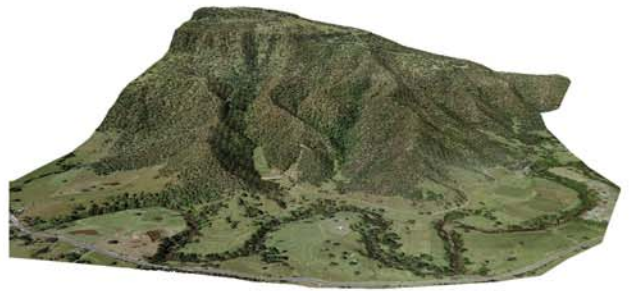




# CANUNGRA RISE OFFSET MANAGEMENT PLAN

EPBC 2015/7485

Prepared for ELBINA P/L



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## Document Control

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### 1.0 INTRODUCTION AND BACKGROUND

Elbina P/L has engaged Planit Consulting to prepare an Offset Management Plan for the Canungra Rise Estate located at Finch Road, Canungra. Canungra Rise is an approved 298 allotment residential subdivision which incorporates 18.3 hectares of parkland and 112 hectares of environmental offset for the long term retention and protection of habitat for the koala.

Canungra Rise was referred under the *Environment Protection and Biodiversity Conservation Act* and determined to be a 'controlled action' under the provisions of sections 18/18A (listed threatened species and communities) of the Act (EPBC2015/7485 dated 30<sup>th</sup> June 2015). The assessment process determined by the Department of Environment was that of 'preliminary documentation' with the required assessments and documentation to be prepared and advertised up until the 30<sup>th</sup> June 2016. During the assessment process it was determined by the Department that the controlling provisions would be the potential impact to approximately 26 hectares of habitat 'critical to the survival' of the Koala which is listed as Vulnerable under the EPBCA.

On 22<sup>nd</sup> August 2016 the Canungra Rise Estate residential development was granted approval under sections 130(1) and 133 of the EPBCA subject to compensation for the loss of koala habitat associated with the development. The agreed compensation would be the provision of 112.2 hectares of koala habitat on the Canungra Rise site as a direct offset to be secured in perpetuity via a Voluntary Declaration under the *Queensland Vegetation Management Act 1999*. The offset area, as agreed throughout the preliminary documentation process and reflected in Map 1 of the EPBC2015/7485 approval, was determined by applying the requirements identified within both the EPBCA Environmental Offsets Policy and the Offset Assessment Guide.

Condition 4 of the approval also requires the preparation of an Offset Management Plan which must:

- i. include monitoring and be designed so that the results are adequate to inform adaptive management and demonstrate whether the outcomes and milestones required by these conditions are on track to be achieved (before they are due) and have been achieved (at the time they are due);
- ii. include contingency measures to mitigate the risks of not achieving the outcomes and milestones required by these conditions;
- iii. be prepared in consultation with a suitably qualified person, and include written evidence of how the suitably qualified person's advice has been considered;



- iv. be in accordance with the proposed offset strategy; and,
- v. demonstrate how it is consistent with the Koala conservation advice.

This report has been prepared to respond to the approval holders obligations as described by Condition 4 of the EPBC2015/7485 approval.

The overarching objectives of this Offset Management Plan (OMP) are to:

- Ensure that koala habitat within the offset area is legally secured
- Ensure that the quality of koala habitat within the offset area is improved over time in accordance with the commitments made to the Department within the Proposed Offsets Strategy (being Planit [April 2016] Proposed Offsets for MNES-Finch Road, Canungra, Canungra Rise Estate EPBC2015/7485)
- Ensure that those values which provide koala habitat within the offset remain protected and sustainable such that the species continues to remain within the secured habitat over the life of the approval (20 years)

The management actions and strategies proposed to be implemented to achieve the above are detailed within this report.

#### 1.1 TERMS, DEFINITIONS AND ACRONYMS

The following terms are used within this report:

**Approval:** means EPBC2015/7485 approval for the Canungra Rise Estate.

**Approval holder:** means the person to whom the approval is granted, or any person acting on their behalf, or to whom approval is transferred under section 145B of the EPBC Act. For this offset under EPBC2015/7485 the approval holder is Elbina Pty Limited.

**Baseline values:** Baseline extent is 112.2 ha and baseline quality is 8, as previously described in the proposed offset strategy. Habitat condition baselines are those outlined within this management plan.

**Canungra Rise:** the development or action.

**Contractor:** means a party or company appointed by the proponent that performs works on site, and includes all employees of the Contractor and its sub-contractors, e.g. machinery operators, bush regenerators, spotter catchers etc

**Commencement:** in regards to the application of this Offset Management Plan, means the date of the Minister's approval of this Offset Management Plan.

**Commence / commenced / commencement of construction:** in regard to the action means any preparatory works required to be undertaken including clearing vegetation, the erection of any onsite temporary structures and the use of heavy equipment for the purposes of breaking the ground for road construction, buildings or infrastructure.

**Construction:** means the clearing of land and creation of residential allotments, roadways and infrastructure services (sewerage, electricity, water, stormwater) associated with the action. This does not include preparatory works.

**Critical koala habitat/Habitat critical to the survival of the koala:** Koala habitat that is considered to be important for the species' long-term survival and recovery. An area that scores five or more using the habitat assessment tool for the koala in Table 4 of koala referral guidelines is highly likely to contain habitat critical to the survival of the koala.

**Department/DoE:** the Australian Government Department administering the EPBC Act.

**Development or action:** Stages 1-4, 6-8 of the Canungra Rise Estate per the referral received by the Department (EPBC2015/7485) on 22 May 2015. This excludes stage 5 as varied on 14 August 2015.

**DNRM:** the QLD Department of Natural Resources and Mines.

**EPBC Act:** the Environment Protection and Biodiversity Conservation Act 1999 (Cth).

**EPBC Act Environmental Offsets Policy:** Department of Sustainability, Environment, Water, Population and Communities (2012). Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy. Commonwealth of Australia, Canberra.

**EPBC Act offsets assessment guide:** the offsets assessment guide tool and how to use the offsets assessment guide document that accompany the EPBC Act Environmental Offsets Policy.

**Koala:** the Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) (*Phascolarctos cinereus* (combined populations of Qld, NSW and the ACT)) listed as a threatened species under the EPBC Act.

**Koala conservation advice:** Threatened Species Scientific Committee (TSSC) (2012). Approved Conservation Advice for *Phascolarctos cinereus* (combined populations of Queensland, New South Wales and the Australian Capital Territory), Commonwealth of Australia, Canberra.

**Koala habitat:** habitat containing species that are known Koala food trees (species of tree whose leaves are consumed by Koalas), including *Eucalyptus moluccana*, *Eucalyptus tereticornis*, *Eucalyptus punctata*, *Eucalyptus exerta* and *Corymbia citriodora*.

**Koala referral guidelines:** the EPBC Act referral guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) document (CoA, 2014).

**Life of the approval:** 20 years after the commencement of construction.

**NES:** means National Environmental Significance.

**Offset area (OA):** the area labeled as 'covenants' in Map 1 of EPBC2015/7485 (refer Figure 3).

**Offset area management plan (OMP):** This document.

**Proponent:** the approval holder.

**Proposed offset strategy:** the document provided to the Department named 'proposed offsets for MNES - Finch Road Canungra, Canungra Rise Estate (EPBC 2015/7485), dated April 2016.

**Quality:** means the habitat quality score comprised of site condition, site context and species stocking rate calculated in accordance with the requirements of the EPBC Act offsets assessment guide or as it relates to the koala means the habitat quality score used to identify habitat critical to the survival of the koala in accordance with the koala referral guidelines.

**QPWS:** the Queensland Parks and Wildlife Service.

**SRRC:** Scenic Rim Regional Council.

**Secure:** means long-term protection under a legal mechanism that is either establishing a covenant on the title as a voluntary declaration under the *Vegetation Management Act 1999* (Qld), or establishing a Nature Refuge under the *Nature Conservation Act 1992* (Qld).

## 1.2 ROLES AND RESPONSIBILITIES

In accordance with the EPBC2015/7485 approval, the approval holder (Elbina Pty Limited) is responsible for ensuring that this Offset Management Plan (OMP) is implemented. The approval holder may appoint appropriately qualified contractors and personnel to undertake works in a manner that is consistent with this OMP and monitor their compliance with the requirements of the management plan. The approval holder is also responsible for notifying the Department of Environment of any incidences of non-compliance with any of the conditions of the approval, performance criteria set within this OMP and publishing relevant reports on their website and supplying the Department with proof of publication in accordance with the requirements of the EPBC2015/7485 approval.

## **2.0 SUMMARY DESCRIPTION OF OFFSET**

### 2.1 DEPARTMENT OF AUSTRALIA REFERENCE DETAILS

Canungra Rise will be developed in accordance with the subdivision approval enabled by Planning and Environment Appeal No. BD2151 of 2006 (dated 11<sup>th</sup> February 2011) and Generally in Accordance determination issued by Scenic Rim Regional Council (MCBd14/096) dated 25<sup>th</sup> November 2014.

In accordance with EPBCA approval EPBC2015/7485 Elbina P/L is required to finalise the submitted Proposed Offset Strategy and secure 112.2 hectares of koala habitat on the Canungra Rise site as a direct offset for the loss of approximately 26 hectares of habitat 'critical to the survival' of the koala.

**TABLE 1: APPROVED DEVELOPMENT DETAILS**

SITE ALLOTMENT DESCRIPTIONS	PART LOTS Lot 3 SP 261485, Lot 2 SP261484, Lot 3 SP261484, Lot 502 SP 261486 located at Finch Road, Canungra
SITE AREA	223.8 hectares including road reserve
APPROVED NUMBER OF RESIDENTIAL ALLOTMENTS	298
AREA OF PARKLAND	18.3 hectares
OWNER	Elbina P/L
TENURE	Freehold
LOCAL GOVERNMENT AREA	Scenic Rim Regional Council
LOCAL GOVERNMENT APPROVAL REFERENCE	P&E Appeal No. BD2151 of 2006 & MCBd14/096
DEPARTMENT OF ENVIRONMENT APPROVAL REFERENCE	EPBC2015/7485
CONTROLLING PROVISION	Listed Threatened Species (Koala)

**DEVELOPMENT SUMMARY**

ROAD WIDTHS					
ROAD	WIDTH	DESCRIPTION	AREA / LENGTH	RATIO	TOTAL AREAS
1	18 & 20m	Minimum Lot Area (Urban)	(in Stage 5) 701m <sup>2</sup>		
2	18m	Maximum Lot Area	(Lot 91) 52.9ha		
2A	18m	Total Lot Area		80%	178.8 ha
3	18m	Park Area		7%	16.1ha
4	18m	Park Area (Drainage Reserve)		1%	2.2ha
5	18m	Road Length (Subdivision)	6.92 km		
6	18 & 20m	Road Length (in MRD Corridor)	0.58 km		
7	18m	Total Road Length (to be Constd.)	7.5 km		
8	18 & 20m	Estate Roads		6%	13.3ha
9	18m	Existing Road Reserve in area required by MRD	4.4ha		
10	18m	New Road in area required by MRD	7.8ha	6%	13.4ha
11	18m	Additional Existing Road Reserve & Land in Future Corridor	1.2 ha		
Finch Road North	20m	TOTAL AREA (including Existing Road Reserve)		100%	223.8 ha

## 2.2 OFFSET AREA LOCATION AND CURRENT OWNERSHIP

The approved offset area (OA) is located within the Canungra Rise site immediately adjacent to the approved impact areas of the development and incorporates 112 hectares of habitat critical to the survival of the koala. In association with the final boundary survey of the OA please note that an increase from 112 to 117 hectares has occurred. The nominated areas (refer Figure 3) will be preserved as environmental covenants on future allotments (created by the approved subdivision) and protected as a voluntary declaration under the Queensland Vegetation Management Act binding the protected areas on the future land titles.

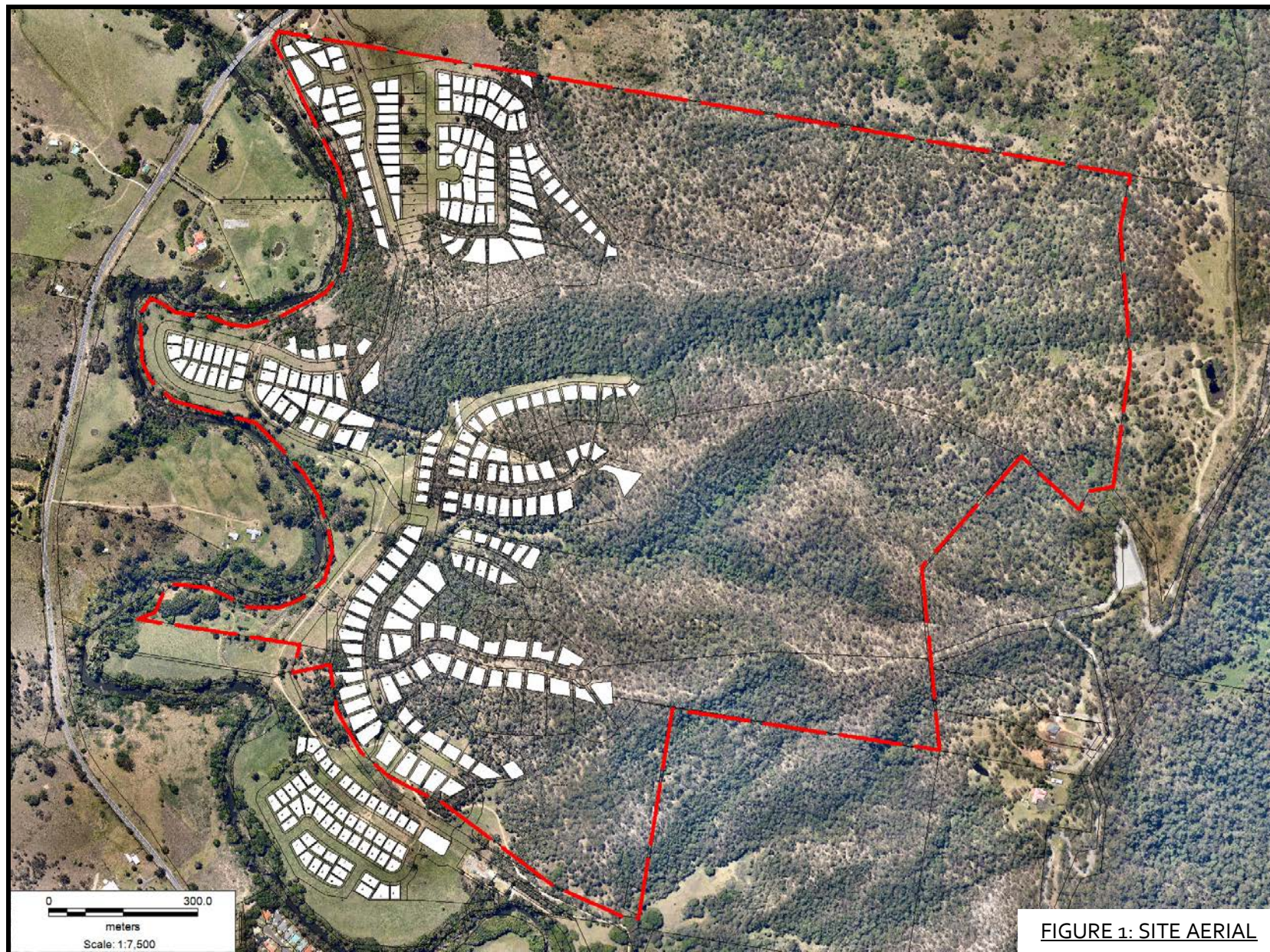
**TABLE 2: OFFSET OWNER DETAILS**

REGISTERED OWNERS	Elbina P/L
BUSINESS/COMPANY NAME	Elbina P/L
CONTACT PERSON	Dale Holt
PHONE NUMBER	07 5570 6607
EMAIL	<a href="mailto:dholt@winten.com.au">dholt@winten.com.au</a>
POSTAL ADDRESS	PO Box 2578 Southport BC 4215

**TABLE 3: OFFSET AREA PROPERTY DETAILS**

PROPERTY NAME	CANUNGRA RISE
REAL PROPERTY DESCRIPTION	PART LOTS Lot 3 SP 261485, Lot 2 SP261484, Lot 3 SP261484, Lot 502 SP 261486
TENURE	FREEHOLD
LOCAL GOVERNMENT AREA	SCENIC RIM REGIONAL COUNCIL
OFFSET AREA SIZE	117.641 HECTARES











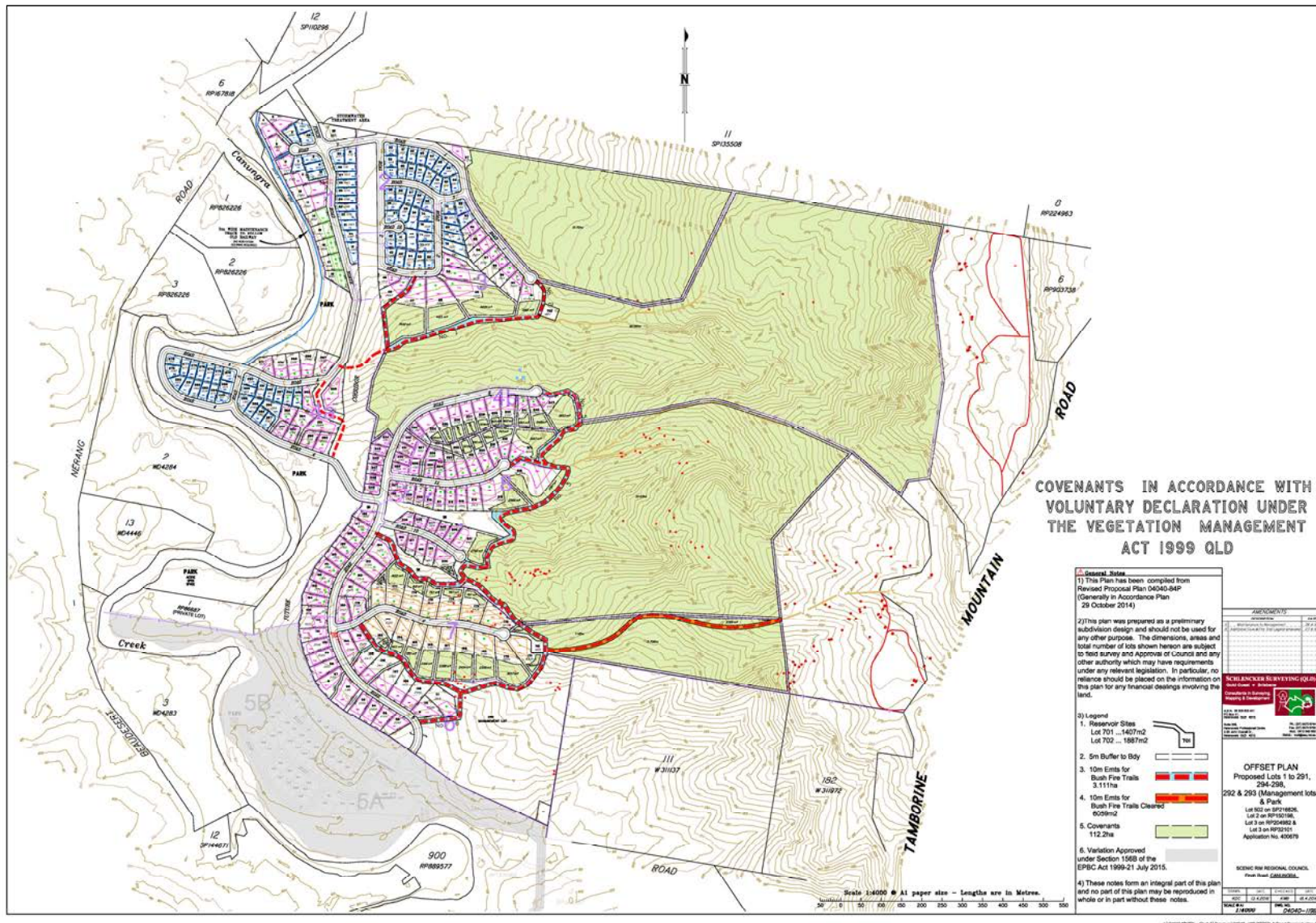


FIGURE 3: APPROVED OFFSET PLAN



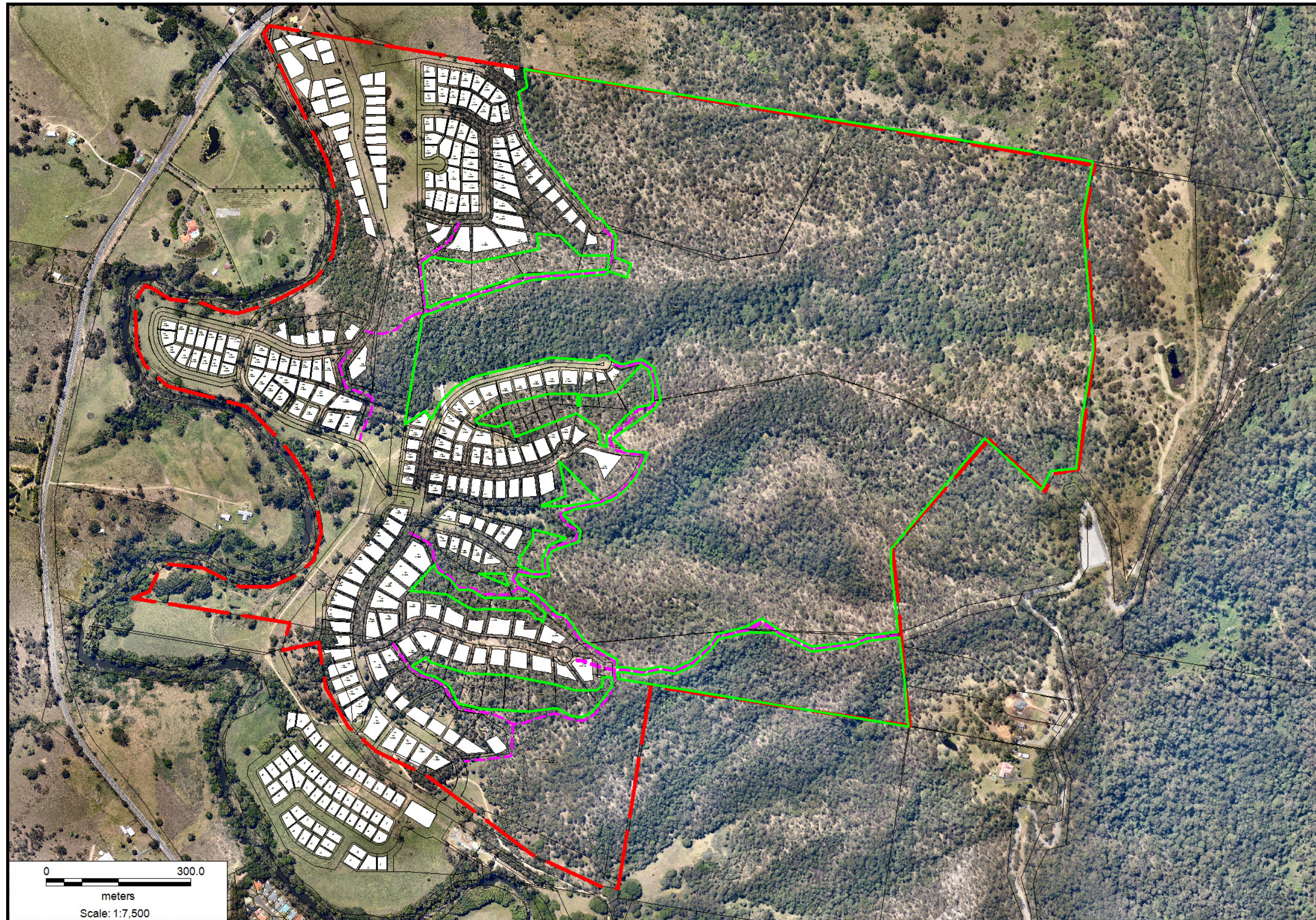


FIGURE 3A: FINAL 117 HECTARE OFFSET AREA/AERIAL OVERLAY



### 2.3 OFFSET AREA VEGETATION/HABITAT

The offset area (and Canungra Rise site) currently support a number of vegetation communities as identified in previous studies (Planit, 2004-2015) and regional ecosystem mapping prepared by the QLD Department of Natural Resources and Mines (refer Figures 3 and 4):

#### VEGETATION COMMUNITY 1: Eucalypt Woodland/Open Forest

The mapped remnants consist of a complex of mixed Eucalypt open forest/woodland that is highly disturbed in parts, is subject to grazing activities, and contains large areas of immature regrowth, particularly in the lower portions of the site and either side of ridgeline vehicular tracks. The more intact and mature remnants are located on the steeper, sheltered slopes and less accessible areas of the property.

Weed invasion is significant in some parts, particularly in the gullies where dense grass and Lantana (*Lantana camara*) growth is impenetrable in sections. Otherwise, most weeds present are common woody and herbaceous pasture weeds (eg *Gomphocarpus* spp, *Cirsium vulgare*, *Verbena bonariensis*, *Neonotonia whightii*, *Senecio madagascariensis* etc) and pasture/exotic grasses.



The canopy dominants vary throughout according to geology, aspect and soil moisture. The lower slopes and ridges are generally comprised of a variety of Stringybarks, Grey Gums, Spotted Gums and Ironbarks with Brush Box in the gullies. Canopy species include: *Eucalyptus major*, *E. biturbinata*, *E. siderophloia*, *Eucalyptus eugenioides*, *E. acmenoides*, *E. tindaliae*, *E. tereticornis*, *Corymbia citriodora*, *C. henryii* and *C. tessellaris*. Also present but less common are *Eucalyptus fibrosa*, *E. microcorys*, *E. carnea* and *Corymbia intermedia*.

Grey Gums (*E. major*, *E. biturbinata*) are widely distributed across the site along with Spotted Gum, Ironbarks and Stringybarks which also dominate the ridgelines. Brush box, Grey Gum and Tallowwood (*Eucalyptus microcorys*) are more common in the moister gullies and on sheltered slopes. Forest Red Gum (*Eucalyptus tereticornis*) is also broadly scattered but becomes more common in higher areas and where Grey Gums are less so.





The canopy height varies but on average does not exceed 20 metres on ridgelines and drier slopes with most areas averaging 15 metres. Canopy height does increase up to about 25 metres in the more sheltered sections and on richer soils. Trees exceeding 30 metres are rare and confined to scattered post-mature individuals. Stem diameters of canopy trees average around 250 -300 mm and rarely exceed 450mm.

On the higher slopes and ridges the canopy is dominated by Stringybarks (*Eucalyptus eugenioides*, *E. microcorys*, *E. tindaliae*, *E. carnea*), Box (*Eucalyptus melliodora*, *E. moluccana*), Forest Red Gum (*Eucalyptus tereticornis*) and Grey Gum (*Eucalyptus biturbinata*) with Forest Oak (*Allocasuarina torulosa*) common. Other canopy trees present include Narrow-leaved Ironbark (*Eucalyptus crebra*), Grey Ironbark (*E. siderophloia*), Spotted Gum (*Corymbia citriodora*) with Pink Bloodwood (*C. intermedia*), Moreton Bay Ash (*C. tessellaris*) and Broad-leaved Apple (*Angophora subvelutina*) less common.

The canopy height in these areas averages 20-25 metres with stem diameters averaging about 300-350 mm and rarely exceeding 450 mm. *Allocasuarina* is dominant in sections on the higher slopes in association with Ironbark, Forest Red Gum, Yellow Box (*E. melliodora*) and Gum-topped Box (*E. moluccana*).





The higher seasonal gullies include some Brush Box and drier rainforest-type species such as Hard Quandong (*Elaeocarpus obovatus*), Blackwood (*Acacia melanoxylon*), Hairy Alectryon (*Alectryon tomentosus*), Brush Cherry (*Syzygium australe*), Grey Myrtle (*Backhousia myrtifolia*), Red Ash (*Alphitonia excelsa*), Mock Olive (*Notolea longifolia*), Sandpaper Fig (*Ficus coronata*) with some shrub growth (*Carissa ovata*, *Eupomatia laurina*, *Cordyline petiolaris*, *Cordyline congesta*), vines (*Cissus antartica*, *Derris involuta*, *Pandorea jasminoides*, *Celastrus australis*) and ferns (*Adiantum hispidulum*, *A. atroviride*, *Asplenium australsicum*) in the moister sites.

There is generally no defined sub-tree layer although in some parts *Allocasuarina torulosa* and a mix of Wattles (*Acacia leiocalyx*, *A. dispartima*, *A. falcata*, *A. maidenii*) form a tall shrub to small tree layer 6-8 metres high and in the more disturbed parts there is regrowth of juvenile eucalypts.

The shrub layer is generally very sparse and lacking diversity. It is mostly absent in the higher parts of the site where the Stringybark- Box alliance dominates as the understorey of this alliance is open and grassy. On the lower parts the shrub layer varies across the site according to soil profile, aspect and level of disturbance. In the more intact parts it includes species such as Coffee Bush (*Breynia oblongifolia*), Dogwood (*Jacksonia scoparia*), Orangebark (*Maytenus silvestris*), Bushman's Bootlace (*Wikstroemia indica*), Poison Peach (*Trema tomentosa*), Long-leaved Mock Olive (*Notolea ovatifolia*), Prickly Broom Heath (*Leucopogon juniperinus*), Orange Boxwood (*Denhamia celastroides*), Prickly Moses (*Acacia ulicifolia*), Quinine Bush (*Petalostigma trilobulare*), Shaggy Pea (*Oxylobium ilicifolium*), Bush Pea (*Pultenea retusa*), Midgen (*Austromyrtus dulcis*), Rice Flower (*Pimelia linariifolia*), Grass Tree (*Xanthorrhoea johnsoni*), Hairy Psychotria (*Psychotria loniceroides*), Diamond-leaved Pittosporum (*Auranticarpa rhombifolia*) etc. *Lantana camara* dominates the more disturbed areas.

The ground layer varies including a variety of common ferns, herbs and creeping plants but is mostly dominated by grasses which are sparse on the rocky lower slopes and dense on the more open upper slopes. Common species include: Barbed-wire Grass (*Cymbopogon refractus*), Blady Grass (*Imperata cylindrica*), Kangaroo Grass (*Themeda triandra*), Flax Lily (*Dianella* spp), Matrush (*Lomandra longifolia*, *L. multiflora*), Barbed-wire Vine (*Smilax australis*), Tape Vine (*Stephania japonica*), Variable Sword-sedge (*Lepidosperma laterale*), Native Sarsaparilla (*Hardenbergia violacea*), Winter Apple (*Eremophila debilis*) etc. There is a high level of weed invasion in the more disturbed parts and in the areas accessible to grazing. These are mostly common herbaceous and woody pasture weeds such as *Bidens pilosa*, *Verbena bonariensis*, *Cirsium vulgare*, *Gomphocarpus* spp, and exotic grass species.

#### Sub-Alliances

Two small sub-alliances of wetter Sclerophyll Forest were noted within the overall Eucalypt Open Forest/Woodland matrix. These two areas are briefly described below and diagrammatically represented on Figure 3.

There is an area of Tall Eucalypt Forest on the south-facing slope directly to the north of the rifle range that is largely composed of Wet Sclerophyll species. Canopy dominants include Flooded Gum (*Eucalyptus grandis*), Grey Gum (*Eucalyptus major*, *E. biturbinata*), Brush Box (*Lophostemon confertus*) with some Hoop Pine (*Araucaria cunninghamii*) at the lower edge. The canopy has a height of 25-30 metres with average stem diameters around 350-450mm. The understorey contains some dry rainforest elements including Long leaved Tuckeroo

(*Cupaniopsis newmanii*), Bennett's Ash (*Flindersia bennettianna*), Grey Myrtle (*Backhousia myrtifolia*), Carissa (*Carissa ovata*), Red Kamala (*Mallotus phillippensis*), Rough Elm (*Aphananthe philippinensis*), Native Holly (*Alchornea ilicifolia*) etc.



There is also a marginal area of Wet Sclerophyll Forest in the gully to the south of the rifle range aligned with an existing gully. The area is highly disturbed with dense areas of Lantana and Large Leaved Privet below an emergent canopy of Flooded and Grey Gum. The vegetation fringing the lower part of the seasonal gully is dominated by some large Black Tee Tree and includes juvenile Hoop Pines, Bennetts Ash, Grey Myrtle, Sandpaper Figs, Hairy Alectryon and Red Kamala.



#### VEGETATION COMMUNITY 2: Open Paddock with Scattered Trees/Regrowth

These areas dominate the lower parts of the site between Canungra Creek and the disturbed lower slopes, but are also present on the higher parts at the eastern boundary and the gentler slopes in the northern and eastern parts of the property. These areas have been cleared and utilised for pasture with the lower parts having been cultivated and improved for grazing purposes with a high proportion of introduced grasses. The higher sections are generally dominated by native grass species. Woody and herbaceous weeds are common throughout.





The open areas do however contain a few mature and post mature remnant trees: Forest Red Gums (*Eucalyptus tereticornis*) and Grey Gums (*E. major*) on the lower parts, Ironbarks (*E. siderophloia*, *E. crebra*, *E. fibrosa*), Stringybarks and others on the higher parts of the site. The largest trees have a height greater than 30 metres and stem diameters in excess of 1200 mm, containing numerous branch and stem hollows.



Regrowth does occur on sections of the previously cleared lower slopes and hills although these areas are still grazed. The regrowth is generally dominated by juvenile canopy trees (Eucalypts, Brush Box and *Acacia* spp) averaging 5-6 metres, but with occasional trees to 15 metres. These areas are mostly absent of native shrub and other understorey species and have a high level of herbaceous and woody weed invasion.

### VEGETATION COMMUNITY 3: Riparian/Riverine Association

The riparian remnant is very narrow, fragmented, has a high level of weed invasion and has been cleared to the creek edge in many places. The remnant is no more than 30 metres at the widest point and averages about 10 metres from the creek edge.





The remaining canopy is dominated by River Oak (*Casuarina cunninghamiana*), Black Tea Tree (*Melaleuca bracteata*) and emergent Eucalypts (*Eucalyptus tereticornis*, *Eucalyptus grandis*, *Eucalyptus siderophloia*) and occasionally Brush Box (*Lophostemon confertus*). Hoop Pine (*Araucaria cunninghamii*) is present in a small cluster in the central west of the creekline on the site. The canopy height is varying (10-25m) emergent species around 30 metres high.



Other canopy or small trees include: Blackbean (*Castanospermum australe*), Silky Oak (*Grevillea robusta*), Laurel (*Cryptocarya triplinervis*), Whalebone Tree (*Streblus brunonianus*), Rough Elm (*Aphananthe philippinensis*), Red Kamala (*Mallotus philipensis*), Lillipilli (*Syzygium australe*), Figs (*Ficus coronata*, *F. macrophylla*, *F. obliqua*), Teak (*Flindersia australis*), Red Cedar (*Toona ciliata*), and Blackwood (*Acacia melanoxylon*). Large Leaved Privet (*Ligustrum sinense*), Camphor Laurel (*Cinnamomum camphora*) and Chinese Celtis (*Celtis sinensis*) are abundant and form thickets in several areas.



Vines are also a consistent element in the canopy and lower strata and are dominated by exotic species (Madeira Vine, Morning Glory, Mile-a-Minute, Cats Claw Creeper etc). Native vines are present in low abundance including common species (*Maclura cochinchensis*, *Cissus antartica*, *C. hypoglauca*, *Derris involuta*, *Trophis scandens*).

The creek edge and shallower channels are lined with Creek Matrush (*Lomandra hystrix*) and Weeping Bottlebrush (*Callistemon viminalis*). Mistweed (*Ageratina riparia*), Billygoat Weed (*Ageratum houstonianum*) and other weeds are common within the high flow channels. Elsewhere the shrub and ground strata are dominated by environmental woody and herbaceous weed species with very few native species present.

#### **REGIONAL ECOSYSTEM MAPPING:**

Five regional ecosystems (RE) have been mapped over the site (refer Figure 4) as described below. It is to be noted that the dominant RE of the Offset Area is 12.9-10.17/a with alluvial REs (12.3.1/12.3.7) well removed to the west and associated with Canungra Creek which does not form part of the offset area.

##### **12.3.1 Endangered [not within offset area]**

Complex to simple notophyll vine forest. Waterhousea floribunda is predominant fringing stream channels. Other species can include Cryptocarya hypospodia, C. obovata, C. triplinervis, Argirodendron trifoliolatum, Ficus coronata, F. fraseri, F. macrophylla forma macrophylla, Aphananthe philippinensis, Elaeocarpus grandis, Grevillea robusta, Castanospermum australe and Syzygium francisii. Ficus racemosa and Nauclea orientalis in north of bioregion. Eucalyptus spp. emergents (e.g. E. grandis) and Araucaria cunninghamii; less commonly Agathis robusta may also be present. Occurs on Quaternary alluvial plains and channels. (BVG1M: 4b)

##### **12.3.7 Least Concern [not within offset area]**

Narrow fringing woodland of Eucalyptus tereticornis, Casuarina cunninghamiana subsp. cunninghamiana +/- Melaleuca viminalis, Waterhousea floribunda. Other species associated with this RE include Melaleuca bracteata, M. trichostachya, M. linariifolia and M. fluviatilis in north of bioregion. Lomandra hystrix often present in stream beds. Occurs on fringing levees and banks of rivers and drainage lines of alluvial plains throughout the region. (BVG1M: 16a)



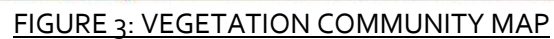
12.9-10.17 and 12.9-10.17A Least Concern

Open forest to woodland complex generally with a variety of stringybarks, grey gums, ironbarks and in some areas spotted gum. Canopy trees include *Eucalyptus siderophloia*, *E. propinqua* or *E. major*, *E. acmenoides* or *E. portuensis*, *E. carnea* and/or *E. microcorys* and/or *Corymbia citriodora* subsp. *variegata*. Other species that may be present locally include *Corymbia intermedia*, *C. trachyphloia*, *Eucalyptus tereticornis*, *E. biturbinata*, *E. moluccana*, *E. longirostrata*, *E. fibrosa* subsp. *fibrosa* and *Angophora leiocarpa*. *Lophostemon confertus* or Whipstick *Lophostemon confertus* often present in gullies and as a sub-canopy or understorey tree. Mixed understorey of grasses, shrubs and ferns. Hills and ranges of Cainozoic and Mesozoic sediments. (BVG1M: 9a)

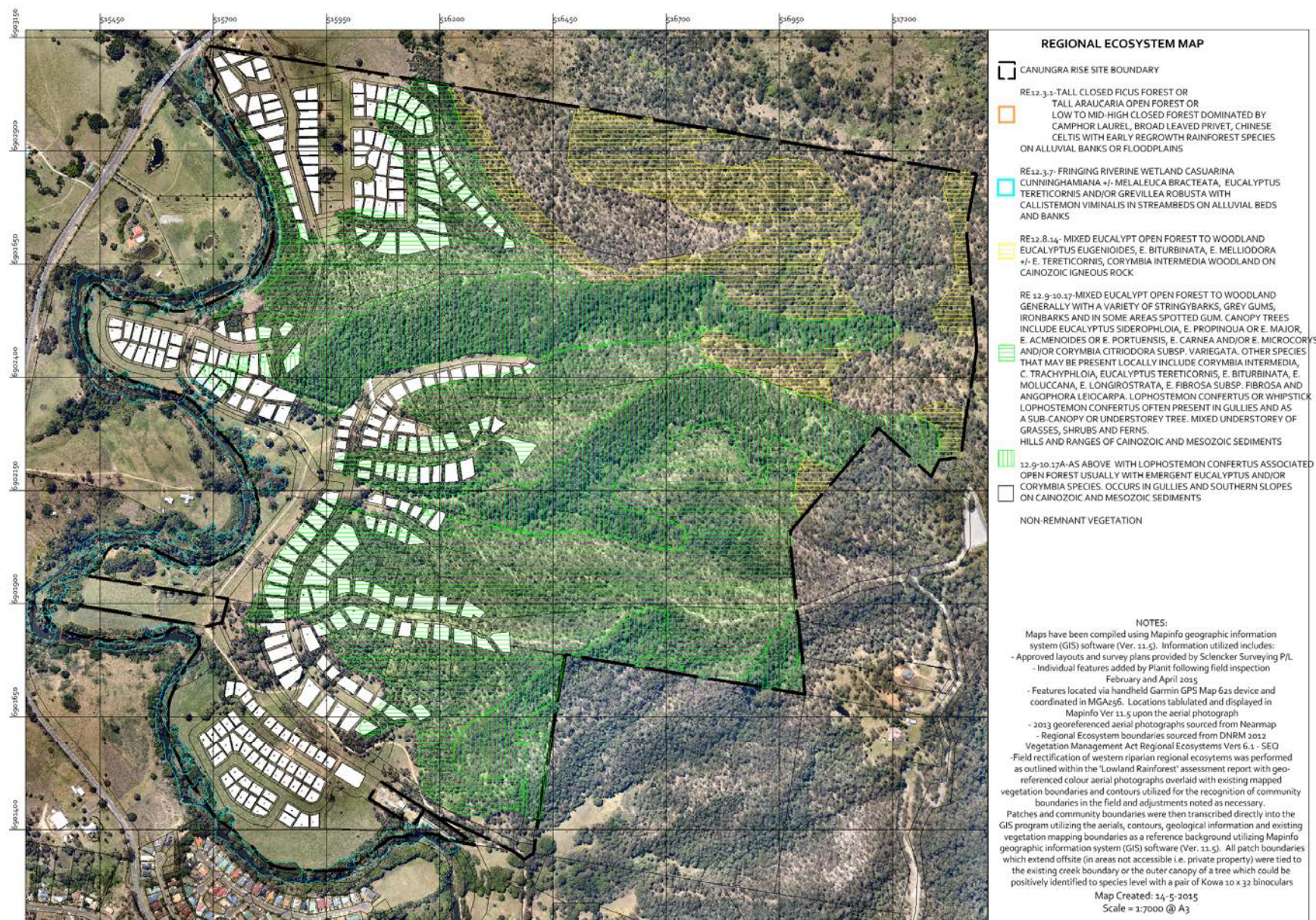
Vegetation communities in this regional ecosystem include:  
12.9-10.17a: *Lophostemon confertus* or *L. suaveolens* dominated open forest usually with emergent *Eucalyptus* and/or *Corymbia* species. Occurs in gullies and southern slopes on Cainozoic and Mesozoic sediments. (BVG1M: 28e)

12.8.14 Least Concern

*Eucalyptus eugenioides*, *E. biturbinata*, *E. melliodora* +/- *E. tereticornis*, *Corymbia intermedia*, *E. crebra* woodland. *Allocasuarina torulosa* is a common understorey species. Localised occurrences of *Eucalyptus laevopinea* and *E. banksii* may occur. Occurs on Cainozoic igneous rocks, especially basalt. (BVG1M: 11a)







**FIGURE 4: REGIONAL ECOSYTEM MAP**



## 2.4 SITE FAUNA ASSEMBLAGE

The development as approved will retain the majority of the existing eucalypt forest/woodland and the entire riparian zone. Such areas currently support a fauna assemblage typical to a combination of inland eucalypt forest, inland waterways and modified rural/agricultural habitats. Species previously encountered on the site by Planit (2004 and 2015) and Agnew and Ingram (2007) are tabulated below [note 2004 family/species names shown per previous reporting]:

CLASS	FAMILY	SPECIES NAME	COMMON NAME	ABUNDANCE	HABITAT ZONE
Birds	Accipitridae	<i>Aquila audax</i>	Wedge-tailed Eagle	R	EF
Birds	Accipitridae	<i>Accipiter novaehollandiae</i>	Grey goshawk	O	RA
Birds	Accipitridae	<i>Accipiter fasciatus</i>	Brown goshawk	O	RA, EF
Birds	Alcedinidae	<i>Alcedo azurea</i>	Azure kingfisher	R	RA
Birds	Anatidae	<i>Anas superciliosa</i>	Pacific black duck	C	RA, OP
Birds	Anatidae	<i>Chenonetta jubata</i>	Australian wood duck	C	AA
Birds	Anhingidae	<i>Anhinga melanogaster</i>	Darter	R	RA, OP
Birds	Ardeidae	<i>Ardea ibis</i>	Cattle egret	C	RA, OP
Birds	Ardeidae	<i>Ardea intermedia</i>	Intermediate egret	O	RA, OP
Birds	Ardeidae	<i>Egretta novaehollandiae</i>	White-faced heron	R	RA
Birds	Artamidae	<i>Artamus cyanopterus</i>	Dusky woodswallow	O	EF, RA
Birds	Artamidae	<i>Artamus personatus</i>	Masked woodswallow	O	EF, RA
Birds	Artamidae	<i>Cracticus nigrogularis</i>	Pied butcherbird	R	AA
Birds	Artamidae	<i>Cracticus torquatus</i>	Grey butcherbird	R	AA
Birds	Artamidae	<i>Gymnorhina tibicen</i>	Australian magpie	C	AA
Birds	Artamidae	<i>Strepera graculina</i>	Pied currawong	R	EF, RA
Birds	Cacatuidae	<i>Cacatua galerita</i>	Sulphur-crested cockatoo	R	EF, RA, OP
Birds	Cacatuidae	<i>Cacatua roseicapilla</i>	Galah	R	EF, RA, OP
Birds	Cacatuidae	<i>Calyptorhynchus lathami</i>	Glossy black-cockatoo	O	EF
Birds	Campephagidae	<i>Coracina novaehollandiae</i>	Black-faced cuckoo-shrike	C	AA
Birds	Centropodidae	<i>Centropus phasianinus</i>	Pheasant coucal	O	RA
Birds	Charadriidae	<i>Vanellus miles miles</i>	Masked lapwing	R	OP
Birds	Cinclosomatidae	<i>Psophodes olivaceus</i>	Eastern whipbird	R	EF, RA, OP
Birds	Climacteridae	<i>Cormobates leucophaeus metastasis</i>	White-throated treecreeper	O	EF
Birds	Columbidae	<i>Columba leucomela</i>	White-headed pigeon	R	RA
Birds	Columbidae	<i>Geopelia cuneata</i>	Diamond dove	O	OP
Birds	Columbidae	<i>Geopelia humeralis</i>	Bar-shouldered dove	C	AA
Birds	Columbidae	<i>Geopelia striata</i>	Peaceful dove	C	AA
Birds	Columbidae	<i>Macropygia amboinensis</i>	Brown cuckoo-dove	R	EF, RA
Birds	Columbidae	<i>Ocyphaps lophotes</i>	Crested pigeon	C	OP, EF
Birds	Coraciidae	<i>Eurystomus orientalis</i>	Dollarbird	R	OP, EF
Birds	Corvidae	<i>Corvus coronoides</i>	Australian raven	R	OP
Birds	Corvidae	<i>Corvus orru</i>	Torresian crow	C	AA
Birds	Cuculidae	<i>Cacomantis flabelliformis</i>	Fan-tailed cuckoo	R	EF
Birds	Cuculidae	<i>Cacomantis variolosus</i>	Brush cuckoo	R	EF
Birds	Cuculidae	<i>Cuculus pallidus</i>	Pallid cuckoo	O	EF
Birds	Dicruridae	<i>Dicrurus bracteatus</i>	Spangled drongo	R	EF, RA
Birds	Dicruridae	<i>Grallina cyanoleuca</i>	Magpie-lark	R	OP, EF
Birds	Dicruridae	<i>Myiagra rubecula</i>	Leaden flycatcher	O	RA
Birds	Dicruridae	<i>Rhipidura fuliginosa</i>	Grey fantail	C	AA
Birds	Dicruridae	<i>Rhipidura leucophrys</i>	Willie wagtail	C	AA
Birds	Dicruridae	<i>Rhipidura rufifrons</i>	Rufous fantail	O	EF
Birds	Halcyonidae	<i>Dacelo leachii</i>	Blue-winged kookaburra	C	EF

Birds	Halcyonidae	<i>Dacelo novaeguineae</i>	Laughing kookaburra	C	AA
Birds	Halcyonidae	<i>Todiramphus macleayii</i>	Forest kingfisher	R	EF, RA
Birds	Hirundinidae	<i>Hirundo neoxena</i>	Welcome swallow	C	OP
Birds	Maluridae	<i>Malurus cyaneus</i>	Superb fairy-wren	R	AA
Birds	Maluridae	<i>Malurus melanocephalus</i>	Red-backed fairy-wren	C	OP, EF
Birds	Meliphagidae	<i>Acanthorhynchus tenuirostris</i>	Eastern spinebill	O	EF
Birds	Meliphagidae	<i>Lichenostomus chrysops</i>	Yellow-faced honeyeater	O	EF, RA
Birds	Meliphagidae	<i>Lichmera indistincta</i>	Brown honeyeater	R	AA
Birds	Meliphagidae	<i>Manorina melanocephala</i>	Noisy minor	C	AA
Birds	Meliphagidae	<i>Meliphaga lewinii</i>	Lewin's honeyeater	C	AA
Birds	Meliphagidae	<i>Melithreptus albugularis</i>	White-throated honeyeater	R	RA, EF
Birds	Meliphagidae	<i>Melithreptus lunatus</i>	White-naped honeyeater	R	RA, EF
Birds	Meliphagidae	<i>Myzomela sanguinolenta</i>	Scarlet honeyeater	R	EF
Birds	Meliphagidae	<i>Philemon corniculatus</i>	Noisy friarbird	C	AA
Birds	Meliphagidae	<i>Plectorhyncha lanceolata</i>	Striped honeyeater	O	EF, OP
Birds	Meropidae	<i>Merops ornatus</i>	Rainbow bee-eater	R	EF, RA
Birds	Oriolidae	<i>Sphecotheres viridis</i>	Figbird	O	RA
Birds	Pachycephalidae	<i>Colluricincla harmonica</i>	Grey shrike-thrush	R	EF, RA
Birds	Pachycephalidae	<i>Pachycephala pectoralis</i>	Golden whistler	C	AA
Birds	Pachycephalidae	<i>Pachycephala rufiventris</i>	Rufous whistler	C	AA
Birds	Pardalotidae	<i>Acanthiza lineata</i>	Striated thornbill	O	EF, RA
Birds	Pardalotidae	<i>Acanthiza pusilla</i>	Brown thornbill	R	EF
Birds	Pardalotidae	<i>Gerygone olivacea</i>	White-throated gerygone	O	EF, RA
Birds	Pardalotidae	<i>Pardalotus striatus</i>	Striated pardalote	C	AA
Birds	Pardalotidae	<i>Sericornis frontalis</i>	White-browed scrubwren	R	RA, EF
Birds	Passeridae	<i>Neochmia temporalis</i>	Red-browed finch	R	AA
Birds	Passeridae	<i>Taeniopygia bichenovii</i>	Double-barred finch	R	OP
Birds	Petroicidae	<i>Eopsaltria australis</i>	Eastern yellow robin	O	EF
Birds	Petroicidae	<i>Petroica rosea</i>	Rose robin	O	EF
Birds	Phasianidae	<i>Coturnix ypsilophora</i>	Brown quail	O	EF
Birds	Podargidae	<i>Podargus strigoides</i>	Tawny frogmouth	O	EF, RA
Birds	Psittacidae	<i>Platycercus adscitus</i>	Pale-headed rosella	R	AA
Birds	Psittacidae	<i>Platycercus elegans</i>	Crimson rosella	O	EF, RA
Birds	Psittacidae	<i>Trichoglossus chlorolepidotus</i>	Scaly-breasted lorikeet	R	EF, OP
Birds	Psittacidae	<i>Trichoglossus haematodus</i>	Rainbow lorikeet	C	EF, OP
Birds	Ptilonorhynchidae	<i>Ptilonorhynchus violaceus</i>	Satin bowerbird	O	EF, RA
Birds	Ptilonorhynchidae	<i>Sericulus chrysocephalus</i>	Regent bowerbird	O	RA
Birds	Rallidae	<i>Gallinula tenebrosa</i>	Dusky moorhen	R	OP, RA
Birds	Rallidae	<i>Porphyrio porphyrio</i>	Purple swamphen	C	OP, RA
Birds	Strigidae	<i>Ninox novaeseelandiae</i>	Southern boobook	C	EF, RA
Birds	Sylviidae	<i>Megalurus timoriensis</i>	Tawny grassbird	R	OP
Birds	Meliphagidae	<i>Plectorhyncha lanceolata</i>	Striped honeyeater	O	EF, OP
Birds	Meropidae	<i>Merops ornatus</i>	Rainbow bee-eater	R	EF, RA
Birds	Oriolidae	<i>Sphecotheres viridis</i>	Figbird	O	RA
Birds	Pachycephalidae	<i>Colluricincla harmonica</i>	Grey shrike-thrush	R	EF, RA
Birds	Pachycephalidae	<i>Pachycephala pectoralis</i>	Golden whistler	C	AA
Birds	Pachycephalidae	<i>Pachycephala rufiventris</i>	Rufous whistler	C	AA
Birds	Pardalotidae	<i>Acanthiza lineata</i>	Striated thornbill	O	EF, RA
Birds	Pardalotidae	<i>Acanthiza pusilla</i>	Brown thornbill	R	EF
Birds	Pardalotidae	<i>Gerygone olivacea</i>	White-throated gerygone	O	EF, RA
Birds	Pardalotidae	<i>Pardalotus striatus</i>	Striated pardalote	C	AA
Birds	Pardalotidae	<i>Sericornis frontalis</i>	White-browed scrubwren	R	RA, EF
Birds	Passeridae	<i>Neochmia temporalis</i>	Red-browed finch	R	AA



Birds	Passeridae	<i>Taeniopygia bichenovii</i>	Double-barred finch	R	OP
Birds	Petroicidae	<i>Eopsaltria australis</i>	Eastern yellow robin	O	EF
Birds	Petroicidae	<i>Petroica rosea</i>	Rose robin	O	EF
Birds	Phasianidae	<i>Coturnix ypsilophora</i>	Brown quail	O	EF
Birds	Podargidae	<i>Podargus strigoides</i>	Tawny frogmouth	O	EF, RA
Birds	Psittacidae	<i>Platycercus adscitus</i>	Pale-headed rosella	R	AA
Birds	Psittacidae	<i>Platycercus elegans</i>	Crimson rosella	O	EF, RA
Birds	Psittacidae	<i>Trichoglossus chlorolepidotus</i>	Scaly-breasted lorikeet	R	EF, OP
Birds	Psittacidae	<i>Trichoglossus haematodus</i>	Rainbow lorikeet	C	EF, OP
Birds	Ptilonorhynchidae	<i>Ptilonorhynchus violaceus</i>	Satin bowerbird	O	EF, RA
Birds	Ptilonorhynchidae	<i>Sericulus chrysocephalus</i>	Regent bowerbird	O	RA
Birds	Rallidae	<i>Gallinula tenebrosa</i>	Dusky moorhen	R	OP, RA
Birds	Rallidae	<i>Porphyrio porphyrio</i>	Purple swamphen	C	OP, RA
Birds	Strigidae	<i>Ninox novaeseelandiae</i>	Southern boobook	C	EF, RA
Birds	Sylviidae	<i>Megalurus timoriensis</i>	Tawny grassbird	R	OP
Birds	Tytonidae	<i>Tyto tenebricosa</i>	Sooty Owl	O	EF
Birds	Meliphagidae	<i>Plectorhyncha lanceolata</i>	Striped honeyeater	O	EF, OP
Birds	Meropidae	<i>Merops ornatus</i>	Rainbow bee-eater	R	EF, RA
Birds	Oriolidae	<i>Sphecotheres viridis</i>	Figbird	O	RA
Birds	Pachycephalidae	<i>Colluricincla harmonica</i>	Grey shrike-thrush	R	EF, RA

CLASS	FAMILY	SCIENTIFIC NAME	COMMON NAME	HABITAT ZONE	ABUNDANCE	METHOD
Amphibians	Bufonidae	<i>**Bufo marinus</i>	Cane toad	AA	C	O, C, T
Amphibians	Hylidae	<i>Litoria caerulea</i>	Green Treefrog	RA, EF	R	C
Amphibians	Hylidae	<i>Litoria gracilentia</i>	Graceful treefrog	RA	R	C
Amphibians	Hylidae	<i>Litoria fallax</i>	Eastern sedgefrog	AA	C	C
Amphibians	Hylidae	<i>Litoria leuseuri</i>	Stony-creek Frog	RA	R	SL, C
Amphibians	Hylidae	<i>Litoria verreauxii</i>	Whistling Treefrog	RA	O	C
Amphibians	Myobatrachidae	<i>Crinia parinsignifera</i>	Beeping froglet	OP, RA	R	C
Amphibians	Myobatrachidae	<i>Limnodynastes peronii</i>	Striped marshfrog	AA	R	C

CLASS	FAMILY	SCIENTIFIC NAME	COMMON NAME	ZONE	ABUNDANCE	METHOD
Mammals	Dasyuridae	<i>Antechinus flavipes</i>	Yellow-footed antechinus	EF	R	T
Mammals	Dasyuridae	<i>Phascogale tapoatafa</i>	Brushtailed Phascogale	EF	R	CAM
Mammals	Canidae	<i>Canis familiaris**</i>	Wild Dog	EF	O	CAM
Mammals	Canidae	<i>Vulpes vulpes</i>	**Red Fox	OP	O	SL, CAM
Mammals	Leporidae	<i>Lepus capensis</i>	**Brown hare	AA	O	SL, O
Mammals	Macropodidae	<i>Macropus parryi</i>	Whiptail Wallaby	EF, OP	C	O, Sc, SL, CAM
Mammals	Macropodidae	<i>Macropus rufogriseus</i>	Red-necked Wallaby	EF, OP	R	O, Sc, CAM
Mammals	Muridae	<i>Melomys cervinipes</i>	Fawn-footed Melomys	EF	R	T
Mammals	Muridae	<i>Mus musculus</i>	**Mouse	AA	C	T, SL
Mammals	Muridae	<i>Rattus fuscipes</i>	Bush Rat	AA	C	T
Mammals	Muridae	<i>Rattus rattus</i>	**Black Rat	AA	R	T
Mammals	Peramelidae	<i>Isodon macrourus</i>	Northern brown bandicoot	EF, RA	C	Trk, T, CAM
Mammals	Petauridae	<i>Petaurus breviceps</i>	Sugar glider	EF, OP	O	SL, Scrt
Mammals	Petauridae	<i>Petaurus norfolcensis</i>	Squirrel Glider	EF	O	SL, Scrt
Mammals	Phalangeridae	<i>Trichosurus caninus</i>	Bobuck Possum	EF, RA, OP	R	SL, Sc, T
Mammals	Phalangeridae	<i>Trichosurus vulpecula</i>	Common brushtail possum	EF, RA, OP	C	SL, CAM, Sc, T
Mammals	Phascolarctidae	<i>Phascolarctos cinereus</i>	Koala	EF	O	O, Scrt, CAM, SL
Mammals	Pteropodidae	<i>Pteropus alecto</i>	Black flying-fox	AA	R	SL
Mammals	Pteropodidae	<i>Pteropus scapulatus</i>	Little Red Flying Fox	AA	O	SL
Mammals	Pteropodidae	<i>Pteropus poliocephalus</i>	Grey-headed Flying Fox	AA	O	SL

Class	Family	Scientific Name	Common Name	Zone	Abundance	Method
Reptiles	Agamidae	<i>Physignathus lesueurii</i>	Eastern water dragon	RA	C	O, T
Reptiles	Boidae	<i>Morelia spilota</i>	Carpet python	EF	O	O, SL
Reptiles	Chelidae	<i>Chelondina longifollis</i>	Snake-necked Turtle	RA	O	O
Reptiles	Chelidae	<i>Elseya latisternum</i>	Saw-shell Turtle	RA	O	O
Reptiles	Chelidae	<i>Emydura signata</i>	Brisbane Saw-shell	RA	O	Sh, O
Reptiles	Elapidae	<i>Pseudechis porphyriacus</i>	Red-bellied Black Snake	OP	R	O
Reptiles	Elapidae	<i>Rhinoplocephalus nigrescens</i>	Small-eyed Snake	EF	O	O
Reptiles	Scincidae	<i>Carlia vivax</i>	Lively Lizard	EF, OP	C	O, T
Reptiles	Scincidae	<i>Cryptoblepharus virgatus</i>	Wall Skink	AA	C	O, T
Reptiles	Scincidae	<i>Lampropholis delicata</i>	Grass Skink	AA	C	O, T
Reptiles	Varanidae	<i>Varanus varius</i>	Lace Monitor	EF, OA	O	Scrt, O

Survey Method Codes:

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

Abundance:

(C) Common  
(R) Regular  
(O) Occasional

Habitat Zones:

EF: Eucalypt Open Forest/Woodland  
RA: Riparian Association  
OP: Open Paddock with Scattered Trees & Regrowth  
AA: All areas

## 2.5 KOALA RECORDS WITHIN OFFSET AREA

The offset area contains habitat critical to the survival of the koala and the animal has been recorded within the offset habitats. Surveys in association with the Preliminary Documentation noted the following regarding koala presence:

- SAT surveys revealed numerous koala scats present although the activity status was assigned 'low activity' in accordance with Phillips and Callaghan (2011).

