of the parameters in the assessment is 80% for food tree abundance and 20% for canopy cover as koalas are known to graze on trees of any size and established smaller trees will grow to provide a larger canopy area over time.

All koala food trees (eucalypt, corymbia and angophora species) with a DBH >100mm were counted within a 100m x 20m plot at each habitat transect to estimate abundance. The count is multiplied by 5 to produce a stem density per hectare which is averaged across the assessment unit. The count is then compared to the average stem density per hectare identified in the regional ecosystem technical descriptions combining T1 and T2 layers (Ryan 2019) with a score out of 8 calculated (refer **Table 5**).

**Table 5: Stem density percentage and relevant score – quality and availability of foraging habitat**

Stem density as percentage compared with benchmark	Score
<1%	0/8
1% - 24.99%	2/8
25% - 49.99%	4/8
50% - 74.99%	6/8
75% - 100%+	8/8

Canopy in Southeast Queensland Eucalypt woodland is dominated by koala food tree species, therefore, the tree canopy cover collected a part of the site condition assessment provides an accurate estimate of



food source availability, and if anything would overestimate food availability giving a conservative baseline score. Canopy cover (T1 layer) has been averaged and compared to the benchmark for the regional ecosystem. A score out of 2 has been calculated (refer **Table 6**):

**Table 6: Canopy coverage percentage and relevant score - quality and availability of foraging habitat**

Canopy cover as percentage compared with benchmark	Score
<1%	0/2
1% - 24.99%	0.5/2
25% - 49.99%	1/2
50% - 74.99%	1.5/2
75% - 100%+	2/2

The scores for food tree abundance and canopy cover are then added together to provide an overall score out of 10 for quality and availability of food sources. For the purposes of the MHQA condition assessment, scores have been categorised (refer **Table 7**).

**Table 7: Combined stem density and canopy coverage score – quality and availability of foraging habitat**

Combined score for stem density and canopy cover	Final Score
0 – 2.99/10	1
3 – 6.99/10	5
7 – 10/10	10

#### *Quality and Availability of Shelter Habitat*

Koalas choose shelter in trees that provide thermal protection, safety from predators, and access to preferred food trees (Briscoe et al 2014; Ellis et al 2012; Law et al 2022). Studies have found shelter trees are not necessarily food species such as eucalypts with a range of ancillary species used as long as they are near a food source. Trees selected are often larger with a DBH of 30cm – 60cm.

Two parameters have been used to assess shelter habitat values at the impact and offset sites:

- Abundance of koala food trees and ancillary trees (hereby referred to as shelter trees)
- Abundance of large shelter trees (food and ancillary species)

These two parameters provide an indication of the number of koala shelter trees available on the impact and offset sites as well as existing larger trees that can be preferred while resting through the day. Weighting of the parameters in the assessment is 60% for shelter tree abundance and 40% for large trees.

All shelter trees with a DBH >100mm were counted within a 100m x 20m plot at each MHQA transect completed at the impact and offset sites to estimate abundance. The count is multiplied by 5 to produce a stem density per hectare which is averaged across the assessment unit. The count is then compared to



the average stem density per hectare identified in the regional ecosystem technical descriptions combining T1 and T2 layers (Ryan 2019) with a score out of 6 calculated (refer **Table 8**).

**Table 8: Stem density percentage and relevant score – quality and availability of shelter habitat**

Stem density as percentage compared with benchmark	Score
<1%	0/6
1% - 24.99%	1.5/6
25% - 49.99%	3/6
50% - 74.99%	4.5/6
75% - 100%+	6/6

Large shelter trees are counted over a 100m x 50m plot at each MHQA transect completed at the impact and offset sites to estimate abundance of large trees. The count is multiplied by 2 to produce a density per hectare which is averaged across the assessment unit and compared to the benchmark for the regional ecosystem. A score out of 4 is calculated (refer **Table 9**):

**Table 9: Large tree percentage and relevant score – quality and availability of shelter habitat**

Large Trees as percentage compared with benchmark	Score
<1%	0/4
1% - 24.99%	1/4
25% - 49.99%	2/4
50% - 74.99%	3/4
75% - 100%+	4/4

The scores for shelter tree abundance and large trees are then added together to provide an overall score out of 10 for quality and availability of shelter. For the purposes of the MHQA condition assessment, scores will be categorised (refer **Table 10**):

**Table 10: Combined stem density and large tree score – quality and availability of shelter habitat**

Combined score for stem density and large trees	Final Score
0 – 2.99/10	1
3 – 6.99/10	5
7 – 10/10	10

Site condition within the impact area was assessed by delineating the impact area into assessment units (AU) as required by the Queensland environmental offsets framework. The impact area was delineated into three (3) AUs based on on-ground vegetation assessments, summarised in **Table 11**. Site condition was measured through the completion of modified habitat quality transects (MHQA). Assessment at multiple locations per AU is necessary to measure vegetation condition at representative locations across the spatial extent of the AU, except where the small size of an AU does not allow for multiple transects.



Site condition was assessed at a total of four (4) transect locations within the impact area, completed by suitably qualified Ecologists. The locations of MHQA transects within the impact area are provided on **Plan 1**. Notably, only 1 transect was completed within AU3 and AU2 given the small AU area. A modified transect (50m) was completed in AU2 given the small overall area and inaccessible terrain. This is an acceptable method of habitat assessment so long as the attributes are adjusted accordingly to allow for scoring comparisons.

**Table 11: Summary of assessment units and MHQA transects – impact area**

Assessment unit	Vegetation community	Impact area (ha)	MHQA transect
AU1	RE12.11.3 (remnant)	3.5	Transects 1 and 2
AU2	RE12.11.10 (pre-clear)	1.1	Transect 3
AU3	RE12.11.3 (pre-clear)	1.3	Transect 4

### Site context (30%)

The site context assessment considers the landscape characteristics adjoining the site. Site context is measured using a suite of attributes to describe the location of the habitat within the surrounding landscape and the influence of its associated threats. This assessment also considers the influence of adjacent vegetated areas and ecological corridors. Under the MHQA, site context is measured using seven characteristics. In developing the MHQA, three species habitat index characteristics were nominated to form part of the site context characteristics: role of site location to overall species population in the state, threats to the species, and species mobility capacity. The seven characteristics are listed below with details of how each are measured in accordance with the *Guide to determining terrestrial habitat quality: A toolkit for assessing land based offsets under the Queensland Environmental Offsets Policy* (version 1.2).

- Size of patch – Measured as the area of vegetation in which the assessment unit(s) is contained, and add on all other directly connecting areas of koala habitat. The calculation of the area of the patch size uses the method outlined in the BioCondition assessment manual v2.2 that considers the patch to be areas connected by corridors greater than 200 m wide within a 1 km radius of the site. This methodology includes use of a “segmentation” process that removes areas connected to the assessment area by narrow corridors)
- Connectedness – Relates to the capacity that the species have to disperse through the landscape. This attribute is calculated using GIS by measuring the length koala habitat along the boundary of the site, calculated as a percentage
- Context – The context score is calculated by GIS to quantify the amount of vegetation immediately surrounding the assessment site. It is measured as the percentage of koala habitat within a 1 km radius of the site
- Ecological corridors – This attribute is as per the methods of the Guide to determining terrestrial habitat quality V1.2 and is used to determine if a site is located within or shares a boundary with an ecological corridor that facilitates long term ecosystem function by connecting large patches of remnant vegetation with sufficient tract size (corridor width in relation to the fragmentation of the landscape) (EHP 2014). These corridors support the habitat of MNES by providing opportunity for long term dispersal of habitat species following landscape level changes in climate. Although the



ecological corridors allow for the dispersal of MNES themselves, for example, Koala, this is not their primary function when assessing the attribute. An 'ecological corridor' is represented as any 'Riparian' or 'Terrestrial' feature within the 'CORR\_TYPE' attribute table of the 'Queensland biodiversity and vegetation offsets special features' map. The mapping can also be viewed on Queensland Globe in the 'Statewide Biodiversity Corridors' layer

- Role of site location to species overall population in the state – This attribute is based on the observed role of the site in relation to the overall population of the species. The scoring table considers the species' use of the site – such as whether it is used for feeding and/or nesting and the effect that damage to or removal of the site would have to the likelihood of the species' overall population survival.
- Threats to the species – This attribute identifies the presence and severity of threatening processes observed at or adjacent to the site which may include clearing associated with development, creation of a barrier to movement, introduction or spread of disease or pathogens, risk of high-intensity fires, degradation of habitat from hydrological change and introducing or increasing mortality attributed to vehicle strike or dog attacks as references in the *Conservation Advice for Phascolarctos cinereus (Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory*. The highest threat level is given to a site if it isolated from other Koala habitat, or if major roads without exclusion measures, or residential encroachment is within 1500 m of the site boundary. A risk matrix relative to the conservation advice for the Koala was applied to determine threats to species:
  - Habitat loss is considered 'Very High Risk' under the Koala conservation advice. Clearing and degradation of habitat is scored Low, Moderate and High and weighted according to risk factor relative to the expected threat score for each (summed vertically as 15 for Low, 7 for Moderate or 1 for High).
  - High intensity bushfire is considered 'Very High Risk' under the Koala conservation advice. Inappropriate fire regimes is scored Low, Moderate and High relative to the implementation of an endorsed bushfire management plan and fuel load weighted according to risk factor relative to the expected threat score for each (15, 7 or 1).
  - Vehicle strike is considered 'Moderate Risk' under the Koala conservation advice. Vehicle strike is scored Low, Moderate and High relative to the presence and severity of road use within 1 km of the site and weighted according to risk factor relative to the expected threat score for each (15, 7 or 1).
  - Dog attack is considered 'Moderate Risk' under the Koala conservation advice. Dog attack is scored Low, Moderate and High relative to the presence of dogs and level of cover available and weighted according to risk factor relative to the expected threat score for each (15, 7 or 1).
- Species mobility capacity – The Guide to Determining Terrestrial Habitat Quality version 1.2 states that this attribute is scored based on the presence and severity of factors that would contribute to a reduction in the mobility of the species. The scoring is based on a percentage reduction of mobility ranging from minor restriction (0-25% reduction) to severely restricted (76-100%). A score of 1, 4, 7 or 10 may be attributed depending on the level of restriction (refer **Table 12** ) for scoring as provided in the guideline.



The Guideline references the presence and severity of factors that would contribute to a reduction in the mobility of the species. This can include barrier that would result in a long-term reduction in genetic fitness or access to important resources. DCCEEW defines a barrier for Koala as an impediment to the genetic dispersal of Koalas over multiple generations such as escarpments or inhospitable landscapes. However, it is noted that the presence or absence of barriers alone do not exclusively determine the percentage reduction in mobility. Other factors such as roads, cleared areas and dense weed infestations (i.e Lantana) will contribute to a reduced mobility capacity and are still relevant when scoring this attribute as ‘presence and severity.’ Under the Habitat Quality Guideline, species mobility capacity is measured in terms of a percentage reduction. A method for calculating percentage reduction is detailed below:

Factors that may limit or impede mobility for the koala used to inform this assessment include:

- The presence of large stretches of cleared land where uses are incompatible with koala movement. This may include intensive agriculture (e.g. cropping) or commercial uses (e.g. hardstand or carparks).
- The presence of thick lantana infestations in woodland or gullies.
- Waterways larger than 40 m wide.
- Roads such as 4-lane arterial roads or smaller connectors that are highly trafficked and safe koala movement features such as underpasses are not present.
- The presence of a non-climbable fences and other small-scale infrastructure.
- The presence of a rail corridor or other linear infrastructure with regular anthropogenic uses.

While the guideline identifies features that restrict mobility, they are not attributed a category of restriction. A literature review has been completed to identify which features would be considered to have the potential to be a severe, high or moderate restrictions to dispersal. The outcomes are summarised in **Table 12**

Potential severity assumes a ‘worst case’ scenario and site-specific condition need to be considered for the assessment. For example, a rural property surrounded by barbed wire with timber fencing and small infrastructure littered throughout the property may only be considered to provide a moderate impediment to koala movement whereas urban areas with timber fencing present in several areas around the site would be considered a high or severe impediment.

**Table 12: Severity of Mobility Restrictions**

Potential Severity	Impediment	Primary Effect on Mobility	References
Severe	Habitat Loss & Fragmentation	Isolates habitat patches; reduces canopy connectivity; forces ground travel. The site must be isolated from any other vegetation cleared land with uses incompatible to koala movement.	Rhodes et al. 2006 McAlpine et al. 2006 Youngentob 2021



Potential Severity	Impediment	Primary Effect on Mobility	References
<b>Severe</b>	Roads & Vehicle Traffic	Roads act as hard physical barriers; vehicle strikes kill dispersing koalas. Dual lane or high trafficked roads with no or limited koala movement features such as underpasses are considered a high barrier to dispersal.	Rhodes et al. 2006 Lunney et al. 2002
<b>High</b>	Fencing & Small-Scale Infrastructure	Fences can prevent koalas from reaching adjacent habitat patches, particularly when too high or lacking climbable surfaces.	NSW Department of Planning and Environment (2022) McAlpine et al. 2006
<b>High</b>	Human Disturbance & Noise	Koalas and other small mammals tend to avoid habitats close to major roads, construction sites, and other loud human activities. If major anthropogenic noise sources are located adjacent the site it is considered a high barrier to dispersal.	McAlpine et al. 2006 Blickley and Patricelli 2010
<b>Moderate</b>	Dense weed infestation	Weed invasion alters vegetation structure, reduces habitat quality, and can significantly influence how koalas move through the landscape.	NSW Department of Planning and Environment (2022)
<b>Moderate</b>	Waterways	Waterways can impede koala movement primarily by creating physical gaps in canopy connectivity, forcing koalas to travel on the ground where they are more vulnerable to predation and vehicle strikes. Large waterways (>40 m wide) are considered a significant barrier because they isolate habitat patches and reduce safe dispersal routes.	Rhodes et al. 2006 McAlpine et al. 2006

Species mobility capacity will be calculated using the following method:

- The site will be spit into four quadrants (north, south, east and west).
- Each quadrant will be reviewed using a combination of desktop and field assessment (where possible) to identify if any restriction to mobility is present.
- Restriction will be allotted a percentage score based on severity as follows:
  - No or any minor restriction not listed in **Table 12** – 0%
  - Moderate restriction – 40%
  - High restriction – 65%
  - Severe restriction – 90%
- Percentages will be added together and divided by 4 to obtain an overall percent reduction in mobility for the site. A score will then be allotted according to the mobility restriction severity scoring in **Table 13**.



**Table 13: Koala site context scoring attributes**

<i>Site context attribute</i>	<i>Scoring and benchmark percentage</i>				
<i>Size of patch</i>	0	2	5	7	10
	<5 ha	5-25 ha	26-100 ha	101-200 ha	>200 ha
<i>Connectedness</i>	0	2	4	5	
	0-10%	>10-<50%	50-75%	>75% or >500 ha	
<i>Context</i>	0	2	4	5	
	<10% habitat	>10-30% habitat	>30-75% habitat	>75% habitat	
<i>Ecological corridors</i>	0	4	6		
	Not within	Sharing common boundary	Within (whole or part)		
<i>Role of the site location to species overall population in the state</i>	1	4	5		
	Not or unlikely to be critical to survival of the koala	Likely to be critical to survival of the koala	Critical to the survival of the koala		
<i>Threats to the species</i>	1	7	15		
	High threat level	Moderate threat level	Low threat level		
<i>Species mobility capacity</i>	1	4	7	10	
	Severely restricted (76-100% reduction)	High restricted (51-75% reduction)	Moderately restricted (26-50% reduction)	Minor restriction (0-25% reduction)	

### *Species Stocking Rate (40%)*

The MHQA incorporates species stocking rate as an attribute not discussed under the traditional terrestrial habitat assessment methodology. Species stocking rates are estimates of the koala carrying capacity of the site at the time of undertaking the survey. Given the discreet nature of the Koala and limited to no published literature on habitat carrying capacity of the species, the species stocking rate scoring methodology has been derived through the collation of site-specific surveys and surrounding contextual habitat analysis. Species stocking rate is calculated using the following parameters:

- Species presence on or adjacent to the site – whether or not evidence of koala has been recorded within or adjoining the site. Evidence may be direct in the form of observation of Koalas, or indirect via the presence of scats.
- Species usage of the site (habitat type and evidenced usage) – the type of habitat includes vegetation structure such as whether it contains remnant, regrowth or non-remnant vegetation values, and evidenced usage is the confirmed presence or use of the species within the habitat. Both factors are used to inform the species usage of the site. Depending on the level of variability in vegetation and usage patterns across the site, this characteristic may be scored differently for assessment units.



- Approximate density of the species on the site – measured through the use of Spot Assessment Technique (SAT) (Phillips *et al.* 2011) and targeted searches with a high probability of detection. The combination of methods produces a higher reliability of data when extrapolating Koala density. The SAT method is an industry recognised technique for identifying presence/absence of Koala and measuring activity. SAT survey results are interpreted using the broad population categories provided in the Australian Koala Foundation Koala activity level classification table to infer an activity level or approximate density. These categories being 'East Coast (low)', 'East Coast (med-high)' and 'Western (med-high)' are shown in **Table 15**. Depending on the population category applied, Koala activity is described as 0%, 'low', 'moderate', or 'high'.
- Role/importance of species population on site – the extent to which the site is considered a key source population for breeding, dispersal, is necessary for maintaining genetic diversity or near the limit of the species' range.

For subjective criteria where it is unclear whether a particular attribute score is achieved, the precautionary approach is applied to favour the higher score. **Table 14** outlines the attributes utilised to assess species stocking rate.

**Table 14: Koala Species Stocking Rate Scoring**

Attribute	Scoring and criteria				
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	Score (/10)	0	5	10	
		No	Yes – adjacent to site	Yes – on-site	
Species usage of the site (habitat type and evidenced usage)	Score (/15)	0	5	10	15
		Not habitat	Dispersal habitat	Foraging habitat	Breeding habitat
Approximate density (per ha)	Score (/30)	0	10	20	30
		0%	Low	Medium	High
Role/importance of species population on site*	Score (/15)	0	5	10	15
		0	5-15	20-35	40-45
Total SSR	/70				
SSR Score	/4				

*Species Stocking Rate supplementary table – Total supplementary score 0 = 0, 5-15 = 5, 20-35 = 10, 40-45 = 15			
Key source population for breeding	Score (/10)	0	10
		No	Yes/Possibly
Key source population for dispersal	Score (/5)	0	5
		No	Yes/Possibly
Necessary for maintaining genetic diversity	Score (/15)	0	15
		No	Yes/Possibly
Near the limit of the species range	Score (/15)	0	15
		No	Yes



Scoring Weight Justification

Site Condition and Site Context were given a weighted score out of three (3), while Species Stocking Rate was given a weighted score out of four (4).

Species Stocking Rate was assigned the highest weighting as it is considered the greatest determinant of site suitability for the Koala. Species Stocking Rate is an important component when assessing the overall habitat quality of a site as it indicates species usage.

Site Condition and Site Context were assigned the equal weighting (scored out of 3). The Koala is known to occupy a variety of habitats, ranging from non-remnant regrowth eucalypt forest/woodland through to old growth remnant forest/woodland, however, the site condition of the habitat is considered to directly influence the long-term Koala carrying capacity. Site Context is considered an important component when assessing the Koala as it directly relates to the long-term survival rate of the species. The proximity of the site to other areas of suitable habitat, the movement pattern through the landscape of the Koala (and/or barriers inhibiting movement) and threats to the species are important attributes to assess when considering the overall functionality of the site.

It is considered that the provision of this weighted scoring most accurately quantifies the ecological requirements of the Koala, which will then assist in determining whether an offset site is suitable to establish a desired capacity to support the prescribed environmental matters being offset.

Baseline Koala presence surveys for SSR

Koala presence and activity levels were determined through utilising the Spot Assessment Technique (SAT) (Phillips *et al.* 2011). The SAT method is an industry recognised technique for identifying presence/absence, density and habitat usage of Koala at a site and is specified as an appropriate survey method in the former EPBC Act Referral Guidelines for the Vulnerable Koala (DofE 2014). Results from SAT surveys are compared against current available published scientific literature to identify an estimated Koala carrying capacity (stocking rate).

SAT survey results are interpreted using the broad population categories provided in the Australian Koala Foundation Koala activity level classification table. These categories being 'East Coast (low)', 'East Coast (med-high)' and 'Western (med-high)' are shown in **Table 15** and are used to estimate Koala activity within a given area. Depending on the population category applied, Koala activity is described as 'low', 'moderate', or 'high'. Population categories are assigned as follows:

- Sites considered to be suitable or have high suitability for Koalas are assigned the 'East Coast (med-high)' category;
- Sites considered to have low suitability are assigned the 'East Coast (low)' category; and
- The 'Western (med-high)' category does not apply to South East Queensland local government areas.

**Table 15: Koala activity level classification (Phillips and Callaghan 2011)**

Activity	East Coast (low)	East Coast (med-high)	Western (med-high)
Low	<3.33%	<22.5%	<35.8
Moderate	3.33-12.6%	22.5-32.8%	35.8-46.7



High	>12.6%	>32.8	>46.7
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A total of four (4) SAT surveys were completed across the MNES impact area, two (2) on 05 December 2022, one (1) on 05 June 2023 and one (1) on 22 December 2024. Inaccessible terrain limited locations where a SAT could be completed. A Koala was directly observed within the impact area during surveys, however results from the SATs completed were assessed under the 'East Coast (med-high)' category and returned a value of 'low usage' indicating limited suitable habitat.



### 3.3.2 Discussion

The habitat quality scores for each AU were determined using a combination of Site Condition, Site Context and Species Stocking Rate technical data and scoring. The site was given an overall weighted habitat quality score of **5.73** out of the total of 10 which is considered a moderate habitat quality score. This score is calculated based on the combined weighted habitat quality scores for each assessment unit.

Refer to **Table 16** for a summary of the results. The complete MHQA data is provided at **Appendix A**.

**Table 16: Impact area koala MHQA final weighted score summary**

MHQA Final Weighting	AU1	AU2	AU3
<b>Site Condition (/3)</b>	1.82	1.04	0.72
<b>Site Context (/3)</b>	2.25	2.25	2.25
<b>Species Stocking Rate (/4)</b>	2.29	1.71	1.71
<b>Assessment Unit Area (Impact) (ha)</b>	3.50	1.10	1.30
<b>Total Impact Area (ha)</b>	5.90	5.90	5.90
<b>AU weighted Score</b>	0.593	0.186	0.220
<b>Total weighted score</b>	<b>5.73 (rounded to 6)</b>		

#### Site Condition

Site condition varied across the referral area as a result of non-remnant vegetation and high levels of disturbance. **Table 17** to **Table 22** details an assessment of Quality and availability of food and foraging resources and Quality and availability of shelter habitat.

**Table 17: Koala Food Tree Abundance – Impact**

Impact Assessment Unit	RE	Benchmark (trees/ha)	Site Count (trees/ha)	Benchmark Percentile	Score
AU1	12.11.3	544	395	73%	6/8
AU2	12.11.10	No benchmark, RE does not have Koala food trees as part of technical description	No Koala food trees	Not applicable	0/8
AU3	12.11.3	544	110	20%	2/8

**Table 18: Canopy Cover – Impact**

Impact Assessment Unit	RE	Benchmark (% cover)	Site (% cover)	Benchmark Percentile	Score
AU1	12.11.3	72	75.8	105%	2/2
AU2	12.11.10	47	No T1 canopy layer	0%	0/2
AU3	12.11.3	17	No T1 canopy layer	0%	0/2



**Table 19: Final score for Quality and availability of food and foraging resources**

Assessment unit	Total score	MHQA score
AU1	8/10	10
AU2	0/10	1
AU3	2/10	1

*Quality and availability of shelter***Table 20: Shelter Tree Abundance – Impact**

Impact Assessment Unit	RE	Benchmark (trees/ha)	Site Count (trees/ha)	Benchmark Percentile	Score
AU1	12.11.3	544	395	73%	4.5/6
AU2	12.11.10	No benchmark, RE does not have Koala food trees as part of technical description	No Koala food trees	Not applicable	0/6
AU3	12.11.3	544	110	20%	1.5/6

**Table 21: Large Trees abundance – Impact**

Impact Assessment Unit	RE	Benchmark (trees/ha)	Site (trees/ha)	Benchmark Percentile	Score
AU1	12.11.3	67	10	15%	1/4
AU2	12.11.10	88	4	5%	1/4
AU3	12.11.3	67	0	0%	0/4

**Table 22: Final score for Quality and availability of shelter**

Assessment unit	Total score	MHQA score
AU1	5.5/10	5/10
AU2	1/10	1/10
AU3	1.5/10	1/10

Site Context*→Size of patch*

This attribute is a measure of the size of the patch of vegetation in which the assessment unit is located. The scoring reflects the importance of large patches in the landscape and is based on the size of the patch of critical Koala habitat connected to the site in this instance. This attribute is scored such that it reflects the fact that larger patches are less susceptible to ecological edge effects and are more likely to sustain viable populations of native flora and fauna than smaller patches. The size of patch attribute was calculated using GIS and determined the referral area to be part of a patch size of larger than 500 ha. This achieved a score of **10 out of 10** (>200 ha Koala Habitat as per the Queensland BioCondition Assessment methodology) (refer **Plan 2**).



→*Connectedness*

As a landscape level attribute, connectedness aims to assess the degree to which the assessment unit is connected to adjacent native vegetation. Connectedness relates to the capacity of the species to disperse through the landscape between sustainable patches of habitat, and therefore has important implications for species persistence. Connectedness was calculated using GIS, with the percentage of referral area boundary length supporting a Koala critical habitat connection off and on-site was calculated at 48 %, and consequently this attribute scored a **2 out of 5** as per the Queensland BioCondition Assessment methodology (refer **Plan 2**).

→*Context*

The context attribute refers to the amount of critical koala habitat that is retained within a 1 km buffer of the site being assessed and is calculated using GIS. Each assessment unit achieved the same scores for Site context. Existing critical koala habitat within a 1 km buffer of the site was calculated at 79%, and therefore the context attribute achieved a score of **5 out of 5** as per the Queensland BioCondition Assessment methodology (refer **Plan 2**).

→*Ecological Corridors*

GIS was utilised to identify the role of the site in any ecological corridors on or adjacent to the site. A score of **6 out of 6** was given to the Ecological Corridors component of Site Context as the site is within state and regional corridors (refer **Plan 3**).

→*Role of site location to species overall population in the State*

This attribute aims to quantify the importance of the site for state Koala populations through a combined approach that considers the activity and usage across the site and the importance of habitat for fulfilling the Koala's life cycle (i.e., foraging and breeding) and thus the effect that removal of habitat would have on a local population and the species as a whole. This attribute achieved a score of **5 out of 5** as it was determined that the referral area contains habitat critical to the survival of the species. While habitat within the referral area is highly disturbed and site-specific surveys found low Koala activity, any habitat that meets the definition of critical koala habitat under the EPBC Act is also considered potential breeding habitat.

→*Threats to the species*

The 'threats to the species' attribute aims to quantify potential risks to the survival of Koala existing within and adjacent to the referral area. Key known threats to the survival of the Koala include habitat degradation and proximity to main roads increasing the risk of motor vehicle strike, as well as predation by wild or domestic dogs.

**Table 23** provides a risk matrix relative to the conservation advice for the Koala to determine threats to the species. Essentially, each of the threats identified within the conservation advice is weighted relative to the identified level of risk, with the weighted scores summed to provide the threat score, noting the MHQA allows for only scores of 1 (high), 7 (moderate) or 15 (low) for threats. An analysis of the scoring attributes for the site is provided below which returned a 'high-risk' level. Consideration is given to the precautionary principle in favour of a higher habitat value score. Therefore, a score of **7 out of 15** or 'moderate risk' is considered appropriate for the site.

- Clearing and degradation of habitat – the referral area is zoned as 'extractive industry' under the GCCC city plan. Additionally, the referral area holds current approvals under state and local



legislation for extraction. A high-level mapping exercise indicates approximately 30-50% of the surrounding area (within 5 km) is disturbed land, predominantly for the rural and extractive uses (refer **Insert 1**). The high-level threat for the referral area is attributed to existing environmental approvals and zoning as part of an existing quarry footprint. Therefore, a weighted score of **0.4** or 'high risk' is appropriate.

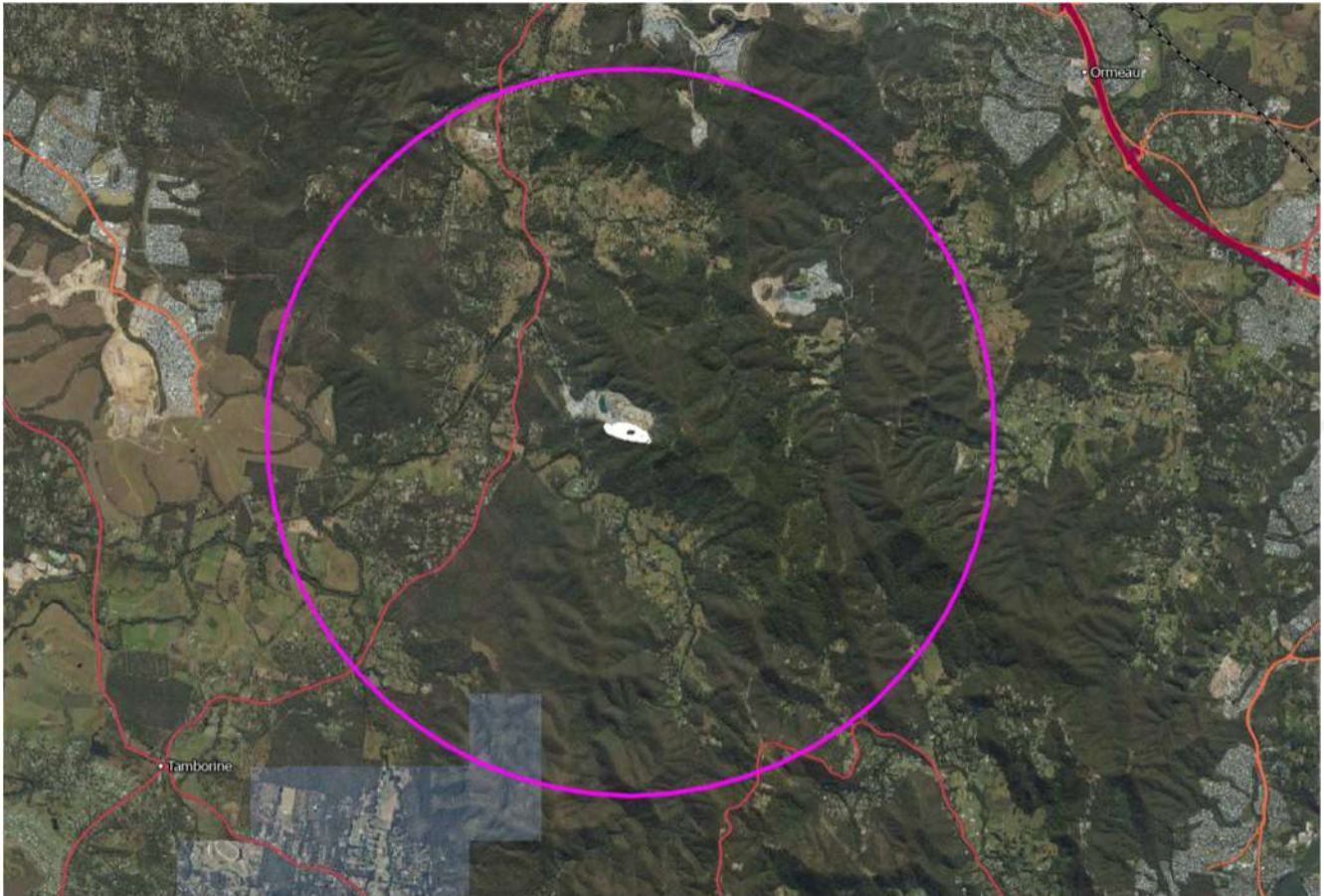
- Inappropriate fire regimes – The GCCC city plan identifies the majority of the referral area as 'very high potential bushfire hazard' and 'high potential bushfire hazard.' A non-Koala specific Bushfire Management Plan is not in place for the referral area which is considered to have high fuel load as a result of dense *Lantana camara* (Lantana) infestation throughout. Therefore, a weighted score of **0.4** or 'high risk' is appropriate.
- Vehicle strike – There is a mix of main roads and internal industry roads located proximal to the referral area. The referral area is located 550 m east of Cedar Creek Road which is signposted as an 70 km p/hr vehicle speed and 1.3 km east of Beaudesert Beenleigh Road which is signposted as an 80 km p/hr vehicle speed. The risk of vehicle strike is considered low-moderate and therefore, a weighted score of **1.5** or 'low risk' is appropriate.
- Dog attack – Wild Dog was recorded within the referral area. Refuge for Koala is present across the majority of the site as intact canopy (i.e >70% coverage compared with benchmark) therefore, a weighted score of **0.7** or 'moderate' is appropriate.

**Table 23: Koala Threat Scoring Matrix (green shading indicates applicable scores for the site)**

Metric	Low	Moderate	High
<b>Threat Thresholds</b>			
<b>Clearing and Degradation of Habitat</b>	Apply one of the following options in order of priority: 1. Apply a current legal protective mechanism. 2. The site is zoned for conservation purposes or clearing is not permitted. 3. If ≤30% of the area within a 5 km buffer of the site is cleared or disturbed land.	In the absence of justification for scoring as high or low and if: >30% and <70% of the area within a 5km buffer of the site is cleared or disturbed land.	Apply one of the following options in order of priority: 1. The site is zoned for development. 2. If ≥ 70% of the area within a 5 km buffer of the site is cleared or disturbed land.
<b>Score Weighting</b>	<b>6</b>	<b>2.8</b>	<b>0.4</b>
<b>Inappropriate Fire Regimes Very High Risk</b>	Current Government endorsed Bushfire Management Plan (BMP) to protect the Koala is in effect.	Non-Koala specific BMP in effect. or; Low fuel load and low fire risk.	Site has a high fuel load and/or high fire risk.
<b>Score Weighting</b>	<b>6</b>	<b>2.8</b>	<b>0.4</b>



Metric	Low	Moderate	High
<b>Vehicle Strike Moderate Risk</b>	Low volume of cars, unsealed, no Koala accessibility, fencing, and mitigation measures in place, negligible Koala mortality.	Site-specific and evidence-based qualitative assessment of these considerations	High volume of cars, sealed, accessibility for Koala, no fencing, and no mitigation measures in place, high Koala mortality
<b>Score Weighting</b>	<b>1.5</b>	<b>0.7</b>	<b>0.1</b>
<b>Dog Attack Moderate Risk</b>	No dogs recorded on site.	Dogs recorded on site and adequate refuge for Koalas (>70% canopy cover).	Dogs recorded on site and limited refuge for Koalas (<70% canopy cover)
<b>Score Weighting</b>	<b>1.5</b>	<b>0.7</b>	<b>0.1</b>
<b>Threats to Species Threshold Analysis Score</b>	$\geq 13.5$ <b>15</b>	$>5$ and $<13.5$ <b>7</b>	$\leq 5$ <b>1</b>



**Insert 1:** High level assessment of degraded land within 5 km of the referral area (between 30 and 50%)



→Species mobility capacity

Species mobility capacity is used to quantify the ability of the species to move from the site and through the surrounding landscape to meet survival needs. Species mobility capacity is considered particularly important in response to rapid changes to the surrounding environment, such as the commencement of land clearing. Assessment has been carried out in accordance with method provided in Section 4.3.2 with outcomes provided in **Table 24**. The site is considered moderately restricted giving it a score of 7/10.

**Table 24: Impact site species mobility capacity assessment**

Direction	Description of restriction	Restriction score
<b>North</b>	The existing quarry operations are present to the north presenting an extensive barrier to species mobility.	Severe – 90%
<b>South</b>	Land to the south contains existing native vegetation	No restriction
<b>East</b>	Land to the east is partially restricted by existing quarry operations but predominantly contains existing vegetation. A significant portion of this area is densely infested with Lantana which does contribute to reduced species mobility for the Koala	Moderate – 40%
<b>West</b>	Land to the west is partially restricted by existing quarry operations but predominantly contains existing vegetation	No restriction
<b>Total restriction score</b>		130 / 4 = 32.5% (moderately restricted or <b>7 out of 10</b> )

Species Stocking Rate (40%)

The final component of the MHQA technique is species stocking rate. Species stocking rates are estimates of the Koala carrying capacity of the site at the time of undertaking the survey. Species stocking rate is ordinarily considered for the site as whole. However, this project includes considerable variations in vegetation values and communities that have significantly different habitat for Koala.

- Species presence on or adjacent to the site – A Koala was directly observed within the referral area, therefore this attribute scored **10 out of 10**.
- Species usage of the site (habitat type and evidenced usage) – The referral area contains three (3) distinct vegetation communities. AU1 reflects eucalypt woodland with evidence of usage, therefore this assessment unit aligns with potential breeding habitat and scores **15 out of 15** for species usage. AU2 contains notophyll vine forest vegetation which is not recognised as Koala habitat owing to the omission of Koala habitat trees. Therefore, AU2 only provides a dispersal role for the species and scores a **5 out of 15**. AU3 is highly degraded and recently cleared non-remnant vegetation consisting of only weeds and some regrowth acacia species, this AU also only provides a dispersal role for the species and scores a **5 out of 15**.
- Approximate density of the species on the site – measured through the use of Spot Assessment Technique (SAT) (Phillips *et al.* 2011) and targeted searches with a high probability of detection.



The SAT method is an industry recognised technique for identifying presence/absence of Koala and measuring activity. A total of four (4) SATs were completed across the referral area between 2022 and 2024. SAT results indicated 'low' usage based on utilising the East coast (med-high) criteria (Phillips and Callaghan, 2011).

- Role/importance of species population on site – the extent to which the site is considered a key source population for breeding, dispersal, is necessary for maintaining genetic diversity or near the limit of the species' range. The site is not considered to be a key source population for breeding or genetic diversity based on low usage recorded and is not near the limit of the species range. There is potential that the site is a key source population for dispersal and therefore scores a 5.

A species stocking rate score of **40 out of 70** was attributed to AU1 and **30 out of 70** for AU2 and AU3.

### 3.3.3 Total Quantum Impact – Koala

The proposed action will result in the clearing and functional loss of **5.9 ha** of vegetation identified as critical habitat for the Koala. With a weighted habitat quality score of 5.73 rounded to **6.00**, the proposed development will result in an overall Quantum Impact of **3.54 ha**.



# PLAN 1. REFERRAL AREA IMPACTS



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## LEGEND

- Site Boundary
  - Referral Area
  - Impact Extent
  - Koala Habitat [5.9 ha]
- Vegetation Communities Impacted**
- Assessment Unit 2:**
    - Indicative of Remnant RE 12.11.3 [3.5 ha impacted]
    - Regrowth RE 12.11.10 [1.1 ha impacted]
  - Assessment Unit 3:**
    - Highly disturbed, dominated by weeds and Acacia regrowth [1.3 ha impacted]
  - MHQA Transect



# PLAN 2. IMPACT SITE KOALA CONTEXT ASSESSMENT



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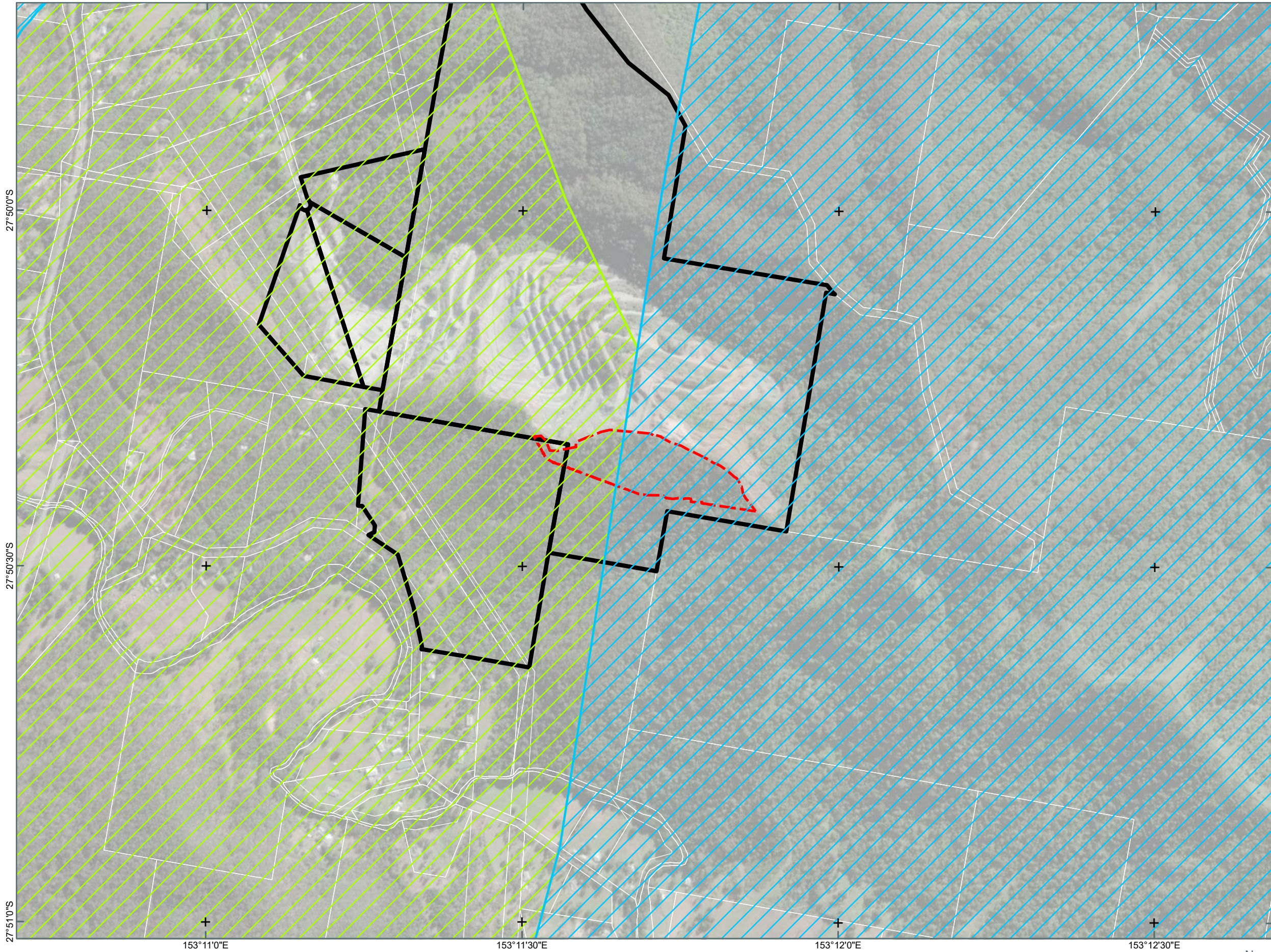
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## LEGEND

- Qld DCDB
- Site Boundary
- Referral Area [5.9 ha]
- 1km Referral Area Buffer
- Percentage of Referral Area boundary length supporting a Koala critical habitat connection off and on site [48%]
- Percentage of Koala critical habitat within 1km of Referral Area [79%]
- Size of Koala critical habitat patch >200m corridor connectivity [>500ha]



# PLAN 3. IMPACT SITE ECOLOGICAL CORRIDORS



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## LEGEND

- Qld DCDB
- Site Boundary
- Referral Area [5.9 ha]
- Statewide Corridors**
- Regional Significance
- State Significance



## 4. Overview of Offset Area

### 4.1. Offset Property Description and Tenure

The offset area (refer **Plan 4**) is located at Little Kipper Creek Road, Biarra, within the Somerset Regional Council (SRC) Local Government Area (LGA), approximately 11 km west of the Queensland town of Esk. The proposed offset area comprises part of Lot 112 on CA311003. The offset area is located approximately 108 km north-west of the proposed impact area (refer Figure 3 and Figure 4). The offset area is currently zoned as 'Rural' under the SRC Planning Scheme. Key details relating to the offset area are provided in Table 25.