SAT SITE LOCATIONS AND ACTIVITY LEVEL

SITE	Central Tree	Latitude	Longitude	Activity %	Activity Level
SAT 1	<i>Eucalyptus microcorys</i>	-27.999651	153.172892	20	low
SAT 2	<i>Eucalyptus propinqua</i>	-28.001763	153.163991	6.66	Low
SAT 3	<i>Eucalyptus crebra</i>	-28.006323	153.164024	0	Low
SAT 4	<i>Eucalyptus microcorys</i>	-27.998227	153.163534	0	Low
SAT 5	<i>Eucalyptus microcorys</i>	-28.007823	153.168883	10	Low
SAT 6	<i>Eucalyptus microcorys</i>	-28.007196	153.166345	10	Low
SAT 7	<i>Eucalyptus crebra</i>	-28.004584	153.165624	0	Low

- Additionally, three individuals were recorded during diurnal, nocturnal and passive camera monitoring surveys during the 2015 survey.

These records will serve as the baseline survey for koala presence with regular koala monitoring outlined in Section 5.3 to determine the ongoing presence of the species within the habitat which will be protected in the offset area.



Koalas sighted in 2015 survey



Koalas sighted in 2015 survey











## 2.6 OFFSET COMMENCEMENT CONDITION AND START SCORE

As discussed in Section 1 On 22<sup>nd</sup> August 2016 the Canungra Rise Estate residential development was granted approval under sections 130(1) and 133 of the EPBCA subject to compensation for the loss of koala habitat associated with the development. The agreed compensation would be the provision of 112.2 hectares (now increased to 117ha) of koala habitat on the Canungra Rise site as a direct offset to be secured in perpetuity via a Voluntary Declaration under the Queensland Vegetation Management Act 1999. The offset area, as agreed throughout the preliminary documentation process and reflected in Map 1 of the EPBC2015/7485 approval, was determined by applying the requirements identified within both the EPBCA Environmental Offsets Policy and the Offset Assessment Guide.

In association with the Referral Documentation and Preliminary Documentation presented and assessed by DoE a 'start score' for the habitat of the Offset Area was determined in association with the EPBC Act Referral Guidelines for the Vulnerable Koala, EPBC Offset Assessment Guide calculator and as agreed with the DoE. These calculations are reproduced in Table 4 below.

It is noted that the Koala Referral Guidelines, Offsets and Existing Projects guidelines prepared by DoE states that the koala referral guidelines contains a 'habitat assessment tool which can be used to identify habitat critical to the survival of the koala. This tool can assist with conforming to the *EPBC Act Environmental Offsets Policy* by helping proponents determine 'habitat quality' referred to in the offset calculator. The habitat assessment tool may be used instead of the three generic habitat quality categories found in the Offsets Assessment Guide. It can also be used to calculate the starting quality of a proposed offset site and to estimate the future quality, with and without the proposed offset or management intervention' (DoE, 2014: 3).

With regard to the previously prepared Proposed Offsets Strategy (Planit, April 2016) and the EPBCA approval issued a koala habitat score of 8 was determined as such is therefore the 'start score' of the Offset Area to be provided.

**TABLE 4: KOALA HABITAT SCORE (TAKEN FROM PLANIT 2015 REFERRAL OF PROPOSED ACTION REPORT)**

Attribute	Score		Assessment for Coastal Area
Koala occurrence	+2 (high)	Evidence of one or more koalas within the last 2 years.	<p>Score = +2</p> <p><u>Desktop</u></p> <p>The Protected Matters Report within a 5km radius of the site indicates that the koala or koala habitat is known to occur within the area. A Wildlife Online search (WILDNET, 2015) using a 5km radius found failed to yield any koala records. In addition, an Atlas of Living Australia database search did not record any koalas within a 5km radius from the centre of the site.</p> <p><u>On-ground</u></p> <p>Site investigations in 2015 recorded an individual during spotlighting efforts within the retained vegetation immediately north of the shooting range. Although not frequent, several eucalypts within the Canungra Rise site yielded koala scratches and scats.</p> <p><b>As there is evidence of one or more koalas occurring on-site within the last 2 years, the 'koala attributes' has been given a score of +2 (high).</b></p>
	+1 (medium)	Evidence of one or more koalas within 2 km of the edge of the impact area within the last 5 years.	
	0 (low)	None of the above.	

Vegetation composition	+2 (high)	Has forest or woodland with 2 or more known koala food tree species, OR 1 food tree species that alone accounts for >50% of the vegetation in the relevant strata.	Score = +2  <u>Desktop</u> The Queensland Government Regulated Vegetation Supporting Map (Regional Ecosystem V8.0) identifies the site as containing RE12.3.1, RE12.3.7, RE12.8.14, RE12.9-10.17 and RE12.9-10.17A. Known koala food trees occur within these mapped regional ecosystems (i.e. <i>E. tereticornis</i> , <i>E. microcorys</i> act.)  <u>On-ground</u> Although the majority of the development footprint is of a cleared nature, the Ecological Assessment (Planit, 2004) undertaken and prepared for the site has identified that the site contains areas of Eucalypt woodland/open forest (primarily where the mapped remnant vegetation occurs). Within these areas, numerous koala food trees have been identified such as Blue Gum ( <i>E. tereticornis</i> ), Tallowood ( <i>E. microcorys</i> ), Grey Gum ( <i>E. propinqua/major</i> ), Gum-topped Box ( <i>E. moluccana</i> ) and Spotted Gum ( <i>C. citriodora</i> ).  <b>As the site contains forest or woodland containing 2 or more known koala food tree species, the 'Vegetation Composition' attribute is given a score of 2 (high)</b>
	+1 (medium)	Has forest or woodland with only 1 species of known koala food tree present.	
	0 (low)	None of the above.	
Habitat connectivity	+2 (high)	Area is part of a contiguous landscape $\geq 500$ ha.	Score = +2 It is considered that the overall Canungra Rise development envelope is not located within a state or regional biodiversity/wildlife corridor due to previous habitat clearing and fragmentation (associated within historical grazing and agricultural pursuits) and rural/urban land development within Canungra, Boyland and Mundoolan. Such has created numerous barriers/impediments to terrestrial dispersal within the locality and general overall reduction of native remnant habitat.  As stated within the Vegetation Composition response, the majority of the development footprint occurs within areas already cleared, although areas of Eucalypt woodland/forest will also be required to be removed/modified to facilitate the development. It is noted however that the vast majority of these eucalypt areas will be retained.  Connectivity from the site to surrounding vegetated areas towards the south and west is limited by the proximity of the Canungra township and associated infrastructures, Beaudesert-Nerang Road, Tamborine Mountain Road and Canungra Creek. It is also noted that areas towards the north and west of the site is utilised for agricultural purposes and is of a cleared/paddock nature.  Nevertheless, the site and locality is part of a contiguous landscape (>500ha) given the high area of connected vegetation in the east of the site which extends past Mount Tamborine.  <b>The connectivity from the site to surrounding vegetation is limited towards the south and west of the site due to the proximity of roadways, Canungra township and associated infrastructures and waterways. Although the majority of the development footprint occupies areas already cleared, the site is part of a contiguous landscape (&gt;500ha) which extends past Mount Tamborine. Reviewing the above, the site has resulted in a score of 2+ (high) for 'habitat connectivity'.</b>
	+1 (medium)	Area is part of a contiguous landscape < 500 ha, but $\geq 300$ ha.	
	0 (low)	None of the above.	
key existing threats	+2 (high)	Little or no evidence of koala mortality from vehicle strike	Score = +1



		or dog attack at present in areas that score 1 or 2 for koala occurrence. Areas which score 0 for koala occurrence and have no dog or vehicle threat present	<p><u>Desktop</u></p> <p>Koala Tracker graphically records the location of koala populations, points of impact and causes of death and injury for the public record. It plots the points of crowd sourced (contributed by members of the public) koala sightings on a dynamic national koala map. The maps indicates that there are no koala sightings within close proximity to the site with the nearest record being ~2km south within Witherin. The map also indicates that there hasn't been any koala deaths within close proximity to the site with the nearest occurring on Beaudesert-Nerang Road within Clagiraba approximately 7km northeast of the Canungra Rise site.</p> <p>The Australian Koala Foundation (AKF) Koala map illustrates that there was no Koala records in close proximity of the site with the nearest recorded being ~6km northeast within Mount Tambourine.</p> <p>Although data showing the number of deaths or injuries to Koalas in the immediate vicinity of the site was limited, given the moderate level of vehicle use in the surrounding area (mainly associated with Beaudesert-Nerang Road) and the observations of koala predators (dogs, foxes) within and surrounding the site, the existing threats to koala is considered to be moderate.</p> <p><b>As there has been Koala mortality recorded on the same road which runs through the area (Canungra) and known Koala predators (dogs, foxes, feral cats etc.) have been observed occurring on-site and within the locality, the 'Key Existing Threats' attribute has been given a score of +1 (medium).</b></p>
	+1 (medium)	Evidence of infrequent or irregular koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for koala occurrence, OR Areas which score 0 for koala occurrence and are likely to have some degree dog or vehicle threat present.	
	0 (low)	Evidence of frequent or regular koala mortality from vehicle strike or dog attack in the study area at present, OR Areas which score 0 for koala occurrence and have a significant dog or vehicle threat present.	
Recovery value	+2 (high)	Habitat is likely to be important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.	<p>Score = +1</p> <p>The relevant interim recovery objective states:</p> <ol style="list-style-type: none"> <li>1. Protect and conserve large, connected areas of koala habitat, particularly large, connected areas that support koalas that are: <ol style="list-style-type: none"> <li>(i) Of sufficient size to be genetically robust / operate as a viable sub-population; or</li> <li>(ii) Free of disease or have a very low incidence of disease; or</li> <li>(iii) Breeding (i.e. presence of back young or juveniles).</li> </ol> </li> <li>2. Maintain corridors and connective habitat that allow movement of koalas between large areas of habitat.</li> </ol> <p>Reviewing the above, it is considered that the vegetation within the Canungra Rise development site is unlikely to be important in achieving the Interim Recovery Objectives for the coastal context given its small size and no evidence of breeding has been found on the site. Limited information on diseased koalas in the locality is available so it's uncertain whether the local koala population is free of disease, however it is noted that koalas within the Gold Coast are known to suffer Chlamydia (QUT IHBI, undated; John Callaghan, pers comm.). It is noted that the majority of the development footprint is of a cleared nature and is</p>
	+1 (medium)	Uncertain whether the habitat is important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.	
	0 (low)	Habitat is unlikely to be important for achieving the interim recovery objectives for the relevant context, as	

		outlined in Table 1.	<p>not considered to provide significant koala habitat (although may provide movement opportunities) and that large areas of habitat will be retained within the site. Nevertheless, given that limited information is available in some aspects, it is not certain as to whether the site is important in achieving the Interim Recovery Objectives.</p> <p>Additionally, the referral site is located external to the mapped areas of suitable for rehabilitation under the State Planning Regulatory Provisions. As the site is not mapped, it is unsure whether it represents low, medium or high value suitability for rehabilitation under the SPRP.</p> <p>Given the general uncertainty whether the habitat on-site is important for achieving the interim recovery objectives for the relevant context, the 'Recovery Value' attribute has been given a score of +1 (medium).</p>
<b>Total</b>	<b>+8</b>	<b>As per the Koala Referral Guidelines, with a score of 8 the site is considered to contain habitat critical to the survival of the Koala (habitat score &gt;5).</b>	

**TABLE 5: KOALA HABITAT OFFSET CALCULATOR INPUTS**  
(SOURCED FROM PLANIT 2016 PROPOSED OFFSETS STRATEGY)

Offset Calculator Step	Score attributed	Comments
Threatened species habitat	Koala ( <i>Phascolarctos cinereus</i> )	Field validation of habitat was conducted by Planit Consulting. The habitat identified on site meets the criteria for consideration as habitat critical to the survival of the Koala.
Area of impact (ha)	29.9359ha	Approximately 29.9359ha of vegetation that meets the criteria for consideration as habitat critical for the survival of the koala occurs within the impact area and will be required to be removed to facilitate the proposed development. This includes building envelopes, roads, firebreaks, reservoirs and stormwater infrastructure.
Current quality of habitat	Score – 8	Utilising the Koala habitat assessment tool, the vegetation of the impact area recorded a score 8.
Total quantum of impact (ha)	23.95ha	Adjusted hectares as per EPBC Offsets Calculator.
Proposed offset	112.2ha	The offset site will contain approximately 112.2ha of habitat considered to represent habitat critical for the survival of the koala (i.e. eucalypt forest/woodland).
Risk Related Time Horizon (ha)	20 years	Time over which loss is averted: The value selected for time over which loss is averted was the maximum of 20 years for the offset site. The loss of the impact site will be permanent as a result of the proposed development.
Time until ecological benefit (years)	1 year	The feature regarding ecological benefit within the offset area will be achieved through rehabilitation of the vegetation communities and habitats, therefore improving the habitat qualities. This is because as soon as the area is gazetted as an offset site, it will be subject to a targeted management regime including ongoing management of weeds and removing livestock from these areas, as well as protection from vegetation clearing. As such, considerable ecological benefit is expected to be realised within a year.
Start quality of offset	Score - 8	Given that the proposed offset area is immediately adjacent to the proposed impact area and contains similar habitat, the start quality of the impact area has been assigned a value of '8'.
Future quality without offset	Score - 6	<p>The following lists the key factors of risk of loss of this offset area:</p> <ul style="list-style-type: none"> <li>Sections of the offset site area contains large infestation of weed species (i.e. Lantana, Blue Billygoat Weed, etc.) which contributes to the degradation of native vegetation and restrict natural regeneration of native vegetation.</li> </ul>



	10% risk of loss	<ul style="list-style-type: none"> <li>The site has been subject to agricultural use and grazing for a long period of time.</li> <li>Feral and pest species have been recorded throughout the site which poses as a threat the koala (i.e. wild dogs, foxes, feral cats).</li> <li>Areas proposed to be protected under the VMA is currently located within the Urban Footprint and may be susceptible to future clearing or development.</li> </ul> <p>With the above mentioned factors, it is considered that the offset site will continually degrade over time with weed species continuously establish and spread throughout the site as a result of the historically agricultural use of the site. Additionally, without protecting the proposed offset area under the VMA, the area may be subject to future clearing/development.</p>
Future quality with offset	Quality Score - 9	As part of an offset site, the habitats would be protected from agricultural use (i.e. cattle, horses removed from the site) and potential clearing/development. Additionally, the rehabilitation of these areas (i.e. weed management) and feral and pest management will enhance the habitat values of the offset site for the Koala.
Risk of loss (%) with offset	1% risk of loss	With the abovementioned actions implemented, it is considered that the future habitat quality score would be a 9 and a 1% risk of loss given that the site will be protected under the Voluntary Declaration and proposed management actions.
Calculating adjusted gain using confidence in result (%)	2.7	The adjusted gain using confidence in result is calculated automatically by the assessment tool.
Net present value (adjusted hectares)	27.21	The score of the net present value is calculated automatically by the assessment tool.
Percentage of impact offset column	113.62	The percentage of impact offset is calculated automatically by the assessment tool.

As the offset area must demonstrate a gain in koala habitat quality across 90% of the offset area within a 20 year period as conditioned by the EPBCA approval inspections were performed in October 2016 to obtain baseline data to be monitored over the life of the approval. Simply put the purpose of the habitat monitoring is to demonstrate improvement in habitat quality over time.

#### OFFSET SITE CONDITION

The Koala Referral Guideline notes that the koala habitat assessment tool can be used to calculate the starting quality of a proposed offset site for which a habitat score of 8 has been agreed as outlined above. To demonstrate gain or improvement in the quality of the offset area habitat establishment of baseline data reflective of the applied habitat score of 8 is necessary. In this regard Biocondition surveys were performed within each of the four habitat assessment units (relatively homogenous units defined by a unique RE and broad condition state [i.e. 'remnant' versus 'regrowth' versus 'non-remnant']) contained within the offset area generally as outlined within Eyre et al (2015).

Biocondition surveys are quantitative and repeatable assessment procedures that serve as a vegetation condition assessment tool that describes the functionality of terrestrial ecosystems in terms of biodiversity values at a local scale (Eyre *et al.* 2011). The results of the survey produce a numeric score as a condition rating, which describes how the attributes of the vegetation in the survey area differ from the attributes in its reference state, or the Biocondition benchmarks of the relevant RE (Eyre *et al.* 2011, Eyre *et al.*, 2015). A

numeric score of 1 indicates that the condition of the surveyed vegetation matches its reference state. The reference state refers to the natural variability in attributes of an ecosystem relatively unmodified since European settlement, or 'the best on offer' (Eyre *et al.* 2011).

A total of four Biocondition sites were surveyed to assess the condition of the regional ecosystems and vegetation communities present within the offset area (refer Attachment 2). Table 6 below displays the Biocondition score that was attributed to each of site as a result of the baseline survey. Please note that in this instance assessable attributes for Biocondition score associated with landscape attributes (size of patch, context and connectivity) whilst requiring consideration per Eyre *et al.* (2015) will not change over the life of the approval and have been calculated incorporating future losses associated with the approved development envelope. These figures should not therefore change over time except in the instance of a local catastrophic failure affecting the site and surrounding areas within 1km (i.e. major bushfire rendering existing bushland 'non-remnant'). Those attributes which shall be repeatedly assessed as part of the management objectives are highlighted in blue below and relate to habitat condition.

**TABLE 6: BIOCONDITION SCORES**

BIOCONDITON SITE	Benchmark Score	1 12.8.14	2 12.8.14 non-remn	3 12.9-10.17a	4 12.9.10.17
Mapped regional ecosystem					
<b>SITE CONDITION</b>					
Recruitment of dominant canopy species	5	3	3	3	3
Native plant species richness - Trees	5	5	5	5	5
Native plant species richness - Shrubs	5	3	5	5	5
Native plant species richness - Grasses	5	3	3	3	3
Native plant species richness - Forbs	5	3	3	5	3
Tree canopy height	5	5	3	5	5
Tree canopy cover	5	5	2	5	5
Native shrub layer cover	5	3	5	5	5
Native perennial grass cover %	5	5	5	1	5
Organic litter cover	5	5	5	5	5
Large Trees	15	15	10	5	10
Coarse woody debris	5	2	5	5	2
Non-native plant cover	10	5	5	5	5
<b>Site Condition Score / 80</b>	<b>80</b>	<b>62</b>	<b>59</b>	<b>57</b>	<b>61</b>
<b>LANDSCAPE</b>					
Patch size	10	5	5	5	7
Connectivity	5	2	2	4	4



Context	5	4	4	4	4
Landscape Score / 20	20	11	11	13	15
Total BC SCORE / 100	100	73	70	70	76
BC Score (Total ÷ 100)	1	0.73	0.7	0.7	0.76

BIOCONDITION SITE	PLANIT VEGETATION COMMUNITY MAPPING (2004)	DNRM REGIONAL ECOSYSTEM MAPPING (2016)	REHABILITATION UNIT (REFER ATTACHMENT 4)	BIOCONDITION SCORE	BIOCONDITION CLASS
1	1-Tall Mixed Eucalypt Open Forest/Woodland	12.8.14	RU3	0.73	2
2	2-Open Paddock with Scattered Trees/Regrowth	Regrowth 12.8.14	RU4	0.70	2
3	1a- Tall Wet Sclerophyll Forest	12.9-10.17a	RU2	0.70	2
4	1-Tall Mixed Eucalypt Open Forest/Woodland	12.9-10.17	RU1	0.76	2

The biocondition assessments will be replicated regularly over the life of the approval (refer Section 5) to determine if the management actions are successful in improving the habitat condition (quality) of the regional ecosystems (and associated koala habitat) within the in the offset area as compared to the baseline assessments. To demonstrate an improvement in habitat 'quality' the starting score for each site established in the baseline survey must increase over the life of the approval.

To further asses the ecological condition (quality) of the offset area, qualitative (visual) monitoring quadrats have been established within an additional seven sites. These sites will also be permanently monitored (refer Section 5 below) to determine the success of weed management and assisted natural regeneration efforts (refer Attachment 3) and also to demonstrate that a gain in habitat quality is achieved.

TABLE 7: VISUAL MONITORING SITES

REHABILITATION UNIT (REFER ATTACHMENT 4)	QUALITATIVE/VISUAL MONITORING SITE	PLANIT VEGETATION COMMUNITY MAPPING	DNRM REGIONAL ECOSYSTEM MAPPING
RU1	P1, P6, P7	1-Tall Mixed Eucalypt Open Forest/Woodland	12.9-10.17
RU2	P4, P5	1a- Tall Wet Sclerophyll Forest	12.9-10.17a
RU3	P3	1-Tall Mixed Eucalypt Open Forest/Woodland	12.8.14
RU4	P2	2-Open Paddock with Scattered Trees/Regrowth	Regrowth 12.8.14

## 2.7 LEGALLY SECURING THE OFFSET VIA VOLUNTARY DECLARATION

A Voluntary Declaration application in accordance with sections 19E of the Queensland Vegetation Management Act 1999 will be prepared and submitted to the QLD Department of Natural Resources and Mines and consultation has begun with the DNRM in this regard. It is anticipated that the declaration will be lodged in October 2016.

The Voluntary Declaration will be registered on the property's title and will be binding on current and future landholders and actions governed by a management plan (this report). This offset area management plan will accompany the Voluntary Declaration and will be implemented to conserve the nature conservation value of the habitat critical to the survival of the koala contained within the offset area.

## 2.8 OFFSET AREA MANAGEMENT OBJECTIVES

This Offset Area Management (OMP) has been prepared in response to DoE's conditions of approval relating to establishment of the Canungra Rise Estate which requires Voluntary Declaration to be placed over the eastern areas (112 hectares) of the land per Section 2.2 above. The issued approval is EPBC2015/7485 dated 22<sup>nd</sup> August 2016.

This OMP provides the framework for the retention, protection, enhancement and management of the critical koala habitat contained within the offset area through the following:

- Provide practical and achievable plans for the management and rehabilitation of the OA to ensure that conditions of EPBC approval are complied with, by producing an integrated management framework for monitoring and control of the nominated areas;
- Provide local/state/federal authorities with a mechanism to ensure the proponent and/or successors in title ('future owners') or their agents do not intentionally or willfully clear, damage or destroy any area relating to the conservation of the physical and/or natural features subject to the Voluntary Declaration within the Canungra Rise Estate;
- Provide local/state authorities and future owners with a framework to confirm compliance with the conditions of approval relating to Offset Management; and
- Provide the community with evidence of the ongoing management of the Canungra Rise Estate development in an environmentally acceptable manner.

As such the intent and objectives of the OMP are to:

- Ensure that native regrowth and remnant regional ecosystems contained within the OA are conserved, preserved and enhanced over the life of the approval by maintaining a groundlayer, understorey and canopy that is consistent with the nominated regional ecosystem classifications;
- Ensure that the critical koala habitat within the offset area is conserved and preserved, and the quality of such habitat is improved over 90% of the OA over the life of the approval;
- Ensure that those values which provide koala habitat within the offset remain protected and sustainable such that the species continues to remain within the secured habitat over the life of the approval;
- Ensure that management controls to mitigate/minimize potential adverse impacts associated with development/anthropogenic activity and threatening natural processes are identified and appropriately implemented;
- For the life of the approval ensure no net loss in the extent of Koala habitat quality in the offset area
- Ensure that at the completion of construction for each stage of development there must be no net loss in Koala habitat quality in the offset area

It is the responsibility of the proponent to ensure that all works required by this OMP are implemented for the life of the approval. This is to include all listed actions, monitoring and reporting tasks performed where specified for the life of the approval and any corrective actions necessitated through non-compliance with the relevant sections of this OMP.



## 2.9 RESTRICTIONS AND PROHIBITIONS

In accordance with the issued approvals and the previously prepared ecological and threatened species assessments the following activities are prohibited within the offset area to ensure that objectives and outcomes are achieved:

- No vegetation clearing is to occur within the offset area except where specifically outlined in this report (i.e. maintenance of approved firetrails, in association with weed management as documented in Attachment 4) or otherwise approved by Scenic Rim Regional Council (SRRC) and DoE. For the purposes of this offset 'vegetation' is defined as follows:
  - 'trees, bushes, plants, shrubs, flowers and other flora including (where the context so admits or requires) grasses, algae, fungi and the like but excluding Class 1-3 declared plants under the *Land Protection (Pest and Stock Route Management) Act 2002*, plants listed as an invasive naturalized plant of Southeast Queensland per Queensland Herbarium (2002) or plants nominated as a recognized environmental weed species within the site weed control list contained in Attachment 4
- Construction of new fixtures and/or improvements of any kind within offset areas is prohibited unless otherwise approved by SRRC and DoE;
- Construction of new trails or paths of any kind within offset areas is prohibited unless otherwise approved (i.e. maintenance of existing fire trails);
- Domestic animals are prohibited from being kept within offset areas or entering such areas unless restrained at all times;
- Production animals and/or livestock or similar, including but not limited to horses, cattle, sheep and goats, are prohibited from being kept within offset areas or entering such areas unless restrained at all times;
- Any additional activity occurring within the offset area which may have an adverse impact on the ecological integrity/environmental value of the offset is prohibited. This includes, but is not limited to:
  - Deposition of any fill, soil, rock, rubbish, ashes, garbage, waste or other foreign material;
  - Lighting of fires;
  - Parking of vehicles;
  - Storage of equipment;
  - Erection of new fencing other than fauna friendly fencing along approved property boundaries external to approved building envelopes. For the purposes of this OMP, fencing is taken to be 'fauna friendly' if the fence includes the following design parameters:
    - Leave a 50 cm gap between the ground and the bottom strand or rail; or
    - Leave 30 cm gaps between all rails or strands with the bottom rail being a maximum of 15cm in height; or
    - Use box wire mesh or chain link with mesh spaces of 15 cm or larger. Make the fence 1.2 m high at most and leave a 30 cm gap between the ground and the fence bottom (source: Redland Shire Council, 2002)

Formal written approval for any of the above listed activities must be obtained from the Qld Department of Natural Resources and Mines, Scenic Rim Regional Council and the Federal Department of Environment prior to undertaking the activity. It must be noted that the intent of the offset area and this management plan is for these activities NOT to be performed and

approval should be considered unlikely unless over-riding merit is established to the satisfaction of the mentioned assessing authorities and generally only in the event of an adaptive management procedure (i.e. clearing for an additional bushfire trail may be needed as a matter of public safety; monospecific acacia or allocasuarina growth is suppressing koala foraging tree recruitment within monitored Biocondition sites and thinning is requested etc). Any such approval must be appended to this Offset Area Management Plan.

#### 2.10 DURATION OF OFFSET MANAGEMENT PLAN

The duration of this Offset Management Plan shall be for the life of the approval unless otherwise amended by DoE and will apply to the defined offset area regardless of future ownership succession. The duration shall be 20 years as stipulated in condition 3a of the EPBC2015/7485 approval or as otherwise approved.

### **3.0 COMPLIANCE WITH CONDITION 4**

Condition 4 of the EPBC2015/7485 approval incorporates several requirements to be addressed within the offset management plan. The below table provides a summary of the requirements and how this report responds:



**TABLE 8: SUMMARY OF COMPLIANCE WITH CONDITION 4**

CONDITION	REQUIREMENT	SECTION	DEMONSTRATION OF HOW THE OMP ADDRESSES THE REQUIREMENT AND ASSOCIATED COMMITMENTS MADE WITHIN THE OMP
4	Prior to the commencement of construction, the approval holder must have an Offset Management Plan in place.	This report	This report has been prepared prior to commencement of construction
4i	include monitoring and be designed so that the results are adequate to inform adaptive management and demonstrate whether the outcomes and milestones required by these conditions are on track to be achieved (before they are due) and have been achieved (at the time they are due);	Section 5 Monitoring Protocols  Table 7. Management Strategy, Performance Requirement, Monitoring to determine success, Corrective Action in event of non-compliance	Baseline monitoring has been completed with baseline benchmarks and start scores assigned to Biocondition sites.  Detailed monitoring protocols are provided to enable replication of baseline surveys for direct comparison and permanent qualitative (visual) monitoring sites have also been selected to review progression of rehabilitation.  Objectives and targets are quantifiable such that demonstration of improvement can be determined.  Adaptive management practices/corrective actions are outlined in the event that objectives/targets are not being met as determined via monitoring results.  Adaptive management actions/corrective actions are also provided for risks which are not currently apparent (i.e. koala predation by feral animals) but may be identified through future monitoring.
4ii	include contingency measures to mitigate the risks of not achieving the outcomes and milestones required by these conditions;	Section 4 Identification of Potential Risks and Recommended Management  Table 7 Management Strategy, Performance Requirement, Monitoring to determine success, Corrective Action in event of non-compliance	Adaptive management/contingency measures are provided for all identified risks if the regular monitoring results indicate that a designated performance criteria is not being met.
4iii	be prepared in consultation with a suitably qualified person, and include written evidence of how the suitably qualified person's advice has been	Throughout report	The author of this OMP has >15 years experience as an ecologist and has prepared and had approved numerous bushland/habitat management plans within SEQLD and is thus suitably qualified.

	considered;		The approval holder commits to implementing this written advice of the author of this management plan (refer Section 8.o)
4iv	be in accordance with the proposed offset strategy; and,	Throughout report	This offset management plan incorporates all requirements of the proposed offsets strategy and provides the detailed analysis of identified risks, specific management actions to reduce risks, sets measurable performance requirements to be achieved and adaptive management strategies/contingencies in the instance of failure which are more broadly presented within the proposed offsets strategy. All baseline surveys have also been completed.
4v	demonstrate how it is consistent with the Koala conservation advice.	Throughout report	<p>This management plan is consistent with the koala conservation advice by:</p> <ul style="list-style-type: none"> <li>• developing strategies to mitigate relevant risks to koalas which, in this instance, includes feral animals, domestic animals, grazing and habitat degradation</li> <li>• developing a plan to protect and improve the quality of koala habitat</li> <li>• incorporating protocols to monitor the effectiveness of koala habitat management strategies</li> <li>• develop a formal conservation arrangement for the protection of koala habitat on private land</li> <li>• developing a monitoring plan which incorporates regular koala surveys within an area for which population sizes and trends are poorly known (i.e. Canungra)</li> </ul>



#### **4.0 MANAGEMENT OF POTENTIAL IMPACTS TO THE OFFSET AREA**

The following discussions of potential impacts to the retained habitats of the Offset area have been previously identified within Planit (2015 EPBC Referral and Preliminary Documentation). The below section includes the following for each key management issue:

- A discussion of the identified impact/issue
- Management strategies/techniques proposed to address the identified issue

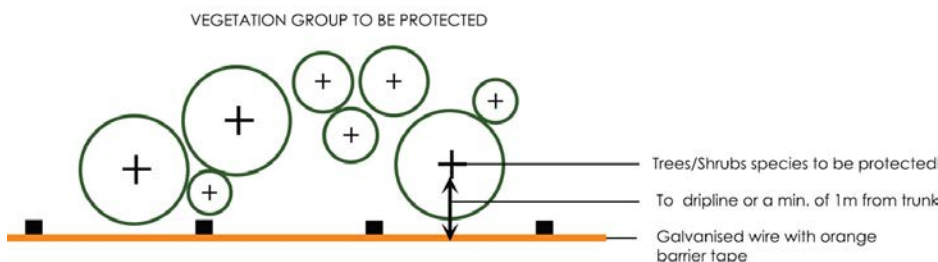
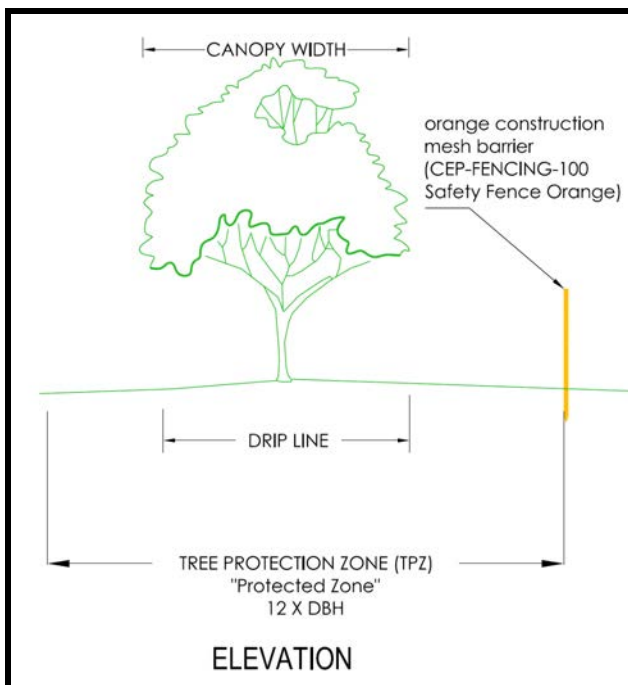
This OMP also adopts an adaptive management/corrective action approach to allow for reassessment and re-evaluation of management measures and techniques over the life of the approval. Through the implementation of this OMP the proposed monitoring and reporting processes and associated review procedures will allow for the identification of knowledge and procedural gaps and will facilitate an evaluation of successes (compliance) and failures (non-compliance). This process also allows for the identification of necessary corrective actions which have not been contemplated in the initial design of the offset management plan and will enable the exploration of new or additional management techniques in the event that proposed techniques are deemed unsuccessful as a result of regular monitoring.

#### **4.1 CLEARING OF VEGETATION/HABITAT**

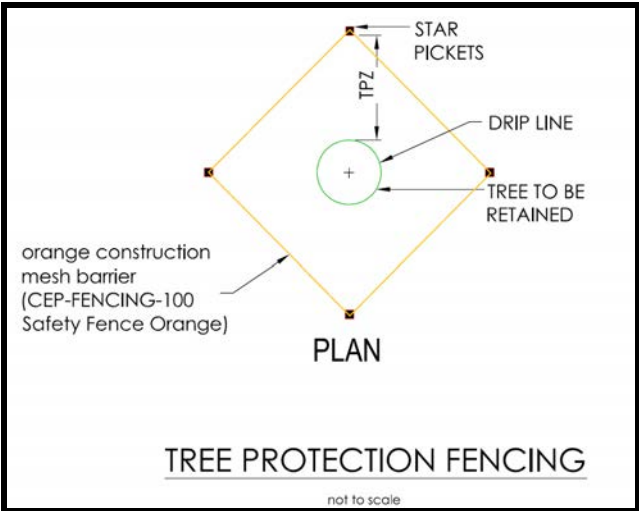

Clearing of vegetation will be the major direct impact associated with the approved Canungra Rise development although no clearing of native vegetation is proposed within the offset area. A vegetation management plan has been previously prepared (approved within Stage 1 of the estate and provided with the Preliminary Documentation report) to minimise the potential impact on native vegetation external to the approved construction zones (refer Figure 7). All vegetation not expressly identified for removal within the Canungra Rise development footprint will be retained as removal is not necessary to facilitate roadway batters, earthworks, bushfire, dwelling envelopes and/or civil infrastructure. To ensure clearing does not extend beyond the identified zones the following vegetation management plan is to be implemented:

**(NB. THE BELOW IS EXTRACTED FROM THE APPROVED VMP FOR STAGE 1. SIMILAR TECHNIQUES WILL BE APPLIED ACROSS ALL STAGES)**

This Vegetation Management Plan (VMP) has been prepared for both the clearing of the Stage 1 earthworks/civil works area of Canungra Rise and the retention and protection of trees which are not located in areas not required to facilitate batters and/or civil infrastructure. The VMP is to be used as a tool during the construction of the development, identifying tasks to be undertaken, the timing of such works and responsible parties for the supervision/implementation of vegetation removal/retention on the site. Areas where vegetation is proposed to be removed to facilitate earthworks and civil works is displayed within Figure 6 and have been determined via review of approved/proposed plans, field pegging and surveying of allotments, road centrelines and sewerlines and site review and inspection with the consulting engineers. This plan identifies appropriate vegetation protection methods also addresses the necessary removal of vegetation as described above. Strict implementation of the following methodologies is necessary to ensure vegetation not approved for removal is not damaged during construction works.

Element	Vegetation Management
Objectives	<ul style="list-style-type: none"> <li>To remove protected vegetation located within the identified clearing zones (Figure 6)</li> <li>To retain designated native vegetation not located within earth or civil works zones (Figure 6)</li> <li>To address and minimise potential fauna mortality associated with tree clearing as part of the construction process.</li> <li>To reduce impacts from dust and erosion associated with tree-clearing and construction works.</li> </ul>
Action	<ul style="list-style-type: none"> <li>Tree-retention zones are to be clearly delineated to ensure that all areas affected by this VMP are readily identifiable.</li> <li>Vegetation to be retained onsite must be tagged/marked/delineated prior to commencement of tree clearing for easy identification (do not use permanent paints or similar) i.e. trees and copses of less mature vegetation/small trees will be retained within designated areas are to be clearly fenced in general accordance with the Australian Standard 4970 Protection of trees on development sites and similar to the below:</li> </ul> <div>  <p>VEGETATION GROUP TO BE PROTECTED</p> <p>Trees/Shrubs species to be protected</p> <p>To dripline or a min. of 1m from trunk</p> <p>Galvanised wire with orange barrier tape</p> </div>
Action	<div>  <p>CANOPY WIDTH</p> <p>DRIP LINE</p> <p>TREE PROTECTION ZONE (TPZ) "Protected Zone" 12 X DBH</p> <p>orange construction mesh barrier (CEP-FENCING-100 Safety Fence Orange)</p> <p>ELEVATION</p> </div>



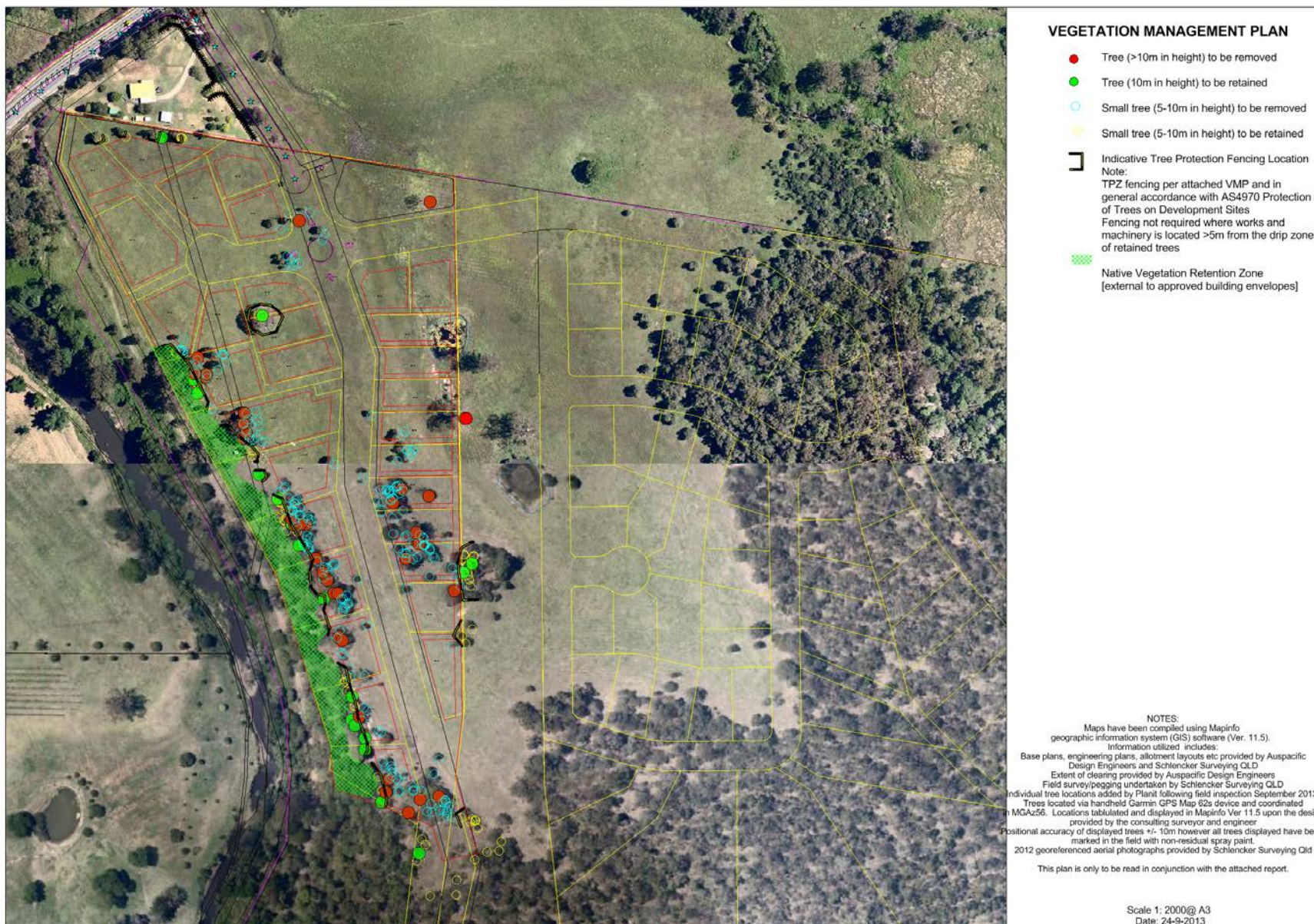
	
Action	 <ul style="list-style-type: none"> <li>• Vegetation where the drip line of a tree or group of trees (including saplings and regrowth) located &gt;5m from the extent of earthworks may be marked with regular signage nominated the area as a no go zone for machinery or personnel but may have a lower standard of fencing given additional separation from works (refer rear fence on above image)</li> <li>• The existing trees to be retained will be managed during construction activities and through the establishment and maintenance periods in accordance with an approved Vegetation Management plan and Australian Standard AS 4970 Protection of trees on development sites to avoid any of the following:             <ul style="list-style-type: none"> <li>○ Structural damage to the tree including root damage;</li> <li>○ Compaction of the root plate including parking of any vehicles;</li> <li>○ Filling of soil within the tree protection zone (tpz) and/or drip zone; and</li> <li>○ Storage of any building materials within the drip zone;</li> <li>○ Long-term harm to the health of the tree.</li> </ul> </li> <li>• The project superintendent must adequately protect from damage any vegetation on private and/or public property which is not designated for removal in association with this development.</li> <li>• Hygiene management is to be applied to all stages of the development (pre-construction, construction and occupation). This requires that prior to entering the construction site all tools, equipment, vehicles and all landscape materials (including but not limited to, soils, mulch, gravel and potted or ex-ground plants) are to be cleaned free of Nut Grass propagules, Cyperus esculentus and Cyperus rotundus.</li> </ul>

	<ul style="list-style-type: none"> <li>• All landscape materials including but not limited to soils, mulch, gravel, potted or ex-ground plants, pavers, timber etc. to be used in landscape treatments on this site are to be free of 'Fire Ants' and Fire Ant eggs.</li> <li>• All landscape material being sourced from areas currently identified as potential Fire Ant risk areas must be checked by a suitably qualified professional and certified that: <ul style="list-style-type: none"> <li>○ No risk of transportation of Fire Ants exists; and</li> <li>○ That all materials are free from Fire Ant contamination.</li> </ul> </li> <li>• All contractors working on the site are to be informed of all provisions specified under this VMP.</li> <li>• All 'vegetation retention zones' are to be appropriately protected by sediment erosion controls and detail is to be reflected within future operational works development applications and within/on any revised sediment and erosion control plans submitted to council for approval.</li> <li>• Cleared vegetation is to be disposed of in accordance with accepted measures including: <ul style="list-style-type: none"> <li>○ All felled trees are sorted for millable timber. Millable timber is sold for use as usable timber/fencing etc.</li> <li>○ All non suitable timber is sheered and mulched for reuse within the site by contractors. Mulch produced onsite must be appropriately treated and composted for a minimum period of 6 weeks prior to use in revegetation areas or other areas of public open space.</li> <li>○ Reduction of wastes are maximised by doing large scale felling to ensure all removed vegetation is contained and mulched.</li> <li>○ Soils are screened from the mulch piles and utilised for top soil.</li> </ul> </li> <li>• Remaining debris not disposed of in either of the above methods is to be removed off-site by the owner to an approved green-waste disposal facility.</li> <li>• A QPWS-recognised fauna spotter-catcher is to ensure safe dispersal of fauna into areas of retained vegetation during clearing works</li> <li>• To be removed hollow-bearing trees are to be dismantled by a QPWS-recognised fauna spotter-catcher and limbs dispersed retained vegetation areas</li> <li>• The following activities are not permitted within the drip zones of trees to be retained (i.e. trees not designated for removal): <ul style="list-style-type: none"> <li>- Storage and mixing of materials;</li> <li>- Vehicle parking or manoeuvring;</li> <li>- Liquids disposal;</li> <li>- Machinery repairs or refuelling;</li> <li>- Site office and/or shed erection;</li> <li>- Lighting of fires;</li> <li>- Rubble, soil or debris stockpiling; and</li> <li>- Excavation.</li> </ul> </li> <li>• If root/crown damage (or other significant disturbance) to retained trees occurs/is required during approved clearing/construction works on the site, works are to cease and treatment by a suitably qualified Arborist (i.e. root truncations, crown thinning) is to be implemented.</li> <li>• Any retained trees with deadwood overhanging road reserve or public open space that may constitute a hazard to members of the public as determined by a qualified Arborist will be pruned in accordance with AS 4373 - 1996 Pruning of Amenity Trees.</li> <li>• Effective sediment and erosion control devices are to be identified and provided at in association with clearing and construction works.</li> <li>• Site access locations will be located external to vegetation retention zones.</li> </ul>
Performance Indicators	<ul style="list-style-type: none"> <li>• Tree-clearing activities are restricted to identified areas.</li> <li>• Construction fencing and sediment/erosion control devices are installed and maintained at all times in accordance with an approved erosion and sediment control plan</li> <li>• A fauna spotter catcher is present during all clearing works and all encountered fauna are safely dispersed with no injury sustained. All works to proceed in accordance with a pre-clearing fauna assessment and management plan.</li> <li>• Retained vegetation is to demonstrate healthy conditions:</li> </ul>

Performance Indicators	Grade	Condition	Descriptor
	1	Healthy	Leaves green, no abnormal leaf loss
	2	Fair	Leaves green, some yellowing of leaves, but <20% of canopy affected
	3	Poor	Many leaves yellow or brown, substantial reduction in canopy extent since last measurement
	4	Dead	Leaves brown or absent, little of the canopy remaining
Frequency/ Deadline	<ul style="list-style-type: none"><li>• Identification of retained vegetation prior to commencement of clearing works.</li><li>• Construction/tree protection fencing is to be installed prior to commencement of any site works.</li><li>• Implement tree clearing works upon receipt of tree clearing approval - completion within 12 months.</li><li>• QPWS-recognised fauna spotter-catcher to be present on-site prior to and during all vegetation-clearing works.</li><li>• All sediment/erosion control devices installed prior to construction works commencing</li></ul>		
Person Responsible	<ul style="list-style-type: none"><li>• The Project Superintendent is responsible for informing all contractors, sub-contractors, consultants and government authorities working on the site of the provisions of this VMP.</li><li>• A QPWS-recognised fauna spotter-catcher is to be contracted for fauna capture/relocation as necessary.</li><li>• A suitably qualified Arborist is responsible for assessing and implementing any remediation works to damaged vegetation retained within protection zones areas if/where required.</li><li>• A suitably qualified consultant is responsible for installing and monitoring erosion and sediment control devices.</li></ul>		
Reporting and Reviewing	<ul style="list-style-type: none"><li>• The project superintendent is responsible for reporting to Council where actions specified in this VMP are not undertaken and/or compromised.</li><li>• The project superintendent is responsible for commissioning all consultants necessary for implementing this VMP (i.e. clearing contractors, arborist, wildlife spotter catchers etc).</li><li>• A licenced Wildlife Spotter Catcher is responsible for all fauna capture/dispersal works</li><li>• The owner/project superintendent is responsible for the implementation of this VMP</li><li>• If damage or tree works is required to ensure the protection of adjacent vegetation, landowners consent may be required.</li></ul>		
Corrective Action	<ul style="list-style-type: none"><li>• If vegetation not identified for removal is disturbed during clearing or building works, the need for supplementary rehabilitation works is to be negotiated between the project superintendent and Scenic Rim Regional Council.</li><li>• If retained trees show signs of ill health (i.e. poor or dead), likely causes are to be determined, methods of mitigating such effects are to be identified in consultation with a suitably qualified Arborist and Council officers, and mitigation measures to improve growth conditions are to be put in place.</li><li>• All works required at the interface of the 'tree/vegetation retention zone' and earthworks where any encroachment is necessary into the drip zone of a retained tree shall incorporate preventative and remedial actions according to the Australian Standard AS 4970 Protection of Trees on development sites. These include:<ul style="list-style-type: none"><li>○ Arborist must be present on site during tree civil earthworks which encroach to TPZs of retained vegetation.</li><li>○ The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ</li><li>○ If approved batters are encroaching a TPZ than sediment fencing is required at the interface</li><li>○ Where roots within the TPZ are exposed by excavation, temporary root protection should be installed to prevent them drying out. This may include mulch, jute mesh or hessian sheeting as multiple layers over exposed roots and excavated soil profile, extending to the full depth of the root zone. Root protection sheeting should be pegged in place and kept moist during the period that the root zone is exposed</li><li>○ If the grade is to be raised the material should be coarser or more porous than the underlying material. Depth and compaction should be minimized</li><li>○ Where the project arborist identifies roots to be pruned within or at the outer edge of the TPZ, they should be</li></ul></li></ul>		



	<p>pruned with a final cut to undamaged wood. Pruning cuts should be made with sharp tools such as secateurs, pruners, handsaws or chainsaws. Pruning wounds should not be treated with dressings or paints. It is not acceptable for roots within the TPZ to be 'pruned' with machinery such as backhoes or excavators.</p> <ul style="list-style-type: none"><li>○ If root zones are overlapping the opinion of a suitably qualified Arborist shall be sought regarding as to what remedial action is required</li><li>• Where a tree shows signs of any loss in structural integrity or a potentially unsafe condition, then in the opinion of a suitably qualified Arborist and Council officers the tree shall be either stabilised or removed to avoid any future danger/risk.</li><li>• Where sediment and erosion control structures fail, likely causes are to be identified and additional measures installed.</li></ul>
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**FIGURE 6: APPROVED VEGETATION MANAGEMENT PLAN STAGE 1**







#### 4.2 CONSTRUCTION PHASE FAUNA MORTALITY/INJURY

Any level of vegetation clearing, construction or earthworks modification undertaken has the potential to kill or injure fauna species. Whilst potential does exist for dispersal of numerous species (particularly avifauna) to retained habitats, less dispersive species or species not tolerant to a surrounding human interface may become trapped within the construction zone during earthworks.

Within the designated development/construction zone identification of areas to be cleared are to be pre-assessed by an experienced ecologist and wildlife spotter/catcher. This pre-assessment shall allow for an inventory of trees bearing birds' nests and/or hollows (suitable for arboreal mammal or bat nesting/roosting) to be undertaken prior to felling works. A wildlife spotter catcher is to be utilized during all phases of clearing of the site to ensure safe dispersal and relocation of native fauna.

#### SUCCESSIONAL CLEARING PROTOCOL FOR KOALAS

As koalas have been previously recorded within the clearing zone (containing 26.49 hectares of critical koala habitat) which is located within Koala District A, sequential clearing and use of a koala spotter is required in accordance with Sections 15 and 16 of the Nature Conservation (Koala) Conservation Plan 2006. In this regard clearing of trees is carried out in a way that ensures koalas living in or near the area being cleared (the clearing site) have enough time to move out of the clearing site without human intervention, including in particular, for a clearing site with an area of more than 3ha, by:

- (i) carrying out the clearing in stages; and
- (ii) ensuring not more than the following is cleared in any 1 stage—
  - (A) for a clearing site with an area of 6ha or less—50% of the site's area;
  - (B) for a clearing site with an area of more than 6ha—3ha or 3% of the site's area, whichever is the greater; , and
- (iii) ensuring that between each stage and the next there is at least 1 period of 12 hours that starts at 6p.m. on a day and ends at 6a.m. on the following day, during which no trees are cleared on the site;
- (b) that clearing of trees is carried out in a way that ensures, while the clearing is being carried out, appropriate habitat links are maintained within the clearing site [IN THIS REGARD IT IS RECOMMENDED THAT CLEARING BE UNDERTAKEN GENERALLY WEST TO EAST TOWARDS THE OFFSET AREA]
- (c) no tree in which a koala is present, and no tree with a crown overlapping a tree in which a koala is present, is cleared [SUCH IS TO BE MONITORED BY A KOALA SPOTTER WHO HAS THE PRIMARY ROLE OF LOCATING KOALAS FOR THE CONTRACTOR OR PERSON IMPLEMENTING THE CLEARING WORKS]

A koala spotter means a person who has demonstrated experience in locating koalas in koala habitats or conducting fauna surveys.

Prior to the commencement of, and during felling operations, it is the responsibility of the developer/contractor/civil and operational works superintendent (whomever is implementing and supervision the contract for vegetation clearing) to appoint and designate the site koala spotter. The koala spotter is to identify trees in which a koala is present and any trees where their crown overlaps trees in which a koala is present and convey this information to the person(s) conducting the clearing.

During this identification process, there will be a differentiation between *Complete cover trees* and *See-through trees* where *Complete cover trees* will be retained until the spotter-catcher responsible is certain of absence of Koalas prior to the tree being felled.

A *Complete cover tree* is defined as a tree with abundant foliage that does not allow confirmation of absence of Koalas without a full 360 degree viewing and if required extended viewing during peripheral clearing operations to detect movement.

A *See-through tree* is defined as sparsely foliated tree where a 360 degree viewing confirms the absence of Koalas.



Any tree in which a koala is located (and any adjacent overlapping tree) is to be tagged and excluded from clearing until the koala has safely dispersed during a 12 hour no clearing period. When located, clearing exclusion zones (20m minimum) around the active Koala tree will be set out where no activity can occur for the day's duration to confirm animal safety and allow dispersal. Secondly, Koala response to peripheral human activity will be monitored by the koala

spotter-catcher to confirm acceptable disturbance and if required cessation of clearing process within a larger radius (i.e. 50m) to reduce stress to the koala.

The site contractor/foreman/superintendent is to be clearly shown the identification of all trees and exclusions zones which are not permitted for any day's clearing prior to starting the first piece of construction equipment on that day of clearing.

Opportunistic capture/release is only permitted where an *Un-located Koala* interaction occurs. If or when this occurs, all clearing will cease until the koala spotter-catcher responsible has determined the severity of incident. In circumstances where the Koala has had a major stress reaction from close proximity to the clearing process, clearing will be directed away from proximity and the Koala reaction monitored until stress reaction is deemed acceptable. In circumstances where the tree containing the Koala has been felled, the Koala will be examined for general alertness, potential injuries to paws, limbs, body, vision prior to the decision to vet check Koala or hold with observations repeated prior to release and post release monitoring to confirm successful dispersal out of the clearing zone.

If a koala is not injured but refuses to move from the clearance area on its own accord after two days, the SC will notify Council and DEHP and negotiate appropriate methods for removal and relocation. Under no circumstances must the tree and the koala be disturbed without prior discussion with DEHP.

An *Un-located Koala* is defined as a Koala that has eluded detection, despite the defined actions of the koala spotter-catcher responsible occurring (as outlined within the preceding points) and is generally associated with dense vegetation areas or canopies exhibiting dense coppicing.

#### 4.3 FIRE MANAGEMENT

High-intensity wildfires pose a threat to koalas, particularly where refuge habitat is not available. High-intensity fires burn the canopy and can cause the death or injury of koalas and a reduction in the availability of foraging habitat. In addition, fast-moving fires fanned by strong winds reduce the ability for koalas to escape to refuge areas (DECC, 2008: 40). Fire can also indirectly affect koala populations through the replacing of some species in favour of others (i.e. pioneers or non-foraging species) or result in the establishment of grasslands/shrublands which are more highly flammable and contribute to the fuel load.

Bushfire management analyses have been previously undertaken for the Canungra Rise Estate in association with the Court Order approval and in accordance with the Council Planning Scheme and the State Planning Policy. Such does not require additional clearing for bushfire purposes within the Offset Area with approved fire trails depicted in Figure 3.

To reduce the potential risk of fire spread through the offset area the following management measures will occur:

- o During construction no felled timber is to be burnt onsite within 100m of the offset area. Within such areas felled timber shall be recycled as follows:
  - Utilised as milled timber, or
  - All non-suitable timber is sheered and mulched for reuse within the site by contractors.



- During the operational phase of the development, burning waste, debris etc including garden refuse, within the offset area shall not be permitted. No open fires are to be permitted regardless of reason. Such shall be enforced by the terms of the covenant imposed on each future created allotment which incorporates any part of the offset (refer Figure 3).
- Weed management and assisted natural regeneration efforts (refer Attachment 4) will also be implemented with the objective of maintaining healthy eucalypt forest/woodland habitats. Managing and reducing invasive grasses and thicket forming woody shrubs (i.e. lantana) which contribute to high fuel levels (and as a consequence higher intensity fires) will serve to reduce the risk of bushfire events within such habitats.

#### 4.4 DOMESTIC ANIMALS

Mortality of fauna as a result of dog attacks is considered to be a key conservation concern for fauna management with some studies reporting that dog attacks account for between 5% and 40% of total recorded mortalities (McAlpine et al, 2007). Within the 'koala coast' of SEQLD an average of 300 koalas each year die as a result of dog attacks (EPA, 2006). Studies into dispersal patterns of koalas undertaken by Dique et al (2003) indicates that in addition to mortality the presence of dogs within or proximate to habitats is likely to disrupt behaviour and associated dispersal options which can lead population fragmentation and/or isolation. The risk of predation can strongly alter the behaviour and activity of potential prey (Lima and Dill 1990). In assessing predation hazards, many species use remote cues of risk because of the dangers of direct encounters with predators, including avoidance of open areas (e.g. Banks et al. 1999) or changing the time that they forage (in Banks et al, 2003; 406).

Cats also have direct impacts on native fauna through predation. 'They can kill vertebrates weighing as much as 3kg (Dickman 1996), but preferentially kill mammals weighing less than 220g and birds less than 200g. They also kill and eat reptiles, amphibians and invertebrates (Dickman 1996). Cats can also have indirect effects on native fauna by carrying and transmitting infectious diseases (DEH 2004). They are thought to have contributed to the extinction of many small to medium-sized mammals and ground-nesting birds in the arid zone, and to have seriously affected populations of bilby, mala and numbat (DEH 2004)'(DEWHA, 2008). It is estimated that cats kill 75 million native animals daily (AWC, 2013).

To mitigate the potential impact of domestic animals on the fauna assemblage of the offset area the following management measures will be implemented:

- Imposition of a 'dog and cat restriction' covenant as follows on future allotments which contain part of the offset area (refer Figure 3):
  - Dogs and cats on the allotment shall not be permitted unrestrained (i.e. to free roam) in areas external to the designated building envelope
  - Dog and cat containment fencing shall only be permitted on the boundaries of the building envelope. Containment fencing shall not be permitted throughout areas external to the designated building envelope

Annual monitoring of pest animals is proposed (refer Section 5.3 below) which will also by way of technique (passive camera monitoring) indicate the presence of domestic dogs or cats within the offset area (usually differentiated by appearance [i.e. groomed] or collaring). If such are noted a trapping exercise will be performed in conjunction with feral animal controls outlined

below but the captured domestic animal would not initially be euthanized but transferred to the Scenic Rim Regional Council animal control officers for processing.

#### 4.5 ESTABLISHMENT AND INVASION OF WEEDS

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

##### *Genetic effects*

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

##### *Introduction of diseases*

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

##### *Competition for resources*

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

##### *Prevention of recruitment*

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

##### *Alteration of ecosystem processes*

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

##### *Changes to abundance of indigenous fauna*

Weeds that become invasive can both directly and indirectly change the abundance of indigenous fauna. Fauna such as the Richmond Birdwing Butterfly and Petrogale persephone (Proserpine Rock Wallaby) are directly impacted by escaped garden plants, Dutchman's Pipe (*Aristolochia elegans*) and Pink Periwinkle (*Catharanthus roseus*), respectively, both of which are attractive as a food source and yet toxic to them when consumed (Watts and Vidler, 2006). Indirectly, weeds impact indigenous fauna by altering the availability of suitable habitat,

including food and shelter, and by creating habitats that harbor other pest species that can, in turn, have a detrimental effect.

The degradation of currently utilised habitat as a result of weed invasion, tree dieback and poor native species recruitment may reduce the potential use of the habitat by koala. For example weed invasion may reduce potential koala movement (i.e. thick lantana, blackberry, prickly pear, morning glory). Thickets of herbaceous and woody weeds within the lower strata of a forest may also reduce native recruitment of preferred foraging species. Tree dieback will also reduce the potential forage base of a forest as well as altering the canopy cover and changing the microclimate of the forest floor. This can lead to the prevalence of weed invasion which, as discussed, can hamper koala movement and reduce recruitment potential of native trees.

To mitigate this impact undertaking of rehabilitation works (including weed management and 'assisted natural regeneration') will occur within the offset area to progressively reduce the potential impacts of existing weed infestations on retained vegetation/habitats.

Weed control techniques will vary depending upon the species being targeted and its location within the site and landscape. In areas of limited native vegetation (i.e. within and adjacent designated fire trails, densely infested areas devoid of native trees etc) broad scale application of herbicide or mechanical removal will be appropriate. Within the retained predominately native bushland areas and proximate to gullies more selective removal techniques (i.e. hand tool removal) and spot application or broad scale application of a non-residual herbicide (i.e. roundup bioactive) will be necessary.

To ensure weeds are not spread from the site via machinery and vehicles a hygiene protocol will be developed. This would identify actions such as washing down equipment and checking tyres for propagules prior to machinery/equipment exiting the offset.

In addition, the removal of grazing animals from the offset area in association with the development will reduce potential weed seed dispersal (i.e. within the scat after being eaten by cattle or by being bound to the coats of the animals).

#### 4.6 PEST/FERAL ANIMALS

Wild goats, deer and hares are known from the broader locality and can compete with native species for herbivorous graze. 'Documented impacts of feral deer in conservation reserves include overgrazing, browsing, trampling, ring-barking, antler rubbing, dispersal of weeds (e.g. Senegal tea *Gymnocoronis spilanthoides*, *Ludwigia peruviana*), creation of trails, concentration of nutrients, exposing soils to erosion/accelerating erosion, and the subsequent degradation of water quality in creek and river systems' (Clarke *et al.* 2000, NPWS 2002, Keith and Pellow 2004, Flora and Fauna Guarantee Scientific Advisory Committee 2004 in NSW Scientific Committee, 2011).

Feral Goats can cause also significant habitat degradation. 'Removal or destruction of vegetation together with trampling by ungulate herbivores decreases soil stability and contributes to erosion (Henzell 1993; Eldridge 1998). An experiment in the Macleay River gorge system, northeastern NSW, demonstrated that removal of goats resulted in a rapid decrease in soil erosion; this initial rapid decrease was followed by a slower decline in erosion coincident



with a relative increase in vegetation (Bayne *et al.* in press). Further, a study of high-intensity goat grazing in dunefields northwest of Cobar, northwestern NSW, found that goat grazing rapidly depleted perennial grasses and shrubs and caused the soil surface to become highly susceptible to wind erosion (Green *et al.* 1998).

Feral Goats may compete with native fauna for food, water and shelter. In particular competition from Feral Goats has been implicated as a threat to the endangered Yellow-footed Rock-wallaby, *Petrogale xanthopus* (Lim 1987) and the endangered Brush-tailed Rock-wallaby, *P. penicillata* (NSW NPWS 2001). Given that goats consume the highly digestible, nitrogen rich parts of plants, and when available, growing tips, fruit and seeds, it is likely that they would reduce the amount of nutritious plant material available to other herbivores. Thus, the capacity of rock-wallabies to respond to improved seasonal conditions following drought might be reduced by the impact of Feral Goats (Henzell 1990) (in NSW Scientific Committee, 2011).

Although not encountered within the offset area monitoring of these species will be undertaken in association with monitoring of dogs and foxes as outlined in Section 5.3.

The effects of wild dogs and foxes are considered in the discussion regarding domestic animals (section 4.4 above) and both have been recorded in low abundance within the Offset Area although presence is likely to be infrequent and of short duration and impact due to the small numbers that occur, the now absence of attractants such as stock animals and the small size of the offset relative to the typical range occupied by such wide ranging predators. Of concern to koala populations is that although wild dogs may not forage upon koalas at all times (i.e. in instances of being well fed) monitoring of wild dogs at Petrie undertaken as part of the Moreton Bay Rail Link site indicates that wild dogs will still kill koalas even if they do not eat the animal. In addition to direct predation, the presence of wild dogs in high densities may modify Koala behaviour and impact upon the health of individuals by limiting their movement on the ground between habitat trees (Mifsud, undated).

Foxes and wild dogs are declared pests under the *Land Protection (Pest and Stock Route Management) Act 2002* and are listed as restricted invasive animals under the *Biosecurity Act 2014*, which means all landholders have a responsibility to minimise the risks associated with invasive animals on lands under their control. Control should be undertaken throughout the year if these species are observed by the site manager/caretaker with annual monitoring (by way of baited camera surveillance monitoring) also performed.

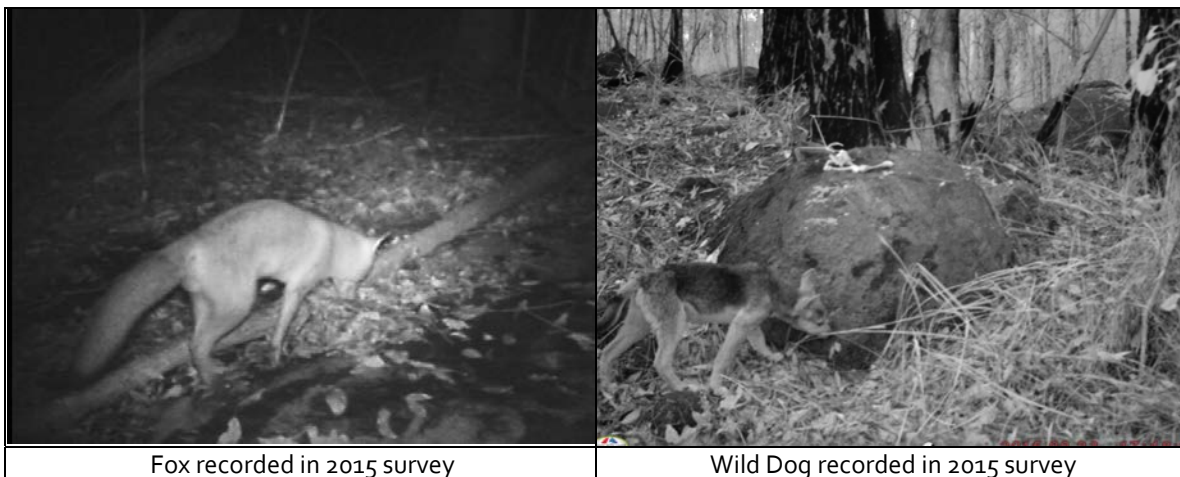
All control actions taken towards the eradication of foxes and wild dogs in should include prior consultation with Scenic Rim Regional Council, Department of Agriculture Fishers and Forestry and QDOG as pest management planning and implementation has a higher chance of local success if undertaken in a holistic manner including adjoining properties.

Please note that the review of the Code of Practice by the Australian DAFF has determined that a range of pest control methods are unacceptable due to the pain and suffering they inflict upon pest species are therefore must not be performed on this site. These include:

- The use of unmodified, serrated-edge, steel jaw traps;
- Strychnine baiting to control fox and dog populations;
- Chloropicrin fumigation of rabbit warrens;
- Warfarin baiting to control pig populations; and

- Yellow phosphorous (CSSP) baiting to control pig populations (Oogjes, 2009).

Within the offset area open shooting, baiting and/or soft-jaw foot trapping exercises are likely to be suitable although upon development of adjacent development stages open shooting is likely to become less suitable in the western portions of the offset area as residences establish nearby. Cage trapping is also a suitable method for the capture of foxes and wild pigs which can then be euthanized. In the event that monitoring results require control action to be implemented (refer Section 7) the contractor is to ensure that the relative humaneness of the control method is appropriately considered in accordance with DAFF (2011) Model for Assessing the Relative Humaneness of Pest Animal Control Methods.



#### 4.7 GRAZING

Grazing of cattle and horses is an agricultural practice involving the utilisation of native pastures and/or the establishment of exotic grasses to be used as a forage resource for livestock. Grazing may result in weed invasion, soil compaction, consumption and trampling of native vegetation, and erosion due to the hooves of cattle. In stream (bank and bed) habitat can be significantly impacted by stock accessing waterways for drinking including wallowing which alter flow dynamics within the stream and increased turbidity. Stock access paths created within riparian zones (and bushland habitat in general) can result in accelerated erosion during periods of extended rainfall and bank full flow as stabilizing plants and topsoil has been removed.

Cattle and horses may pose a significant threat to the viability of ecological functioning and the maintenance of biodiversity through soil compaction, ringbarking of native trees, inhibiting native plant regeneration, degradation and structural simplification of habitat, increased erosion and nutrient availability, competition for space, as vectors for the introduction of weeds/diseases, and the consumption of palatable feed from native animals. Whilst poorly understood the presence of grazing animals may impact upon the behavior of native fauna (particularly sensitive/secretive species) including free access to waterways and dams during times of drought.

Grazing activities on the site will continue until such time as construction of the residential development is commenced at which time grazing will not be permitted within the offset area by way of covenant on title and will, therefore, avoid associated negative impacts such as:

- introduction of excess nutrients into waterways from manure;
- grazing of seedlings/saplings;
- trampling of vegetation;
- compacting soils;
- increased erosion in riparian areas during bank full flow periods.

A significant and immediate benefit to the viability and regeneration potential of the habitats of the offset area is considered likely in this regard.

## **5.0 MONITORING**

The following monitoring will be performed to demonstrate that the objectives of the offset management plan are being achieved, and to measure how the offset is progressing over time in relation to improving the quality of the protected habitat.

### **5.1 BASELINE MONITORING**

Baseline Biocondition assessments were performed in October 2016 to establish the values of the existing condition of the habitat which in association with the EPBC Referral documentation and associated approvals has been assigned a koala habitat value of 8. The locations of the Biocondition transects are presented in Attachment 2. Permanent photo monitoring points have been established at the centre (50m point) of the transects and photos taken over 360 degrees at each of these points.

In addition to the permanent Biocondition sites', permanent visual/qualitative monitoring points were established within the offset area to provide an indication of the status of the quality and the ongoing rehabilitation of the habitat contained within. The details to be collected within these 10m x 10m quadrats are outlined within Attachment 4 (Weed and Rehabilitation Plan) and include:

- Estimated average height of plants (height in metres for tree, shrub and groundcover species);
- Dominant species (qualitative description of dominant species within tree, shrub and ground layer);
- Area of ground cover covered by weed species (area in square metres);
- Death or illegal removal of any native plants;
- Incidence of recruitment, both exotic and native (species and quantity estimates of new species noted [i.e. D = dominant, .C=codominant, A = associated, S= isolated/suppressed])
- Native fauna presence (native fauna species recorded via observation, track or trace during inspections are to be noted)
- Search for feral predator scats (for analysis at a private laboratory refer Section 5.3)

### **5.2 ONGOING VISUAL MONITORING AND BIOCONDITION ASSESSMENTS**

'Biocondition assessments provide a measure of how well a terrestrial ecosystem is functioning for biodiversity values. It is a site-based, quantitative and therefore repeatable assessment procedure that can be used in any vegetative state, and provides a numeric score that can be summarised as a condition rating of 1, 2, 3 or 4, or functional through to dysfunctional condition



for biodiversity. In Biocondition, 'condition' refers to the degree to which the attributes of a patch of vegetation differ from the attributes of the same vegetation in its reference state (Eyre et al, 2015:1-2).

Biocondition assessments will be conducted every three years to assess the ecological condition of the offset area in accordance with Biocondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland, Assessment Manual (Version 2.2, February 2015; Eyre et al, 2015). Assessments will be conducted at the locations used in the baseline monitoring (refer Attachment 2) and should be undertaken in accordance with the same methodology to enable a meaningful comparison. To demonstrate an improvement in habitat 'quality' the starting score for each site established in the baseline survey must increase over the life of the approval.

Photo monitoring is to be undertaken annually to enable visual assessment of changes over time (particularly focusing upon natural regeneration success) and will consist of the following:

- 7 permanent 10m x 10m photo-monitoring sites have been established utilising flagging tape and at the start of construction permanent pickets will be installed. The location of each monitoring plot has been recorded using a handheld GPS device and mapped (refer Attachment 3)
- Photo-monitoring will also be undertaken annually within each of the 4 Biocondition transects with photos to be taken from the centre of the Biocondition transect
- A record of the photographs will be maintained, including site and date of each photograph and the qualitative data listed in Section 5.1 above.

### 5.3 FAUNA MONITORING

#### *KOALAS*

The matter of NES to which the offset area relates is the koala and as such regular surveys will be conducted to determine if the species continues to exist within the habitat for which it was protected. A koala baseline survey was conducted in association with the EPBCA Referral documentation which confirmed the presence of the koala on the site. This survey shall be replicated annually for five years and then every three years after for the 20 year life of the development. Each koala survey will include:

- Spot Assessment Technique (SAT) for Koala Faecal Pellets x seven sites
- Diurnal searches for koalas whilst moving between SAT sites
- Nocturnal searches for koalas x two nights

#### *FERAL ANIMALS*

Feral animal (particularly targeting dogs and foxes) will be conducted once every year during the spring months which is likely to identify the presence of fox cubs indicating breeding within the locality (wild dogs and cats may breed at any time depending upon availability of resources and survey during spring would generally coincide with the weaning of juvenile terrestrial and arboreal mammals which provide a potential food source for wild dogs). As discussed previously to reduce costs the annual monitoring shall be via passive camera monitoring as follows:

- 10 cameras deployed for 14 days and nights

- Cameras are to include a metal bait chamber pegged to the ground and baited with a carnivore bait (i.e. tuna and chicken pieces)
- Bait chambers are to be sprayed with tuna oil as an attractant

Predator scat searches and collection shall also occur when traversing habitat between trapping sites. Scats will be analysed at a private laboratory to determine if such contain koala remains providing evidence that predation is occurring.

## 6.o REPORTING

In accordance with condition 10A of the EPBCA Approval an annual compliance report detailing the progress of works and results against the objectives and outcomes proposed by this OMP will be prepared. This shall occur annually for a period of twenty years unless an earlier discharge of completion is agreed to in writing by the Minister. The compliance report is to include the following details as a minimum and be prepared in accordance with DoE 2014 Annual Compliance Report Guidelines:

- Departmental reference/approval number and project name
- Name and contact details of proponent and ACN or ABN
- Lot on plan property description and postal address
- Activities undertaken within each management action and the outcomes achieved
- Schedule of management actions with progress section completed
- Program of action for the next management period
- Results of Biocondition assessments if due that year or a statement of when the next upcoming Biocondition assessment will occur
- Photo monitoring results
- Results of koala monitoring if due that year or a statement of when the next upcoming koala survey will occur
- Results of feral animal monitoring
- Progress towards the achievement of offset area objectives and outcomes
- Problems, issues and impediments to achieving the objectives and outcomes of the management plan
- Adaptive management/corrective actions (i.e. unpredicted adverse conditions such as storm damage or bushfire, feral animal abundance increases, invasion of weed species or failure in a control technique for a particular species etc)
- Proponent declaration of accuracy

Any detailed incidences of non-compliance are to include:

- the relevant EPBC approval condition number
- who detected the non-compliance
- date the non-compliance was detected
- was the Department notified of the non-compliance and if so, when and how
- how the non-compliance was/will be corrected
- who (the actual person completing the correction) was/is responsible for correcting the non-compliance
- date correction measures were/will be commenced and/or completed or the time frame for correction
- what measures have been/ will be taken to avoid recurrence.

## 7.0 MANAGEMENT, MONITORING AND REPORTING SCHEDULE INCLUDE CORRECTIVE ACTIONS

The below table provides a summary of the actions to be undertaken in association with the implementation of this offset management plan including the responsibility for delivery, timing and frequency, performance criteria to be achieved and contingency/adaptive management. Monitoring and reporting requirements are also included.

**TABLE 9: MANAGEMENT, MONITORING AND REPORTING SCHEDULE INCLUDE CORRECTIVE ACTIONS**

Management Action	How the management action will be carried out	Where the action will be carried out	When the action will be carried out	Who will be carrying out the action	Performance criteria/outcome to be achieved	Contingencies/corrective actions	Comments/Progress
Legally securing the habitats of the offset area	Voluntary declaration under the VMA and binding covenant on title	n/a	Prior to commencement of construction	Suitably qualified professional as appointed by the proponent.	The approved offset area is declared under Sections 19F and 19k of the QLD Vegetation Management Act 1999	Notify the DoE if the declaration is not achieved  In consultation with DoE investigate and apply for alternative measures to protect the habitat within the offset	Discussions have commenced with the DNRM (22 <sup>nd</sup> September 2016) and it is anticipated that the declaration will be lodged in October 2016.
Offset area habitat protection during clearing and construction	Vegetation clearing within the offset area will be restricted to: <ul style="list-style-type: none"> <li>Establishing and maintaining firebreaks;</li> <li>That necessary for the removal of non-native weeds or declared pest species from the offset area</li> </ul> To ensure that retained vegetation/habitat within the offset area will not be impacted upon as a result of construction works, vegetation protection fencing at the interface between the proposed works and the offset site will be erected.	Firebreaks and firetrail clearings in approved locations only (refer Figure 3)  Tree protection fencing at the boundary of approved works within each stage.	In association with the construction of each stage	Suitably qualified professional as appointed by the proponent.	No evidence of clearing activities (excluding weeds) are evident within the offset area.  No evidence of construction equipment, workers or vehicles within offset area.  Tree protection fences are erected and in good condition	Ensure vegetation protection/construction exclusion fences are intact and adequately signed  Any accidental damage caused by the proponent or proponent appointed contractors is to be revegetated in accordance with a program to be agreed with Scenic Rim Regional Council, DoE and DNRM.  Any illegal clearing to be recorded in landowner records and identified during the monitoring and reporting program. Scenic Rim Regional Council, DoE and DNRM to be notified.	Clearing and construction will occur on a staged basis and a vegetation management plan submitted to SRRC for approval with each stage in accordance with the existing development approval. All VMPs are to follow the protocols developed and already approved for Stages 1 and 5.
Koala Protection during construction	Koalas are known to occur on site including within the approved construction footprint from which 26.49 hectares of koala habitat will be removed. The protection of individuals and avoidance of injury during the clearing phase is required.  A suitably qualified koala spotter catcher will be contracted to protect, monitor and passively disperse koalas into retained habitats (i.e. the offset area) during all clearing works across all stages).	The construction and development footprint	In association with the construction of each stage	A koala spotter and catcher appointed by the proponent.	No tree in which a koala occurs is felled  No koalas are killed or injured as a result of clearing or construction works  Koalas encountered are safely dispersed into retained habitats. Koalas disperse of their own volition as a result of the successional clearing methods outlined in Section 4.2	Opportunistic capture/release is permitted where an <i>un-located Koala</i> interaction occurs. If or when this occurs, all clearing will cease until the koala spotter-catcher responsible has determined the severity of incident. In circumstances where the Koala has had a major stress reaction from close proximity to the clearing process, clearing will be directed away from proximity and the Koala reaction monitored until stress reaction is deemed acceptable.  In circumstances where a tree containing the Koala has been felled, the Koala will be examined for general alertness, potential injuries to paws, limbs, body, vision prior to the decision to vet check Koala or hold with observations repeated prior to release and post release monitoring to confirm successful dispersal out of the clearing zone. In this event where the animal is physically detained it is not to be released back into habitat which is approved for removal. It is to be released into habitats approved for retention (i.e. the offset area). QPWS to be notified within 24 hours of incident.  If despite the best management practices of the spotter and catcher (refer Section 4.2) a koala is	Clearing and construction will occur on a staged basis and koala spotters and catchers will be appointed for all stages.



						<p>killed as a result of clearing/construction then works are to immediately cease. The spotter catcher is to notify the proponent and both are to make contact with DoE and QPWS.</p> <p>Additional protocols are to be investigated including the use of additional spotter catchers and a reduction in the daily clearing rate. Works may not continue until:</p> <ul style="list-style-type: none"> <li>the additional protocols have been agreed to with DoE and QPWS</li> <li>an agreement has been made upon disposal of the animal</li> <li>written agreement (electronic) is given by DoE and QPWS that construction may continue</li> </ul>	
Fire management	<p><i>Fire-bans</i></p> <p>All fires (including domestic fires such as burning of garden refuse) are prohibited from the offset area</p> <p>During tree felling and construction no fires are permitted within 100m of the offset area</p>	Throughout offset area	At all times	Suitably qualified professional as appointed by the proponent.	<p>Prevent unplanned fire events within the offset area</p> <p>Any incidence of wild fire or illegal burning is to be identified during inspections and documented within the monitoring and reporting program.</p>	<p>Investigate additional bushfire management practices including additional fire management breaks/lines or additional exercises to reduce fuel loads such as winter prescribed burns. Any such prescribed burns are to be planned as low-moderate intensity bans to maintain RE structure per the fire management guidelines for RE12.9-10.17 and 12.8.14 (refer Regional Ecosystem Description Database).</p> <p>Overgrown fire breaks/management lines are to be maintained to reduce load</p> <p>Non-trafficable (4wd) bushfire trails are to be repaired to a standard determined in association with the rural fire brigade</p> <p>Areas of increased fuel loads as a result of exotic plant growth are to be managed in accordance with the weed management plan</p> <p>Prosecute any proven incidences of illegal fire activity within the offset area</p>	<p>Prohibition on fire bans within the offset will commence upon securing the offset via voluntary declaration under the VMA.</p> <p>The southern firebreak/trail exists as of 2004. The western fire trails external the perimeter of the offset area will be created in association with Stage 3, 4b, 7 and 8 of the estate.</p> <p>No firebreaks are nominated on the approval adjacent to the eastern boundary of the estate as reduced fuel loads and firebreaks occur on adjacent allotments.</p> <p>Reduction of fuel loads within areas of weed invasion will commence in conjunction with the first stage of development</p>
	<p><i>Fuel Load Reduction</i></p> <p>Monitor fuel loads regularly during weed management and rehabilitation activities as well as weed monitoring events and annual visual monitoring/photographing inspections and Biocondition surveys</p> <p>Maintain reduced fuel loads in association with weed control works (refer Weed Management Plan)</p>	Throughout offset area	Annually and as required as a result of visual monitoring	Suitably qualified professional as appointed by the proponent.	<p>Maintain fuel loads by reducing the extent of existing exotic pasture grasses and weed thickets (lantana) within the offset area</p> <p>Firebreaks are maintained and not overgrown with heavy fuel loads.</p>		
	<p><i>Firebreaks</i></p> <p>Establish firebreaks and fire trails on the perimeter of the offset area in accordance with the approved Plan of Development to minimise the risk of fire spreading from the development footprint into the offset habitats</p> <p>Inspect firebreaks and fire trails annually in association with visual monitoring of offset area</p>	Within and on the perimeter of the offset area in accordance with Figure 3.	<p>Maintain existing fire trails/firebreaks. Create approved fire trails/firebreaks on a staged basis in accordance with the development staging plan</p> <p>Inspect annually</p>	Suitably qualified professional as appointed by the proponent. Liaison with Rural Fire Brigade where required	<p>Fire trails are navigable by the rural fire brigade</p>		
Grazing stock management	All grazing and domestic stock are to be excluded from the offset area to enhance natural regeneration and reduce soil compaction.	Throughout the entire offset area	Prior to the commencement of construction and throughout the life of the project	Suitably qualified professional as appointed by the proponent	<p>No evidence of livestock occurring within the offset area (visual observation, scats etc.).</p> <p>Check fencing to ensure it is intact and correctly functioning.</p>	<p>Any livestock observed within the offset area is to be removed.</p> <p>Fence lines are to be inspected in conjunction with weed monitoring efforts and repaired if required.</p>	Prohibition on stock animals within the offset will commence upon securing the offset via voluntary declaration under the VMA.
Weed management and rehabilitation	<p><i>Weed Baseline Survey</i></p> <p>Conduct field survey to determine the occurrence and distribution of weed infested areas</p> <p>Identify and map priority weed management areas</p>	The offset area	Prior to commencement of construction	Suitably qualified professional as appointed by the proponent	<p>Identify, map and develop strategies for existing weed infestations</p> <p>Develop strategies to ensure treated areas regenerate with native flora</p>	N/A. Reporting for this component completed as part of this document	Baseline weed surveys and mapping completed in October 2016
	<p><i>Weed Management Planning</i></p> <p>Develop a weed management plan based upon the results of the weed baseline survey including appropriate control techniques to eradicate observed species and recommended protocols to ensure treated areas regenerate with native flora.</p>	N/A	Prior to commencement of construction	Suitably qualified professional as appointed by the proponent			Weed management and rehabilitation plan developed in October 2016 (refer Attachment 4 of this report)

	<p><b>Weed Control and Management</b> Implement weed control/management to reduce the density and extent of occupation within the offset area</p> <p>Weed control methods will be chosen based on the results of baseline and annual weed surveys and tailored to suit individual weed species which have the potential to spread rapidly</p>	The offset area	<p>As per weed management plan.</p> <p>Control to be undertaken as early as practicable focussing upon the priority management areas identified to improve the potential for further natural regeneration process the Offset Area.</p> <p>Periodic treatment thereafter dependent upon regeneration and as a result of annual monitoring findings.</p>	Suitably qualified professional as appointed by the proponent	<p>Reduce the extent of existing weed coverage within the offset area and thus reduce the potential impacts of habitat degradation associated with weed spread by:</p> <ul style="list-style-type: none"> <li>reducing the extent of known infestations to reduce the potential for dispersal and further habitat quality reduction</li> <li>ensure treated areas are monitored and maintained such that regeneration of native flora rather than exotic flora occurs</li> <li>prevent weeds from spreading into currently unaffected areas</li> <li>avoid the introduction of new weed species into the offset area</li> </ul>	<p>In the event of increased weed cover or non-response of treated areas during annual monitoring:</p> <ul style="list-style-type: none"> <li>Re-treat the area and increase the re-inspection/re-application rate to ensure any juvenile recruitment is eradicated before it can become established</li> <li>Investigate alternative weed management regimes or techniques for species which do not respond to treatment</li> <li>Develop and implement an updated weed management plan.</li> <li>Revise hygiene protocols</li> </ul>	<p>To commence in conjunction with construction.</p> <p>Update weed management plan as required where monitoring results do not meet performance requirements, areas of failure are identified and corrective actions are implemented.</p>
	<p><b>Treatment Monitoring</b> Monitoring of targeted weed infestations will be conducted as follow up after initial weed control events to ensure infestations have been sufficiently eradicated and to conduct re-control where required.</p>	The offset area	<p>One month after initial treatment in accordance with weed management plan</p> <p>Weed presence also monitored annually within photo/visual monitoring quadrats and Biocondition sites</p>	Suitably qualified professional as appointed by the proponent	<p>Ensure the area of specific criteria of the Weed and Rehabilitation Management Plan (Attachment 4 are achieved)</p>		
	<p><b>Weed Hygiene</b></p> <ul style="list-style-type: none"> <li>Minimise the potential for the movement of weed material from weed infested areas into the non-infested habitats within the offset area.</li> <li>Ensure that all vehicles and equipment accessing the offset area are clean and free of weed seed prior to entry.</li> </ul>	The offset area	At all times	Suitably qualified professional as appointed by the proponent			
	<p><b>Assisted Natural regeneration</b> The monitoring of natural regeneration within Biocondition sites and weed management area visual/photo quadrats.</p>	The offset area	Annually and as per the weed management / rehabilitation plan	Suitably qualified professional as appointed by the proponent	<p>Natural regeneration and recruitment typical to the existing regional ecosystems occurs</p> <p>Natural regeneration tree recruitment includes koala trees (i.e. eucalypts)</p>	<p>Where assisted natural regeneration is deemed to be failing, revegetation of disturbed or failing areas will occur as outlined within the rehabilitation plan (refer Attachment 4). This will include pocket planting tubestock of species indigenous to the locality, mulching and maintaining (i.e. watering) for three months.</p> <p>Where natural recruitment of koala trees is deemed to be failing tubestock plantings of eucalypts will occur at densities typical to comparable Biocondition reference sites for occurring regional ecosystems.</p>	To commence in conjunction with construction.
Pest/Feral Animals	<p><b>WILD/FERAL ANIMALS</b> Minimise the introduction of pest/feral animals and control of the existing populations within the offset area in accordance with the <i>Land Protection (Pest and Stock Route Management) Act 2002</i>. If populations are noted as a result of annual survey then control techniques are to be implemented.</p>	The offset area	As required by in response to feral animal monitoring results	Suitably qualified professional as appointed by the proponent	<p>Annual feral pest surveys will be conducted within the offset area with the aim to be to reduce feral animal populations (&lt;5 dogs and &lt;5 foxes recorded during 2015 surveys).</p> <p>Reduce the potential impact of feral animals on native fauna and associated habitat.</p> <p>Feral animal scats, tracks and visual</p>	<p>If an increase in pig, fox, cat or wild dog numbers is observed via annual monitoring, the landholder will implement a pest animal management programme (potentially including cage trapping, baiting, soft jaw trapping and/or open range shooting) to control the feral animal population in consultation with Scenic Rim Regional Council, Department of Agriculture Fishers and Forestry and QDOG. Consultation should also include neighbours as such programs have a higher chance of success if management measures are integrated</p>	<p>Feral animal monitoring will begin annually following commencement of construction with management measures implemented annually if required by monitoring results.</p> <p>The removal of rural production animals from the site is likely to reduce the habitat potential for dogs and foxes due to a reduction in available foraging resources and such production uses attracting pests to the site.</p>

					indications (i.e. pig wallowing sites) will be searched for during traversal of the habitat between camera monitoring sites.	with neighbouring properties.	
	<p><b>DOMESTIC ANIMALS</b> The offset area will be designated as a dog, cat and other domestic animal (i.e. donkey, goat, sheep etc) exclusion area. The proponent will ensure that all future residents which contain part of the offset area are made aware of this prohibition which will be binding on the title by way of covenant including this management plan.</p> <p>It is noted that all allotments which contain part of the offset which include domestic animals in future are required to have exclusion fencing. The allotment owner is required to ensure that the exclusion fencing remains intact and that the domestic animal remains within the designated building envelope and not the offset area. This will be binding on the title by way of covenant including this management plan.</p>	Throughout the entire offset area	At all times	Proponent and future land owners	No evidence of domestic animals occurring within the offset area (visual observation, scats etc.) with annual passive camera surveys conducted.	<p>Annual monitoring of pest animals is proposed which will also by way of technique (passive camera monitoring) indicate the presence of domestic dogs or cats within the offset area (usually differentiated by appearance [i.e. groomed] or collaring). If such are noted a trapping exercise will be performed in conjunction with feral animal controls outlined above but the captured domestic animal would not initially be euthanized but transferred to the Scenic Rim Regional Council animal control officers for processing.</p> <p>Any landowners claiming a domestic animal which was captured within the offset area will be made aware of the prohibitions in place and the animal will be recorded in the annual report. In the instance of repeat offences a formal complaint and request for prosecution will be made by the proponent to the Council, DoE and DNRM.</p> <p>Visual check of building envelope exclusion fencing to ensure it is intact and correctly functioning.</p>	<p>Prohibition on domestic animals within the offset will commence upon securing the offset via voluntary declaration under the VMA.</p> <p>Domestic animal monitoring will occur annually in conjunction with the feral animal monitoring program.</p>
Monitoring	<p><b>Biocondition</b> Biocondition assessments will be undertaken every three years to assess the ecological condition of the offset area in accordance with Biocondition: A condition assessment framework for terrestrial biodiversity in Queensland, assessment manual (Eyre et al, 2015) for site based score assessment.</p>	At the 4 sites contained within the baseline surveys (refer Attachment 2)	<p>The baseline survey is completed.</p> <p>The next biocondition survey shall be three years after commencement of construction and then every three years for the life of the approval (20 years)</p>	Suitably qualified professional as appointed by the proponent	<p>Biocondition assessments are required to determine if the management actions are successful in improving the ecological condition (quality) of the regional ecosystems (and associated koala habitat) within the in the offset area as compared to the baseline surveys</p> <p>Identify areas that are not regenerating naturally despite implementation of weed management</p> <p>Demonstrate that there is a gain in habitat quality for the koala across a minimum of 90% of the offset area (after 20 years)</p> <p>For the life of the approval ensure no net loss in the extent of Koala habitat quality in the offset area</p>	Corrective actions provided in 'weed management and rehabilitation' above.	<p>Baseline Biocondition assessments completed in October 2016 (Attachment 2)</p> <p>Baseline photo monitoring/visual assessment quadrats established and undertaken in October 2016 (Attachment 2 and 3)</p>
	<p><b>Photo/Visual Monitoring</b> Visual/photo monitoring quadrats have been established and shall be investigated annually with other opportunistic monitoring performed while implementing management actions/strategies contained within this OMP.</p> <p>Permanent photo monitoring quadrats have been</p>	At the 7 sites contained within Attachment 3	<p>The baseline photo monitoring and visual survey quadrats are complete.</p> <p>Monitoring shall occur annually</p>	Suitably qualified professional as appointed by the proponent	Assess the visual changes within the monitoring sites to determine if the management actions are successful in improving the ecological condition (quality) of the regional ecosystems (and associated koala habitat) within the in the offset area as compared to the baseline information.		



	established and include the Biocondition sites (this ensures these sites are visually inspected annually in addition to the three-yearly technical biocondition assessments) and 7 additional 10m x 10m quadrats within the site.				<p>Identify areas that are not regenerating naturally despite implementation of weed management</p> <p>Demonstrate that there is a gain in habitat quality for the koala across a minimum of 90% of the offset area (after 20 years)</p> <p>For the life of the approval ensure no net loss in the extent of Koala habitat quality in the offset area</p> <p>Ensure that at the completion of construction for each stage of development there must be no net loss in Koala habitat quality in the offset area</p>		
	<p><i>Fauna Monitoring</i></p> <p>Relevant licences and approvals (including ethics approvals) relating to fauna survey are to be current prior to undertaking any surveys</p>	N/A	Prior to undertaking survey	Suitably qualified professional as appointed by the proponent	Proponent to ensure ecological consultant has current licences and approvals.	Survey cannot commence until licences and approvals are presented	N/A
	<p><i>Koala Monitoring</i></p> <p>Each koala survey will include:</p> <ul style="list-style-type: none"> <li>Spot Assessment Technique (SAT) for Koala Faecal Pellets x seven sites</li> <li>Diurnal searches for koalas whilst moving between SAT sites</li> <li>Nocturnal searches for koalas x two nights</li> </ul> <p>Surveys will be conducted between August and January.</p>	the offset area	Annually for five years and then three years for the life of the approval	Suitably qualified professional as appointed by the proponent	<p>The koala remains within the habitat of the offset area which was protected for the species.</p> <p>Abundance of koalas within the offset area does not decline during the life of the approval</p>	<p>Investigate potential reasons for the absence of the koala including a review of potential threatening processes</p> <p>Incorporate adaptive management strategies into this OMP and implement the strategies (i.e. increased numbers of wild dogs were recorded during feral pest survey which may have lead to reduced numbers of koalas within the offset area. The corrective action strategies for wild dog control are immediately implemented)</p> <p>Notify DoE of results and adaptive management strategies</p>	<p>Koala baseline survey completed in 2015 in association with EPBCA Referral documentation.</p> <p>Ongoing surveys will occur to demonstrate that the species continues to exist within the habitat for which the offset was required and will be provided.</p>
	<p><i>Feral Animal Monitoring (including domestic pets)</i></p> <p>A feral animal survey shall be conducted annually during the spring months targeting dogs, foxes and cats. The annual monitoring shall be via passive camera monitoring and analysis of predator scats.</p>	The offset area	Annually	Suitably qualified professional as appointed by the proponent	Per the previous sections feral pest surveys will be conducted with the aim to be to reduce feral animal populations (<5 dogs and <5 foxes recorded during 2015 surveys).	If an increase in abundance of feral fauna species targeted is noted then the corrective actions within the 'Pest/Feral Animals' outlined above shall commence.	Baseline surveys in 2015 did not provide any evidence that feral animals are impacting or suppressing koala populations. Monitoring of such pests shall occur and increases in abundance will trigger management actions to control such species to maintain the viability of the offset habitat area for the koala.
Reporting	<p><i>Annual Compliance Report</i></p> <p>In accordance with condition 10A of the EPBCA Approval an annual report detailing the progress of works and results against the objectives and outcomes proposed by this OMP will be prepared. The compliance report is to include the following details as a minimum and be prepared in accordance with DoE 2014 Annual Compliance Report Guidelines:</p> <ul style="list-style-type: none"> <li>Departmental reference/approval number and project name</li> <li>Name and contact details of proponent and ACN or ABN</li> <li>Lot on plan property description and postal address</li> </ul>	N/A	Annually	Suitably qualified professional as appointed by the proponent	To be submitted to the DoE within three months of the annual anniversary of the commencement of construction.	If any delays occur the DoE is to be immediately notified.	N/A

	<ul style="list-style-type: none"> <li>Activities undertaken within each management action and the outcomes achieved</li> <li>Schedule of management actions with progress section completed</li> <li>Program of action for the next management period</li> <li>Results of Biocondition assessments if due that year or a statement of when the next upcoming Biocondition assessment will occur</li> <li>Photo monitoring results</li> <li>Results of koala monitoring if due that year or a statement of when the next upcoming koala survey will occur</li> <li>Results of feral animal monitoring</li> <li>Progress towards the achievement of offset area objectives and outcomes.</li> <li>Problems, issues and impediments to achieving the objectives and outcomes of the management plan.</li> <li>Adaptive management/corrective actions (i.e. unpredicted adverse conditions such as storm damage or bushfire, feral animal abundance increases, invasion of weed species or failure in a control technique for a particular species etc).</li> <li>Proponent declaration of accuracy</li> </ul> <p>Any detailed incidences of non –compliance are to include:</p> <ul style="list-style-type: none"> <li>the relevant EPBC approval condition number</li> <li>who detected the non-compliance</li> <li>date the non-compliance was detected</li> <li>was the Department notified of the non-compliance and if so, when and how</li> <li>how the non-compliance was/will be corrected</li> <li>who (the actual person completing the correction) was/is responsible for correcting the non-compliance</li> <li>date correction measures were/will be commenced and/or completed or the time frame for correction</li> <li>what measures have been/ will be taken to avoid recurrence.</li> </ul>						
	<p><i>General Records</i></p> <p>The proponent should maintain an accurate record and log of all works and inspections undertaken within and adjacent to the approved offset area. Such documents are useful to demonstrate compliance with implementation of the plan (i.e. access work logs and invoices paid to a bushland regenerating team can be used as evidence to verify that an annual weed control cycle occurred)</p>	N/A	At all times	Proponent	N/A	N/A	N/A



**8.0 CONSENT/COMMITMENT BY PROPONENT**

Consent to and commitment to implement this offset management plan must be provided by the owners of the site and the proponents of the action associated with EPBC2015/7485.

SIGNED BY ELBINA PTY LTD and DALE HOLT

being the current owner/s of the abovementioned property and entity (proponent) undertaking the Canungra Rise Residential development in accordance with EPBC2015/7485 approval dated 22<sup>nd</sup> August 2016 to indicate that the terms of this offset management plan including responsibilities under the management plan, have been read, understood and accepted.

A handwritten signature in black ink, appearing to read "M. O'Brien".

ELBINA PTY LTD ACN 104 956 327 by its duly constituted  
Attorney MARGARET O'BRIEN under Power of Attorney  
No 716283996 and I declare that I have received no  
Notice of Revocation of such Power of Attorney

A handwritten signature in black ink, appearing to read "D. Holt".