**Table 25: Little Kipper Creek Road Offset Area summary**

Offset Area Details	
<b>Address</b>	Little Kipper Creek Road, Biarra, Queensland, 4313
<b>Lot / Plan</b>	Part of Lot 112 on CA311003
<b>Area</b>	40 ha
<b>Tenure</b>	Freehold
<b>Local Government Area</b>	Somerset Regional Council

The proposed offset area forms part of the broader Little Kipper Creek Road Offset Property, which totals >800ha (refer **Figure 3**). The proposed offset area contains a single vegetation community defined as non-remnant vegetation mapped as pre-clear RE12.9-10.2 under the VMA. A review of historical aerial imagery was undertaken to assist with the broad delineation of vegetation communities and identification of historical land management patterns that potentially affect current local vegetation values (refer to **Plan 5**). The offset area has been cleared extensively since at least the 1940s with agricultural uses and associated land management continuing to the current day.

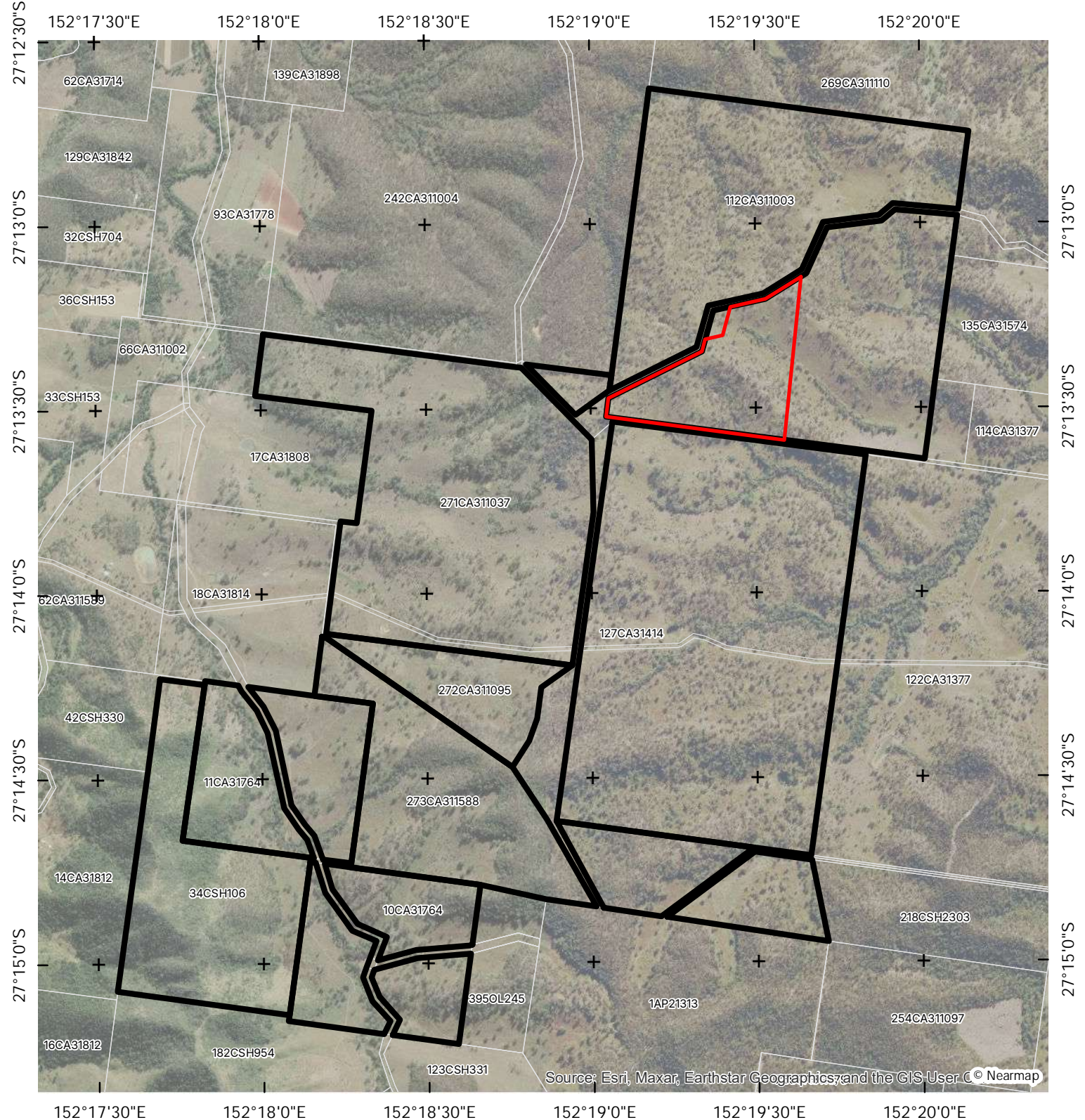
The offset area is highly disturbed as a result of grazing activities and dominated by pasture grasses with scattered Eucalypts and regrowth. Weeds were recorded across the offset area including *Melinis repens* (Red Nata Grass), *Opuntia sp.* (Velvet Tree Pear), *Gomphocarpus physocarpus* (Balloon Cotton) and *Sporobolus spp.* (Giant Rat's Tail Grass), however WONS were largely limited with only very sparse individual *Lantana camara* (Lantana) and *Opuntia sp* observed.

The proposed offset area is considered to have the capacity to meet the offset requirements given the location of the area amongst other offset sites with Koala trees and records present. The proposed offset area can act as receiving area for rehabilitation and the creation/improvement of habitat value. Additionally, this offset area sits in the northern extent of KFF's Littler Kipper Creek Property adjacent to Statewide biodiversity corridors with current approved offsets directly to the south and west (~ 175 ha total) and ~ 180 ha approximately 700 m to the south also mapped Category A. The Pine Cliffs Nature Refuge is also located within the nearby biodiversity corridor, about 3 km west of the site. The location of the proposed offset area near to a regional biodiversity corridor and within the same sub-bioregion as the impact area ensures the land will continue to provide habitat and fauna connectivity within the greater landscape.



Upon EPBC Act Approval, the offset will be protected by the mechanism chosen by DCCEEW. Most likely this will be via a Voluntary Declaration under the *Vegetation Management Act 1999* followed by a covenant either under the *Land Act 1994* or *Land Titles Act 1994*, which will provide protection for the duration of the impact. An assessment of the suitability of the proposed offset area is provided in **Section 5**.



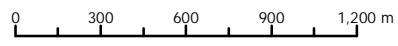


- LEGEND**
- Qld DCDB
  - Offset Site
  - Offset Area [40.0 ha]

**FIGURE 3**  
 OFFSET SITE AERIAL



PROJECT  
 CEDAR CREEK, QLD  
 COORDINATE SYSTEM  
 GDA 2020 MGA Z56  
 SCALE (A4)  
 1:26,578

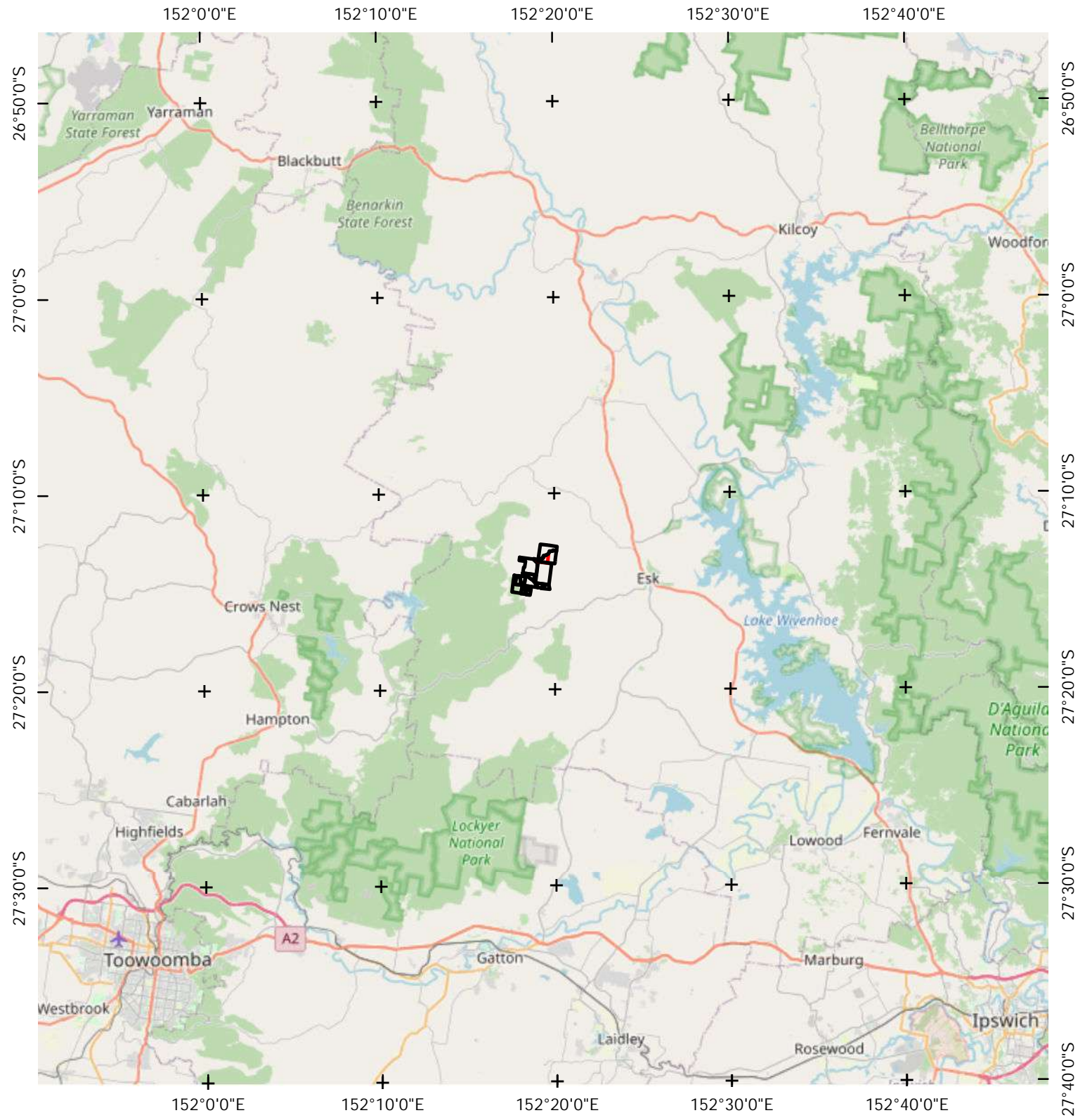



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**FILE REFERENCE**  
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**DATE** 9/10/2025

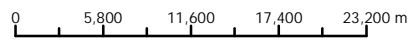


- LEGEND
-  Offset Site
  -  Offset Area [40.0 ha]

**FIGURE 4**  
OFFSET SITE CONTEXT



PROJECT  
CEDAR CREEK, QLD  
COORDINATE SYSTEM  
GDA 2020 MGA Z56  
SCALE (A4)  
1:500,000



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# PLAN 4. PROPOSED OFFSET AREA



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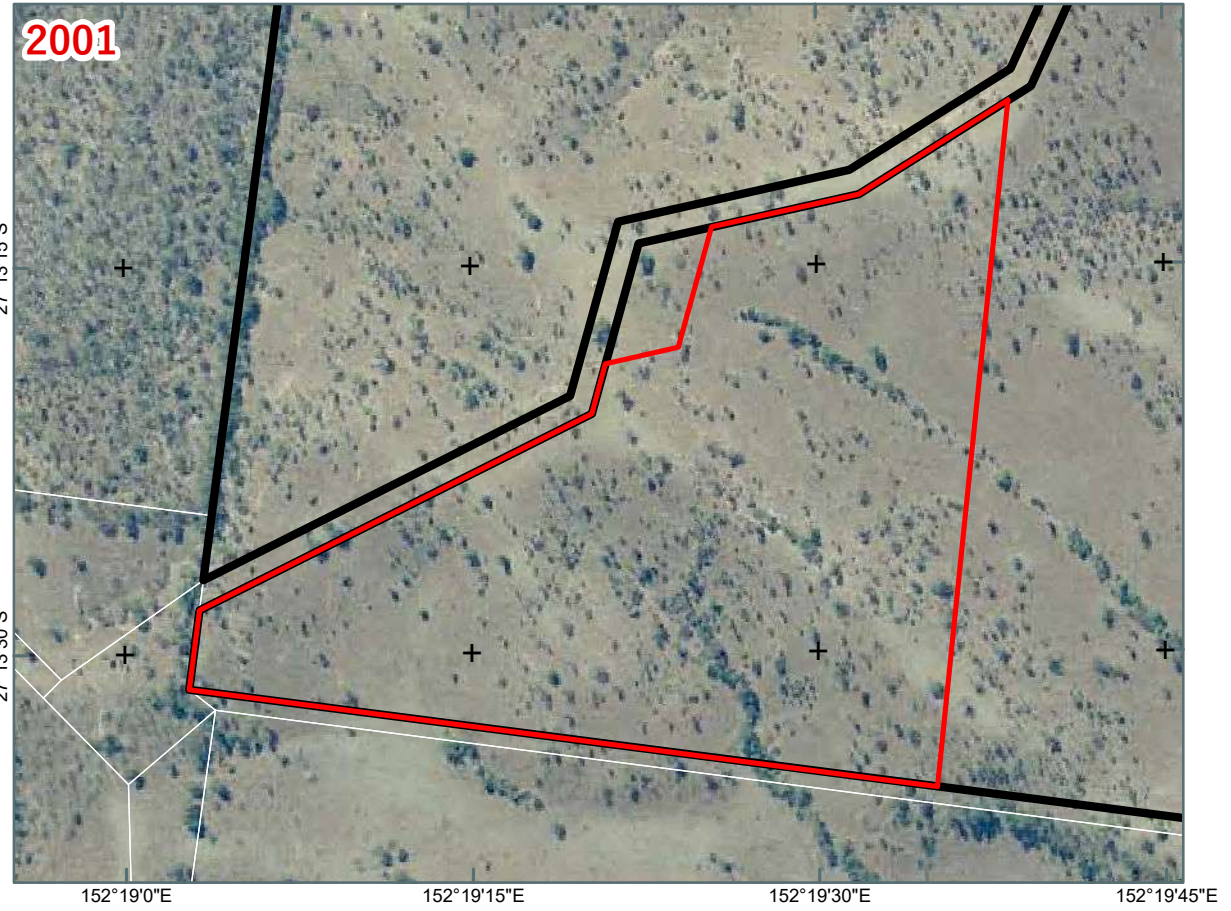
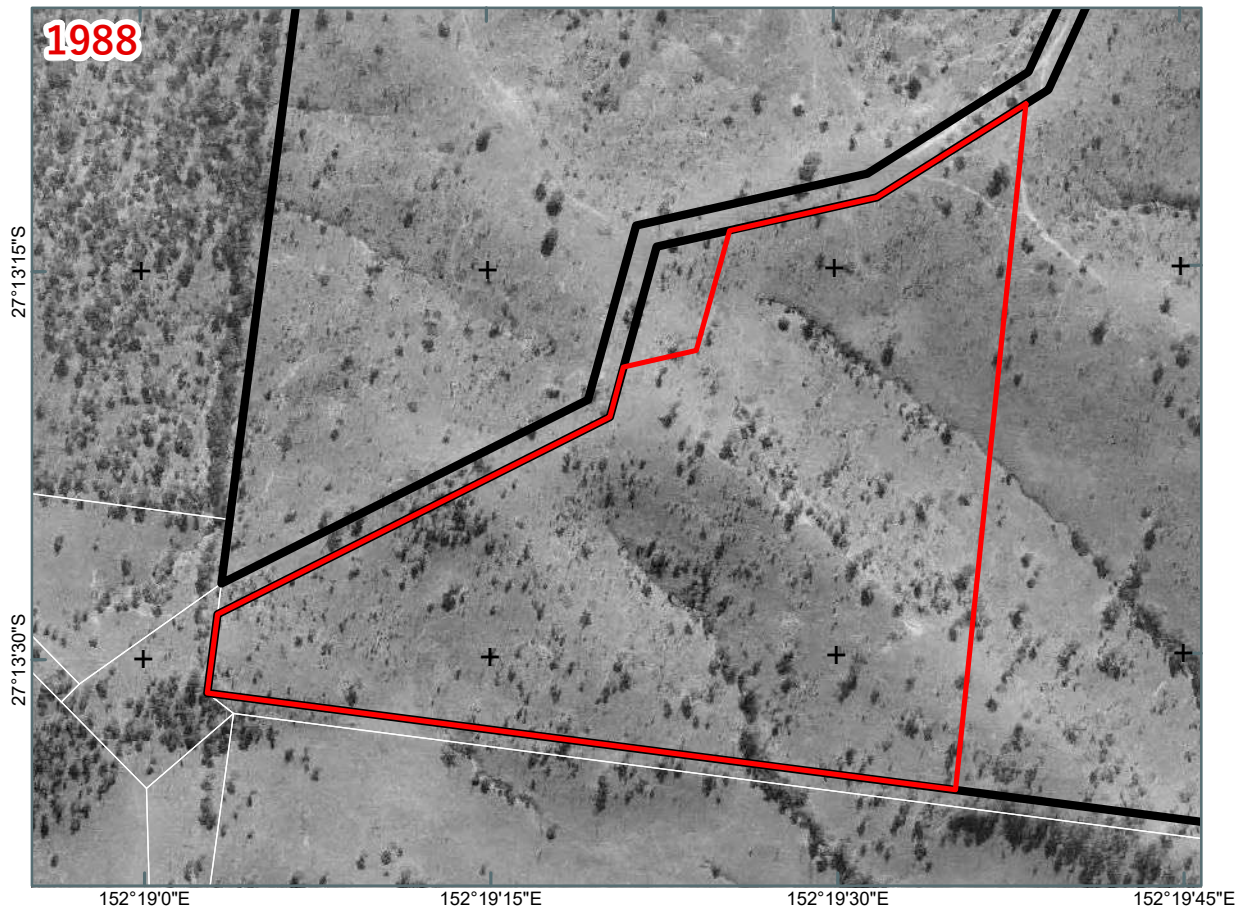
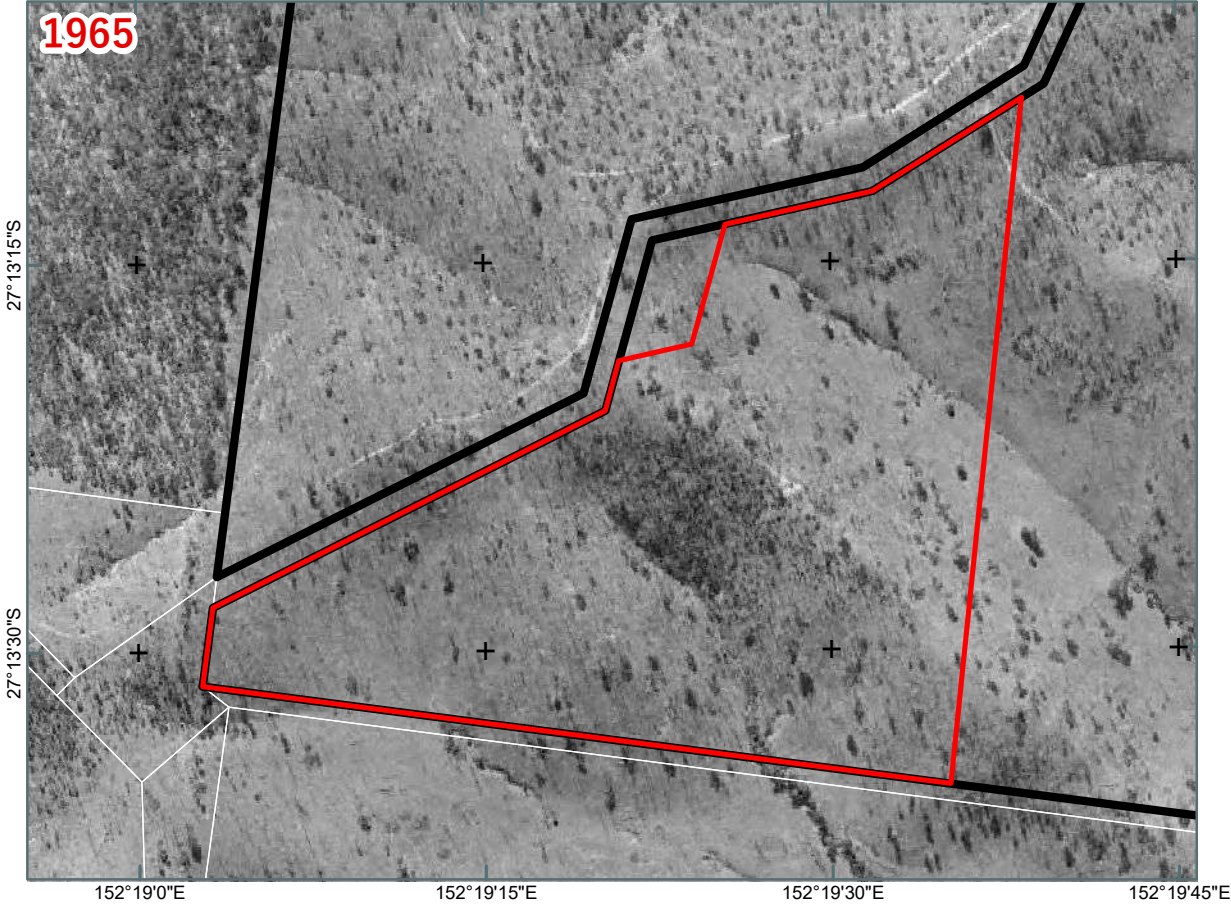
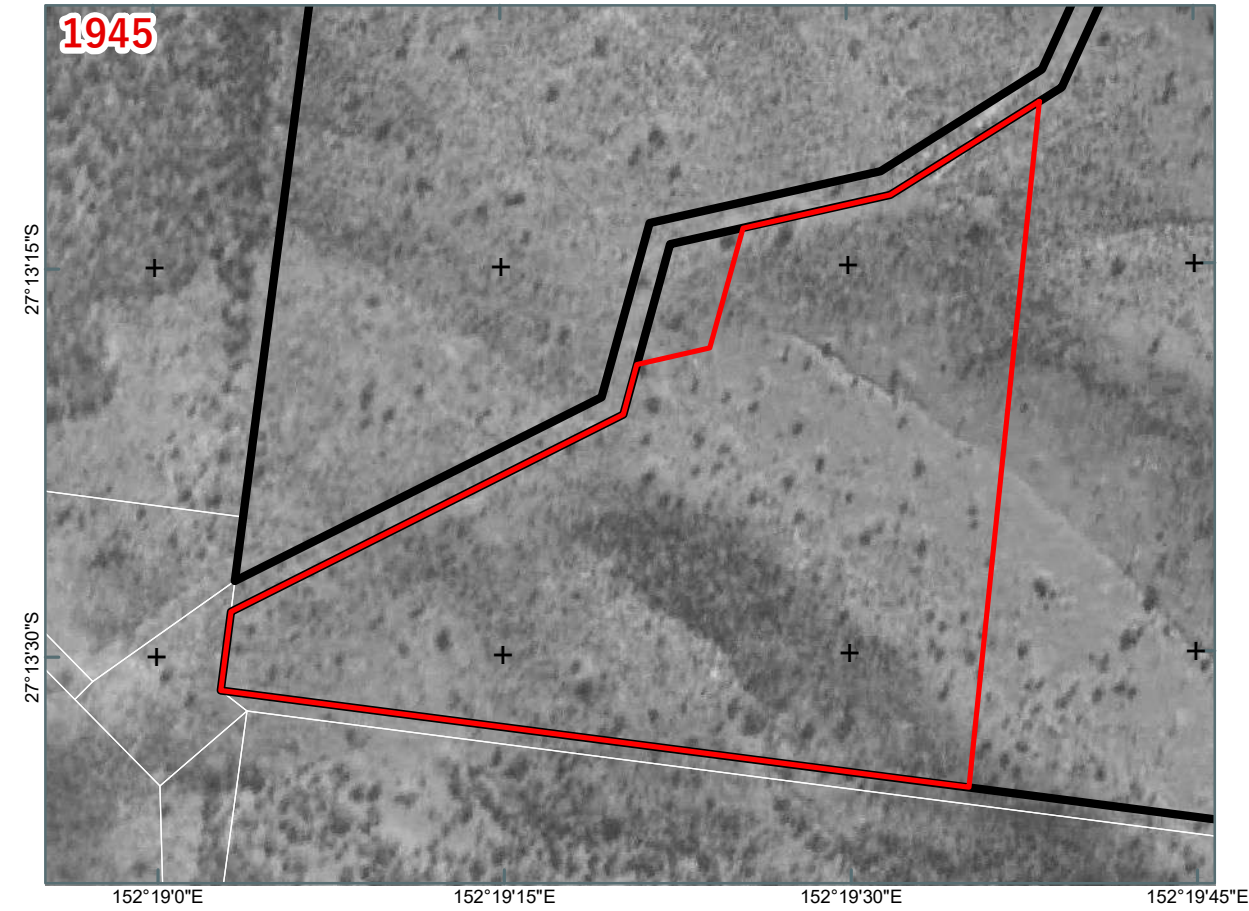
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## LEGEND

- Qld DCDB
- Offset Site Boundary
- Proposed Offset Area [40.0 ha]



# PLAN 5. OFFSET AREA HISTORICAL AERIAL IMAGERY



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## LEGEND

- Qld DCDB
- Offset Site Boundary
- Proposed Offset Area [40.0 ha]



# 5. Offset Area Suitability

As detailed in **Section 4**, one (1) offset area has been selected to be secured to wholly acquit the impacts to MNES proposed under the EPBC application (EPBC 2024/09844) and provide benefit additional to the required compensation for residual impacts. The suitability of the proposed offset area is discussed within this section and considers the bioregional context of the site, ecological values, water resources and topography, and existing habitat values for Koala.

## 5.1. Bioregional Context

Queensland is divided into 13 biogeographical areas to identify biodiversity features at a regional scale. The proposed offset area is located in the South East Queensland (SEQ) Bioregion. The SEQ Bioregion shares its western boundary with the Brigalow Belt Bioregion and extends from the Border Ranges on the New South Wales border, north to the dry coastal corridor between Gladstone and Rockhampton (DEHP 2016). The McPherson Range borders the southern boundary of the bioregion while the Great Dividing Range is to the west. Ranges extend north-south through the central region creating an altitudinal gradient from the coast. Small volcanic plugs remain in the landscape offering distinctive conditions for taxa and ecosystems (DEHP 2016). Large sand islands off the coast offer unique environments and create sheltered bays and passages within which marine and coastal plants and animals thrive (DEHP 2016). The impact area and proposed offset area are both in the same sub-bioregion, being the Moreton Basin.

## 5.2. Offset Area Values

### 5.2.1 Regional and landscape context

The proposed offset area sits adjacent to the Biodiversity Planning Assessment regional corridor and South East Queensland Regional Plan (*'ShapingSEQ 2023'*) regional biodiversity corridor which spans from the Noosa headland in the north, down to Mount Barney and Lamington National Park on the Queensland border (refer **Plan 6**). The corridor aims to encompass large tracts of vegetation, terrestrial connectivity, aquatic connectivity, species richness, diversity and refugia, ecosystem representation and uniqueness and climate resilience areas (Queensland Government 2017).

The regional biodiversity corridor forms part of the Great Eastern Ranges terrestrial corridor which extends from the mountains of Victoria to the Atherton Tablelands in far north Queensland (Mackay *et al.* 2010). The Great Eastern Ranges corridor provides habitat and movement for a range of species that have Federal, State and Local significance, supports significant cultural heritage values and offers scenic amenity and outdoor recreation opportunities (Mackay *et al.* 2010).

The proposed offset area will conserve freehold land surrounding the regional biodiversity corridor, extending the habitat within the adjoining legally bound environmental offset areas and that is generally available around the remnant vegetation within the regional biodiversity corridor. The proposed offset site is well positioned to provide high conservation values once rehabilitated through the management actions proposed in this OMP and contribute to the provision of protected, well-connected, and high-quality Koala habitat in the region. By assisting the natural revegetation, replanting, and removing pests, weeds, and threats, the property will provide biodiversity offsets that ensure an ecological gain on the residual impacts resulting from the impact area which aligns with offset principle 1 of the EOP.



### 5.2.2 Topography

The proposed offset area has varied topography characterised by open paddock and gently sloping hills. The topography of the proposed offset area ranges from 295m Above Sea Level within the higher points to 205m above sea levels in the gully line areas. Refer to **Plan 7**.

### 5.2.3 Water resources

The proposed offset area contains a central watercourse which flows downstream west-east. Additional gully lines are present across the proposed offset area which are not mapped as waterways. This watercourse can be observed in **Plan 7**. Vegetation is consistent across the proposed offset area.

### 5.2.4 Koala habitat

The proposed offset area comprises low quality Category X (non-remnant) vegetation which is mapped as a single pre-clear vegetation community RE12.9-10.2. The site does contain scattered Koala habitat trees and regrowth vegetation but contains significant cleared open paddock with pasture grasses throughout. Existing vegetation within the offset area consists of predominantly *Corymbia citriodora* (Spotted Gum) with *Eucalyptus crebra* (Narrow-leaved Ironbark), *Corymbia intermedia* (Pink Bloodwood) and *Angophora subvelutina* (Broad-leaved Apple). Species present are indicative of the pre-clear vegetation community of RE12.9-10.2 described in **Table 26** and **Photo set 1**.

**Table 26: Regional ecosystem descriptions**

Regional Ecosystem	Description (Queensland Herbarium)
12.9-10.2	<i>Corymbia citriodora subsp. variegata</i> open forest or woodland usually with <i>Eucalyptus crebra</i> . Other species such as <i>Eucalyptus tereticornis</i> , <i>E. moluccana</i> , <i>E. acmenoides</i> and <i>E. siderophloia</i> may be present in scattered patches or in low densities. Understorey can be grassy or shrubby. Shrubby understorey of <i>Lophostemon confertus</i> (whipstick form) often present in northern parts of bioregion. Occurs on Cainozoic and Mesozoic sediments. Not a Wetland. (BVG1M: 10b).

The dominance of vegetation communities containing foraging habitat values for the Koala suggests the proposed offset area can provide value for this species with targeted restoration techniques.

### 5.2.5 Current management arrangement

Presently, the proposed offset area is utilised for cattle grazing and is managed through various farming practices. This includes the use of the following management activities:

- Controlled grazing to ensure ground cover levels are maintained, subsoil moisture is retained, and pasture grass growth is encouraged
- Invasive and noxious weed control in grazing areas targeting WONS where practicable, and;
- Establishing and maintaining adequate firebreaks across the property.

### 5.2.6 Current threats

The wider Little Kipper Creek Road offset property is and has been utilised in various ways for agriculture, which attracts threats to both livestock and native wildlife. The major and obvious threat within the proposed offset area and broader offset property is Wild Dogs. The SRC lists wild dogs as abundant and



widespread throughout the region and has also listed Wild Dogs (*Canis familiaris dingo*, *Canis familiaris dingo* X *Canis familiaris*, *Canis familiaris*) as declared pest animals. The SRC website documents that wild dog numbers are at an all-time high across the SRC area. Further, residents are increasingly engaged in raising livestock and poultry, resulting in a readily available food sources for wild dogs.

The Queensland WildNet database identifies 2 confirmed records of *Canis* sp. and/or *Canis familiaris* and 3 records of European foxes within 20 km of the proposed offset area, located within connected vegetation. Wild dogs are known to travel up to 20 km seeking prey with home ranges of individuals likely to overlap with the offset area. Further, as discussed in detail in **Section 6**, both motion-sensor camera traps that were placed on site for the baseline surveys directly recorded wild dogs.

Presently, under the Queensland *Biosecurity Act 2014*, there is a 'general biodiversity obligation' for landholders to manage biosecurity risks that are under their control and take reasonable and practical steps in doing so. To determine the extent of management and whether it is necessary to take reasonable steps in managing the biosecurity risk, the landholder is required to assess the risk and its potential harm (*i.e.*, extensive productivity loss). Currently, the landholder does not undertake feral animal control as it is assessed under the 'general biosecurity obligation' of the *Biosecurity Act 2014*, that feral animal threat to productivity does not have a positive cost benefit to the current land use (*i.e.*, the expenditure to undertake feral animal control would not result in enough economic gain in productivity to warrant implementation). Other threats include:

- clearing and harvesting of timber for pastoral uses
- uncontrolled wildfire, and;
- barbed wire.

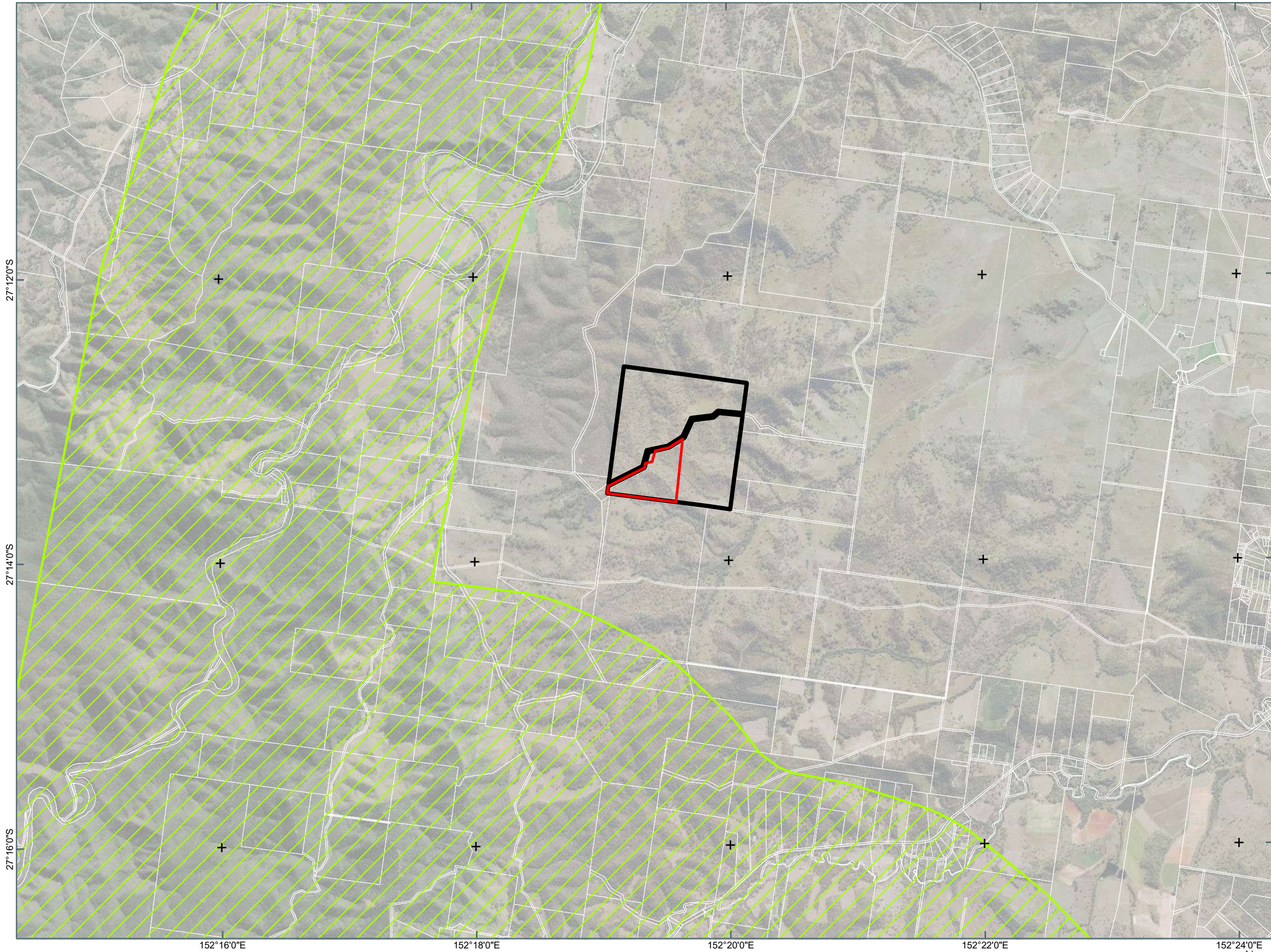




**Photo set 1:** AU1 – Non-remnant RE12.9-10.2



# PLAN 6. OFFSET SITE ECOLOGICAL CORRIDORS



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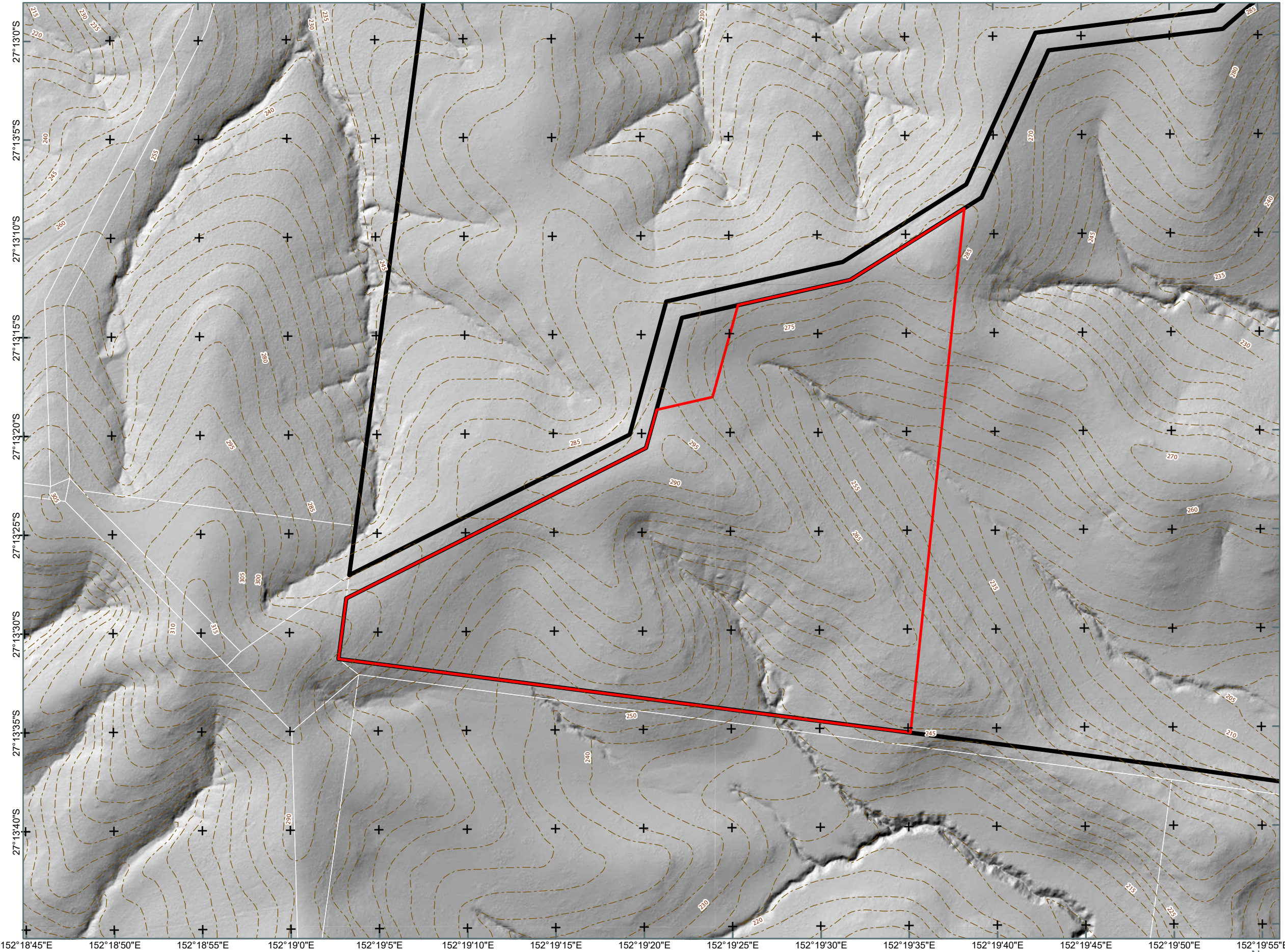
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## LEGEND

- Qld DCDB
- Offset Site Boundary
- Proposed Offset Area [40.0 ha]
- Statewide Corridors**
- Regional Significance







# PLAN 7. OFFSET SITE TOPOGRAPHY



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## LEGEND

-  Qld DCDB
-  Offset Site Boundary
-  Proposed Offset Area [40.0 ha]
-  5m Contours



### 5.3. Suitability Analysis – Environmental Offset Policy

The objective of this OMP is to outline appropriate management actions to achieve the offset outcomes specified within the EPBC Act and provide an overall improved conservation outcome and net gain in Koala habitat, thereby ensuring the long-term viability of this species. **Table 27** lists the principles of the EPBC Act EOP and describes how the proposed offset has been developed to adhere to these principles.