DALE HOLT



## 9.0 REFERENCES

BANKS, P., NELIKA, K., HUGHES, A. AND ROSE, T. (2003) DO NATIVE AUSTRALIAN SMALL MAMMALS AVOID FAECES OF DOMESTIC DOGS? RESPONSES OF RATTUS FUSCIPES AND ANTECHINUS SUTARTII IN AUSTRALIAN ZOOLOGIST V32(3) PP. 406-409

COMMONWEALTH OF AUSTRALIA (2014) EPBC ACT REFERRAL GUIDELINES FOR THE VULNERABLE KOALA (COMBINED POPULATIONS OF QUEENSLAND, NEW SOUTH WALES AND THE AUSTRALIAN CAPITAL TERRITORY). COE, CANBERRA.

COMMONWEALTH OF AUSTRALIA/DEPARTMENT OF THE ENVIRONMENT (2014) ANNUAL COMPLIANCE REPORT GUIDELINES. COE, CANBERRA.

COMMONWEALTH OF AUSTRALIA/DEPARTMENT OF THE ENVIRONMENT (2014) KOALA REFERRAL GUIDELINES, OFFSETS AND EXISTING PROJECTS. COE, CANBERRA.

DEPARTMENT OF AGRICULTURE, FISHERIES AND FORESTRY (2011) A MODEL FOR ASSESSING THE HUMANENESS OF PEST ANIMAL CONTROL METHODS. DAFF, CANBERRA

DEPARTMENT OF ENVIRONMENT AND CLIMATE CHANGE NSW (2008) RECOVERY PLAN FOR THE KOALA PHASCOLARCTOS CINEREUS. DECC, SYDNEY.

DEPARTMENT OF ENVIRONMENT AND RESOURCE MANAGEMENT QUEENSLAND (2009) DECLINE OF THE KOALA COAST POPULATION: POPULATION STATUS IN 2008. DERM, BRISBANE

DEPARTMENT OF SUSTAINABILITY, ENVIRONMENT, WATER, POPULATION AND COMMUNITIES (2012) ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999 ENVIRONMENTAL OFFSETS POLICY. COMMONWEALTH OF AUSTRALIA, CANBERRA.

DEPARTMENT OF SUSTAINABILITY, ENVIRONMENT, WATER, POPULATION AND COMMUNITIES (2012) HOW TO USE THE OFFSETS ASSESSMENT GUIDE. COMMONWEALTH OF AUSTRALIA, CANBERRA.

DEPARTMENT OF SUSTAINABILITY, ENVIRONMENT, WATER, POPULATION AND COMMUNITIES (2011) THE FERAL CAT FELIS CATUS. COMMONWEALTH OF AUSTRALIA, CANBERRA.

DEPARTMENT OF SUSTAINABILITY, ENVIRONMENT, WATER, POPULATION AND COMMUNITIES (2011) THE FERAL GOAT CAPRA HIRCUS. COMMONWEALTH OF AUSTRALIA, CANBERRA.

DEPARTMENT OF THE ENVIRONMENT, WATER, HERITAGE AND THE ARTS (2008) THREAT ABATEMENT PLAN FOR PREDATION BY FERAL CATS. DEWHA, CANBERRA.

DIQUE, D., THOMPSON, J., PREECE, H., DE VILLIERS, D. AND CARRICK, F. (2003) DISPERSAL PATTERNS IN A REGIONAL POPULATION IN SOUTH-EAST QUEENSLAND IN WILDLIFE RESEARCH VOL30 PP281-290.

EYRE, T.J., KELLY, A.L., NELDNER, V.J., WILSON, B.A., FERGUSON, D.J., LAIDLAW, M.J. AND FRANKS, A.J. (2015) BIOCONDITION: A CONDITION ASSESSMENT FRAMEWORK FOR TERRESTRIAL BIODIVERSITY IN QUEENSLAND. ASSESSMENT MANUAL. VERSION 2.2. QUEENSLAND HERBARIUM, DEPARTMENT OF SCIENCE, INFORMATION TECHNOLOGY, INNOVATION AND ARTS, BRISBANE.

EYRE, T.J., KELLY, A.L., AND NELDNER, V.J. (2011). METHOD FOR THE ESTABLISHMENT AND SURVEY OF REFERENCE SITES FOR BIOCONDITION. VERSION 2.0. DEPARTMENT

OF ENVIRONMENT AND RESOURCE MANAGEMENT (DERM), BIODIVERSITY AND ECOLOGICAL SCIENCES UNIT, BRISBANE.

FRC ENVIRONMENTAL (2007 OCTOBER) AUSPACIFIC ENGINEERS, ELBINA AND WINTEN V BEAUDESERT SHIRE COUNCIL - (P&E APPEAL NO. BD2151 OF 2006 AND NO. BD2675 OF 2006) - BUFFER TO CANUNGRA CREEK. FRC, WELLINGTON POINT

MCALPINE, C., RHODES, J., PETERSON, A., POSSINGHAM, H., CALLAGHAN, J., CURRAN, T., MITCHELL, D., AND LUNNEY, D. (2007) PLANNING GUIDELINES FOR KOALA CONSERVATION AND RECOVERY.

NSW DEPARTMENT OF ENVIRONMENT AND CLIMATE CHANGE (2008) RECOVERY PLAN FOR THE KOALA PHASCOLARCTOS CINERUES). DECC, SYDNEY.

NSW SCIENTIFIC COMMITTEE (2011) HERBIVORY AND ENVIRONMENTAL DEGRADATION CAUSED BY FERAL DEER - KEY THREATENING PROCESS LISTING FINAL DETERMINATION. ONLINE @  
[HTTP://WWW.ENVIRONMENT.NSW.GOV.AU/DETERMINATIONS/FERALDEERKTP.HTM](http://www.environment.nsw.gov.au/determinations/feraldeerktp.htm)

OLSEN, M. AND FOX, S. (2007 JANUARY) REPORT OF MEETING OF EXPERTS ON FLORA MATTERS P&E COURT APPEAL NOS BD2675 AND BD2151 OF 2006.

OOGJES (2009) PROBLEMS WITH CURRENT ANIMAL PROTECTION – SENTIENT ANIMALS SLIPPING THROUGH THE NET. ONLINE @  
[HTTP://WWW.AUSTRALIANANIMALWELFARE.COM.AU/CONTENT/DAY-ONE](http://www.australiananimalwelfare.com.au/content/day-one)

PLANIT (2004 AUGUST) ECOLOGICAL ASSESSMENT PROPOSED RESIDENTIAL DEVELOPMENT AT FINCH ROAD, CANUNGRA LOT 3 ON RP32101, LOT 2 ON RP150198, LOT 3 ON RP204982 & LOT 5 ON RP903738 FOR WINTEN PROPERTY GROUP C/- AUSPACIFIC ENGINEERS P/L. PLANIT, SURFERS PARADISE.

PLANIT (2008 JULY) UPDATED ECOLOGICAL ASSESSMENT PROPOSED RESIDENTIAL DEVELOPMENT AT FINCH ROAD, CANUNGRA LOT 3 ON RP32101, LOT 2 ON RP150198, LOT 3 ON RP204982 & LOT 5 ON RP903738 FOR WINTEN PROPERTY GROUP C/- AUSPACIFIC ENGINEERS P/L. PLANIT, NOBBY BEACH.

PLANIT (2011 DECEMBER) VEGETATION REMOVAL REPORT CANUNGRA RISE STAGE 5 IN ASSOCIATION WITH APPROVED 298 LOT SUBDIVISION AT FINCH ROAD, CANUNGRA (P&E APPEAL NO: BD2151 OF 2006) FOR ELBINA P/L. PLANIT, NOBBY BEACH. [WICL11146412 DATED 28<sup>TH</sup> MAY 2012]

PLANIT (2011 JULY) TREE REMOVAL REPORT FINCH ROAD UPGRADE IN ASSOCIATION WITH APPROVED 298 LOT SUBDIVISION AT FINCH ROAD, CANUNGRA (P&E APPEAL NO: BD2151 OF 2006) FOR ELBINA P/L. PLANIT, NOBBY BEACH.

PLANIT (2011 JULY) VEGETATION REMOVAL REPORT FINCH ROAD UPGRADE IN ASSOCIATION WITH APPROVED 298 LOT SUBDIVISION AT FINCH ROAD, CANUNGRA (P&E APPEAL NO: BD2151 OF 2006) FOR ELBINA P/L. PLANIT, NOBBY BEACH. [WICL14121214 DATED 19<sup>TH</sup> FEBRUARY 2014]

PLANIT (2011 NOVEMBER) TREE REMOVAL REPORT CANUNGRA RISE STAGE 5 IN ASSOCIATION WITH APPROVED 298 LOT SUBDIVISION AT FINCH ROAD, CANUNGRA (P&E APPEAL NO: BD2151 OF 2006) FOR ELBINA P/L. PLANIT, NOBBY BEACH.

PLANIT (2012 JANUARY) PROPERTY VEGETATION MANAGEMENT PLAN & ASSESSABLE CLEARING REPORT STAGE 5 CANUNGRA RISE ESTATE, CANUNGRA FOR ELBINA P/L. PLANIT, NOBBY BEACH. INCLUDING RESPONSE TO INFORMATION REQUEST 2012/001361 STAGE 5 CANUNGRA RISE ESTATE CANUNGRA DATED MAY 2012

PLANIT (2013 OCTOBER) PROPERTY VEGETATION MANAGEMENT PLAN & STATE DEVELOPMENT ASSESSMENT PROVISIONS REPORT STAGE 1 CANUNGRA RISE ESTATE, CANUNGRA FOR ELBINA P/L. PLANIT, NOBBY BEACH.

PLANIT (2013 OCTOBER) VEGETATION CLEARING REPORT 'LEAST CONCERN' PLANTS WITHIN ROAD RESERVE STAGE 1 CANUNGRA RISE ESTATE, CANUNGRA IN ASSOCIATION WITH APPROVED 298 LOT SUBDIVISION AT FINCH ROAD, CANUNGRA (P&E APPEAL NO: BD2151 OF 2006) FOR ELBINA P/L. PLANIT, NOBBY BEACH. [PERMIT WICL14138314 DATED 19<sup>TH</sup> FEBRUARY 2014]

PLANIT (2013 SEPTEMBER) VEGETATION CLEARING REPORT & MANAGEMENT PLAN STAGE 1 CANUNGRA RISE ESTATE, CANUNGRA FOR ELBINA P/L. PLANIT, NOBBY BEACH.

PLANIT (2015 DECEMBER) EPBC ACT PRELIMINARY DOCUMENTATION EPBC 2015/7485 CANUNGRA RISE ESTATE FOR ELBINA P/L. PLANIT, NOBBY BEACH

PLANIT (2015 FEBRUARY) VEGETATION CLEARING LEAST CONCERN PLANTS REPORT STAGE 5 + EXTERNAL ROADWORKS CANUNGRA RISE ESTATE, CANUNGRA FOR ELBINA P/L. PLANIT, NOBBY BEACH

PLANIT (2015 MAY) ASSESSMENT OF LOWLAND RAINFOREST OF SUBTROPICAL AUSTRALIA CANUNGRA RISE ESTATE @ FINCH ROAD, CANUNGRA FOR ELBINA P/L. PLANIT, NOBBY BEACH

PLANIT (2016 APRIL) PROPOSED OFFSETS FOR MNES-FINCH ROAD, CANUNGRA, CANUNGRA RISE ESTATE EPBC2015/7485). PLANIT, NOBBY BEACH

PLANIT (2016 FEBRUARY) EPBC ACT PRELIMINARY DOCUMENTATION INFORMATION REQUEST RESPONSE EPBC 2015/7485 CANUNGRA RISE ESTATE FOR ELBINA P/L. PLANIT, NOBBY BEACH

REDLAND SHIRE COUNCIL (2002) FAUNA FRIENDLY FENCING REF: FS075. RSC, CLEVELAND

RYAN, T.S. (ED.) (2012) TECHNICAL DESCRIPTIONS OF REGIONAL ECOSYSTEMS OF SOUTHEAST QUEENSLAND. QUEENSLAND HERBARIUM, DEPARTMENT OF SCIENCE, INFORMATION TECHNOLOGY, INNOVATION AND THE ARTS: BRISBANE

SHARP, T. AND SAUNDERS, G. (2011). A MODEL FOR ASSESSING THE RELATIVE HUMANESS OF PEST ANIMAL CONTROL METHODS (SECOND EDITION). AUSTRALIAN GOVERNMENT DEPARTMENT OF AGRICULTURE, FISHERIES AND FORESTRY, CANBERRA, ACT.

THREATENED SPECIES SCIENTIFIC COMMITTEE (2010) LOSS AND DEGRADATION OF NATIVE PLANT AND ANIMAL HABITAT BY INVASION OF ESCAPED GARDEN PLANTS, INCLUDING AQUATIC PLANTS-ADVICE TO THE MINISTER FOR THE ENVIRONMENT, HERITAGE AND THE ARTS FROM THE THREATENED SPECIES SCIENTIFIC COMMITTEE (THE COMMITTEE) ON AMENDMENTS TO THE LIST OF KEY THREATENING PROCESSES UNDER THE ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999 (EPBC ACT). TSSC, CANBERRA

THREATENED SPECIES SCIENTIFIC COMMITTEE (TSSC) (2012). APPROVED CONSERVATION ADVICE FOR PHASCOLARCTOS CINEREUS (COMBINED POPULATIONS OF QUEENSLAND, NEW SOUTH WALES AND THE AUSTRALIAN CAPITAL TERRITORY), COMMONWEALTH OF AUSTRALIA, CANBERRA.



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**ATTACHMENT 1**

**EPBC 2015/7485 APPROVAL**

**AND**

**FINAL PLAN OF OFFSET**

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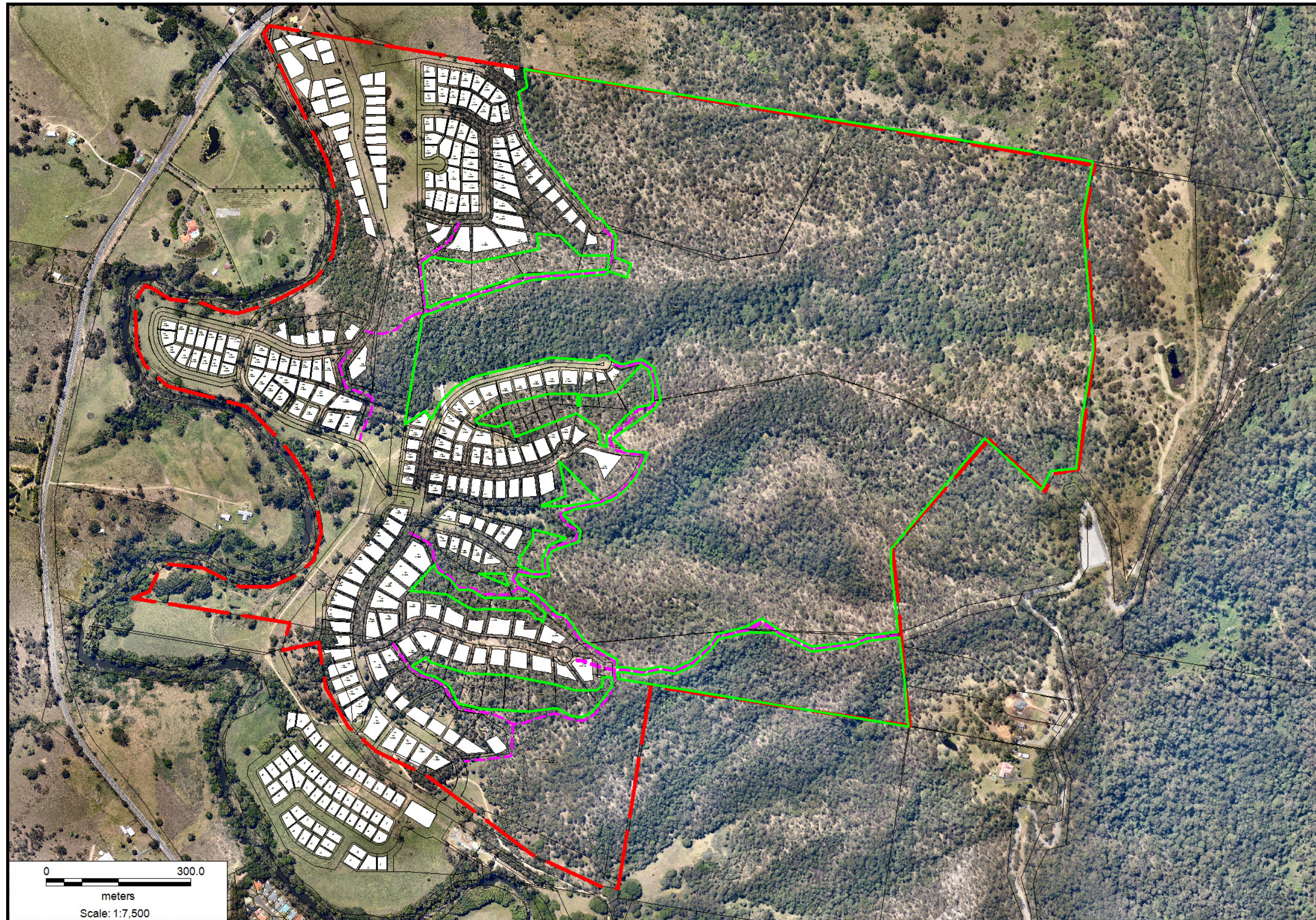


FIGURE 3A: FINAL 117 HECTARE OFFSET AREA/AERIAL OVERLAY





## Approval

### Canungra Rise Estate residential development, Finch Road, Canungra, Queensland (EPBC 2015/7485)

This decision is made under sections 130(1) and 133 of the *Environment Protection and Biodiversity Conservation Act 1999*.

#### Proposed action

**person to whom the approval is granted** Elbina Pty Limited

**proponent's ACN** 104 956 327

**proposed action** To undertake the development of Canungra Rise Estate, Finch Road, Canungra, Queensland [See EPBC Act referral 2015/7485 and approved variation dated 14 August 2015].

#### Approval decision

Controlling Provision	Decision
Listed threatened species and communities (sections 18 & 18A)	Approve

#### conditions of approval

This approval is subject to the conditions specified below.

#### expiry date of approval

This approval has effect until 31 August 2041.

#### Decision-maker

**name and position** James Barker  
Assistant Secretary  
Assessments and Sea Dumping Branch

#### signature

**date of decision** 22 August 2016



## Conditions attached to the approval

1. The **approval holder** must not clear more than 26.49 hectares of **Koala habitat** within the **clearance area**.
2. To compensate for the loss of **Koala habitat**, the **approval holder** must:
  - i. **secure**, prior to the **commencement of construction**, the offset containing 112.2 hectares of **Koala habitat** within the **offset area**;
  - ii. provide the **Department** with the **offset attributes** clearly defining the location and boundary of the offset within 10 **business days** of lodgement of the offset with the **Titles Office**.
3. To compensate for the impacts to **Koala habitat**, the **approval holder** must achieve the following outcomes and milestones as compared to **baseline values** for **Koala habitat quality** and **extent**:
  - a. Outcomes:
    - i. By 20 years after the **commencement of construction**, there must be a gain in **Koala habitat quality** across 90% of the **offset area**;
    - ii. For the life approval, the **approval holder** must ensure no net loss in the **extent of Koala habitat** in the **offset area**.
  - b. Milestones:
    - i. At the completion of **construction** for each **stage of development**, there must be no net loss in **Koala habitat quality** in the **offset area**.
4. Prior to the **commencement of construction**, the **approval holder** must have an Offset Management Plan in place. The Offset Management Plan must:
  - i. include monitoring and be designed so that the results are adequate to inform adaptive management and demonstrate whether the outcomes and milestones required by these conditions are on track to be achieved (before they are due) and have been achieved (at the time they are due);
  - ii. include contingency measures to mitigate the risks of not achieving the outcomes and milestones required by these conditions;
  - iii. be prepared in consultation with a **suitably qualified person**, and include written evidence of how the **suitably qualified person's** advice has been considered;
  - iv. be in accordance with the **proposed offset strategy**; and,
  - v. demonstrate how it is consistent with the **Koala conservation advice**.
5. The Offset Management Plan must be implemented. The **approval holder** must publish the Offset Management Plan on their website prior to the **commencement of construction** and the Offset Management Plan (or any subsequent revised versions) must remain on the website for the life of the approval. The results of the Offset Management Plan must be included in the annual compliance report required under condition 10A.

6. If, at any time during the life of the approval, the **approval holder** identifies that the outcomes or milestones required under these conditions are not on track to be achieved, the **approval holder** must report to the **Department** in writing within 20 **business days** of becoming aware. The report must state the cause, the response measures (including timeframes for reporting the success of those measures to the **Department**) and the actions to prevent further occurrences.
- 7A. If the **Minister** is not satisfied that the outcomes or milestones required by these conditions are likely to be achieved, or is not satisfied that there is sufficient evidence that the outcomes or milestones required by these conditions are likely to be achieved, the **Minister** may (in writing) request the **approval holder** to submit a plan for the **Minister's** approval, to monitor, manage, avoid, mitigate, offset, record or report on, impacts to **Koala habitat**.
- 7B. The **Minister** may set a timeframe in which the plan must be submitted, and may designate that the plan must be prepared or reviewed by a **suitably qualified person**.
- 7C. If the **Minister** approves the plan in writing then the **approval holder** must implement that plan (or a revised version if approved in writing by the **Minister** or otherwise allowed under these conditions).
- Note: Cost recovery does not apply to a plan required under this condition.
8. Within 20 **business days** after the **commencement of construction**, the **approval holder** must advise the **Department** in writing of the actual date of **commencement of construction** and **publish** that date.
9. The **approval holder** must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to: implement the approval conditions; implement the management plans required by this approval; and measures taken to achieve the outcomes and milestones required under the conditions, and make them available upon request to the **Department**. Such records may be subject to audit by the **Department** or an independent auditor in accordance with section 458 of the **EPBC Act**, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the **Department's** website. The results of audits may also be publicised through the general media.
- 10A. Within three months of every 12 month anniversary of the **commencement of construction**, the **approval holder** must **publish** a compliance report on their website and provide documentary evidence providing proof of the date of publication to the **Department** by email (to EPBCMonitoring@environment.gov.au or another email address agreed to in writing by the **Minister**). The first compliance report must cover the period beginning on the day of the **commencement of construction** through 12 months, with subsequent compliance reports to cover the 12 month period immediately following the period covered by the previous compliance report. The **approval holder** may cease preparing compliance reports required by this condition with written agreement of the **Minister**.
- 10B. Compliance reports must: consider the **Department's Annual Compliance Report Guidelines**; and must address any actual or potential contraventions of the conditions of this approval including commitments made in management plans that are being implemented and must address whether the outcomes and milestones required by these conditions are on track to met and have been met.

11. Any potential or actual contravention of the conditions of this approval must be reported to the **Department** by email (to [EPBCMmonitoring@environment.gov.au](mailto:EPBCMmonitoring@environment.gov.au) or another email address agreed to in writing by the **Minister**) within 10 **business days** of the **approval holder** becoming aware of the actual or potential contravention.
- 12A. Upon the direction of the **Minister**, the **approval holder** must ensure that an independent audit of compliance with the conditions of approval is conducted. The **approval holder** must bear the financial cost of the audit. The audit includes the following elements (which must each be undertaken to the satisfaction of the **Minister**): selection of an independent auditor; determination of audit criteria; and an audit report (which must address the audit criteria). The **Minister** may specify in writing: a timeframe for the **approval holder** to select the independent auditor; and timeframes (which the **approval holder** must take reasonable steps to ensure are met) for submission or completion of the audit criteria and audit report.
- 12B. Within 10 **business days** of the **Minister's** written notification of satisfaction with the audit report, the **approval holder** must **publish** the audit report.
- 12C. After an independent audit is complete, the **Minister** may set out additional actions which must be implemented by the **approval holder** (within specified timeframes) to avoid, mitigate, offset, monitor, manage, record, or report on impacts of the proposal to **protected matters** relating to the findings of the independent audit.
13. If the **commencement of construction** does not occur within 5 years from the date of this approval, then the **approval holder** must not **commence construction** without the written agreement of the **Minister**.

## Definitions

**Approval holder:** means the person to whom the approval is granted, or any person acting on their behalf, or to whom approval is transferred under section 145B of the **EPBC Act**.

**Baseline values:** Baseline **extent** is 112.2 ha and baseline **quality** is 8, as described in the **proposed offset strategy**.

**Business days:** measured in relation to the doing of any action, any day other than a Saturday, a Sunday, or a public holiday that occurs in Queensland.

**Clearance area:** the area labelled as 'Koala habitat clearing area' in [Map 1](#).

**Commence / commenced / commencement of construction:** any preparatory works required to be undertaken including clearing vegetation, the erection of any onsite temporary structures and the use of heavy equipment for the purposes of breaking the ground for road construction, buildings or infrastructure.

**Construction:** means the clearing of land and creation of residential allotments, roadways and infrastructure services (sewerage, electricity, water, stormwater) associated with the action. This does not include preparatory works.

**Department:** the Australian Government Department administering the **EPBC Act**.

**EPBC Act:** the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).



**EPBC Act Environmental Offsets Policy:** Department of Sustainability, Environment, Water, Population and Communities (2012). *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy*. Commonwealth of Australia, Canberra.

**EPBC Act offsets assessment guide:** the *offsets assessment guide* tool and *how to use the offsets assessment guide* document that accompany the **EPBC Act Environmental Offsets Policy**.

**Extent:** the coverage of **Koala habitat** measured in hectares.

**Koala:** the Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) (*Phascolarctos cinereus* (combined populations of Qld, NSW and the ACT)) listed as a threatened species under the **EPBC Act**.

**Koala conservation advice:** Threatened Species Scientific Committee (TSSC) (2012). *Approved Conservation Advice for Phascolarctos cinereus* (combined populations of Queensland, New South Wales and the Australian Capital Territory), Commonwealth of Australia, Canberra.

**Koala habitat:** habitat containing species that are known **Koala** food trees (species of tree whose leaves are consumed by **Koalas**), including *Eucalyptus moluccana*, *Eucalyptus tereticornis*, *Eucalyptus punctata*, *Eucalyptus exerta* and *Corymbia citriodora*.

**Minister:** the Australian Government Minister administering the **EPBC Act** and includes a delegate of the **Minister**.

**Offset area:** the area labelled as 'covenants' in Map 1.

**Offset attributes:** means electronic files including '.xls' files and ESRI shapefiles containing '.shp', '.shx' and '.dbf' files capturing the relevant attributes of the offset area/s, including the **EPBC Act** reference number, the physical address of the offset area/s, coordinates of the boundary points in decimal degrees, the **EPBC Act** protected matters that the offset area/s compensates for, any additional **EPBC Act** protected matters benefiting from the offset/s and the size of the offset area/s (in hectares).

**Proposed offset strategy:** the document provided to the **Department** named 'proposed offsets for MNES – Finch Road Canungra, Canungra Rise Estate (EPBC 2015/7485)' dated April 2016.

**Protected matters:** Matters protected under the controlling provisions (under Part 3 of the **EPBC Act**) for which this approval applies.

**Publish / Published:** Displayed on (or directly linked from) an internet webpage of the **approval holder**. That webpage must: include all material required to be published under these conditions; have web page metadata optimised for discoverability on internet search engines; and where relevant, directly link to other web pages of the **approval holder** that relate to the action. Unless otherwise stated in the conditions, published material must remain published for the life of the approval. Unless otherwise agreed to in writing by the **Minister**, any material required to be published under these conditions must be provided to a member of the public upon request within a reasonable timeframe.

**Quality:** means the habitat quality score comprised of *site condition*, *site context* and *species stocking rate* calculated in accordance with the requirements of the **EPBC Act offsets assessment guide**.

**Secure:** means long-term protection under a legal mechanism that is either establishing a covenant on the title as a voluntary declaration under the *Vegetation Management Act 1999* (Qld), or establishing a Nature Refuge under the *Nature Conservation Act 1992* (Qld).

**Stage of development:** Stages 1-8 as outlined in the referral received by the Department on 22 May 2015. This excludes stage 5 as varied on 14 August 2015.

**Suitably qualified person:** A person who has professional qualifications, training, skills and/or experience related to the Koala and can give authoritative independent assessment, advice and analysis on performance relative to the subject matter using the relevant protocols, standards, methods and/or literature.

**Titles Office:** means the relevant authority responsible for registering the land title transaction.



# Map 1

## LEGEND

**COVENANTS AREA: 112.2ha**

## KOALA HABITAT CLEARING AREA



# C O N S U L T I N G

**PROJECT TITLE:** FINCH ROAD,  
CANUNGRA

**DRAWING TITLE:** OFFSETS STRATEGY PLAN

BASE PROVIDED BY: SCHLENCKER SURVEYING

**CLIENT:**

[illegible]

SCALE: 1:4000 @ A1

**DESIGN:** PLANIT CONSULTING

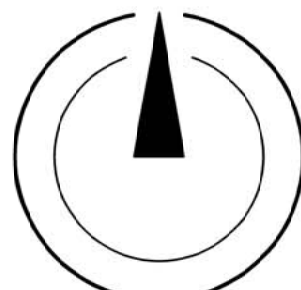
DRAWN: MR

DATE: 07/2016

CHECKED: TR / BE

**DRAWING NO:** CRE 283 OSP 01

**NORTH POINT:**



**SHEET NO:** 01 OF 01

Level 1 2247 Gold Coast Hwy Telephone: 07 5526 1500  
Nobby Beach Fax: 07 5526 1502  
PO Box 206 QLD 4218 Email: [admin@planitconsulting.com.au](mailto:admin@planitconsulting.com.au)

Telephone: 07 5526 1500  
Fax: 07 5526 1502  
@planitconsulting.com.au

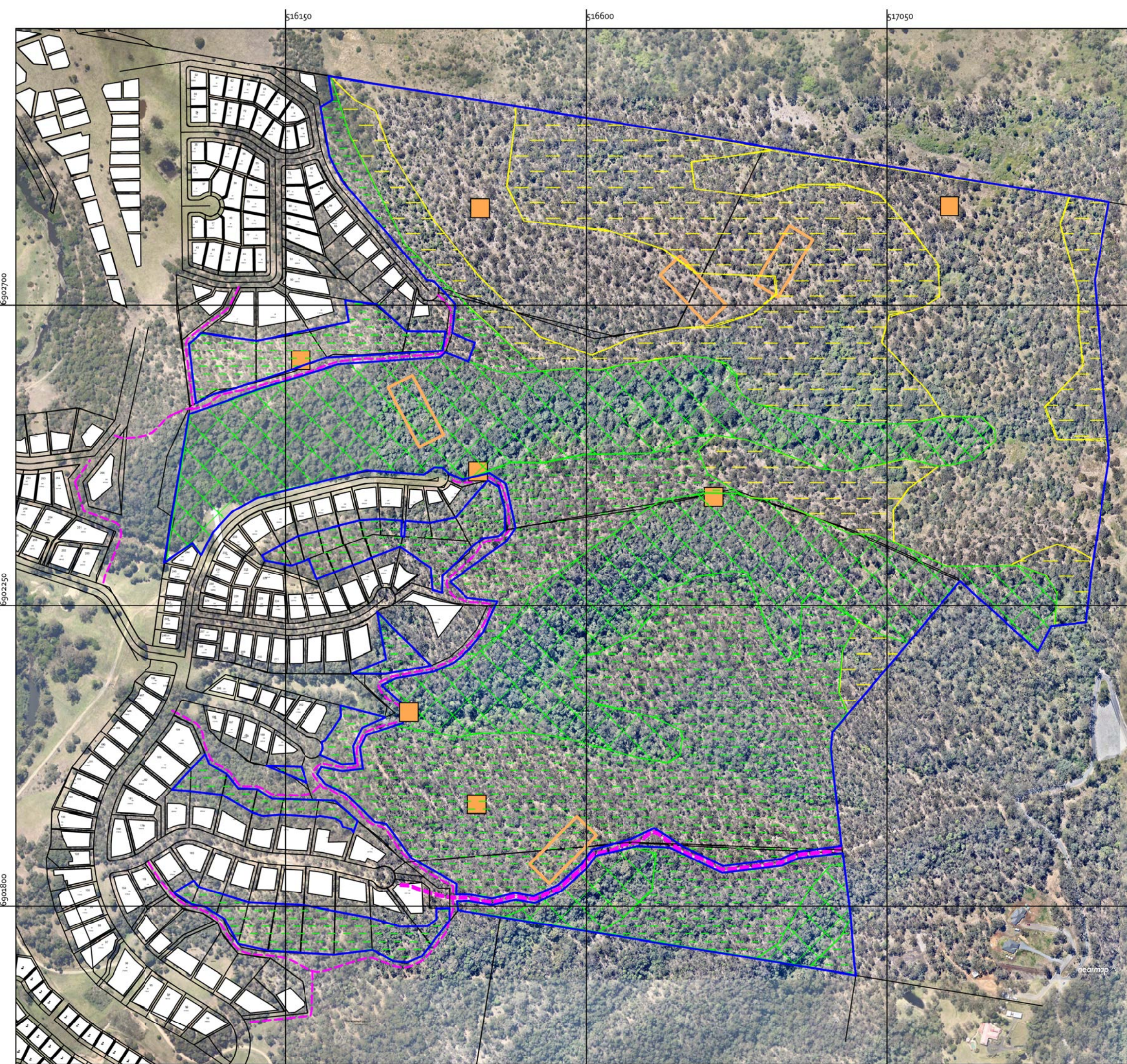


**ATTACHMENT 2**

**BASELINE BIOCONDITION ASSESSMENTS**

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# MONITORING SITES

- OFFSET AREA
- REHABILITATION UNIT 1
- REHABILITATION UNIT 2
- REHABILITATION UNIT 3
- REHABILITATION UNIT 4
- FIRE TRAILS
- BIOCONDITION MONITORING SITES
- VISUAL/QUALITATIVE MONITORING SITES

## NOTES:

- Maps have been compiled using Mapinfo geographic information system (GIS) software (Ver. 11.5). Information utilized includes:
- Approved layouts and survey plans provided by Sclencker Surveying P/L
  - Individual features added by Planit following field inspection September and October 2016
  - Features located via handheld Garmin GPS Map 62s device and coordinated in MGAz56. Locations tabulated and displayed in Mapinfo Ver 11.5 upon the aerial photograph
  - 2013 georeferenced aerial photographs sourced from Nearmap
  - Regional Ecosystem boundaries sourced from DNRM 2012 Vegetation Management Act Regional Ecosystems Vers 6.1 - SEQ

Map Created: 12-10-2016  
Scale = 1:5500 @ A3



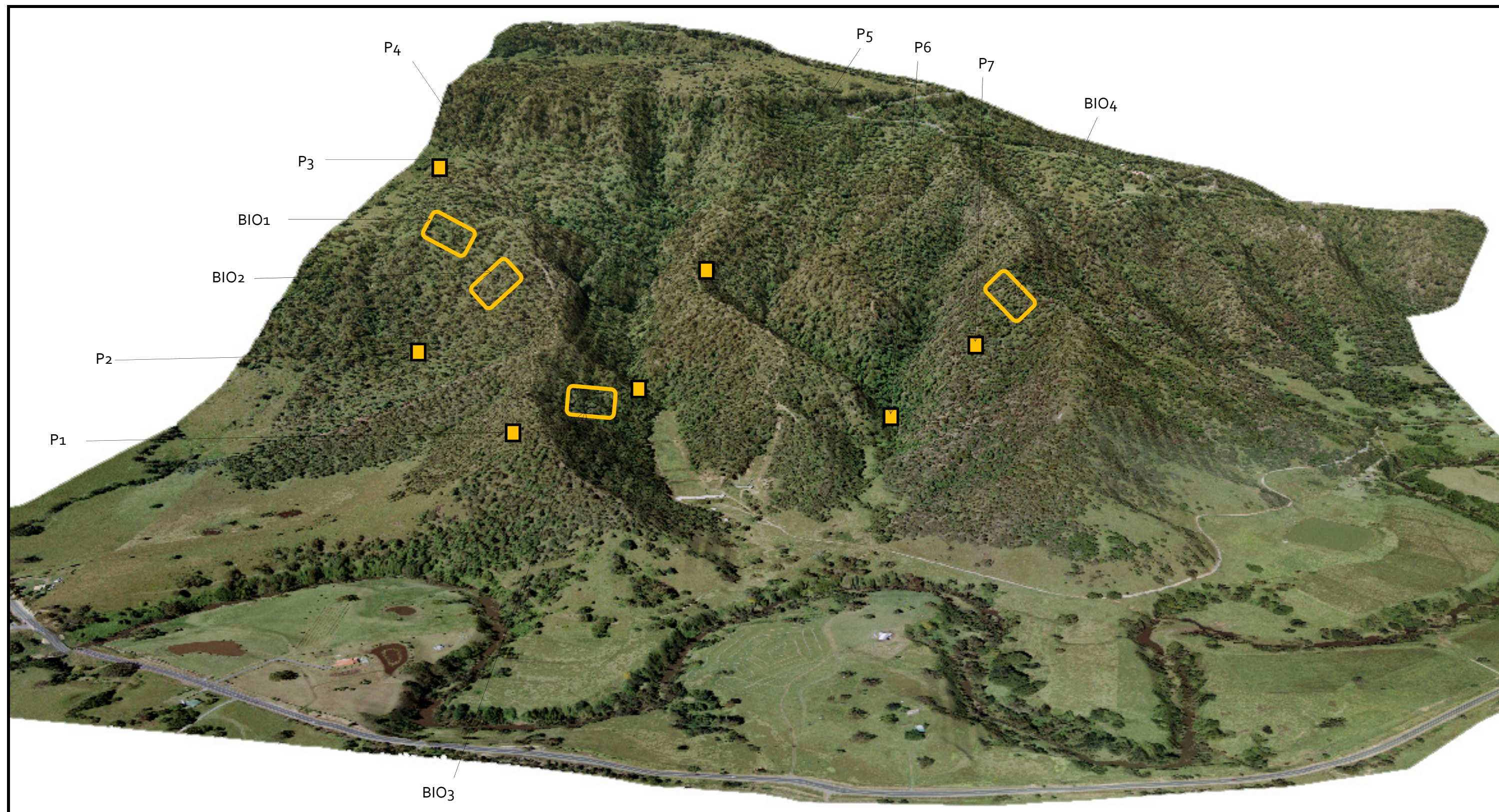


FIGURE 5: MONITORING SITES



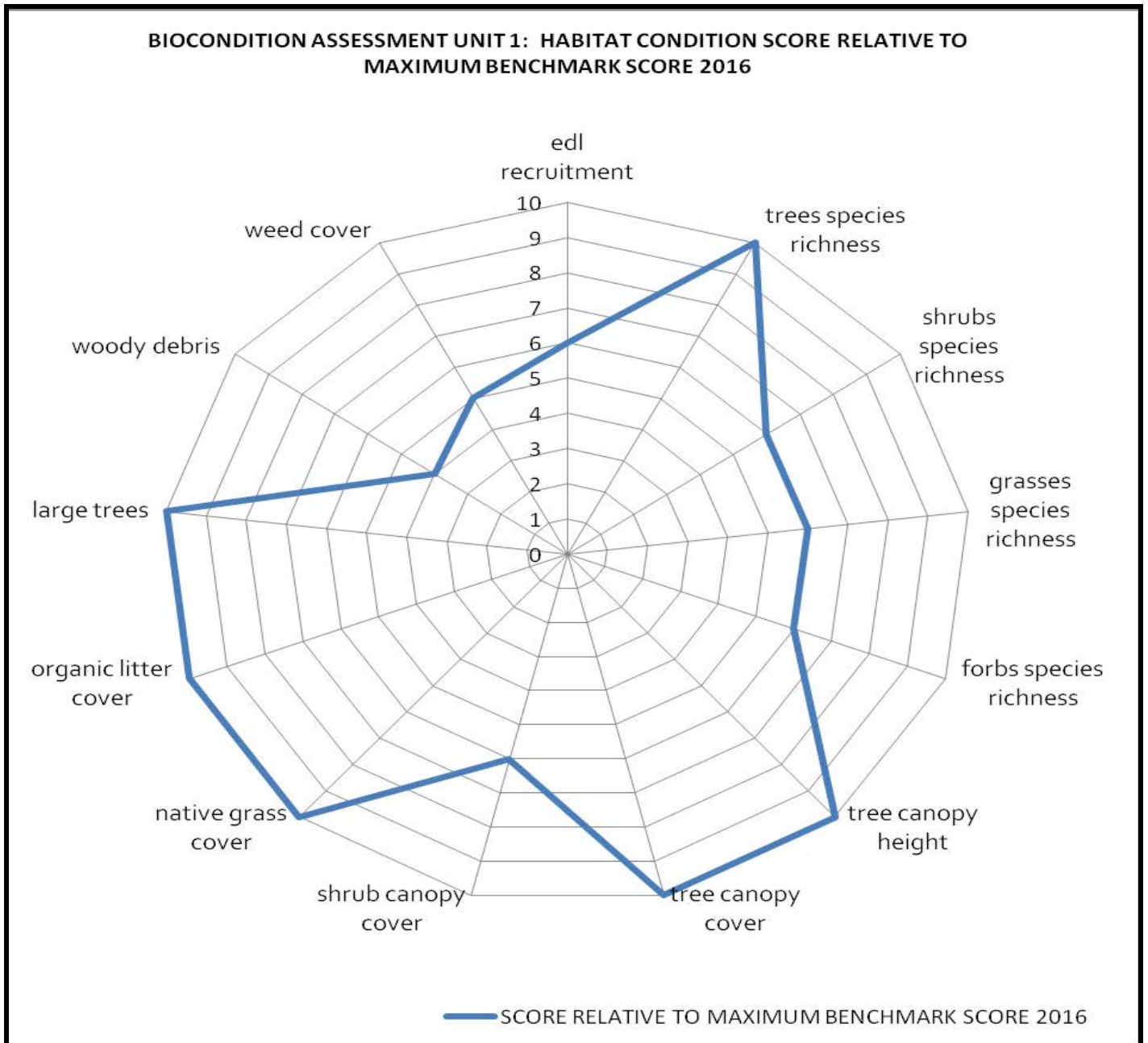
### BIOCONDITION SITE SUMMARY

BIOCONDITION SITE	PLANIT VEGETATION COMMUNITY MAPPING (2004)	DNRM REGIONAL ECOSYSTEM MAPPING (2016)	REHABILITATION UNIT (REFER ATTACHMENT 4)	BIOCONDITION SCORE	BIOCONDITION CLASS
1	1-Tall Mixed Eucalypt Open Forest/Woodland	12.8.14	RU <sub>3</sub>	0.73	2
2	2-Open Paddock with Scattered Trees/Regrowth	Regrowth 12.8.14	RU <sub>4</sub>	0.70	2
3	1a- Tall Wet Sclerophyll Forest	12.9-10.17a	RU <sub>2</sub>	0.70	2
4	1-Tall Mixed Eucalypt Open Forest/Woodland	12.9-10.17	RU <sub>1</sub>	0.76	2

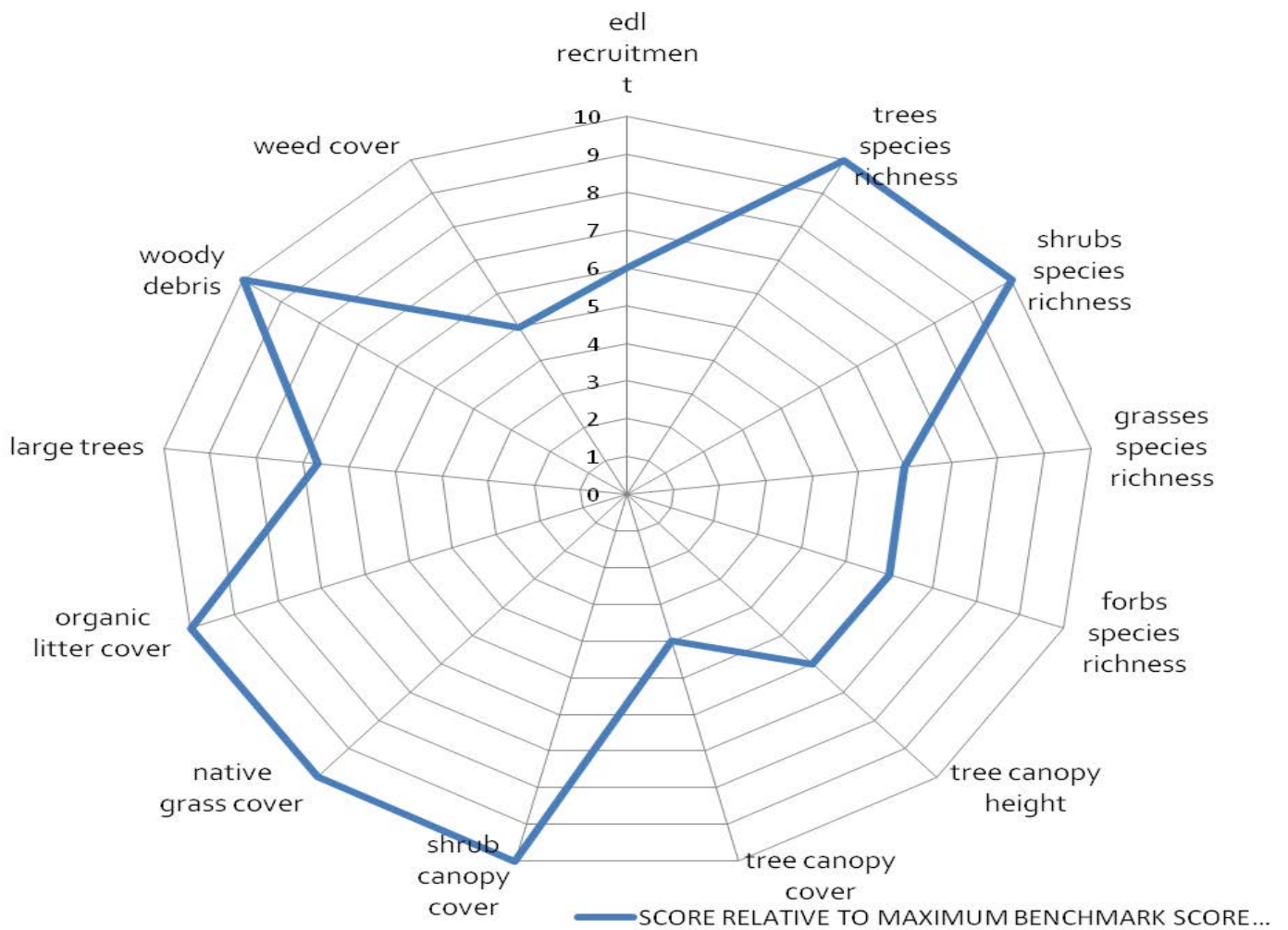
### BIOCONDITION SCORE SUMMARY

BIOCONDITON SITE	Benchmark Score	1 12.8.14	2 12.8.14 non-remn	3 12.9-10.17a	4 12.9.10.17
Mapped regional ecosystem					
<b>SITE CONDITION</b>					
Recruitment of dominant canopy species	5	3	3	3	3
Native plant species richness - Trees	5	5	5	5	5
Native plant species richness - Shrubs	5	3	5	5	5
Native plant species richness - Grasses	5	3	3	3	3
Native plant species richness - Forbs	5	3	3	5	3
Tree canopy height	5	5	3	5	5
Tree canopy cover	5	5	2	5	5
Native shrub layer cover	5	3	5	5	5
Native perennial grass cover %	5	5	5	1	5
Organic litter cover	5	5	5	5	5
Large Trees	15	15	10	5	10
Coarse woody debris	5	2	5	5	2
Non-native plant cover	10	5	5	5	5
<b>Site Condition Score / 80</b>	<b>80</b>	<b>62</b>	<b>59</b>	<b>57</b>	<b>61</b>
<b>LANDSCAPE</b>					
Patch size	10	5	5	5	7
Connectivity	5	2	2	4	4
Context	5	4	4	4	4
<b>Landscape Score / 20</b>	<b>20</b>	<b>11</b>	<b>11</b>	<b>13</b>	<b>15</b>
<b>Total BC SCORE / 100</b>	<b>100</b>	<b>73</b>	<b>70</b>	<b>70</b>	<b>76</b>
<b>BC Score (Total ÷ 100)</b>	<b>1</b>	<b>0.73</b>	<b>0.7</b>	<b>0.7</b>	<b>0.76</b>

BIOCONDITION BASELINE SCORES RELATIVE TO MAXIMUM BENCHMARK SCORES

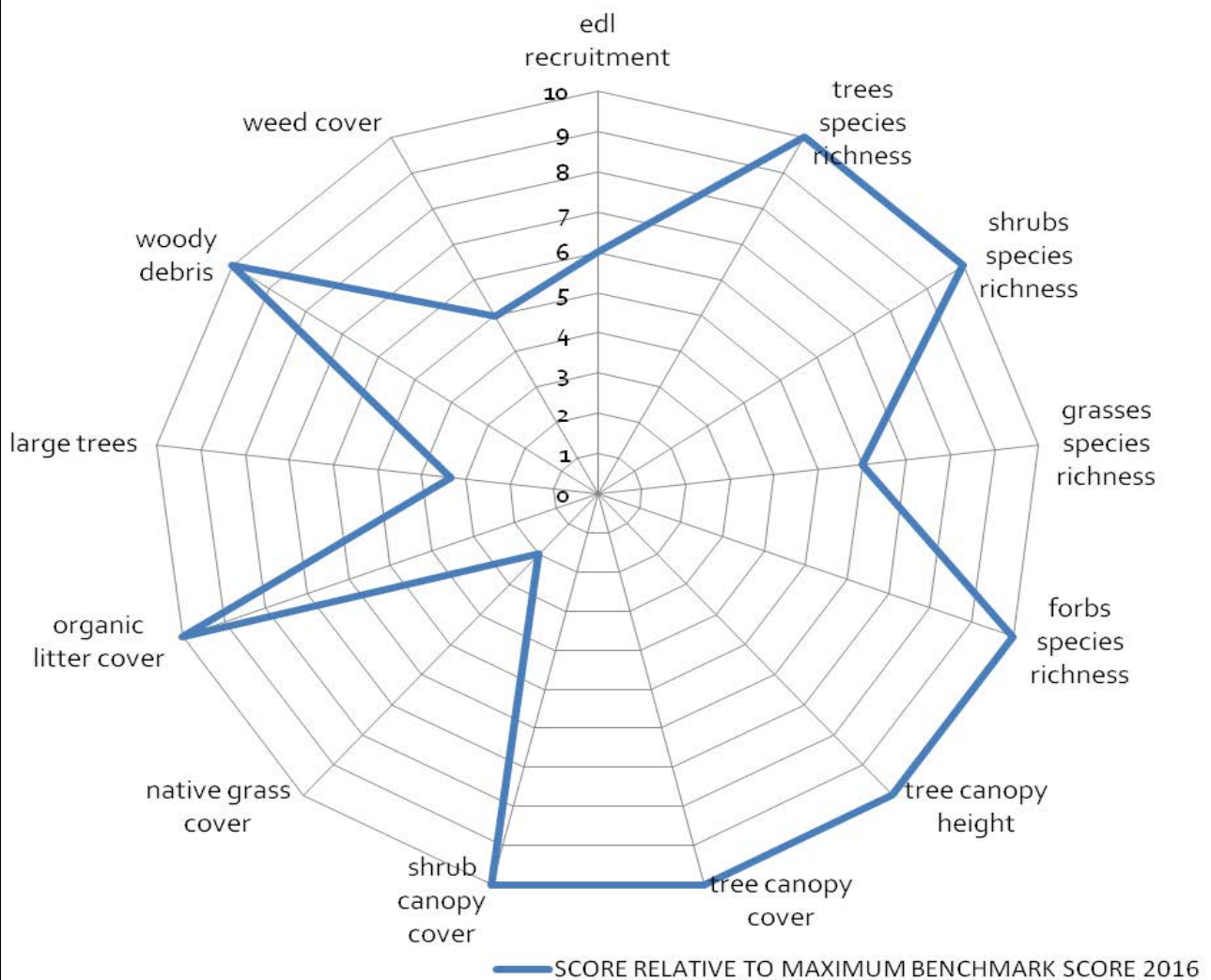


**BIOCONDITION ASSESSMENT UNIT 2: HABITAT CONDITION SCORE RELATIVE TO  
MAXIMUM BENCHMARK SCORE 2016**

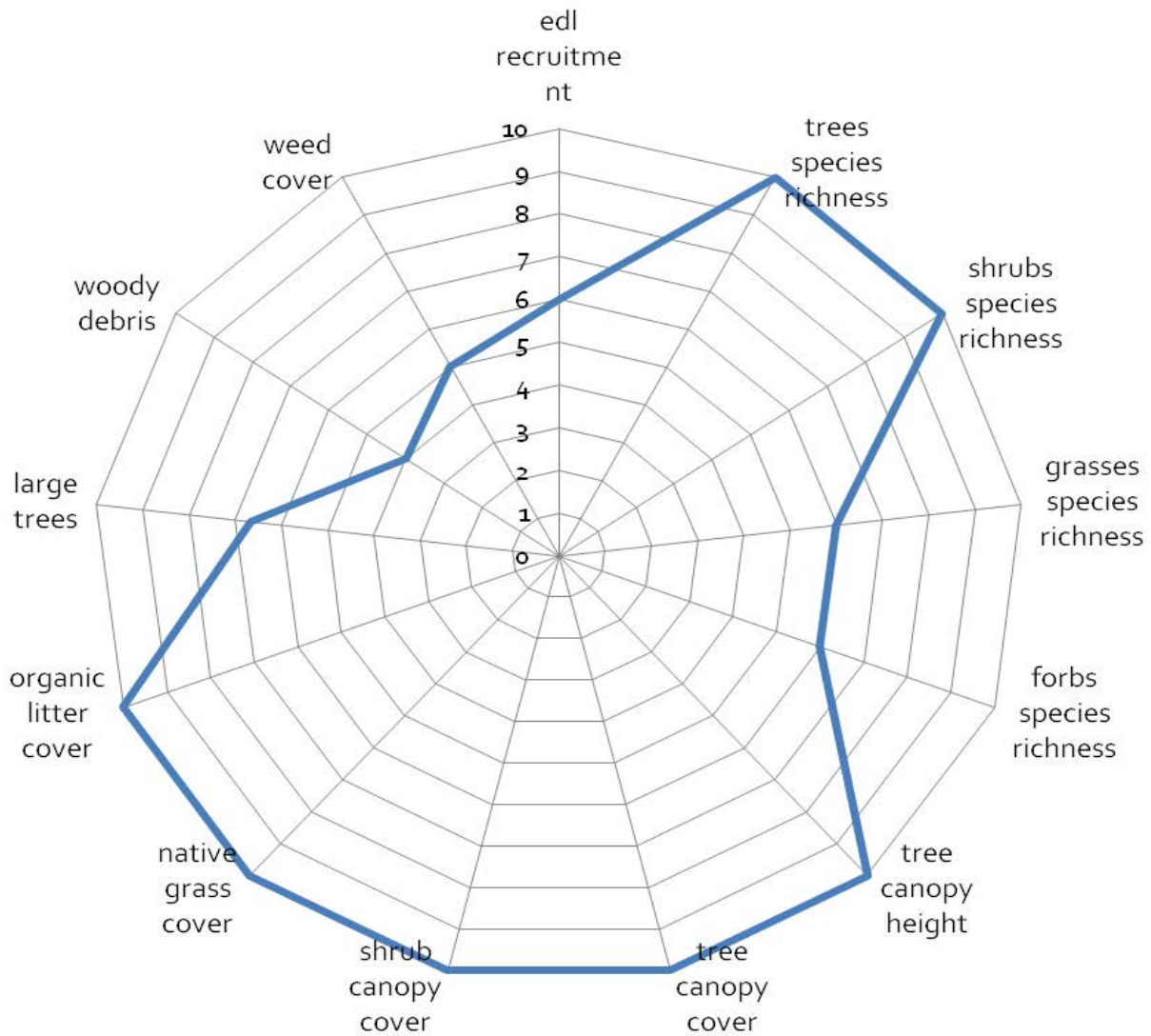




**BIOCONDITION ASSESSMENT UNIT 3: HABITAT CONDITION SCORE RELATIVE TO  
MAXIMUM BENCHMARK SCORE 2016**



**BIOCONDITION ASSESSMENT UNIT 4: HABITAT CONDITION SCORE RELATIVE TO  
MAXIMUM BENCHMARK SCORE 2016**



— SCORE RELATIVE TO MAXIMUM BENCHMARK SCORE 2016





**PLEASE COMPLETE THE BENCHMARK OR BEST ON OFFER SITE DETAILS BELOW AS DIRECTED FOR EACH ASSESSMENT UNIT AND REGIONAL ECOSYSTEM LISTED BELOW**

Case Reference	EPBC 2015/7485
Project Name	CANUNGRA RISE OFFSET
Total Area	2

**SITE ASSESSMENT TEMPLATE - BENCHMARK OR BEST ON OFFER SITE DETAILS - ENTER DETAILS IN CELLS BELOW**

INFORMATION ON BENCHMARKS IS AVAILABLE ON THE QUEENSLAND GOVERNMENT WEBSITE THAT CAN BE ACCESSED HERE: [BENCHMARKS](#)  
(NOTE: WHERE THERE IS NO BENCHMARK AVAILABLE FOR THE REGIONAL ECOSYSTEM IN QUESTION A BEST ON OFFER SITE MAY BE USED AS A SURROGATE.)