**Table 27: Offset suitability analysis – Environmental Offsets Policy**

EOP Requirements Suitable offsets must:	Delivery
<p><b>Deliver an overall conservation outcome that improves or maintains the viability of the protected matter</b></p>	<p>The offset area will directly contribute to the ongoing viability of the Koala (<i>Phascolarctos cinereus</i>). Protection, enhancement and management of the offset area in accordance with this OMP will deliver an overall conservation benefit and net gain in Koala habitat. Prior to the impact, the offset area was not protected or managed for conservation outcomes. Actions outlined in this OMP will commence the regeneration and restoration of habitat, contributing to a connected corridor with reduced threats. In doing so, the OMP aims to encourage the use of restored and new areas of habitat through increasing the numbers and area of Koala food trees, maintaining low abundance of weeds and reducing predator abundance. The proposed offset aims to contribute to the resilience of the Koala by increasing landscape connectivity provided through the protection of the offset properties.</p>
<p><b>Be built around direct offsets but may include other compensatory measures</b></p>	<p>The offset is built around direct offsets and easily compensates for the potential impact. The offset area will be legally secured for conservation purposes prior to the impact occurring and will endure for the duration of the impact. Legally securing and managing the offset area in accordance with this OMP protects the areas from incompatible land uses and contributes to the viability of the Koala.</p>
<p><b>Be in proportion to the level of statutory protection that applies to the protected matter</b></p>	<p>The OAG lists the probability of annual extinction of the Koala as 1.2%. The use of this measurement in the OAG ensures that the appropriate level of statutory protection is applied. All threats to Koalas outlined in the Department’s Species Profile and Threats Database and EPBC Act Conservation Advice and Recovery plan for the Koala have been addressed within this OMP.</p>
<p><b>Be of a size and scale proportionate to the residual impacts on the protected matter</b></p>	<p>Permanent protection and management until the proposed outcomes are achieved will deliver a conservation gain adequately compensating for the quantum impact for each matter. The total offset area for protection and management is 40 ha, delivering a 151.32% offset for the Koala, thus satisfying the 90% minimum direct offset area.</p> <p>Management actions outlined within this OMP aim to protect and enhance Koala habitat, compensating for and exceeding habitat quality of the impact.</p> <p>The offset and management actions will provide:</p> <ul style="list-style-type: none"> <li>• Legally secured and long-term protection of 40 ha of Koala habitat.</li> </ul>



EOP Requirements	Delivery
<p>Suitable offsets must:</p>	<ul style="list-style-type: none"> <li>• Improvement of habitat through revegetation and natural regeneration of Koala food trees and removal of weeds.</li> <li>• Contribution to a large contiguous protected habitat and biodiversity corridor with reduced threats.</li> <li>• Long-term reduction in threats, through the removal of incompatible land uses.</li> <li>• Reduced risk of Koala mortality or injury due to vehicle strike.</li> <li>• Reduced risk of Koala mortality or injury due to predators, through control of non-native predators.</li> <li>• Reduced risk of high intensity fire through management of fuel loads.</li> <li>• Reduced risk of the spread of diseases and/or pathogens.</li> </ul>
<p><b>Effectively account for and manage the risks of the offset not succeeding</b></p>	<p>Confidence in the success of the offset is high (<math>\geq 75\%</math>) given the detail and intensity of the management actions outlined within this OMP. The confidence is supported by the offset area selection, design of management actions, and clear monitoring and reporting procedures. The offset area contains well-maintained access tracks that will facilitate access to planting areas. Risks associated with the offset delivery will be mitigated and managed through the detailed management actions outlined in <b>Section 9</b>. Management actions have been drawn from offset targets which aim to protect and conserve large, connected areas of Koala foraging habitat to support viable populations.</p>
<p><b>Be additional to what is already required, determined by law or planning regulations, or agreed to under other schemes or programs</b></p>	<p>Legally securing the offset area for the duration of the impact will ensure existing and future owners are prohibited from conflicting land uses, including clearing. Management beyond minimum legislative requirements is proposed across the whole area to ensure loss of habitat values does not occur through intensification of weeds causing loss of connectivity, destruction of habitat via hot, intense fires, or increased risk of mortality or injury by dog attack.</p>
<p><b>Be efficient, effective, timely, transparent, scientifically robust, and reasonable</b></p>	<p>Efficient and Effective:</p> <ul style="list-style-type: none"> <li>• The offset area is surrounded by a landscape of connected Koala habitat, and more directly by potential habitat that is being actively rehabilitated as offsets. Management actions will ensure efficient delivery of outcomes over the offset area and proactive management, monitoring and reporting will ensure response/corrective actions are timely and focused.</li> <li>• Prior to the EPBC Act process, the offset area was not protected or managed for conservation outcomes. Protection and management of the offset area in accordance with this OMP aims to deliver an overall</li> </ul>



EOP Requirements	Delivery
<p>Suitable offsets must:</p>	<p>improved conservation outcome and net gain in Koala habitat.</p> <p>Timely:</p> <ul style="list-style-type: none"> <li>The mix of paddock and scattered trees within the offset area allows for the achievement of immediate and long-term conservation outcomes. The offset area will be legally secured prior to the commencement of clearing at the project site.</li> <li>Following the approval and implementation of this OMP, management actions outlined within <b>Section 9</b> will commence. Adaptive management processes will ensure management actions respond to technology improvements, natural events and potential risks identified in the risk assessment.</li> </ul> <p>Transparent:</p> <ul style="list-style-type: none"> <li>The baseline surveys established the survey methodology to be used for the monitoring and reporting required for the lifetime of the approval. A clear monitoring and reporting framework is established within this OMP (refer <b>Section 6</b>). Monitoring and reporting of the offset area will be summarised within the Offset Area Annual Report provided by the Offset Provider which is then included in the Annual Compliance Reports for project.</li> </ul> <p>Scientifically robust:</p> <ul style="list-style-type: none"> <li>The proposed offset area was assessed by suitable qualified and experienced Ecologists. Ongoing management and monitoring actions will be conducted in collaboration with other qualified Ecologists and regeneration specialists to achieve the outcomes specified within the EPBC Act approval and this OMP.</li> <li>The baseline surveys conducted for the offset area follows standard, accepted monitoring methodology and are considered scientifically robust, reliable and repeatable. This will ensure the monitoring and compliance reporting are consistent and relate back to the overall outcomes specified within the EPBC Act approval.</li> </ul> <p>Reasonable:</p> <ul style="list-style-type: none"> <li>The offset is considered reasonable as the offset areas are greater than the significant residual impact on both Koala habitat and provide a 151.32% offset for the Koala based on the quantum impact (using the OAG).</li> <li>This OMP outlines appropriate management actions to achieve the offset outcomes specified within the EPBC Act approval and an overall improved conservation outcome and net gain in Koala habitat, ensuring the long-term viability of the protected matters.</li> </ul>



EOP Requirements	Delivery
<p>Suitable offsets must:</p>	
<p><b>Have transparent governance arrangements including being able to be readily measures, monitored, audited and enforced</b></p>	<p>This OMP provides a detailed monitoring and reporting framework, performance criteria and corrective actions (refer <b>Table 14</b> and <b>Sections 6 and 7</b>). These provide minimum requirements for success/failure of management actions and triggers for corrective actions.</p> <p>The approval holder will engage qualified and experienced consultants and specialists periodically throughout the offset delivery to ensure the offset outcomes are achieved. Section 491 of the EPBC Act makes it an offence in certain circumstances to knowingly provide false or misleading information or documents to specified persons who are known to be performing a duty or carrying out a function under the EPBC Act or the <i>Environment Protection and Biodiversity Conservation Regulations 2000</i> (Cth). The offence is punishable on conviction by imprisonment or a fine, or both. As such, engaged consultants and specialists are required to complete a declaration of accuracy in reports provided to the Department, acknowledging their responsibility and accountability for information provided to the Department.</p> <p>Annual Compliance Reports must be published on the approval holder’s website in accordance with an EPBC Act approval and may be subject to audit by the Department by an independent auditor in accordance with section 458 of the EPBC Act, and/or used to verify compliance with the conditions. Summaries of the result of an audit may be published on the Department's website or through the general media.</p>

5.3.1 Recovery plans and advice

**Koala Conservation Advice and National Recovery Plan**

Conservation Advice for *Phascolarctos cinereus* (Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory (Threatened Species Scientific Committee, 2010).

The Conservation Advice came into effect on 12 February 2022. It lists six conservation and recovery actions that are categorised into ‘supporting strategies’ which provide governance to coordinate actions, led by the Australian Government in partnership with the States and Territories, and ‘on-ground (direct) strategies’ which relate to improving habitat quality and restoration, implemented at the site level.

The impact and offset are considered to be consistent with the on-ground strategies detailed in the Conservation Advice and recovery Plan:

- Strategy 3: Increase habitat protection
- Strategy 5: Strategic habitat restoration
- Strategy 6: Active metapopulation management

**Strategy 3: Increase habitat protection**

Land-use change is the most significant threat to the Koala through habitat loss, fragmentation, and degradation. Increasing the total area of protected, connected, quality Koala habitat is important to protect and recover Koala populations.

The proposed offset area will create a net gain of Koala habitat, with improved habitat quality, connectivity, and longevity over the impact area. The eventual dedication of the offset site will protect this gain in Koala



habitat in perpetuity, securing it from the threat of land-use change or increases in the intensity of current grazing practices.

#### Strategy 5: Strategic habitat restoration

Restoration increases the overall habitat available for Koalas and increases the connectivity between areas of habitat to contribute to ensuring the long-term survival of Koala populations. It involves restoring lost and degraded habitat to improve environmental functions.

While the project proposes to impact 5.9 ha of Koala habitat, the habitat within the impact area consists of a mixture of moderate and low value habitat as a result of high levels of disturbance and poor value habitat. At approximately five times the size of the impact area and with greater contextual suitability that will be protected, the rehabilitation of the proposed offset site will provide a net gain of Koala habitat by strategic habitat restoration. As it is surrounded by other offset sites and adjacent to a regional biodiversity corridor, this habitat is located well to maximise the projected benefit to Koala.

#### Strategy 6: Active metapopulation management

Metapopulation management concerns the movement of individuals and genes between populations. Consideration of metapopulation management is reflected in the design of the development, specifically the creation and rehabilitation of conservation areas to promote connectivity and Koala movement within the landscape, and through the removal of hazards to Koala.

Although the project will involve the removal of habitat critical to the survival of the Koala, all significant residual impacts are to be compensated through the provision of land-based offsets. Proposed offsets will be located amongst Koala-occupied areas of connected and resilient habitat, and within the same sub-bioregion as the impact area.



### **South East Queensland Koala Conservation Strategy**

The South East Queensland Koala Conservation Strategy 2020-2025 (the Strategy) (DES 2020) came into effect on 16 February 2020 and addresses the key threats facing Koalas and outlines strategies to stop the decline of Koala numbers and set in train the species' recovery. Issues addressed in the Strategy include:

#### **Habitat protection**

The project requires impacts of 5.9 ha to Koala habitat. However, the impact area sits adjacent to an existing quarry and is within an extractive industry with an existing state environmental approval (EA-100268669). Therefore, assessment under the Strategy is not triggered.

All vegetation clearing under the project will be governed by impact and pre-clearing management protocols, including preparation of site-based management plans and pre-start checklists.

#### **Habitat restoration for Koalas**

The project requires impacts of 5.9 ha to Koala habitat. However, the referral area sits adjacent to an existing quarry and is within a extractive industry with an existing state environmental approval (EA-100268669). Proposed offsets will be located in areas of connected and resilient habitat, and significant uplift in habitat quality is possible given the non-remnant, cleared condition it currently exists in as a result of extensive historical rural land uses.

#### **Threat management**

**Section 4.8** lists the relevant threats to Koala (vehicle strike, dog attack and weed invasion) and effective mitigation measures to reduce risks during the construction and operational phases of the project. Mitigation measures are to be incorporated into Vegetation Conservation and Management Plans, and Fauna Management Plans. All contractors and visitors are to undertake site inductions to address threats and risks to MNES.

#### **Improved mapping, monitoring, research and reporting**

Not applicable.

#### **Strong community engagement and partnerships**

Not applicable

#### **Partnerships and strategic coordination**

Not Applicable.

In conclusion, the project has considered the avoid, mitigate and offset hierarchy. The proposed quarry extension is directly adjacent to the existing quarry footprint within land that is zoned as extractive industry and covered by a state environmental approval. The project will result in the removal of 5.9 ha of Koala habitat including 2.4 ha of extremely low value vegetation offering only a dispersal role to the species. All vegetation clearing under the proposal will be government by State requirements for fauna management and the significant residual impacts will be compensated through land-based offsets, in an area surrounded by other offsets and a nearby regional biodiversity corridor that will ensure connectivity and longevity of the rehabilitated habitat is protected.



## 6. Baseline Surveys

### 6.1. Offset Area Baseline Surveys – Methodology

Baseline field surveys to determine habitat quality for Koala, non-native vertebrate pest presence and weed mapping was completed on 18 and 19 February and 4 March 2025. Refer to **Table 28** and the subsections below for specific details on survey dates for each method applied.

**Table 28: Offset area baseline field surveys methods summary**

Date	Temperature	Rainfall	Methods implemented
18 February 2025	17.6°C min – 32.0°C max	0 mm	MHQA transects, camera installation, SAT surveys.
19 February 2025	19.1°C min – 32.7°C max	0 mm	MHQA transects, SAT surveys
4 March 2025	17.3°C min – 32.0°C max	0 mm	Camera collection and weed mapping

NB: Temperature data sourced from Bureau of Meteorology (BoM) – Station 040082 University of Queensland Gatton.

#### 6.1.1 Habitat quality – Koala

The Koala habitat quality assessment methods used for the impact area (described in **Section 0**) were also applied to the proposed offset area. Site condition within the proposed offset area was assessed using the BioCondition method as recommended under the Queensland environmental offsets framework within a single AU identified in the proposed offset area as shown in **Table 29** and shown in **Plan 8**. Assessment at multiple locations is necessary where possible to measure vegetation condition at representative locations across the spatial extent of the proposed offset area. Field survey effort is provided as **Plan 9**.

Site condition was assessed through the completion of a total of two (2) MHQA transects within the proposed offset area to account for minor variations in conditions.

**Table 29: Summary of assessment units and MHQA transects – offset area**

Assessment unit	Vegetation community	Area (ha)	MHQA transect
AU1	Non-remnant pre-clear RE12.9-10.2	40	Transects 1 and 2

#### 6.1.2 Spot Assessment Technique surveys

Baseline Koala activity levels were determined through utilising the SAT surveys (Phillips et al. 2011). The SAT method is an industry recognised technique for identifying presence/absence of Koala at a site. Results from the SAT surveys are compared against current available published scientific literature to identify an estimated Koala carrying capacity (stocking rate) to be determined. A total of two (2) SAT surveys were completed across the proposed offset area in conjunction with MHQA transects 1 and 2 (refer **Plan 9**) to target presence of Koala.







# PLAN 8. OFFSET ASSESSMENT UNITS



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## LEGEND

-  Qld DCDB
-  Offset Site Boundary
-  Proposed Offset Area [40.0 ha]
-  AU1 – Non-remnant RE12.9-10.2 [40.0 ha]



# PLAN 9. OFFSET BASELINE FIELD SURVEY



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## LEGEND

- Qld DCDB
- Offset Site Boundary
- Proposed Offset Area [40.0 ha]
- GPS Track Log
- MHQA Transect
- SAT Survey
- Motion Camera



### 6.1.3 Motion-triggered camera trapping

Surveys for non-native vertebrate pest presence, primarily targeting wild dogs which are the primary threat to Koala, were completed via the use of infrared motion-triggered camera trapping. Camera trapping involves setting up a fixed digital camera to capture images or video of animals that pass in front of a camera with an infrared trigger. This survey technique identifies fauna activity beyond the scope of direct observational studies and with the absence of potential observer impacts. The method for determining camera locations utilise the standard grid-based system which is common practice on sites where access is good. In lieu of any published guidelines from DCCEEW for monitoring wild dogs, the number of cameras/distances between cameras was driven by several case studies and existing guidelines (refer **Table 30**). The literature states that as a result of extensive home ranges and large daily movements, a recommended camera spacing of between 500 m and 1 km is advised to capture activity.

The field survey design utilised the lower threshold of approximately 500 m as a guide for camera placement/number of cameras ensuring surveys are adequate for species detection. The ultimate camera trapping locations were driven by site specific factors. Cameras were directed to animal trails which are more likely to support fauna. Heavy, loose vegetation was avoided to reduce the chance of false triggering, and the camera was aimed to avoid sun shining directly onto the lens. Cameras were attached 30-100 cm from the ground on a tree or post and directed towards landscape features.

**Table 30: Camera spacing justification**

Target Animal	Approx. Home Range	References	Spacing Recommendations
Wild Dog	>250ha	<ul style="list-style-type: none"> <li>Department of Primary Industries, NSW Government (2018), Guidelines for camera trapping wild dogs, foxes and feral cats</li> </ul>	<ul style="list-style-type: none"> <li>1 km</li> </ul>
		<ul style="list-style-type: none"> <li>Northern Territory Government (2015), A guide for the use of remote cameras for wildlife survey in northern territory</li> </ul>	<ul style="list-style-type: none"> <li>500 m</li> </ul>
		<ul style="list-style-type: none"> <li>Contardo, J. E. (2017). Occupancy of free-ranging dogs in relation to infrastructure and habitat on Navarino Island, Cape Horn Reserve, Chile</li> </ul>	<ul style="list-style-type: none"> <li>700 m</li> </ul>
		<ul style="list-style-type: none"> <li>Department of Industry, (2017). NSW Wild Dog Management Strategy 2022-2027</li> </ul>	<ul style="list-style-type: none"> <li>700 m</li> </ul>
		<ul style="list-style-type: none"> <li>McNeill et al (2016), Dingoes at the Doorstep: Home Range Sizes and Activity Patterns of Dingoes and Other Wild Dogs around Urban Areas of North Eastern Australia</li> </ul>	<ul style="list-style-type: none"> <li>700 m</li> </ul>





Four (4) camera traps were installed across the proposed offset area for a period of 14 nights from 18 February 2025 to 4 March 2025, baited with chicken necks to target wild dogs and other known potential threats to MNES in the broader area. Refer to **Plan 9** for the location cameras and **Table 31** for a description of camera deployment locations.

**Table 31: Fauna camera summary (18 February to 4 March 2025)**

ID	Latitude	Longitude	Photo	Description of location
1	- 27.219665°	152.326939°		Camera 1 was deployed in the northern extent of the proposed offset area.
2	- 27.223256°	152.324111°		Camera 2 was deployed in the central portion of the proposed offset area along the main ridgeline where a historical access track is present.



3	-	152.324137°		Camera 3 was deployed in a gully line in the south-east of the proposed offset area.
4	-	152.318177°		Camera 4 is located in the south-west corner of the proposed offset area adjacent to the main access track.

#### 6.1.4 Relative Abundance Index

The results of the motion-triggered camera detection survey (recorded species and number of occurrences over days of camera deployment) were utilised to provide relative abundance of non-native vertebrate pest species over the proposed offset area, reducing bias and increasing repeatability.

A relative abundance index (RAI) is then calculated for feral animal abundance, using the formula **RAI= D/TN x 100**, where D is number of individual detections and TN is the total number of camera-trap nights (all cameras combined). This methodology ensures that the surveys are representative of the entire area and are repeatable for future monitoring requirements. A higher RAI indicates a higher pest presence.

#### 6.1.5 Weed cover

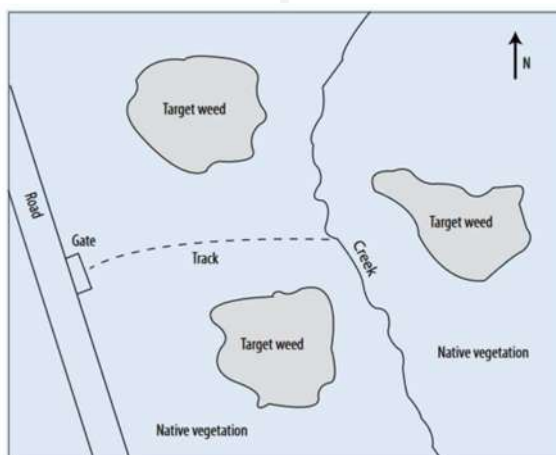
WONS are considered the primary focus of this assessment. However, WONS were observed in low abundance and therefore this assessment included the mapping of any non-native flora species. Mapping non-native flora is ideally done by directly delineating every plant to provide an exact percentage coverage for the site. However, this method is often not feasible given the abundance of weeds and the mixture of flora species across the site. Therefore, the percentage cover of weeds was determined using a two-step method detailed in the *Guidelines for Monitoring Weed Control and recovery of native vegetation* (Auld 2009).

##### Step 1: Delineate weed patches

Using an antenna-based GPS system, the spatial extent or patches of weeds (including WONS) within the proposed offset area was mapped on-ground as polygons to produce a 'mud map' of the site (refer **Extract**



1). Each polygon was given an initial visual estimate of weed cover percentage. This step is completed to define patches of weeds and subsequently guide the placement of targeted weed transects as a means of accurately estimating percentage cover within a given patch. The entirety of the proposed offset area was observed to contain consistent weed coverage in the form of non-native pasture grasses throughout.



Extract 1: 'Mud map' from Auld (2009) – Figure 1.

### Step 2: Line-transect method

To quantify the percentage cover within each mapped area the line-transect methodology presented in the *Guidelines for Monitoring Weed Control and recovery of native vegetation* (Auld 2009) was implemented.

In this methodology, the ground cover of a weed is a measure of the perpendicular projection of aerial parts of plants to the ground. This method minimises user variability as cover calculations are not reliant on estimations, as cover is instead accurately measured against the tape, typically standardised at 100 metres in length. With this technique, the percentage cover of all weed species (WONS and non-WONS) along the line transect is recorded.

The entirety of the proposed offset area was observed as consistent vegetation communities and ground covers as a result of widespread cattle grazing. Two (2) 100 m transects were established across the proposed offset area to obtain quantifiable data. Auld (2009) does not prescribe a minimum number of line-transects, a feature of other transect methods such as the BioCondition Assessment Manual. Due to the relatively small size of the proposed offset area and consistent conditions, the location of transects are considered adequate to represent the general condition of the proposed offset area. Refer **Plan 10** to for the location of transects and the extent of initial mapped weed polygons.

Surveys to estimate the weed cover using the vegetation cover classes proposed by Auld (2009) will be undertaken by suitably qualified persons before the end of Years 5, 10, 15, and 20 of the offset and are recommended at Year 8, in addition to Modified Habitat Quality Assessment transects which also involve a component of weed cover estimation. Due to the location and size of weed patches during baseline surveys, only one transect was required to be completed for each patch category, but if additional transects are required as part of future surveys, the average cover percentage for a patch should be calculated. Results and progress against the management and monitoring actions will be reported on as part of the Annual Compliance Report.



## 6.2. Offset Area Baseline Assessment Results

### 6.2.1 Assessment unit description

#### Assessment Unit 1

The entirety of the proposed offset area was identified as a single assessment unit categorised as non-remnant vegetation of pre-clear RE12.9-10.2. While gully lines are present, these are the upper catchments and do not contain a significant change in vegetation to be considered a separate assessment unit. The entirety of the proposed offset area is reflective of land zone 9-10 (sedimentary rocks). The majority of the proposed offset area consists of cleared paddocks dominated by pasture grasses at near 100% coverage. Ground cover species present are predominantly native species including *Heteropogon contortus* (Black Spear Grass), *Imperata cylindrica* (Blady Grass), *Chrysocephalum apiculatum* (Yellow buttons), *Cymbopogon refractus* (Barbed Wire Grass), *Panicum decompositum* (Native Millet). Exotic weed species include *Gomphocarpus physocarpus* (Balloon Cotton Bush), *Sporobolus pyramidalis* (Giant Rat's Tail Grass), *Melinis repens* (Red Natal Grass) and *Opuntia tomentosa* (Velvet Tree Pear). Where trees are present these are reflective of pre-clear RE12.9-10.2 including *Corymbia citriodora* (Spotted Gum), *Eucalyptus crebra* (Narrow-leaved Ironbark), *Corymbia intermedia* (Pink Bloodwood) and *Angophora subvelutina* (Broad-leaved Apple). **Photo set 2** shows the vegetation present within this AU.



**Photo set 2:** Cleared paddocks and scattered trees across the entire offset area.

### 6.2.2 Feral animal abundance survey

There were six (6) individual sightings of non-native animals over a combined total of fifty-six (56) survey nights as part of preliminary baseline surveys (refer **Table 32**). Non-native predator species were detected, being *Canis lupis familiaris* (Wild Dog) (refer **Photo set 3**) no other feral animal species were recorded. Any non-native animal was recorded as a new individual if >1 hour had elapsed between sightings.

A baseline RAI was calculated using the formula  $RAI = \frac{D}{TN} \times 100$ , where D is numbers of detection and TN is the total number of camera-trap nights (all cameras combined). This methodology ensures that the surveys are representative of the entirety of the proposed offset area and are repeatable for future monitoring requirements.

The RAI for non-native predators is **10.71** (refer **Table 32**). All other feral animal species would have a RAI of 0.

Table 32: Non-native pest survey results summary

Camera	Species	Survey Duration (nights)	Detection	RAI
1	-	14	-	10.71
2	-	14	-	
3	<i>Canis lupis familiaris</i> (Wild Dog)	14	2	
4	<i>Canis lupis familiaris</i> (Wild Dog)	14	4	
<b>Total</b>		56	<b>6</b>	



Photo set 3: Multiple *Canis lupis familiaris* (Wild Dog) observed within the offset area

6.2.3 Weed cover

Ground coverage on site is heavily dominated by pasture grasses as a result of historical land-uses including *Heteropogon contortus* (Black Spear Grass), *Imperata cylindrica* (Blady Grass), *Cymbopogon refractus* (Barbed Wire Grass), *Panicum decompositum* (Native Millet) *Sporobolus pyramidalis* (Giant Rat's Tail Grass), *Melinis repens* (Red Natal Grass) (refer **Photo set 4**). Scattered patches of *Opuntia sp* (Velvet Tree Pear) were observed (refer **Photo set 5**). Native grasses were observed to dominate the ground cover across the offset site. Importantly, there was a significant lack of WONS across the offset site. **Table 33** presents the summary of weed coverage transect data.

Results of the two (2) weed cover transects all returned consistent results of between 15 and 25% weed cover across the proposed offset area (refer Photo set). The results of the baseline weed surveys are displayed on **Plan 10** and raw data provided at **Appendix C**.

Table 33: Weed coverage transects summary

	Total dominant species coverage (%)		Area (ha)	Relative cover of non-native flora (ha)	WONS cover
	Non-native species	Native species			
Transect 1	16	84	40	7.36	<5% (refer Plan 10)
Transect 2	20.8	79.2			



Average	18.4	81.6			
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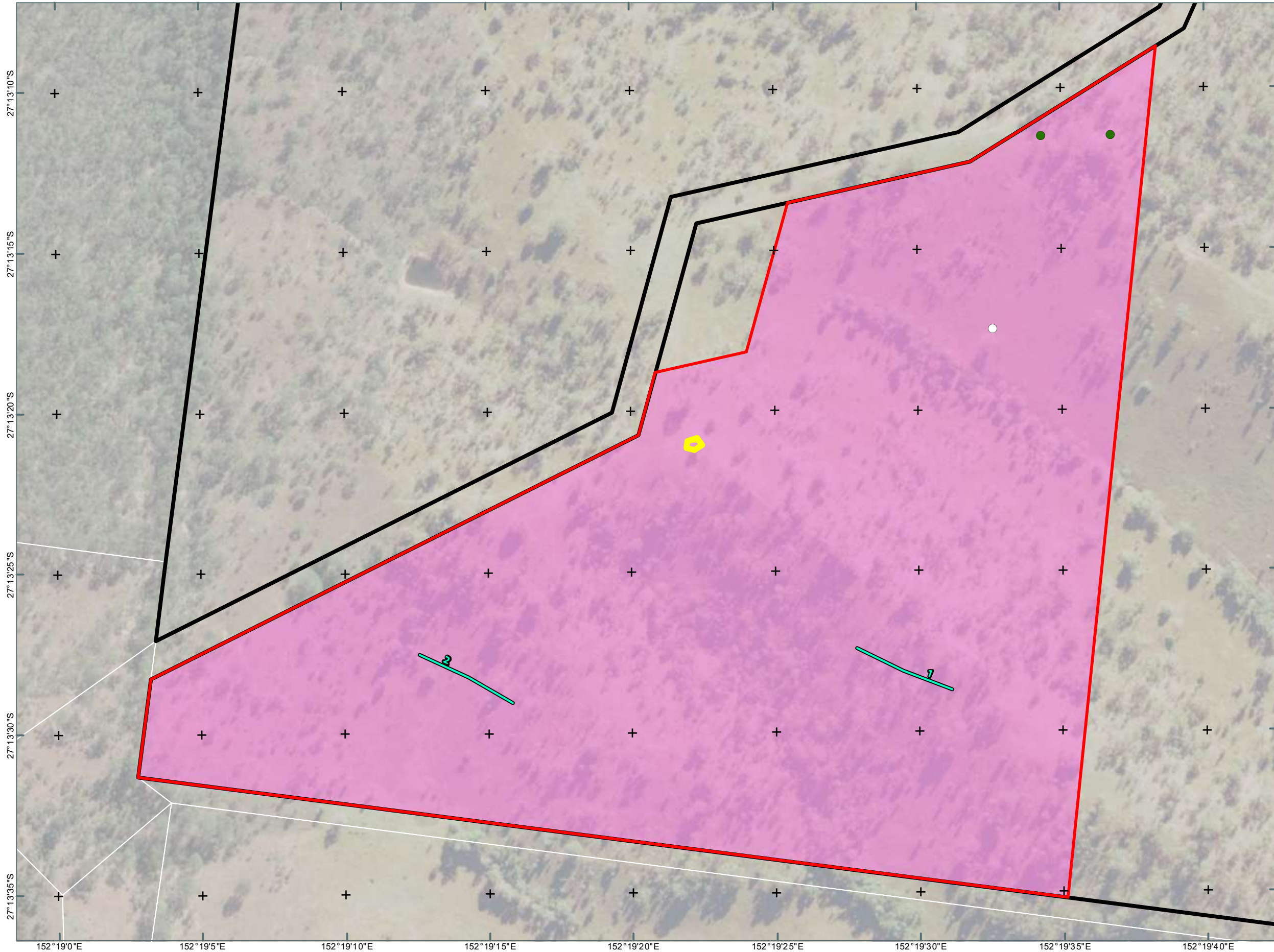
**Photo set 5:** Predominantly native grass across the entire offset site.



**Photo set 4:** *Opuntia sp.* (Velvet Tree Pear) in scattered patches across the offset area.



# PLAN 10. OFFSET BASELINE WEED MAPPING



**Notes:**  
 The information on this plan is not suitable for any purpose other than the expressed use of the Client. Property dimensions, areas, numbers of lots and contours and other physical features may need verification if the development application is approved and development proceeds, and may change when a full survey is undertaken or in order to comply with development approval conditions. No reliance should be placed on the information on this plan for detailed design or for any financial dealings involving the land. Saunders Havill therefore disclaims any liability for any loss or damage whatsoever or howsoever incurred, arising from any party using or relying upon this plan for any purpose other than as a document prepared for the sole purpose of accompanying a development application and which may be subject to alteration beyond the control of Saunders Havill. Unless a development approval states otherwise, this is not an approved plan.

**Layer Sources**  
 Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community  
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 Updated data available at  
<http://qds.spatial.information.qld.gov.au/catalogue/>  
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## LEGEND

- Qld DCDB
- Offset Site Boundary
- Proposed Offset Area [40.0 ha]
- 10-25% non-native pasture grasses [40.0 ha]
- Opuntia sp. and Lantana Dominated [107m<sup>2</sup>]
- Weed Transect
- Opuntia sp. Observation
- Sporadic Balloon Cotton



#### 6.2.4 Koala Modified Habitat Quality Assessment – results and discussion

Utilising the same methodologies detailed in **Section 3.3** and implemented at the impact site, the following sections discuss the results of the baseline MHQA for Koala.

The habitat quality scores for each AU were determined using a combination of Site Condition, Site Context and Species Stocking Rate technical data and scoring. The scores for Site Condition are derived directly from the MHQA tool data. These scores are then used to determine the scores for Quality and Availability of Food and Foraging Habitat, and Quality and Availability of Shelter.

##### Site condition (30%)

The site condition scoring for the proposed offset area is summarised in **Table 34**. Refer to **Appendix B** for detailed baseline Koala MHQA scoring and the raw data.

**Table 34: Site condition scores for offset area assessment units**

	AU1
Pre-clear Regional Ecosystem	12.9-10.2
Remnant/Non-remnant/Regrowth	Non-remnant
Recruitment of woody perennial species in EDL	5
Native plant species richness - trees	2.5
Native plant species richness -	2.5
Native plant species richness - grasses	5
Native plant species richness - forbs	0
Average tree canopy height*	3
Average tree canopy cover*	2
Shrub canopy cover	0
Native grass cover	5
Organic litter	3
Large trees	5
Coarse woody debris	2
Non-native plant cover	5
Quality and availability of food and foraging habitat	5
Quality and availability of shelter	5
<b>Total (Out of 100)</b>	<b>50</b>
<b>Score out of 3</b>	<b>1.50</b>

##### *Quality and availability of food and foraging habitat/Quality and availability of shelter*

In developing the MHQA to better incorporate MNES, two (2) species habitat index characteristics, being, quality and availability of food and foraging habitat, and quality and availability of shelter, have been added to the site condition indicator. **Table 35** to **Table 40** detail these baseline scores for the offset site as **5 out of 10** for both quality and availability of food and foraging habitat, and quality and availability of shelter.



*Quality and availability of food and foraging resources*

As detailed in **Section 3.3.1**, canopy cover is drawn from the bio condition benchmarks while stem densities are taken from the RE technical descriptions (Ryan 2001). Notably, RE12.9-10.2 does not reference a stem density as part of the technical description. The Queensland Herbarium have provided a draft technical description of RE12.9-10.2 which does include stem densities and has been utilised during this assessment (refer **Appendix D**).

**Table 35: Koala Food Tree Abundance – Offset Site**

Impact Assessment Unit	RE	Benchmark (trees/ha)	Site Count (trees/ha)	Benchmark Percentile	Score
AU1	12.9-10.2	240	95	39.58%	4/8

**Table 36: Canopy Cover – Offset Site**

Impact Assessment Unit	RE	Benchmark (% cover)	Site (% cover)	Benchmark Percentile	Score
AU1	12.9-10.2	64	7.2	11.25%	0.5/2

**Table 37: Final score for *Quality and availability of food and foraging resources***

Assessment unit	Total score	MHQA score
AU1	4.5/10	5/10

*Quality and availability of shelter***Table 38: Shelter Tree Abundance – Offset Site**

Impact Assessment Unit	RE	Benchmark (trees/ha)	Site Count (trees/ha)	Benchmark Percentile	Score
AU1	12.9-10.2	240	95	39.58%	3/6

**Table 39: Large Trees abundance – Offset Site**

Impact Assessment Unit	RE	Benchmark (trees/ha)	Site (trees/ha)	Benchmark Percentile	Score
AU1	12.9-10.2	38	6	15.79%	1/4

**Table 40: Final score for *Quality and availability of shelter***

Assessment unit	Total score	MHQA score
AU1	4/10	5/10



**Site Context (30%)**

The site context characteristics for Koala are shown on with scores summarised in **Table 41**.

**Table 41: Koala site context scores for offset area**

	AU1 (non-remnant pre-clear 12.9-10.2)
Size of patch	10
Connectedness	4
Context	5
Ecological corridors	0
Role of the site location to species overall population in the state	5
Threats to species	7
Species mobility capacity	10
<b>Total (out of 56)</b>	<b>38</b>
<b>Score out of 3</b>	<b>2.04</b>

Site Context*Size of patch*

This attribute is a measure of the size of the patch of vegetation in which the assessment unit is located. The scoring reflects the importance of large patches in the landscape and is based on the size of the patch of critical Koala habitat connected to the site in this instance. This attribute is scored such that it reflects the fact that larger patches are less susceptible to ecological edge effects and are more likely to sustain viable populations of native flora and fauna than smaller patches. The size of patch attribute was calculated using GIS and determined the proposed offset area to be part of a patch size of larger than 500 ha. The proposed offset area is connected to a patch >500 ha and therefore achieves a score of **10 out of 10** (refer **Plan 11**)

*Connectedness*

As a landscape level attribute, connectedness aims to assess the degree to which the assessment unit is connected to adjacent native vegetation. Connectedness relates to the capacity of the species to disperse through the landscape between sustainable patches of habitat, and therefore has important implications for species persistence. Connectedness was calculated using GIS, with the percentage of the proposed offset area boundary length supporting a Koala critical habitat connection off and on-site was calculated at 58% and therefore achieves a score of **4 out of 5** (refer **Plan 11**)

*Context*

The context attribute refers to the amount of critical koala habitat that is retained within a 1 km buffer of the site being assessed and is calculated using GIS. Each assessment unit achieved the same scores for Site context. Existing critical koala habitat within a 1 km buffer of the site was calculated at 76% and



therefore achieves a score of **5 out of 5** as per the Queensland BioCondition Assessment methodology (refer **Plan 11**).

*Ecological corridors*

The proposed offset area is not located within a Statewide corridor of regional significance (refer **Plan 6**) therefore achieves a score of **0 out of 6**.

*Role of site location to species overall population in the State*

This attribute aims to quantify the importance of the site for state Koala populations through a combined approach that considers the activity and usage across the site and the importance of habitat for fulfilling the Koala’s life cycle (i.e., foraging and breeding) and thus the effect that removal of habitat would have on a local population and the species as a whole. This attribute achieved a score of **5 out of 5** as it was determined that the referral area contains habitat critical to the survival of the species. While habitat within the referral area is highly disturbed and site-specific surveys found low Koala activity, any habitat that meets the definition of critical koala habitat under the EPBC Act is also considered potential breeding habitat.

*Threats to species*

- Clearing and degradation of habitat – the offset area is zoned as rural under the SRC plan as is the majority of surrounding land. Approximately 50-70% of the surrounding land is degraded as it consisted with rural farmland in the broader locality **Insert 2**. There is currently no protective mechanisms in place for the offset area. The offset area would continue to be grazed and slashed to promote rural uses if not utilised as an offset. Therefore, a weighted score of **2.8** or ‘moderate risk’ is appropriate.
- Inappropriate fire regimes – SRC identifies at least part of the offset property as bushfire risk. A non-Koala specific Bushfire Management Plan is not in place for the offset area which is considered to have low fuel load as a result of sparse canopy and promotion of paddocks. Therefore, a weighted score of **2.8** or ‘moderate risk’ is appropriate.
- Vehicle strike – There are limited roads proximal to the offset area with most roads unsealed access tracks. The offset area is located approximately 2 km east of Kipper Creek Road, therefore the risk of vehicle strike is considered low. A weighted score of **1.5** or ‘low risk’ is appropriate.
- Dog attack – Several Wild Dogs have been recorded within the offset area. Canopy cover providing refuge for Koala is limited to only 11.25% of the benchmark for canopy and 45.25% of the benchmark for sub-canopy. Therefore, a weighted score of **0.1** or ‘high risk’ is appropriate.
- A total score for threats based on these attributes was assigned as **7 out of 15** or ‘moderate.’

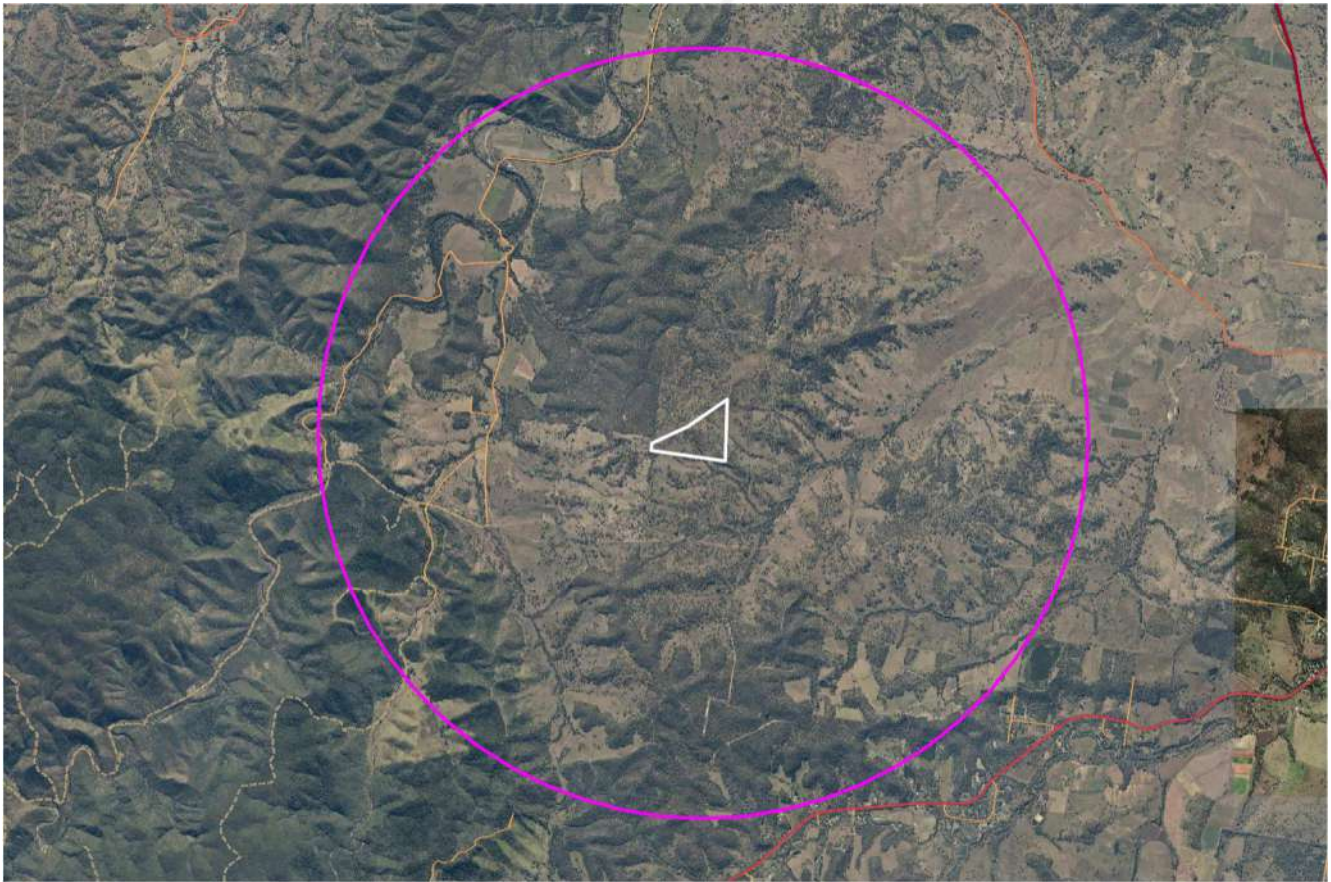
**Table 42: Koala Threat Scoring Matrix (green shading indicates applicable scores for the site)**

Metric	Low	Moderate	High
<b>Threat Thresholds</b>			



Metric	Low	Moderate	High
<b>Clearing and Degradation of Habitat</b>	Apply one of the following options in order of priority: <ol style="list-style-type: none"> <li>1. Apply a current legal protective mechanism.</li> <li>2. The site is zoned for conservation purposes or clearing is not permitted.</li> <li>3. If <math>\leq 30\%</math> of the area within a 5 km buffer of the site is cleared or disturbed land.</li> </ol>	In the absence of justification for scoring as high or low and if: $>30\%$ and $<70\%$ of the area within a 5km buffer of the site is cleared or disturbed land.	Apply one of the following options in order of priority: <ol style="list-style-type: none"> <li>1. The site is zoned for development.</li> <li>2. If <math>\geq 70\%</math> of the area within a 5 km buffer of the site is cleared or disturbed land.</li> </ol>
<b>Score Weighting</b>	<b>6</b>	<b>2.8</b>	<b>0.4</b>
<b>Inappropriate Fire Regimes Very High Risk</b>	Current Government endorsed Bushfire Management Plan (BMP) to protect the Koala is in effect.	Non-Koala specific BMP in effect. or; Low fuel load and low fire risk.	Site has a high fuel load and/or high fire risk.
<b>Score Weighting</b>	<b>6</b>	<b>2.8</b>	<b>0.4</b>
<b>Vehicle Strike Moderate Risk</b>	Low volume of cars, unsealed, no Koala accessibility, fencing, and mitigation measures in place, negligible Koala mortality.	Site-specific and evidence-based qualitative assessment of these considerations	High volume of cars, sealed, accessibility for Koala, no fencing, and no mitigation measures in place, high Koala mortality
<b>Score Weighting</b>	<b>1.5</b>	<b>0.7</b>	<b>0.1</b>
<b>Dog Attack Moderate Risk</b>	$<10\%$ the Relative Abundance Index	Dogs recorded on site and adequate refuge for Koalas ( $>70\%$ canopy cover).	Dogs recorded on site and limited refuge for Koalas ( $<70\%$ canopy cover)
<b>Score Weighting</b>	<b>1.5</b>	<b>0.7</b>	<b>0.1</b>
<b>Threats to Species Threshold Analysis Score</b>	$\geq 13.5$ <b>15</b>	$>5$ and $<13.5$ <b>7</b>	$\leq 5$ <b>1</b>





**Insert 2:** High level assessment of degraded land within 5 km of the offset area (between 50 and 60%)

*Species mobility capacity*

Species mobility capacity is used to quantify the ability of the species to move from the site and through the surrounding landscape to meet survival needs. Species mobility capacity is considered particularly important in response to rapid changes to the surrounding environment, such as the commencement of land clearing. Assessment has been carried out in accordance with method provided in **Section 3.3** with outcomes provided below (refer **Table 43**). The site is considered, minor restriction giving it a score of **10 out of 10**.

**Table 43: Species mobility capacity assessment – Offset site**

Direction	Description of restriction	Restriction score
<b>North</b>	To the north of the Offset Site exists similarly managed cleared rural land.	No restriction
<b>South</b>	To the south of the Offset Site exists similarly managed cleared rural land.	No restriction
<b>East</b>	To the east of the Offset Site exists similarly managed cleared rural land.	No restriction



Direction	Description of restriction	Restriction score
West	To the west of the Offset Site exists similarly managed cleared rural land.	No restriction
<b>Total restriction score</b>		0% (minor restriction)

**Species stocking rate (40%)**

The species stocking rate for Koala scored has been scored at **40 out of 70** for AU1 (refer to **Table 44**).