Part	Habitat Quality Attributes
	Assessment Unit Area (ha)
	Regional Ecosystems
	Bioregion

BenchMark or Best on Offer Site Data									
1	2	3	4	5	6	7	8	9	10
0.5	0.5	0.5	0.5	0	0	0	0	0	0
12.8.14	12.8.14	12.9-10.17	12.9-10.17						
Southeast Queensland	Southeast Queensland	Southeast Queensland	Southeast Queensland						

1	Site Condition Attributes	1. Recruitment of woody perennial species (Number of ecologically dominant layers regenerating)
		2. Native plant species richness
		- Trees
		- Shrubs
		- Grasses
		- Forbs
		3. Tree canopy height
		- Canopy Layer
		- Sub-Canopy Layer
		- Emergent Layer
		4. Tree canopy cover
		- Canopy Layer
		- Sub-Canopy Layer
		- Emergent Layer
		5. Shrub canopy cover
		6. Native perennial grass cover
		7. Organic litter
		8. Large trees
		9. Coarse woody debris (Meters)
		10. Weed cover

100.00	100.00	100.00	100.00						
--------	--------	--------	--------	--	--	--	--	--	--

7.00	7.00	5.00	5.00						
7.00	7.00	7.00	7.00						
7.00	7.00	11.00	11.00						
29.00	29.00	14.00	14.00						

20.00	20.00	28.00	28.00						

41.00%	41.00%	55.00%	55.00%						
4.00%	4.00%	15.00%	15.00%						
45.00%	45.00%	19.00%	19.00%						
21.00%	21.00%	55.00%	55.00%						
32	32	66	66						
592.00	592.00	299.00	299.00						
0.00%	0.00%	0.00%	0.00%						

## SITE ASSESSMENT BENCHMARK COMPARISON RESULTS

Assessment Unit Number									
1	2	3	4	5	6	7	8	9	10
0.5	0.5	0.5	0.5	0	0	0	0	0	0
12.8.14	12.8.14	12.9-10.17	12.9-10.17						
Southeast Queensland	Southeast Queensland	Southeast Queensland	Southeast Queensland						

71.40%	33.00%	66.00%	66.60%						
171.43%	171.43%	320.00%	280.00%						
85.71%	100.00%	285.71%	185.71%						
71.43%	85.71%	45.45%	45.45%						
34.48%	41.38%	114.29%	78.57%						
95.00%	64.00%	89.29%	87.14%						
142.93%	45.61%	134.36%	142.73%						
30.00%	72.50%	114.00%	52.67%						
170.67%	146.67%	33.68%	105.26%						
95.24%	142.86%	87.27%	63.27%						
115.63%	81.25%	45.45%	63.64%						
47.80%	142.91%	149.50%	394.98%						
5.00%	5.00%	10.00%	15.00%						

[illegible][illegible]





Forbs and others (non grass ground) species richness:			
Total number of species	10		
Scientific Name	<i>Goodenia rotundifolia</i>	Common Name	Centella asiatica
Scientific Name	<i>Glycine clandestina</i>	Common Name	Pultenaea paleacea
Scientific Name	<i>Desmodium rhytidophyllum</i>	Common Name	Hardenbergia violacea
Scientific Name	<i>Eustrephus latifolius</i>	Common Name	
Scientific Name	<i>Phyllanthus gunnii</i>	Common Name	
Scientific Name	<i>Lepidosperma laterale</i>	Common Name	
Scientific Name	<i>Cyperus gracilis</i>	Common Name	

Part E - Non-Native Plant Cover: (\*list species below)

Total percentage cover within plot	5.00%		
Scientific Name	<i>Lantana camara</i>	Common Name	
Scientific Name	<i>Lantana montevidensis</i>	Common Name	
Scientific Name	<i>Echium plantagineum</i>	Common Name	
Scientific Name	<i>Passiflora subpeltata</i>	Common Name	
Scientific Name	<i>Ageratina adenophora</i>	Common Name	
Scientific Name	<i>Bidens pilosa</i>	Common Name	
Scientific Name	<i>Cirsium vulgare</i>	Common Name	
Scientific Name	<i>Senna floribunda</i>	Common Name	
Scientific Name	<i>Senecio madagascariensis</i>	Common Name	
Scientific Name		Common Name	

Part F - Coarse Woody Debris: (\*list lengths of individual logs in meters)

Total Length of Coarse Woody Debris (Meters):	283.00		
1	7.00	26	
2	2.00	27	
3	5.40	28	
4	6.20	29	
5	3.20	30	
6	3.00	31	
7	0.50	32	
8	1.00	33	
9		34	
10		35	
11		36	
12		37	
13		38	
14		39	
15		40	
16		41	
17		42	
18		43	
19		44	
20		45	
21		46	
22		47	
23		48	
24		49	
25		50	

Part G - Native perennial grass cover, organic litter: (\*provide percentage cover within each quadrat, and provide average cover)

Native perennial grass cover	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Average
	90.00%	92.00%	74.00%	59.00%	69.00%	76.80%
Organic Litter	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Average
	5.00%	5.00%	20.00%	40.00%	30.00%	20.00%

Part H - Number of large trees , tree canopy height, recruitment of woody perennial species:

Eucalypt Large tree DBH benchmark used :	30	Non- Eucalypt Large tree DBH benchmark used:	
Number of large eucalypt trees:	37	Number of large non eucalypt trees:	
Total Number Large Trees:	37		

Median Tree Canopy Height Measurements	Canopy:	19.00	Sub-canopy:	-	Emergent:	-
Number of ecologically dominant layer species regenerating:		71				

Part I - Tree canopy cover, Shrub canopy cover

Tree canopy cover %	Canopy:	58.60%	Sub-canopy:		Emergent:	
Shrub canopy cover %	1.20%					

Note: Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present \*If trees are in the same layer and continuous along the transect you can group them

Part J - Site Context Score

ATTRIBUTE	Size of Patch	Connectedness	Context	Distance to Permanent Water	Ecological Corridors
DESCRIPTION	3 - 26 - 100ha	2 - >10% - <50%	3 - >30-75% remnant		
SCORE	5	2	4		







TYPICAL CONDITION @ 50M WEST



TYPICAL CONDITION @ 50M NORTH



TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION

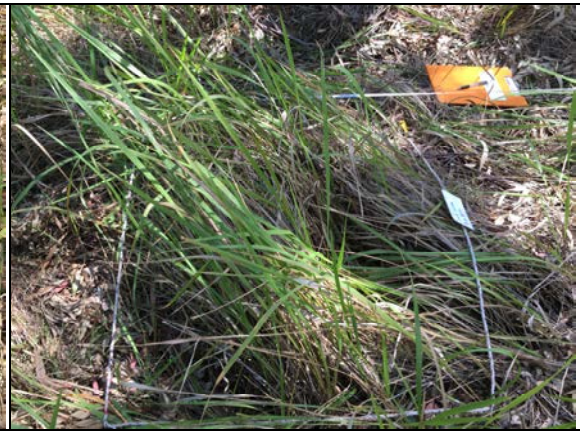


TYPICAL CONDITION: WOODY DEBRIS





GROUND PLOT @ 35M



GROUND PLOT @ 45M



GROUND PLOT @ 55M



GROUND PLOT @ 65M



GROUND PLOT @ 75M



TYPICAL CONDITION





TYPICAL CONDITION



TYPICAL CONDITION

**Habitat Quality Site Assessment Template.....****PLEASE NOTE - YELLOW INDICATES AN AUTO POPULATED FIELD**

For all environmental offset applications you must:

- Complete form (Environmental Offsets Delivery Form 1– Notice of Election and Advanced Offsets Details)
- Complete any other forms relevant to your application
- Provide the mandatory supporting information identified on the forms as being required to accompany your application

This form is useful for undertaking a **habitat quality analysis** of an impact and/or offset/advanced offset site.

Please note that this form should be completed individually for each assessment unit under consideration.

Is this Assessment for:		An Impact Site	<input type="checkbox"/>	An Offset Site	<input checked="" type="checkbox"/>	an Advanced Offset Site		<input type="checkbox"/>	
Habitat Quality Assessment Unit Score Sheet									
Part A - Administrative									
Case reference		EPBC 2015/7485		Project Name		CANUNGRA RISE OFFSET			
Part B – Nominated Approach (FOR IMPACT SITE ONLY)									
Please Select Your Nominated approach:				Rapid approach		<input type="checkbox"/>	Standard Approach		<input checked="" type="checkbox"/>
i) Rapid Assessment									(ENTER BVG FROM DROP-DOWN LIST BELOW)
Enter BVG:						Presumed HQ Equals			
ii) Standard Assessment									(COMPLETE REMAINDER OF FORM)
Part C - Site Data									
Property		canungra rise offset within lot 67/91			Date		4th octo/		
Assessment Unit:		Assessment Unit Area (ha)		RE		Bioregion Number			
2		0.5		12.8.14		Southeast Queensland			
Landscape Photo- Please attach or insert north, south, east and west photos in the spaces provided from row 231-355 below and include details such as Time and Mapping Coordinates in the following row.									
Datum WGS 84 GDA 94		0m Mark		Zone		Easting		Northing	
<input type="checkbox"/>				56		516792		6902694	
<input checked="" type="checkbox"/>		50m Mark		Zone		Easting		Northing	
				56		516766		6902736	
Plot bearing		300 nw		Recorders		gd			
Site description and Location (including details of discrete polygons within the assessment unit)									
Downhill and across slope. Non-remnant regrowth eucalypt fores/woodland on land zone 8. Few large trees. Typically sparse and grassy lower strata. Rocks regularly encountered at surface.									
Part D - Native Species Richness: (*list species below)									
Tree species richness:									
Total number of species					12				
Scientific Name		Eucalyptus crebra [d-19]			Common Name		Allocasuarina torulosa		
Scientific Name		Eucalyptus tereticornis [a-10]			Common Name		Alphitonia excelsa		
Scientific Name		Corymbia tessellaris [a-10]			Common Name				
Scientific Name		Eucalyptus carnea [s-5]			Common Name				
Scientific Name		Corymbia citriodora/henryi [s-3]			Common Name				
Scientific Name		Eucalyptus melliodora [s-3]			Common Name				
Scientific Name		Eucalyptus biturbinata [s-1]			Common Name				
Scientific Name		Angophora subulentina [s-1]			Common Name				
Scientific Name		Acacia melanoxylon			Common Name				
Scientific Name		Acacia dispartima			Common Name				
Shrub species richness:									
Total number of species					7				
Scientific Name		Acacia dispartima			Common Name				
Scientific Name		Acacia longissima			Common Name				
Scientific Name		Corymbia tessellaris			Common Name				
Scientific Name		Corymbia citriodora/henryi			Common Name				
Scientific Name		Corymbia intermedia			Common Name				
Scientific Name		Angophora subulentina			Common Name				
Scientific Name		Acacia melanoxylon			Common Name				
Scientific Name					Common Name				
Scientific Name					Common Name				
Scientific Name					Common Name				
Grass species richness:									
Total number of species					6				
Scientific Name		Imperata cylindrica			Common Name				
Scientific Name		Entolasia stricta			Common Name				
Scientific Name		Themeda triandra			Common Name				
Scientific Name		Poa spp			Common Name				
Scientific Name		Cymbopogon refractus			Common Name				
Scientific Name		Ottochloa gracilima			Common Name				
Scientific Name					Common Name				
Scientific Name					Common Name				
Scientific Name					Common Name				
Scientific Name					Common Name				



Forbs and others (non grass ground) species richness:			
Total number of species	12		
Scientific Name	<i>Desmodium rhytidophyllum</i>	Common Name	Lomandra longifolia
Scientific Name	<i>Centella asiatica</i>	Common Name	Adiantum hispidulum
Scientific Name	<i>Chryscephalum apiculatum</i>	Common Name	Plectranthus spp
Scientific Name	<i>Lomandra filiformis</i>	Common Name	Smilax australis
Scientific Name	<i>Cyperus gracilis</i>	Common Name	Dianella longifolia
Scientific Name	<i>Lobelia purpurascens</i>	Common Name	
Scientific Name	<i>Goodenia rotundifolia</i>	Common Name	

Part E - Non-Native Plant Cover: (*list species below)			
Total percentage cover within plot	5.00%		
Scientific Name	<i>Lantana camara</i>	Common Name	
Scientific Name	<i>Panicum maximum</i>	Common Name	
Scientific Name	<i>Echium plantagineum</i>	Common Name	
Scientific Name	<i>Gomphocarpus physocarpus</i>	Common Name	
Scientific Name	<i>Ageratum houstanum</i>	Common Name	
Scientific Name	<i>Bidens pilosa</i>	Common Name	
Scientific Name	<i>Senecio madagascariensis</i>	Common Name	
Scientific Name	<i>Baccharis halimifolia</i>	Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Part F - Coarse Woody Debris: (*list lengths of individual logs in meters)			
Total Length of Coarse Woody Debris (Meters):	846.00		
1	1.00	26	
2	2.20	27	
3	7.40	28	
4	5.10	29	
5	4.50	30	
6	3.20	31	
7	2.00	32	
8	1.10	33	
9	7.60	34	
10	2.00	35	
11	0.70	36	
12	3.40	37	
13	3.50	38	
14	2.10	39	
15	2.50	40	
16	7.60	41	
17	4.00	42	
18	3.40	43	
19	4.00	44	
20	5.20	45	
21	2.40	46	
22	1.80	47	
23	7.50	48	
24	1.00	49	
25		50	

Part G - Native perennial grass cover, organic litter: (*provide percentage cover within each quadrat, and provide average cover)						
Native perennial grass cover	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Average
	90.00%	60.00%	60.00%	30.00%	90.00%	66.00%
Organic Litter	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Average
	7.00%	26.00%	39.00%	68.00%	10.00%	30.00%

Part H: Number of large trees , tree canopy height, recruitment of woody perennial species:						
Eucalypt Large tree DBH benchmark used :	30		Non- Eucalypt Large tree DBH benchmark used:			
Number of large eucalypt trees:	26		Number of large non eucalypt trees:			
Total Number Large Trees:	26					
Median Tree Canopy Height Measurements	Canopy:	12.80	Sub-canopy:	7.00	Emergent:	17.40
Number of ecologically dominant layer species regenerating:			33			

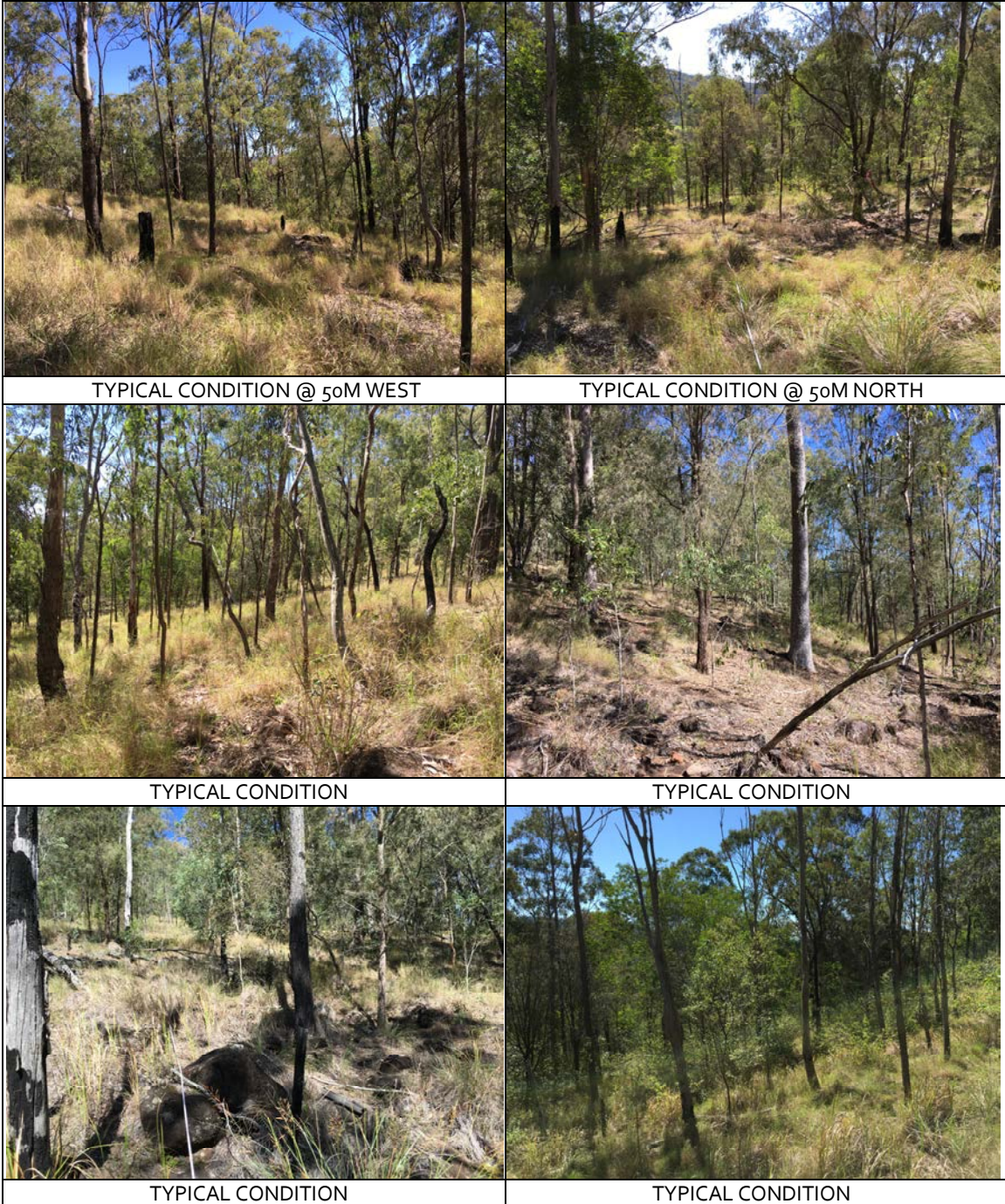
Part I - Tree canopy cover, Shrub canopy cover					
Tree canopy cover %	Canopy:	18.70%	Sub-canopy:	Emergent:	21.70%
Shrub canopy cover %	2.90%				

Note: Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present \*If trees are in the same layer and continuous along the transect you can group them

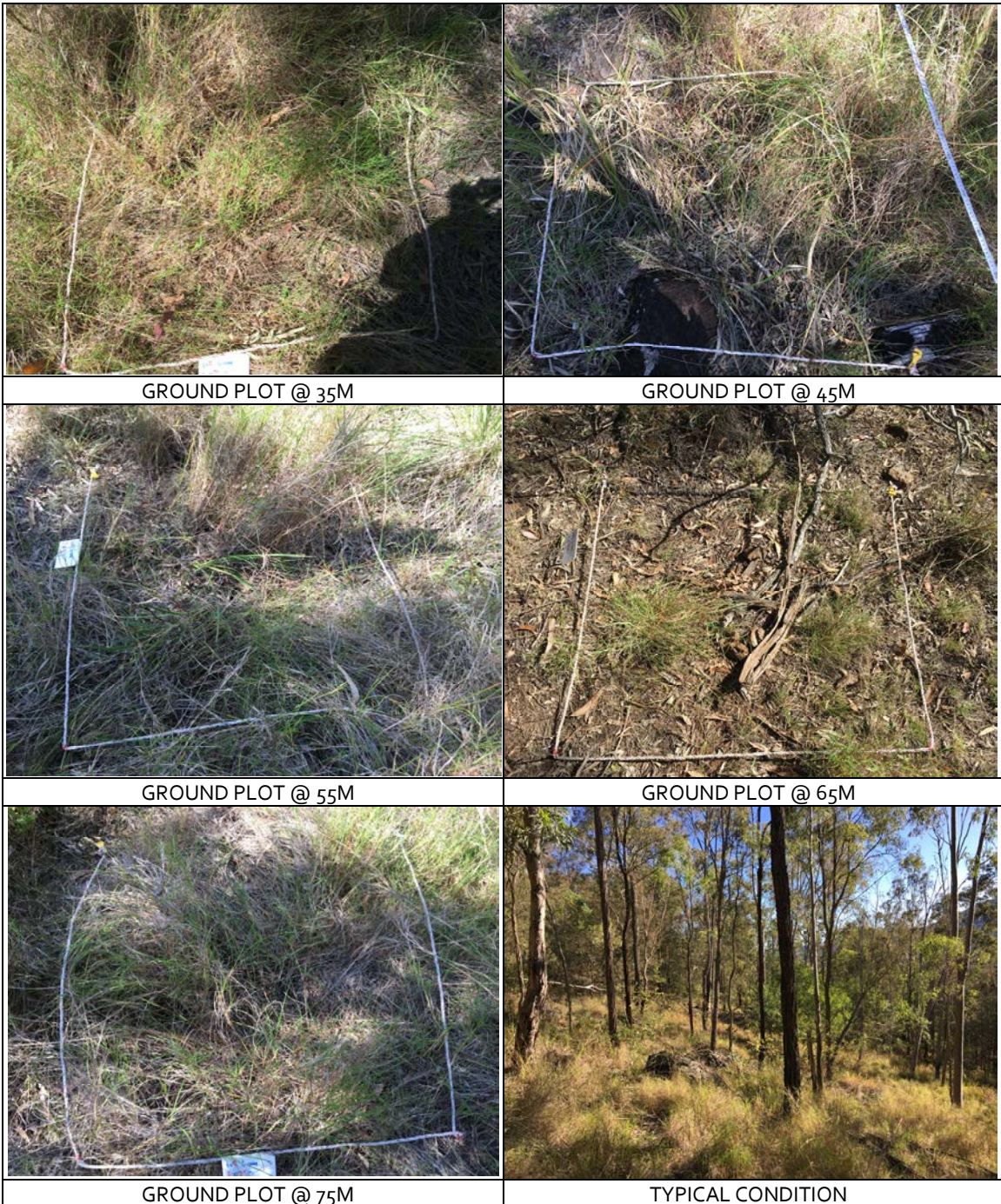
Part J - Site Context Score					
ATTRIBUTE	Size of Patch	Connectedness	Context	Distance to Permanent Water	Ecological Corridors
DESCRIPTION	3 - 26 - 100ha	2 - >10% - <50%	3 - >30-75% remnant		
SCORE	5	2	4		















TYPICAL CONDITION



TYPICAL CONDITION

**PLEASE NOTE - YELLOW INDICATES AN AUTO POPULATED FIELD**

This form is useful for undertaking a **habitat quality analysis** of an impact and/or offset/advanced offset site. Please note that this form should be completed individually for each assessment unit under consideration.

Is this Assessment for:

An Impact Site

An Offset Site

an Advanced Offset Site

Habitat Quality Assessment Unit Score Sheet

Part A - Administrative

Case reference

EPBC 2015/7485

Project Name

CANUNGRA RISE OFFSET

Part B – Nominated Approach (FOR IMPACT SITE ONLY)

Please Select Your Nominated approach:

Rapid approach

Standard Approach

i) Rapid Assessment

Enter BVG:

Presumed HQ Equals

ii) Standard Assessment

Part C - Site Data

Property

canungra rise offset within 91

Date

5th octo

Assessment Unit:

Assessment Unit Area (ha)

RE

Bioregion Number

Landscape Photo- Please attach or insert north, south, east and west photos in the spaces provided from row 231-355 below and include details such as Time and Mapping Coordinates in the following row.

Datum

WGS 84

GDA 94

0m Mark

50m Mark

Zone

Zone

Easting

Easting

Northing

Northing

Plot bearing

295 W-W-n

Recorders

gd

Site description and Location (including details of discrete polygons within the assessment unit)

cross steep slope heading west. North of rifle range. Very Tall Open Forest Brushbox, Grey Gum, Ironbark over regenerating rainforest + regrowth EDL species + wattles. Wet Sclerophyll. Deep leaf litter layer

Part D - Native Species Richness: (\*list species below)

Tree species richness:

Total number of species

16

Scientific Name

Scientific Name

Shrub species richness:

Total number of species

20

Scientific Name

Scientific Name

Grass species richness:

Total number of species

5

Scientific Name

Common Name



Forbs and others (non grass ground) species richness:			
Total number of species	16		
Scientific Name	<i>Lomandra filiformis, Lomandra multiflora</i>	Scientific Name	spp17, spp2 [purple/joyweed?]
Scientific Name	<i>Cyperus gracilis</i>	Scientific Name	<i>Doodia aspera</i>
Scientific Name	<i>Lobelia purpurascens</i>	Scientific Name	<i>Adiantum aethiopicum</i>
Scientific Name	<i>Lomandra laxa</i>	Scientific Name	<i>Dioscorea transversa</i>
Scientific Name	<i>Smilax australis</i>	Scientific Name	<i>Stephania japonica</i>
Scientific Name	<i>Derris involuta</i>	Scientific Name	<i>Geitonoplesium cymosum</i>
Scientific Name	<i>Desmodium rythidophyllum</i>	Scientific Name	<i>Goodenia rotundifolia</i>

Part E - Non-Native Plant Cover: (\*list species below)

Total percentage cover within plot	10.00%		
Scientific Name	<i>Lantana camara</i>	Common Name	
Scientific Name	<i>Passiflora suberosa</i>	Common Name	
Scientific Name	<i>Oxalis corniculata</i>	Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Part F - Coarse Woody Debris: (\*list lengths of individual logs in meters)

Total Length of Coarse Woody Debris (Meters):	447.00		
1	9.20	26	
2	1.50	27	
3	2.50	28	
4	5.00	29	
5	7.50	30	
6	3.20	31	
7	5.10	32	
8	0.50	33	
9	10.20	34	
10		35	
11		36	
12		37	
13		38	
14		39	
15		40	
16		41	
17		42	
18		43	
19		44	
20		45	
21		46	
22		47	
23		48	
24		49	
25		50	

Part G - Native perennial grass cover, organic litter: (\*provide percentage cover within each quadrat, and provide average cover)

Native perennial grass cover	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Average
	15.00%	5.00%	5.00%	2.00%	5.00%	6.40%
Organic Litter	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Average
	65.00%	60.00%	60.00%	20.00%	35.00%	48.00%

Part H- Number of large trees , tree canopy height, recruitment of woody perennial species:

Eucalypt Large tree DBH benchmark used :	30	Non- Eucalypt Large tree DBH benchmark used:	
Number of large eucalypt trees:	30	Number of large non eucalypt trees:	
Total Number Large Trees:	30		
Median Tree Canopy Height Measurements	Canopy:	25.00	Sub-canopy: 5.60 Emergent:
Number of ecologically dominant layer species regenerating:		66	

Part I - Tree canopy cover, Shrub canopy cover

Tree canopy cover %	Canopy:	73.90%	Sub-canopy:	69.90%	Emergent:
Shrub canopy cover %	17.10%				

Note: Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present \*If trees are in the same layer and continuous along the transect you can group them

Part J - Site Context Score

ATTRIBUTE	Size of Patch	Connectedness	Context	Distance to Permanent Water	Ecological Corridors
DESCRIPTION	3 - 26 - 100ha	3 - 50%-75% connection	3 - >30-75% remnant		
SCORE	5	4	4		



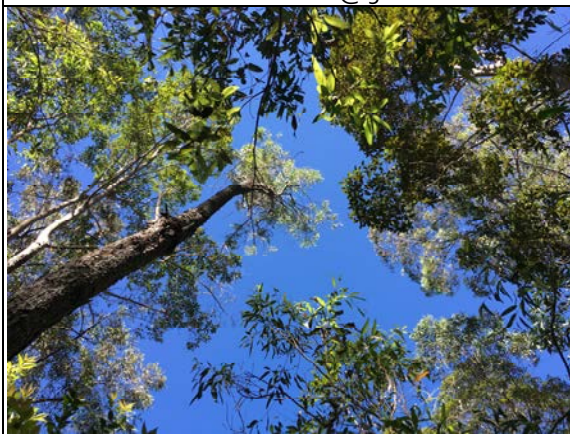




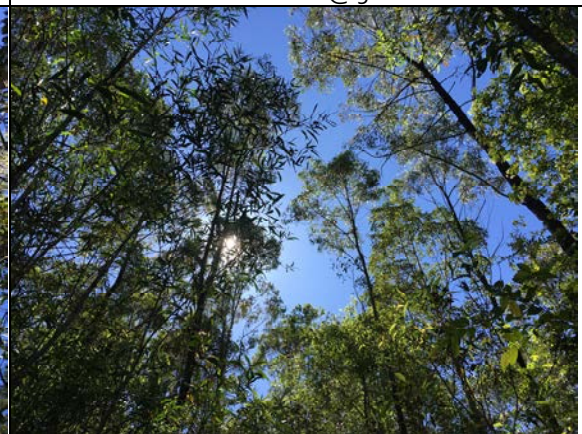
TYPICAL CONDITION @ 50M WEST



TYPICAL CONDITION @ 50M NORTH



TYPICAL CONDITION @ 100M



TYPICAL CONDITION @ 100M



TYPICAL CONDITION @ 100M



TYPICAL CONDITION @ 100M





TYPICAL CONDITION @ 100M



TYPICAL CONDITION @ 100M



TYPICAL CONDITION @ 100M



TYPICAL CONDITION @ 100M

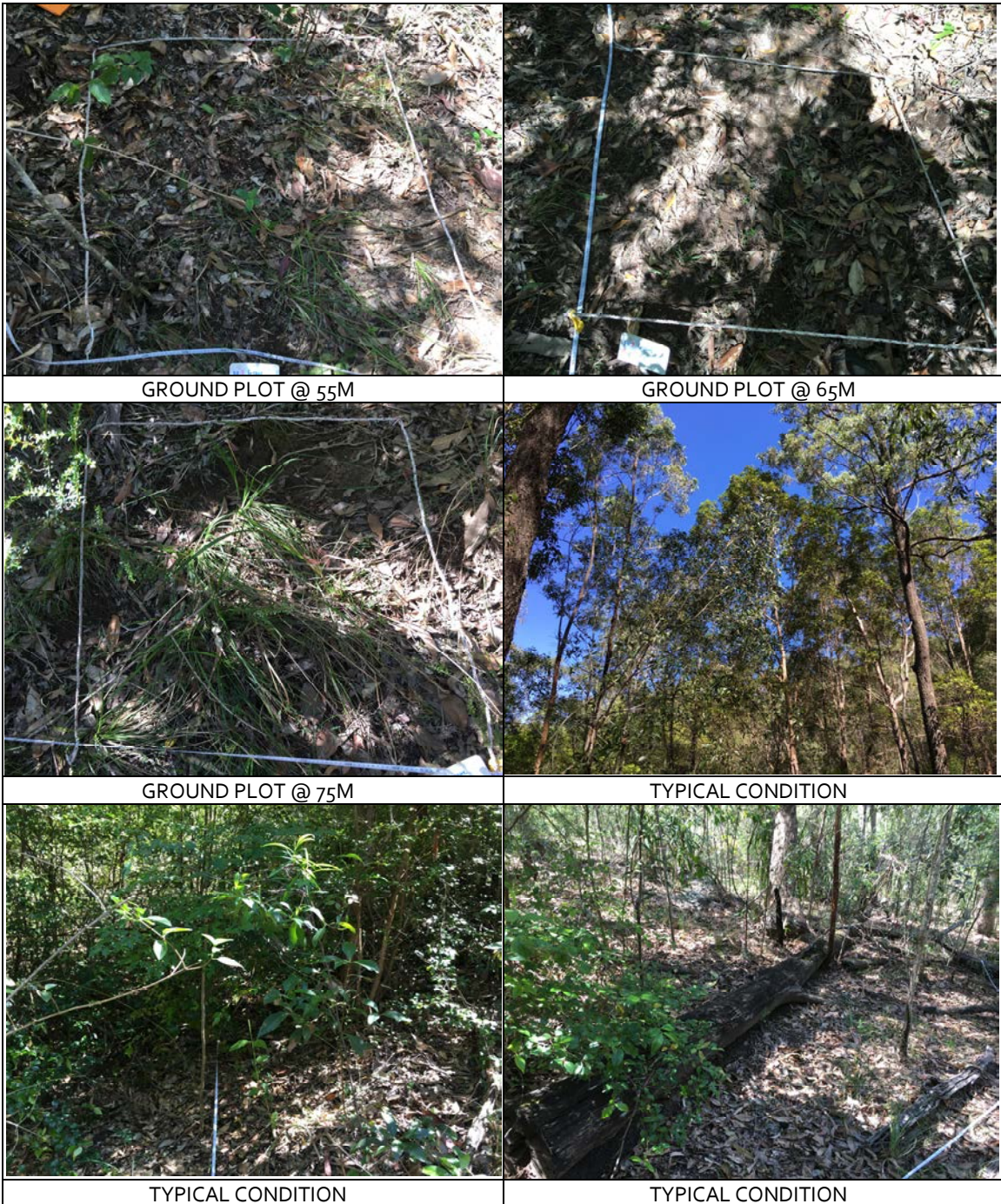


GROUND PLOT @ 35M



GROUND PLOT @ 45M









TYPICAL CONDITION



TYPICAL CONDITION





Forbs and others (non grass ground) species richness:					
Total number of species	11				
Scientific Name	<i>Dianella longifolia</i>	Scientific Name	Doodia aspera		
Scientific Name	<i>Smilax australis</i>	Scientific Name	Eustrephus latifolius		
Scientific Name	<i>Geitonoplesium cymosum</i>	Scientific Name	Pteridium esculentum		
Scientific Name	<i>Lomandra longifolia</i>	Scientific Name	Stephania japonica		
Scientific Name	<i>Glycine tabacina</i>	Scientific Name			
Scientific Name	<i>Clematicissus opaca</i>	Scientific Name			
Scientific Name	<i>Desmodium ryhtidophyllum</i>	Scientific Name			

Part E - Non-Native Plant Cover: (\*list species below)

Total percentage cover within plot	15.00%				
Scientific Name	<i>Lantana montevidensis [common]</i>	Common Name			
Scientific Name	<i>Lantana camara</i>	Common Name			
Scientific Name	<i>Echium plantagineum</i>	Common Name			
Scientific Name	<i>Sporobolus spp</i>	Common Name			
Scientific Name	<i>Bidens pilosa</i>	Common Name			
Scientific Name	<i>Gomphocarpus physocarpus</i>	Common Name			
Scientific Name	<i>Passiflora subpeltata</i>	Common Name			
Scientific Name	<i>Cinnamomum camphora</i>	Common Name			
Scientific Name	<i>Senna pendula</i>	Common Name			
Scientific Name		Common Name			

Part F - Coarse Woody Debris: (\*list lengths of individual logs in meters)

Total Length of Coarse Woody Debris (Meters):	1181.00				
1	2.10	26	7.70		
2	3.40	27	6.20		
3	1.00	28	1.80		
4	4.50	29	3.00		
5	3.10	30	5.40		
6	2.90	31	8.80		
7	4.00	32	6.10		
8	3.90	33	12.10		
9	0.90	34			
10	1.70	35			
11	1.80	36			
12	1.00	37			
13	2.10	38			
14	8.00	39			
15	2.20	40			
16	1.40	41			
17	2.30	42			
18	7.00	43			
19	2.10	44			
20	1.50	45			
21	2.60	46			
22	0.90	47			
23	1.40	48			
24	3.00	49			
25	2.20	50			

Part G - Native perennial grass cover, organic litter: (\*provide percentage cover within each quadrat, and provide average cover)

Native perennial grass cover	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Average
	80.00%	5.00%	5.00%	5.00%	5.00%	20.00%
Organic Litter	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Average
	10.00%	25.00%	55.00%	4.00%	80.00%	34.80%

Part H- Number of large trees , tree canopy height, recruitment of woody perennial species:

Eucalypt Large tree DBH benchmark used :	30	Non- Eucalypt Large tree DBH benchmark used:	
Number of large eucalypt trees:	41	Number of large non eucalypt trees:	1
Total Number Large Trees:	42		
Median Tree Canopy Height Measurements	Canopy:	24.40	Sub-canopy: Emergent:
Number of ecologically dominant layer species regenerating:		67	

Part I - Tree canopy cover, Shrub canopy cover

Tree canopy cover %	Canopy:	78.50%	Sub-canopy:	Emergent:
Shrub canopy cover %	7.90%			

Note: Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present \*If trees are in the same layer and continuous along the transect you can group them

Part J - Site Context Score

ATTRIBUTE	Size of Patch	Connectedness	Context	Distance to Permanent Water	Ecological Corridors
DESCRIPTION	4 - 101-200ha	3 - 50%-75% connection	3 - >30-75% remnant		
SCORE	7	4	4		

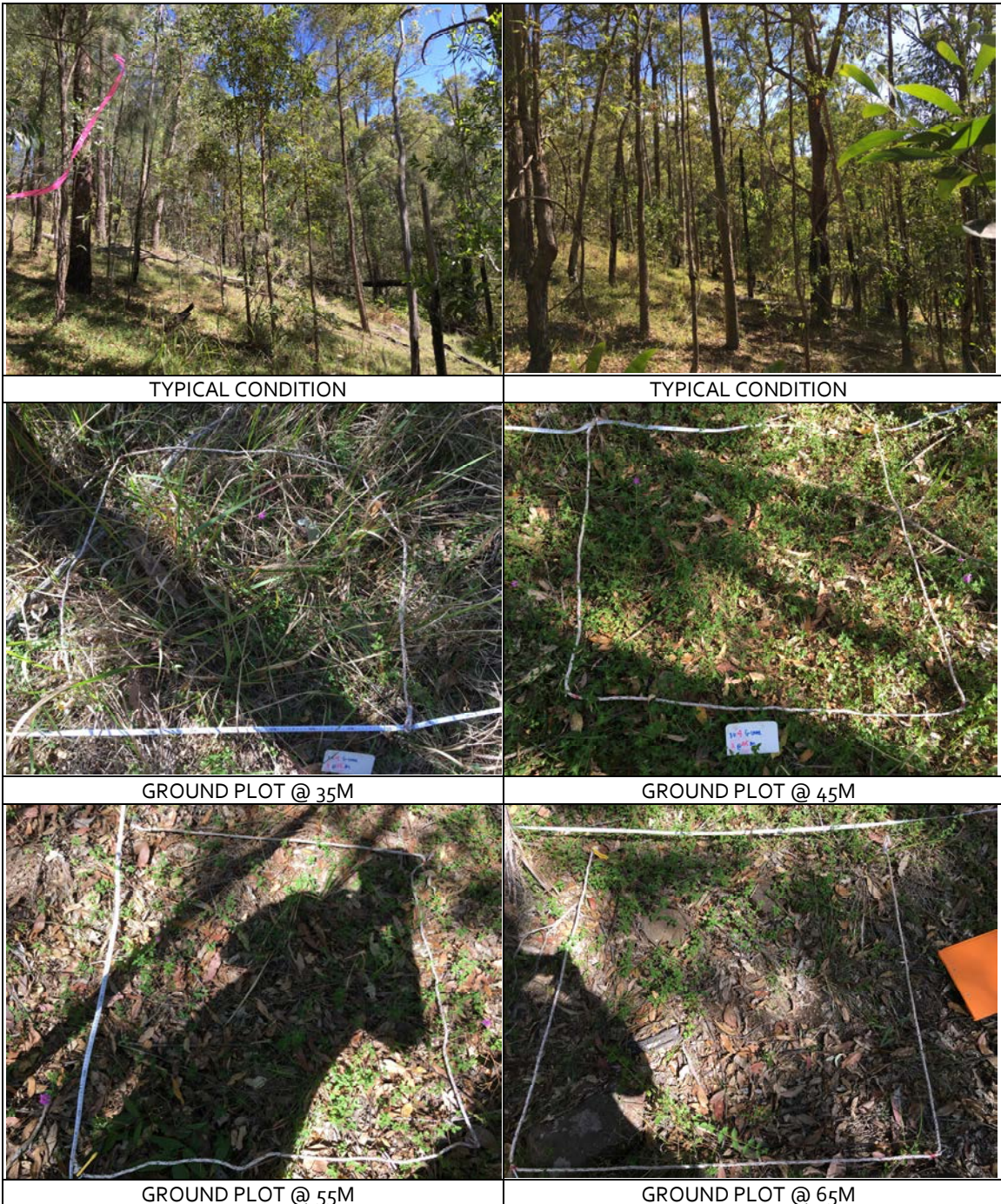














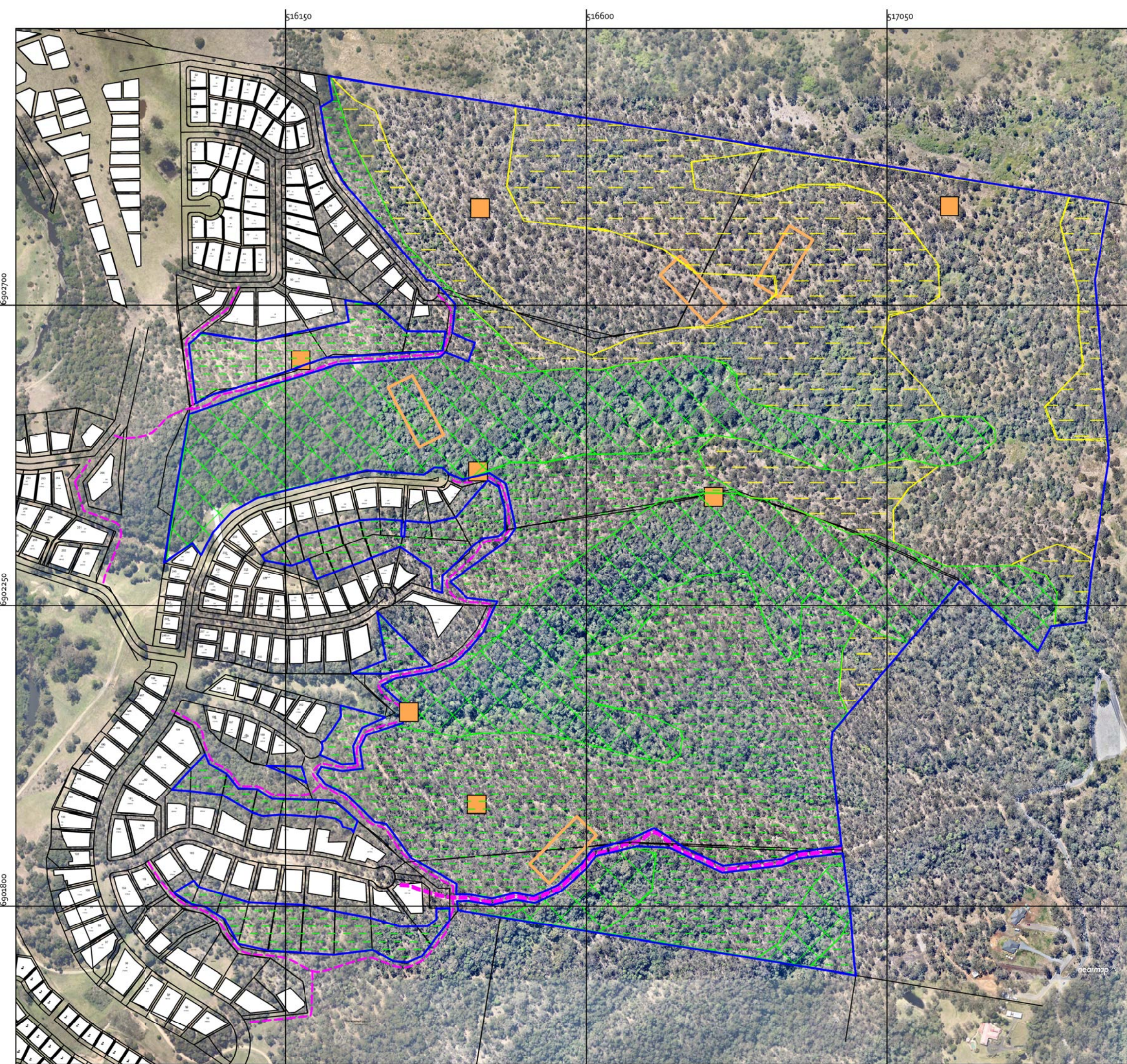


**ATTACHMENT 3**

**BASELINE VISUAL/QUALITATIVE PLOT  
ASSESSMENTS**

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# MONITORING SITES

- OFFSET AREA
- REHABILITATION UNIT 1
- REHABILITATION UNIT 2
- REHABILITATION UNIT 3
- REHABILITATION UNIT 4
- FIRE TRAILS
- BIOCONDITION MONITORING SITES
- VISUAL/QUALITATIVE MONITORING SITES

## NOTES:

- Maps have been compiled using Mapinfo geographic information system (GIS) software (Ver. 11.5). Information utilized includes:
- Approved layouts and survey plans provided by Sclencker Surveying P/L
  - Individual features added by Planit following field inspection September and October 2016
  - Features located via handheld Garmin GPS Map 62s device and coordinated in MGAz56. Locations tabulated and displayed in Mapinfo Ver 11.5 upon the aerial photograph
  - 2013 georeferenced aerial photographs sourced from Nearmap
  - Regional Ecosystem boundaries sourced from DNRM 2012 Vegetation Management Act Regional Ecosystems Vers 6.1 - SEQ

Map Created: 12-10-2016  
Scale = 1:5500 @ A3



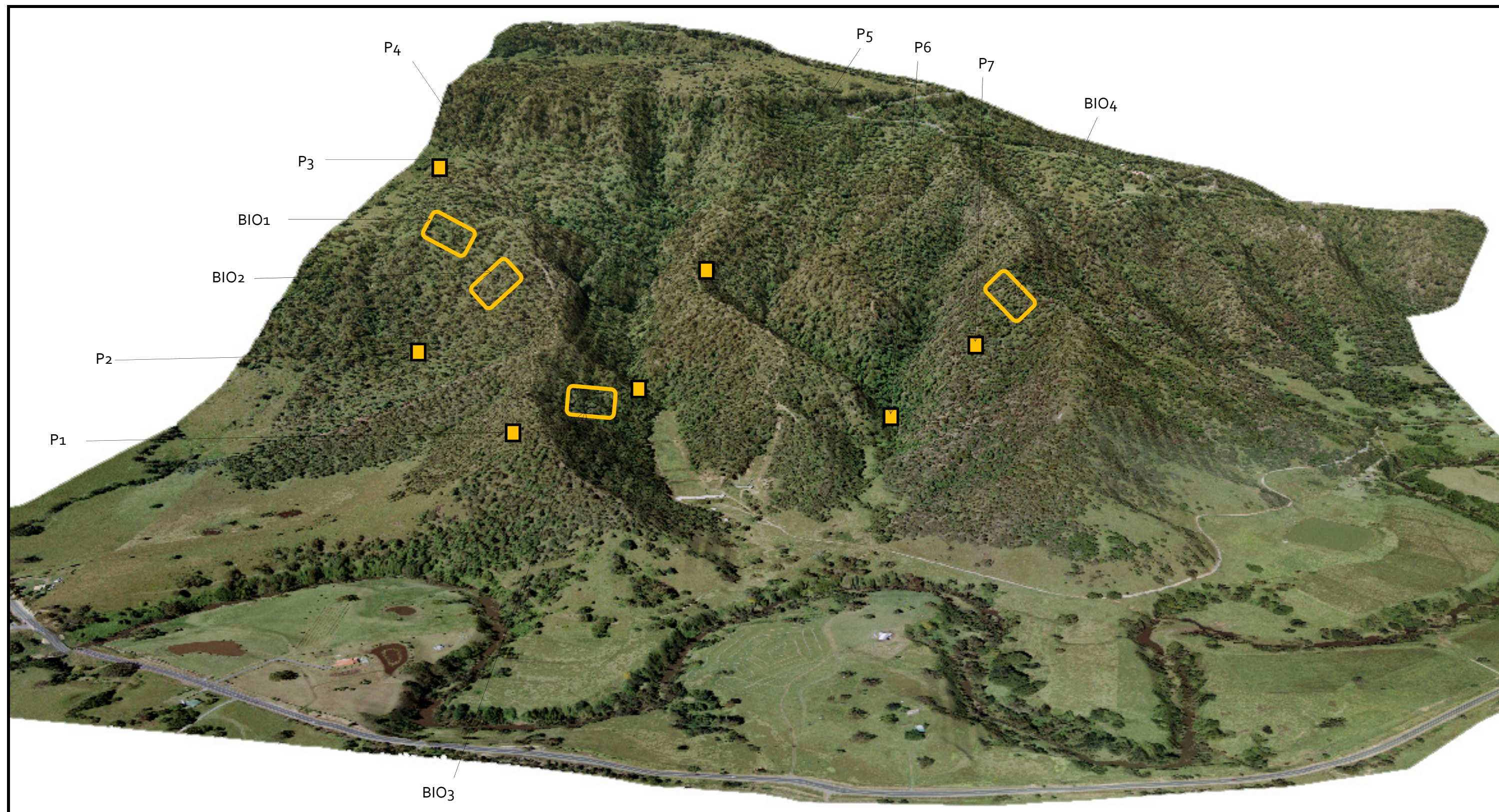


FIGURE 5: MONITORING SITES



## Location

Site No. P1 Recorder: GD Day/Date: 5-10-16

Purpose: Baseline monitoring weed management/rehabilitation and habitat condition quadrat 10m x 10m + surrounds

Locality: (inc. distance/direction to nearest town) CANUNGRA FINCH ROAD

GPS coordinates centre patch: Zone 5 6 E 0 5 1 6 1 7 3 N 6 9 0 2 6 2 0 Datum: MGA94Z56

## Vegetation structure

Stratum	Height Interval Estimate (m)	Est. cover density (D,M,S,V)
E	-	-
T <sub>1</sub>	12-15	M
T <sub>2</sub>	4-8	M
S <sub>1</sub>	0.5-2.5	S-D
G	0-0.5	M-S healthy leaf litter

Structural formation: (including height)

Mid-high to Tall Open Eucalypt Forest

Ecologically dominant layer: t<sub>1</sub>

Refer Walker & Hopkins 1998 Tables 14a, 15 & 17

EVIDENCE OF KOALAS	PRESENT?
SCRATCH	✓
SCAT	✓
SIGHTING	

## Plant species

Record relative (numerical) dominance for each stratum;  
d – dominant; c – codominant; a – associated; s – suppressed.

Str.	Rel. dom	Scientific Name
T <sub>1</sub>	D	Stringybarks – Eucalypt acmenoides, E. carnea
T <sub>1</sub>	A	E. crebra
T <sub>1</sub>	A	Corymbia citriodora
T <sub>1</sub>	A	E. tereticornis
T <sub>2</sub>	S	Lophostemon confertus
T <sub>2</sub>	C	Acacia spp x 2
T <sub>2</sub>	C	Regenerating T <sub>1</sub> species
T <sub>2</sub>	S	Jagera pseudorhus
T <sub>2</sub>	S	Alphitonia excelsa
S	D	Lantana camara*
S	S	Trema tomentose
S	S	Breynia oblongifolia
G	C	Imperata cylindrica
G	C	Themeda triandra
G	S	Poa spp
G	A	Desmodium rythidophyllum
G	S	Lomandra filiformis
G	A	Chrysocephalum apiculatum
G	S	Lantana montevidensis*
G	S	Lobelia purpurascens
G	S	Senecio madagascariensis
G	C	Good leaf litter. Fallen debris common.