Further details on the assessment are provided below:

- Presence detected on or adjacent to site (neighbouring property with connecting habitat) – a single Koala scat was recorded within the offset area. Recorded evidence of usage (directly or indirectly) within the offset area results in a score of **10 out of 10**.
- Species usage of the site (habitat type and evidenced usage) – This attribute relies on habitat type and evidence of usage. While the offset area does contain large areas of open paddock, Koala habitat trees are present. Koala usage was recorded indirectly (scats) therefore the offset site is considered to provide dispersal, foraging and breeding habitat for the Koala and has been assigned a score of **15 out of 15**.
- Approximate density – This attribute utilises evidence of usage compared with the Phillips *et al.* 2011 'Koala use (East Coast med-high)' category. Two (2) SAT assessments completed within the offset area recorded 'low use' at SAT 1 and 'no use' at SAT2. The approximate density for the offset site has therefore been considered as 'low' and scores **10 out of 30**.
- Role/importance of species population on site – The low evidence of usage and no evidence of breeding recorded within the offset area indicates that it is highly unlikely that the offset site contains a key source population for breeding (0 out of 5). It is not clear if the offset site provides a key population for dispersal however given the dispersal capacity of the Koala and utilising the precautionary principle it is considered possible (5 out of 5). The low evidence of usage indicates it is unlikely that the offset site contains a population necessary for maintaining genetic diversity (0 out of 15). The location of the offset site is not near the limit of the species range (0 out of 15). Utilising the SSR Supplementary Table – Total supplementary score results in a **5 out of 15** for this attribute

**Table 44: Koala species stocking rate scores within offset area assessment units**

Species Stocking Rate Table	
	AU1
Presence detected on or adjacent to site (neighbouring property with connecting habitat) (/10)	10
Species usage of the site (habitat type and evidenced usage) (/15)	15
Approximate density (per ha) (/30)	10
Role/importance of species population on site* (/15)	5
<b>Total Species Stocking Rate Score (/70)</b>	<b>40</b>
<b>Species Stocking Rate Score – out of 4</b>	<b>2.29</b>
<b>*SSR Supplementary Table – Total supplementary score 0 = 0, 5-15 = 5, 20-35 = 10, 40-45 = 15</b>	



	<b>AU1</b>
Key source population for breeding (/5)	0
Key source population for dispersal (/5)	5
Necessary for maintaining genetic diversity (/15)	0
Near the limit of the species range (/15)	0

Two (2) SATs were completed at MHQA transects 1 and 2. A single scat was recorded at SAT 1 (refer **Photo set 6**).



**Photo set 6:** Single scat recorded within the offset area

A summary of the SAT survey results completed at each MHQA transect are provided in **Table 45**, with raw data provided at **Appendix E**.

**Table 45: Baseline SAT survey results**

SAT ID (MHQA transect)	Number of scats	Evidence of Koala activity (%)	Koala use (East Coast med-high)
<b>AU1</b>			
SAT 1 (MHQA 1)	1	3.33	Low
SAT 2 (MHQA 2)	0	0	No use

The SAT surveys demonstrate that contemporary Koala utilisation of the proposed offset area is not present, as expected, given the current state of the vegetation on site, but has the capacity to support ecological gain for the Koala with rehabilitation efforts. Koala are known to occur in the locality, having been recorded previously across the adjoining offset areas, and it is assumed that utilisation of the site will increase over the lifespan of the offset as site condition and context improve.



# PLAN 11. OFFSET SITE KOALA CONTEXT ASSESSMENT



**Notes:**  
 The information on this plan is not suitable for any purpose other than the expressed use of the Client. Property dimensions, areas, numbers of lots and contours and other physical features may need verification if the development application is approved and development proceeds, and may change when a full survey is undertaken or in order to comply with development approval conditions. No reliance should be placed on the information on this plan for detailed design or for any financial dealings involving the land. Saunders Havill therefore disclaims any liability for any loss or damage whatsoever or howsoever incurred, arising from any party using or relying upon this plan for any purpose other than as a document prepared for the sole purpose of accompanying a development application and which may be subject to alteration beyond the control of Saunders Havill. Unless a development approval states otherwise, this is not an approved plan.

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- LEGEND**
- Qld DCDB
  - Offset Site Boundary
  - Proposed Offset Area [40.0 ha]
  - 1km Offset Site Buffer
  - Percentage of Koala critical habitat within 1km of Offset Site [76%]
  - Size of Koala critical habitat patch >200m corridor connectivity [>500ha]
  - Percentage of Offset Site boundary length supporting a Koala critical habitat connection off and on site [58%]



### 6.2.5 Summary of baseline scores for offset area

The overall habitat quality scores for Koala at the proposed offset area are presented in **Table 46**.

**Table 46: Offset area MHQA score summary – Koala**

	AU1
Site Condition (/3)	1.50
Site Context (/3)	2.20
Species Stocking Rate (/4)	2.29
MHQA Score	<b>5.98 (rounded to 6)</b>



# 7. Environmental Outcomes

This OMP identifies outcomes focused management actions pursuant the EPBC Act for the provision of Koala habitat offset. The management objectives for the proposed offset area, in alignment with the Environmental Offsets Policy (EOP) will:

- Deliver an overall conservation outcome that improves the viability of habitat for the Koala.
- Provide a direct offset that is in proportion to the level of statutory protection that applies to Koala habitat.
- Be of a size and scale proportionate to the residual impacts on Koala habitat.
- Effectively account for and manage the risks of the offset not being successful within the required management timeframe.
- Provide a conservation gain additional to what is already required by a duty of care or to any environmental planning laws at any level of Government.
- Be efficient, effective, timely, transparent, scientifically robust and reasonable with appropriate transparent governance arrangements in place for measuring, monitoring, auditing and enforcing the management of the proposed offset area.

## 7.1. Koala

A summary of the baseline and improvement scoring for each assessment unit within the proposed offset area is outlined in **Table 47**. Detailed environmental outcomes showing the specific attributes which will be improved by the offset actions including interim milestones are provided at **Table 50** and **Table 51**.

**Table 47: Koala baseline MHQA and offset improvement scores**

MHQA Final Scores	AU1 – Baseline	AU1 – Uplift
Site condition (/3)	1.50	2.70
Site context (/3)	2.20	2.63
Species stocking rate (/4)	2.29	2.29
<b>AU score</b>	<b>5.98</b>	<b>7.61</b>
<b>Rounded</b>	<b>6</b>	<b>8</b>
<b>Assessment Unit Area (ha)</b>	40	



## 7.2. Offset Assessment Guide – Calculator

**Table 48** and **Table 49** outlines a summary of the MNES offset compensation associated with the 5.9 ha of impacts, being 151.32% for Koala. The offset compensation for the impacts on MNES is derived from the EPBC Offset Assessment Guide (OAG) calculator and habitat quality gains achieved from the successful implementation of the management actions.

Refer to **Appendix F** for the detailed EPBC offset calculator sheets.

**Table 48: Offset Assessment Guide Parameters – Koala**

Parameter	Rationale
<b>Impact (Area)</b>	5.9 ha for Koala
<b>Quantum of Impact (Quality)</b>	A score of 6 for Koala
<b>Quantum Impact (Area)</b>	3.54 ha
<b>Risk Related Time Horizon</b>	The proposed offset area will be legally secured in perpetuity; hence, the maximum score of 20 years.
<b>Time Until Ecological Benefit</b>	Measures prescribed in this Offset Area Management Plan are expected to achieve the predicted increase in habitat quality over a period of 20 years. This timeframe is broadly recognised for regrowth vegetation to meet remnant status (50% canopy cover and 70% canopy height (Neldner et al. 2023)
<b>Start Area</b>	40 ha
<b>Start Quality</b>	6 out of 10 - Refer <b>Table 49</b>
<b>Risk of Loss without Offset</b>	It is understood risk of loss is to be set at 0% without any comprehensive evidence to the contrary.
<b>Risk of Loss with Offset</b>	It is understood risk of loss is to be set at 0% without any comprehensive evidence to the contrary.
<b>Confidence in Result (Risk of Loss)</b>	As risk of loss is set at 0%, a high score of 90% is used for confidence in result.
<b>Future Quality without Offset</b>	Existing habitat quality is expected to be maintained if the current land use / management regime is continued. Under management for exclusively grazing over 20 years and without the offset, current habitat quality for Koala is unlikely to improve, and some attributes may deteriorate where regrowth is subject to periodic clearing for cattle grazing and/or maintenance/fire regimes that are not compatible with ecosystem improvement are employed.
<b>Future Quality with Offset</b>	Though the direct implementation of management actions detailed in this OMP the future quality of the offset will improve. Refer <b>Table 49</b> .



Parameter	Rationale
<b>Confidence in Result (Future Quality)</b>	<p>Confidence in the success of the offset is typical of non-remnant vegetation with some existing vegetation (<math>\geq 85\%</math>). Given the detail and intensity of the management actions outlined within this OMP and the proposed uplift of two points, this confidence is considered appropriate. The confidence is supported by the offset area selection, design of management actions, and clear monitoring and reporting procedures. The offset area contains well-maintained access tracks that will facilitate access to weed treatment areas and planting areas. This offset area is the northern extent of a much larger offset property with several approved offset areas. Therefore, a level of increased confidence would come with the aggregation of offset approvals within the one offset property which is undertaking identical management actions and outcomes across all offset approvals with identical baseline conditions.</p>

**Table 49: Summary of Koala offset compensation**

Impact Area			Offset Area		
Impact Area	Impact Score	Quantum Impact (QI) Area	Habitat Quality Gain	Offset Area (ha)	% of Impact Offset
			AU1	AU1	AU1
5.9 ha	6/10	3.54 QI ha	6/10 to 8/10	40	151.32



### 7.2.1 Completion criteria

The management framework designed to achieve the proposed environmental outcomes summarised above are detailed in **Section 9** of this OMP.

A summary of the management actions and their completion criteria required to achieve the environmental outcomes are provided in **Table 50**. The management actions will result in a net gain of the overall habitat quality for Koala over the period of effect of the offset through active management, maintenance, monitoring and reporting.

This OMP includes completion criteria and performance targets that evidence protection or improvement of Koala habitat. For the purpose of the plan:

- a) **completion criteria** are longer term time-bound values, specified for measurable parameters, that if attained and maintained ensure the plan's environmental outcomes are achieved; and
- b) **performance targets** are time-bound short- and medium-term targets guided by prescribed management measures, for management interventions and environmental condition, that are used to monitor, evaluate, review and improve the effectiveness of the plan to offset impacts.

Tracking of progress against the environmental outcomes will be measured at milestone monitoring years using the baseline survey methodologies detailed in **Section 6**. A schedule of monitoring and reporting is provided in **Section 8**.



**Table 50: Completion criteria and performance targets**

Management Action	OMP Section	Performance Targets	Completion criteria
<p><b>Management Action 1 – Legally Secure Offset Area</b></p>	<p>9.3</p>	<p>Not applicable</p>	<ul style="list-style-type: none"> <li>• The offset area is legally secured for conservation via a suitable method. It is anticipated that this will be via a Voluntary Declaration (VDEC) process administered under the Queensland <i>Vegetation Management Action 1999</i> in the interim, prior to the impacts occurring, followed by a covenant under the <i>Land Act 1994</i> or <i>Land Titles Act 1994</i></li> <li>• The Department is notified of the legal securement within 5 business days of commencing the implementation of the OMP <i>i.e.</i>, the date from which the offset area is legally secured.</li> <li>• The offset area is not used for other purposes – site access is restricted.</li> </ul>
<p><b>Management Action 2 – Non-native Vertebrate Pest Management</b></p>	<p>9.4</p>	<ul style="list-style-type: none"> <li>• Development and implementation of a property-wide feral animal management program specifying techniques (trapping, baiting, shooting) and ongoing monitoring methods (including datasheets) to be utilised will be completed within <u>Year 1 of the offset</u>.</li> <li>• A suitably qualified pest management contractor will be engaged to manage feral animals within the offset area for the life of the offset.</li> </ul>	<ul style="list-style-type: none"> <li>• Feral animals suppressed within the offset area to &lt;10% of the baseline Relative Abundance Index (RAI). Priority wild dogs</li> </ul>



Management Action	OMP Section	Performance Targets	Completion criteria
<p><b>Management Action 3</b> – Management of Weeds of National Significance (WONS)</p>	<p>9.5</p>	<ul style="list-style-type: none"> <li>Establish photo monitoring locations in <u>Year 1 of the offset</u> to monitor increases in WONS extent</li> <li>All WONS will receive on-going treatment</li> <li>Follow-up treatment of WONS will occur <u>annually</u> or as needed, determined by the suitably qualified regeneration contractor.</li> </ul>	<ul style="list-style-type: none"> <li>The management actions must maintain the extent of WONS cover &lt;5% of the offset area for the life of the offset (20 years).</li> </ul>
<p><b>Management Action 4</b> – Bushfire Management Plan</p>	<p>9.6</p>	<ul style="list-style-type: none"> <li>A Bushfire Management Plan (BMP) will be developed and implemented in accordance with relevant Queensland guidelines and endorsed by an experienced bushfire practitioner to reduce potential threats from fires to Koala.</li> </ul>	<ul style="list-style-type: none"> <li>Implement BMP</li> <li>Monitor and maintain fire breaks and fuel loads within the offset area</li> <li>Minimise risk of high intensity fires</li> <li>Minimise risk of vegetation composition and restoration regime being negatively affected by prescribed burns</li> </ul>
<p><b>Management Action 5</b> – Habitat Creation and Regeneration</p>	<p>9.7</p>	<ul style="list-style-type: none"> <li>Initial infill planting (primarily trees) within low vegetation cover areas to be completed by the end of <u>Year 2 of the offset</u></li> <li>Establish photo monitoring locations in <u>Year 1 of the offset</u> to monitoring natural regeneration prior to Year 5 milestone event.</li> <li>By the end of Year 5, Site condition metrics for Koala have improved in accordance with environmental outcomes (refer <b>Table 51</b>).</li> </ul>	<ul style="list-style-type: none"> <li>Rehabilitated areas are established, regenerated and mapped as remnant vegetation under Queensland's <i>Vegetation Management Act 1999</i> (VMA) successor legislation by Year 20 which requires 70% of canopy height and 50% of expected cover according to the relevant Regional Ecosystem benchmark to be reached.</li> </ul>



Management Action	OMP Section	Performance Targets	Completion criteria
			<ul style="list-style-type: none"> <li>Site condition metrics for Koala improves in accordance with environmental outcomes (refer <b>Table 51</b>).</li> </ul>
<p><b>Management Action 6 – Fencing and Signage</b></p>	<p>9.8</p>	<ul style="list-style-type: none"> <li>Fencing and signage is installed and retrofitted by the end of <u>Year 1 of the offset</u> and maintained for the life of the offset (20 years).</li> </ul>	<ul style="list-style-type: none"> <li>All fencing and signage has been installed, retrofitted and maintained for the life of the offset</li> <li>Fencing enables Koala to move through the offset area and into surrounding land.</li> <li>If stock breaches or unauthorised access is observed, fencing is rectified within 2 weeks.</li> </ul>



**Table 51: Koala environmental outcomes – AU1**

Attribute	Current Score	Year 5 score	Year 10 score	Year 15 score	Year 20 score	Time Until Measured Benefit	Justifications / Management Actions	Monitoring	KPIs and Adaptive Management
<b>Recruitment of woody perennial species</b>	5	5	5	5	5	Immediate	Recruitment of EDL species will be maintained at >75% of the benchmark as a result of management actions 1, 3, 4 & 5 outlined in <b>Table 50</b> . These management actions are all proposed to reduce land degradation and promote habitat regeneration. Current rural uses include intensive unmanaged slashing, grazing and inappropriate burning to promote pasture grasses reducing the likelihood of recruitment of native shrubs and trees.	Baseline Site Condition attributes are established. Establish photo monitoring points where remedial tree planting occurs at commencement of offset. Habitat quality transects and photo monitoring to be completed by suitably qualified professionals at annually for the first three years and then year 5, 10, 15, and 20 years.	It is anticipated that recruitment of woody perennial species will be maintained at >75% of the benchmark. Remedial actions are not anticipated.
<b>Native plant species richness – Trees</b>	2.5	2.5	5	5	5	10 Years	All of the expected tree species will be present as a result of specific management actions 1, 3, 4 & 5 outlined in <b>Table 50</b> . These management actions are all proposed to reduce land degradation and promote habitat regeneration. Current rural uses include intensive unmanaged slashing, grazing and inappropriate burning to promote pasture grasses reducing the likelihood of recruitment of native shrubs and trees. Infill plantings in line with management action 5 will directly improve this attribute.	Baseline Site Condition attributes are established. Habitat quality transects to be completed by suitably qualified professionals at 5, 10, 15, and 20 years.	Tree species richness is currently at 66.67% of the benchmark. If the tree species richness has not improved to greater than 75% at 10 years then remedial actions to improve the prospect of achieving >90% in 20 years will be applied. These include remedial plantings.
<b>Native plant species richness - Shrubs</b>	2.5	5	5	5	5	5 years	All of the expected shrub species to be present as a result of specific management actions 1, 3, 4 & 5 outlined in <b>Table 50</b> . These management actions are all proposed to reduce land degradation and promote habitat regeneration. Current rural uses include intensive unmanaged slashing, grazing and inappropriate burning to promote pasture grasses reducing the likelihood of recruitment of	Baseline Site Condition attributes are established. Habitat quality transects to be completed by suitably qualified professionals at 5, 10, 15, and 20 years.	Shrub species richness is currently at 42.86% of the benchmark. If the shrub species richness has not improved to greater than 75% at 15 years then remedial actions to improve the prospect of achieving 90% in 20 years will be applied. These include remedial plantings.



Attribute	Current Score	Year 5 score	Year 10 score	Year 15 score	Year 20 score	Time Until Measured Benefit	Justifications / Management Actions	Monitoring	KPIs and Adaptive Management
							native shrubs and trees. Infill plantings in line with management action 5 will directly improve this attribute.		
<b>Native plant species richness - Grasses</b>	5	5	5	5	5	Immediate	All of the expected grass species to be present as a result of specific management actions 1, 3, 4 & 5 outlined in <b>Table 50</b> . These management actions are all proposed to reduce land degradation and promote habitat regeneration. Current rural uses include intensive unmanaged slashing, grazing and inappropriate burning to promote pasture grasses. Native grasses are present across the offset area which will be maintained.	Baseline Site Condition attributes are established. Habitat quality transects to be completed by suitably qualified professionals at 5, 10, 15, and 20 years.	Grass species richness is currently at 92.86% of the benchmark. If the grass species richness has not been maintained above 90% at 15 years then remedial actions to improve the prospect of achieving 90% in 20 years will be applied. These include remedial plantings.
<b>Native plant species richness - Forbs</b>	0	2.5	2.5	5	5	10 years	All of the expected forb species to be present as a result of specific management actions 1, 3, 4 & 5 outlined in <b>Table 50</b> . These management actions are all proposed to reduce land degradation and promote habitat regeneration. Current rural uses include intensive unmanaged slashing, grazing and inappropriate burning to promote pasture grasses reducing the likelihood of recruitment of particularly groundcovers.	Baseline Site Condition attributes are established. Habitat quality transects to be completed by suitably qualified professionals at 5, 10, 15, and 20 years.	Forb species richness is currently at 23.08% of the benchmark. If monitoring indicates that forb species richness is not transitioning to over 25% at Year 5 and over 90% at Year 15 then remedial actions will be applied. These include remedial plantings.
<b>Tree canopy height</b>	3	3	3	3	5	20 years	Tree canopy height greater than 70% of the benchmark will be achieved as a result of management actions 1, 3, 4 & 5 outlined in <b>Table 50</b> . These management actions are all proposed to reduce land degradation and promote habitat regeneration. Existing trees will continue to mature with a reduced risk of being impacted by rural land-uses. Direct plantings will have reached the required height in 20 years.	Baseline Site Condition attributes are established. Habitat quality transects to be completed by suitably qualified professionals at 5, 10, 15, and 20 years.	Median tree canopy height is currently 52.38% (EDL) and 50% (sub-canopy), average 51.19%. It is anticipated that the tree canopy height will increase to greater than 70% of the benchmark by the end of Year 20.



Attribute	Current Score	Year 5 score	Year 10 score	Year 15 score	Year 20 score	Time Until Measured Benefit	Justifications / Management Actions	Monitoring	KPIs and Adaptive Management
<b>Tree canopy cover</b>	2	2	2	2	5	20 years	Tree canopy cover between 50% and 200% of the benchmark will be achieved as a result of management actions 1, 3, 4 & 5 outlined in <b>Table 50</b> . These management actions are all proposed to reduce land degradation and promote habitat regeneration. Existing trees will continue to mature with a reduced risk of being impacted by rural land-uses.	Baseline Site Condition attributes are established. Habitat quality transects to be completed by suitably qualified professionals at 5, 10, 15, and 20 years.	Tree canopy cover is currently 11.25% (EDL) and 45.25% (sub-canopy), average 28.25%. It is anticipated that the tree canopy cover will increase to between 50% and 200% of the benchmark by the end of Year 15. If the tree canopy cover has not improved to greater than 35% at 10 years then remedial actions to improve the prospect of achieving between 50% and 200% in 20 years will be applied. These include remedial plantings.
<b>Shrub canopy cover</b>	0	3	5	5	5	10 years	Shrub canopy cover to be between 50% and 200% of the benchmark as a result of specific management actions 1, 3, 4 & 5 outlined in <b>Table 50</b> . These management actions are all proposed to reduce land degradation and promote habitat regeneration. Current rural uses include intensive unmanaged slashing, grazing and inappropriate burning to promote pasture grasses reducing the likelihood of recruitment of native shrubs and trees. These management actions will promote shrub cover.	Baseline Site Condition attributes are established. Habitat quality transects to be completed by suitably qualified professionals at 5, 10, 15, and 20 years.	Shrub canopy cover is currently at 9.17% of the benchmark. If monitoring indicates that shrub canopy cover is not transitioning to between 50 and 200% by Year 15 then remedial actions will be applied. These include remedial plantings.
<b>Native perennial grass cover</b>	5	5	5	5	5	Immediate	Native perennial grass cover greater than 90% of the benchmark will be maintained as a result of management actions 1, 3, 4 & 5 outlined in <b>Table 50</b> . Native grass cover is currently high as has been promoted for cattle grazing. The management of the land in line with proposed management actions and promotion of natural regeneration will maintain native grass cover.	Baseline Site Condition attributes are established. Habitat quality transects to be completed by suitably qualified professionals at 5, 10, 15, and 20 years.	Native grass cover is currently at 338.10% of the benchmark. It is anticipated the grass cover will reduce once active regeneration has taken place. However, if monitoring indicates that native grass cover has not been maintained >90% in Year 5 then remedial actions will be applied. These include remedial plantings.



Attribute	Current Score	Year 5 score	Year 10 score	Year 15 score	Year 20 score	Time Until Measured Benefit	Justifications / Management Actions	Monitoring	KPIs and Adaptive Management
Organic litter	3	3	3	3	5	20 years	Organic litter between 50% and 200% of the benchmark will be achieved as a result of management actions 1, 3, 4 & 5 outlined in <b>Table 50</b> . These management actions are all proposed to reduce land degradation and promote habitat regeneration. Organic litter is directly linked to the presence of vegetation at multiple strata. The increase in these attributes will lead to an increase in organic litter.	Baseline Site Condition attributes are established. Habitat quality transects to be completed by suitably qualified professionals at 5, 10, 15, and 20 years.	Organic litter is currently at 15.63% of the benchmark. If monitoring indicates that organic litter is not at >40% by Year 15 then remedial actions will be applied. These include remedial plantings.
Large trees	5	5	5	5	5	Immediate	The number of large trees will not increase in the 20-year timeframe. No management actions can be utilised to increase the number of larger trees. However, existing large trees will be protected through management actions 1, 3 and 4.	Baseline Site Condition attributes are established. Habitat quality transects to be completed by suitably qualified professionals at 5, 10, 15, and 20 years.	It is anticipated that the number of large trees will not increase to between >50% of the benchmark. Remedial actions not warranted
Coarse woody debris	2	2	2	5	5	15 years	Course woody debris greater than 50% and less than 200% of the benchmark will be achieved by specific management actions 1, 3, 4 & 5 outlined in <b>Table 50</b> . Woody debris is directly linked to the presence of vegetation. The increase in these attributes will lead to an increase in woody debris which will then be retained through appropriate bushfire management.	Baseline Site Condition attributes are established. Habitat quality transects to be completed by suitably qualified professionals at 5, 10, 15, and 20 years.	Coarse woody debris is currently 38.29% of the benchmark due to current and historical land uses. If monitoring by Year 15 indicates that coarse woody debris is not transitioning to between 50 and 200% then remedial actions will be applied. These include a review of actions that impact on coarse woody debris such as fire regimes and importing native tree debris if necessary.
Weed cover	5	5	10	10	10	10 years	Weed coverage will reduce to less than 5% of the site over the course of 10 years by specific management actions 3 & 5 outlined in <b>Table 50</b> . On-going weed management is necessary to promote native regeneration.	Baseline Site Condition attributes are established. Habitat quality transects to be completed by suitably qualified professionals at 5, 10, 15, and 20 years. An additional survey is recommended at Year 8 to track progress to the Year 10 milestone objective.	Weed cover is currently 15% of the site. If improvement to below 5% of the site has not been achieved by the end of Year 10 then remedial actions to reduce weed cover will be applied. These include refining weed control methods.
Quality and availability of food and foraging habitat	5	5	10	10	10	10 years	Quality and availability of food and foraging habitat will be improved to high by specific management actions 1, 3, 4 & 5 outlined	Baseline attributes are established. Establish strategic photo monitoring points at commencement of offset. Habitat quality	Quality and availability of food and foraging habitat is currently moderate scoring 5 out of 10. An increase in key attributes, recruitment,



Attribute	Current Score	Year 5 score	Year 10 score	Year 15 score	Year 20 score	Time Until Measured Benefit	Justifications / Management Actions	Monitoring	KPIs and Adaptive Management
							in <b>Table 50</b> . This metric is driven by recruitment, tree species richness canopy and subcanopy height and cover and shrub cover. An increase in these attributes will increase the quality and availability of food and foraging habitat.	transects and photo monitoring to be completed by suitably qualified professionals annually for the first three years and then year 5, 10, 15, and 20 years.	tree species richness canopy and subcanopy height and cover and shrub cover will increase this score
<b>Quality and availability of shelter</b>	5	5	10	10	10	10 years	Quality and availability of shelter will be improved to high by specific management actions 1, 3, 4 & 5 outlined in <b>Table 50</b> . This metric is driven by recruitment, tree species richness canopy and subcanopy height and cover and shrub cover. An increase in these attributes will increase the quality and availability of shelter.	Baseline attributes are established. Establish strategic photo monitoring points at commencement of offset. Habitat quality transects and photo monitoring to be completed by suitably qualified professionals annually for the first three years and then year 5, 10, 15, and 20 years.	Quality and availability of shelter is currently moderate scoring 5 out of 10. An increase in key attributes, recruitment, tree species richness canopy and subcanopy height and cover and shrub cover will increase this score
<b>Site Condition Score</b>	<b>50</b>	<b>58</b>	<b>67.5</b>	<b>83</b>	<b>90</b>				
<b>Overall Site Condition Score out of 3</b>	<b>1.50</b>	<b>1.74</b>	<b>2.03</b>	<b>2.49</b>	<b>2.70</b>				
<b>Size of patch</b>	10	10	10	10	10	No change	N/A	N/A	N/A
<b>Connectedness</b>	4	4	4	4	4	No change	N/A	N/A	N/A
<b>Context</b>	5	5	5	5	5	No change	N/A	N/A	N/A
<b>Ecological Corridors</b>	0	0	0	0	0	No Change	N/A	N/A	N/A
<b>Role of site location to species overall population in the state</b>	5	5	5	5	5	No Change	N/A	N/A	N/A
<b>Threats to the species</b>	7	7	15	15	15	10 years	Threats to species will be reduced by specific management actions 1, 2, & 4 outlined in <b>Table 50</b> .  As per the threats matrix detailed in Section 6.2.4, Land degradation will be reduced to 'low risk' following the legal securement of the offset area. Inappropriate fire regimes will be managed by a specific bushfire management plan to protect Koala 'low risk.' This risk of dog attack will be reduced through measurable reduction targets and increase in refuge habitat within the offset area 'low risk.' All these actions will	Baseline attributes are established. This criterion is reliant upon the protection of land against degradation and the suppression and control of pest species. Pest monitoring will be evaluated as per the pest management program.	Legal securement of the offset area will immediately reduce the risk of land degradation.  The control of pest species will provide a reduction in threats. If monitoring as per the pest management program indicates pest species are not reduced then the management plan will require amendment and improved control demonstrated.



Attribute	Current Score	Year 5 score	Year 10 score	Year 15 score	Year 20 score	Time Until Measured Benefit	Justifications / Management Actions	Monitoring	KPIs and Adaptive Management
							reduce existing threats at the offset area.		
<b>Species mobility capacity</b>	10	10	10	10	10	No change	Baseline species mobility score of 10 out of 10 has been assigned to the offset area.	Baseline attributes are established. Milestone monitoring to be completed at year 5, 10, 15, and 20 years.	Site remedial actions not required as species mobility capacity remains unchanged
<b>Site Context Score</b>	<b>41</b>	<b>41</b>	<b>49</b>	<b>49</b>	<b>49</b>				
<b>Overall Site Context Score (out of 3)</b>	<b>2.20</b>	<b>2.20</b>	<b>2.63</b>	<b>2.63</b>	<b>2.63</b>				
<b>Presence</b>	10	10	10	10	10	No change	Field surveys recorded evidence of Koala within the offset area. Through Management actions detailed in <b>Table 50</b> it's expected that Koala will continue to utilise the offset area	Koala SAT surveys will be completed by suitably qualified professionals at 5, 10, 15, and 20 years.	Site remedial actions will improve the condition, context, and other stocking rate factors of the offset area. It is anticipated that the evidence of Koala on-site will continue.
<b>Usage</b>	15	15	15	15	15	No change	Field surveys recorded evidence of Koala within the offset area with Koala habitat present. Through Management actions detailed in <b>Table 50</b> it's expected that habitat type and evidence of usage will remain at 'breeding.'	Baseline SAT attributes are established. Koala SAT surveys will be completed by suitably qualified professionals at 5, 10, 15, and 20 years.	The offset area is currently considered breeding habitat which will only increase through natural regeneration occurring across the site
<b>Approximate Density</b>	10	10	10	10	10	No change	Field surveys recorded evidence of Koala within the offset area. Through Management actions detailed in <b>Table 50</b> it's expected that at least low-level Koala activity (non-zero scats recorded using the East Coast med-high population category) will be maintained.	Baseline SAT attributes are established. Koala SAT surveys will be completed by suitably qualified professionals at 5, 10, 15, and 20 years.	If density levels are not maintained at least low level at the 15-year mark, then broader Koala population surveys will be undertaken to ascertain potential external causes and the management actions re-visited accordingly.
<b>Role of the population</b>	5	5	5	5	5	No change	NA - Not anticipated to change	NA - Not anticipated to change	NA - Not anticipated to change
<b>SSR Score out of 70</b>	<b>40</b>	<b>40</b>	<b>40</b>	<b>40</b>	<b>40</b>				
<b>SSR Score out of 4</b>	<b>2.29</b>	<b>2.29</b>	<b>2.29</b>	<b>2.29</b>	<b>2.29</b>				
<b>Total Habitat Quality Scores</b>	<b>5.98</b>	<b>6.22</b>	<b>6.94</b>	<b>7.40</b>	<b>7.61</b>				



# 8. Monitoring and Reporting Schedule

The timing and frequency of monitoring and reporting actions, corrective actions and responsibilities for the proposed offset area are provided in **Table 52**. The monitoring schedule is considered appropriate to allow the Proponent, Offset Provider and appointed suitably qualified person to assess the quality of the proposed offset area and success of management actions. In addition, if any non-compliances or ineffectiveness of management action are identified, adaptive management strategies can be implemented to ensure the proposed offset area will increase in quality for the Koala.

**Table 52: Timeline for monitoring and reporting actions**

Management Action	Monitoring action(s)	Reporting Action and Timing	Responsible person(s) for activity/reporting
<b>1. Legally secure offset area</b>	The offset area will be secured via a suitable method. This will be completed via a Voluntary Declaration administered under the Queensland <i>Vegetation Management Act 1999</i> in the interim, prior to impacts occurring, followed by a covenant under the <i>Land Act 1994</i> or <i>Land Titles Act 1994</i>	The Department will be notified that the offset area has been secured. Evidence in the form of the shapefiles and confirmation of declaration from the Queensland Department of Resources will be provided with the notification. Details will be included in the Annual Compliance Report (ACR).	Suitably qualified person as appointed by the Proponent
<b>2. Pest management</b>	Monitoring will occur before the end of Years 5, 10, 15, and 20 and will include a repeat of baseline survey methodologies (i.e., motion triggered detection camera deployment) and sightings (direct and indirect) with evidence of non-native predators GPS recorded.  Evidence of feral animal presence within the offset area and feral animal management implementation will be extracted from the	An OAAR will be completed annually within one (1) month of the end of each offset year detailing feral animal management implementation.  Milestone Reports will be prepared three (3) months after the completion of milestone surveys at Years 5, 10, 15, and 20 of the offset and included in the ACR.	Offset Provider and Suitably qualified pest management contractor as appointed by the Offset Provider. Suitably qualified person as appointed by the Proponent.



Management Action	Monitoring action(s)	Reporting Action and Timing	Responsible person(s) for activity/reporting
	<p>Offset Area Annual Report (OAAR) and will be used in assessments of the relative success of the management of threats and progress towards the environmental outcomes and milestone criteria.</p>		
<b>3. WONS management</b>	<p>Weed cover surveys and mapping, and MHQA surveys will be conducted before the end of Years 5, 10, 15, and 20 of the offset in accordance with baseline survey methodologies to track progress against interim milestone targets and completion criteria and identify any issues for rectification. Annual photo monitoring will be implemented in Year 1 to Year 3 to monitor weed treatment areas prior to the first milestone monitoring period at Year 5.</p> <p>Milestone monitoring will be undertaken during the same time of year at every monitoring event, to ensure that the timing is consistent and aligns with the baseline assessment.</p>	<p>An OAAR will be completed within one (1) month of the end of each offset year detailing WONS management implementation, where required, and progress against the performance targets. OAARs will be included in the ACR. Photo monitoring details will be included in OAAR.</p> <p>Milestone Reports will be prepared three (3) months after the completion of milestone surveys at Years 5, 10, 15, and 20 of the offset and included in the ACR.</p>	<p>Offset Provider and suitably qualified weed management contractor as appointed by the Offset Provider.</p> <p>Suitably qualified person as appointed by the Proponent.</p>
<b>4. Bushfire Management Plan</b>	<p>Annual monitoring requirements to review access tracks, fire breaks, seasonal fuel loads and outcomes of controlled burns or other management in accordance with the associated Bushfire Management Plan.</p>	<p>An OAAR will be completed within one (1) month of the end of each offset year which documents bushfire management actions undertaken under the direction of the local authority or recommended in consultation with the Queensland Rural</p>	<p>Offset Provider and suitably qualified bushfire management contractor as appointed by the Offset Provider.</p>



Management Action	Monitoring action(s)	Reporting Action and Timing	Responsible person(s) for activity/reporting
		<p>Fire Brigade. OAARs will be included in the ACR.</p>	
<p><b>5. Habitat creation and regeneration</b></p>	<p>Photo monitoring will be completed annually during the first three (3) years of the offset and documented in the OAAR. Photo monitoring will encompass areas of assisted natural regeneration and reconstruction to document on-ground progress. Photo monitoring coordinates are to be recorded and occur in the same location each survey period.</p> <p>Direct infill planting areas will be monitored quarterly for first year then bi-annually to Year 5 or until establishment is reached. The monitoring timing is dependent on the planting cycle of the engaged bush regeneration contractor.</p> <p>MHQA surveys will be conducted before the end of Years 5, 10, 15, and 20 of the offset in accordance with baseline survey methodologies to track progress against interim milestone targets and completion</p>	<p>An OAAR will be completed within one (1) month of the end of each offset year with input from the suitably qualified bush regeneration contractor to document:</p> <ul style="list-style-type: none"> <li>• Planting/seedling events</li> <li>• Watering schedule</li> <li>• Implemented corrective actions</li> <li>• Success/failure rates within initial maintenance period/watering period until establishment</li> <li>• Certificate of practical completion of planting works; and</li> <li>• Certificate/sign off that establishment has been reached.</li> </ul> <p>OAARs will be included in the ACR.</p> <p>Milestone Reports prepared three (3) months after the completion of milestone surveys at Years 5, 10, 15, and 20 of the offset and will be included in the ACR.</p>	<p>Offset Provider and suitably qualified bush regeneration contractor as appointed by the Offset Provider.</p> <p>Suitably qualified person as appointed by the Proponent.</p>



Management Action	Monitoring action(s)	Reporting Action and Timing	Responsible person(s) for activity/reporting
	criteria and identify any issues for rectification.		
<b>6. Fencing and signage</b>	Status of fencing and signage and any issues requiring rectification will be identified through regular site inspections (approximately quarterly) to be determined by the Offset Provider.	Installation and maintenance of fencing will be reported in the Year 1 OAAR. Ongoing status of fencing/signage and any rectification works will be reported in OAARs for the relevant offset year and subsequently in the ACR for the project period.	Offset Provider



**Table 53: Monitoring Summary Table**

<b>Monitoring Summary</b>									
<b>Monitoring Action</b>	Year 1	Year 2	Year 3	Year 4	Year 5	Year 10	Year 15	Year 20	
<b>Pest Monitoring</b>	x	x	x	x	✓	✓	✓	✓	✓
<b>Rehabilitation photo monitoring</b>	✓	✓	✓	x	x	x	x	x	x
<b>Weed mapping</b>	x	x	x	x	✓	✓	✓	✓	✓
<b>MHQA assessments</b>	x	x	x	x	✓	✓	✓	✓	✓
<b>Planting</b>	Following any plantings - quarterly for first year then bi-annually to Year 5 or until plants have become established								
<b>Bushfire Monitoring</b>	Annually for the life of the offset								
<b>Fencing and signage</b>	Monitoring of fence lines is expected to occur quarterly (approximately), as determined by the offset provider, for the life of the offset								



# 9. Management Framework

This section outlines the management framework to be implemented for the life of the offset (20 years) including management measures to be implemented by the Offset Provider or appointed contractor, annual monitoring requirements, and interim milestone monitoring of environmental outcomes for relevant management actions to be completed by a suitably qualified person at Years 5, 10, 15, and 20 of the offset. These management actions are designed to minimise the risks associated with key threatening processes to the Koala and enhance the quality of the habitat within the proposed offset area. The proposed monitoring actions are summarised in a monitoring and reporting schedule in **Section 6**.

## 9.1. Management Approach

The measures outlined in the following subsections are considered effective for the listed status of the Koala in addition to the size and scale of the offset and the focus on priority management actions, which are efficient, timely and transparent (*i.e.*, able to be monitored and are auditable). Additionally, a number of these measures correspond to Priority Management Actions outlined in the following documents:

- *Approved Conservation Advice for Phascolarctos cinereus (combined populations of Queensland, New South Wales and the Australian Capital Territory) (Koala Northern Designable Unit) (DAWE 2022)*
- *National Recovery Plan for the Koala Phascolarctos cinereus (DAWE 2022b)*

Although the measures have been developed to achieve the required offset environmental outcomes as a priority, they will deliver an overall improvement in the condition and quality of a wide range of native species present within the proposed offset area.

## 9.2. Operational Management Units

For the purpose of the management framework, the Assessment Units are termed Operational Management Units (OMUs). The consistent vegetation type and single assessment unit across the referral area results in a single OMU, details for the proposed offset area is provided in **Table 54**.

**Table 54: Offset area operational management units**

OMU	Assessment Unit	VMA Status	Regional Ecosystem	Area (ha)
<b>OMU1</b>	AU1	Category X	Non-remnant RE12.9-10.2	40



### 9.3. Management Action 1 – Legally Secure Offset Area

The proposed offset area must be protected and managed against known and potential threats for the Koala in perpetuity to attain a conservation gain. As such, the proposed offset area will be legally secured for conservation prior to impacts occurring via a suitable method such as a covenant and VDEC process administered under the Queensland VMA. Notification of declaration will be supplied to DCCEEW.

The declared area will be recognised as making significant contribution to the conservation of biodiversity. KFF, as the offset provider, will continue to manage the proposed offset area for the life of the offset, whilst reporting required milestones and data to the proponent annually. Legally securing the proposed offset area is listed in the Conservation Advice as a Priority Management Action, under “Habitat Loss, Disturbance and Modification”. Demonstration of this management action will be provided in the Annual Compliance Report.



## 9.4. Management Action 2 – Non-native Vertebrate Pest Management

### 9.4.1 Justification

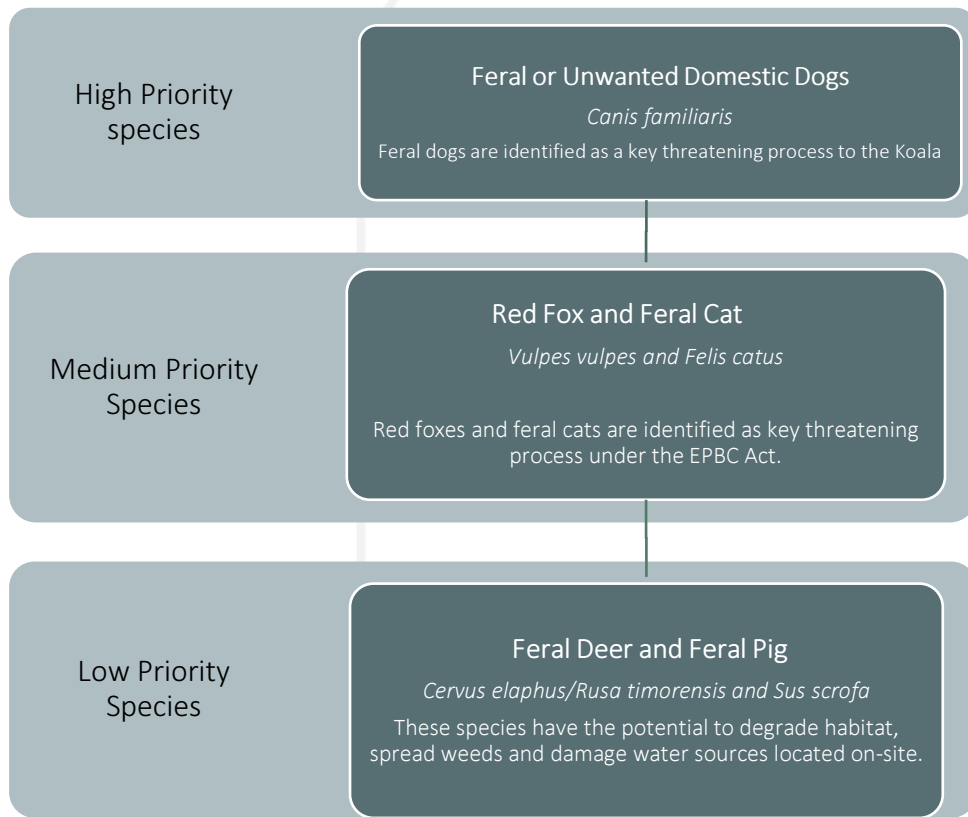
Wild dogs have been identified as a key threatening process under the EPBC Act and are confirmed as a direct predation risk to Koalas. Managing animal predation is listed as a Priority Management Action under the Koala Conservation Advice.