## Geology, landform and other notes

Geology mapping: DNR (2002 & 2005) Geological Survey of QLD, SEQLD Region Geoscience Data Set

Geology code and rock types: RJbw: Quartzose sandstone, siltstone, shale conglomerate, coal. SEDIMENTARY ROCK

Landform: North facing slope

Field observation and notes: Good condition excluding lanata

Landzone: 9-10

## Applied RE code

RE code: 12.9-10.17



TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION





MONITORING FORM A-GENERAL [ANNUAL]		
<p><u>General Management</u></p> <p>Has there been a fire within the last period? _____</p> <p>Does the adjacent fire trail require mowing or maintenance to reduce fire risk? _____</p> <p>Is there evidence of rubbish dumping within the management area? _____</p> <p>Is there evidence of plant theft within the management area? _____</p> <p>Does it appear that the management area has been utilized for stockpiling, vehicle parking, building waste dumping, domestic animal walking or stock grazing? _____</p> <p>If yes, acknowledge below what works were undertaken to rectify/restore and the date _____</p>	<p><u>Weeds</u></p> <p>Have any areas of weeds re-established within the management area during the last period? _____</p> <p>What species? _____</p> <p>Estimate the area of new weed coverage in square metres _____</p> <p>What management was undertaken to eradicate these weeds? _____</p> <p>If management was undertaken acknowledge that such was performed in accordance with the weed management plan. _____</p>	<p><u>Vegetation regeneration [10m x 10m quadrat]</u> add additional page if necessary</p> <p>Natural regeneration is occurring in (height range estimate):</p> <ul style="list-style-type: none"><li>- Tree species _____</li><li>- Shrub species _____</li><li>- ground covers _____</li></ul> <p>What are the dominant species within each layer?</p> <ul style="list-style-type: none"><li>- Tree _____</li><li>- Shrub _____</li><li>- ground covers _____</li></ul> <p>Provide a list of flora species (on the back) observed and an estimate of abundance (i.e. A = abundant, .R = relatively common, I = isolated/scarce) _____</p> <p>Have you noticed any new native plant species since the last inspection? _____</p> <p>If yes name the species or take a photograph _____</p> <p>Acknowledge that the required routine photographs have been taken within the monitoring points _____</p>
<p><u>Biodiversity</u></p> <p>Have you spotted native fauna within the management area during inspection?</p> <p>If yes, what types?</p> <p>Frogs _____</p> <p>Koala _____</p> <p>Kangaroo/wallaby _____</p> <p>Possums/glidens _____</p> <p>Small mammal (i.e. bandicoot, echidna) _____</p> <p>Reptiles (i.e. snakes/lizards) _____</p> <p>Birds of prey _____</p> <p>Large birds (i.e. lorikeets, parrots, coucal) _____</p> <p>Small tree and ground birds (i.e. finches, fairy wrens, treecreepers) _____</p> <p>Flying Foxes _____</p> <p>Pest Animals _____</p> <p>Other _____</p> <p>Confirm that predator scats were searched for within the quadrat and any encountered were sent away for analysis _____</p>	<p><u>Modifications</u></p> <p>Have there been any structural additions (eg. new tracks, fences etc) to the management area since the last visit? _____</p> <p>What actions were undertaken to remove any illegal modifications? _____</p>	<p>Are any of the following performance criteria exceeded or not achieved?</p> <p>Declared Weeds? _____</p> <p>Extent of other Weeds? _____</p> <p>Survival Rate of Plants? _____</p> <p>Condition of Plants? _____</p> <p>Canopy Coverage? _____</p> <p>Tree, Small Tree &amp; Shrub Diversity? _____</p> <p>Groundcover Coverage? _____</p> <p>General Coverage/Success? _____</p> <p>If yes, what corrective action was performed (i.e. weed recolonistaion was evident so routine management was performed as per Table 2; garden waste dumping was noted and removed, assisted regeneration was deemed unsuccessful and revegetation of the relevant module was undertaken etc).</p>



MONITORING FORM B-CONDITION FOR 10M X 10M MONITORING SITE

PROJECT DESCRIPTION

Project name: Finch Road Offset		Project ID: EPBC2015/7485
Site location centrepoint (MGAz56): 516173, 6902620		Monitoring Site ID: P1
Type of on-grounds: Monitoring of Assisted Natural Regeneration	Years since site commenced: 0	When was this site last assessed? N/A-BASELINE
Current assessment conducted by: GD	Date of current assessment: 5-10-16	
Overall comments on site condition: Generally good condition RE12.9-10.17. Koala habitat. Lantana species spreading from lower slopes.		
Has the condition of the site changed since last assessment? YES ..... or NO ..... If Yes, briefly describe changes in this box, and provide details in table below. N/A. BASELINE.		

DESCRIPTION OF SITE CONDITION Complete table annually. Also draw map and take photographs.

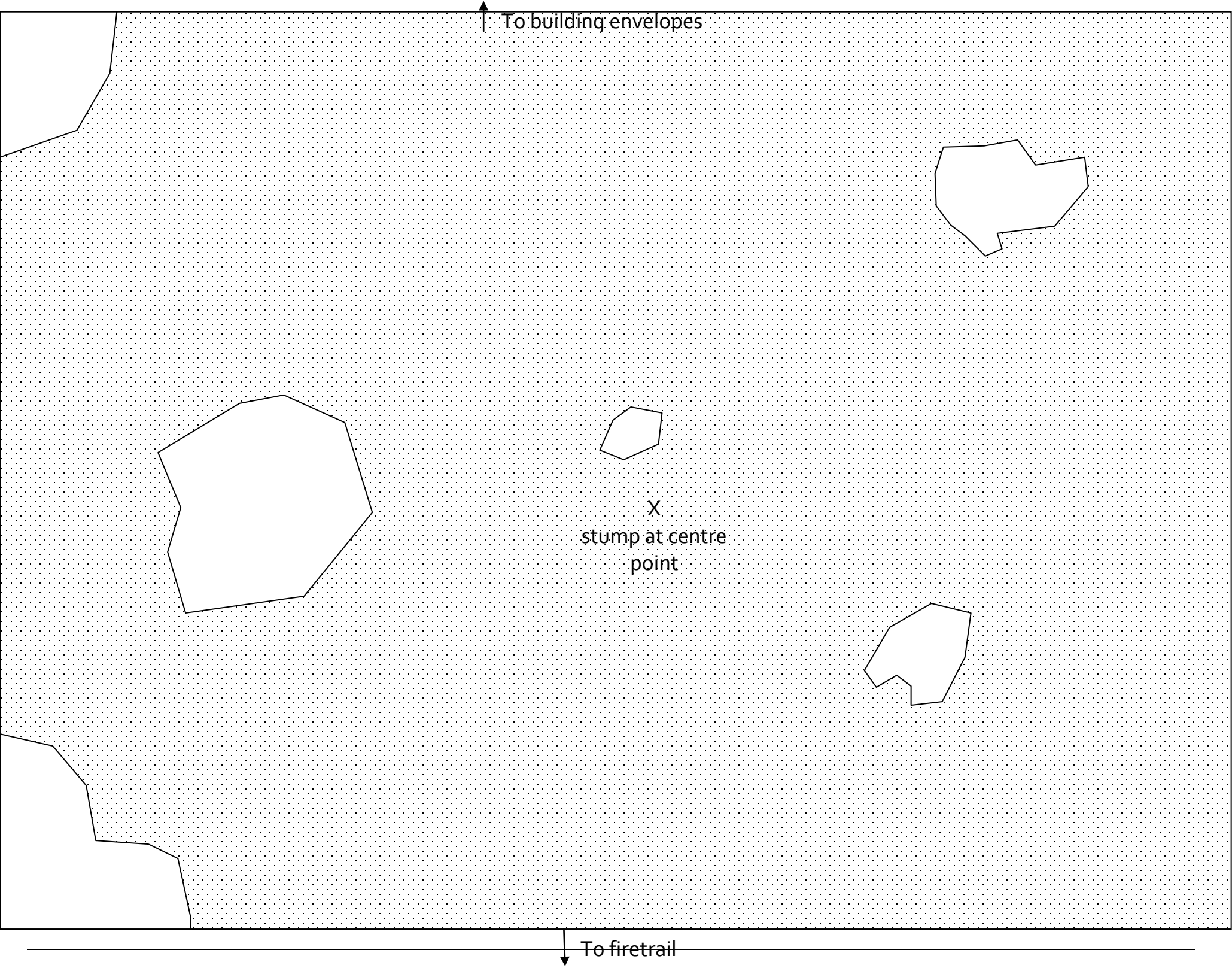
Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
A = OK on track towards target	80	Most of plot typical to Re12.9-10.17	40-50	typically grassy with good leaf litter		All T1 trees recruiting		Routine Lantana control  (should be routine: describe if necessary)
B = Uncertain significant problems	20	Scattered clumps of lantana	40-50	leaf litter OK. Grass and shrubs suppressed within lantana thickets				Lantana control required  (describe)
C = Poor major problems, likely to fail								(describe)
Overall Condition Score (ranges from 0-100%) Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%								90 %

MAP OF SITE CONDITION [REFER IMAGES]

Draw a map of the monitoring site, showing variation in outcomes as zones (Zone A = OK, Zone B = Uncertain, Zone C = Poor).

Lantana clumps

Otherwise good condition 12.9-10.17





## Location

Site No.	P2	Recorder:	GD	Day/Date:	6-10-16																
Purpose	Baseline monitoring weed management/rehabilitation and habitat condition quadrat 10m x 10m + surrounds																				
Locality: (inc. distance/direction to nearest town)	CANUNGRA FINCH ROAD																				
GPS coordinates centre patch:	Zone	5	6	E	0	5	1	6	4	4	2	N	6	9	0	2	8	4	7	Datum:	MGA94Z56

## Vegetation structure

Stratum	Height Interval Estimate (m)	Est. cover density (D,M,S,V)
E	>20	VS
T <sub>1</sub>	15-20	S-M
T <sub>2</sub>	3-5	S
S <sub>1</sub>	0.5-2	Native-S Exotic-D
G	0-0.5	S-M healthy leaf litter

**Structural formation:** (including height)  
Tall Open Eucalypt Woodland/Scattered Mature Trees over regrowth

**Ecologically dominant layer:** t<sub>1</sub>

Refer Walker & Hopkins 1998 Tables 14a, 15 & 17

EVIDENCE OF KOALAS	PRESENT?
SCRATCH	
SCAT	
SIGHTING	

## Plant species

Record relative (numerical) dominance for each stratum;  
d – dominant; c – codominant; a – associated; s – suppressed.

Str.	Rel. dom	Scientific Name
E	D	<i>Corymbia citriodora/henryi</i>
T <sub>1</sub>	D	<i>Corymbia citriodora/henryi</i>
T <sub>1</sub>	A	<i>E. crebra</i>
T <sub>1</sub>	S	<i>E. biturbinata</i>
T <sub>1</sub>	S	<i>E. tereticornis</i>
T <sub>2</sub>	S	<i>Ficus spp</i>
T <sub>2</sub>	D	<i>Acacia spp</i> x 3 <i>A. disparrima</i> , <i>A. melanoxylon</i> , <i>A. fimbriata</i>
T <sub>2</sub>	A	Regenerating T <sub>1</sub> species
T <sub>2</sub>	S	<i>Alphitonia excelsa</i>
S	D	<i>Lantana camara</i> *
S	S	<i>Senna pendula</i> *
S	S	<i>Glochidion ferdinandi</i>
S	S	<i>Pittosporum revolutum</i>
S	S	<i>Gomphocarpus physocarpus</i> *
S	S	<i>Sida cordifolia</i> *
S	S	<i>Dodonea triquetra</i>
G	S	<i>Chloris gayana</i>
G	A	<i>Imperata cylindrica</i>
G	D	<i>Themeda triandra</i>
G	S	<i>Plectranthus spp</i>
G	S	<i>Desmodium ryhtidophyllum</i>
G	A	<i>Lomandra filiformis</i>
G	S	<i>Glycine tabacina</i>
G	S	<i>Stephania japonica</i>
G	S	<i>Ageratum houstonianum</i> *
G	S	<i>Lomandra longifolia</i>
G	C	Good leaf litter. Fallen debris common. Exposed boulders

## Geology, landform and other notes

Geology mapping:	DNRM (2002 & 2005) Geological Survey of QLD, SEQLD Region Geoscience Data Set	
Geology code and rock types:	TQcb-SEQ - Colluvium basalt - soil, clay, cobbles and boulders	
Landform:	gently sloping NW to dry gully	
Field observation and notes:	Lantana abundant. Numerous exposed boulders typical to LZ8	
	Landzone:	8

## Applied RE code

RE code:	non remnant regrowth 12.8.14 ecotone with 12.9-10.17 to the west. Localised spotted gum.
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TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION





TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION



MONITORING FORM A-GENERAL [ANNUAL]		
<p><u>General Management</u></p> <p>Has there been a fire within the last period? _____</p> <p>Does the adjacent fire trail require mowing or maintenance to reduce fire risk? _____</p> <p>Is there evidence of rubbish dumping within the management area? _____</p> <p>Is there evidence of plant theft within the management area? _____</p> <p>Does it appear that the management area has been utilized for stockpiling, vehicle parking, building waste dumping, domestic animal walking or stock grazing? _____</p> <p>If yes, acknowledge below what works were undertaken to rectify/restore and the date _____</p>	<p><u>Weeds</u></p> <p>Have any areas of weeds re-established within the management area during the last period? _____</p> <p>What species? _____</p> <p>Estimate the area of new weed coverage in square metres _____</p> <p>What management was undertaken to eradicate these weeds? _____</p> <p>If management was undertaken acknowledge that such was performed in accordance with the weed management plan. _____</p>	<p><u>Vegetation regeneration [10m x 10m quadrat]</u> add additional page if necessary</p> <p>Natural regeneration is occurring in (height range estimate):</p> <ul style="list-style-type: none"><li>- Tree species _____</li><li>- Shrub species _____</li><li>- ground covers _____</li></ul> <p>What are the dominant species within each layer?</p> <ul style="list-style-type: none"><li>- Tree _____</li><li>- Shrub _____</li><li>- ground covers _____</li></ul> <p>Provide a list of flora species (on the back) observed and an estimate of abundance (i.e. A = abundant, .R = relatively common, I = isolated/scarce) _____</p> <p>Have you noticed any new native plant species since the last inspection? _____</p> <p>If yes name the species or take a photograph _____</p> <p>Acknowledge that the required routine photographs have been taken within the monitoring points _____</p>
<p><u>Biodiversity</u></p> <p>Have you spotted native fauna within the management area during inspection?</p> <p>If yes, what types?</p> <p>Frogs _____</p> <p>Koala _____</p> <p>Kangaroo/wallaby _____</p> <p>Possums/glidens _____</p> <p>Small mammal (i.e. bandicoot, echidna) _____</p> <p>Reptiles (i.e. snakes/lizards) _____</p> <p>Birds of prey _____</p> <p>Large birds (i.e. lorikeets, parrots, coucal) _____</p> <p>Small tree and ground birds (i.e. finches, fairy wrens, treecreepers) _____</p> <p>Flying Foxes _____</p> <p>Pest Animals _____</p> <p>Other _____</p> <p>Confirm that predator scats were searched for within the quadrat and any encountered were sent away for analysis _____</p>	<p><u>Modifications</u></p> <p>Have there been any structural additions (eg. new tracks, fences etc) to the management area since the last visit? _____</p> <p>What actions were undertaken to remove any illegal modifications? _____</p>	<p>Are any of the following performance criteria exceeded or not achieved?</p> <p>Declared Weeds? _____</p> <p>Extent of other Weeds? _____</p> <p>Survival Rate of Plants? _____</p> <p>Condition of Plants? _____</p> <p>Canopy Coverage? _____</p> <p>Tree, Small Tree &amp; Shrub Diversity? _____</p> <p>Groundcover Coverage? _____</p> <p>General Coverage/Success? _____</p> <p>If yes, what corrective action was performed (i.e. weed recolonistaion was evident so routine management was performed as per Table 2; garden waste dumping was noted and removed, assisted regeneration was deemed unsuccessful and revegetation of the relevant module was undertaken etc).</p>





MONITORING FORM B-CONDITION FOR 10M X 10M MONITORING SITE

PROJECT DESCRIPTION

Project name: Finch Road Offset		Project ID: EPBC2015/7485
Site location centrepoint (MGAz56): 516442, 6902847		Monitoring Site ID: P2
Type of on-grounds: Monitoring of Assisted Natural Regeneration	Years since site commenced: 0	When was this site last assessed? N/A-BASELINE
Current assessment conducted by: GD	Date of current assessment: 6-10-16	
Overall comments on site condition: Regrowth 12.8.14 with local dominance of spotted gum. Numerous exposed boulders.		
Has the condition of the site changed since last assessment? YES ..... or NO ..... If Yes, briefly describe changes in this box, and provide details in table below. N/A. BASELINE.		

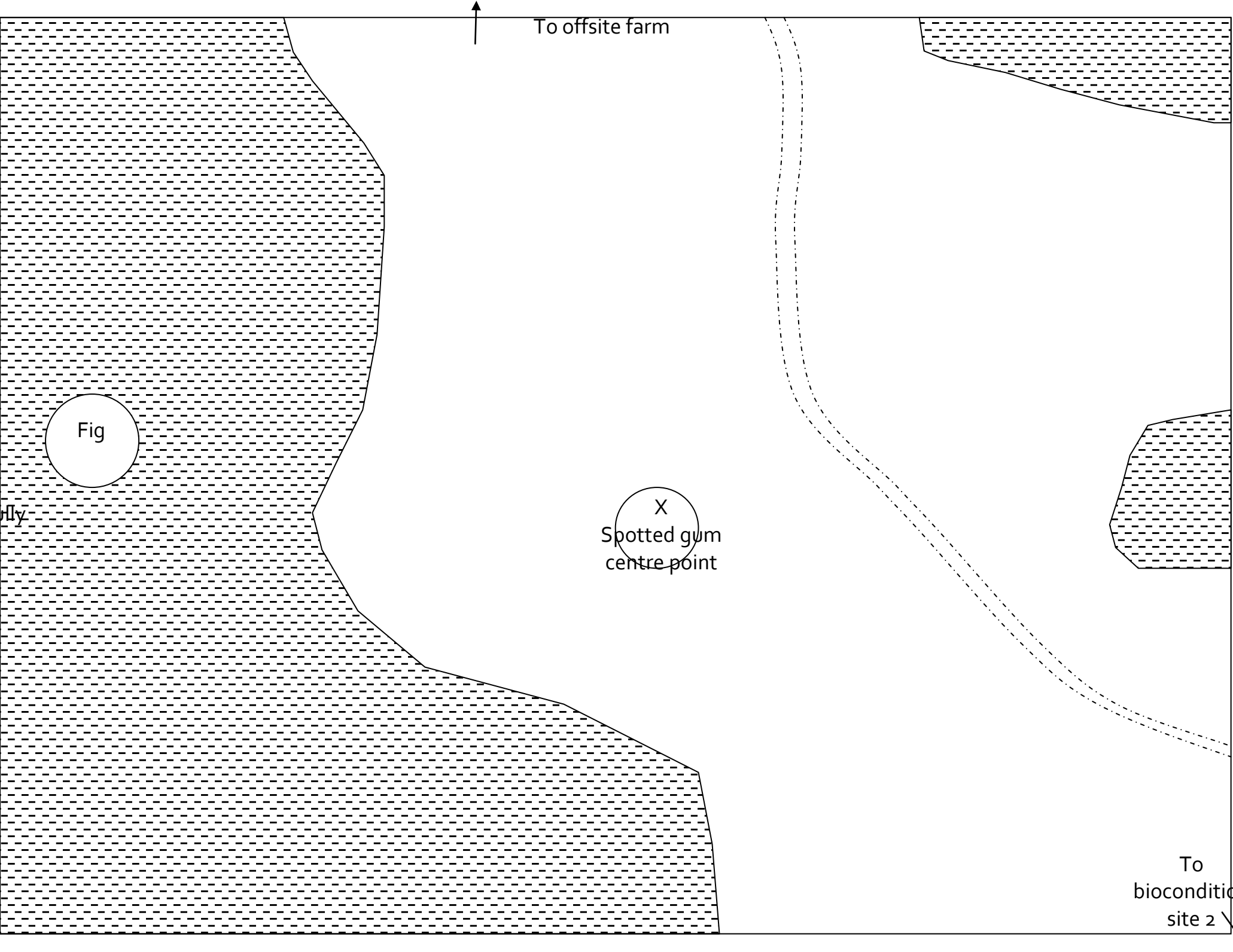
DESCRIPTION OF SITE CONDITION *Complete table annually. Also draw map and take photographs.*

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
A = OK on track towards target	50	Typical regrowth of previously grazed areas. Generally OK excluding lantana	20-30	typically grassy with good leaf litter + boulders	Lantana	Present but reduced due to lantana		Routine Lantana control  (should be routine: describe if necessary)
B = Uncertain significant problems	50	Lantana thickets suppressive	20-30	As above	As above but dense cover	Very low in thickets	Suppressive lantana shrub layer	Lantana control required ASAP  (describe)
C = Poor major problems, likely to fail								(describe)
Overall Condition Score (ranges from 0-100%) Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%								75 %

MAP OF SITE CONDITION [REFER IMAGES]

Draw a map of the monitoring site, showing variation in outcomes as zones (Zone A = OK, Zone B = Uncertain, Zone C = Poor).

- Lantana clumps with Euc. Woodland Cover but reduced regeneration
- Relatively good condition regrowth Eucalypt Woodland
- Dry rocky overland flow path



## Location

Site No. P3 Recorder: GD Day/Date: 6-10-16

Purpose Baseline monitoring weed management/rehabilitation and habitat condition quadrat 10m x 10m + surrounds

Locality: (inc. distance/direction to nearest town) CANUNGRA FINCH ROAD

GPS coordinates centre patch: Zone 5 6 E 0 5 1 7 1 4 4 N 6 9 0 2 8 5 0 Datum: MGA94Z56

## Vegetation structure

Stratum	Height Interval Estimate (m)	Est. cover density (D,M,S,V)
E	-	-
T <sub>1</sub>	15-20	S-M
T <sub>2</sub>	3-8	M-S
S <sub>1</sub>	0.5-2	Native -VS Exotic-D
G	0-0.5	M-D

### Structural formation: (including height)

Tall Open Eucalypt Woodland/Scattered Mature  
Tall-Very Tall Eucalypt Woodland

### Ecologically dominant layer: t1

Refer Walker & Hopkins 1998 Tables  
14a, 15 & 17

EVIDENCE OF KOALAS	PRESENT?
SCRATCH	✓
SCAT	✓
SIGHTING	

## Plant species

Record relative (numerical) dominance for each stratum;  
**d** – dominant; **c** – codominant; **a** – associated; **s** – suppressed.

Str.	Rel. dom	Scientific Name
T <sub>1</sub>	D	<i>Eucalyptus tereticornis</i>
T <sub>1</sub>	A	<i>E. crebra</i>
T <sub>1</sub>	S	<i>Corymbia citriodora/henryi</i>
T <sub>2</sub>	D	<i>Sparsely regenerating T1 species</i>
T <sub>2</sub>	S	<i>Acacia spp x 2</i>
T <sub>2</sub>	S	<i>Corymbia intermedia</i>
S	D	<i>Lantana camara*</i>
S	A	<i>Other weeds -Senna pendula*, Gomphocarpus physocarpus*, Solanum hispidum*, Citris limon cult*</i>
S	S	<i>Trema tomentosa</i>
G	D	<i>Weeds - Ambrosia artemisiifolia*, Echium plantagineum*, Ageratina adenophora*, exotic/pasture grasses*, Passiflora subpeltata*, Desmodium uncinatum*</i>
G	A	<i>Imperata cylindrica</i>
G	S	<i>Themeda triandra</i>
G	S	<i>Smilax australis</i>
G	S	<i>Centella asiatica</i>
G	S	<i>Lomandra filiformis</i>
G	S	<i>Poa spp</i>
G	S	<i>Stephania japonica</i>
G	S	<i>Cyperus gracilis</i>

## Geology, landform and other notes

Geology mapping: DNRM (2002 & 2005) Geological Survey of QLD, SEQLD Region Geoscience Data Set

Geology code and rock types: TQcb-SEQ - Colluvium basalt - soil, clay, cobbles and boulders

Landform: Top of ridge

Field observation and notes: Ex grazing area. Poor condition lower strata due to weeds

Landzone: 8

## Applied RE code

RE code: 12.8.14





TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION





TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION

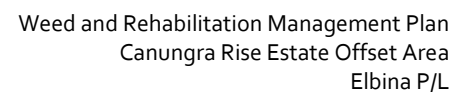


TYPICAL CONDITION





MONITORING FORM A-GENERAL [ANNUAL]		
<p><u>General Management</u></p> <p>Has there been a fire within the last period? _____</p> <p>Does the adjacent fire trail require mowing or maintenance to reduce fire risk? _____</p> <p>Is there evidence of rubbish dumping within the management area? _____</p> <p>Is there evidence of plant theft within the management area? _____</p> <p>Does it appear that the management area has been utilized for stockpiling, vehicle parking, building waste dumping, domestic animal walking or stock grazing? _____</p> <p>If yes, acknowledge below what works were undertaken to rectify/restore and the date _____</p>	<p><u>Weeds</u></p> <p>Have any areas of weeds re-established within the management area during the last period? _____</p> <p>What species? _____</p> <p>Estimate the area of new weed coverage in square metres _____</p> <p>What management was undertaken to eradicate these weeds? _____</p> <p>If management was undertaken acknowledge that such was performed in accordance with the weed management plan. _____</p>	<p><u>Vegetation regeneration [10m x 10m quadrat]</u> add additional page if necessary</p> <p>Natural regeneration is occurring in (height range estimate):</p> <ul style="list-style-type: none"><li>- Tree species _____</li><li>- Shrub species _____</li><li>- ground covers _____</li></ul> <p>What are the dominant species within each layer?</p> <ul style="list-style-type: none"><li>- Tree _____</li><li>- Shrub _____</li><li>- ground covers _____</li></ul> <p>Provide a list of flora species (on the back) observed and an estimate of abundance (i.e. A = abundant, .R = relatively common, I = isolated/scarce) _____</p> <p>Have you noticed any new native plant species since the last inspection? _____</p> <p>If yes name the species or take a photograph _____</p> <p>Acknowledge that the required routine photographs have been taken within the monitoring points _____</p>
<p><u>Biodiversity</u></p> <p>Have you spotted native fauna within the management area during inspection?</p> <p>If yes, what types?</p> <p>Frogs _____</p> <p>Koala _____</p> <p>Kangaroo/wallaby _____</p> <p>Possums/glidens _____</p> <p>Small mammal (i.e. bandicoot, echidna) _____</p> <p>Reptiles (i.e. snakes/lizards) _____</p> <p>Birds of prey _____</p> <p>Large birds (i.e. lorikeets, parrots, coucal) _____</p> <p>Small tree and ground birds (i.e. finches, fairy wrens, treecreepers) _____</p> <p>Flying Foxes _____</p> <p>Pest Animals _____</p> <p>Other _____</p> <p>Confirm that predator scats were searched for within the quadrat and any encountered were sent away for analysis _____</p>	<p><u>Modifications</u></p> <p>Have there been any structural additions (eg. new tracks, fences etc) to the management area since the last visit? _____</p> <p>What actions were undertaken to remove any illegal modifications? _____</p>	<p>Are any of the following performance criteria exceeded or not achieved?</p> <p>Declared Weeds? _____</p> <p>Extent of other Weeds? _____</p> <p>Survival Rate of Plants? _____</p> <p>Condition of Plants? _____</p> <p>Canopy Coverage? _____</p> <p>Tree, Small Tree &amp; Shrub Diversity? _____</p> <p>Groundcover Coverage? _____</p> <p>General Coverage/Success? _____</p> <p>If yes, what corrective action was performed (i.e. weed recolonistaion was evident so routine management was performed as per Table 2; garden waste dumping was noted and removed, assisted regeneration was deemed unsuccessful and revegetation of the relevant module was undertaken etc).</p>

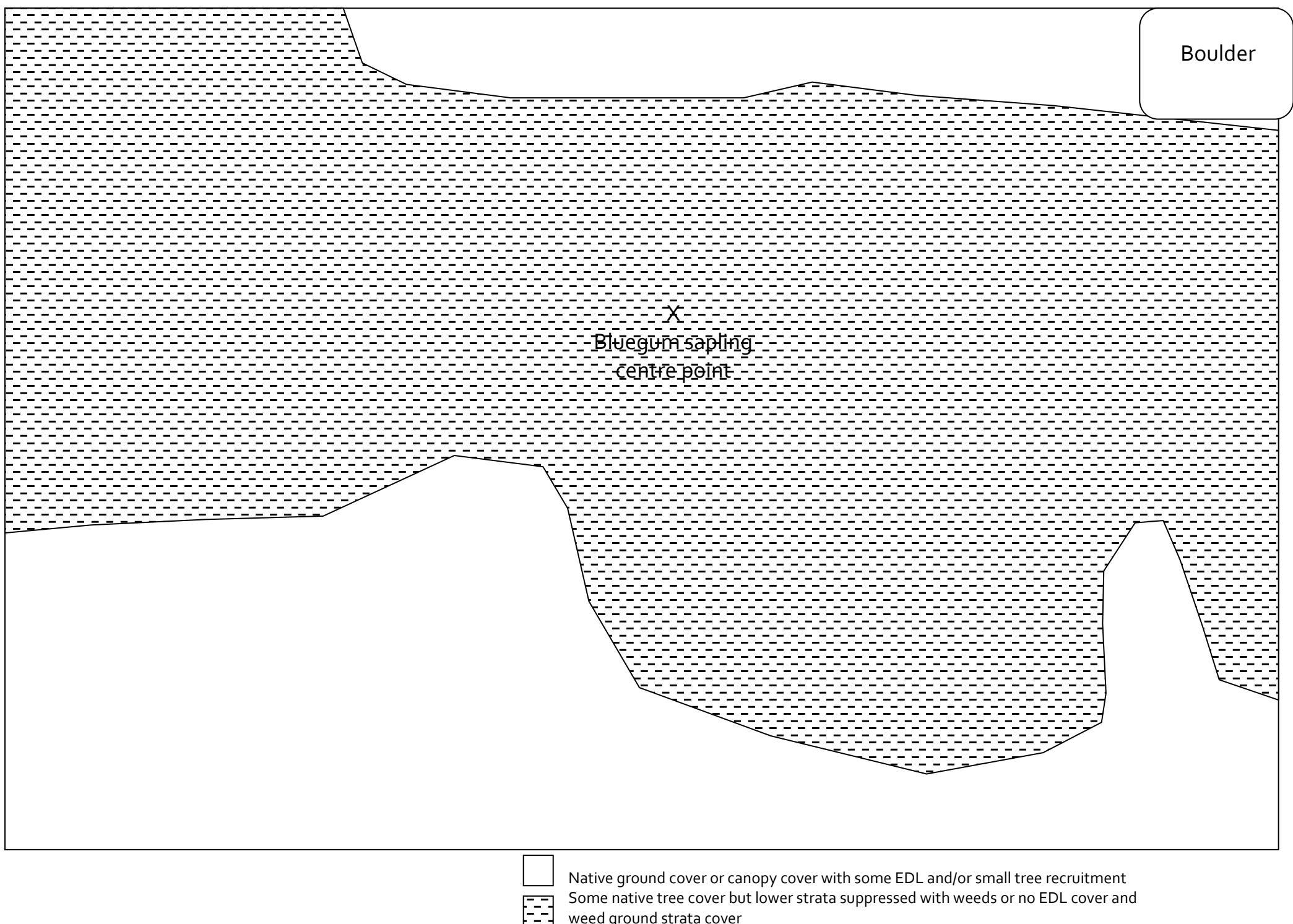


## PROJECT DESCRIPTION

Project name: Finch Road Offset		Project ID: EPBC2015/7485
Site location centrepoin (MGAz56): 517144, 6902850		Monitoring Site ID: P3
Type of on-grounds: Monitoring of Assisted Natural Regeneration	Years since site commenced: 0	When was this site last assessed? N/A-BASELINE
Current assessment conducted by: GD	Date of current assessment: 6-10-16	
Overall comments on site condition: Remnant 12.8.14/16. Poor recruitment beneath canopy due to prevalent weeds. Woodland cover remains. Ex grazing area		
Has the condition of the site changed since last assessment? YES ..... or NO ..... If Yes, briefly describe changes in this box, and provide details in table below. N/A. BASELINE.		

[illegible]

Draw a map of the monitoring site, showing variation in outcomes as zones (Zone A = OK, Zone B = Uncertain, Zone C = Poor).





## Location

Site No.	P4	Recorder:	GD	Day/Date:	6-10-16																
Purpose	Baseline monitoring weed management/rehabilitation and habitat condition quadrat 10m x 10m + surrounds																				
Locality: (inc. distance/direction to nearest town)	CANUNGRA FINCH ROAD																				
GPS coordinates centre patch:	Zone	5	6	E	0	5	1	6	4	3	9	N	6	9	0	2	4	5	3	Datum:	MGA94Z56

## Vegetation structure

Stratum	Height Interval Estimate (m)	Est. cover density (D,M,S,V)
E	>20	S
T <sub>1</sub>	15-20	M-S
T <sub>2</sub>	5-10	D
S <sub>1</sub>	0.5-2	M-D
G	0-0.5	M deep leaf litter

Structural formation: (including height)	
Very Tall Woodland-open Woodland	
Ecologically dominant layer:	t <sub>1</sub>
Refer Walker & Hopkins 1998 Tables 14a, 15 & 17	

EVIDENCE OF KOALAS	PRESENT?
SCRATCH	✓
SCAT	
SIGHTING	

## Plant species

Record relative (numerical) dominance for each stratum;  
**d** – dominant; **c** – codominant; **a** – associated; **s** – suppressed.

Str.	Rel. dom	Scientific Name
E	D	<i>Eucalyptus grandis</i>
T <sub>1</sub>	D	<i>E. grandis</i>
T <sub>1</sub>	A	<i>Lophostemon confertus</i>
T <sub>1</sub>	A	<i>E. siderophloia</i>
T <sub>2</sub>	A	<i>Regenerating T<sub>1</sub> species</i>
T <sub>2</sub>		<i>Rainforest/Riparian Species</i>
		<i>Ficus coronata, Mallotus philippensis, Glochidion ferdinandi, Dysoxylum gaudichaudianum, Melia azedarach, Croton verreauxii, Acronychia oblongifolia, Rhodospaera rhodanthema, Syzygium oleosum, Backhousea myrtifolia, Glochidion ferdinandi,</i>
T <sub>2</sub>	D	<i>Acacia maidenii, A. disparrima</i>
S		<i>Riparian/Rainforest species on sheltered banks</i>
		<i>Rhodospaera rhodanthema, Cordyline rubra, Mallotus philippensis, Eupomatia laurina, Backhousea myrtifolia, Alchornea ilicifolia, Hibiscus heterophyllus</i>
S	D	<i>Lantana camara*fringing areas</i>
S	A	<i>Ochna serrulata*, Solanum hispidum*, Cinnamomum camphora*</i>
G	S	<i>Aneilema acuminatum</i>
G		<i>Ferns</i>
		<i>Adiantum hispidulum, Adiantum aethiopicum, Doodia apsera, Dicranopteris spp?, Blechnum spp., Asplenium australasicum,</i>
G	C	<i>Vines</i>
		<i>Maclura cochinchinensis, Derris involuta, Geitenoplesium cymosum, Trophis scandens, Cissus antarctica, Stephania japonica, Pleogyne australis, Morinda jasminoides</i>
G	S	<i>Lomandra hystrix</i>
G	S	<i>Opismenus aemulus</i>
G	D	<i>Leaf litter, debris, rocks</i>
G	S	<i>Weeds (Ageratina riparia*, Passiflora subpeltata*, Ageratina adenophora*)</i>

## Geology, landform and other notes

Geology mapping:	DNRM (2002 & 2005) Geological Survey of QLD, SEQLD Region Geoscience Data Set		
Geology code and rock types:	RJbw: Quartzose sandstone, siltstone, shale conglomerate, coal. SEDIMENTARY ROCK		
Landform:	Narrow rocky gully		
Field observation and notes:	intermittent gully with eucalypt/lophostemon overstorey and regenerating dry rainforest. Weed thickets (lantana) on higher, less sheltered banks.		
	Landzone:	9-10	

## Applied RE code

RE code:	12.9-10.17A
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TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION



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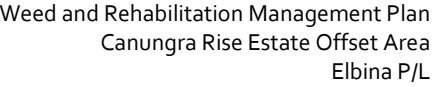
TYPICAL CONDITION





MONITORING FORM A-GENERAL [ANNUAL]		
<p><u>General Management</u></p> <p>Has there been a fire within the last period? _____</p> <p>Does the adjacent fire trail require mowing or maintenance to reduce fire risk? _____</p> <p>Is there evidence of rubbish dumping within the management area? _____</p> <p>Is there evidence of plant theft within the management area? _____</p> <p>Does it appear that the management area has been utilized for stockpiling, vehicle parking, building waste dumping, domestic animal walking or stock grazing? _____</p> <p>If yes, acknowledge below what works were undertaken to rectify/restore and the date _____</p>	<p><u>Weeds</u></p> <p>Have any areas of weeds re-established within the management area during the last period? _____</p> <p>What species? _____</p> <p>Estimate the area of new weed coverage in square metres _____</p> <p>What management was undertaken to eradicate these weeds? _____</p> <p>If management was undertaken acknowledge that such was performed in accordance with the weed management plan. _____</p>	<p><u>Vegetation regeneration [10m x 10m quadrat]</u> add additional page if necessary</p> <p>Natural regeneration is occurring in (height range estimate):</p> <ul style="list-style-type: none"><li>- Tree species _____</li><li>- Shrub species _____</li><li>- ground covers _____</li></ul> <p>What are the dominant species within each layer?</p> <ul style="list-style-type: none"><li>- Tree _____</li><li>- Shrub _____</li><li>- ground covers _____</li></ul> <p>Provide a list of flora species (on the back) observed and an estimate of abundance (i.e. A = abundant, .R = relatively common, I = isolated/scarce) _____</p> <p>Have you noticed any new native plant species since the last inspection? _____</p> <p>If yes name the species or take a photograph _____</p> <p>Acknowledge that the required routine photographs have been taken within the monitoring points _____</p>
<p><u>Biodiversity</u></p> <p>Have you spotted native fauna within the management area during inspection?</p> <p>If yes, what types?</p> <p>Frogs _____</p> <p>Koala _____</p> <p>Kangaroo/wallaby _____</p> <p>Possums/glidens _____</p> <p>Small mammal (i.e. bandicoot, echidna) _____</p> <p>Reptiles (i.e. snakes/lizards) _____</p> <p>Birds of prey _____</p> <p>Large birds (i.e. lorikeets, parrots, coucal) _____</p> <p>Small tree and ground birds (i.e. finches, fairy wrens, treecreepers) _____</p> <p>Flying Foxes _____</p> <p>Pest Animals _____</p> <p>Other _____</p> <p>Confirm that predator scats were searched for within the quadrat and any encountered were sent away for analysis _____</p>	<p><u>Modifications</u></p> <p>Have there been any structural additions (eg. new tracks, fences etc) to the management area since the last visit? _____</p> <p>What actions were undertaken to remove any illegal modifications? _____</p>	<p>Are any of the following performance criteria exceeded or not achieved?</p> <p>Declared Weeds? _____</p> <p>Extent of other Weeds? _____</p> <p>Survival Rate of Plants? _____</p> <p>Condition of Plants? _____</p> <p>Canopy Coverage? _____</p> <p>Tree, Small Tree &amp; Shrub Diversity? _____</p> <p>Groundcover Coverage? _____</p> <p>General Coverage/Success? _____</p> <p>If yes, what corrective action was performed (i.e. weed recolonistaion was evident so routine management was performed as per Table 2; garden waste dumping was noted and removed, assisted regeneration was deemed unsuccessful and revegetation of the relevant module was undertaken etc).</p>



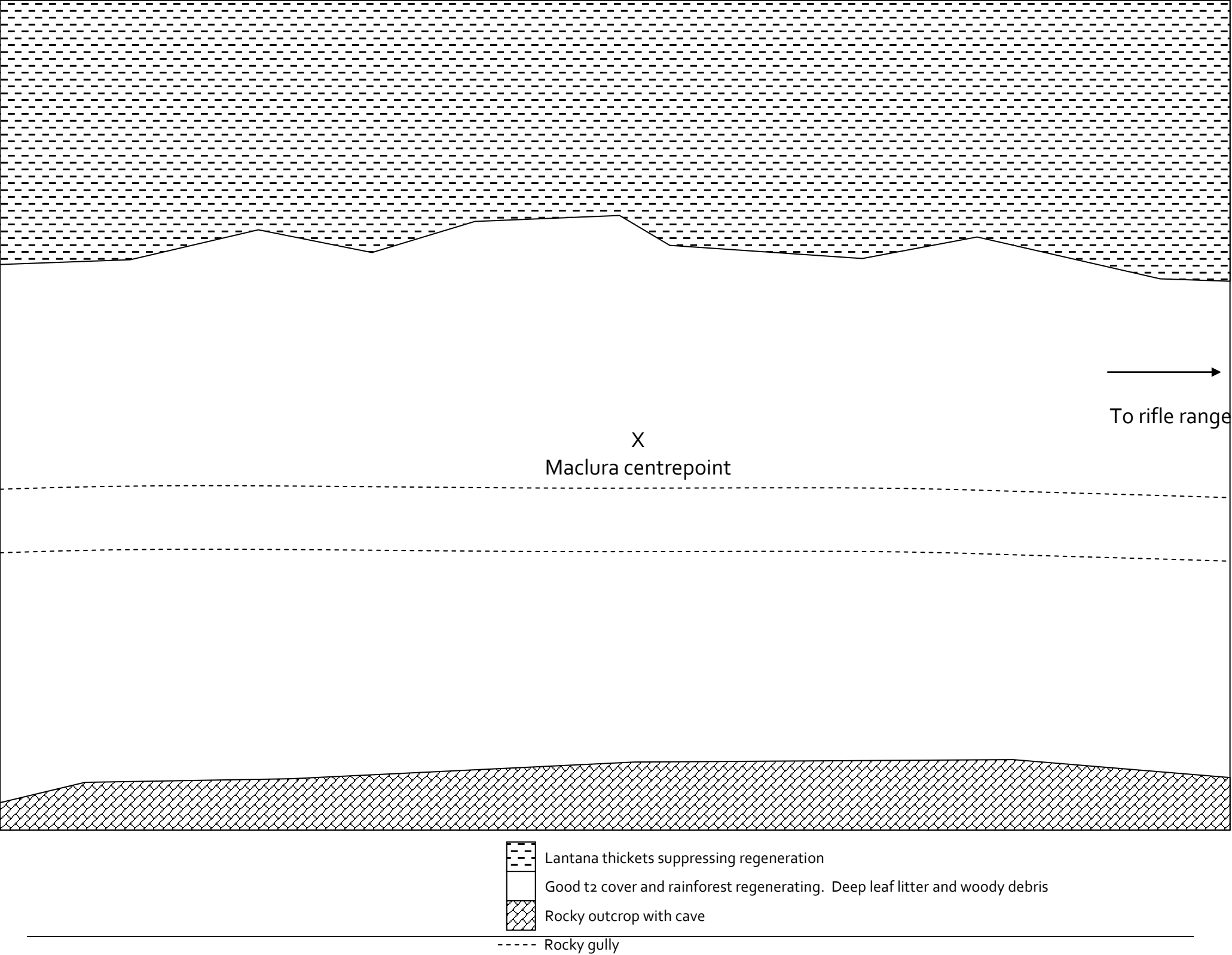


## PROJECT DESCRIPTION

Project name: Finch Road Offset		Project ID: EPBC2015/7485
Site location centrepoint (MGAz56): 516439, 6902453		Monitoring Site ID: P4
Type of on-grounds: Monitoring of Assisted Natural Regeneration	Years since site commenced: 0	When was this site last assessed? N/A-BASELINE
Current assessment conducted by: GD	Date of current assessment: 6-10-16	
Overall comments on site condition: Excellent rainforest regeneration adjacent rocky gully/stream draining the ridge. Weeds (lantana) suppression of Eucalypt Forest/Woodland on higher banks and heading upslope particularly to the south.		
Has the condition of the site changed since last assessment? YES ..... or NO ..... If Yes, briefly describe changes in this box, and provide details in table below.		N/A. BASELINE.

[illegible]

Draw a map of the monitoring site, showing variation in outcomes as zones (Zone A = OK, Zone B = Uncertain, Zone C = Poor).



## Location

**Site No.** P5 **Recorder:** GD **Day/Date:** 6-10-16  
**Purpose**  
 Baseline monitoring weed management/rehabilitation and habitat condition quadrat 10m x 10m + surrounds  
**Locality:** (inc. distance/direction to nearest town) CANUNGRA FINCH ROAD  
**GPS coordinates centre patch:** Zone 5 6 E 0 5 1 6 7 9 1 N 6 9 0 2 4 1 5 **Datum:** MGA94Z56

## Vegetation structure

Stratum	Height Interval Estimate (m)	Est. cover density (D,M,S,V)
E	>20	V
T <sub>1</sub>	10-15	M
T <sub>2</sub>	6-10	M-D
S <sub>1</sub>	0.5-2	M
G	0-0.5	M-D typically grassy

**Structural formation:** (including height)  
 Mid-high to Tall Open Eucalypt Forest  
**Ecologically dominant layer:** t<sub>1</sub>  
 Refer Walker & Hopkins 1998 Tables 14a, 15 & 17

EVIDENCE OF KOALAS	PRESENT?
SCRATCH	✓
SCAT	✓
SIGHTING	

## Plant species

Record relative (numerical) dominance for each stratum;  
**d** – dominant; **c** – codominant; **a** – associated; **s** – suppressed.

Str.	Rel. dom	Scientific Name
E	D	<i>Eucalyptus crebra</i>
T <sub>1</sub>	C	<i>Stringybarks E. acmenoides, E. microcorys, E. carnea</i>
T <sub>1</sub>	A	<i>Corymbia citriodora</i>
T <sub>1</sub>	A	<i>E. crebra</i>
T <sub>1</sub>	A	<i>E. major</i>
T <sub>1</sub>	S	<i>Lophostemon confertus</i>
T <sub>2</sub>	A	<i>Allocasuarina torulosa</i>
T <sub>2</sub>	A	<i>Acacia spp x 2</i>
T <sub>2</sub>	D	<i>Regenerating T<sub>1</sub> species</i>
T <sub>2</sub>	A	<i>Alphitonia excelsa</i>
S	D	<i>T<sub>1</sub> and T<sub>2</sub> species</i>
S	S	<i>Ochna serrulata*</i>
S	A	<i>Breynia oblongifolia</i>
S	A	<i>Acacia falcata</i>
S	A	<i>Bursaria spinosa</i>
S	S	<i>Cyclophyllum comprosmoides</i>
S	S	<i>Jacksonia scoparia</i>
S	S	<i>Euroschinus falcatus</i>
G	D	Native Grasses - <i>Imperata cylindrica, Themeda triandra, Poa spp</i>
G	S	<i>Dianella longifolia, D. caerulea</i>
G	A	<i>Lomandra laxa</i>
G	A	<i>Lomandra filiformis</i>
G	A	<i>Chrysocephalum apiculatum</i>
G		Twining/Vines <i>Clematicissus opaca, Eustrephus latifolius, Geitonoplesium cymosum, Desmodium rythidophyllum, Glycine clandestine, Smilax australis</i>
G	S	<i>Plectranthus spp.</i>
G	C	Good leaf litter. Fallen debris common.

## Geology, landform and other notes

**Geology mapping:** DNRM (2002 & 2005) Geological Survey of QLD, SEQLD Region Geoscience Data Set  
**Geology code and rock types:** RJbw: Quartzose sandstone, siltstone, shale conglomerate, coal. SEDIMENTARY ROCK  
**Landform:** Narrow ridge. Steep slopes north and south  
**Field observation and notes:** Remnant mixed eucalypt forest. Few weeds. Excellent EDL recruitment  
**Landzone:** 9-10

## Applied RE code

**RE code:** 12.9-10.17





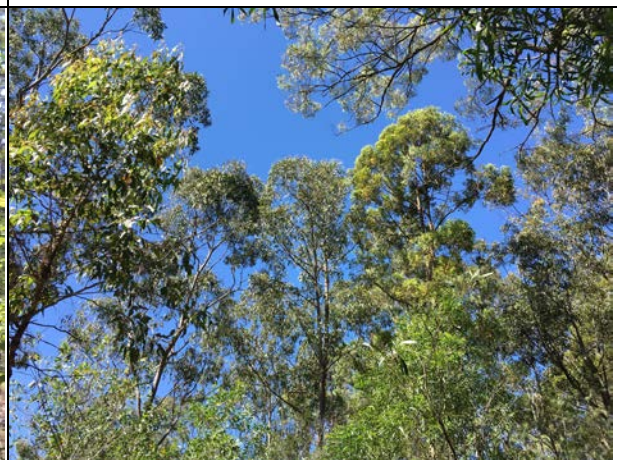
TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION



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TYPICAL CONDITION





MONITORING FORM A-GENERAL [ANNUAL]		
<p><u>General Management</u></p> <p>Has there been a fire within the last period? _____</p> <p>Does the adjacent fire trail require mowing or maintenance to reduce fire risk? _____</p> <p>Is there evidence of rubbish dumping within the management area? _____</p> <p>Is there evidence of plant theft within the management area? _____</p> <p>Does it appear that the management area has been utilized for stockpiling, vehicle parking, building waste dumping, domestic animal walking or stock grazing? _____</p> <p>If yes, acknowledge below what works were undertaken to rectify/restore and the date _____</p>	<p><u>Weeds</u></p> <p>Have any areas of weeds re-established within the management area during the last period? _____</p> <p>What species? _____</p> <p>Estimate the area of new weed coverage in square metres _____</p> <p>What management was undertaken to eradicate these weeds? _____</p> <p>If management was undertaken acknowledge that such was performed in accordance with the weed management plan. _____</p>	<p><u>Vegetation regeneration [10m x 10m quadrat]</u> add additional page if necessary</p> <p>Natural regeneration is occurring in (height range estimate):</p> <ul style="list-style-type: none"><li>- Tree species _____</li><li>- Shrub species _____</li><li>- ground covers _____</li></ul> <p>What are the dominant species within each layer?</p> <ul style="list-style-type: none"><li>- Tree _____</li><li>- Shrub _____</li><li>- ground covers _____</li></ul> <p>Provide a list of flora species (on the back) observed and an estimate of abundance (i.e. A = abundant, .R = relatively common, I = isolated/scarce) _____</p> <p>Have you noticed any new native plant species since the last inspection? _____</p> <p>If yes name the species or take a photograph _____</p> <p>Acknowledge that the required routine photographs have been taken within the monitoring points _____</p>
<p><u>Biodiversity</u></p> <p>Have you spotted native fauna within the management area during inspection?</p> <p>If yes, what types?</p> <p>Frogs _____</p> <p>Koala _____</p> <p>Kangaroo/wallaby _____</p> <p>Possums/glidens _____</p> <p>Small mammal (i.e. bandicoot, echidna) _____</p> <p>Reptiles (i.e. snakes/lizards) _____</p> <p>Birds of prey _____</p> <p>Large birds (i.e. lorikeets, parrots, coucal) _____</p> <p>Small tree and ground birds (i.e. finches, fairy wrens, treecreepers) _____</p> <p>Flying Foxes _____</p> <p>Pest Animals _____</p> <p>Other _____</p> <p>Confirm that predator scats were searched for within the quadrat and any encountered were sent away for analysis _____</p>	<p><u>Modifications</u></p> <p>Have there been any structural additions (eg. new tracks, fences etc) to the management area since the last visit? _____</p> <p>What actions were undertaken to remove any illegal modifications? _____</p>	<p>Are any of the following performance criteria exceeded or not achieved?</p> <p>Declared Weeds? _____</p> <p>Extent of other Weeds? _____</p> <p>Survival Rate of Plants? _____</p> <p>Condition of Plants? _____</p> <p>Canopy Coverage? _____</p> <p>Tree, Small Tree &amp; Shrub Diversity? _____</p> <p>Groundcover Coverage? _____</p> <p>General Coverage/Success? _____</p> <p>If yes, what corrective action was performed (i.e. weed recolonistaion was evident so routine management was performed as per Table 2; garden waste dumping was noted and removed, assisted regeneration was deemed unsuccessful and revegetation of the relevant module was undertaken etc).</p>



MONITORING FORM B-CONDITION FOR 10M X 10M MONITORING SITE

PROJECT DESCRIPTION

Project name: Finch Road Offset		Project ID: EPBC2015/7485
Site location centrepoint (MGAz56): 516791, 6902415		Monitoring Site ID: P5
Type of on-grounds: Monitoring of Assisted Natural Regeneration	Years since site commenced: 0	When was this site last assessed? N/A-BASELINE
Current assessment conducted by: GD	Date of current assessment: 6-10-16	
Overall comments on site condition: Good condition mixed eucalypt forest. High recruitment of EDL. Leaf litter and fallen woody debris abundant. Groundlayer typically grassy.		
Has the condition of the site changed since last assessment? YES ..... or NO ..... If Yes, briefly describe changes in this box, and provide details in table below. N/A. BASELINE.		

DESCRIPTION OF SITE CONDITION Complete table annually. Also draw map and take photographs.