Additionally, the presence of other non-native predators which may pose a lower level of threat, such as *Felis catus* (feral cat) and *Vulpes vulpes* (European red fox), have the potential to attack and indirectly stress Koalas making them more susceptible to disease. Predation rates by wild dogs are difficult to quantify because attack often occurs in areas infrequently visited by people, and the carcasses of killed animals are buried, eaten, or may go undetected (Beyer *et al.* 2018). Wild dog attack is routinely cited as one of the main causes of mortality of Koalas (Rhodes *et al.* 2011; Gonzalez-Astudillo *et al.* 2017; Beyer *et al.* 2018). Wild dogs are also identified as regional pest species by Somerset Regional Council.

Removal of the wild dog threat produced significant gains in the survival of Koalas in a study where the causes of mortality of 291 Koalas were tracked over four years (Beyer *et al.* 2018). Wild dogs were confirmed as the cause of death for 117 (40.2% of total) deaths during the study. In addition, wild dogs were attributed to another 38 (13.1% of the total) deaths but were not confirmed. Population growth rates of Koala in the study increased from 0.659 in the first year to 1.20 in the fourth year of the project through a combination of reduction in predation and disease treatment. Modelling indicated that the population would increase in size by 21% within a decade with continued management (Beyer *et al.* 2018).

Feral animal species are detailed below in order of prioritisation relative the direct threat to Koala.





**Wild Dogs**

The Department of Agriculture and Fisheries (DAF) lists feral dogs as abundant and widespread throughout the Somerset region. Wild dogs (*Canis lupus dingo and Canis lupus familiaris*) are listed as declared pest animals by Somerset Regional Council, (refer Somerset Regional Council Biosecurity Plan – Invasive Plants and Animals 2020 – 2025).

Targeted baseline surveys specific to the Offset Area identified six (6) sperate dogs during the survey period. A total of four (4) cameras were deployed throughout this period which equates to a total of fifty-six (56) camera nights. The total RAI of wild dogs within the property is calculated as **10.71**. No other feral species were recording during this survey however are still considered relevant due to their known occurrence in the broader landscape.

**European Fox**

While the European Fox is not considered a threat under the Koala Conservation Advice, existing literature indicates European Fox to pose at least some risk to the species (Mella et al 2018). DAF lists foxes as being widespread across Australia due to being highly adaptable and opportunistic feeders. The Australian Government’s 2022-2023 Threatened Species Action Plan includes targets to manage foxes in important habitats for threatened species. The Queensland Government sites several control methods for this species, including shooting, trapping, fencing, baiting, and livestock guardian dogs, combined with land management (Business Queensland, 2021) (refer **Table 28**). While evidence of European Fox was not recorded within the Offset Area, they are knwin to be present across the broader offset property. Continued pest management of Foxes is still considered relevant to Koala as a lower priority.



### **Feral Cats**

The DCCEEW state that feral cats pose a significant threat to many nationally listed threatened species. This species is known to predate on native species, spread diseases and reduce viable habitat for species most at risk. While not listed as a recognised threat to Koala under the Conservation Advice, Feral Cats have been included as a lower risk predator. While evidence of Feral Cat was not recorded within the Offset Area, continued pest management of Feral Cats is still considered relevant.

### **Feral Pig**

Feral pigs (*Sus scrofa*) are opportunistic omnivores and will consume a wide range of animals including small mammals and birds. Feral Pigs are also widely known to cause significant environmental destruction to soil and vegetation via digging, spreading weeds and consuming vegetation. Feral pigs were not recorded during targeted surveys however are considered a relevant threat through large scale land degradation.

### **Feral Deer**

Feral deer such as Red deer (*Cervus elaphus*) and Rusa deer (*Rusa timorensis*) pose significant threats to ecological restoration through their browsing of seedlings and under-storey plants, ring-barking and bark-stripping of young trees, trampling of regenerating vegetation and disturbance of soil through wallowing or hard-hoofed movement. These behaviours reduce vegetation recruitment, alter species composition and degrade habitat structure; moreover, the soil disturbance they cause can create bare patches that facilitate invasive weeds, undermining restoration efforts. Ecological restoration therefore faces a heightened risk of failure if deer populations are unmanaged, particularly in planting or natural regeneration areas where plant establishment is critical.

While specific site-based case studies for red deer or rusa deer within the region are limited in public documentation, national research and regional control programs in SEQ indicate that rusa deer can maintain home-ranges of a few hundred hectares in peri-urban and bushland fringe settings (making them locally manageable) and hence pose a realistic threat to restoration success within the Offset Area.

### **Current Biosecurity Obligations**

Presently, under the *Biosecurity Act 2014*, there is the General Biodiversity Obligation (GBO) for landholders to manage biosecurity risks that are under their control and take reasonable and practical steps in doing so. To determine the extent of management and to determine if it is necessary to take reasonable and practical steps in managing the biosecurity risk, the landholder is required to assess the risk and its potential harm (i.e., extensive productivity loss). If not utilised as an environmental offset, the landowner would not undertake feral animal control as it is assessed under the 'general biosecurity obligation' of the *Biosecurity Act 2014*, that feral animal threat to productivity does not have a positive cost benefit to the current land use (i.e., the expenditure to undertake feral animal control would not result in enough economic gain in productivity to warrant implementation).

The implementation of a targeted Pest Management Program for the offset site will provide certain, detailed, and active reduction of pest species in the local area.

#### **9.4.2 Proposed action**

The control and prevention of invasive animal incursions will be undertaken in accordance with the relevant legislation (such as the *Commonwealth Biosecurity (Consequential Amendments and Transitional Provisions) Act 2015* and the *Queensland Biosecurity Act 2014*) and include the control of non-native



predators by legal methods by suitably qualified pest management contractor(s). Any required hazardous materials must be handled and stored in accordance with the material's safety data sheets and the *Approved Code of Practice for the Storage and Handling of Dangerous Goods*. Non-native predator control will be undertaken in a humane manner.

Management measures will be implemented by the Offset Provider for the life of the offset (20 years) for the control of the feral animal species identified in across the proposed offset area include:

- Development and implementation of a property wide feral animal management program specifying techniques (trapping, baiting, shooting) and ongoing monitoring methods (including datasheets) will be utilised, completed within Year 1 of the offset.
- Adjacent land holders will be consulted for the potential of collaboration in a localised landscape-wide pest management effort if considered appropriate by the suitably qualified pest management contractor/offset provider. As feral animal management is best achieved on a property-wide scale, this will occur across adjacent offset holdings at a minimum.
- if considered appropriate by the suitably qualified pest management contractor/offset provider, cooperative participation in feral animal management planning and implementation with local land managers (government departments, local governments and utility providers) will occur to ensure effective management in the locality of the offset area, being Somerset Regional Council.
- Signage installation informing that feral animal control being undertaken within the offset area.

The proposed action to be implementation at the discretion of the suitably qualified pest contractor for feral animal species is provided in **Table 55**. These have been adapted from the *National Wild Dog Action Plan: Promoting and supporting community-driven action for landscape scale wild dog management* (WoolProducers Australia 2014), refer **Table 56** Any control methods will be used in consultation with local residents and authorities.

**Table 55: Feral animal control Actions**

Timeframe	Details
<p><b>Year 1</b></p>	<ul style="list-style-type: none"> <li>• Development of a property wide feral animal management program specifying techniques (trapping, baiting, shooting) and ongoing monitoring methods (including datasheets) will be utilised.</li> <li>• Incorporates baseline RAI of feral animals completed as part of this OMP and detailed in Section 6.2.2</li> <li>• The feal animal management program will use the baseline data to build a calendar of annual activities based around varying control methods, seasons and species recorded.</li> </ul>
<p><b>Years 2-20</b></p>	<ul style="list-style-type: none"> <li>• Implement property wide feral animal management program</li> </ul> <p>Best practice management measures will be implemented and will include for:</p> <ol style="list-style-type: none"> <li>a. Dogs – biannual control (Mar-May breeding and Sep-Nov weening)</li> </ol>



Timeframe	Details
	<ul style="list-style-type: none"> <li>i. Shooting – dawn</li> <li>ii. Cage trap – set evening, clear morning</li> <li>iii. Foothold / padded-jaw / offset laminated jaw traps – set evening, clear morning</li> <li>iv. Leg hold trap – set evening, clear morning</li> <li>v. Collarum® neck restraint – set evening, clear morning</li> <li>vi. Baiting with / without infra-red sensing cameras – set as required</li> </ul>
	<ul style="list-style-type: none"> <li>b. Foxes – biannual control (winter/spring breeding and autumn migration)                             <ul style="list-style-type: none"> <li>i. Shooting – dawn</li> <li>ii. Cage trap – set evening, clear morning</li> <li>iii. Padded-jaw / offset laminated jaw traps – set evening, clear morning</li> <li>iv. Leg hold trap – set evening, clear morning</li> <li>v. Baiting with / without infra-red sensing cameras – set as required</li> </ul> </li> </ul>
	<ul style="list-style-type: none"> <li>c. Cats – biannual control                             <ul style="list-style-type: none"> <li>i. Shooting – nocturnal more productive</li> <li>ii. Wire ‘treadle-type’ box traps – baited and set evening, clear morning</li> <li>iii. Rubber-jawed leg-hold traps - baited</li> <li>iv. Baiting with / without infra-red sensing cameras – set as required</li> </ul> </li> </ul>
	<ul style="list-style-type: none"> <li>d. Pigs – annual control targeting ≥ 70% of population                             <ul style="list-style-type: none"> <li>i. Shooting – outside of trapping and baiting</li> <li>ii. Fenced trapping - set evening, clear morning – pre-feeding and then triggered</li> <li>iii. Baiting with / without infra-red sensing cameras – set as required – can pre-feed to attract</li> </ul> </li> </ul>
	<ul style="list-style-type: none"> <li>e. Deer – manage in response to an incursion                             <ul style="list-style-type: none"> <li>i. Shooting – diurnal</li> <li>v. Self-mustering trap - set evening, clear morning and euthanise</li> </ul> </li> </ul>
	<p>Year 5: Compile findings in a Milestone Report of five years of the Feral Animal Management Program (as outlined below).</p> <p>Year 10: Compile findings in a Milestone Report of five years of the Feral Animal Management Program (as outlined below).</p> <p>Year 15: Compile findings in a Milestone Report of five years of the Feral Animal Management Program (as outlined below).</p> <p>Year 20: Compile findings in a Milestone Report of five years of the Feral Animal Management Program (as outlined below).</p>



**Table 56: Feral animal (predator) species control methods - adapted from WoolProducers Australia 2014**

Method	Efficacy	Cost effectiveness	Target specificity	Humaneness acceptability	Comment
<b>Ground baiting with 1080</b>	Effective	Cost-effective	High	Conditionally acceptable	Currently the most cost-effective technique available. Poison baits are made from raw animal meat or offal or manufactured baits are used. Average and minimum weights vary between states. Sodium fluoroacetate (1080) is the main toxin used for control of wild dogs – reference to relevant State directions for use will be required.
<b>Shooting to euthanise trapped dogs / fox / cats</b>	Effective	Cost-effective	High	Acceptable	Effective technique although will require to be completed in accordance with existing State laws and guidelines.
<b>Ground shooting</b>	Can be effective to target individual dogs / foxes – largely opportunistic	Moderately expensive and time consuming	Moderate to high	Conditionally acceptable, dependent on skillset of shooter. Welfare issues arise if animal is not shot humanely	Limited effectiveness for broadscale population reduction, however, can achieve sustained control within a local area.
<b>Exclusion fencing</b>	Effective in suitable areas	Expensive	Can be effective in	Acceptable	Requires substantial resource input both initially, during installation, and in an ongoing capacity due to high maintenance requirements. Electric fencing can



Method	Efficacy	Cost effectiveness	Target specificity	Humaneness acceptability	Comment
			specific situations		be an effective barrier when used appropriately and in conjunction with supplementary management techniques. Often adequate defense against reinvasion of controlled areas. Due to high levels of maintenance and upkeep required, fencing can be difficult to effectively maintain.
<b>Aversion techniques</b>	Not known	Not known	Not certain – possible short-term until target species become familiar with technique	Acceptable	Suggested aversion methods include flashing lights, sounding alarms, objects flapping in the wind and chemicals.



### **Adaptive management for feral animal species**

Given the extended management timeline, it is not possible or intended that this Offset Management Framework will provide a detailed prescription of management actions. This framework has been based on the current state of knowledge of species ecology and best practice habitat management approaches for Koala habitat. It is anticipated that new techniques will become available over the course of the management period to monitor environmental values through indicators including vegetation composition, Koala absence, presence and abundance, and weed presence or density (including level of infestation). In addition, given the variable nature of pest management, an adaptive management approach has been adopted to ensure the Pest Management Plan works effectively for any species over the area, as well as integrating future research and insights into management and monitoring actions. This will ensure best practice techniques can be adopted as new information becomes available over time via an adaptive management approach, ensuring the anticipated delivery and measurement of offset outcomes.

Adaptive management refers to a way of managing natural resources where management actions are reviewed and, if necessary, modified, based on observed changes in environmental condition and/or updates in knowledge which underpins the original management approach.

Adaptive management will be used to incorporate changes into management processes across the proposed offset area, and will include the following:

- Assimilation of new data or information – such as updates to conservation advice or new threat abatement plans relevant to the Koala.
- Annual review of risks – to reassess existing risks/threats to the offset area and ensure best practice methodology is implemented to achieve effective management of target species.
- Annual review of management measure effectiveness – to reassess management actions where monitoring performance criteria are not met.

#### **9.4.3 Monitoring**

The effectiveness of pest management actions will be measured and monitored through a structured process which includes annual surveys by a qualified pest management contractor and 5 yearly milestone monitoring by a suitably qualified person before the end of Years 5, 10, 15, and 20 of the offset.

#### **Baseline surveys (completed)**

- Detailed Offset Area-specific Baseline Survey (Year 1) – Establishes initial feral animal population data and report.

#### **Years 2 – 20**

- Annual scheduled Feral Animal Surveys and Control completed by suitably qualified pest contractor

#### **Years 5, 10, 15 and 20**

- Targeted feral animal surveys completed by suitably qualified Ecologists replicating baseline surveys detailed in **Section 6.1** and summarised below.

The following non-native predator monitoring methodology will be implemented by a suitably qualified person:

- Desktop Assessment



- Review previous survey mapping and camera locations, field datasheets, photos and notes.
- Field Survey
  - Grid-based motion detection camera deployment for minimum of 14 nights in the same locations at 5 yearly monitoring schedule for the life of the offset. Motion detection camera locations are to be recorded with hand-held GPS. GPS coordinates and photos to be recorded.
  - Field datasheet will detail the time of year of the monitoring event, record observed scats or tracks, photo location and notes of any evidence of positive and/or negative changes in feral animal occurrence.
  - A GPS will be used to locate the presence of feral animal species, with a focus on species identified during baseline field surveys via notable tracks or scats.
  - Transfer GPS data to spatial data programs to generate feral animal occurrences and collate all data in excel spreadsheets and save all digital photos to file for ongoing monitoring and reporting purposes.
  - Where feral animal presence is detected, targeted trapping and baiting programs, will be implemented on completion of the monitoring program.

#### 9.4.4 Reporting

- Milestone feral animal monitoring survey results will be reported by the suitably qualified person in the 5, 10, 15 and 20 Year Milestone Report. This will provide detail on survey methodologies and detected predator abundance with reference to the baseline survey data.
- Implementation of the Feral Animal Management Program and results of feral animal management program will be detailed annually by the Offset Provider in Offset Area Annual Reports.
- OAARs and/or Milestone Reports will be included in the relevant Annual Compliance Report.
- In the event that the completion criteria has been met (<10% of RAI) monitoring will continue for the life of the offset to ensure continued environmental outcome for the Koala.

#### 9.4.5 Completion Criteria

Timing	Completion Criteria
<b>Year 1</b>	Development of a property wide feral animal management program
<b>Year 2 – 20</b>	Implement property wide feral animal management program to reduce feral animal abundance
<b>Years 5, 10, 15</b>	Review feral animal management program based on available data and endorsed guidelines and including a review of management techniques and adaptive management strategies where appropriate.
<b>Year 15</b>	Feral animals suppressed within the offset area to <10% of the Relative Abundance Index (RAI). Priority wild dogs.



## 9.5. Management Action 3 – Management of Weeds of National Significance

### 9.5.1 Justification

The listing and prioritisation of WONS is a joint initiative of the States, Territories and Australian Government and their long-term control is of national interest. *L. camara* and its impact on Koala movement is listed as a key threatening process, prolonging time spent on the ground and therefore increasing susceptibility to predators (Paull *et al.* 2019, The Honourable Leeanne Enoch 2019). The Queensland Koala Strategy 2019–2024 lists Koala habitat restoration, including removal of weeds, as a key priority, and these recommendations were developed at the advice of the Koala expert panel (Queensland Government 2019).

As well as limiting movement for Koalas and other fauna, *L. camara* also changes the structure and health of the ecosystem, which can lead to a decline in the health and quality of Koala food and habitat. *L. camara* is a transformer weed, altering wildfire behaviour, potentially resulting in destruction of native trees on a larger scale (Berry *et al.* 2011, DAF 2016). *L. camara* also suppresses eucalypt recruitment, both through its allelopathic properties and its capacity to shade out other species. Without management intervention this leads to an overall decline in habitat health (Threatened Species Scientific Committee, 2010). If eucalypt species cannot recruit the succession of vegetation is interrupted, threatening the future health of the ecosystem.

Weed control is fundamental to improving biodiversity and the ecological condition of the habitat within the offset area. Historical land uses across the proposed offset area have resulted in the introduction and spread of a variety of environmental weeds. Weeds recorded on-site are generally confined to ground cover species such as pasture grasses which dominate the area. *Lantana camara* (Lantana), a WONS, is a persistent weed in SEQ and is widespread across the broader Little Kiper Creek Offset Property. However, *Lantana camara* (Lantana) was recorded in only very low abundance within the proposed offset area, likely a result of continued cattle grazing and dominance of pasture grasses. Nevertheless, the ongoing maintenance of <5% WONS is considered relevant, particularly given the potential for *Lantana camara* (Lantana) to seed from adjacent dense patches and quickly spread. Germination can occur rapidly after wet weather or when a parent plant is removed. Therefore, on-going repeat visits to the offset area following are required to maintain low abundance of *Lantana camara* (lantana).

### 9.5.2 Proposed action

The majority of weeds recorded on-site are ground cover species indicative of cattle grazing country. As such, the suppression of weeds will likely occur following the reinstatement of native vegetation and canopy cover. Direct weed control will be implemented where necessary to achieve the scoring as proposed in **Table 22**. Given the potential for *Lantana camara* (Lantana) infestation to occur, future works will be adaptive and any new infestations of *Lantana camara* (Lantana), or any other WONS, will be prioritised. Weed management strategies for Lantana specifically are listed in **Table 57** and other WONS in **Table 58**.

The management actions must maintain WONS weed cover below 5% over the entire offset site by Year 15 of the offset, as detailed in the environmental outcomes (**Section 7** and **Table 24**). The timing for the implementation of management measures includes:

- Establish photo monitoring locations
- Treatment of WONS will occur annually and where needed.



**Table 57: Lantana management methods**

Type of infestation	Physical	Mechanical	Chemical	Fire	Biological
Small (few plants, small area)	Hand grubbing only suitable for seedlings. Wear gloves for protection from thorns.	Not suitable.	Spot spray plants less than 2 m in height between summer and autumn with a registered herbicide.	Not suitable.	There are four useful biological control agents. They are already distributed throughout their potential range.
Medium (medium density, medium total area)		Bulldoze, plough, stick-rake or slash infestations. Soil disturbance will lead to mass seed germination, so follow up with further controls. Do not use mechanical control in areas susceptible to erosion. A permit may be required.	Spraying is uneconomical for medium or large infestations. Helicopter spraying is used when there is no access for mechanical control, eg very steep slopes.	Under permit, burn in summer with good fuel load of grass and/or mechanically cleared lantana. Also use as follow-up. Do not burn in rainforests.	
Large (many plants, many ha)					

Note: table extracted from CRC for Australian Weed Management, 2003, *Weed Management Guide, Lantana – Lantana camara*, Commonwealth Department of the Environment and Heritage.



**Table 58: Weed treatment and removal methods**

No.	Family	Scientific name	Common name	Non-chemical control	Chemical control
1	Amaranthaceae	<i>Alternanthera philoxeroides</i>	Alligator Weed	<p>Refer to Business Queensland: Invasive Plants at <a href="https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/land-management/health-pests-weeds-diseases/weeds-diseases/invasive-plants">https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/land-management/health-pests-weeds-diseases/weeds-diseases/invasive-plants</a> for additional guidance.</p> <p>Or</p> <p>WONS weed management guides available at <a href="https://www.environment.gov.au/biodiversity/invasive/weeds/weeds/lists/wons.html">https://www.environment.gov.au/biodiversity/invasive/weeds/weeds/lists/wons.html</a></p>	<p>Herbicides must be applied by appropriately qualified / supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority issued off-label permit where applicable.</p> <p>Also refer to: Business Queensland: Invasive Plants at <a href="https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/landmanagement/health-pests-weeds-diseases/weeds-diseases/invasive-plants">https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/landmanagement/health-pests-weeds-diseases/weeds-diseases/invasive-plants</a> for additional guidance.</p>
2	Gramineae	<i>Andropogon gayanus</i>	Gamba Grass		
3	Annonaceae	<i>Annona glabra</i>	Pond Apple		
4	Basellaceae	<i>Anredera cordifolia</i>	Madeira Vine		
5	Asparagaceae	<i>Asparagus aethiopicus</i> cv. <i>Sprengeri</i>	Asparagus Ground Fern		
6	Asparagaceae	<i>Asparagus africanus</i>	Ornamental Asparagus, Asparagus Fern		
7	Asparagaceae	<i>Asparagus asparagoides</i>	Bridal Creeper		
8	Asparagaceae	<i>Asparagus declinatus</i>	Bridal Veil, South African Creeper		
9	Asparagaceae	<i>Asparagus plumosus</i>	Asparagus Fern		
10	Asparagaceae	<i>Asparagus scandens</i>	Climbing Asparagus Fern		
11	Cactaceae	<i>Austrocylindropuntia</i> spp.	Prickly Pears		
12	Cabombaceae	<i>Cabomba caroliniana</i>	Cabomba		
13	Asteraceae	<i>Chrysanthemoides monilifera</i> subsp. <i>Monilifera</i>	Boneseed		
14	Asteraceae	<i>Chrysanthemoides monilifera</i> subsp. <i>rotundata</i>	Bitou Bush		
15	Asclepiadaceae	<i>Cryptostegia grandiflora</i>	Rubber Vine		
16	Cactaceae	<i>Cylindropuntia</i> spp.	Prickly Pears		
17	Fabaceae	<i>Cytisus scoparius</i>	Common Broom		
18	Bignoniaceae	<i>Dolichandra (Macfadyena) unguis-cati</i>	Cat's Claw Creeper		



No.	Family	Scientific name	Common name	Non-chemical control	Chemical control
19	Pontederiaceae	<i>Eichhornia crassipes</i>	Water Hyacinth		Southeast Queensland Ecological Restoration Framework WONS weed management guides available at <a href="https://www.environment.gov.au/biodiversity/invasive/weeds/weeds/lists/wons.html">https://www.environment.gov.au/biodiversity/invasive/weeds/weeds/lists/wons.html</a>
20	Fabaceae	<i>Genista linifolia</i>	Flax-leaved Broom, Mediterranean Broom		
21	Fabaceae	<i>Genista monspessulana</i>	Montpellier Broom, Cape Broom, Canary Broom		
22	Poaceae	<i>Hymenachne amplexicaulis</i>	Hymenachne		
23	Euphorbiaceae	<i>Jatropha gossypifolia</i>	Bellyache Bush		
24	Verbenaceae	<i>Lantana camara</i> var. <i>camara</i>	Lantana		
25	Solanaceae	<i>Lycium ferocissimum</i>	African Boxthorn		
26	Mimosaceae	<i>Mimosa pigra</i>	Giant Mimosa		
27	Gramineae	<i>Nassella neesiana</i>	Chilean Needle Grass		
28	Gramineae	<i>Nassella trichotoma</i>	Serrated Tussock		
29	Cactaceae	<i>Opuntia</i> spp.	Prickly Pears		
30	Cactaceae	<i>Parkinsonia aculeata</i>	Parkinsonia		
31	Asteraceae	<i>Parthenium hysterophorus</i>	Parthenium Weed		
32	Mimosaceae	<i>Prosopis pallida</i>	Algaroba		
33	Rosaceae	<i>Rubus fruticosus</i> aggregate	Blackberry		
34	Alismataceae	<i>Sagittaria platyphylla</i>	Delta Arrowhead, Arrowhead, Slender Arrowhead		
35	Salicaceae	<i>Salix</i> spp. except <i>S.babylonica</i> , <i>S.x calodendron</i> & <i>S.x reichardtii</i>	Willows (except Weeping Willow, Pussy Willow and Sterile Pussy Willow)		
36	Salviniaceae	<i>Salvinia molesta</i>	Salvinia		
37	Asteraceae	<i>Senecio madagascariensis</i>	Fireweed		



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No.	Family	Scientific name	Common name	Non-chemical control	Chemical control
38	Solanaceae	<i>Solanum elaeagnifolium</i>	Silver Nightshade		
39	Tamaricaceae	<i>Tamarix aphylla</i>	Athel Pine		
40	Fabaceae	<i>Ulex europaeus</i>	Gorse, Furze		



### Weed notes

Weed management typically comprises a major part of rehabilitation site works. Weed management provides the basis of aiding natural regeneration and assisted natural regeneration.

Weed Management will be undertaken in accordance with the SEQERF Primary, Follow-up and Maintenance works notes above targeting WONS.

Critical skills for Weed Management include:

- Knowledge of relevant legislation.
- Plant Identification skills.
- Knowledge of different weed management techniques.

### Knowledge of different weed management techniques

A range of weed management techniques are available to combat varying weed species and scenarios. Refer to the following **Table 59** for a summary of contemporary weed management techniques extracted from the SEQERF.

**Table 59: Weed treatment schedules (source: SEQERF)**

Method	Description
<b>Herbicide</b>	The herbicide weed control techniques described below provide a range of proven methods that can be used on a restoration site
<b>Cut- scrape - paint</b>	Cut the stem of the plant close to the ground (approximately 1-2cm) ensuring that soil does not come in contact with the cut surface. The cut can be made at a slight angle in order to increase the surface area that is exposed to the chemical. Apply herbicide immediately to the cut stump using poison pot and brush or dripper bottle. Using a knife, scrape the sides of the stump thoroughly to expose the green tissue. Apply herbicide to the scraped stump. The chemical must be applied within 10 seconds of the cut or scrape being made in order for it to be fully effective.
<b>Cut- paint</b>	Cut the stem of the plant close to ground level. Apply herbicide to the cut stump using poison pot and brush or dripper bottle. This method is best suited to easy-to-treat weeds such as small-leaved privet ( <i>Ligustrum sinense</i> ), provided that the diameter of the stem at ground level is less than approximately three centimetres. If a glyphosate-/ metsulfuron methyl herbicide mix is being used in the poison pot, a greater range of weeds can be controlled using this method e.g., Easter cassia.
<b>Scrape - paint</b>	Scrape as much of the stem as possible (one side of the stem) using a knife and apply herbicide to the scrape. Leave a small section of the vine unscraped, and then twist the vine so that the next scrape is made on the opposite side of the stem to the preceding scrape. Continue along the length of the vine, scraping and painting as much of the stem as possible, with scraping to be concentrated along the thicker stems close to the root of the plant. This is the best method to use for madeira vine, as it allows the chemical to translocate to the underground storage organs and aerial tubers which may be hanging in large clusters above head height. This avoids the potential problem of tubers from cut stems left hanging in the trees from dropping to the ground and sprouting. When scraping madeira vine stems a deep scrape is advisable - scrape right through to the fibrous, stringy section of the stem, taking care not to sever the vine. This method is also suitable for treatment of ochona.
<b>Over-spraying</b>	Over-spraying involves the use of knapsacks or power sprayers to treat large expanses of weed such as lantana thickets. The foliage must be covered with



Method	Description
	herbicide but not to the point of running off the plant. The dead plants remain in place and can be cut down at a later stage. Prior to over-spraying, any weeds that are growing closely around established native plants must be hand removed or treated by cut-scrape-paint.
<b>Oil-hang</b>	Vines such as mile-a-minute ( <i>Ipomoea cairica</i> ) which produce long stolons extending many metres along the surface of the ground, are suited to the oil-hang method. Locate the base of the plant and carefully pull up the runners and roll them up. The resulting roll of vine is then hung in the fork of a tree to dry out as if it is left on the ground it is likely to re-shoot. Where runners are climbing up into a tree they are cut off at head height prior to the runner being rolled up - there is no need to pull cut vines down from trees as this action is likely to damage the tree. The base of the vine is treated using the cut scrape- paint method.
<b>Gouge-paint</b>	This method applies to plant species that have a fleshy underground storage organ, such as the large tuber that is often found at the base of madeira vine. It is also particularly appropriate for the treatment of climbing asparagus ( <i>Protasparagus plumosus</i> ). If using this technique on climbing asparagus, first cut the stems that are growing into the canopy at head height and also at the base. The fleshy rhizome can then be gouged, or alternatively in the case of climbing asparagus, it may be struck several times firmly with the head of a pair of loppers, allowing the brown outer covering of the crown to peel away exposing the white fleshy inner section of the rhizome for application of herbicide. Gouge out sections of the fleshy base with a knife and apply herbicide using a paint pot and brush or dripper bottle within 10 seconds
<b>Basal Barking</b>	This method involves mixing an oil soluble herbicide in diesel/kerosene and painting or spraying the full circumference of the trunk or stem of the plant from ground level to a height of approximately 45cm. Basal bark application is suitable for thin-barked woody weeds including saplings, regrowth and multi- stemmed shrubs. The method will usually result in the mortality of difficult-to- control woody weeds at any time of the year, provided the bark is not wet or too thick to enable the herbicide to penetrate. The method should not be used in wet weather, adjacent to waterways or in areas where native trees and shrubs are located. The use should be restricted to situations where a weed is particularly difficult to control e.g., cherry guava and where other methods have been unsuccessful.
<b>Splatter Gun</b>	This small gas-powered injector kit is fitted into a knapsack for easy carrying and delivers large droplets in a stream over the weed. The gun is used to deliver a concentrated herbicide (glyphosate or metsulfuron methyl) across large dense expanses of weed. This method is used for species such as lantana (ratio of 1:9 of glyphosate water). Splatter gun involves spraying strips at one to two meter intervals over the thicket. The herbicide is then translocated throughout the entire plant. The method does not require the whole plant to be covered as in over-spray
<b>Spot-spraying</b>	A knapsack filled with an appropriate herbicide mix is used by the operator to selectively control environmental weeds. A keen eye and an ability to distinguish between the native and weed species likely to be present, especially at seedling stage, is essential. Marker dye is added to the chemical mix to allow the operator to see what has already been sprayed, thus covering the ground weeds comprehensively and thoroughly Glyphosate and metsulfuron methyl are the main herbicides used for spot-spraying in ecological restoration, together with the addition of a penetrant and/or surfactant and marker dye



Method	Description
<b>Stem Injection</b>	Large woody weeds such as camphor laurel, coral trees ( <i>Erythrina spp.</i> , <i>Privet Ligustrum spp.</i> ) and umbrella trees are generally treated by stem-injection. Holes are drilled at regular intervals around the base of the tree and exposed roots using a drill. A tree injection syringe attached to a small capacity knapsack is used to fill the holes with herbicide. Stem-injection of trees can also be undertaken using a hatchet to create cuts in a brickwork pattern in trunks of trees for the application of herbicide (known as tree filling). Frilling is more labour intensive than drilling. The greatest benefit of stem injection is that the trees can be left standing in situ as they die, provided there is no risk to humans or infrastructure from falling limbs. This creates convenient roosts for birds and other animals, and prevents the formation of large amounts of debris on the ground and damage to understorey plants which would result if the trees were to be cut down using a chainsaw.
<b>Wick Wiping</b>	Wick wipers can be manually used with a sponge or wick applicator, attached to a container filled with herbicide or as an attachment towed by a tractor. The manual method can be used to selectively apply herbicide to the leaves of weeds growing in sensitive situations. The hand held container can leak and generally spot spraying would be recommended. The use of a tractor drawn wick wiper is used to control taller growing species such as introduced grasses and to encourage the growth of lower growing species. This method could be used in preparation for planting.
<b>Mechanical</b>	Mechanical weed control involves the use of powered and non-powered equipment such as brushcutters, chainsaws, slashers, shovels, pruners, saws, etc. These methods are best used in situations where there is a large, uninterrupted stand of weeds.
<b>Dig and Bag</b>	Dig and remove tuberous/ rhizomatous root systems. Remove roots or whole plant in hard/ compacted soils. Place in suitable container and remove from site, dispose of by deep burial, burn or burial at a land fill, must not place declared weed species in recycling (mulch).
<b>Hand-pull</b>	Remove totally from ground by hand (human). Perform when soil is moist. Applicable to small infestations or areas of environmental sensitivity (including sensitive watercourses, when frogs are breeding, or presence of threatened species).
<b>General Mechanical</b>	May involve use of machinery (e.g., brushcutter, chainsaw, slasher, dozer, excavator). Suitable for large infestations and weed trees. Initially cost-effective, but requires immediate revegetation of site or matting/ mulch application and extensive maintenance periods, Generates excessive soil and vegetation disturbance

#### 9.5.4 Monitoring

A suitably qualified person will complete monitoring for WONS before the end of Years 5, 10, 15, and 20 of the offset to track against the interim milestone and completion criteria in the environmental outcomes as outlined in **Table 51**. Detailed surveys are also recommended at Year 8 to ensure WONS cover remain below 5% over the whole offset area.

The methodology for non-native plant survey will be repeated by the suitably qualified person in accordance with the monitoring and reporting schedule in **Section 6**. Surveys include the search and recording of infestations and MHQA transects to record weed cover. The following procedures will be implemented to ensure that the monitoring events align with the baseline survey methodology:



**Baseline surveys (completed)**

- Detailed Offset Area-specific weed mapping – Establishes baseline WONS cover

**Years 1 - 3**

- Photo monitoring across offset area

**Years 5, 10, 15 and 20**

- Detailed WONS mapping completed by suitably qualified Ecologists replicating baseline surveys detailed in **Section 6.1** and summarised below.
- Desktop Assessment
  - Reviewing previous survey mapping, field datasheets, photos and notes including WONS priority areas where applicable.
  - Reviewing weed and bush regeneration records for the last year.
- Field Survey
  - MHQA transects are carried out at baseline survey locations,
  - Utilising the weed cover assessment methodology discussed in **Section 6.1**, inspect previously identified weeds infestations. Mapping of any new WONS infestation areas using GPS unit and quantify using weed cover transects.
  - Record WONS and all non-native flora species.
  - Provide photo monitoring at established locations to be set up in Year 1 of the offset with photo location and direction, and
  - Notes of any notable positive and/or negative changes in weed density and coverage.

9.5.5 Reporting

Details of any WONS treatment and photo monitoring will be detailed in the OAAR.

Milestone monitoring survey results will be reported by the suitably qualified person in the Year 5, 10, 15, and 20 Milestone Report and included in the ACR. This will provide detail on survey methodologies and detected predator abundance with reference to the baseline survey data.

9.5.6 Completion Criteria

Timing	Completion Criteria
Year 1	Initial treatment of existing WONS
Year 2 - 9	Continued treatment of existing WONS
Year 10 – 20	<ul style="list-style-type: none"> <li>• Maintain WONS at &lt;5% of the offset area for the life of the offset</li> <li>• Reduce all weeds to &lt;5% of the site</li> </ul>



## 9.6. Management Action 4 – Bushfire Management Plan

### 9.6.1 Justification

Fire management of the offset area is critical to achieving the intended outcomes and conservation gains over the management period. Managing the vegetation to promote natural regeneration and reduce the impacts of uncontrolled wildfire within the offset area will ensure management objectives are achieved. Uncontrolled wildfire is considered a key threat to Koala populations, with impacts inclusive of mortality, injury, and loss of or altered habitat resulting in a reduction in food source and potentially increased exposure to predators.

The management measures contained in this OMP will be used to assess baseline fuel loads and indicate management techniques and planning, specific to the offset area in the context of the surrounding landscape. The overall objective is to prevent fire-induced Koala mortality via targeted fuel hazard reduction and prescribed fire management. Managing the vegetation to promote natural regeneration and reduce the impacts of uncontrolled wildfire within the offset area will ensure management objectives are achieved.

Under current Queensland legislation, landowners are required to prepare and plan for bushfire hazards by being aware of fire management issues in the area, trimming trees, mowing grass, removing flammable material around the home, and clearing vegetation, particularly if land boundaries are shared with bushland. It is important to balance undertaking these activities and preventing harm to the natural environment and areas of cultural heritage. This can be achieved through property planning or preparing and implementing a land and water management system. Specific actions as directed by the local authorities must be implemented which may include prescribed burning or other techniques undertaken in consultation with the Queensland Rural Fire Brigade to manage fuel loads if required.

### 9.6.2 Proposed action

A specific BMP will be developed in accordance with relevant Queensland guidelines and endorsed by an experienced bushfire practitioner to reduce potential threats from fires to Koala. The BMP will assess baseline fuel loads and minimise risk of bushfires to Koalas or habitat. The BMP will expand points on wider fire management concepts.

The BMP will combine information from a variety of sources including land manager discussions, industry best practice, This OMP, as well as the following technical documents:

- Queensland Fire and Emergency Services. (2020). Queensland Bushfire Plan.
- Queensland Parks and Wildlife Services (QPWS) Bioregional Planned Burn Guidelines
  - Queensland Parks and Wildlife Service. (2022). Planned Burn Guidelines: Introductory Volume.
  - Queensland Parks and Wildlife Service. (2022). Planned Burn Guidelines: Southeast Queensland Bioregion of Queensland.
  - Queensland Parks and Wildlife Service. (2012). Planned Burn Guidelines - How to Assess if Your Burn is Ready to Go. [www.bom.gov.au](http://www.bom.gov.au)
  - Queensland Parks and Wildlife Service. (2012). QPWS Planned Burn Fire Behaviour Tables.
- Queensland Fire and Emergency Services. (2019). Bushfire Resilient Communities (BRC) Technical Reference Guide for the State Planning Policy State Interest "Natural Hazards, Risk and Resilience Bushfire.
- Australasian Fire Authorities Council (AFAC) National Burning Project.



- Queensland Fire and Biodiversity Consortium (2022). Burnett Mary Fire Management Guidelines

The BMP will include the following components, with further initial detail on some of these components in the below sections:

- Fire management for MNES: Description of fire management considerations for koala, including threats from inappropriate fire regimes.
- Bushfire hazards: A comprehensive landscape-scale assessment and historical review of the key factors characterising the area's bushfire risk, including fire weather, topography and fire history. Site fuel load assessment. A brief description of hazards on the Offset Property is provided in **Section 9.6.3** below.
- Operation fire management units (FMUs): outlining site fire management activities including but not limited to weed management, stock grazing and planned burning for fuel reduction and ecological management, access and fire break maintenance and habitat protection measures (further detailed in Section 9.6.3 below).
- Fire management plan: Provides a land management plan which outlines Fuel Management Units, including land management zones (including operational and site information).
- Monitoring and maintenance schedule: Describing an approach for adaptive management and monitoring to evaluate the effectiveness of fire management regimes and land management activities (monitoring methods outlined in **Section 9.6.5**).

#### Planned burns

Planned burns have been included as a bushfire management technique however it is not possible to provide a detailed plan of frequency of these events as they are driven by fuel hazard monitoring as detailed in the BMP and **Section 9.6.5**.

As a guide to burn frequency, the Queensland Department of Environment, Tourism, Science and Innovation (DETSI) provide fire management guidelines for RE12.9-10.2 which is the sole vegetation community across the Offset Site. A burn interval of 4 – 25 years is referenced with an aim for 40-60% mosaic burn. This high variability of burn frequency of RE12.9-10.2 highlights the challenges with providing a detailed burn regime. Planned burns will not occur at frequency intervals of less than 4 years as detailed in the fire management guidelines and dependent on outcomes of fuel hazard monitoring.

If results of the fuel load monitoring determine that a planned burn is required, then a plan will be put in place detailing the location/extent of the planned burn, the methods to be utilised and a photo log of pre/post burn conditions which will feed into the monitoring regime discussed in **Section 9.6.5**.

#### 9.6.3 Bushfire risk areas and potential ignition sources

##### External bushfire risk areas

The Offset Property is bordered on all sides by rural pastoral land. These surrounding land uses present potential pathways for bushfire to originate outside the Offset Property and enter the site, particularly under elevated fire weather conditions.

Higher external bushfire risk is associated with:

- North-western boundaries, where more continuous native vegetation connects to the Offset Property, increasing the potential for large landscape scale fires to enter the site.
- Boundaries with rural pastoral land where fire may originate from due to pasture management activities, machinery use or escaped planned burns; and



- Roadside corridors and access tracks adjoining or entering the Offset Property, which may act as ignition sources during periods of high fire danger.

#### Internal bushfire ignition sources

Potential sources of bushfire ignition within the Offset Property include:

- Escaped planned fire management activities, including ecological or hazard reduction burning.
- Operational activities, such as use of farm machinery and vehicle movements along internal tracks.
- Natural ignition sources, including lightning strikes, particularly along ridgelines and elevated areas; and
- Accumulated fine fuels, including grasslands, regrowth areas and edge interfaces between cleared land and remnant vegetation.

#### Bushfire hazard characteristics

Bushfire behaviour across the Offset Property is influenced by fuel, weather and topography. Fuel loads vary spatially and include heavily grazed areas, ungrazed grasslands, regenerating vegetation and wooded area. Areas of steeper terrain and woody vegetation, particularly along ridgelines and vegetated creek lines, present a higher potential bushfire intensity.

Much of the Offset Property is mapped as a Bushfire Prone Area under the State Planning Policy. Mapping indicates patches of Very High and High Potential Bushfire Intensity associated with woody vegetation on, with Medium Potential Bushfire Intensity generally occurring along vegetated drainage lines. Cleared areas with scattered regrowth are mapped as Potential Impact Buffers (**Insert 3**).

Existing access tracks and cleared areas provide opportunities for fire containment and suppression, subject to prevailing fire weather conditions and fire behaviour.

Fire management across the Offset Property will prioritise asset protection and prevention, with the offset values and restoration areas treated as critical assets requiring protection from high-intensity or unplanned fire.



*Insert 3: Fire hazard mapping across offset site*

#### 9.6.4 Fire access, breaks and water resources

##### Site access and fire management lines

The Offset Property contains an established network of internal access tracks and entry points that provide access for land managers and emergency services (**Plan 12**). These tracks also function as fire management lines, enabling fire suppression access and assisting in fire containment during bushfire events.

Existing 10 m wide fire breaks have already been established across the whole of the Kipper property as depicted in **Plan 12**. No further clearing for fire breaks is required. These fire breaks will be maintained for the life of the offset. Currently there are three water bores and three water storage tanks across the Offset Property.

##### Water resources and fire management infrastructure

The offset site currently has numerous water bores, dams and water storage tanks for use during firefighting and revegetation activities (Plan 12). These water sources may provide suitable access points for fire management vehicles and emergency services during bushfire suppression activities.

The approximate locations of existing water resources are identified to support fire response planning. Locations for temporary or permanent fire management infrastructure, including additional water tanks or equipment storage areas, will be further assessed and refined through the development of the BMP.

##### Protection of revegetation and rehabilitation areas

Fire management will specifically address the heightened vulnerability of developing revegetation and rehabilitation areas, which are at increased risk of damage from unplanned or high intensity fire, particularly during early establishment phases. Fire regimes will be designed to minimise the likelihood of fire impacting these areas until vegetation communities have sufficiently matured.

Protection of restoration areas is critical to achieving offset objectives and will be a key consideration in fire management planning, prioritisation of suppression response and selection of fuel management techniques.

##### Fuel management

It is acknowledged that the primary aim of the Offset Area is to manage habitat and food resources for MNES, therefore fuel management should be implemented as part of an integrated land management approach that aims to appropriately manage the offset site values and risk profile.

Prescribed low intensity burning as a bushfire management technique is widely employed and generally agreed upon as an effective means of reducing widespread and severe bushfire risk particularly when implemented in line with Indigenous cultural burning practices. The National Recovery Plan for Koala acknowledges the scope of impacts of prescribed burning on Koala population dynamics is not well understood. While the risk of wildfire can be reduced through prescribed burning regimes, it is acknowledged that the effectiveness of this is determined by the scale and severity of the bushfire, as exemplified by the 2019-2020 summer bushfires which affected areas that were considered low risk to bushfire.

Instead of conducting a full ecological burn through a larger area of the offset, low intensity hazard reduction burns can be undertaken to reduce the locally abundant fire fuel loads and in turn reducing the risk of a high intensity wildfire spreading throughout the offset. A hazard reduction action will be used around fire exclusion zones (i.e., revegetation zones) to reduce the risk of any fire spread into these areas.



While new research is emerging which supports the benefits of low intensity temporary grazing for the management of bushfire fuel loads and the broader benefits in avoiding the impacts of wildfire on conservation values. At the time of drafting this OMP the Department does not support even the temporary use of light grazing as a preferred bushfire load management tool when compared to traditional controlled burns. Therefore, cattle grazing will not occur within the offset area as detailed in this OMP. The offset provider is pursuing a property wide grazing plan separate to this OMP as a potential management action. Under no circumstances will cattle grazing occur within the offset area until such a time that a grazing plan is approved by the department.

#### 9.6.5 Monitoring

Monitoring of the Offset Area will be undertaken by the Offset Provider annually and as required to review access tracks, fire breaks, fuel loads and outcomes of controlled burns or other management techniques such as use of livestock. Fuel loads and bushfire breaks will be monitored annually by the Offset Provider as required depending on seasonal variation in fuel loads.

Monitoring and adaptive site management will be incorporated into the management of bushfire risk within the Offset Property to assess the effectiveness of management activities. Specifically, monitoring will occur prior to and after implementing planned burns. The adaptive management program may pose simple questions such as those provided below, or more complex assessment. For example:

- Was the fuel hazard reduced to the targeted level for the FMU?
- Did the management activity contribute to a fire regime that is maintaining offset targets and environmental values?
- Did target regrowth or planted canopy species of a specific size survive the management activity?

If the answer to these questions is no, then adjustments to the land management actions or schedule may need to be made. The fuel hazard, vegetation condition and fire management tracks will be comprehensively assessed annually, as well as periodically as part of regular property activity, and especially before the start of the bushfire season (August – November).

#### Fuel hazard monitoring

Fuel hazard monitoring within each FMU (or between FMUs with similar condition) will be used to identify triggers for implementing proposed fuel reduction measures including any rotational grazing and planned burns and evaluate the effectiveness of these measures. The Overall Fuel Hazard Assessment Guide (Hines et al., 2010) provides a quick and representative estimate of fuel hazard on site that will be used for ongoing fuel hazard monitoring to inform management intervention. The OFHAG methodology is based on the structure and availability of fuels within various strata categories (bark, elevated, near surface and surface) and is widely used by land managers across southeast Queensland.

Target fuel layer attributes for each FMU will be detailed in the BMP which will be based on the contribution to fire behaviour and the risk to recruiting Eucalypt trees. Fuel hazard monitoring will be undertaken annually, which will encompass pre and post bushfire management activities. These will be completed at the same location which will be GPS located.

#### Bushfire Audit

If a bushfire affects the offset site, a post-fire site audit will be undertaken once emergency response activities (if applicable) have concluded and it is safe to access the area. The purpose of the audit is to



confirm site safety, identify environmental and asset risks, and determine the actions required to stabilise and recover the habitat values within the site.

The bushfire audit will address the following at a minimum:

- Confirm site safety prior to works recommencing, including identification of unsafe areas, exclusion zones, and access restrictions.
- Inspect for fire-related hazards, such as unstable or fire-damaged trees, ash pits, weakened ground surfaces, damaged structures, and compromised services or utilities.
- Assess the extent and severity of fire impacts, including source of the fire, the distribution of burnt areas, loss of vegetation and ground cover, and evidence of soil exposure or heat damage.
- Review soil condition and erosion risk, with particular attention to slopes, areas of bare ground, and locations where ash or sediment could be mobilised during rainfall.
- Inspect waterways and drainage features, where present, to identify ash, debris, or sediment accumulation and potential impacts to water quality or drainage performance.
- Check for contamination or hazardous materials, including damaged fuel or chemical storage areas, burnt infrastructure materials, asbestos-containing debris, or other potential sources of pollution.
- Assess impacts to vegetation and habitat, including plant survival, natural regeneration potential, loss of fauna shelter, and increased weed or pest risk.
- Inspect site infrastructure and assets, such as access tracks, fences, culverts, erosion controls, signage, buildings, and hardstand areas, to identify damage and restoration needs.
- Identify and prioritise risks, distinguishing between immediate safety or environmental risks, short-term stabilisation requirements, and longer-term rehabilitation actions.
- Document findings and recommended actions, including photographs and summary notes, to support decision-making, recovery planning, and regulatory compliance.

The bushfire audit will provide recommendations for stabilisation and rehabilitation of the offset area including actions to reduce the risk of future bushfire events. Recommendations from the audit will be used to update the BMP and develop an offset area recovery plan to guide re-instatement of the offset area.

#### 9.6.6 Reporting

Implementation of the BMP will be reported annually by the Offset Provider in the MVOA Annual Report and will provide detail on maintenance and monitoring activities undertaken under the BMP such as maintenance of access tracks and fire breaks, records of seasonal fuel loads and outcomes of controlled burns or other management techniques such as use of livestock. Notes of any evidence of positive and/or negative changes will be recorded and documented. Annual monitoring and reporting is important to ensure any possible negative impacts are identified early and management processes are appropriately adapted to ensure conservation outcomes are achieved. Monitoring to occur 3-6 months post fire event or after the next wet weather event (whichever is sooner).

Bushfire audits will be completed once emergency response activities (if applicable) have concluded and it is safe to access the area. The audit, including recommended updates to the BMP, and a offset area recovery plan will be issued to DCCEEW within 3 months of the date of the audit.



### 9.6.7 Management Action Completion Criteria

Timing	Completion Criteria
<b>Year 1</b>	<ul style="list-style-type: none"> <li>• Develop BMP</li> <li>• Complete consultation with SRC and QRFS</li> </ul>
<b>Year 2 – 20</b>	<ul style="list-style-type: none"> <li>• Implement BMP</li> <li>• Monitor and maintain fire breaks and fuel loads within the offset area</li> <li>• Minimise risk of high intensity fires</li> <li>• Minimise risk of vegetation composition and restoration regime being negatively affected by prescribed burns</li> </ul>

### 9.6.8 Management Action Adaptive Management

Management actions to reduce the risk of bushfire impacts within the offset area include:

- Maintaining existing bushfire breaks between adjacent landholders in particular along the boundaries where the State Planning Policy bushfire hazard mapping indicates there is a 'high' or 'very high' risk of bushfire occurring (refer to **Insert 3**).
- Cooperating with the local QRFS, SRRC and adjoining landholders to minimise bushfire risk at a regional scale.
- Undertaking a feasibility assessment on insurance for plant stock replacement.

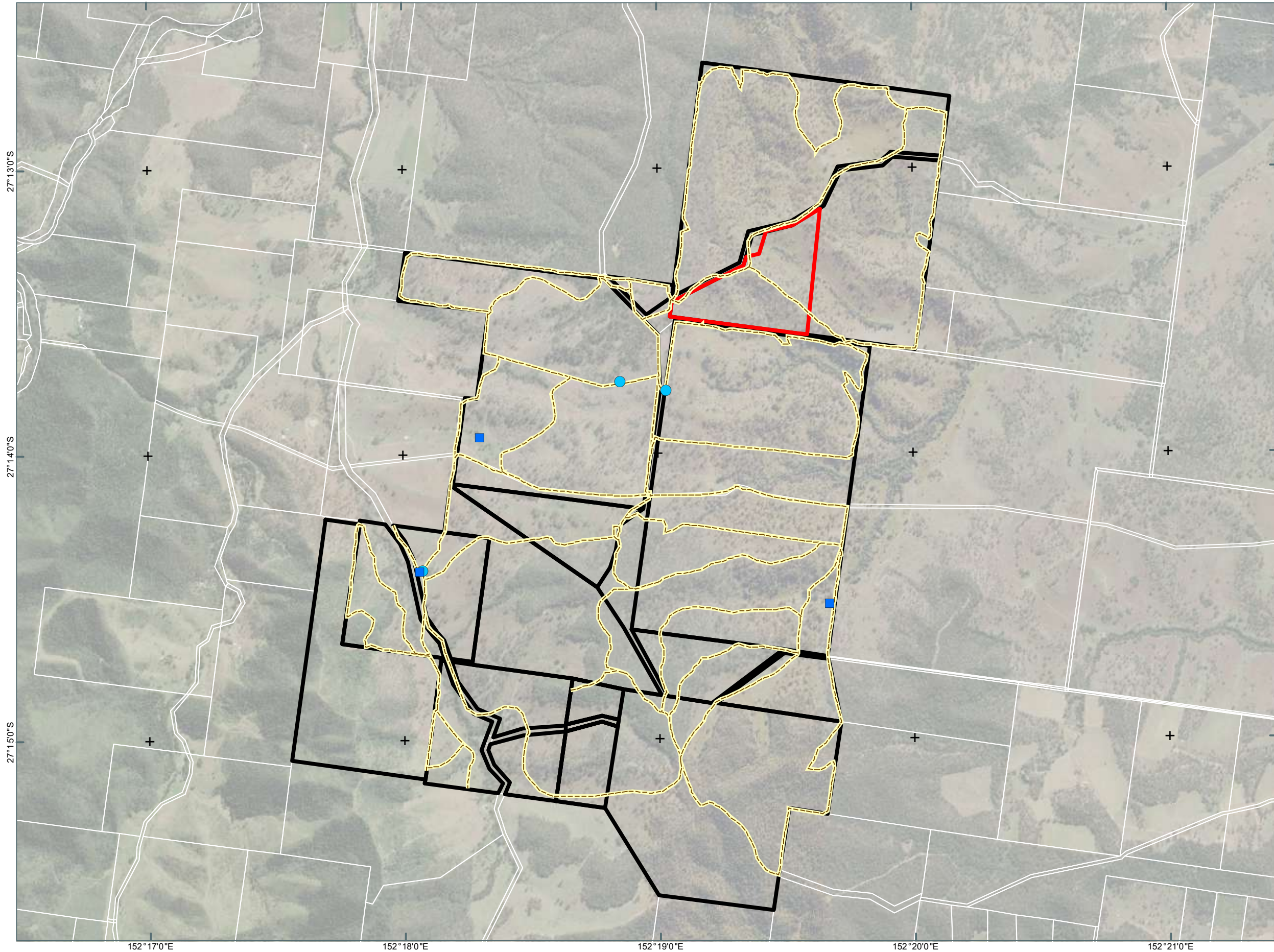
The overall assessment of bushfire risk is that their occurrence is unlikely within the life of the offset and consequences of such an event would be moderate. With intervention and management, bushfire is evaluated as a moderate risk to this offset project. Refer to **Appendix G** for more details.

In the event a bushfire does occur within the offset area, adaptive management will involve:

- The provision of additional rehabilitation works where bushfire has occurred and damage or losses to plantings has resulted.
- Review of the adequacy of risk management measures to determine factors that may have resulted in the bushfire occurring and an assessment of any other management measures that could be implemented to reduce the risk further.



# PLAN 12. BUSHFIRE MANAGEMENT



**Notes:**  
 The information on this plan is not suitable for any purpose other than the expressed use of the Client. Property dimensions, areas, numbers of lots and contours and other physical features may need verification if the development application is approved and development proceeds, and may change when a full survey is undertaken or in order to comply with development approval conditions. No reliance should be placed on the information on this plan for detailed design or for any financial dealings involving the land. Saunders Havill therefore disclaims any liability for any loss or damage whatsoever or howsoever incurred, arising from any party using or relying upon this plan for any purpose other than as a document prepared for the sole purpose of accompanying a development application and which may be subject to alteration beyond the control of Saunders Havill. Unless a development approval states otherwise, this is not an approved plan.

**Layer Sources**  
 Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community  
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 Updated data available at <http://qds.spatialinformation.qld.gov.au/catalogue/>  
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## LEGEND

- Qld DCDB
- Offset Property
- Proposed Offset Area [40.0 ha]
- Water Bores
- Water Tanks
- Access Tracks



## 9.7. Management Action 5 – Habitat creation and regeneration

### 9.7.1 Justification

Habitat creation and regeneration is a key management action that will improve existing habitat values within the proposed offset area and expand habitat values in areas that have been subject to weed infestation. In addition, regeneration is a Priority Management Action listed under “Habitat Loss, Disturbance and Modification” of the Conservation Advice for the Koala. Rehabilitation aims to enhance degraded areas through assisted natural regeneration and Management Action 3 which will continue to manage WONS. Assisted natural regeneration applies to areas where the native plant community is largely healthy and functioning or where native plant seed is still stored in the soil, can easily disperse from nearby natural areas, or be readily dispersed by animals. It is applied when limited human intervention, such as weed control, minor soil amelioration, fencing works or cessation of slashing etc., is enough to trigger the recovery process and natural regeneration. Planting occurs where necessary and does not interfere with natural process.

Management Actions 3 to 5 will work together to improve habitat quality through WONS management, bushfire management and native species establishment.

### 9.7.2 Locations

The entire offset area is considered as a single OMU as per **Section 9.2**. Key management actions across the proposed offset area will be relatively consistent based on existing values. Actions will include assisted natural regeneration practices to expand patches of regrowth and direct planting where cleared areas are present to assist in vegetation coverage and composition. **Table 60** summaries the management methods required at the proposed offset site. Indicative planting locations are provided in Plan 12 where existing vegetation cover is lacking.

**Table 60: Operational management unit rehabilitation method summary**

OMU	Description	Rehabilitation Method
<b>Non-remnant vegetation area (OMU 1)</b>	Discontinuous canopy vegetation	<ul style="list-style-type: none"> <li>• Assisted natural regeneration</li> <li>• Infill planting</li> <li>• Weed removal/control</li> <li>• Bushfire management</li> </ul>

On-ground works proposed within the OMU include are detailed below.

#### **Non-remnant vegetation area (OMU 1)**

- Implementation of rehabilitation techniques that aim to promote the regeneration of native vegetation and improve habitat values:
  - Infill planting of trees will occur by the end of Year 2 in areas show in **Plan 13** and where deemed necessary following primary site works. Follow up planting of shrubs, grasses and ground coves will be completed as required to meet environmental outcomes and interim targets.
  - Where natural regeneration is ineffective (i.e photo monitoring and milestone monitoring demonstrates limited evidence of growth compared with baseline results), seeding with



native endemic seeds will occur utilising species necessary to achieve the proposed MHQA uplifts.

- Assisted natural regeneration practices were weed treatment results in open areas – replanting with locally endemic species (infill planting as necessary).
- Removal of impediments to Koala movement such as old, unused fences (where present).
- Introduction of management practices which support and favour habitat increase (e.g. bushfire management)
- Maintain and manage the land for the life of the offset (20 years from the legal securement/implementation of the offset area), including direct monitoring of Koala usage.

### 9.7.3 Rehabilitation methodology

Following the resolution of site analysis and management areas as part of rehabilitation design, prioritising site works should be considered. Prior to site works commencing, the site should be secured from degrading impacts such as grazing by stock, unauthorised access and rubbish. Some factors that may require immediate attention include:

- The presence of highly invasive weed species which may disperse further prior to substantial site works commencing.
- The presence of weed species which may have a long-term impact on ecological communities such as exotic and weed varieties of vines.
- Flammable materials (including weed thickets, grasses and vines).
- Damaging and easy access by 4WD, motorbikes, and pedestrians into core retained vegetation and ecological restoration areas. This may require installation of temporary fencing if deemed appropriate.

Site works can be typically broken down into the following categories depending on the condition of the site prior to works commencing:

1. Primary Works
2. Follow-up Works
3. Maintenance Works

#### **1. Primary works**

Primary works, or initial works, within the site or a section of the site will commonly involve a sequence of activities such as the control of groundcover weeds, woody weeds in the understorey and exotic vines prior to the control of weed trees. Primary work has the effect of creating a large degree of disturbance which will stimulate the germination of native and exotic species. Therefore, continuing works should be scheduled shortly after the initial visit to allow for timely control of the newly regenerating weeds. Where present, highly invasive weeds should be treated as a priority during primary work in order to avoid invasion of newly disturbed areas. Some weeds will need to be treated in steps e.g., where weeded areas are being used by nesting birds or where the staged removal of canopy weed trees is required. Techniques used during primary work commonly involve spot spray, cut-scrape paint, cut-paint, scrape-paint, roll-hang and over spraying (source: SEQERF).

Following completion of weed management, rehabilitation such as assisted natural regeneration, construction, and fabrication planting can occur in areas unaffected by weed management activities or



areas where primary weed management activities have concluded. Direct planting will occur within areas with very little vegetation cover to assist in further promoting natural regeneration processes. At the end of primary work, the zone will have been comprehensively and systematically worked, ready for follow-up works.

## 2. Follow-up works

At intervals, which will vary according to the type of weed impacting the site and growing conditions, follow-up work will be necessary. This generally involves the spot-spraying of newly germinating weeds and re-sprouting sections of woody weeds and vines. It is at this stage that observational visits should be made to the site to assess the progress of vegetation regeneration and determine whether follow-up work is necessary. A site that receives poorly-timed, too frequent, or too little follow-up will rapidly experience setbacks, as weed propagules will quickly become established in the newly disturbed areas. Regular visual assessments are to occur approximately quarterly as determined by the offset provider.

Germinating native seedlings may be outcompeted by weeds or damaged by inexperienced operators thereby exhausting the seed bank. Unless adequate follow-up can be ensured when planning restoration works, there is little point in commencing primary work, as time and resources are consumed with no substantial gain achieved (source: SEQERF).

## 3. Maintenance works

By the maintenance stage, the vegetation community supports germination and establishment of native plant species and canopy formation. Weed density decreases as the native plants, which have been supported through restoration works, are able to out-compete the weed species. One of the fundamental principles of ecological restoration involves creating or re-establishing a self-sustaining ecosystem. Therefore, the underlying goal is that maintenance will progressively decrease. While this goal is not always possible due to factors such as the continual reintroduction of weed propagules to the site from adjoining properties, unfavourable seasons or significant weather events, persistent weed species, or global influences such as the enhanced greenhouse effect, it should always be strived for (source: SEQERF).

Maintenance works including minor, ongoing weed management and infill planting will be determined by on-going visual assessments of the offset area and results of milestone monitoring. All rehabilitation works are to be carried out by a suitably qualified bush regeneration contractor.

### Plant identification skills

Both native and weed species should be identified prior to primary weed removal works and ongoing throughout the follow-up and maintenance periods. This will maximise natural regeneration by reducing the likelihood of accidental weed spraying to native vegetation. Regenerating species are to be treated and maintained in a similar manner to planted tube stock. Where a contractor is unsure of species, advice should be sought from a botanist, specialist contractor, or confirmed with Queensland Herbarium. Refer to indicative Weed Treatment schedules derived from the *South East Queensland Ecological Restoration Framework: Manual* (2012) for an indication of weed species and treatments (refer **Table 59**).



### **Planting notes**

Areas subjected to weed removal and control may require infill planting (assisted natural regeneration) where lack of natural regeneration is evident. Prior to installation, the following items should be considered:

- Species selection;
- Sourcing plant material;
- Timing of planting;
- Site preparation;
- Planting density; and
- Planting installation.

### **Sourcing plant material**

There are several options for sourcing plant material for infill planting purposes. Propagation from site seed is a good outcome but is often limited by the required timing of works. Sourcing plants from local nurseries is the more commonly chosen option and has the following benefits:

- Awareness of genetic considerations when collecting seed;
- Experience with breaking dormancy mechanisms in hard to germinate seeds;
- Highly successful propagation techniques;
- Ability to provide high quality stock to order; and
- Draw on industry resources.

### **Timing of planting**

The timing of planting should ideally be aligned with the wet season in SEQ (Summer and Autumn). This minimises the need for intensive watering to establishment planting. Planting between February - May is the most beneficial as it generally avoids intense heat periods of summer. However, it is understood planting may occur at various times within rehabilitation areas due to development timing needs.

### **Site preparation**

Site or planting preparation includes:

- Fencing to exclude grazing animals and people (if required);
- Pre-spraying of exotic grasses and other weeds to planting areas;
- Consideration of source of water for new planting (access tracks, temporary irrigation);
- Arranging delivery of mulch, jute netting and tree guards (if required);
- Treatment of heavily compacted soils by ripping and or application of gypsum; and
- Soil amelioration as required.

### **Planting installation**

The following outlines the preferred installation methodology for revegetation works within the rehabilitation areas. It has been designed to maximise plant establishment success rates and minimise plant mortality. Revegetation works shall be either undertaken or directly supervised by an experienced



and qualified contractor. All works shall be in accordance with the provisions of this Offset Management Framework, and local government policies and Australian Standards.

Plant installation methods shall include:

- Plants are to be vigorous, well established, hardened off, consistent with species or variety, free from disease and insect pests, with large root systems and no evidence of having been restricted or damaged. The landscape coordinator has the right to inspect and reject stock prior to planting.
- Plants are to be planted immediately after delivery to the planting site.
- Excavate planting medium to a depth suitable for the installation of tube or pot specimens. In areas where planting substrate is deemed to be very poor (compacted, nutrient deficient, hydrophobic etc.) and above areas of potential frequent inundation and waterflow, topsoil may be used.
- Pre-water plant hole if soil is dry to decrease root stress upon planting and assess the infiltration of water through the soil.
- Place plant into hole and backfill ensuring that the plant is upright and the stem is not covered in any less than 10 millimetres (mm) or any more than 20 mm of planting medium.
- Planting should only occur when the ground is wet. If planting occurs in dry conditions, plants are to be watered thoroughly immediately after planting (ensure deep irrigation) and thereafter as guided by the suitable qualified bush regenerator. Creation of a concave hollow around the base of each plant will aid water infiltration to the plant roots.
- A complete, long-term slow-release fertiliser such as Nutricote or similar is recommended and will be administered appropriately during planting as guided by the bush regenerator. Topdressing with slow-release fertiliser is preferred to avoid toxic levels of fertiliser accumulating in the plant hole around the plant roots.
- Where considered suitable by the bush regenerator planting surfaces will be covered in:
  - a 100 mm layer of high-quality weed-free composted chip mulch (site mulch)- Note: to avoid possible stem rot in some 'drier' species ensure mulch is 'dished' and not covering plant stem by more than 20 mm. Where available, mulch material to be sourced from cleared vegetation material if adequately seasoned, or
  - Suitable individual anchored natural fibre weed mat (jute netting).
- A minimum 80% survival rate should be achieved. Noting that the requirements of species density and diversity is driven by the MHQA scoring metrics as defined in the environmental outcomes and interim targets.
- The offset site currently has numerous water bores, dams and water storage tanks for use during revegetation activities (**Plan 12**). Currently there are three water bores and three water storage tanks across the Offset Property.

### Indicative planting pallet

An indicative planting pallet has been provided as **Table 61** listing potential species utilised throughout the offset area where infill planting is required. This species list is referenced directly from the Bio-condition technical description of RE12.9-10.2. Not all species in **Table 61** will be utilised where planting occurs. Direct planting of trees will focus on species that are lacking from the offset area. For example, the offset area is dominated by *Corymbia citriodora* (Spotted Gum) with Ironbarks, *Eucalyptus crebra* (Narrow-



leaved Ironbark), *Eucalyptus siderophloia* (Grey Ironbark) and *Eucalyptus melanophloia* (Silver-leaved Ironbark) having been historically cleared for logging. The promotion of a diversity of species is required to achieve the proposed environmental outcomes.

Plantings will primarily include trees to allow time for establishment. Infill planting of shrubs and ground covers will occur as required to meet the interim targets and environmental outcomes specified in **Table 51**.

All trees in the T1 canopy layer will reflect Non-juvenile Koala Habitat Trees (NJKHTs). Primary food trees, preferred by Koala, have been designated with a (P)\*, whilst secondary food trees, still important food and shelter trees, are designated with a (S\*).

**Table 61: Indicative planting palette for RE12.9-10.2**

Scientific Name	Common Name	Plant Form	RE
<b>Trees</b>			<b>12.9-10.2</b>
<i>Corymbia citriodora</i> subsp. <i>Variegata</i> (S)*	Spotted Gum	T1/T2	✓
<i>Eucalyptus tereticornis</i> (P)*	Forest Red Gum	T1/T2	✓
<i>Eucalyptus crebra</i> (P)*	Narrow-leaved Iron Bark	T1/T2	✓
<i>Eucalyptus siderophloia</i> (P)*	Grey Ironbark	T1/T2	✓
<i>Eucalyptus moluccana</i> (S)*	Gum-topped Box	T1/T2	✓
<i>Eucalyptus major</i> (P)*	Grey Gum	T2	
<i>Angophora leiocarpa</i> (S)*	Smooth-barked Apple	T1/T2	✓
<i>Eucalyptus melanophloia</i> (S)*	Silver-leaved Ironbark	T2	✓
<i>Corymbia intermedia</i> (S)*	Pink Bloodwood	T2	✓
<i>Corymbia tessellaris</i> (S)*	Moreton Bay Ash	T1/T2	✓
<i>Allocasuarina torulosa</i>	Forest Sheoak	T2	✓
<i>Alphitonia excelsa</i>	Soap Tree	T2 / S1	✓
<i>Acacia disparrima</i>	Hickory Wattle	T2 / S1	✓
<b>Shrubs</b>			
<i>Pittosporum angustifolium</i>	Bitter Bush	S1	✓
<i>Acacia leiocalyx</i>	Early Flowering Wattle	S1	✓
<i>Acacia fimbriata</i>	Brisbane Wattle	S1	✓
<i>Denhamia cunninghamii</i>	Yellowberry Bush	S1	✓
<i>Acacia salicina</i>	Sally Wattle	S1	✓
<i>Jacksonia scoparia</i>	Dogwood	S1	✓



Scientific Name	Common Name	Plant Form	RE
<i>Hovea lorata</i>	Purple Pea Bush	S1	✓
<i>Persoonia sericea</i>	Silky Geebung	S1	✓
<b>Ground</b>			
<i>Cymbopogon refractus</i>	Barbed-wire Grass	G	✓
<i>Entolasia stricta</i>	Wiry Panic	G	✓
<i>Themeda triandra</i>	Kangaroo Grass	G	✓
<i>Imperata cylindrica</i>	Blady Grass	G	✓
<i>Heteropogon contortus</i>	Black-spear Grass	G	✓
<i>Eragrostis brownii</i>	Browns Love Grass	G	✓
<i>Dianella revoluta</i>	Blue-flax Lily	G	✓
<i>Eremophila debilis</i>	Winter Apple	G	✓
<i>Hardenbergia violacea</i>	Native Sarsaparilla	G	✓
<i>Desmodium rhytidophyllum</i>	Hairy Trefoil	G	✓
<i>Dichondra repens</i>	Kidney Weed	G	✓
<i>Hardenbergia violacea</i>	Native Sarsaparilla	G	✓
<i>Glycine tabacina</i>	Variable Glycine	G	✓
<i>Lomandra multiflora subsp. multiflora</i>	Multi-flowered Matrush	G	✓
<i>Lomandra longifolia</i>	Spiky-headed Mat-rush	G	✓

#### 9.7.4 Monitoring

##### Baseline surveys (completed)

- Detailed Offset Area-specific habitat quality assessment (Year 0) – Establishes baseline MHQA results

##### Years 1 - 3

- Annual photo point monitoring
- Quarterly (approximately) visual assessments and data sheets

##### Years 1 – 5 (infill planting)

- Quarterly monitoring for first year
- Bi-annual monitoring until year 5 or until plants have become established

##### Years 5, 10, 15 and 20

- Milestone monitoring (MHQA and weed mapping)



- Detailed habitat quality assessments (MHQA) and weed mapping completed by suitably qualified Ecologists replicating baseline surveys detailed in **Section 6.1** and summarised below.

### **Annual photo point monitoring**

To monitor Management Action 5, photo point monitoring and GPS locational and extent survey will be utilised. The coordinates of the initial photo monitoring will be recorded using the handheld GPS. Photo point monitoring will be undertaken annually at the same location and time of the year, before and after regeneration activities. Photo points will be the same directions (i.e North, South, East and West) to provide an assessment of regeneration values.

Photo monitoring for the first 3 years is considered suitable as the early stages of the offset is when significant works will occur including weed removal and direct plantings. The photos provide the baseline imagery to compare future photo point monitoring. A record of the photos will be maintained which includes:

- GPS coordinates of the photo point.
- Date, time and number of each photo.
- Direction in which the photo was taken (north, south, east and west).

### **Rehabilitation and regeneration monitoring – visual assessments**

The following elements will be noted on a field datasheet:

- Evidence of natural regeneration of native species.
- The presence of weeds within the rehabilitation extent.
- The average health of rehabilitation areas
- The average height of rehabilitation areas

### **Milestone monitoring**

The suitably qualified person as appointed by the Proponent will complete MHQA surveys before the end of Years 5, 10, 15, and 20 of the offset to assess against the interim milestones and environmental outcomes (see **Section 3** and **Table 51**). Milestone monitoring will replicate all surveys utilising the same methodologies as completed as part of the baseline survey and detailed in Section 6.

Milestone monitoring surveys will included:

- MHQA transects at baseline sampling locations and
- Detailed weed mapping.

### **Direct planting monitoring**

Where direct infill planting has occurred, the suitably qualified regeneration contractor will complete quarterly monitoring of planted stock for the first year and then bi-annually until Year 5 or until plants are established. The following data will be recorded during these periods:

- Photos of planting progress
- The success of planted stock (a physical count of alive plants in the ground, >80% survival rate required).
- The average health of planted stock.



- The average height of planted stock.
- Any additional remedial actions required

If photo monitoring, visual assessment and MHQA data indicates that natural regeneration is not occurring in line with interim targets (refer **Table 51**). Then infill planting will be utilised where specific attributes area lacking (i.e shrub species richness, forb species richness, etc). Additional infill planting can occur at any point during the life of the offset in response to interim targets.

#### 9.7.5 Reporting

- The Offset Provider is responsible for preparing and issuing Offset Area Annual Reports to the proponent within contracted timeframes for inclusion in the Approved Project Annual Compliance Report.
- Photo monitoring details and rehabilitation works progress reports will be prepared by the suitably qualified regeneration contractor and included in the OAAR.
- Milestone weed monitoring and MHQA survey results will be reported by the suitably qualified person in the 5, 10, 15 and 20 Year Milestone Report. This will provide detail on interim habitat quality targets (MHQA) and detected WONS and other weed presence with reference to the baseline survey data.
- Reporting, or a sample of, will be included in the relevant Annual Compliance Report.

#### 9.7.6 Completion Criteria

**Table 62: Management Action 5 completion criteria**

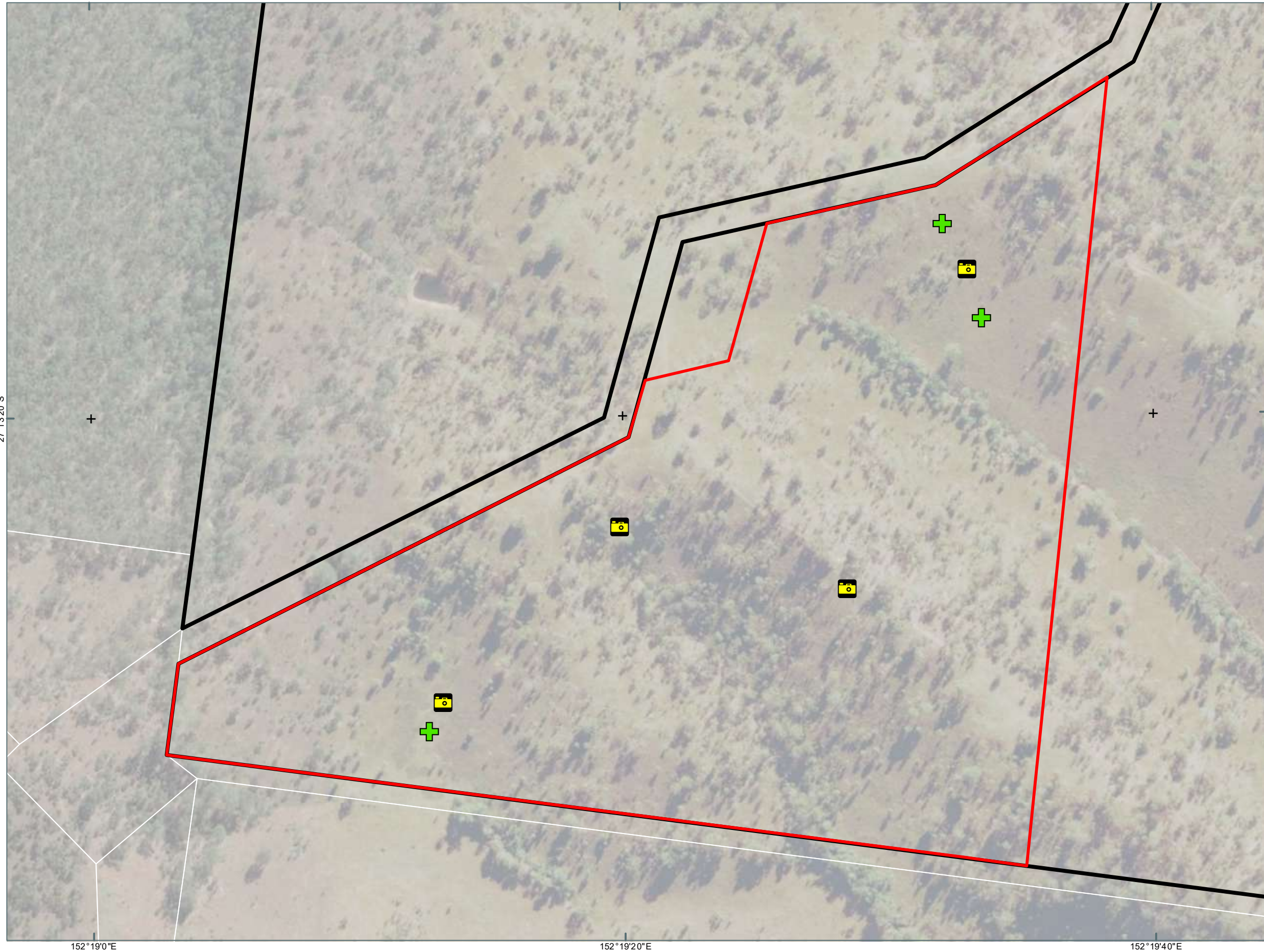
Timing	Completion Criteria
<b>Year 1 - 3</b>	<ul style="list-style-type: none"> <li>• Initial weed treatment and site preparation (excluding cattle)</li> <li>• Establish photo monitoring locations to monitor natural regeneration progress</li> </ul>
<b>Year 2</b>	<ul style="list-style-type: none"> <li>• Complete infill planting in areas of the offset area where existing vegetation cover is low in accordance with planting palette.</li> </ul>
<b>Years 3 - 20</b>	<ul style="list-style-type: none"> <li>• Infill planting proposed if interim targets not being met by milestone monitoring (Year 5, Year 10, Year 15, Year 20) or if natural regeneration not progressing though photo monitoring</li> <li>• Ensure 80% survival rate of any planting implemented (focusing on trees).</li> </ul>
<b>Years 5, 10, 15 and 20</b>	<ul style="list-style-type: none"> <li>• Vegetation meets interim targets and environmental outcomes detailed in <b>Table 51</b>.</li> <li>• Rehabilitated areas are established, regenerated and mapped as remnant vegetation under Queensland's <i>Vegetation</i></li> </ul>



*Management Act 1999 (VMA) successor legislation by Year 20 which requires 70% of canopy height and 50% of expected cover according to the relevant Regional Ecosystem benchmark to be reached.*



# PLAN 13. PROPOSED PLANTING AREAS AND INDICATIVE PHOTO MONITORING LOCATION



**Notes:**  
 The information on this plan is not suitable for any purpose other than the expressed use of the Client. Property dimensions, areas, numbers of lots and contours and other physical features may need verification if the development application is approved and development proceeds, and may change when a full survey is undertaken or in order to comply with development approval conditions. No reliance should be placed on the information on this plan for detailed design or for any financial dealings involving the land. Saunders Havill therefore disclaims any liability for any loss or damage whatsoever or howsoever incurred, arising from any party using or relying upon this plan for any purpose other than as a document prepared for the sole purpose of accompanying a development application and which may be subject to alteration beyond the control of Saunders Havill. Unless a development approval states otherwise, this is not an approved plan.

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 Updated data available at  
<http://qds.spatial.information.qld.gov.au/catalogue/>  
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## LEGEND

- Qld DCDB
- Offset Site Boundary
- Proposed Offset Area [40.0 ha]
- Indicative photo monitoring locations
- Indicative supplementary planting areas where existing vegetation cover is low

*\*Note: Potential for infill planting to occur across the entire offset area if interim targets are not being met through natural regeneration.*



## 9.8. Management Action 6 – Fencing and Signage

The proposed offset area will be suitably fenced and marked with signage to discourage trespassing and keep out cattle. Gates leading to the subject proposed offset area will have signage installed for added protection. Any internal fences that include barbed wire will also be retrofitted to further reduce threats to MNES.

The external boundary of Lot 112 on CA311003, where the offset area is located, will be fenced with fauna friendly fencing (refer to **Plan 14** for proposed offset area fencing and signage). The entirety of Lot 112 is planned as a future environmental offset area and therefore internal fencing is not proposed. Fauna friendly fencing are based on the following specifications:

- Top strand plain wire, and
- Bottom strand plain wire at a minimum 300 mm above ground.

A minimum gap of 300 mm from the ground to the bottom strand is considered suitable for Koala movement as detailed in Department of Environment and Science (Queensland) 2020, Koala-sensitive design guideline.

### 9.8.1 Monitoring and establishment

Fencing and signage will be installed in Year 1. Any internal fencing requiring retrofitting will be completed within Year 1. All fencing management and implementation works are the responsibility of the offset provider.

As part of general site management protocols, fencing is inspected on a quarterly basis (approximate) as a result of regular site monitoring by the offset provider. Increased frequency to occur following significant weather events or correspondence from neighbouring landowners at the discretion of the offset provider. Damaged fences will be rectified within 2 weeks of being identified.

### 9.8.2 Reporting

- The Offset Provider is responsible for preparing and issuing Offset Area Annual Reports to the proponent within contracted timeframes for inclusion in the Approved Project Annual Compliance Report.
- Details of installed/retrofitted fences will be detailed in the OAAR.

Reporting, or a sample of, will be included in the relevant Annual Compliance Report.

### 9.8.3 Completion criteria

Timing	Completion Criteria
<b>Year 1</b>	Fencing and signage will be installed in Year 1
<b>Year 2 – 20</b>	<ul style="list-style-type: none"> <li>• All fencing and signage has been installed, retrofitted and maintained for the life of the offset</li> <li>• Fencing enables Koala to move through the offset area and into surrounding land.</li> </ul>



Timing	Completion Criteria
	<ul style="list-style-type: none"> <li>If stock breaches or unauthorised access is observed, fencing is rectified within 2 weeks.</li> </ul>

## 9.9. Reporting requirements

An OAAR will be prepared by the Offset Provider for each year of the offset detailing management activities undertaken in accordance with the Management Framework and providing clear details on how performance targets specified in **Table 50** are being addressed and any adaptive management measures implemented. The OAAR will be provided to the Proponent and suitably qualified person preparing the **Annual Compliance Report (ACR)** one (1) month after each annual anniversary of the date of legal securement of the offset area (i.e. if the site is legally secured on 1 July 2025, year one ACR will be due before 1 Augst 2026, year two before 1 August 2027, etc.).

A **Milestone Report** is proposed to be completed by a suitably qualified person appointed by the Proponent 3 months after the completion of milestone surveys of Years 5, 10, 15, and 20 of the offset detailing how the offset is progressing against the interim milestones, key performance indicators and environmental outcomes specified in **Section 7** and **Table 24**. This will include an assessment of whether each environmental outcome has been or is likely to be achieved and advise of any circumstance/s which they consider is/are affecting the achievement of each outcome. The findings of each assessment will be documented and published within 3 months of the end of the relevant year of the offset in which the assessment is undertaken.

An ACR will be prepared in line with any conditions associated with EPBC approval. The OAAR and Milestone Reports will be included as part of the Annual Compliance Reports. The reporting period for the action will be the year following the commencement of the action.

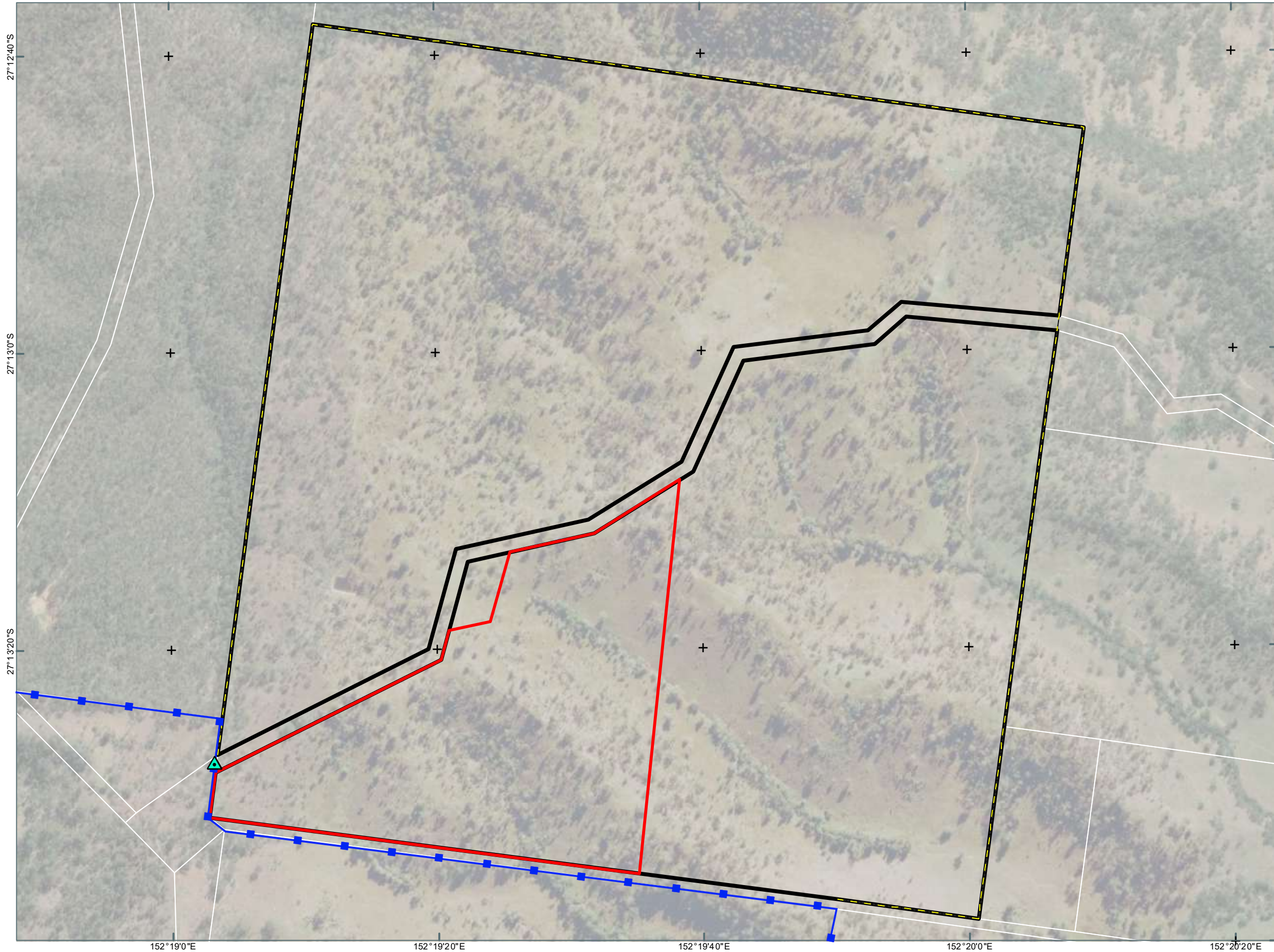
The ACR will be prepared by a qualified environmental person as directed by the Proponent and published on the project website each year by the conditioned date. The report will address the compliance with each of the conditions of approval, including any incident reports of undesirable impacts upon Koalas (i.e where corrective actions have been triggered as detailed in **Table 63**) and any monitoring and management milestones achieved during the previous 12 months, including progress on key management measures, attainment of performance targets and completion criteria, and adaptive implementation outcomes. The compliance report will also address the effectiveness of the management measures and how the proposed offset area is progressing against performance and completion criteria.