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
A = OK on track towards target	95	minor erosion on old ridge cattle trail	60-70	90% leaf litter, debris and native grass cover	lantana minor only	All T1 trees recruiting		(should be routine: describe if necessary)
B = Uncertain significant problems	5	Minor lantana and passiflora	as above	as above	as above	as above		Lantana control required  (describe)
C = Poor major problems, likely to fail								(describe)
Overall Condition Score (ranges from 0-100%) Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%								97.5 %

MAP OF SITE CONDITION [REFER IMAGES]

Draw a map of the monitoring site, showing variation in outcomes as zones (Zone A = OK, Zone B = Uncertain, Zone C = Poor).

↑ Steep slope to south

X

Acacia centrepoint near  
Fallen log

↓ Steep slope to north

Minor lantana presence

RE12.9-10.17 in excellent condition

----- Disused cattle trail



## Location

Site No.	P6	Recorder:	GD	Day/Date:	6-10-16																
Purpose	Baseline monitoring weed management/rehabilitation and habitat condition quadrat 10m x 10m + surrounds																				
Locality: (inc. distance/direction to nearest town)	CANUNGRA FINCH ROAD																				
GPS coordinates centre patch:	Zone	5	6	E	0	5	1	6	3	2	4	N	6	9	0	2	0	9	3	Datum:	MGA94Z56

## Vegetation structure

Stratum	Height Interval Estimate (m)	Est. cover density (D,M,S,V)
E	-	-
T <sub>1</sub>	20-30	M
T <sub>2</sub>	7-10	D
S <sub>1</sub>	0.5-2.5	M-D
G	0-0.5	M

Structural formation: (including height)	
Very Tall Open Forest-Woodland	
Ecologically dominant layer:	t <sub>1</sub>
Refer Walker & Hopkins 1998 Tables 14a, 15 & 17	

EVIDENCE OF KOALAS	PRESENT?
SCRATCH	
SCAT	
SIGHTING	

## Plant species

Record relative (numerical) dominance for each stratum;  
**d** – dominant; **c** – codominant; **a** – associated; **s** – suppressed.

Str.	Rel. dom	Scientific Name
E	D	<i>Araucaria cunninghamii</i> [collapsed]
T <sub>1</sub>	D	<i>Lophostemon confertus</i>
T <sub>1</sub>	A	<i>Eucalyptus major</i>
T <sub>1</sub>	S	<i>E. siderophloia</i>
T <sub>2</sub>	S	Regenerating T <sub>1</sub> species
T <sub>2</sub>		Rainforest/Riparian Species
		<i>Ficus coronata</i> , <i>Alphitonia excelsa</i> , <i>Glochidion ferdinandi</i> , <i>Melia azedarach</i> , <i>Backhousea myrtifolia</i> , <i>Glochidion ferdinandi</i> , <i>Hibiscus heterophyllus</i> , <i>Hymenosporum flavum</i>
T <sub>2</sub>	D	
T <sub>2</sub>	S	<i>Acacia maidenii</i> , <i>A. disparrima</i>
T <sub>2</sub>	S	<i>Melaleuca bracteata</i>
T <sub>2</sub>	S	<i>Araucaria cunninghamii</i>
S		Riparian/Rainforest species on sheltered banks
		<i>Mallotus philippensis</i> , <i>Backhousea myrtifolia</i> , <i>Alchornea ilicifolia</i> , <i>Acronychia oblongifolia</i> , <i>Psychotria loniceroides</i> , <i>Podocarpus elatus</i> , <i>Pittosporum undulatum</i> , <i>Jagera pseudorhus</i> , <i>Rapanea (Myrsine) variabilis</i> , <i>Polyscias elegans</i> , <i>Glochidion ferdinandi</i>
G	D	
G	S	<i>Acacia maidenii</i>
S	D	<i>Lantana camara</i> *fringing areas away from sheltered stream
S	S	<i>Breynia oblongifolia</i>
G	S	<i>Centella asiatica</i>
G		Ferns - <i>Adiantum hispidulum</i> , <i>Adiantum aethiopicum</i> , <i>Doodia aspera</i> , <i>Dicranopteris spp?</i> , <i>Blechnum spp.</i> , <i>Asplenium australasicum</i> ,
G	C	Vines - <i>Derris involuta</i> , <i>Geitenoplesium cymosum</i> , <i>Trophis scandens</i> , <i>Cissus antarctica</i> , <i>Sarcopetalum harveyanum</i>
G	A	<i>Lomandra hystrix</i>
G	S	<i>Oplismenus aemulus</i>
G	D	Leaf litter, debris, rocks
G	S	Weeds ( <i>Ageratina riparia</i> *, <i>Lantana camara</i> *, <i>Ageratina adenophora</i> *, <i>Sporobolus spp</i> *)

## Geology, landform and other notes

Geology mapping:	DNRM (2002 & 2005) Geological Survey of QLD, SEQLD Region Geoscience Data Set		
Geology code and rock types:	RJbw: Quartzose sandstone, siltstone, shale conglomerate, coal. SEDIMENTARY ROCK		
Landform:	Narrow rocky gully		
Field observation and notes:	Rocky gully with brushbox/grey gum overstorey. Regenerating rainforest beneath. Weed thickets (lantana) on both banks limiting T <sub>1</sub> recruitment.		
	Landzone:	9-10	

## Applied RE code

RE code:	12.9-10.17A
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TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION



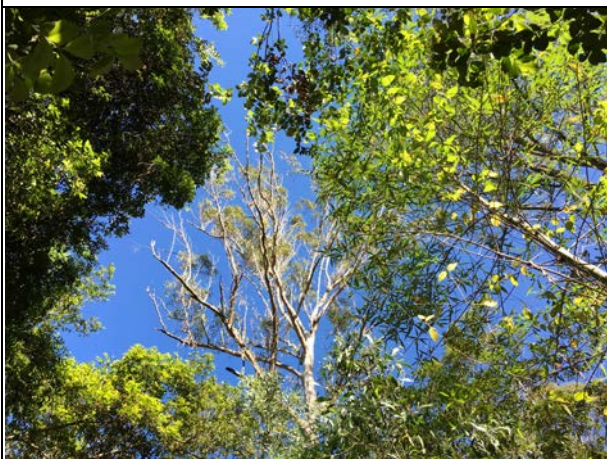
TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION





TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION



MONITORING FORM A-GENERAL [ANNUAL]		
<p><u>General Management</u></p> <p>Has there been a fire within the last period? _____</p> <p>Does the adjacent fire trail require mowing or maintenance to reduce fire risk? _____</p> <p>Is there evidence of rubbish dumping within the management area? _____</p> <p>Is there evidence of plant theft within the management area? _____</p> <p>Does it appear that the management area has been utilized for stockpiling, vehicle parking, building waste dumping, domestic animal walking or stock grazing? _____</p> <p>If yes, acknowledge below what works were undertaken to rectify/restore and the date _____</p>	<p><u>Weeds</u></p> <p>Have any areas of weeds re-established within the management area during the last period? _____</p> <p>What species? _____</p> <p>Estimate the area of new weed coverage in square metres _____</p> <p>What management was undertaken to eradicate these weeds? _____</p> <p>If management was undertaken acknowledge that such was performed in accordance with the weed management plan. _____</p>	<p><u>Vegetation regeneration [10m x 10m quadrat]</u> add additional page if necessary</p> <p>Natural regeneration is occurring in (height range estimate):</p> <ul style="list-style-type: none"><li>- Tree species _____</li><li>- Shrub species _____</li><li>- ground covers _____</li></ul> <p>What are the dominant species within each layer?</p> <ul style="list-style-type: none"><li>- Tree _____</li><li>- Shrub _____</li><li>- ground covers _____</li></ul> <p>Provide a list of flora species (on the back) observed and an estimate of abundance (i.e. A = abundant, .R = relatively common, I = isolated/scarce) _____</p> <p>Have you noticed any new native plant species since the last inspection? _____</p> <p>If yes name the species or take a photograph _____</p> <p>Acknowledge that the required routine photographs have been taken within the monitoring points _____</p>
<p><u>Biodiversity</u></p> <p>Have you spotted native fauna within the management area during inspection?</p> <p>If yes, what types?</p> <p>Frogs _____</p> <p>Koala _____</p> <p>Kangaroo/wallaby _____</p> <p>Possums/glidens _____</p> <p>Small mammal (i.e. bandicoot, echidna) _____</p> <p>Reptiles (i.e. snakes/lizards) _____</p> <p>Birds of prey _____</p> <p>Large birds (i.e. lorikeets, parrots, coucal) _____</p> <p>Small tree and ground birds (i.e. finches, fairy wrens, treecreepers) _____</p> <p>Flying Foxes _____</p> <p>Pest Animals _____</p> <p>Other _____</p> <p>Confirm that predator scats were searched for within the quadrat and any encountered were sent away for analysis _____</p>	<p><u>Modifications</u></p> <p>Have there been any structural additions (eg. new tracks, fences etc) to the management area since the last visit? _____</p> <p>What actions were undertaken to remove any illegal modifications? _____</p>	<p>Are any of the following performance criteria exceeded or not achieved?</p> <p>Declared Weeds? _____</p> <p>Extent of other Weeds? _____</p> <p>Survival Rate of Plants? _____</p> <p>Condition of Plants? _____</p> <p>Canopy Coverage? _____</p> <p>Tree, Small Tree &amp; Shrub Diversity? _____</p> <p>Groundcover Coverage? _____</p> <p>General Coverage/Success? _____</p> <p>If yes, what corrective action was performed (i.e. weed recolonistaion was evident so routine management was performed as per Table 2; garden waste dumping was noted and removed, assisted regeneration was deemed unsuccessful and revegetation of the relevant module was undertaken etc).</p>





MONITORING FORM B-CONDITION FOR 10M X 10M MONITORING SITE

PROJECT DESCRIPTION

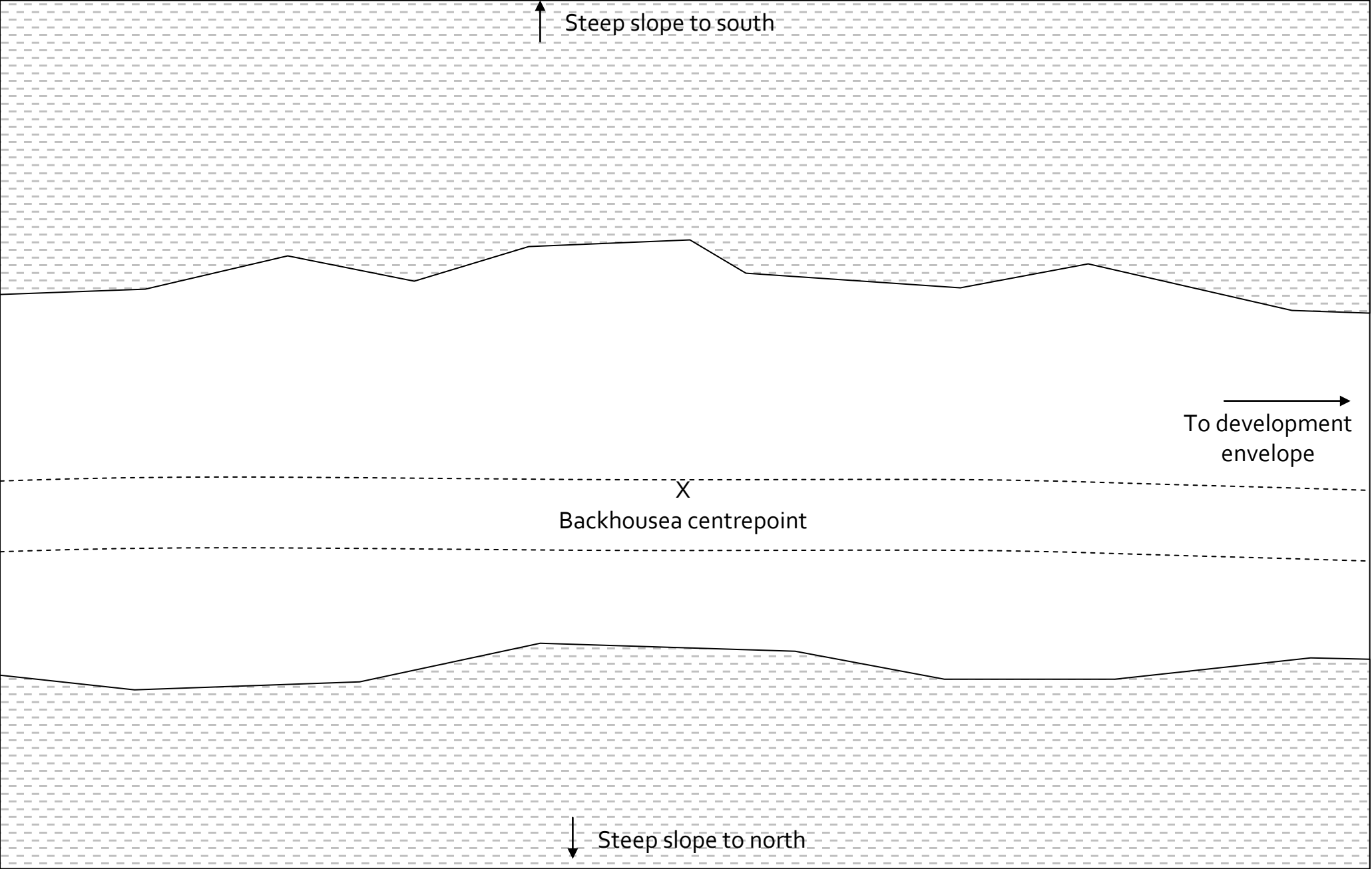
Project name: Finch Road Offset		Project ID: EPBC2015/7485
Site location centrepoint (MGAz56): 516324, 6902093		Monitoring Site ID: P6
Type of on-grounds: Monitoring of Assisted Natural Regeneration	Years since site commenced: 0	When was this site last assessed? N/A-BASELINE
Current assessment conducted by: GD	Date of current assessment: 6-10-16	
Overall comments on site condition: Excellent rainforest regeneration adjacent narrow rocky gully/stream draining the ridge. Weeds (lantana) suppression of Eucalypt Forest/Woodland on higher banks and heading upslope north and south.		
Has the condition of the site changed since last assessment? YES ..... or NO ..... If Yes, briefly describe changes in this box, and provide details in table below. N/A. BASELINE.		

DESCRIPTION OF SITE CONDITION Complete table annually. Also draw map and take photographs.

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
A = OK on track towards target	50	Eucalypt overstorey with sheltered areas regenerating with rainforest	100	100% cover with flora or leaf litter (rocks, water in flowpath)	Mistweed, Lantana	Good Rainforest recruitment.	Lantana encroaching from higher banks	Routine Lantana control  (should be routine: describe if necessary)
B = Uncertain significant problems	50	Dense lantana thickets threatening regeneration	40-50	Suppressed by Lantana. Poor native ground cover and tree recruitment	Lantana	Some recruitment but limited in dense thickets of lantana	Lantana resulting in suppression thus limiting potential for shading	Lantana control required ASAP  (describe)
C = Poor major problems, likely to fail								(describe)
Overall Condition Score (ranges from 0-100%) Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%								75 %

MAP OF SITE CONDITION [REFER IMAGES]

Draw a map of the monitoring site, showing variation in outcomes as zones (Zone A = OK, Zone B = Uncertain, Zone C = Poor).



- Eucalypt overstorey with Lantana thickets suppressing regeneration away from banks
- Good t2 cover and rainforest regenerating. Deep leaf litter and woody debris
- Rocky gully

## Location

Site No.	P7	Recorder:	GD	Day/Date:	6-10-16																
Purpose	Baseline monitoring weed management/rehabilitation and habitat condition quadrat 10m x 10m + surrounds																				
Locality: (inc. distance/direction to nearest town)	CANUNGRA FINCH ROAD																				
GPS coordinates centre patch:	Zone	5	6	E	0	5	1	6	4	3	7	N	6	9	0	1	9	5	5	Datum:	MGA94Z56

## Vegetation structure

Stratum	Height Interval Estimate (m)	Est. cover density (D,M,S,V)
E	-	-
T <sub>1</sub>	14-18	M-D
T <sub>2</sub>	2-10 varying	M-D
S <sub>1</sub>	0.5-2	M-D
		S-M
G	0-0.5	typically grassy with good leaf litter cover

Structural formation: (including height)
Mid-high to Tall Open Eucalypt Forest
Ecologically dominant layer: t <sub>1</sub>
Refer Walker & Hopkins 1998 Tables 14a, 15 & 17

EVIDENCE OF KOALAS	PRESENT?
SCRATCH	
SCAT	✓
SIGHTING	

## Plant species

Record relative (numerical) dominance for each stratum;  
**d** – dominant; **c** – codominant; **a** – associated; **s** – suppressed.

Str.	Rel. dom	Scientific Name
T <sub>1</sub>	C	<i>Stringybarks E. acmenoides, E. carnea</i>
T <sub>1</sub>	C	<i>Corymbia intermedia</i>
T <sub>1</sub>	C	<i>E. crebra</i>
T <sub>1</sub>	S	<i>E. tereticornis</i>
T <sub>1</sub>	S	<i>Corymbia henryi</i>
T <sub>2</sub>	A	<i>Allocasuarina torulosa</i>
T <sub>2</sub>	A	<i>Acacia spp x 2</i>
T <sub>2</sub>	D	<i>Regenerating T<sub>1</sub> species</i>
T <sub>2</sub>	S	<i>Alphitonia excelsa</i>
S	D	<i>T<sub>1</sub> and T<sub>2</sub> species</i>
S	S	<i>Lantana camara*</i>
S	A	<i>Breynia oblongifolia</i>
S	S	<i>Leucopogon juniperinus</i>
S	S	<i>Jagera pseudorhus</i>
S	S	<i>Cyclophyllum comprosmoides</i>
		Native Grasses - <i>Imperata cylindrica, Themeda triandra, Entolasia stricta</i>
G	D	<i>Dianella longifolia</i>
G	S	<i>Lomandra laxa, Lomandra filiformis</i>
G	A	<i>Lomandra multiflora</i>
G	S	<i>Chrysocephalum apiculatum</i>
G	S	<i>Eustrephus latifolius</i>
G	S	<i>Goodenia rotundifolia</i>
G	S	<i>Lepidosperma laterale</i>
G	S	<i>Lantana montevidensis</i>
G	C	Good leaf litter. Fallen debris common.

## Geology, landform and other notes

Geology mapping:	DNRM (2002 & 2005) Geological Survey of QLD, SEQLD Region Geoscience Data Set	
Geology code and rock types:	RJbw: Quartzose sandstone, siltstone, shale conglomerate, coal. SEDIMENTARY ROCK	
Landform:	Broad ridge	
Field observation and notes:	Forest in good condition with excellent regeneration. Minor lantana encroachment	
	Landzone:	9-10

## Applied RE code

RE code:	12.9-10.17
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TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION





TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION



TYPICAL CONDITION





MONITORING FORM A-GENERAL [ANNUAL]		
<p><u>General Management</u></p> <p>Has there been a fire within the last period? _____</p> <p>Does the adjacent fire trail require mowing or maintenance to reduce fire risk? _____</p> <p>Is there evidence of rubbish dumping within the management area? _____</p> <p>Is there evidence of plant theft within the management area? _____</p> <p>Does it appear that the management area has been utilized for stockpiling, vehicle parking, building waste dumping, domestic animal walking or stock grazing? _____</p> <p>If yes, acknowledge below what works were undertaken to rectify/restore and the date _____</p>	<p><u>Weeds</u></p> <p>Have any areas of weeds re-established within the management area during the last period? _____</p> <p>What species? _____</p> <p>Estimate the area of new weed coverage in square metres _____</p> <p>What management was undertaken to eradicate these weeds? _____</p> <p>If management was undertaken acknowledge that such was performed in accordance with the weed management plan. _____</p>	<p><u>Vegetation regeneration [10m x 10m quadrat]</u> add additional page if necessary</p> <p>Natural regeneration is occurring in (height range estimate):</p> <ul style="list-style-type: none"><li>- Tree species _____</li><li>- Shrub species _____</li><li>- ground covers _____</li></ul> <p>What are the dominant species within each layer?</p> <ul style="list-style-type: none"><li>- Tree _____</li><li>- Shrub _____</li><li>- ground covers _____</li></ul> <p>Provide a list of flora species (on the back) observed and an estimate of abundance (i.e. A = abundant, .R = relatively common, I = isolated/scarce) _____</p> <p>Have you noticed any new native plant species since the last inspection? _____</p> <p>If yes name the species or take a photograph _____</p> <p>Acknowledge that the required routine photographs have been taken within the monitoring points _____</p>
<p><u>Biodiversity</u></p> <p>Have you spotted native fauna within the management area during inspection?</p> <p>If yes, what types?</p> <p>Frogs _____</p> <p>Koala _____</p> <p>Kangaroo/wallaby _____</p> <p>Possums/glidens _____</p> <p>Small mammal (i.e. bandicoot, echidna) _____</p> <p>Reptiles (i.e. snakes/lizards) _____</p> <p>Birds of prey _____</p> <p>Large birds (i.e. lorikeets, parrots, coucal) _____</p> <p>Small tree and ground birds (i.e. finches, fairy wrens, treecreepers) _____</p> <p>Flying Foxes _____</p> <p>Pest Animals _____</p> <p>Other _____</p> <p>Confirm that predator scats were searched for within the quadrat and any encountered were sent away for analysis _____</p>	<p><u>Modifications</u></p> <p>Have there been any structural additions (eg. new tracks, fences etc) to the management area since the last visit? _____</p> <p>What actions were undertaken to remove any illegal modifications? _____</p>	<p>Are any of the following performance criteria exceeded or not achieved?</p> <p>Declared Weeds? _____</p> <p>Extent of other Weeds? _____</p> <p>Survival Rate of Plants? _____</p> <p>Condition of Plants? _____</p> <p>Canopy Coverage? _____</p> <p>Tree, Small Tree &amp; Shrub Diversity? _____</p> <p>Groundcover Coverage? _____</p> <p>General Coverage/Success? _____</p> <p>If yes, what corrective action was performed (i.e. weed recolonistaion was evident so routine management was performed as per Table 2; garden waste dumping was noted and removed, assisted regeneration was deemed unsuccessful and revegetation of the relevant module was undertaken etc).</p>



MONITORING FORM B-CONDITION FOR 10M X 10M MONITORING SITE

PROJECT DESCRIPTION

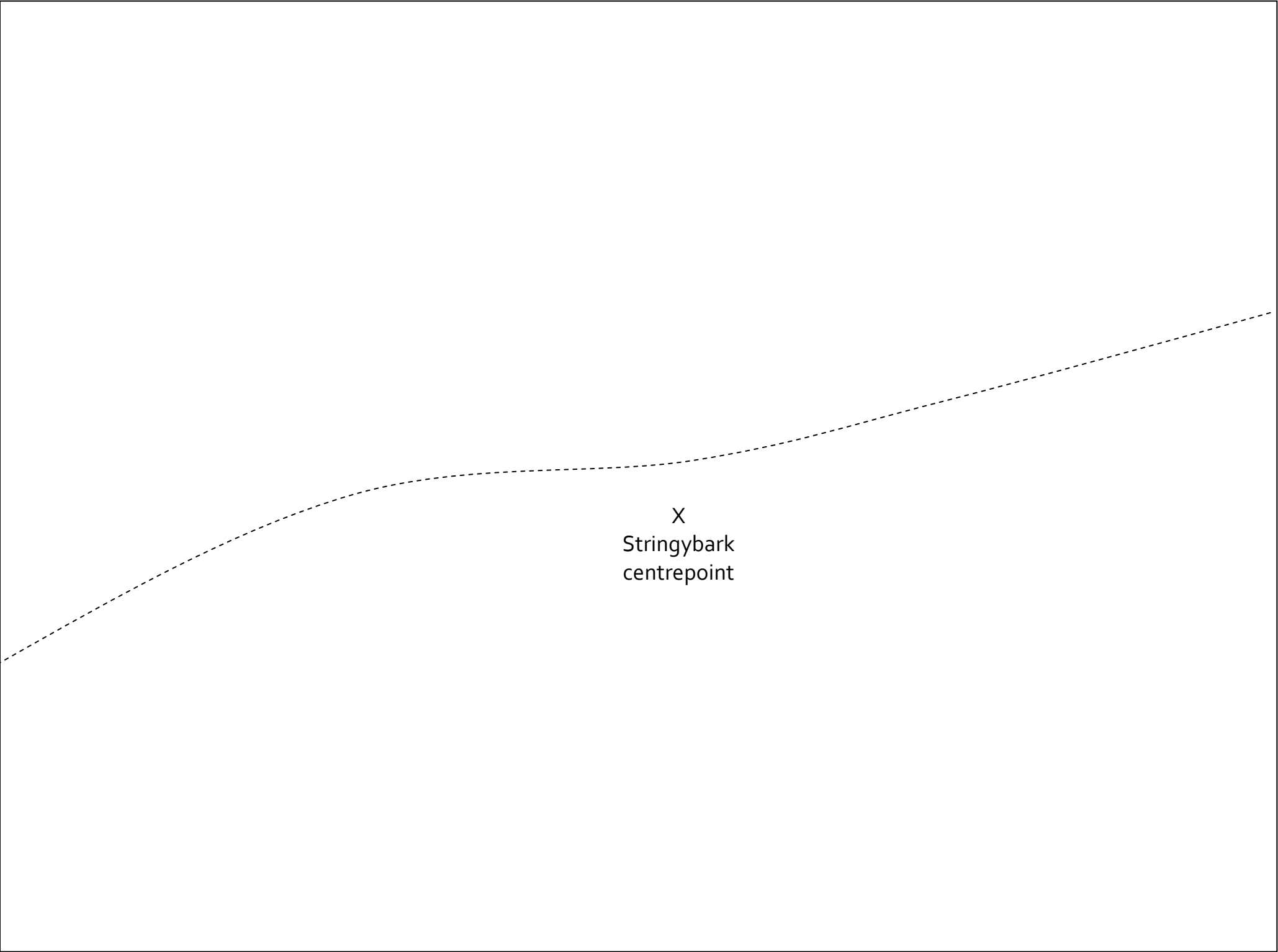
Project name: Finch Road Offset		Project ID: EPBC2015/7485
Site location centrepoint (MGAz56): 516437, 6901955		Monitoring Site ID: P7
Type of on-grounds: Monitoring of Assisted Natural Regeneration	Years since site commenced: 0	When was this site last assessed? N/A-BASELINE
Current assessment conducted by: GD	Date of current assessment: 6-10-16	
Overall comments on site condition: Excellent condition throughout. Isolated stems of lantana and creeping lantana		
Has the condition of the site changed since last assessment? YES ..... or NO ..... If Yes, briefly describe changes in this box, and provide details in table below. N/A. BASELINE.		

DESCRIPTION OF SITE CONDITION Complete table annually. Also draw map and take photographs.

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
A = OK on track towards target	100	Healthy remnant eucalypt forest	60-70	100% plant or leaf litter	lantana, creeping lantana, minor only	All T1 trees recruiting		(should be routine: describe if necessary)
B = Uncertain significant problems								Lantana control required  (describe)
C = Poor major problems, likely to fail								(describe)
Overall Condition Score (ranges from 0-100%) Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%								100%

MAP OF SITE CONDITION [REFER IMAGES]  
Draw a map of the monitoring site, showing variation in outcomes as zones (Zone A = OK, Zone B = Uncertain, Zone C = Poor).

good condition 12.9-10.17  
..... cattle track





**ATTACHMENT 4**

**WEED AND REHABILITATION MANAGEMENT PLAN**

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# WEED AND REHABILITATION MANAGEMENT PLAN

CANUNGRA RISE OFFSET  
EPBC 2015/7485

Prepared for ELBINA P/L





This report has been prepared by:



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## Document Control

Issue	Date	Description	Prepared By	Checked By
A	18-10-16	1 <sup>st</sup> issue to client for review and signing	GD	GD

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### 1.0 INTRODUCTION & BACKGROUND

Elbina P/L has engaged Planit Consulting to prepare a Weed and Rehabilitation Management Plan (WMP) for the Canungra Rise Estate located at Finch Road, Canungra. Canungra Rise is an approved 298 allotment residential subdivision which incorporates 18.3 hectares of parkland and 112 hectares of environmental offset for the long term retention and protection of habitat for the koala.

Canungra Rise was referred under the *Environment Protection and Biodiversity Conservation Act* and determined to be a 'controlled action' under the provisions of sections 18/18A (listed threatened species and communities) of the Act (EPBC2015/7485 dated 30<sup>th</sup> June 2015). The assessment process determined by the Department of Environment was that of 'preliminary documentation' with the required assessments and documentation prepared and advertised up until the 30<sup>th</sup> June 2016. During the assessment process it was determined by the Department that the controlling provisions would be the potential impact to approximately 26 hectares of habitat 'critical to the survival' of the Koala which is listed as Vulnerable under the EPBCA.

On 22<sup>nd</sup> August 2016 the Canungra Rise Estate residential development was granted approval under sections 130(1) and 133 of the EPBCA subject to compensation for the loss of koala habitat associated with the development. The agreed compensation would be the provision of 112.2 hectares of koala habitat on the Canungra Rise site as a direct offset to be secured in perpetuity via a Voluntary Declaration under the Queensland Vegetation Management Act 1999. The offset area, as agreed throughout the preliminary documentation process and reflected in Map 1 of the EPBC2015/7485 approval, was determined by applying the requirements identified within both the EPBCA Environmental Offsets Policy and the Offset Assessment Guide.



This WRMP is a component of the attached Offset Management Plan which governs the management of the offset area.

## **2.0 SUMMARY OF OFFSET AREA**

### **2.1 LOCATION & SIZE**

The approved offset area (OA) is located within the Canungra Rise site immediately adjacent to the approved impact areas of the development and incorporates 112 hectares (increased to 117 hectares) of habitat critical to the survival of the koala. The nominated areas (refer Figure 2) will be preserved as environmental covenants on future allotments (created by the approved subdivision) and protected as a voluntary declaration under the Queensland Vegetation Management Act binding the protected areas on the future land titles.

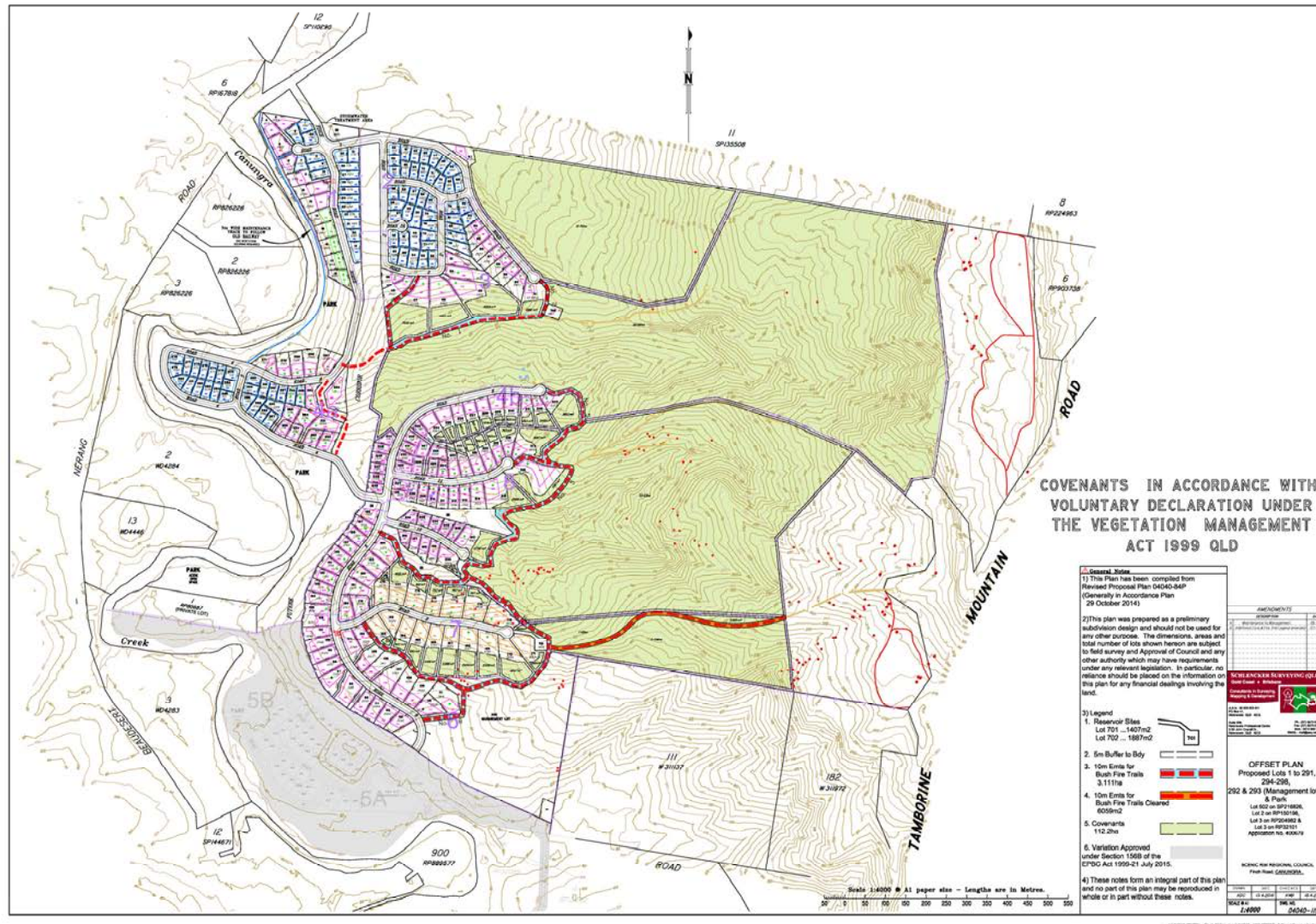


FIGURE 1: APPROVED OFFSET PLAN



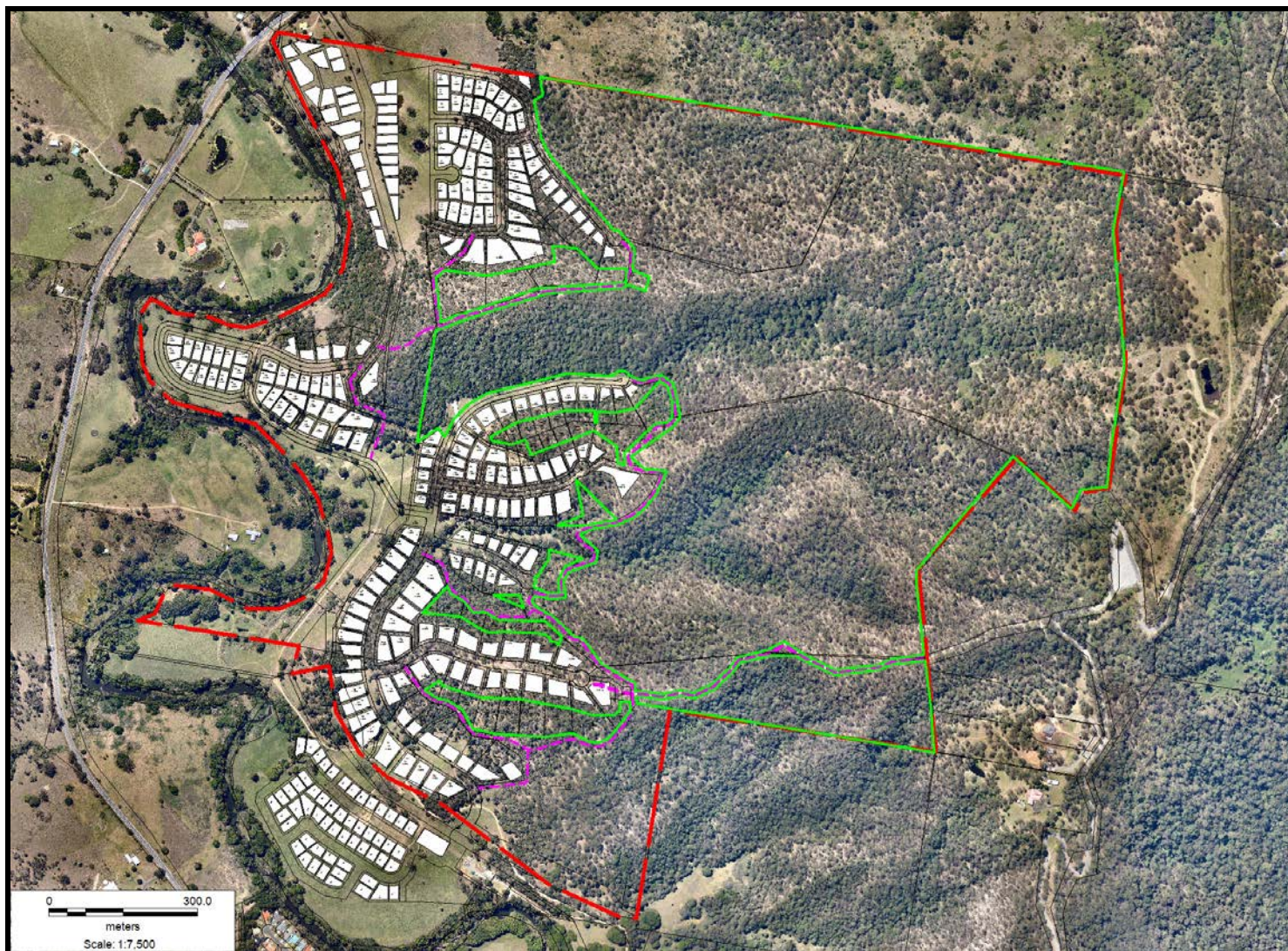


FIGURE 2: OFFSET AERIAL OVERLAY

## 2.2 REHABILITATION MANAGEMENT UNITS

Rehabilitation of critical koala habitat is to occur within the approved OA which has been subdivided into a series of rehabilitation units (RU) as depicted in Figure 3. Each rehabilitation unit represents a mapped polygon, where the polygon boundaries correlate with the existing regional ecosystems. Detailed descriptions of each RE are provided below:

### 12.9-10.17 Least Concern

Open forest to woodland complex generally with a variety of stringybarks, grey gums, ironbarks and in some areas spotted gum. Canopy trees include *Eucalyptus siderophloia*, *E. propinqua* or *E. major*, *E. acmenoides* or *E. portuensis*, *E. carnea* and/or *E. microcorys* and/or *Corymbia citriodora* subsp. *variegata*. Other species that may be present locally include *Corymbia intermedia*, *C. trachyphloia*, *Eucalyptus tereticornis*, *E. biturbinata*, *E. moluccana*, *E. longirostrata*, *E. fibrosa* subsp. *fibrosa* and *Angophora leiocarpa*. *Lophostemon confertus* or Whipstick *Lophostemon confertus* often present in gullies and as a sub-canopy or understorey tree. Mixed understorey of grasses, shrubs and ferns. Hills and ranges of Cainozoic and Mesozoic sediments. (BVG1M: 9a)

### 12.9-10.17A Least Concern

*Lophostemon confertus* or *L. suaveolens* dominated open forest usually with emergent *Eucalyptus* and/or *Corymbia* species. Occurs in gullies and southern slopes on Cainozoic and Mesozoic sediments. (BVG1M: 28e)

### 12.8.14 Least Concern

*Eucalyptus eugenioides*, *E. biturbinata*, *E. melliodora* +/- *E. tereticornis*, *Corymbia intermedia*, *E. crebra* woodland. *Allocasuarina torulosa* is a common understorey species. Localised occurrences of *Eucalyptus laevopinea* and *E. banksii* may occur. Occurs on Cainozoic igneous rocks, especially basalt. (BVG1M: 11a)

### Non-remnant/ Regrowth 12.8.14 Least Concern

*Eucalyptus eugenioides*, *E. biturbinata*, *E. melliodora* +/- *E. tereticornis*, *Corymbia intermedia*, *E. crebra* woodland. *Allocasuarina torulosa* is a common understorey species. Localised occurrences of *Eucalyptus laevopinea* and *E. banksii* may occur. Occurs on Cainozoic igneous rocks, especially basalt. (BVG1M: 11a)

The below table presents a summary of rehabilitation units attributes including:

- The area of the rehabilitation unit in hectares;
- The RE code for pre-clearing vegetation within the rehabilitation unit and the landzone/geology of the rehabilitation unit.
- Which of the three environmental corridors associated with the Canungra Rise Estate the Rehabilitation Unit is located in

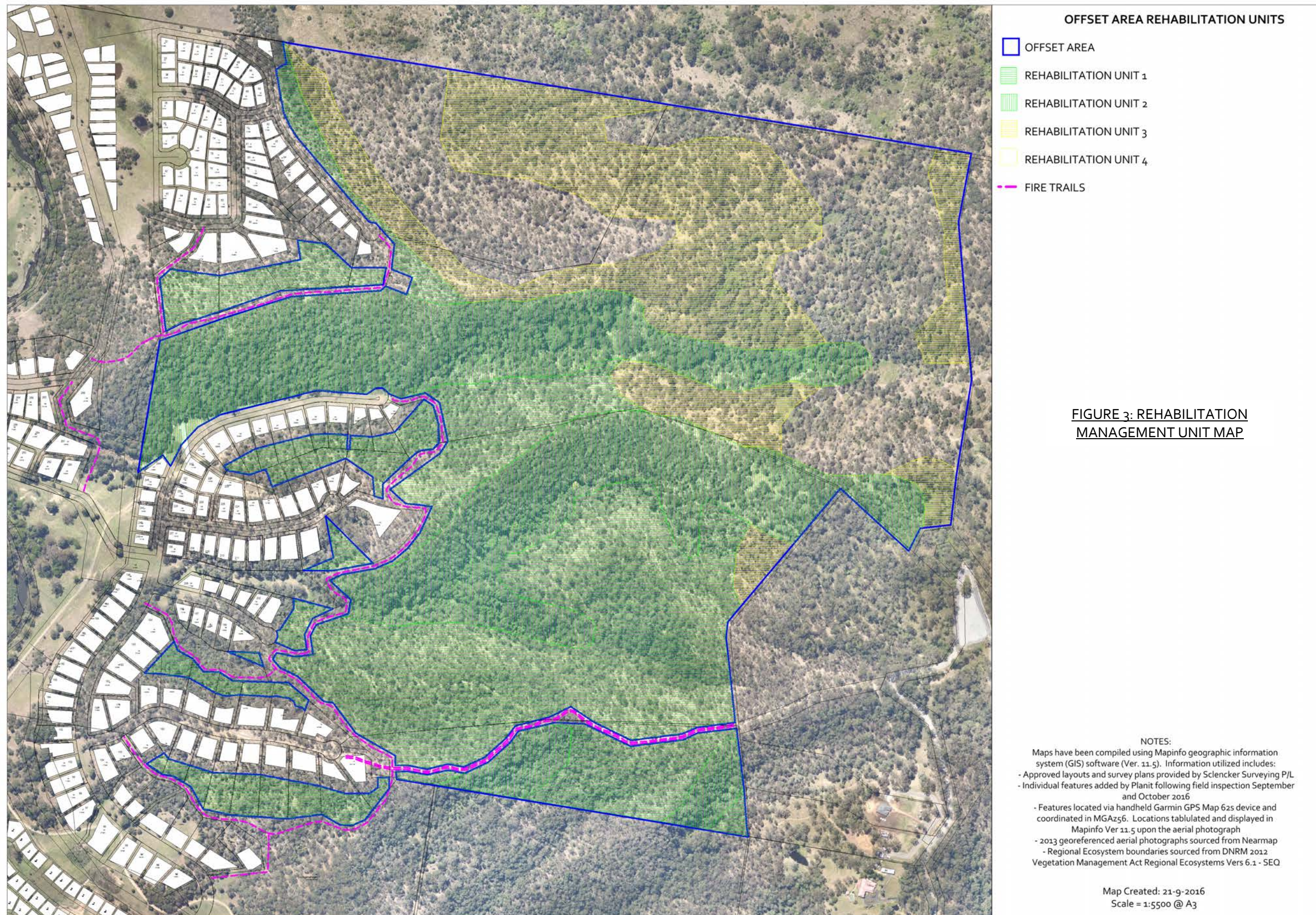
Delineating the habitat in this manner was also necessary in association with undertaking the baseline biocondition assessments in accordance with Eyre et al 2015 (refer Attachment 2 of the Offset Management Plan).



TABLE 1: REHABILITATION UNIT SUMMARY

REHABILITATION UNIT	AREA (HA)	CORRIDOR TYPE	RE CODE	LANDZONE/ GEOLOGY
RU1	38.0	central upland eucalypt terrestrial	12.9-10.17	Fine grained sedimentary rocks Wongaroo Subgroup Quartzose sandstone, siltstone, shale, conglomerate, coal
RU2	31.8	east west linkage & central upland eucalypt terrestrial	12.9-10.17a	Fine grained sedimentary rocks Wongaroo Subgroup Quartzose sandstone, siltstone, shale, conglomerate, coal
RU3	23.4	central upland eucalypt terrestrial	12.8.14	Cainozoic igneous rocks colluvium basalt-soil, clay, cobbles and boulders
RU4	23.9	central upland eucalypt terrestrial	regrowth 12.8.14	Cainozoic igneous rocks colluvium basalt-soil, clay, cobbles and boulders







#### 4.0 REHABILITATION STRATEGY

This section outlines the Rehabilitation Strategy for the Offset Area. Management of the OA will be largely focused upon the management and rehabilitation of weed infested areas. Future revegetation/landscaping will only be required as an adaptive management strategy/corrective action where monitoring of natural regeneration determines recruitment is failing.

Review of the previous reports relating to the existing environment of the site and surrounds was undertaken to assist in setting objectives for the rehabilitation of the OA. The below rehabilitation strategy is recommended and aimed initially at the protection of habitats to be retained within the OA and secondly at providing a level of enhancement. It often takes a period of several years before the achievement of such aims are realized and as such it is of paramount importance that an appropriate strategy is derived and implemented in the initial phases of rehabilitation.

The primary objectives recommended for the OA to be rehabilitated include:

- Retain and protect remnant and non-remnant bushland within the OA;
- Retain and enhance existing native fauna habitat which represents habitat critical to the survival of the koala;
- Increase the extent of native vegetation cover over time (i.e. across weeded and/or sparsely covered areas). In accordance with best management practice restoration and rehabilitation works should seek to stabilize and reverse the negative effects of habitat fragmentation. That is, priority should be given to works which protect and expand larger remnants (and/or vegetation cover within fragmented remnants). This is based on the following ecological observations:
  - Habitat fragmentation generally reduces the viability of both faunal and floral populations by restricting ranges of fauna below minimum levels and by preventing the natural exchange of genetic material which may ensure genetic vigour.
  - Reconnecting fragmented landscapes into larger, (and, where appropriate, more consolidated) units by filling in gaps can increase habitat area and may improve linkages for passage of species. (The configuration of those linkages, however, will determine whether edge/area ratios reduce or increase.)
  - Narrow corridor links may themselves be subject to feral predation, disease and species imbalances, therefore, the width of a corridor should exceed the extent of edge effects.
  - Biological potential for diverse natural regeneration and expansion frequently exists in and adjacent to remnants. Investments which harness this potential usually provide higher ecological returns than reconstruction elsewhere (Greening Australia, 1999).

As the OA is comprised predominately of intact remnant bushland it is considered that the overarching rehabilitation approach should be that of 'assisted natural regeneration' (GCCC, 2007; TSC, 2009; Greening Australia, 1999). The applicable circumstances of this type of rehabilitation per GCCC (2007) are provided below:

Assisted Natural Regeneration applies:

- To natural areas where the native plant community is largely healthy and functioning.
- When native plant seed is still stored in the soil or will be able to reach the site from nearby natural areas, by birds or other animals, wind or water.

- Where the natural regeneration processes (seedling germination, root suckering, etc) are being inhibited by external factors, such as weed invasion, soil compaction, cattle grazing, mechanical slashing, etc
- When limited human intervention, such as weed removal, minor amelioration of soil conditions, erection of fencing, cessation of slashing, etc. will be enough to trigger the recovery processes through natural regeneration.
- When the major component is weed control.

Greening Australia (1999) notes that 'in or immediately adjacent to remnants, priority is given to facilitation of natural regeneration. In these locations, planting or direct seeding is only carried out where pre-existing species are incapable of colonization-and after a "rest" period sufficient to test natural regeneration. This is based on the following ecological and field observations.

- Natural regeneration potential can be surprisingly persistent in and adjacent to fragmented remnants.
- Natural regeneration maintains natural selection processes, can provide a wider range of site adapted species and genetic stock, demonstrates any capacity for future regeneration, and informs us about a site's regeneration dynamics and any pre-existing species requiring reintroduction.
- Planting can be more expensive, interfere with regeneration and compromise the genetic integrity and scientific value of a site. Planted stock may not regenerate if the species selection or genetic stock is inappropriate to the site.
- The mechanisms of recovery of individual species after natural disturbances (particularly whether they form persistent soil seed banks or not) can provide insight into the restoration approach needed. This determination can be improved by conducting preliminary trials to trigger germination from soil seed banks (e.g. using fire, smoke, tillage or irrigation as appropriate) - Such trials can also help to determine pre-existing plant associations more precisely.'

In areas where 'assisted natural regeneration' is unsuccessful (refer Section 4.2.1) in the medium term then 'reconstruction' shall be required (per GCCC, 2007; TSC, 2009; Greening Australia, 1999). The applicable circumstances of this type of rehabilitation per GCCC (2007) are provided below:

Reconstruction applies:

- Where the site is highly degraded or altered
- When the degree of disturbance has been so great and long-standing that the pre-existing native plant community cannot recover by natural means.
- To sites such as areas of fill, sites affected by stormwater flow, and areas that have been drastically cleared, either mechanically or by stock even though there may be a few remaining native trees or shrubs.
- When a greater degree of human intervention is required, such as weed removal, cessation of grazing and/or slashing, amelioration of soil conditions such as importation of soils, drainage works or reshaping of the landscape.
- When a major component is the importation of native species through planting.



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#### 4.1 WEED MANAGEMENT STRATEGY

The following weed management strategy has been prepared for the OA. The intent of the strategy is to progressively remove weed species from these areas. Substantial research regarding weed management activities within areas of native bushland has been undertaken in this regard. The strategy presented has been adapted from the following sources:

- Bradley, J. (1988) *Bringing back the bush: The Bradley method of bush regeneration*. Lansdowne Publishing Pty. Ltd. The Rocks, NSW;
- Buchanan, R. A. (1989) *Bush Regeneration: Recovering Australian Landscapes*. TAFE Student Learning Publications, NSW;
- Robertson, M. (1994) *Stop Bushland Weeds: A guide to successful weeding in South Australia's bushland*. The Nature Conservation Society of South Australia Inc;
- Greening Australia (1995) *Local Greening Plans: A Guide for Vegetation and Biodiversity Management*. Greening Australia, Canberra
- Big Scrub Rainforest Landcare Group (2005) *Subtropical Rainforest Restoration: A Practical Manual and Data Source for Landcare Groups, Land Managers and Rainforest Regenerators*. BSRLG, Bangalow.
- NSW Agriculture (2004) *Noxious and Environmental Weed Control Handbook: A Guide to Weed Control in Non-Crop, Aquatic and Bushland Situations*.
- Chenoweth EPLA and Bushland Restoration Services (2012) *South East Queensland Ecological Restoration Framework: Manual*. Prepared on behalf of SEQ Catchments and South East Queensland Local Governments, Brisbane

1. Target areas of least disturbance and weed invasion and work towards the more weed infested areas.

Under these circumstances the indigenous species have the upper hand because their seed or spores are already in the ground and the natural environment favours the plants that have evolved in it (Bradley 1988). This method represents a significant reduction in follow-up time and related costs because the regeneration is more likely to comprise a higher proportion of native species. It is noted that this method is the EPAs preferred method of weed control (DEH, 1999).

2. Minimising the amount of soil disturbance will reduce the potential for a fresh weed invasion.

Weeding will cause some disturbance to the existing soil structure and layers depending on weed methods utilised (i.e. mechanical removal, hand removal). Disturbed soil should therefore always be returned as close as possible to its original layer and firmed down. This includes the mulch which is the first line of defence against a fresh invasion (Bradley 1988).

3. Let native plant regeneration dictate the rate of weed removal

The regeneration of native species is inversely proportional to increasing weed growth. Therefore, weeding should not automatically move into more degraded areas when less infested areas have been initially weeded. It is often better to simply wait for the less infested areas to regenerate before proceeding slowly into the worse areas. Clearing all infested areas at once causes extensive, additional follow up weeding works (refer below figure).

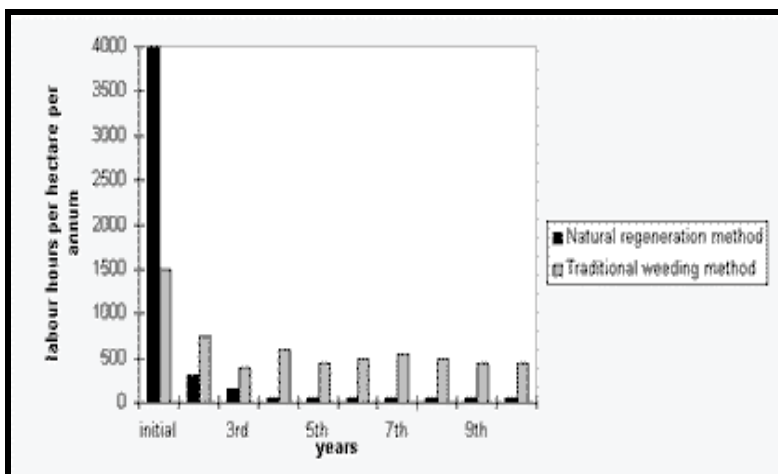


FIGURE Source - Ku-ring-gai Parks Dept. NSW, cited in Buchanan (1989) Comparison of labour hours using traditional weeding and natural regeneration methods.