Documentary evidence providing proof of the date of publication of the ACR and non-compliance with any of the conditions of the approval will be provided to DCCEEW at the time of publishing the compliance report if the action is approved.

**Section 6** provides a monitoring and reporting schedule for the OMP. This includes the management action, monitoring actions, corrective action trigger, corrective action, reporting action and responsible person/party.



# PLAN 14. OFFSET AREA FENCING



**Notes:**  
 The information on this plan is not suitable for any purpose other than the expressed use of the Client. Property dimensions, areas, numbers of lots and contours and other physical features may need verification if the development application is approved and development proceeds, and may change when a full survey is undertaken or in order to comply with development approval conditions. No reliance should be placed on the information on this plan for detailed design or for any financial dealings involving the land. Saunders Havill therefore disclaims any liability for any loss or damage whatsoever or howsoever incurred, arising from any party using or relying upon this plan for any purpose other than as a document prepared for the sole purpose of accompanying a development application and which may be subject to alteration beyond the control of Saunders Havill. Unless a development approval states otherwise, this is not an approved plan.

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## LEGEND

- Qld DCDB
- Offset Site Boundary
- Proposed Offset Area [40.0 ha]
- Installed Fauna Friendly Fencing
- Future Fauna Friendly Fencing
- Future Gates and Offset Area Signage



## 9.10. Data Management

The Proponent, Offset Provider and engaged suitably qualified person appointed by the Proponent and/or Offset Provider will be responsible for the management of data, including interpretation, reporting and presentation. The Proponent will be responsible for the ownership, distribution and availability of data to the Department.



# 10. Adaptive Management

An adaptive implementation program will be used to ensure uncertainty is reduced over time, and that completion criteria are attained and maintained for the life of the offset. As more information becomes available following ongoing performance monitoring, the management and monitoring regime will be reviewed and revised to maximise the likelihood of attaining and maintaining the outcomes to be achieved by implementing the OMP. Any updates to the OMP which do not result in a material change to the environmental outcomes, performance and completion criteria will be made by the Offset Provider **KFF1 and/or The Proponent** without the requirement of approval from DCCEEW (however a copy of OMP changes will be sent to DCCEEW for record keeping). If material amendments likely to alter the environmental outcomes, or performance and completion criteria are proposed to the OMP, the amendments and justification for the contingency measures will be provided to DCCEEW in writing.

Adaptive management will be used to incorporate changes in any of the following areas:

1. Assimilation of new data or information - such as, updates to conservation advice or new threat abatement plans relevant to the Koala.
2. Project coordination and scheduling – to manage unforeseen disruptions to schedule such as inclement weather on contractor works for management actions and environmental consultant monitoring events.
3. Annual review of risks – to refresh the mitigation measures should new threats be identified or stochastic events such as unplanned fires or floods occur.
4. Annual review of management measure effectiveness – to increase the frequency or change the method of management actions where monitoring performance criteria are not met.
5. Contingency for unplanned incidents – such as stochastic events including unplanned fires or floods.

An audit of OMP completed every five (5) years with consideration to the areas identified above and will be directed by the Offset Provider and an appointed suitably qualified person by the proponent.

Changes to the management plan resulting from the adaptive management process will be reported to DCCEEW differently depending on whether they are minor, major or urgent. These are defined as:

- **Minor Change** – has no potential to alter any of the environmental outcomes or completion criteria specified in the management plan. A notification will be provided to DCCEEW at least 10 business days prior to the change occurring.
- **Major Change** – has potential to alter the environmental outcomes or completion criteria specified in the management plan. A notification requesting approval for the change will be provided to DCCEEW prior to the change occurring.
- **Urgent Change** – actions that are required to be taken to address an urgent matter. Changes will be implemented immediately at the direction of a suitably qualified expert with notification sent to DCCEEW as soon as practical but no more than 10 business days after the change occurs. An example of an urgent change could be an increase in buffers or removal of understorey vegetation in response to an intense bushfire.

The notification for any change will be accompanied by documentation addressing at a minimum:



- A description of the proposed change including identification of specific management measures to be altered and how the changes will be implemented.
- Target outcomes of the proposed change including alterations to environmental outcomes or completion criteria if applicable.
- Proposed monitoring regime to demonstrate the outcomes of the change.
- Future reporting requirements with monitoring outcomes to be provided to DCCEE no more than 6 months after the commencement of the change.
- If the target outcomes have not been achieved reporting must include response actions and ongoing monitoring requirements.

Once the target outcomes have been achieved notification will be provided to DCCEE stating that the change will be permanently included in the management plan. The changed management measure will continue to be monitored as part of general compliance reporting unless otherwise specified.

In the case of an urgent change notification and documentation may be provided retrospectively.

## 10.1. Uncertainty

The plan identifies and manages uncertainty. To this end the plan specifies:

- a) key data/information used to formulate the plan;
- b) the limitations and/or uncertainty associated with the use of that data/information;
- c) the risks that limitation and/or uncertainty represents for plan failure; and
- d) how limitations and/or uncertainty, and associated risks, are mitigated during plan implementation. For example, where a margin of safety is applied to management measures until uncertainty is reduced to an acceptable level or performance targets/completion criteria are attained/maintained.

To identify and manage uncertainty, the OMP used regulatory and policy context to formulate the plan, listed below.

### 10.1.1 Regulatory and policy context

This document has been prepared taking into account the following technical guidelines and legislation:

- National Recovery Plan for the Koala *Phascolarctos cinereus* (combined populations of Queensland, New South Wales and the Australian Capital Territory) (DAWE 2022)
- EPBC Act environmental offsets policy (Department of Sustainability, Environment, Water, Population and Communities, 2012);
- EPBC Act Environmental Management Plan Guidelines (DoEE, 2014)
- Policy Statement: Advanced environmental offsets under the *Environment Protection and Biodiversity Conservation Act 1999*;
- *Vegetation Management Act 1999* (legally securing the offset through a Voluntary Declaration under Section 19F);
- Queensland *Environmental Offsets Act 2014*; and
- Queensland *Environmental Offsets Regulation 2014*.



## 10.2. Risk of Failure

The plan assesses the risk of failure to achieve the plan's performance targets and/or completion criteria. To this end the plan:

- a) states the plan's performance targets and/or completion criteria;
- b) identifies events or circumstances that prejudice attainment/maintenance of performance targets and/or completion criteria. The events or circumstances must address scientific/ecological uncertainty, stochastic events and legal/land use planning factors that may represent risks;
- c) includes a qualitative assessment of the likelihood and consequence of those events or circumstances, and the residual risk of failure to achieve those criteria due to identified events or circumstances (*assuming management measures will be implemented*);
- d) characterises risk as low, medium, high or severe, and derived from likelihood (highly likely, likely, possible, unlikely, rare) and consequence (minor, moderate, high, major and critical); and
- e) outlines how consequence, likelihood and risk level for each risk have been determined.

To identify the risk of failure, **Table 63** states the management action, completion criteria, corrective action triggers and corrective actions. In addition, a risk assessment has been completed in **Appendix G**.



**Table 63: Risk of failure table and corrective actions**

Action	Completion Criteria	Corrective Action Trigger	Corrective Action
<b>Legally secure the offset area</b>	<ul style="list-style-type: none"> <li>The offset area is legally secured for conservation via a suitable method such as a VDEC process administered under the Queensland VMA or a covenant under the <i>Land Act 1994</i> or <i>Land Titles Act 1994</i> prior to the impacts occurring</li> <li>The Department is notified of the legal securement within 5 business days of commencing the implementation of the OMP <i>i.e.</i>, the date from which the offset area is legally secured.</li> <li>The offset area is not used for other purposes – site access is restricted.</li> </ul>	Offset area is not legally secured.	The offset area is legally secured prior to any impacts occurring.
<b>Non-Native Vertebrate Pest Management</b>	<ul style="list-style-type: none"> <li>Feral animals suppressed within the offset area to &lt;10% of the Relative Abundance Index (RAI). Priority wild dogs.</li> </ul>	<p>Feral animal management is not implemented and/or evidence of predation on Koalas is observed.</p> <p>Monitoring actions and OAARs identify ongoing presence of predator pest species.</p> <p>Monitoring actions and OAARs show no decrease in non-native</p>	<p>Implement supplementary control measures, increase frequency of control events or other management actions as recommended by suitably qualified pest contractor within 3 months of a monitoring event where non-native predator detection has not decreased from baseline.</p>



Action	Completion Criteria	Corrective Action Trigger	Corrective Action
		<p>predators from the previous survey (or &lt;10% of the RAI)</p> <p>Monitoring actions and OAARs detect an increase in non-native predators from the previous survey or relative to the baseline.</p>	<p>Where there is evidence of non-native predator activity, a trapping or baiting program by a suitably qualified contractor will be conducted within 3 months of detection.</p> <p>Risk management, corrective actions and adaptive management are to be integrated as required throughout the offset management period in response to changes or natural events.</p> <p>If performance criteria are not achieved by the timeframes outlined, the corrective actions will continue until achieved, extending the management period.</p>
<p><b>WONS management</b></p>	<ul style="list-style-type: none"> <li>WONS weed cover is currently at &lt;5% of the offset area. The management actions must maintain WONS weed cover at &lt;5% of the offset area for the life of the offset (20 years).</li> </ul>	<p>Weed cover has increased to &gt;5% of the offset area.</p> <p>The extent of WONS has not been maintained as required to reach the environmental outcome as identified in the OAARs and Milestone Reports.</p>	<p>Weed control program to be expanded/adapted to improve outcomes within 6 months following a monitoring event where the WONS extent has not been maintained &lt;5% of the offset area.</p> <p>Risk management, corrective actions and adaptive management are to be integrated as required throughout the offset management</p>



Action	Completion Criteria	Corrective Action Trigger	Corrective Action
<b>Bushfire management</b>	<ul style="list-style-type: none"> <li>• Implement BMP</li> <li>• Monitor and maintain fire breaks and fuel loads within the offset area</li> <li>• Minimise risk of high intensity fires</li> <li>• Minimise risk of vegetation composition and restoration regime being negatively affected by prescribed burns</li> </ul>	<p>Bushfire management measures not implemented and/or a high intensity bushfire impacts the offset area.</p> <p>Unexpected bushfire event and resurgence of weeds/decreased habitat.</p>	<p>period in response to changes or natural events.</p> <p>If key milestones and performance criteria are not achieved by the timeframes outlined in <b>Table 4</b> and <b>Table 51</b>, the corrective actions will continue until achieved, extending the management period.</p> <p>Undertake audit to inspect impacts within 2 weeks or within 2 weeks from when the site is deemed safe.</p> <p>Following annual monitoring of fuel loads, implement actions as directed by the local authority which may include prescribed burning or other techniques undertaken in consultation with the Queensland Rural Fire Brigade to manage fuel loads within 6 months or as soon as appropriate (<i>i.e.</i>, consider weather conditions).</p> <p>If required, recovery actions including weed control and management and/or infill planting may be undertaken to ensure the habitat quality performance criteria are achieved within the management period within 6</p>



Action	Completion Criteria	Corrective Action Trigger	Corrective Action
<b>Habitat creation and regeneration management</b>	<ul style="list-style-type: none"> <li>Rehabilitated areas are established, regenerated and mapped as remnant vegetation under Queensland’s VMA successor legislation by Year 20, which requires 70% of canopy height and 50% of expected cover according to the relevant Regional Ecosystem benchmark to be reached.</li> <li>Site condition metrics for Koala improves in accordance with environmental outcomes (see <b>Section 3</b> and <b>Table 51</b>).</li> </ul>	<p>Regeneration measures not implemented as proposed; site condition metrics do not improve according to proposed environmental outcomes.</p> <p>OAARs indicate that the rate of plant stock failure is greater than 10%.</p> <p>Habitat does not achieve performance criteria as identified in Milestone Reports within the management period, implement corrective actions.</p>	<p>months following an audit if weather conditions are favourable.</p> <p>Risk management, corrective actions and adaptive management are to be integrated as required throughout the offset management period in response to changes or natural events.</p> <p>Infill planting will be implemented if required within 12 months following MHQA survey intervals. Monitoring of infill planting to occur quarterly for first year and then bi-annually until establishment.</p> <p>Requirements for watering schedules (depending on rainfall), weed control, fertilizer, amelioration or other management actions will be implemented as required to enhance success rate and stimulate tree growth and establishment.</p> <p>Risk management, corrective actions and adaptive management are to be integrated as required throughout the offset management</p>



Action	Completion Criteria	Corrective Action Trigger	Corrective Action
<b>Fencing and Signage</b>	<ul style="list-style-type: none"> <li>▪ All fencing and signage has been installed, retrofitted and maintained for the life of the offset</li> <li>▪ Fencing enables Koala to move through the offset area and into surrounding land.</li> <li>• If stock breaches or unauthorised access is observed, fencing is rectified within 2 weeks.</li> </ul>	<p>fencing or signage not installed or retrofitted or monitoring by offset provider (approximately quarterly) identifies fencing causing Koala injury, stock breaches, or other unauthorised access.</p>	<p>period in response to changes or natural events.</p> <p>The management period may be extended to ensure environmental outcomes are able to be achieved.</p> <p>Fencing is rectified within 2 weeks of corrective action being recorded.</p> <p>Fencing is repaired and alternative signage and fencing solutions are considered if needed.</p>



### 10.3. Limitations

Although an adaptive management plan will be implemented across the offset area for life of the offset (20 years), potential limitations to achieving these include:

- Associated risks and uncertainty in predicting the occurrence and extent of natural disasters or extreme weather events, including drought and flooding.
- Uncertainty of the rate at which vegetation will re-establish.
- The ability of native fauna (*i.e.*, Koala) to recognise and utilise the site.
- Uncertainty of future predator occurrence and the effectiveness of the pest management measures.
- Coordinated approaches between local governments and the offset area holder to ensure effective implementation of management plans.

The implementation of adaptive management measures will ensure that identified limitations are avoided and/or the subsequent impacts are mitigated where possible. The promotion of suitable habitat on-site through implementing the various management actions, along with the continuous monitoring of abundance, will assist in species utilisation of the site.

Further, the review of this OMP, inclusive of the management actions and monitoring methodologies detailed within it, will assist in identifying areas requiring improvement, as well as identify methodology that has been successful. The success or required amendments to the management plans or works on-site will be assessed during the completion of the ACR as required under the EPBC Approval.

To ensure progress towards environmental outcomes and completion criteria is assessed correctly the baseline surveys have been developed to be repeatable and provide the data required for comparison against the completion criteria. Surveys are to be repeated in the same manner and location as practicable throughout the management period to ensure a consistent approach and accurate representation of the conservation values within the proposed offset area.



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# 12. Appendices

## Appendix A

Impact Area – MHQA (Koala) results

## Appendix B

Offset Area – MHQA (Koala) baseline results and raw data

## Appendix C

Offset Area – Raw Weed Mapping data

## Appendix D

RE12.9-10.2 technical description (Ryan 2001)

## Appendix E

Offset Area – Baseline Raw SAT Data

## Appendix F

Offset Assessment Guide Calculator Results and Justification

## Appendix G

Risk Assessment



# Appendix A

## Impact Area – MHQA (Koala) results



Assessment Unit - Regional Ecosystem	AU 1 - Remnant (RE12.11.3)					
	RE12.11.3 Benchmark	Transect 1	Transect 2	Average of Transect(s)	% Benchmark	Score
<b>SITE CONDITION</b>						
Recruitment of woody perennial species in EDL	100	100	100	100.00	100.00	5
Native plant species richness - trees	6	12	11	11.50	191.67	5
Native plant species richness - shrubs	12	6	4	5.00	41.67	2.5
Native plant species richness - grasses	4	3	2	2.50	62.50	2.5
Native plant species richness - forbs	21	13	9	11.00	52.38	2.5
Tree canopy height (Canopy)*	25	19	22	20.50	82.00	5
Tree canopy height (Sub-canopy)*	10	8	11	9.50	95.00	5
				<b>*Average tree canopy height</b>		5
Tree canopy cover (Canopy)**	72	77.5	74.1	75.8	105.28	5
Tree canopy cover (Sub-canopy)**	17	35.6	26.8	31.2	183.53	5
				<b>**Average tree canopy cover</b>		5
Shrub canopy cover	21	11.6	4.9	8.25	39.29	3
Native grass cover*	16	13	23	18.00	112.50	5
Organic litter*	76	57	65	61.00	80.26	5
Large trees (euc plus non-euc) (per ha)	45	14	6	10.00	22.22	5
Coarse woody debris (per ha)	370	11.4	22.4	16.90	4.57	0
Non-native plant cover	0	70	60	65.00	65.00	0
Quality and availability of food and foraging habitat	NA	10	10	10.00	-	10
Quality and availability of shelter	NA	10	10	10.00	-	5
				<b>Site Condition Score (/100)</b>		60.5
				<b>Overall Site Condition Score - out of 3</b>		1.82
<b>SITE CONTEXT</b>						
Size of patch	10					10
Connectedness	5					2
Context	5					5
Ecological Corridors	6					6
Role of site location to species overall population in the state	5					5
Threats to the species	15					7
Species mobility capacity	10					7
				<b>Site Context Score (/56)</b>		42
				<b>Overall Site Context Score - out of 3</b>		2.25
<b>SPECIES STOCKING RATE</b>						
Koala Stocking Rate (utilising SSR & SSR Supplementary Table(s))	70	55	55	55		40
				<b>Species Stocking Rate Score (/70)</b>		40.00
				<b>Overall Species Stocking Rate Score - out of 4</b>		2.29
				<b>Overall Assessment Unit Score</b>		6.35



## Impact area Koala species stocking rate results – Assessment Unit 1

<b>Species Stocking Rate attributes</b>	
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	10/10
Species usage of the site (habitat type and evidenced usage)	15/15
Approximate density (per ha)	10/30
Role/importance of the species population on site*	5/30
<b>Total Species Stocking Rate Score</b>	<b>40/70</b>
<b>Species Stocking Rate Score – out of 4</b>	<b>2.29</b>

<b>*Species Stocking Rate supplementary table attributes</b>	
Key source population for breeding	0/10
Key source population for dispersal	5/5
Necessary for maintaining genetic diversity	0/15
Near the limit of the species range	0/15



Assessment Unit - Regional Ecosystem	AU 2 - Regrowth (RE12.11.10)				
	RE12.11.10 Benchmark	Transect 3	Average of Transect(s)	% Benchmark	Score
<b>SITE CONDITION</b>					
Recruitment of woody perennial species in EDL	100	100	100.00	100.00	5
Native plant species richness - trees	25	6	6.00	24.00	0
Native plant species richness - shrubs	23	8	8.00	34.78	2.5
Native plant species richness - grasses	1	1	1.00	100.00	5
Native plant species richness - forbs	35	7	7.00	20.00	0
Tree canopy height (Canopy)*	22	0	0.00	0.00	0
Tree canopy height (Sub-canopy)*	8	9	9.00	112.50	5
<b>*Average tree canopy height</b>					<b>2.5</b>
Tree canopy cover (Canopy)**	64	0	0	0.00	0
Tree canopy cover (Sub-canopy)**	47	70	70	148.94	5
<b>**Average tree canopy cover</b>					<b>2.5</b>
Shrub canopy cover	29	2.4	2.40	8.28	0
Native grass cover*	15	0	0.00	0.00	0
Organic litter*	54	34	34.00	62.96	5
Large trees (euc plus non-euc) (per ha)	88	4	4.00	4.55	5
Coarse woody debris (per ha)	705	820	820.00	116.31	5
Non-native plant cover	0	70	70.00	70.00	0
Quality and availability of food and foraging habitat	NA	1	1.00	-	1
Quality and availability of shelter	NA	5	5.00	-	1
<b>Site Condition Score (/100)</b>					<b>34.5</b>
<b>Overall Site Condition Score - out of 3</b>					<b>1.04</b>
<b>SITE CONTEXT</b>					
Size of patch	10	10	10		10
Connectedness	5	4	4		2
Context	5	4	4		5
Ecological Corridors	6	6	6		6
Role of site location to species overall population in the state	5	5	5		5
Threats to the species	15	7	7		7
Species mobility capacity	10	7	7		7
<b>Site Context Score (/56)</b>					<b>42</b>
<b>Overall Site Context Score - out of 3</b>					<b>2.25</b>
<b>SPECIES STOCKING RATE</b>					
Koala Stocking Rate (utilising SSR & SSR Supplementary Table(s))	70				30
<b>Species Stocking Rate Score (/70)</b>					<b>30.00</b>
<b>Overall Species Stocking Rate Score - out of 4</b>					<b>1.71</b>
<b>Overall Assessment Unit Score</b>					<b>5.00</b>



Impact area Koala species stocking rate results – Assessment Unit 2

<b>Species Stocking Rate attributes</b>	
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	10/10
Species usage of the site (habitat type and evidenced usage)	5/15
Approximate density (per ha)	10/30
Role/importance of the species population on site*	5/30
<b>Total Species Stocking Rate Score</b>	<b>30/70</b>
<b>Species Stocking Rate Score – out of 4</b>	<b>1.71</b>

<b>*Species Stocking Rate supplementary table attributes</b>	
Key source population for breeding	0/10
Key source population for dispersal	5/5
Necessary for maintaining genetic diversity	0/15
Near the limit of the species range	0/15



Assessment Unit - Regional Ecosystem	AU 3 - Non-remnant (RE12.11.3)				
	RE12.11.3 Benchmark	Transect 4	Average of Transect(s)	% Benchmark	Score
<b>SITE CONDITION</b>					
Recruitment of woody perennial species in EDL	100	100	100.00	100.00	5
Native plant species richness - trees	6	6	6.00	100.00	5
Native plant species richness - shrubs	12	3	3.00	25.00	2.5
Native plant species richness - grasses	4	1	1.00	25.00	2.5
Native plant species richness - forbs	21	4	4.00	19.05	0
Tree canopy height (Canopy)*	25	0	0.00	0.00	0
Tree canopy height (Sub-canopy)*	10	7	7.00	70.00	3
*Average tree canopy height					1.5
Tree canopy cover (Canopy)**	72	0	0	0.00	0
Tree canopy cover (Sub-canopy)**	17	18.2	18.2	107.06	5
**Average tree canopy cover					2.5
Shrub canopy cover	21	5.4	5.40	25.71	3
Native grass cover*	16	1	1.00	6.25	0
Organic litter*	76	0	0.00	0.00	0
Large trees (euc plus non-euc) (per ha)	45	0	0.00	0.00	0
Coarse woody debris (per ha)	370	0	0.00	0.00	0
Non-native plant cover	0	90	90.00	90.00	0
Quality and availability of food and foraging habitat	NA	1	1.00	-	1
Quality and availability of shelter	NA	1	1.00	-	1
<b>Site Condition Score (/100)</b>					<b>24</b>
<b>Overall Site Condition Score - out of 3</b>					<b>0.72</b>
<b>SITE CONTEXT</b>					
Size of patch	10	10	10		10
Connectedness	5	4	4		2
Context	5	4	4		5
Ecological Corridors	6	6	6		6
Role of site location to species overall population in the state	5	5	5		5
Threats to the species	15	7	7		7
Species mobility capacity	10				7
<b>Site Context Score (/56)</b>					<b>42</b>
<b>Overall Site Context Score - out of 3</b>					<b>2.25</b>
<b>SPECIES STOCKING RATE</b>					
Koala Stocking Rate (utilising SSR & SSR Supplementary Table(s))	70	55	55		30
<b>Species Stocking Rate Score (/70)</b>					<b>30.00</b>
<b>Overall Species Stocking Rate Score - out of 4</b>					<b>1.71</b>
<b>Overall Assessment Unit Score</b>					<b>4.68</b>



## Impact area Koala species stocking rate results – Assessment Unit 3

<b>Species Stocking Rate attributes</b>	
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	10/10
Species usage of the site (habitat type and evidenced usage)	5/15
Approximate density (per ha)	10/30
Role/importance of the species population on site*	5/30
<b>Total Species Stocking Rate Score</b>	<b>30/70</b>
<b>Species Stocking Rate Score – out of 4</b>	<b>1.71</b>

<b>*Species Stocking Rate supplementary table attributes</b>	
Key source population for breeding	0/10
Key source population for dispersal	5/5
Necessary for maintaining genetic diversity	0/15
Near the limit of the species range	0/15



# Appendix B

Offset Area – MHQA (Koala) baseline results and raw data



Assessment Unit - Regional Ecosystem	AU 1 - 12.9-10.2 (non-remnant)					
	RE12.9-10.2 Benchmark	Transect 1	Transect 2	Average of Transect(s)	% Benchmark	Score
<b>SITE CONDITION</b>						
Recruitment of woody perennial species in EDL	100	100	100	100	100	5
Native plant species richness - trees	6	4	4	4	66.67	2.5
Native plant species richness - shrubs	7	3	3	3	42.86	2.5
Native plant species richness - grasses	7	5	8	6.5	92.86	5
Native plant species richness - forbs	13	2	4	3	23.08	0
Tree canopy height (Canopy)*	21	8	14	11	52.38	3
Tree canopy height (Sub-canopy)*	12	6	6	6	50.00	3
					<b>*Average tree canopy height</b>	<b>3</b>
Tree canopy cover (Canopy)**	64	2.6	11.8	7.2	11.25	2
Tree canopy cover (Sub-canopy)**	20	6.4	11.7	9.1	45.25	2
					<b>**Average tree canopy cover</b>	<b>2</b>
Shrub canopy cover	6	0	1.1	0.6	9.17	0
Native grass cover*	21	67	75	71.0	338.10	5
Organic litter*	48	6	9	7.5	15.63	3
Large trees (euc plus non-euc) (per ha)	38	2	10	6.0	15.79	5
Coarse woody debris (per ha)	506	105	282.5	193.8	38.29	2
Non-native plant cover	0	20	10	15.0	15.00	5
Quality and availability of food and foraging habitat	NA				-	5
Quality and availability of shelter	NA				-	5
					<b>Site Condition Score (/100)</b>	<b>50</b>
					<b>Overall Site Condition Score - out of 3</b>	<b>1.50</b>
<b>SITE CONTEXT</b>						
Size of patch	10			10		10
Connectedness	5			4		4
Context	5			5		5
Ecological Corridors	6			0		0
Role of site location to species overall population in the state	5			5		5
Threats to the species	15			7		7
Species mobility capacity	10			7		10
					<b>Site Context Score (/56)</b>	<b>41</b>
					<b>Overall Site Context Score - out of 3</b>	<b>2.20</b>
<b>SPECIES STOCKING RATE</b>						
Koala Stocking Rate (utilising SSR & SSR Supplementary Table(s))	70					40
					<b>Species Stocking Rate Score (/70)</b>	<b>40.00</b>
					<b>Overall Species Stocking Rate Score - out of 4</b>	<b>2.29</b>
<b>Overall Assessment Unit Score</b>						<b>5.98</b>



<b>Species Stocking Rate attributes</b>	
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	10/10
Species usage of the site (habitat type and evidenced usage)	15/15
Approximate density (per ha)	10/30
Role/importance of the species population on site*	5/30
<b>Total Species Stocking Rate Score</b>	<b>40/70</b>
<b>Species Stocking Rate Score – out of 4</b>	<b>2.29</b>

<b>*Species Stocking Rate supplementary table attributes</b>	
Key source population for breeding	0/10
Key source population for dispersal	5/5
Necessary for maintaining genetic diversity	0/15
Near the limit of the species range	0/15



# Appendix C

## Offset Area – Raw Weed Mapping data



**Transect 1 – Weed Cover**

Distance (m)			
Start	End	Interval (m)	Dominant Species Coverage
0	3.5	3.5	<i>Sporobolus sp.</i> (Giant Rat's Tails Grass)
3.5	22.2	18.7	Native Grasses*
22.2	23.4	1.2	<i>Melinis repens</i> (Red Natal Grass)
23.4	40.9	17.5	Native Grasses*
40.9	48.6	7.7	<i>Melinis repens</i> (Red Natal Grass)
48.6	55.6	7	Native Grasses*
55.6	58.9	3.3	<i>Melinis repens</i> (Red Natal Grass)
58.9	61	2.1	Native Grasses*
61	63.5	2.5	Leaf Litter
63.5	65.2	1.7	Native Grasses*
65.2	67.3	2.1	<i>Chrysocephalum apiculatum</i> (Yellow Buttons)
67.3	71	3.7	Native Grasses*
71	72.1	1.1	<i>Melinis repens</i> (Red Natal Grass)
72.1	79.1	7	Native Grasses*
79.1	80.3	1.2	Leaf Litter
80.3	86.4	6.1	Native Grasses*
86.4	89	2.6	<i>Melinis repens</i> (Red Natal Grass)
89	90.2	1.2	Bare Ground
90.2	95.8	5.6	<i>Melinis repens</i> (Red Natal Grass)
95.8	100	4.2	Native Grasses*
<b>Total</b>	<b>100</b>		
<b>Native species</b>	<b>75.0</b>		
<b>Non-native species</b>	<b>25.0</b>		

\*The site is dominated by a mixture of native and exotic pasture grasses. Native species are referred to as *Heteropogon contortus* (Black Spear Grass), *Capillipedium parviflorum* (Scented Top Grass), *Imperata cylindrica* (Blady Grass), *Cymbopogon refractus* (Barbed-wire Grass), *Panicum decompositum* (Native Millet), *Eragrostis brownii* (Brown's lovegrass) and *Aristida vagans* (Three awn Aristida).



**Transect 2 – Weed Cover**

Distance (m)			
Start	End	Interval (m)	Dominant Species Coverage
0	1.2	1.2	<i>Imperata cylindrica</i> (Blady Grass)
1.2	4.1	2.9	<i>Melinis repens</i> (Red Natal Grass)
4.1	19.2	15.1	Native Grasses*
19.2	21.2	2	<i>Melinis repens</i> (Red Natal Grass)
21.2	26.3	5.1	<i>Gomphocarpus physocarpus</i> (Balloon Cotton Bush)
26.3	32	5.7	<i>Imperata cylindrica</i> (Blady Grass)
32	37.5	5.5	Exotic Forb
37.5	43	5.5	Native Grasses*
43	45.1	2.1	<i>Chrysocephalum apiculatum</i> (Yellow Buttons)
45.1	45.7	0.6	<i>Melinis repens</i> (Red Natal Grass)
45.7	48.6	2.9	<i>Chrysocephalum apiculatum</i> (Yellow Buttons)
48.6	56.4	7.8	<i>Imperata cylindrica</i> (Blady Grass)
56.4	63.7	7.3	Native Grasses
63.7	67.6	3.9	<i>Melinis repens</i> (Red Natal Grass)
67.6	72.5	4.9	Native Grasses
72.5	73.1	0.6	<i>Melinis repens</i> (Red Natal Grass)
73.1	97.4	24.3	Native Grasses*
97.4	100	2.6	<i>Imperata cylindrica</i> (Blady Grass)
<b>Total</b>	<b>100</b>		
<b>Native species</b>	<b>79.4</b>		
<b>Non-native species</b>	<b>20.6</b>		

\*The site is dominated by a mixture of native and exotic pasture grasses. Native species are referred to as *Heteropogon contortus* (Black Spear Grass), *Capillipedium parviflorum* (Scented Top Grass), *Imperata cylindrica* (Blady Grass), *Cymbopogon refractus* (Barbed-wire Grass), *Panicum decompositum* (Native Millet), *Eragrostis brownii* (Brown's lovegrass) and *Aristida vagans* (Three awn Aristida).



# Appendix D

RE12.9-10.2 technical description  
(Ryan 2001)



## Regional Ecosystem Technical Descriptions

Technical descriptions provide a detailed description of the full range in structure and floristic composition of regional ecosystems (e.g. 12.3.5) and their component vegetation communities (e.g. 12.3.5a).

The descriptions are compiled using site survey data from the Queensland Herbarium's CORVEG database. Distribution maps, representative images (if available) and the pre-clearing and remnant area (hectares) of each vegetation community derived from the regional ecosystem mapping (spatial) data are included. The technical descriptions should be used in conjunction with the fields from the regional ecosystem description database (REDD) for a full description of the regional ecosystem. Quantitative site data from relatively undisturbed sites are extracted from CORVEG and summarized to provide information specific to each vegetation community.

Technical descriptions include the attributes: tree canopy height and cover and native plant species composition of the predominant layer, which are used to assess the remnant status of vegetation under the *Vegetation Management Act 1999*. However, as technical descriptions reflect the full range in structure and floristic composition across the climatic, natural disturbance and geographic range of the regional ecosystem, local reference sites should be used where possible (Neldner *et al.* 2005 section 3.3.3).

The technical descriptions are subject to review and are updated as additional data becomes available.

When conducting a BioCondition assessment, these technical descriptions should be used in conjunction with [BioCondition benchmarks](#) for the specific regional ecosystem, or component vegetation community.

### Field definitions

Description	Description of the species, structural formation and habitat of the vegetation community (this is not the Regulation description)
Area of pre-clearing regional ecosystem	The area of the regional ecosystem vegetation community before clearing in hectares
Area of remnant RE and percentage remaining	The area of the remnant regional ecosystem vegetation community in hectares and as a percentage of pre-clearing extent
Species recorded	Total number; number of woody species; number in the ground layer (some species can be both woody and occur in the ground layer); average number of species per site (using only sites where a completed species list was recorded); standard deviation; number of sites used to calculate the average species number.
Basal area	Site average, range and standard deviation (m <sup>2</sup> /hectare)
Structural Formation	Percentage of sites by structural formation. For example: Woodland: 39%; open-forest: 39%; open-woodland: 22%, 23 site(s)
Representative CORVEG sites	Site (id) numbers used in the description
For each stratum present: <ul style="list-style-type: none"> <li>Emergent (E)</li> <li>Canopy (T1), Sub-canopy (T2) and Low tree layers (T3)</li> <li>Shrub (S1) and Sub-shrub layers (S2)</li> <li>Ground (G)</li> </ul>	<ul style="list-style-type: none"> <li><i>Height</i> - average canopy height in metres, range in metres and number of sites values are based on.</li> <li><i>Cover</i> - Average percentage canopy cover of the layer, range and number of sites values are based on.</li> <li><i>Average stem density</i> (stems per hectare), range and number of sites values are based on.</li> </ul>
Dominant species (relative cover, frequency):	Relative cover (mean of cover of species / total cover of all species in that stratum for all values > zero) and frequency (percent of total sites) ordered by decreasing relative abundance. Up to five most dominant species with frequency > 20% listed for each stratum. For example: <i>Abutilon albescens</i> (78, 46%), means this species occurs in 46% of all sites and when it occurs comprises 78% of total cover (of the stratum)
Frequent species (cover, frequency):	Frequent species: Cover (mean of all values > zero) and frequency (percent of total sites) of all species occurring in more than 5% of sites ordered by decreasing frequency. For example: <i>Abutilon albescens</i> (10, 46%), means this species occurs in 46% of all sites and when it occurs has a mean cover of 10% Ground layer species are listed as either graminoid or forbs. Naturalised species have an asterisk (*) after the scientific name. <i>indet.</i> after listed name = indeterminate species or genus



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### Conditions of use

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Users should reference information contained in the technical descriptions as: Ryan, T.S. (ed.) (year\*) Technical Descriptions of Regional Ecosystems of Southeast Queensland, (month, year\*) (Queensland Herbarium, Department of Science, Information Technology, Innovation and the Arts: Brisbane). \* Date shown in footnote of individual descriptions.

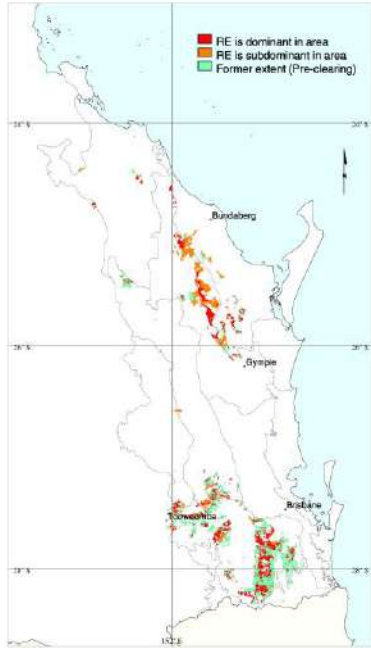
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Technical descriptions are based on a combination of quantitative and qualitative information and should be used as a guide only. Technical descriptions are not to be used as a substitute for reference sites. Descriptions are subject to review and are updated as additional data becomes available.

### For more information, contact:

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**Corymbia citriodora subsp. variegata +/- Eucalyptus crebra open-forest on sedimentary rocks**



Pre-clearing area (ha), remnant area (ha) and per cent remaining: 227,046 88,197 39%

Species recorded: Total: 175; woody: 59; ground: 125; Avg. spp./site: 28.2; std dev.: 7.7, 15 site(s)

Basal area: Avg./site: 16.0 m<sup>2</sup>/ha, range: 8.0 - 30 m<sup>2</sup>/ha, std. deviation: 5 m<sup>2</sup>/ha, 15 site(s)

Structural formation: Open-forest: 73%; woodland: 27%, 15 site(s)

Representative sites: 14276, 14283, 15472, 15476, 15477, 15480, 15481, 15482, 15483, 15518, 15525, 15528, 15786, 15795, 40825.

**Stratum: T1**

Height avg. = 21.2m, range 18-25m, 15 sites

Crown cover avg. = 53.5%, range 25.0-71.0%, 15 sites

*Dominant species (relative cover, frequency): Corymbia citriodora subsp. variegata (65, 100%), Angophora leiocarpa (28, 27%), Eucalyptus crebra (25, 80%)*

*Frequent species (cover, frequency): Corymbia citriodora subsp. variegata (34, 100%), Eucalyptus crebra (14, 80%), Angophora leiocarpa (16, 27%), Eucalyptus tereticornis (3, 20%), Corymbia tessellaris (13%), Eucalyptus moluccana (16, 13%), Eucalyptus siderophloia (9, 13%), Allocasuarina torulosa (7%), Alphitonia excelsa (7%), Alstonia constricta (7%), Brachychiton populneus (7%), Eucalyptus melanophloia (3, 7%)*

**Stratum: T2**

Height avg. = 12.9m, range 9-17m, 14 sites

Crown cover avg. = 19.9%, range 2.0-40.0%, 14 sites

*Dominant species (relative cover, frequency): Corymbia citriodora subsp. variegata (42, 73%), Eucalyptus crebra (36, 67%), Angophora leiocarpa (18, 27%)*

*Frequent species (cover, frequency): Corymbia citriodora subsp. variegata (10, 73%), Eucalyptus crebra (6, 67%), Angophora leiocarpa (3, 27%), Alphonitonia excelsa (1, 20%), Acacia disparrima subsp. disparrima (14, 13%), Corymbia intermedia (4, 13%), Corymbia tessellaris (4, 13%), Eucalyptus major (7, 13%), Lophostemon confertus (14, 13%), Acacia maidenii (7%), Allocasuarina torulosa (7%), Eucalyptus melanophloia (4, 7%), Eucalyptus moluccana (4, 7%), Eucalyptus siderophloia (2, 7%), Eucalyptus tereticornis (3, 7%), Notelaea longifolia (7%)*

Dominant species: Relative cover (mean of cover of species / total cover of all species in that stratum for all values > zero) and frequency (percent of total sites) ordered by decreasing relative abundance. Up to five most dominant species with frequency > 20% listed for each stratum.

Frequent species: Cover (mean of all values > zero) and frequency (percent of total sites) of all species occurring in more than 5% of sites ordered by decreasing frequency. Ground layer species are listed as either graminoid or forb.

Naturalised species have an asterisk (\*) after the name. indet. after listed name = indeterminate species or genus

**Stratum: T3**

Height avg. = 7.2m, range 5-10m, 6 sites

Crown cover avg. = 13.0%, range 8.0-20.0%, 6 sites

*Dominant species (relative cover, frequency): Eucalyptus crebra (57, 27%), Corymbia citriodora subsp. variegata (34, 33%)*

*Frequent species (cover, frequency): Corymbia citriodora subsp. variegata (6, 33%), Eucalyptus crebra (5, 27%), Angophora leiocarpa (3, 13%), Acacia glaucocarpa (8, 7%), Allocasuarina luehmannii (13, 7%), Alphitonia excelsa (7%), Celastrus subspicata (7%), Corymbia tessellaris (1, 7%), Eucalyptus major (7, 7%)*

**Stratum: S1**

Height avg. = 2.5m, range 1.5-5m, 15 sites

Crown cover avg. = 21.6%, range 2.0-50.0%, 15 sites

*Dominant species (relative cover, frequency): Acacia disparrima subsp. disparrima (48, 40%), Alphitonia excelsa (24, 53%), Acacia leiocalyx (20, 40%), Eucalyptus crebra (16, 27%), Lantana camara\* (12, 40%)*

*Frequent species (cover, frequency): Alphitonia excelsa (4, 53%), Corymbia citriodora subsp. variegata (1, 47%), Acacia disparrima subsp. disparrima (7, 40%), Acacia leiocalyx (4, 40%), Lantana camara\* (4, 40%), Eucalyptus crebra (2, 27%), Jacksonia scoparia (1, 27%), Alstonia constricta (4, 20%), Angophora leiocarpa (1, 20%), Acacia falcata (9, 13%), Acacia fimbriata (15, 13%), Acacia glaucocarpa (4, 13%), Acacia maidenii (2, 13%), Choretrum candollei (13%), Corymbia tessellaris (13%), Eremophila debilis (13%), Maytenus cunninghamii (13%), Myoporum montanum (1, 13%), Pittosporum angustifolium (1, 13%), Acacia amblygona (8, 7%), Acacia concurrens (7%), Acacia decora (7%), Acacia implexa (7%), Acacia irrorata (8, 7%), Acacia loroloba (1, 7%), Acacia neriifolia (7%), Alectryon diversifolius (5, 7%), Allocasuarina littoralis (18, 7%), Allocasuarina torulosa (2, 7%), Astrotricha latifolia (5, 7%), Brachychiton populneus (1, 7%), Brachychiton rupestris (7, 7%), Breynia oblongifolia (2, 7%), Citrus australis (5, 7%), Corymbia intermedia (7%), Cupaniopsis parvifolia (7%), Daviesia ulicifolia (7%), Eucalyptus major (2, 7%), Eucalyptus moluccana (4, 7%), Eucalyptus tereticornis (7%), Flindersia australis (7%), Gomphocarpus physocarpus\* (7%), Hovea lorata (2, 7%), Indigofera australis (8, 7%), Lophostemon confertus (20, 7%), Persoonia sericea (7%), Psydrax odorata (4, 7%), Psydrax odorata forma buxifolia (7%), Pultenaea euchila (2, 7%), Solanum ellipticum (7%), Solanum seafortianum\* (7%), Swainsona galegifolia (7%), Wikstroemia indica (7%), Xanthorrhoea johnsonii (8, 7%)*

Dominant species: Relative cover (mean of cover of species / total cover of all species in that stratum for all values > zero) and frequency (percent of total sites) ordered by decreasing relative abundance. Up to five most dominant species with frequency > 20% listed for each stratum.