Implementing these principles into a weed management strategy should begin by determining priority species and areas for management. The weed species recorded within the Finch Road site and their rank contained within the "List of the 200 Most Invasive Environmental Weeds in SEQ" (DNRME, 2002) is provided in table 2 below. Priority management areas have been determined based upon existing levels of infestation and the 'invasiveness' of species contained therein.

Recommended treatment for recorded weed species listed in the table below have been sourced from Appendix 8 'Common Weeds of Northern NSW Rainforest - A Practical manual on their identification and control' produced by The Big scrub Rainforest Landcare Group and Appendix 3 of the 'SEQld Ecological Restoration Framework Manual.'

#### Abbreviations used within Table 2:

CS&P = cut, scrape and paint  
C&P = cut and paint  
F/I = frill/stem-inject/spear or drill  
S&P = scrape and paint

Numbers in brackets are:

G = glyphosate dilution ratios, MM = metsulfuron-methyl dilution ratios  
S = surfactant, e.g. LI 700  
W = wet-ting agent, e.g. Agral, Pulse  
O = denotes use of spray adjuvant, e.g. Codacide, Protec Plus

#### Best Practice Methods for Weed Control

Please note: (1) It is the responsibility of the herbicide user to hold an off-label permit (obtained from the National Registration Authority for Agricultural and Veterinary Chemicals) for herbicide use that is not consistent with conditions specified on the label; and (2) The methods and herbicide use rates provided below are current best practice methods. It is the



responsibility of the operator to ensure methods used are current best practice and are suitable for the site and any environmental constraints experienced at the site.

#### CUT-SCRAPE-PAINT

This weed control method applies to all woody shrubs, trees and some vines.

- Cut plant low to the ground at an angle.
- Apply Glyphosate immediately at the rate of 1 part Glyphosate to 1.5 parts water, with a paintbrush approximately 1.5 centimetres wide.
- Scrape sides lightly to reveal green tissue and apply the herbicide to the scraped area.
- Take care that the brush is not contaminated with soil.

Note - all seed that has high viability and longevity, e.g. *Senna spp.* and other members of the Fabaceae family, or plants with a high invasive potential, such as Umbrella Tree *Schefflera actinophylla*, must be removed from the parent and either composted on site or removed from the site.

#### GOUGE-PAINT

This weed control method applies to those plant species that have a fleshy root system, such as rhizomes or large bulbs. It is particularly appropriate for the treatment of *Asparagus spp.*

- Gouge out sections of the fleshy base with a knife (if using on *Asparagus*, first cut the stems at shoulder height and also at the base).
- Apply 1 part Glyphosate to 1.5 parts water immediately, with a paint brush approximately 1.5 centimetres wide.

#### STEM INJECTION

This weed control method applies to all woody trees and shrubs with a diameter of about six to ten centimetres or greater.

- Drill a hole at an angle into the sap wood using an 8-10mm drill bit angle, Holes to be no >than 10cm apart.
- Apply herbicide (approx 4ml) immediately into the hole using a tree-injecting device (if using Glyphosate, apply undiluted or at the rate of 1 part Glyphosate to 1.5 parts water).
- Repeat this procedure at intervals around the circumference of the tree, as close to the ground as possible. Where the presence of a crotch angle makes this difficult, drill a hole above it. Note – one row of drill holes will be sufficient for trees with trunks of six to ten centimetres; larger trunk diameters will need correspondingly more.
- Treat all visible lateral roots as per dot point 1.

#### SCRAPE-PAINT

This weed control method is applicable to many species of vines where it is desirable to treat the vines intact, particularly those with aerial tubers such as Madeira Vine *Anredera cordifolia* or those which will propagate from segments, e.g. Cape Ivy *Delairia odorata*.

- Scrape the stem tissue on one side of the stem only for at least 20-30 centimetres if possible. Note on Madeira vine it is necessary to scrape heavily. Scrape as many sections of the stem as possible.
- Apply undiluted Glyphosate with a paintbrush.

- On stems that are thicker or horizontal, make a ditch into the stem with a knife and apply herbicide. Tubers and side roots should be treated the same way. Note - care must be taken not to sever the stem.

### SPOT SPRAYING

This weed control method is carried out using a 15 litre backpack spray unit with a modified spray nozzle that gives a solid spray pattern. Glyphosate is the main herbicide used with the addition of a marker dye. For plants that show some resistance (e.g. Madeira Vine) or where growing conditions are not optimal, an acidifying agent, LI700®, is added. Metsulfuron methyl can also be used for resistant species and grasses. It should be used with a surfactant, such as Agral® or Pulse®.

- Where both Glyphosate and Metsulfuron methyl it is important to mix the chemicals as recommended e.g. MM must be well mixed with water prior to adding to backpack.
- Dilution rates for Glyphosate and Metsulfuron methyl are in accordance with the manufacturer's recommendations and any variation requires a permit from the National Registration Authority.
- Dilution rates for Glyphosate to water for treatment of some weed species are provided below:
- Plants with more or less succulent leaves, e.g. Wandering Jew Tradescantia fluminensis, Madeira Vine Anredera cordifolia (autumn to winter is the suggested time for spraying these plants), Spider/Ribbon Plants Chlorophytum spp. etc - 1 part Glyphosate to 50 parts water plus 1.5g Metsulfuron methyl to 10 litres water + 2 ml Agral® or 20ml Pulse® to 10 litres water.
- Lantana Lantana camara - 1 part Glyphosate to 100 parts water
- Other soft-leaved plants, annuals and grasses - 1 part Glyphosate to 100 parts water
- Bitou Bush Chrysanthemoides monilifera subsp. rotundata - 1 part Glyphosate to 150 parts water to 1 part Glyphosate to 400 parts water
- Typical dilution rates for Metsulfuron methyl to water are - 1.5g Metsulfuron methyl to 10 litres water + 2 ml Agral® or 20ml Pulse® to 10 litres water.

### OVERSPRAY

This weed control method is applicable to large, dense infestations of such plants as *Lantana camara*, where it is desirable to leave the dead plants intact to prevent erosion and over-exposure of large areas, protect native seedlings from predators such as wallabies, and avoid trampling by humans.

- Spray over the top of the infestation, using a weak solution of Glyphosate.
- Any native plants that may be under the weed will be protected by the foliage cover of the weed. Leave the sprayed plants intact so that native seedlings can establish under the shelter provided.
- The rate for overspraying of Lantana is 1 part Glyphosate to 100 parts water.
- Alternatively, weeds can be cut and flattened with bush-hooks or loppers and the subsequent regrowth sprayed with Glyphosate. In many cases it is preferable to overspray wherever practicable as this will cause less erosion and trampling of suppressed native plants, such as ferns and seedlings. However, handwork will be necessary to cut-scrape-paint any unsprayed Bitou Bush or Lantana that surrounds native plants.



### CROWNING

This weed control method is applicable to weeds which have their growing points below the surface of the ground (corms, bulbs, rhizomes, clumped or fibrous root systems, etc. e.g. *Asparagus* spp., and introduced grasses).

- Grasp the leaves or stems and hold them tightly so that the base of the plant is visible. Plants with sharp leaves or stems should be cut back first.
- Insert the knife close to the base of the plant at a slight angle, with the tip well under the root system.
- Cut through the roots close to the base. Depending on the size of the plant, two or more cuts may be needed to sever all the roots.
- Remove the plant. Make sure that the base of the plant where the roots begin is completely removed.



**TABLE 2: WEED CONTROL METHODS**

Scientific Name*	Common Name	Invasiveness Rank	Recommended Treatment
<i>Abutilon auritum</i>	Mallow	Unranked	Shrubs: CS&P (G1:1.5) Plants: hand-pull or spray (G 200 mL/10 L + S or O). Collect and bag seed pods. Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted
<i>Agapanthus praecox</i>	Lily of the Nile	Unranked	Plants: hand-pull or spray (G 100 mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted
<i>Ageratina riparia</i>	Mistflower	Rank 25	Plants: hand-pull or spray (G 100 mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted NOTE: No slashing of seeding mistflower is to occur. If plant is seeding at any time during the management period, individual plants are sprayed as above or to be removed via hand (for recolonised and/or isolated plants) and bagged to prevent potential for seed spread via wind.
<i>Ageratina adenophora</i>	Crofton Weed	Rank 17	Plants: spot spray (G 100 mL/10 L + S or O, or MM 1-2g/10L + W or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted. NOTE: No slashing of seeding crofton weed is to occur. If plant is seeding at any time during the management period, individual plants are sprayed as above or to be removed via hand (for recolonised and/or isolated plants) and bagged to prevent potential for seed spread via wind.
<i>Ageratum houstonianum</i>	Blue Billygoat Weed	Rank 115	Plants: spot spray (G 100 mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.
<i>Alternanthera dentata</i>	Ruby Leaf	Unranked	Plants: spot spray (G 100 mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.
<i>Ambrosia artemisiifolia</i>	Annual Ragweed	Unranked	Plants: hand-pull or spray (G 100 mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted
<i>Anredera cordifolia</i>	Madeira Vine	Rank 5	Vines: hand-pull or CS&P (1:1.5). Materials above head height to be left insitu where it will die and fall to the ground as natural mulch. Spot spray: (G 200 mL/10 L + S or O, or G 200 mL/10 L + MM 1.5 g/10 L + W or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.
<i>Asparagus aethiopicus</i> , <i>A. densiflorus</i>	Asparagus Fern	Rank 23/57	Initial treatment via hand removal using crowning technique and hanging off ground to dry. For successful weed control it is vital to cut out the entire central growing point.





			Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted Plants: spot spray (G 100 mL/10 L + MM1.5g/10L + W or O).
<i>Baccharis halimifolia</i>	Groundsel	Rank 2	Seedlings: hand-pull or CS&P (G1:1.5). Or spray (G200mL/10L + S or O). Trees: CS&P or F/I (G1:1). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted  NOTE: If groundsel is seeding at any time, individual plants are to be removed via hand and bagged to prevent seed spread via wind.
<i>Bidens pilosa</i>	Cobblers Pegs	Rank 110	Plants: spot spray (G 100 mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.
<i>Celtis sinensis</i>	Chinese Celtis	Rank 7	Hand pull seedlings or spot spray (G 100 mL/10 L + S or O). Saplings: CS&P (G1:1.5) Trees stem inject 1: 1.5 Glyphosate Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.
<i>Cestrum parqui</i>	Green Cestrum	Rank 59	Plants: spot spray (G 200 mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.
<i>Cirsium vulgare</i> , <i>Sonchus oleraceus</i>	Spear Thistles	Unranked	Plants: spot spray (G 100 mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.
<i>Cinnamomum camphora</i>	Camphor Laurel	Rank 8	Hand pull seedlings or spot spray (G 100 mL/10 L + S or O). Saplings: CS&P (G1:1.5) Trees stem inject 1: 1.5 Glyphosate Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.
<i>Conyza bonariensis</i> , <i>C. sumatrensis</i>	Fleabane	Rank 179	Plants: spot spray (G 100 mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.
<i>Corymbia torelliana</i>	Cadaghi	Unranked	Hand pull seedlings or spot spray 1:50 Glyphosate + Surfactant + Colour Marking Dye or for better results spray 1:50 Glyphosate + 1.5g Metsulfuron methyl: 10L water + Spray adjuvant + Colour Marking Dye. Saplings CS&P Glyphosate1:1.5 + Colour Marking Dye.



			Trees stem inject 1: 1.5 Glyphosate + Colour Marking Dye. Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.
<i>Crassocephalum crepidioides</i>	Thickhead	Unranked	Plants: spot spray (G 10 mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted
<i>Crotalaria species</i>	Rattlepods	Unranked	Plants: spot spray (G 10 mL/10 L + S or O). Collect and bag seeds Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted
<i>Cuphea carthagenensis</i>	Columbian Waxweed	Unranked	Plants: spot spray (G 100 mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.
<i>Desmodium uncinatum</i>	Silverleaf Desmodium	Rank 64	Vines: hand-pull or CS&P (1:1.5). Materials above head height to be left insitu where it will die and fall to the ground as natural mulch. Spot spray: (G 200 mL/10 L + S or O, or G 200 mL/10 L + MM 1.5 g/10 L + W or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.
<i>Echium plantagineum</i>	Patterson's Curse	Unranked	Plants: spot spray (G 100 mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.
<i>Emilia sonchifolia</i>	Tassel Flower	Unranked	Plants: spot spray (G 100 mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.
<i>Eugenia uniflora</i>	Brazil Cherry	Rank 118	Shrubs: CS&P (G1:1.5) Trees: F/I (G1:1.5) Plants: hand-pull or spray (G 200 mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted
<i>Ficus elastica</i>	Rubber Fig	Unranked	Trees: F/I (G1:1.5) or CS&P Stumps (G1:1.5) Seedlings: hand-pull or spray (G 200 mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted





<i>Gomphocarpus physocarpus, Asclepias curassavica</i>	Cotton Bushes	Rank 86/126	Plants: hand-pull or spray (G 100 mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted
<i>Hypoestes phyllostachya</i>	Polka-dot Plant	Unranked	Plants: spot spray (G 100 mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.
<i>Hypochoeris radicata</i>	Flatweed	Unranked	Plants: spot spray (G 100 mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.
<i>Ipomoea cairica</i> <i>Ipomoea indica</i>	Mile a minute Morning Glory	Rank 28/40	Plants: hand-pull or crown, CS&P tuberous roots (G 1:1.5). Materials above head height to be left insitu where it will die and fall to the ground as natural mulch. Spray (G 100 mL/10L + S or O, or G 200 mL/10L + MM 1.5 g/10L + W or O, or MM 1-2 g/10L + W or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted
<i>Lantana camara</i>	Lantana	Rank 1	Lopper, then CS&P base 1:1.5 G Spot spray regrowth and overspray large infestations (G200mL/10L G + S or O) Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.
<i>Lantana montevidensis</i>	Creeping Lantana	Rank 18	Plants: spot spray (G 100 mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.
<i>Leucaena leucocephala</i>	Coffee Bush	Rank 41	Shrubs: CS&P (G1:1.5) Plants: hand-pull or spray (G 200 mL/10 L + S or O). Collect and bag seed pods. Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted
<i>Ligustrum lucidum, Ligustrum sinense</i>	Privets	Rank 15/21	Hand pull seedlings or spot spray (G 200 mL/10 L + S or O). Saplings: CS&P (G1:1.5) Trees stem inject 1: 1.5 Glyphosate Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.
<i>Macroptilium atropurpureum</i>	Siratro	Rank 51	Vines: hand-pull or CS&P (1:1.5). Materials above head height to be left insitu where it will die and fall to the ground as natural mulch. Spot spray: (G 100 mL/10 L + S or O, or G 200 mL/10 L + MM 1.5 g/10 L + W or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all



			foliage is wetted.
<i>Macroptilium lathyroides</i>	Phasey Bean	Unranked	Shrubs: CS&P (G1:1.5) Plants: hand-pull or spray (G 100 mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted
<i>Macfadyena unguis-cati</i>	Cats Claw Creeper	Rank 4	Vines: hand-pull or CS&P (1:1.5). Materials above head height to be left insitu where it will die and fall to the ground as natural mulch. Spot spray: (G 100 mL/10 L + S or O, or G 200 mL/10 L + MM 1.5 g/10 L + W or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.
<i>Morus alba</i>	White Mulberry	Rank 162	Hand pull seedlings or spot spray (G 200 mL/10 L + S or O). Saplings CS&P G:1.5 Trees: F/I G 1: 1.5. Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted
<i>Murraya paniculata</i>	Mock Orange	Rank 139	Shrubs: CS&P (G1:1.5) Plants: hand-pull or spray (G 200 mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted
<i>Neonotonia wightii</i>	White Glycine	Rank 19	Vines: hand-pull or CS&P (G1:1.5). Materials above head height to be left insitu where it will die and fall to the ground as natural mulch. Spot spray: (G 200 mL/10 L + S or O, or G 200 mL/10 L + MM 1.5 g/10 L + W or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.
<i>Nephrolepis cordifolia</i>	Fishbone Fern	Unranked	Hand removal or crown and hang to dry. Plants: spot spray (G 100 mL/10 L + MM1.5g/10L + W or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted
<i>Ochna serrulata</i>	Mickey Mouse Plant	Rank 22	Shrubs: CS&P (G1:1.5) Seedlings/regrowth: hand-pull or spray (G 200 mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted
<i>Opuntia stricta</i>	Prickly Pear	Rank 111	Plants: hand pull and remove or CS&P in horizontal cuts across flat stems (G1:1.5 + 1gMM)





<i>Passiflora suberosa</i> <i>P. subpeltata</i> <i>P. edulis</i> <i>P. foetida</i>	Passion -flowers	Rank 37/193	Vines: hand-pull or CS&P (1:1.5). Materials above head height to be left insitu where it will die and fall to the ground as natural mulch. Spot spray: (G 200 mL/10 L + S or O, or G 100 mL/10 L + MM 1.5 g/10 L + W or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted
<i>Phytolacca octandra</i>	Inkweed	Rank 125	Shrubs: CS&P (G1:1.5) Plants: hand-pull or spray (G 200 mL/10 L + S or O. Collect and bag seed pods. Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted
<i>Pinus elliotii</i>	Slash Pine	Rank 44	Hand pull seedlings or spot spray (G200mL/10L + S or O). Saplings and trees: cut close to ground or ringbark or F/I (G1:1.5) ensuring bark is penetrated. Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.
<i>Ricinus communis</i>	Castor Oil Plant	Rank 81	Stems: CS&P G:1.5 + 1gMM Regrowth or small plants: spot spray (G 100mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted
<i>Schefflera actinophylla</i>	Umbrella Tree	Unranked column.	Hand pull seedlings or spot spray (G 100 mL/10 L + S or O). Saplings CS&P G:1.5 Trees: F/I G 1: 1.5. Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted
<i>Schinus terebinthifolia</i>	Broadleaved Pepper Tree	Rank 9	Hand pull seedlings or spot spray (G 200 mL/10 L + S or O). Saplings CS&P G:1.5 Trees: F/I G 1: 1.5. Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted
<i>Senecio madagascariensis</i>	Fireweed	Rank 82	Plants: spot spray (G 100 mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.
<i>Senna pendula</i> , <i>Cassia floribunda</i>	Easter Cassias	Rank 45	Shrubs: CS&P (G1:1.5) Plants: hand-pull or spray (G 200 mL/10 L + S or O. Collect and bag seed pods. Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted



<i>Andropogon virginicus</i> <i>Axonopus compressus</i> <i>Axonopus affinis</i> <i>Bromus catharticus</i> <i>Chloris gayana</i> <i>Panicum pygmaeum</i> <i>Panicum maximum</i> <i>Paspalum spp</i> <i>Setaria sphacelata</i> <i>Setaria verticillata</i> <i>Cynodon dactylon</i> <i>Sporobolus spp.</i> <i>Digitaria didactyla</i> <i>Eragrostis tenuifolia</i> <i>Melinis minutiflora</i> <i>Melinis repens</i> <i>Digitaria parviflora</i> <i>Sorghum halepense</i> <i>Pennisetum purpureum</i> <i>Pennisetum clandestinum</i>	Exotic/ pasture grasses	Rank various	<p>Combination of herbicide foliar treatment and hand removal. Spot spraying of clumps and hand removal of scattered individuals. Plants: spot spray (G 100 mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.</p> <p>NB. The majority of these species are located external to the offset area within existing fodder pastures and will be removed mechanically in association with site development</p>
<i>Sida rhombifolia</i>	Paddy's Lucerne	Rank 153	<p>Plants: spot spray (G 100 mL/10 L + S or O, or MM 1-2 g/10L + W or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.</p>
<i>Sida cordifolia</i>	Flannel Weed	Unranked	<p>Plants: spot spray (G 100 mL/10 L + S or O, or MM 1-2 g/10L + W or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.</p>
<i>Solanum mauritianum</i>	Wild Tobacco	Rank 61	<p>Stems: C&amp;P (G 1:1.5). Regrowth: spot spray (G 200 mL/10 L + S or O). Seedlings: Handpull or spot spray (G 200 mL/10 L + S or O); Saplings: CS&amp;P (G 1:1.5). Trees: F/I (G 1:1.5). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted</p>
<i>Solanum hispidum</i> <i>Syn chrysotrichum, S. apsicoides,</i> <i>Solanum nigrum</i>	Devil's Fig, Nightshade	Rank 135	<p>Stems: C&amp;P (G 1:1.5). Regrowth: spot spray (G 200 mL/10 L + S or O). Seedlings: Handpull or spot spray (G 200 mL/10 L + S or O); Saplings: CS&amp;P (G 1:1.5). Trees: F/I (G 1:1.5). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.</p>
<i>Solanum seaforthium</i>	Climbing Nightshade	Rank 55	<p>Vines: hand-pull or CS&amp;P (1:1.5). Materials above head height to be left insitu where it will die and fall to the ground as natural mulch. Spot spray: (G 200 mL/10 L + S or O, or G 100 mL/10 L + MM 1.5 g/10 L + W or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all</p>



			foliage is wetted.
<i>Sonchus oleraceus</i>	Thistle	Unranked	Plants: spot spray (G 100 mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.
<i>Sphagneticola trilobata</i>	Singapore Daisy	Rank 16	Plants: spot spray (G 200 mL/10 L + MM 1.5g/10L + W or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.
<i>Syagrus romanzoffianum</i>	Cocos Palm	Rank 75	Seedlings: hand-pull or crown or spot spray (G 200 mL/10 L + S or O, or G 200 mL/10 L + MM 1.5 mL/10 L + W or O, or MM 1-2 g/10 L + W or O). Trees: cut below growing point or F/I (G 1:1.5). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.
<i>Tagetes minuta</i>	Stinking Roger	Rank 176	Plants: spot spray (G 100 mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted. Given low leaf surface area of this species, if isolated plants occur (i.e. small numbers, not within an area dominated by other weeds) they are to be removed via hand.
<i>Tecoma stans</i>	Yellow Bells	Rank 100	Shrubs: CS&P (G1:1.5) Plants: hand-pull or spray (G 200 mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.
<i>Triumfetta rhomboidea</i>	Chinese Burr	Rank 68	Shrubs: CS&P (G1:1.5) Plants: hand-pull or spray (G 200 mL/10 L + S or O). Collect and bag seed pods. Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.
<i>Trifolium campestre</i> <i>T. repens</i>	Clovers	Unranked	Plants: spot spray (G 100 mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted.
<i>Verbena bonariensis</i>	Purple Top	Unranked	Plants: spot spray (G 100 mL/10 L + S or O). Follow-up spot spraying or hand removal of recolonised individuals following 2-3 week period. Spot spraying is to ensure all foliage is wetted. Given low leaf surface area of this species, if isolated plants occur (i.e. small numbers, not within an area dominated by other weeds) they are to be removed via hand.

\*please note that many of the above species were recorded in areas which are part of the Canungra Rise development envelope which will be cleared and earthworked. Additionally several of the above species were not recorded within the Offset Area during recent inspections but have been previously listed as occurring on the overall >200ha Canungra Rise Site (Planit, 2004-2015). Notwithstanding, treatment measures for these species has been included in the event that they recolonise any of the



OA during the life of the approval. As such an adaptive/reiterative approach is required with regular weed inspections and areas to be reviewed in association with bush regeneration works. This approach is proposed as there can be time delays between approval of the management plan and actual works and due to weed immigration over a long term project (20 years) such as this.

\*\* where herbicide treatment is required the use of Roundup Biactive is primarily recommended. The active ingredient of this herbicide is Glyphosate isopropylamine which has been found to be non-toxic to frog tadpoles and generally does not require the use of additional surfactants.

#### Recommended Application Technique For Spraying (Knapsack/Handgun Equipment)

The dilution rate is given as a ratio of herbicide volume to water volume. Adjust equipment to achieve an even spray pattern. Apply to ensure complete and uniform wetting of all foliage. For handgun equipment, a D6 spray tip (Spraying Systems Australia P/L) or equivalent, and an operating pressure of 400-700 kPa are recommended.

#### Additional Recommendations

- All weed control must be undertaken by a suitably qualified or experienced bush regenerator or bushland restorator.
- Where areas are spot-sprayed and/or hand weeded, weed material must be left insitu to act as natural site mulch.
- Spot-spraying must occur from areas that are dominated by native vegetation and extend into more weedy areas.
- Weed control (especially groundcover weed control) must be undertaken in a manner which does not promote erosion or instability of soil, especially in waterways or high velocity flow zones.
- Herbicide dye must be used to reduce the potential for over spraying or re-spraying of previously treated areas. If evidence of excessive spraying exists or if off target damage is evident, rehabilitation will be required to ensure all areas are stable and not at increased risk of erosion due to off target damage.
- All undesirable vine species must be treated by cutting the plant twice. Once at head height and then at ground level. Immediately after cutting at ground level herbicide must be applied using the cut, scrape and paint method.
- Tractor slashing must not to be undertaken within the offset area.
- Weed inspection (and treatment where necessary) will occur annually.
- No declared Class I or Class II weeds are to be present within the offset area within five years of the commencement of this plan and are to be eradicated as they are discovered annually thereafter
- Environmental weed species (woody weeds, all vines and herbaceous groundcovers/grasses) are to have initial treatment throughout at least 90% of the offset area within five years of the commencement of this plan.
- A significant reduction in the extent of other weed species within the offset as compared to its current state is to be evident. In practice it is noted that the removal of all individuals of all weed species is unachievable. Therefore it is considered appropriate that the following performance criteria be adopted for the 112ha offset area:
  - All large weed trees are to be treated within the first five years;





- Scattered woody weed shrubs may occur but not covering an area greater than 5000m<sup>2</sup> in any one location and not covering a combined area greater than 25000m<sup>2</sup> which represents 2.3% of the entire extent of the offset area;
- Scattered groundcover weed species but not covering an area greater than 5000m<sup>2</sup> in any one location and not covering a combined area greater than 25000m<sup>2</sup> which represents 2.3% of the entire extent of the offset area.

Referenced Material:

Mann, M. (2000) *Toxicological Impact of Agricultural Surfactants on Australian Frogs* (PHD Thesis). Curtin University of Technology, Perth









Nufarm Australia Limited (undated) Roundup Biactive Herbicide by Monsanto NRA Approval No. 48518/1102

Big Scrub Rainforest Landcare Group (2005) *Subtropical Rainforest Restoration: A Practical Manual and Data Source for Landcare Groups, Land Managers and Rainforest Regenerators*. BSRLG, Bangalow.









Chenoweth EPLA and Bushland Restoration Services (2012) *South East Queensland Ecological Restoration Framework: Manual*. Prepared on behalf of SEQ Catchments and South East Queensland Local Governments, Brisbane

Following site inspections, two areas of priority weed management have been identified within the overall offset area. Priority management of these areas is required to reduce the potential of continued spread (as a result of a reduced propagule base) and to restore native floral species dominance to degraded areas. The selected areas are summarized below:



Location	Description	Management Technique	Images	
Management Area 1 [MA1]	<p>These areas are typically drier remnant and non-remnant eucalypt forest/woodland habitat which whilst being in good condition in most respects contain an abundance of lantana in the shrub layer. In several areas (as evidenced by baseline inspections) the thickening effect is considered to be potentially limiting native species recruitment.</p> <p>As lantana is the rank 1 priority weed of SEQld immediate treatment is recommended to prevent spread throughout the parkland.</p>	<p>Staged removal of existing weed infestations is to occur over a maximum period of three years (via methods outlined in Table 2) with follow-up spot-spraying/hand removal of recolonised weed species after one month where required. Where areas are spot-sprayed and/or hand weeded, weed material should be left insitu to act as natural site mulch.</p> <p>Assisted natural regeneration is then to occur in accordance with Section 4.2.1 below. The rehabilitation focus shall be long term maintenance and improvement of RE12.9-10.17 and RE12.8.14</p>		
				
				
				



Location	Description	Management Technique	Images	
Management Area 2 [MA2]	<p>These areas are typically 'wetter' and associated with the two largest gullies draining the ridgelines and slopes which are generally of a rocky nature. The western portions are most affected by woody and pasture weeds which have likely spread from adjacent pasture areas within the former rifle range facility. Minor spread up the northern slope of the gully near the rifle range is also evident and these areas are on a sheltered southfacing slope increasing potential for species such as lantana and creeping herbaceous species (i.e. cobbles pegs, mistflower, crofton weed, blue billygoat weed etc).</p> <p>Priority treatment is recommended to reduce further spread up and down the gullies which are the most botanically diverse areas of the offset due to the presence of regenerating rainforest/riparian species.</p> <p>Several riparian invasive species occur including crofton weed, mistflower, devils fig and lantana.</p>	<p>Staged removal of existing weed infestations is to occur over a maximum period of three years (via methods outlined in Table 2) with follow-up spot-spraying/hand removal of recolonised weed species after one month where required. Where areas are spot-sprayed and/or hand weeded, weed material should be left insitu to act as natural site mulch.</p> <p>Assisted natural regeneration is then to occur in accordance with Section 4.2.1 below. The rehabilitation focus shall be long term maintenance and improvement of RE12.9-10.17A</p> <p>Monitoring and treatment of the areas adjacent the rifle range building post demolition will determine the success of natural regeneration in this small area and the potential future requirement for localized revegetation.</p>		
				
				
				



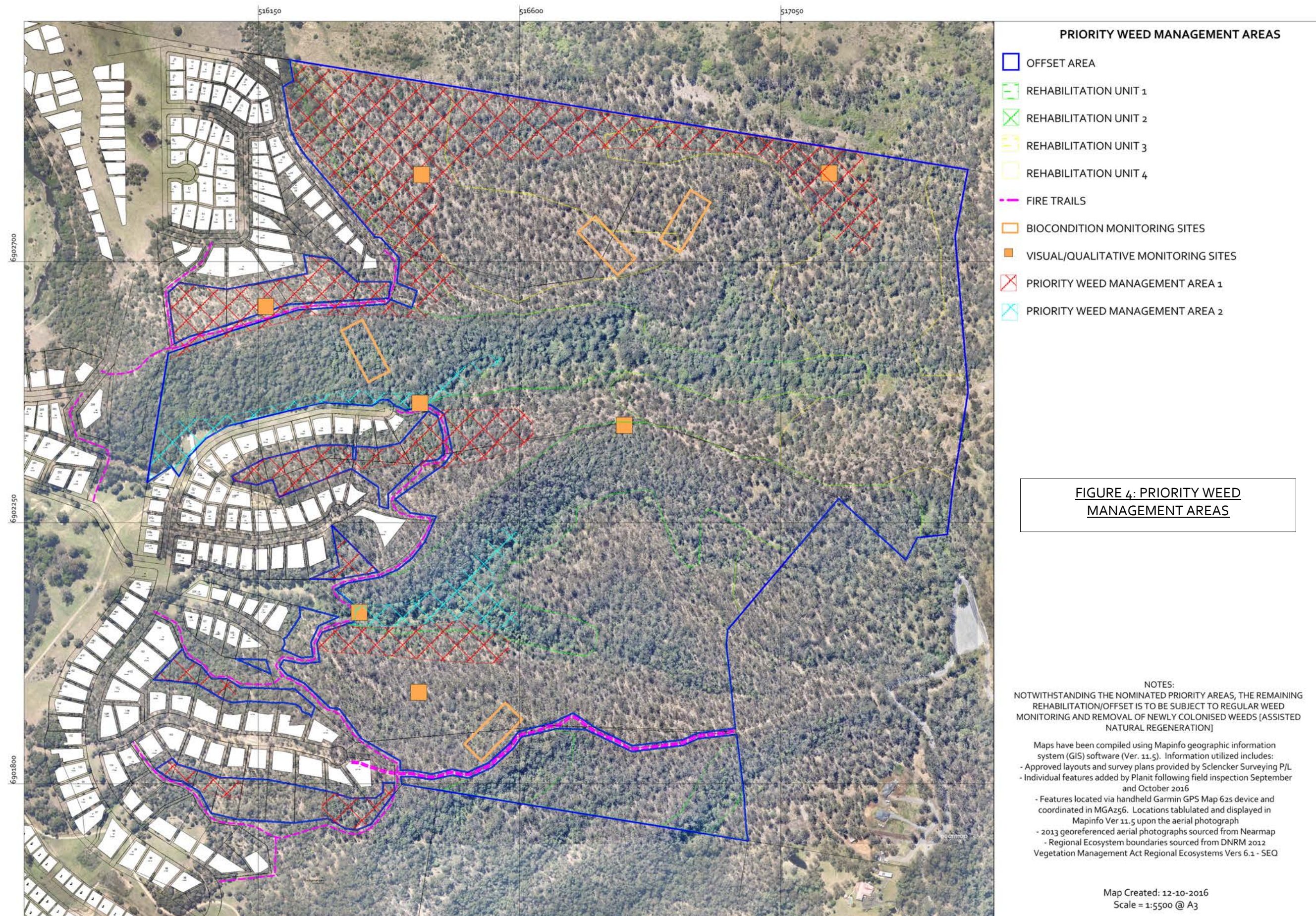
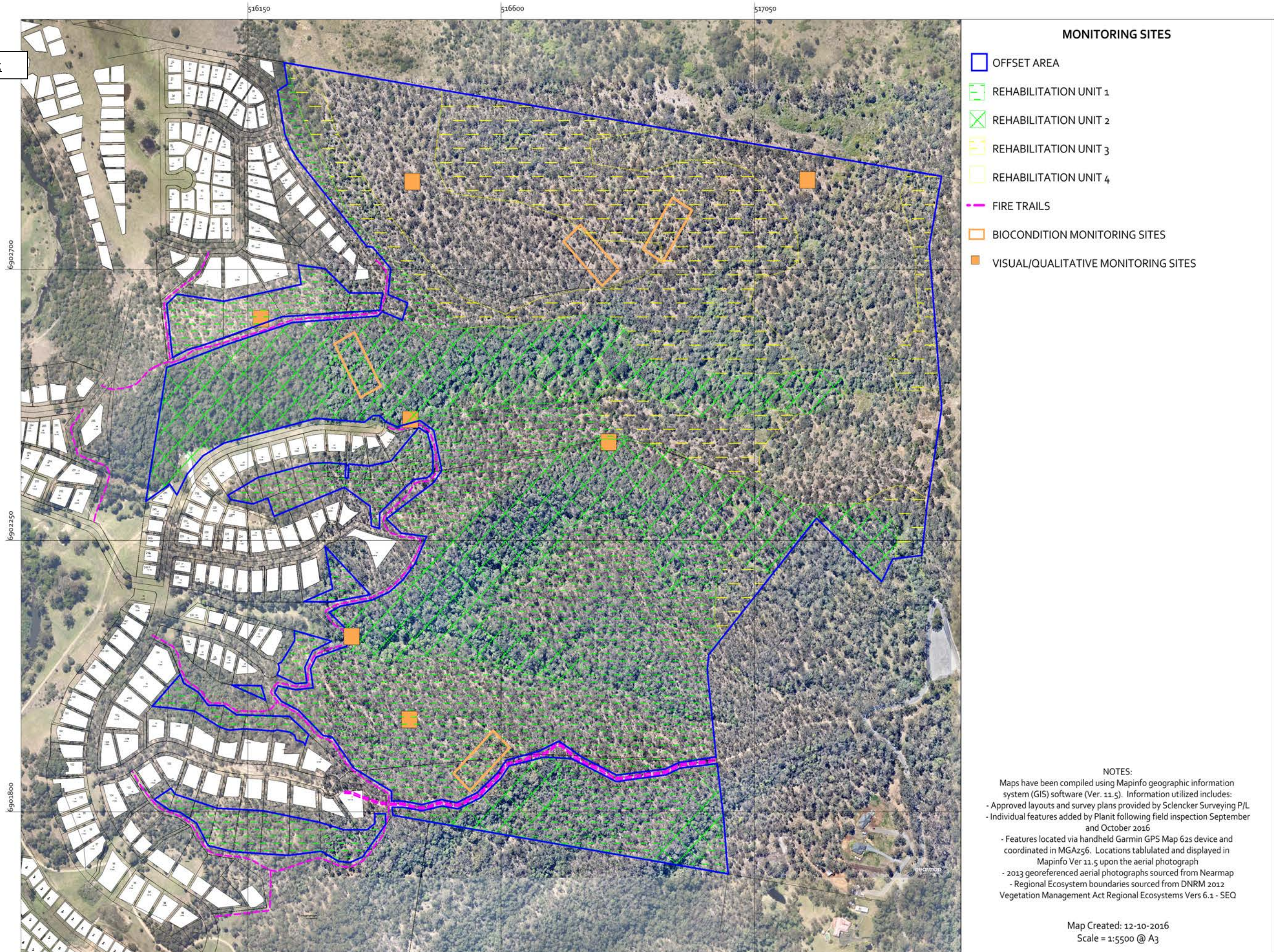




FIGURE 5





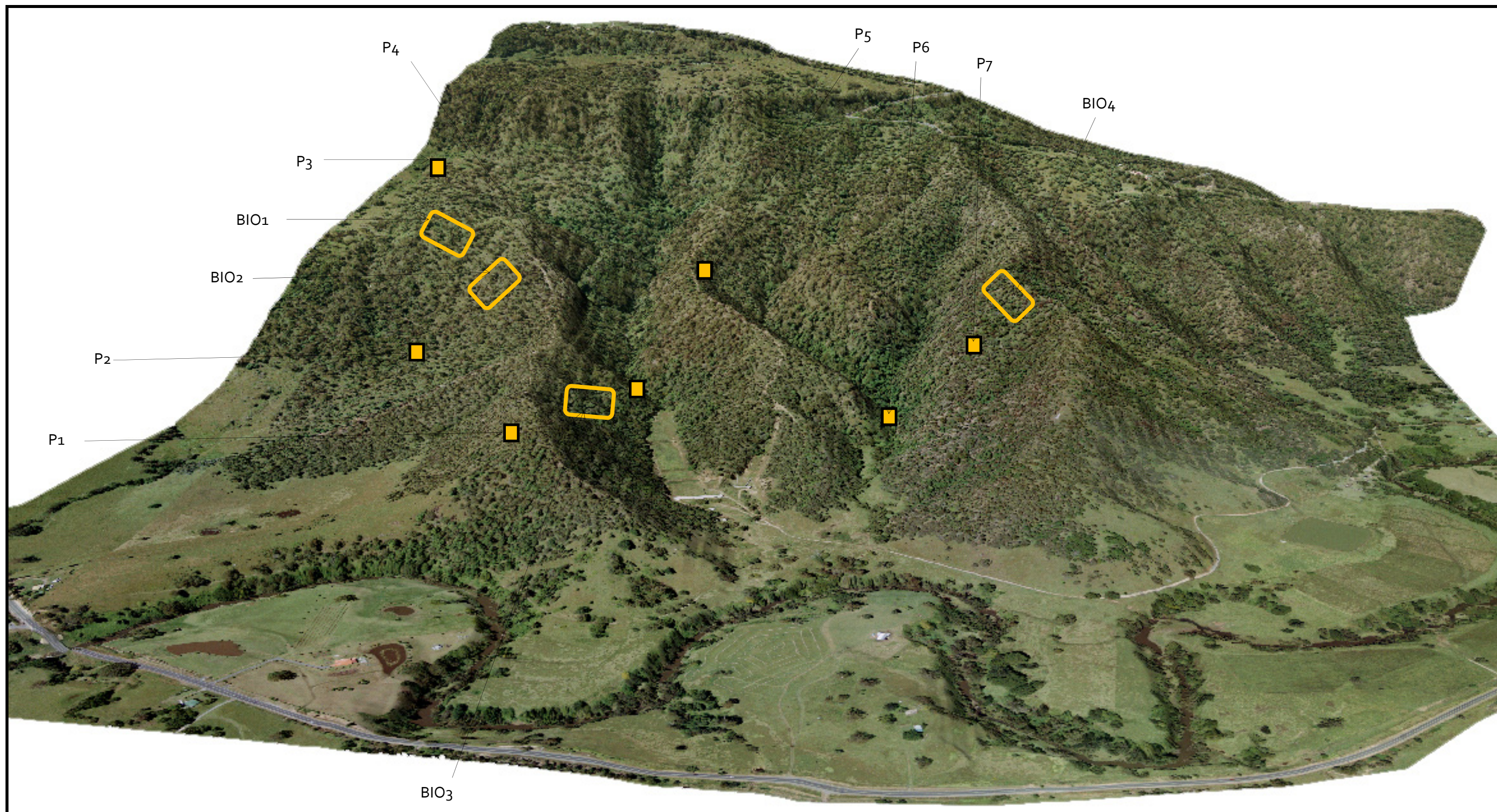


FIGURE 5: MONITORING SITES



In association with the progressive removal of the nominated weed species from the OA, a regeneration strategy should be selected to ensure that the newly weeded areas become established with native species. The regeneration strategies to be utilised on site are discussed below.

#### 4.2 REVEGETATION/REGENERATION STRATEGY

It is recommended that regeneration of disturbed areas be undertaken on site for the following reasons:

- To maintain the existing level of integrity of vegetation communities contained within the OA
- To maintain and potentially increase the floristic diversity currently exhibited within the OA
- To ensure that degraded and managed areas regenerate with native endemic flora species
- To stabilize areas subjected to weed management
- To restore cover and habitat diversity for the faunal assemblage following weed removal
- To increase crown cover in open areas such that with the ongoing regrowth succession of the site there is potential for the existing communities to reach remnant status in the future.

In addition to the above, rehabilitation of disturbed areas and areas of sparse vegetative cover is required to provide long-term protection to bushland remnants from potential edge effects including:

- Abiotic effects: those changes in light, temperature, humidity and wind that occur when a remnant edge is formed by the creation of new surrounding land uses, such as clearing land for grazing, agriculture or urban development.
- Direct biological effects: include changes in the number and abundance of species brought about by changed environmental conditions (e.g. the spread of species that adapt well to the altered climatic conditions, and the reduction in recruitment of species that do not prosper).
- Indirect biological effects: are changes in the way species interact, particularly modified patterns of competition, pollination, and the dispersal of seeds (Greening Australia, 2000).

##### *4.2.1 REVEGETATION/REGENERATION TYPES*

It is suggested for the OA that a strategy of assisted natural regeneration is the method that would prove feasible and effective. Locations for these types of regeneration strategy are outlined below.

#### Assisted Natural Regeneration (with follow up revegetation/reconstruction only where necessary)

Assisted natural regeneration will occur within the following areas:

- Within priority weed treatment zones described as Management Areas 1-2 and mapped within Figure 4;
- Within the balance of the OA which has a lower incidence of weed invasion excluding MA1-2.

The areas to be managed for assisted natural regeneration are highlighted within Figure 4 above. These areas shall be managed as 'assisted regeneration' areas whereby weed re-establishment will be routinely monitored (and control applied as necessary) and regeneration of native vegetation cover also monitored.

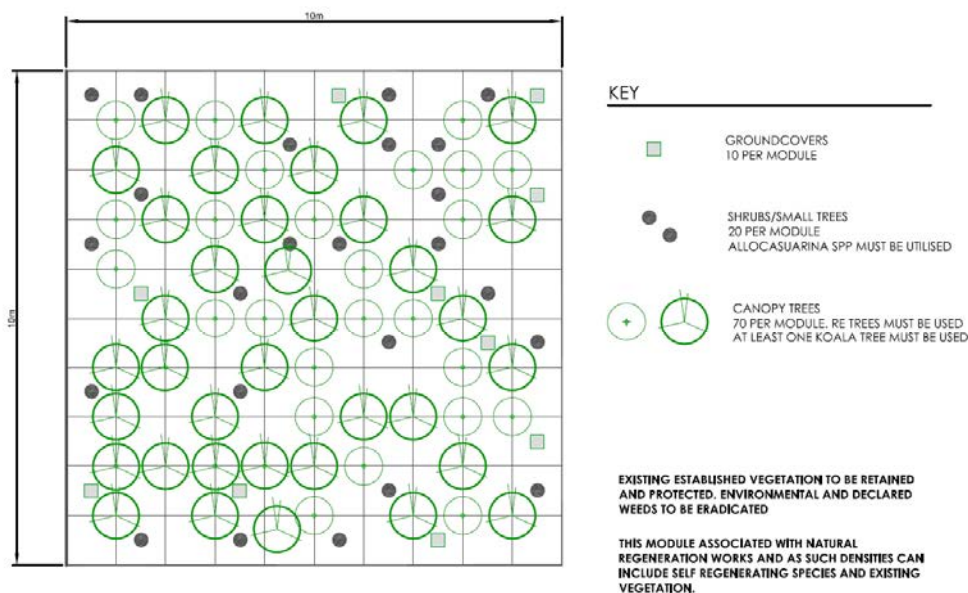
This shall be undertaken annually from within the first year of commencement of construction of the Canungra Rise Estate. After the first six years the success of the natural regeneration effort shall be assessed in association with the annual visual monitoring plots and biocondition assessments as outlined within the attached Offset Management Plan.

This shall be determined via the cover of the natural regeneration zones with native species. In order for assisted natural regeneration to be considered successful the following is to be present over the majority of the areas within the offset area:

- generally 1 plant per square metre to the rehabilitation zone (or establishment of leaf litter/natural debris and/or foliage projection cover typical to surrounding areas of the pre-clearing regional ecosystem)
- An increase in biocondition score within the biocondition monitoring sites
- Assisted regeneration areas must exhibit recruitment of species typically occurring within pre clearing regional ecosystems (i.e. RE12.8.14, 12.9-10.17 species).

Any areas which are considered failed, bare or denuded shall be addressed via reconstructive management (i.e. revegetation). This landscaping will be implemented and maintained for 3 months to ensure plants take hold. Plant species are to be selected from native species naturally occurring on the site and relevant to the land zone upon which the revegetation occurs.

Ground preparation and ongoing monitoring/maintenance for landscaping of any bare areas shall occur in accordance with sections 4.2.2 and 4.2.3.



**SUPPLEMENTARY BUSHLAND MODULE 10m X 10m**

module layout indicative only to illustrate intended densities and ratios of plantings

**FIGURE 6: SUPPLEMENTARY BUSHLAND MODULE FOR FAILED ASSISTED REGENERATION AREAS**



**TABLE 3: REVEGETATION MODULES**

RE Module Number	Short Description	Biodiversity Status	Applicable Rehabilitation Unit	Applicable Priority Weed Management Area
12.9-10.17	Open forest to woodland complex generally with a variety of stringybarks, grey gums, ironbarks and in some areas spotted gum on Hills and ranges of Cainozoic and Mesozoic sediments	No Concern At Present	RU1	MA1 (on land zone 9-10)
12.9-10.17a	Lophostemon confertus or L. suaveolens dominated open forest usually with emergent Eucalyptus and/or Corymbia species. Occurs in gullies and southern slopes on Cainozoic and Mesozoic sediments	No Concern At Present	RU2	MA2
12.8.14	Eucalyptus eugenoides, E. biturbinata, E. melliodora +/- E. tereticornis, Corymbia intermedia woodland on Cainozoic igneous rocks	No Concern At Present	RU3, RU4	MA1 (on land zone 8)

MODULE 12.9-10.17			
Species	Size	Percentage	QTY
Trees			
<i>Eucalyptus acmenoides</i>	75mm Tube	70%	Determined onsite to achieve densities of 1 plan per m <sup>2</sup> The first three trees must be used and at least one koala food tree must be used
<i>Eucalyptus major</i>			
<i>Eucalyptus siderophloia</i>			
<i>Corymbia citriodora</i>			
<i>Corymbia intermedia</i>			
<i>Eucalyptus microcorys</i>			
Understorey Small Trees/Shrubs			
<i>Allocasuarina torulosa</i>	75mm Tube	20%	Determined onsite to achieve densities of 1 plan per m <sup>2</sup> Allocasuarina species must be used
<i>Alphitonia excelsa</i>			
<i>Acacia leiocalyx</i>			
<i>Acacia disparrima</i>			
<i>Trema tomentosa</i>			
<i>Wikstroemia indica</i>			
<i>Acacia falcata</i>			
<i>Alyxia ruscifolia</i>			
Groundcovers			
<i>Dianella caerulea</i>	75mm Tube	10%	Determined onsite to achieve densities of 1 plan per m <sup>2</sup>
<i>Lepidosperma laterale</i>			
<i>Lomandra longifolia</i>			
<i>Eremophila debilis</i>			
<i>Cymbopogon refractus</i>			
<i>Themeda triandra</i>			
<i>Alloteropsis semialata</i>			

MODULE 12.9-10.17a			
Species	Size	Percentage	QTY
Trees			
<i>Lophostemon confertus</i>	75mm Tube	70%	Determined onsite to achieve densities of 1 plan per m <sup>2</sup> The first tree must be used and at least one koala food tree must be used
<i>Eucalyptus major</i>			
<i>Eucalyptus grandis</i>			
<i>Corymbia intermedia</i>			
<i>Eucalyptus microcorys</i>			
Understorey Small Trees/Shrubs			
<i>Allocasuarina torulosa</i>	75mm Tube	20%	Determined onsite to achieve densities of 1 plan per m <sup>2</sup> Allocasuarina species must be used
<i>Backhousia myrtifolia</i>			
<i>Carissa ovata</i>			
<i>Mallotus philippensis</i>			
<i>Aphananthe philippinensis</i>			
<i>Alchornea ilicifolia</i>			
<i>Toeckima tenax</i>			
<i>Cryptocarya triplinervis</i> var <i>pubens</i>			
<i>Jagera pseudorhus</i>			
Groundcovers			
<i>Dianella longifolia</i>	75mm Tube	10%	Determined onsite to achieve densities of 1 plan per m <sup>2</sup>
<i>Gahnia aspera</i>			
<i>Lomandra multiflora</i>			
<i>Cheilanthes sieberi</i>			
<i>Adiantum hispidulum</i>			
<i>Calochlaena dubia</i>			

MODULE 12.8.14			
Species	Size	Percentage	QTY
Trees			
<i>Eucalyptus eugenioides</i>	75mm Tube	70%	Determined onsite to achieve densities of 1 plan per m <sup>2</sup> The first three trees must be used and at least one koala food tree must be used
<i>Eucalyptus biturbinata</i>			
<i>Eucalyptus melliodora</i>			
<i>Eucalyptus tereticornis</i>			
<i>Corymbia intermedia</i>			
<i>Eucalyptus microcorys</i>			
Understorey Small Trees/Shrubs			
<i>Allocasuarina torulosa</i>	75mm Tube	20%	Determined onsite to achieve densities of 1 plan per m <sup>2</sup> Allocasuarina species must be used
<i>Angophora subvelutina</i>			
<i>Exocarpos cupressiformis</i>			
<i>Acacia maidenii</i>			
<i>Bursaria incana</i> var. <i>incana</i>			
<i>Breynia oblongifolia</i>			
<i>Jacksonia scoparia</i>			
<i>Leucopogon juniperinus</i>			
<i>Oxylobium ilicifolium</i>			
Groundcovers			
<i>Dianella brevipedunculata</i>	75mm Tube	10%	Determined onsite to achieve densities of 1 plan per m <sup>2</sup>
<i>Lepidosperma laterale</i>			
<i>Lomandra longifolia</i>			
<i>Imperata cylindrica</i>			
<i>Cymbopogon refractus</i>			
<i>Themeda triandra</i>			

\*Planting schedule species selected from REDD (DEHP, 2016), SEQld Technical Descriptions (Ryan et al (2012), QLD BVGs (Nelder et al, 2015), Supplementary Descriptions (Bean et al, 1998) and native species recorded on site relevant to the community (Planit, 2004-2016). Canopy trees must however be dominated by those specifically listed within the above modules (i.e. dominant species typical to each regional ecosystem designation) and must utilize koala foraging trees.



#### Revegetation (Reconstruction)

This type of revegetation will occur in the instance that 'assisted natural regeneration' works are unsuccessful (as described above). Revegetation within these areas (only where required) will be reflective of the following:

- Planting of the Eucalypt Open Forest Module relevant to the pre-clearing regional ecosystem where the revegetation occurs (i.e. 12.8.14, 12.9-10.17, 12.9-10.17a)

Ground preparation and ongoing monitoring/maintenance shall occur in accordance with sections 4.2.2 and 4.2.3.

All species must be planted to suit site conditions and will be placed in an appropriate location within the profile (i.e. species which tolerate wet conditions will be located in gullies, and species which tolerate drier conditions will be located further from gullies and in drier areas of the OA).

#### **4.2.2 REVEGETATION TECHNIQUES**

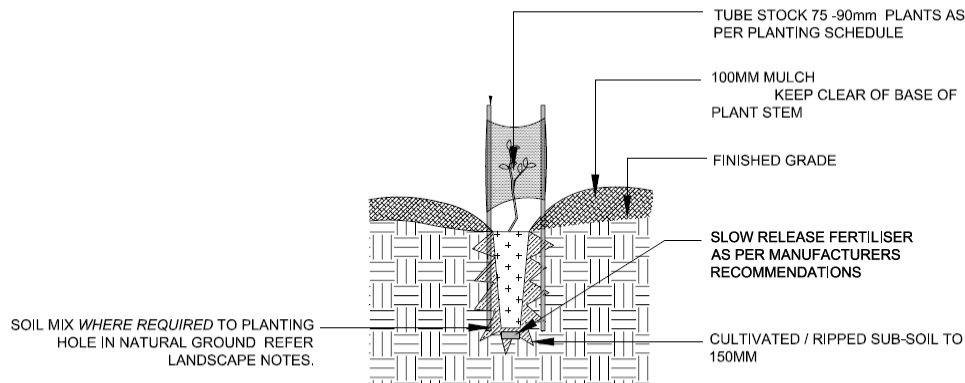
##### *Reconstruction (Landscaping)*

This technique is suitable for small-scale sequential revegetation of disturbed areas, and within open locations to increase crown cover. Landscaping is the most common method of revegetation, however, it does require establishment, maintenance watering, mulching and weeding and also has the highest cost. The landscaping process should occur as follows:

- Identify areas on site which require direct planting (i.e. areas deemed unsuccessful 'assisted natural regeneration sites' as outlined within Section 4.2.1 above)
- Ensure areas identified are appropriately prepared (refer below) including mulching with forest mulch;
- Select plant species to be utilised from