Frequent species: Cover (mean of all values > zero) and frequency (percent of total sites) of all species occurring in more than 5% of sites ordered by decreasing frequency. Ground layer species are listed as either graminoid or forb.

Naturalised species have an asterisk (\*) after the name. indet. after listed name = indeterminate species or genus

**Stratum: G**

Height avg. = 0.6m, range 0.15-1m, 15 sites

PFC avg. = 47.2%, range 10-90%, 15 sites

*Dominant species (relative cover, frequency):* *Entolasia stricta* (33, 27%), *Cymbopogon refractus* (28, 67%), *Themeda triandra* (24, 67%), *Eremochloa bimaculata* (20, 33%), *Imperata cylindrica* (17, 27%)

*Frequent species (cover, frequency):* **GRAMINOIDS:** *Cymbopogon refractus* (14, 67%), *Themeda triandra* (14, 67%), *Panicum effusum* (1, 60%), *Heteropogon contortus* (8, 47%), *Aristida vagans* (1, 40%), *Eragrostis brownii* (33%), *Eremochloa bimaculata* (5, 33%), *Entolasia stricta* (9, 27%), *Imperata cylindrica* (6, 27%), *Cyperus gracilis* (20%), *Eragrostis spartinoides* (2, 20%), *Bothriochloa decipiens* (1, 13%), *Capillipedium spicigerum* (13%), *Chloris divaricata* (20, 13%), *Digitaria breviglumis* (2, 13%), *Gahnia aspera* (1, 13%), *Melinis repens*\* (5, 13%), *Scleria mackaviensis* (13%), *Aristida calycina* (36, 7%), *Aristida gracilipes* (16, 7%), *Aristida indet.* (7%), *Aristida personata* (4, 7%), *Aristida queenslandica* var. *queenslandica* (7%), *Bothriochloa bladhii* (7%), *Cleistochloa rigida* (7%), *Cyperus aggregatus*\* (7%), *Dichanthium sericeum* (7%), *Digitaria didactyla*\* (7%), *Digitaria parviflora* (7%), *Eriachne glabrata* (7%), *Fimbristylis dichotoma* (7%), *Lepidosperma laterale* (2, 7%), *Megathyrsus maximus* var. *pubiglumis*\* (1, 7%), *Oplismenus aemulus* (7%), *Panicum decompositum* (5, 7%), *Paspalidium caespitosum* (7%), *Paspalidium distans* (7%), *Sarga leiocladum* (7%), *Scleria sphacelata* (7%), *Sporobolus elongatus* (1, 7%), *Urochloa foliosa* (1, 7%)

**FORBS:** *Cyanthillium cinereum* (47%), *Dianella revoluta* (1, 47%), *Eustrephus latifolius* (47%), *Lantana camara*\* (5, 40%), *Glycine tabacina* (33%), *Peripleura hispidula* var. *hispidula* (33%), *Desmodium rhytidophyllum* (27%), *Eremophila debilis* (27%), *Lantana montevidensis*\* (3, 27%), *Brunoniella australis* (20%), *Chrysocephalum apiculatum* (20%), *Galactia tenuiflora* (20%), *Hardenbergia violacea* (20%), *Opuntia stricta*\* (20%), *Sida hackettiana* (3, 20%), *Achyranthes aspera* (2, 13%), *Bidens pilosa*\* (13%), *Desmodium gunnii* (13%), *Dianella caerulea* (13%), *Dianella indet.* (13%), *Gomphocarpus physocarpus*\* (13%), *Laxmannia gracilis* (13%), *Lobelia purpurascens* (13%), *Lomandra longifolia* (1, 13%), *Lomandra multiflora* (1, 13%), *Mentha diemenica* (1, 13%), *Opuntia tomentosa*\* (13%), *Passiflora subpeltata*\* (15, 13%), *Abutilon oxycarpum* forma *oxycarpum* (7%), *Acacia leiocalyx* (1, 7%), *Alphitonia excelsa* (7%), *Alstonia constricta* (1, 7%), *Asparagus africanus*\* (7%), *Breynia oblongifolia* (2, 7%), *Brunonia australis* (7%), *Cassytha pubescens* (7%), *Cheilanthes sieberi* (7%), *Cheilanthes tenuifolia* (7%), *Clematicissus opaca* (7%), *Conyza bonariensis*\* (7%), *Crotalaria montana* (7%), *Cynanchum bowmanii* (1, 7%), *Desmodium brachypodum* (7%), *Desmodium uncinatum*\* (7%), *Desmodium varians* (7%), *Dianella brevipedunculata* (1, 7%), *Dianella caerulea* var. *vannata* (7%), *Einadia hastata* (7%), *Glycine indet.* (7%), *Goodenia hederacea* (1, 7%), *Goodenia rotundifolia* (7%), *Grewia latifolia* (1, 7%), *Gymnostachys anceps* (7%), *Hibiscus sturtii* (1, 7%), *Hovea acutifolia* (7%), *Jasminum didymum* (7%), *Jasminum didymum* subsp. *lineare* (7%), *Jasminum suavissimum* (1, 7%), *Leucopogon juniperinus* (7%), *Lissanthe strigosa* (2, 7%), *Lomandra confertifolia* subsp. *pallida* (25, 7%), *Lomandra filiformis* (7%), *Monotoca scoparia* (7%), *Myoporum montanum* (7%), *Opuntia indet.* (7%), *Ozothamnus diosmifolius* (7%), *Passiflora suberosa*\* (7%), *Picris angustifolia* subsp. *carolorum-henricorum* (7%), *Plectranthus parviflorus* (7%), *Podolepis neglecta* (7%), *Pomax umbellata* (7%), *Pterocaulon redolens* (7%), *Pycnosorus chrysanthes* (7%), *Rhodanthe anthemoides* (7%), *Secamone elliptica* (1, 7%), *Sida cordifolia*\* (7%), *Sida rhombifolia*\* (7%), *Solanum nemophilum* (1, 7%), *Solanum stelligerum* (7%), *Stephania japonica* (7%), *Velleia paradoxa* (7%), *Velleia spathulata* (7%), *Wahlenbergia gracilis* (7%), *Wedelia spilanthis* (7%)

Dominant species: Relative cover (mean of cover of species / total cover of all species in that stratum for all values > zero) and frequency (percent of total sites) ordered by decreasing relative abundance. Up to five most dominant species with frequency > 20% listed for each stratum.

Frequent species: Cover (mean of all values > zero) and frequency (percent of total sites) of all species occurring in more than 5% of sites ordered by decreasing frequency. Ground layer species are listed as either graminoid or forb.

Naturalised species have an asterisk (\*) after the name. indet. after listed name = indeterminate species or genus

## 12.9-10.2 draft technical description

**Tree 1** (Ht avg=24.46m, 18-33m, 44 sites; Cover avg=55.96%, 14-90%, 44 sites; SD/ha avg=110, 40-180, 2 sites)

### Dominant species (cover)

*Corymbia citriodora* subsp. *variegata* (32, 100%), *Eucalyptus moluccana* (17, 9%), *Eucalyptus crebra* (15, 75%), *Angophora leiocarpa* (13, 14%), *Eucalyptus acmenoides* (11, 23%)

### Species (frequency, cover)

*Corymbia citriodora* subsp. *variegata* (100%, 32), *Eucalyptus crebra* (75%, 15), *Eucalyptus acmenoides* (23%, 11), *Eucalyptus siderophloia* (20%, 10), *Eucalyptus tereticornis* (18%, 5), *Angophora leiocarpa* (14%, 13), *Corymbia tessellaris* (11%, 4), *Eucalyptus moluccana* (9%, 17), *Corymbia intermedia* (7%, 4), *Eucalyptus exserta* (7%, 8), *Allocasuarina torulosa* (5%), *Eucalyptus melanophloia* (5%, 2), *Eucalyptus propinqua* (5%), *Alphitonia excelsa* (2%), *Brachychiton populneus* (2%), *Corymbia trachyphloia* subsp. *trachyphloia* (2%, 8), *Eucalyptus longirostrata* (2%, 3), *Eucalyptus major* (2%)

**Tree 2** (Ht avg=13m, 9-17m, 38 sites; Cover avg=20.05%, 1-60%, 38 sites; SD/ha avg=130, 40-220, 2 sites)

### Dominant species (cover)

*Allocasuarina littoralis* (14, 2%), *Lophostemon confertus* (11, 7%), *Eucalyptus acmenoides* (10, 14%), *Acacia disparrima* subsp. *disparrima* (10, 14%), *Corymbia citriodora* subsp. *variegata* (9, 73%)

### Species (frequency, cover)

*Corymbia citriodora* subsp. *variegata* (73%, 9), *Eucalyptus crebra* (48%, 7), *Acacia disparrima* subsp. *disparrima* (14%, 10), *Angophora leiocarpa* (14%, 4), *Eucalyptus acmenoides* (14%, 10), *Alphitonia excelsa* (11%, 1), *Corymbia tessellaris* (9%, 6), *Eucalyptus exserta* (9%, 4), *Eucalyptus siderophloia* (9%, 3), *Eucalyptus tereticornis* (9%, 4), *Allocasuarina torulosa* (7%, 5), *Corymbia intermedia* (7%, 3), *Eucalyptus major* (7%, 4), *Eucalyptus moluccana* (7%, 3), *Lophostemon confertus* (7%, 11), *Acacia maidenii* (2%), *Allocasuarina littoralis* (2%, 14), *Eucalyptus melanophloia* (2%, 4), *Notelaea longifolia* (2%), *Petalostigma pubescens* (2%, 4)

**Tree 3** (Ht avg=7.5m, 5-10m, 15 sites; Cover avg=11.58%, 1-35%, 15 sites; SD/ha avg=40, 40-40, 1 sites)

### Dominant species (cover)

*Allocasuarina luehmannii* (13, 2%), *Allocasuarina torulosa* (10, 2%),

*Acacia glaucocarpa* (8, 2%), *Eucalyptus major* (7, 2%), *Eucalyptus crebra* (5, 16%)

**Species (frequency, cover)**

*Corymbia citriodora* subsp. *variegata* (30%, 5), *Eucalyptus crebra* (16%, 5), *Eucalyptus acmenoides* (9%, 4), *Eucalyptus siderophloia* (7%, 5), *Angophora leiocarpa* (5%, 3), *Acacia glaucocarpa* (2%, 8), *Allocasuarina luehmannii* (2%, 13), *Allocasuarina torulosa* (2%, 10), *Alphitonia excelsa* (2%), *Celastrus subspicata* (2%), *Corymbia tessellaris* (2%, 1), *Corymbia trachyphloia* subsp. *trachyphloia* (2%, 3), *Eucalyptus major* (2%, 7), *Eucalyptus tereticornis* (2%)

**Shrub 1** (Ht avg=2.61m, 1-5m, 38 sites; Cover avg=21.77%, 1-65%, 38 sites; SD/ha avg=170, 120-220, 2 sites)

**Dominant species (cover)**

*Daviesia filipes* (15, 2%), *Lophostemon confertus* (13, 5%), *Acacia complanata* (12, 2%), *Acacia fimbriata* (11, 7%), *Allocasuarina littoralis* (11, 5%)

**Species (frequency, cover)**

*Acacia leiocalyx* subsp. *leiocalyx* (36%, 4), *Acacia disparrima* subsp. *disparrima* (34%, 5), *Corymbia citriodora* subsp. *variegata* (34%, 2), *Alphitonia excelsa* (32%, 8), *Lantana camara* (27%, 8), *Eucalyptus crebra* (18%, 3), *Jacksonia scoparia* (14%, 1), *Breynia oblongifolia* (11%, 1), *Acacia maidenii* (9%, 2), *Pultenaea euchila* (9%, 1), *Acacia falcata* (7%, 6), *Acacia fimbriata* (7%, 11), *Acacia glaucocarpa* (7%, 3), *Allocasuarina torulosa* (7%, 3), *Alstonia constricta* (7%, 4), *Angophora leiocarpa* (7%, 3), *Choretrum candollei* (7%), *Corymbia tessellaris* (7%, 1), *Eremophila debilis* (7%), *Eucalyptus tereticornis* (7%), *Myoporum acuminatum* (7%, 1), *Acacia melanoxydon* (5%, 3), *Allocasuarina littoralis* (5%, 11), *Denhamia cunninghamii* (5%), *Eucalyptus exserta* (5%, 2), *Eucalyptus siderophloia* (5%, 1), *Exocarpos cupressiformis* (5%, 2), *Lophostemon confertus* (5%, 13), *Lophostemon suaveolens* (5%, 5), *Psydrax odorata* forma *buxifolia* (5%, 2), *Acacia amblygona* (2%, 8), *Acacia complanata* (2%, 12), *Acacia concurrens* (2%), *Acacia decora* (2%), *Acacia implexa* (2%), *Acacia irrorata* subsp. *irrorata* (2%, 8), *Acacia loroloba* (2%, 1), *Acacia neriifolia* (2%), *Acrotriche aggregata* (2%), *Alectryon diversifolius* (2%, 5), *Astrotricha latifolia* (2%, 5), *Brachychiton populneus* (2%, 1), *Brachychiton rupestris* (2%, 7), *Citrus australis* (2%, 5), *Corymbia intermedia* (2%), *Cupaniopsis parvifolia* (2%), *Daviesia filipes* (2%, 15), *Daviesia ulicifolia* (2%), *Daviesia ulicifolia* subsp. *stenophylla* (2%), *Erythrina vespertilio* (2%, 1), *Eucalyptus major* (2%, 2), *Eucalyptus moluccana* (2%, 4), *Flindersia australis* (2%), *Gomphocarpus physocarpus*

(2%), *Hovea lorata* (2%, 2), *Indigofera australis* (2%, 8), *Indigofera australis subsp. australis* (2%), *Persoonia sericea* (2%), *Phyllota* (2%, 1), *Pittosporum angustifolium* (2%, 2), *Psydrax odorata* (2%), *Pultenaea villosa* (2%, 1), *Solanum ellipticum* (2%), *Solanum seaforthianum* (2%), *Swainsona galegifolia* (2%), *Trema tomentosa* (2%), *Wikstroemia indica* (2%), *Xanthorrhoea johnsonii* (2%, 8)

**Shrub 2** (Ht avg=1.2m, 1.2-1.2m, 1 sites; Cover avg=3%, 3-3%, 1 sites)

**Dominant species (cover)**

*Macrozamia mountperriensis* (3, 2%)

**Species (frequency, cover)**

*Macrozamia mountperriensis* (2%, 3)

**Ground** (Ht avg=0.53m, 0.15-0.85m, 44 sites; PFC avg=45.75%, 6-90%, 44 sites)

**Dominant species (cover)**

*Cymbopogon queenslandicus* (50, 2%), *Aristida caput-medusae* (28, 2%), *Aristida calycina* (26, 5%), *Chloris divaricata* (20, 5%), *Themeda triandra* (18, 68%)

**Species (frequency, cover)**

*Themeda triandra* (68%, 18), *Cymbopogon refractus* (59%, 10), *Desmodium rhytidophyllum* (36%, 1), *Eremochloa bimaculata* (36%, 11), *Cyanthillium cinereum* (32%), *Panicum effusum* (30%, 1), *Entolasia stricta* (27%, 6), *Eustrephus latifolius* (27%), *Heteropogon contortus* (27%, 9), *Dianella revoluta* (25%, 1), *Imperata cylindrica* (25%, 10), *Aristida vagans* (23%, 3), *Brunoniella australis* (23%), *Eragrostis brownii* (23%, 1), *Glycine tabacina* (20%, 1), *Lobelia purpurascens* (20%), *Aristida queenslandica var. queenslandica* (16%, 11), *Lantana camara* (16%), *Lantana montevidensis* (16%, 4), *Lomandra multiflora subsp. multiflora* (16%, 1), *Chrysocephalum apiculatum* (14%), *Digitaria parviflora* (14%, 1), *Eragrostis spartinooides* (14%, 2), *Hardenbergia violacea* (14%), *Laxmannia gracilis* (14%), *Cheilanthes sieberi* (11%), *Cyperus gracilis* (11%, 1), *Eremophila debilis* (11%), *Peripleura hispidula var. hispidula* (11%), *Achyranthes aspera* (9%, 1), *Bidens pilosa* (9%), *Desmodium varians* (9%, 1), *Fimbristylis dichotoma* (9%), *Galactia tenuiflora* (9%), *Grewia latifolia* (9%, 1), *Lomandra longifolia* (9%, 2), *Parsonsia straminea* (9%), *Scleria mackaviensis* (9%), *Acacia leiocalyx subsp. leiocalyx* (7%, 1), *Aristida gracilipes* (7%, 10), *Aristida personata* (7%, 5), *Chrysopogon sylvaticus* (7%, 10), *Crotalaria montana* (7%), *Desmodium brachypodum* (7%), *Desmodium gunnii* (7%, 2), *Dianella caerulea* (7%, 1), *Digitaria*

*didactyla* (7%, 5), *Gahnia aspera* (7%, 1), *Melinis repens* (7%, 11), *Murdannia graminea* (7%), *Opuntia stricta* (7%), *Opuntia tomentosa* (7%), *Passiflora subpeltata* (7%, 10), *Sarga leiocladum* (7%, 4), *Sida hackettiana* (7%, 3), *Alloteropsis semialata* (5%, 1), *Alphitonia excelsa* (5%), *Apowollastonia spilanthis* (5%), *Aristida* (5%), *Aristida benthamii* var. *benthamii* (5%, 4), *Aristida calycina* (5%, 26), *Aristida calycina* var. *calycina* (5%, 5), *Arundinella nepalensis* (5%, 15), *Bothriochloa decipiens* (5%, 1), *Bothriochloa decipiens* var. *decipiens* (5%, 2), *Capillipedium spicigerum* (5%), *Cheilanthes* (5%), *Chloris divaricata* (5%, 20), *Chrysopogon fallax* (5%, 5), *Cymbidium canaliculatum* (5%), *Cyperus aggregatus* (5%), *Dianella* (5%), *Digitaria breviglumis* (5%, 2), *Glycine* (5%), *Glycine tomentella* (5%, 1), *Gomphocarpus physocarpus* (5%), *Goodenia rotundifolia* (5%), *Jacksonia scoparia* (5%, 2), *Lomandra confertifolia* subsp. *pallida* (5%, 13), *Mentha satyroides* (5%, 1), *Opuntia* (5%), *Panicum decompositum* (5%, 3), *Paspalidium distans* (5%), *Passiflora suberosa* (5%, 1), *Phyllanthus virgatus* (5%), *Plectranthus parviflorus* (5%, 1), *Pterocaulon redolens* (5%), *Pycnosorus chrysanthes* (5%), *Sida cordifolia* (5%), *Sigesbeckia* (5%), *Sigesbeckia orientalis* (5%), *Sporobolus creber* (5%), *Xanthorrhoea latifolia* subsp. *latifolia* (5%, 7), *Zornia dyctiocarpa* var. *dyctiocarpa* (5%), *Abutilon oxycarpum* var. *oxycarpum* (2%), *Acacia disparrima* subsp. *disparrima* (2%, 3), *Afrohybanthus enneaspermus* (2%), *Alstonia constricta* (2%, 1), *Aristida caput-medusae* (2%, 28), *Aristida muricata* (2%), *Aristida queenslandica* var. *dissimilis* (2%), *Aristida ramosa* (2%), *Asparagus africanus* (2%), *Bothriochloa bladhii* (2%), *Breynia oblongifolia* (2%, 2), *Brunonia australis* (2%), *Bryophyllum delagoense* (2%), *Calotis dentex* (2%), *Capillipedium parviflorum* (2%, 5), *Carex breviculmis* (2%), *Cassytha filiformis* (2%), *Cassytha pubescens* (2%), *Cenchrus caliculatus* (2%, 1), *Chamaecrista mimosoides* (2%), *Cheilanthes sieberi* subsp. *sieberi* (2%), *Cheilanthes tenuifolia* (2%), *Chloris gayana* (2%), *Chloris ventricosa* (2%), *Chorizema parviflorum* (2%), *Clematicissus opaca* (2%), *Crotalaria montana* var. *angustifolia* (2%), *Cymbopogon queenslandicus* (2%, 50), *Cyperus javanicus* (2%), *Desmodium uncinatum* (2%), *Dianella brevipedunculata* (2%, 1), *Dianella caerulea* var. *vannata* (2%), *Dianella rara* (2%), *Dichanthium sericeum* (2%), *Dichondra repens* (2%, 2), *Digitaria diffusa* (2%, 3), *Dimorphochloa rigida* (2%), *Dodonaea triquetra* (2%), *Echium* (2%), *Einadia hastata* (2%), *Eragrostis lacunaria* (2%), *Eragrostis leptostachya* (2%), *Eragrostis tenuifolia* (2%), *Eriachne glabrata* (2%), *Erigeron bonariensis* (2%), *Erigeron pusillus* (2%), *Exocarpos cupressiformis* (2%, 2), *Flemingia parviflora* (2%, 1), *Galactia tenuiflora* var. *lucida* (2%), *Glycine clandestina* var. *clandestina* (2%), *Glycine cyrtoloba* (2%), *Goodenia delicata* (2%), *Goodenia hederacea* (2%),

1), *Gymnostachys anceps* (2%), *Hibbertia linearis* (2%), *Hibiscus sturtii* (2%, 1), *Hovea acutifolia* (2%), *Iphigenia indica* (2%), *Jasminum dianthifolium* (2%, 1), *Jasminum didymum* (2%), *Jasminum didymum subsp. lineare* (2%), *Lepidosperma laterale* (2%, 2), *Lepidosperma laterale var. laterale* (2%), *Leucopogon juniperinus* (2%), *Liliaceae* (2%), *Lissanthe strigosa subsp. subulata* (2%, 2), *Lomandra filiformis* (2%), *Lomandra laxa* (2%, 2), *Macrozamia mountperriensis* (2%, 10), *Malvastrum americanum var. americanum* (2%), *Marsdenia* (2%), *Marsdenia rostrata* (2%), *Megathyrsus maximus* (2%, 16), *Megathyrsus maximus var. maximus* (2%), *Megathyrsus maximus var. pubiglumis* (2%, 1), *Monotoca scoparia* (2%), *Myoporum acuminatum* (2%), *Oplismenus aemulus* (2%), *Oxalis* (2%), *Oxalis corniculata* (2%), *Ozothamnus diosmifolius* (2%), *Panicum simile* (2%), *Parsonsia eucalyptophylla* (2%), *Paspalidium* (2%), *Paspalidium caespitosum* (2%), *Paspalidium constrictum* (2%), *Paspalidium criniforme* (2%), *Paspalidium disjunctum* (2%), *Passiflora foetida* (2%), *Petalostigma pubescens* (2%), *Phyllanthus* (2%), *Picris angustifolia subsp. carolorum-henricorum* (2%), *Plantago debilis* (2%), *Podolepis neglecta* (2%), *Polygala triflora* (2%), *Pomax umbellata* (2%), *Pterocaulon* (2%), *Pultenaea villosa* (2%, 1), *Rhodanthe anthemoides* (2%), *Rhynchosia minima* (2%), *Rostellularia adscendens subsp. adscendens* (2%), *Scleria sphacelata* (2%), *Secamone elliptica* (2%, 1), *Sida rhombifolia* (2%), *Solanum nemophilum* (2%, 1), *Solanum stelligerum* (2%), *Sporobolus elongatus* (2%, 1), *Stephania japonica* (2%), *Tephrosia filipes* (2%), *Urochloa foliosa* (2%, 1), *Velleia spathulata* (2%), *Vincetoxicum ovatum* (2%, 1), *Wahlenbergia gracilis* (2%), *Xanthorrhoea johnsonii* (2%), *Xanthorrhoea latifolia* (2%, 5)

## Summary

Species recorded	Total: 272; Woody: 78; Ground: 209; Avg spp/site: 23.95; StDev: 12.28
Basal Area	Avg BA/site: 15.05 m <sup>2</sup> /ha; Range: 6 - 30 m <sup>2</sup> /ha; StDev: 5.03 m <sup>2</sup> /ha
Structural Form range	Open-Forest: 61.36%; Woodland: 34.09%; Tall Closed-Forest: 2.27%; Closed-Forest: 2.27%
Representative sites	(40825, 15644, 15392, 15986, 15989, 15407, 15690, 15696, 15518, 15476, 15477, 40826, 48714, 15969, 15652, 15648, 15865, 15283, 15979, 15999, 15140, 14276, 15409, 15174, 15182, 14283, 15022, 15525, 15472, 15795, 15480, 15481, 15483, 15482, 15489, 15491, 15492, 54874, 54934, 55018, 55354, 15528, 15786, 15504)

# Appendix E

## Offset Area – Baseline Raw SAT Data



<b>Spot Assessment Technique (SAT) Survey</b>				
<b>Date:</b> 18.02.2024		<b>SAT ID:</b> 1, adjoining MHQA 1		
<b>Tree No.</b>	<b>Scientific Name</b>	<b>Common Name</b>	<b>DBH</b>	<b>Scat present?</b>
1	<i>Corymbia intermedia</i>	Pink Bloodwood	140	No
2	<i>Angophora subvelutina</i>	Broad-leaved Apple	210	No
3	<i>Angophora subvelutina</i>	Broad-leaved Apple	280	No
4	<i>Corymbia intermedia</i>	Pink Bloodwood	230	No
5	<i>Angophora subvelutina</i>	Broad-leaved Apple	300	No
6	<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark	170	No
7	<i>Corymbia intermedia</i>	Pink Bloodwood	230	No
8	<i>Corymbia intermedia</i>	Pink Bloodwood	120	No
9	<i>Corymbia intermedia</i>	Pink Bloodwood	140	No
10	<i>Corymbia intermedia</i>	Pink Bloodwood	160	No
11	<i>Corymbia intermedia</i>	Pink Bloodwood	170	No
12	<i>Eucalyptus tereticornis</i>	Fores Red Gum	280	No
13	<i>Corymbia intermedia</i>	Pink Bloodwood	160	No
14	<i>Corymbia intermedia</i>	Pink Bloodwood	100	No
15	<i>Corymbia intermedia</i>	Pink Bloodwood	130	No
16	<i>Corymbia citriodora</i>	Spotted Gum	290	Yes
17	<i>Corymbia citriodora</i>	Spotted Gum	270	No
18	<i>Corymbia citriodora</i>	Spotted Gum	220	No
19	<i>Corymbia citriodora</i>	Spotted Gum	160	No
20	<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark	250	No
21	<i>Corymbia intermedia</i>	Pink Bloodwood	280	No
22	<i>Corymbia intermedia</i>	Pink Bloodwood	180	No
23	<i>Corymbia citriodora</i>	Spotted Gum	190	No
24	<i>Corymbia citriodora</i>	Spotted Gum	440	No
25	<i>Corymbia citriodora</i>	Spotted Gum	160	No
26	<i>Corymbia intermedia</i>	Pink Bloodwood	100	No
27	<i>Corymbia intermedia</i>	Pink Bloodwood	160	No
28	<i>Corymbia intermedia</i>	Pink Bloodwood	120	No
29	<i>Corymbia intermedia</i>	Pink Bloodwood	110	No
30	<i>Corymbia intermedia</i>	Pink Bloodwood	180	No
<b>Total scats (/30)</b>				1
<b>Percentage</b>				3.33
<b>East Coast (med-high) Activity Category</b>				Low



<b>Spot Assessment Technique (SAT) Survey</b>				
<b>Date:</b>		<b>SAT ID: 2, adjoining MHQA 2</b>		
19.02.2024				
<b>Tree No.</b>	<b>Scientific Name</b>	<b>Common Name</b>	<b>DBH</b>	<b>Scat present?</b>
1	<i>Corymbia citriodora</i>	Spotted Gum	160	No
2	<i>Corymbia citriodora</i>	Spotted Gum	170	No
3	<i>Corymbia citriodora</i>	Spotted Gum	180	No
4	<i>Corymbia citriodora</i>	Spotted Gum	170	No
5	<i>Corymbia citriodora</i>	Spotted Gum	140	No
6	<i>Corymbia citriodora</i>	Spotted Gum	150	No
7	<i>Corymbia citriodora</i>	Spotted Gum	400	No
8	<i>Corymbia citriodora</i>	Spotted Gum	340	No
9	<i>Corymbia citriodora</i>	Spotted Gum	370	No
10	<i>Corymbia citriodora</i>	Spotted Gum	210	No
11	<i>Corymbia citriodora</i>	Spotted Gum	100	No
12	<i>Corymbia citriodora</i>	Spotted Gum	130	No
13	<i>Corymbia citriodora</i>	Spotted Gum	280	No
14	<i>Corymbia citriodora</i>	Spotted Gum	160	No
15	<i>Corymbia citriodora</i>	Spotted Gum	100	No
16	<i>Corymbia citriodora</i>	Spotted Gum	160	No
17	<i>Corymbia citriodora</i>	Spotted Gum	170	No
18	<i>Corymbia citriodora</i>	Spotted Gum	150	No
19	<i>Corymbia citriodora</i>	Spotted Gum	120	No
20	<i>Corymbia citriodora</i>	Spotted Gum	250	No
21	<i>Corymbia citriodora</i>	Spotted Gum	130	No
22	<i>Corymbia citriodora</i>	Spotted Gum	200	No
23	<i>Corymbia citriodora</i>	Spotted Gum	190	No
24	<i>Corymbia citriodora</i>	Spotted Gum	170	No
25	<i>Corymbia citriodora</i>	Spotted Gum	110	No
26	<i>Corymbia citriodora</i>	Spotted Gum	390	No
27	<i>Corymbia citriodora</i>	Spotted Gum	160	No
28	<i>Corymbia citriodora</i>	Spotted Gum	160	No
29	<i>Corymbia citriodora</i>	Spotted Gum	180	No
30	<i>Corymbia citriodora</i>	Spotted Gum	200	No
<b>Total scats (/30)</b>				0
<b>Percentage</b>				0
<b>East Coast (med-high) Activity Category</b>				No usage



# Appendix F

## Offset Assessment Guide Calculator Results and Justification



# Offsets Assessment Guide

For use in determining offsets under the Environment Protection and Biodiversity Conservation Act 1999  
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Koala
EPBC Act status	Endangered
Annual probability of extinction <small>Based on IUCN category definitions</small>	1.2%

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator						
Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
<i>Ecological communities</i>						
Area of community	No		Area			
			Quality			
			Total quantum of impact	0.00		
<i>Threatened species habitat</i>						
Area of habitat	Yes	Koala habitat patches	Area	5.9	Hectares	
			Quality	6	Scale 0-10	
			Total quantum of impact	3.54	Adjusted hectares	
<i>Threatened species</i>						
Birth rate <small>e.g. Change in nest success</small>	No					
Mortality rate <small>e.g. Change in number of road kills per year</small>	No					
Number of individuals <small>e.g. Individual plants/animals</small>	No					

Offset calculator																			
Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)	Start area and quality	Future area and quality without offset	Future area and quality with offset	Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source			
<i>Ecological Communities</i>																			
Area of community	No				Risk-related time horizon (max. 20 years)	Start area (hectares)	Risk of loss (%) without offset	Risk of loss (%) with offset											
					Future area without offset (adjusted hectares)	0.0	Future area with offset (adjusted hectares)	0.0											
					Time until ecological benefit	Start quality (scale of 0-10)	Future quality without offset (scale of 0-10)	Future quality with offset (scale of 0-10)											
<i>Threatened species habitat</i>																			
Area of habitat	Yes	3.54	Adjusted hectares	30	Time over which loss is averted (max. 20 years)	20	Start area (hectares)	40	Risk of loss (%) without offset	0%	Risk of loss (%) with offset	0%	0.00	95%	0.00	0.00	5.36	151.32%	Yes
					Future area without offset (adjusted hectares)	40.0	Future area with offset (adjusted hectares)	40.0	0.00	95%	0.00	0.00							
					Time until ecological benefit	20	Start quality (scale of 0-10)	6	Future quality without offset (scale of 0-10)	6	Future quality with offset (scale of 0-10)	8	2.00	85%	1.70	1.34			
<i>Threatened species</i>																			
Number of features <small>e.g. Nest hollows, habitat trees</small>	No																		
Condition of habitat <small>Change in habitat condition, but no change in extent</small>	No																		
Birth rate <small>e.g. Change in nest success</small>	No																		
Mortality rate <small>e.g. Change in number of road kills per year</small>	No																		
Number of individuals <small>e.g. Individual plants/animals</small>	No																		

Summary							
Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost (\$)		
					Direct offset (\$)	Other compensatory measures (\$)	Total (\$)
Birth rate	0				\$0.00		\$0.00
Mortality rate	0				\$0.00		\$0.00
Number of individuals	0				\$0.00		\$0.00
Number of features	0				\$0.00		\$0.00
Condition of habitat	0				\$0.00		\$0.00
Area of habitat	3.54	5.36	151.32%	Yes	\$0.00	N/A	\$0.00
Area of community	0				\$0.00		\$0.00
					<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>

# Appendix G

## Risk Assessment



## Offset Management Plan

### Risk assessment for offset area

A qualitative risk assessment which considers the risks of achieving the objectives and outcomes for the offset area is presented in the table below. The risk assessment is completed in accordance with the EPBC Act Environmental Management Plan Guidelines (2014) and characterises risk as low, medium, high or severe, as derived from the likelihood (highly likely, likely, possible, unlikely, rare) and consequence (minor, moderate, high, major and critical) risk matrix.

The risk analysis assesses the risk of failure to achieve the OMP management objectives. It is necessary to re-evaluate and modify the risk analysis and contingency measures throughout the period of EPBC Act approval, particularly if any unforeseen risks emerge or any negative outcomes identified are greater than expected.

During the first five (5) years of monitoring and Annual Compliance Reporting, Offset Provider **KFF1 and/or The Proponent** will review management commitments in this Offset Management Framework, and if the review results in the need to revise the framework it will be revised and submitted for approval. It is noted that events are only addressed once in the risk assessment under the most relevant management objective, however, some events are likely to impact on multiple management objectives.

Note, potential impacts from the occurrence of cyclones have been included within the risk analysis table. Cyclones, if to occur proximal to the offset area, are likely to result in indirect impacts only, including increased rainfall and wind events. Whilst the pathway of and occurrence of cyclones can change easily, becoming difficult to determine, an assessment of the potential associated risks has been completed. According to BoM (2019), cyclones have rarely traversed inland SEQ for at least the last 20 years, with the exception of Cyclone Debbie in 2017 and Cyclone Alfred in 2025. While the risk of cyclones occurring south of 25°S has increased in more recent years, it is unlikely a formed cyclone would occur at or proximal to the offset area location. This is due to a range of factors, including surrounding changes in topography, modified urban environment and lack of warm open water to provide continued energy generation<sup>1</sup>.

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<sup>1</sup> Bureau of Meteorology 2019, *Past Tropical Cyclones*, BoM, Australian Government, accessed at <http://www.bom.gov.au/cyclone/tropical-cyclone-knowledge-centre/history/past-tropical-cyclones/>  
EPBC 2024/09844



**Risk framework**

		Consequence				
Likelihood		Minor	Moderate	High	Major	Critical
	Highly Likely	Medium	High	High	Severe	Severe
	Likely	Low	Medium	High	High	Severe
	Possible	Low	Medium	Medium	High	Severe
	Unlikely	Low	Low	Medium	High	High
	Rare	Low	Low	Low	Medium	High

**Likelihood and consequence**

<ul style="list-style-type: none"> <li>Qualitative measure of likelihood (how likely is it that this event/circumstances will occur after management actions have been put in place/are being implemented)</li> </ul>	
Highly likely	<ul style="list-style-type: none"> <li>Is expected to occur in most circumstances</li> </ul>
Likely	<ul style="list-style-type: none"> <li>Will probably occur during the life of the project</li> </ul>
Possible	<ul style="list-style-type: none"> <li>Might occur during the life of the project</li> </ul>
Unlikely	<ul style="list-style-type: none"> <li>Could occur but considered unlikely or doubtful</li> </ul>
Rare	<ul style="list-style-type: none"> <li>May occur in exceptional circumstances</li> </ul>
<ul style="list-style-type: none"> <li>Qualitative measure of consequences (what will be the consequence/result if the issue does occur)</li> </ul>	
Minor	<ul style="list-style-type: none"> <li>Minor risk of failure to achieve the plan's objectives. Results in short term delays to achieving plan objectives, implementing low cost, well characterised corrective actions.</li> </ul>
Moderate	<ul style="list-style-type: none"> <li>Moderate risk of failure to achieve the plan's objectives. Results in short term delays to achieving plan objectives, implementing well characterised, high cost/effort corrective actions.</li> </ul>
High	<ul style="list-style-type: none"> <li>High risk of failure to achieve the plan's objectives. Results in medium-long term delays to achieving plan objectives, implementing uncertain, high cost/effort corrective actions.</li> </ul>
Major	<ul style="list-style-type: none"> <li>The plan's objectives are unlikely to be achieved, with significant legislative, technical, ecological and/or administrative barriers to attainment that have no evidenced mitigation strategies.</li> </ul>



- Critical

- The plan's objectives are unable to be achieved, with no evidenced mitigation strategies.



**Risk assessment and management**

Management objective/desired outcome	Event or circumstance	Relevant management actions/measures	Residual risk			Trigger detection and monitoring activity/ies	Feasible/effective corrective actions
			L	C	RL		
To legally secure approved offset properties for conservation.	<p>Failure to legally secure approved offset area.</p> <p>Legislative reform prejudices proposed tenure arrangements for offset properties.</p>	<p>Management action 1:</p> <ul style="list-style-type: none"> <li>Legally secure the offset area via a suitable method such as a voluntary declaration under the <i>Vegetation Management Act 1999</i> or a covenant under the <i>Land Act 1994</i> or <i>Land Titles Act 1994</i>.</li> </ul>	R	Mod	Low	Clearing of the 5.9 ha impact area cannot occur without legally securing the offset area.	N/A
Pest management	Failure to reduce the threat of feral animals	<p>Management Action 2:</p> <ul style="list-style-type: none"> <li>Conduct baseline surveys and determine relative abundance index.</li> <li>Implement predator control program.</li> <li>Conduct follow-up monitoring and implement further control.</li> </ul>	U	Mod	Low	<p>Monitoring of the presence of introduced predators through the use of remote motion-activated cameras;</p> <p>Survey the site to record the presence / absence of signs of introduced predator (sightings, killings and/or scats and tracks).</p>	<ul style="list-style-type: none"> <li>Should the initial and ongoing introduced predator control measures not result in a reduction of introduced predator numbers (compared to baseline survey), introduced predator program to be expanded/adapted to improve outcomes.</li> <li>Any incidence of injury/mortality resulting from introduced predator attack will initiate supplementary</li> </ul>



Management objective/desired outcome	Event or circumstance	Relevant management actions/measures	Residual risk			Trigger detection and monitoring activity/ies	Feasible/effective corrective actions
			L	C	RL		
							<p>monitoring and control measures.</p> <p>In the event that an offset species is found injured, transport immediately to a local vet, or suitably qualified and experienced wildlife carer.</p>
WONS management	Failure to control WONS.	<p>Management Action 3:</p> <ul style="list-style-type: none"> <li>Develop and implement a weed strategy, to maintain weeds listed with particular ability to impact on movement and structural vegetation composition (predominantly <i>Lantana camara</i>), and under the <i>Biosecurity Act 2014</i>, to reduce weed cover to target thresholds.</li> <li>Undertake weed management in accordance with the OMP.</li> </ul>	U	Mod	Low	<p>Annual photo monitoring for the first three years and then year 5, 10, 15, and 20 years and mapping of weed infestations, and 5-year targeted transects and MHQA surveys of non-native plant cover to ensure low weed abundance across offset area.</p> <p>Surveys in-line with weed management strategy.</p> <p>Repeated surveys of baseline data including 5 yearly habitat monitoring data as part of the framework.</p>	<p>If weed survey indicates WONS cover has increased since previous survey, the weed control program will be expanded/ adapted to improve outcomes.</p>
High intensity fire	A high intensity uncontrolled fire occurs within the offset area/s which	Management Action 4: Actions as directed by the local authority which may include prescribed burning or other techniques	P	M	Med	Annual monitoring requirements to review access tracks, fire breaks, fuel loads and outcomes of controlled	<p>If a wildfire occurs in the offset area, the following actions will be undertaken:</p>



Management objective/desired outcome	Event or circumstance	Relevant management actions/measures	Residual risk			Trigger detection and monitoring activity/ies	Feasible/effective corrective actions
			L	C	RL		
	causes loss of habitat.	undertaken in consultation with the Queensland Rural Fire Brigade and controlled grazing to manage fuel loads.				burns or other management techniques such as use of livestock.	<ul style="list-style-type: none"> <li>• Implement fire control</li> <li>• Repair any fire breaks and access tracks.</li> <li>• Stay informed through the Rural Fire Service.</li> <li>• Assess damage caused by the wildfire and monitor for natural regeneration.</li> <li>• Monitoring to occur 3-6 months post event or after the next wet weather event (whichever is sooner).</li> </ul>
Achieve performance targets and completion criteria for habitat	Landowner-approval holder agreements fail to adequately address management commitments in the offset plan.	Management Action 1-5: <ul style="list-style-type: none"> <li>• The offset area has been legally secured for conservation purposes. The development of this framework outlines specific management actions to achieve performance criteria.</li> </ul>	U	Mod	Low	Scheduled monitoring/surveys and Annual Compliance Reports	<ul style="list-style-type: none"> <li>• Review Offset Management Framework</li> <li>• Implement adaptive management and corrective actions</li> </ul>



Management objective/desired outcome	Event or circumstance	Relevant management actions/measures	Residual risk			Trigger detection and monitoring activity/ies	Feasible/effective corrective actions
			L	C	RL		
	The offset area fails to naturally regenerate.	Management Action 3: <ul style="list-style-type: none"> <li>Remove incompatible land uses.</li> <li>WONS management (refer Management Action 3).</li> <li>Sufficient rest period.</li> </ul>	U	Mod	Low	After a sufficient rest period the repeat MHQA will indicate progress towards performance criteria.	<ul style="list-style-type: none"> <li>Where natural regeneration is failing to thrive, assist natural regeneration through direct seeding and planting</li> <li>infill planting/ revegetation to be implemented after sufficient rest period.</li> </ul>
	Failure to increase habitat for offset species.	Management Action 1: <ul style="list-style-type: none"> <li>legally secure offset area and remove incompatible land uses.</li> </ul> Management Action 3: <ul style="list-style-type: none"> <li>Reduce the extent of weed as per criteria; and</li> <li>Implement infill planting if required.</li> </ul>	U	Mod	Low	Annual surveys (photo monitoring & audit of revegetation works) of revegetation area to ensure plant survival.  Repeated surveys of baseline data including 5-yearly MHQA habitat monitoring data and annual observational data as part of the OMP.	If MHQA transects indicate habitat less than performance indicators, implement infill planting in weed control areas.  Should plant stock fail supplementary planting, direct seeding, weed control, fertiliser, amelioration or other management actions necessary to stimulate tree growth.



Management objective/desired outcome	Event or circumstance	Relevant management actions/measures	Residual risk			Trigger detection and monitoring activity/ies	Feasible/effective corrective actions
			L	C	RL		
	Where infill planting is required and there is high plant stock failure.	Management Action 3: <ul style="list-style-type: none"> <li>Adhere to planting method and watering schedule.</li> </ul>				Annual plant stock audit (first 5 years).  Planting and monitoring event schedules by the qualified bush regenerator.	If there is a high rate of plant stock failure adaptive management and corrective actions will be implemented and may include, additional supplementary planting, direct seeding, weed control, fertiliser, water spike, mulching, tree guards, etc.

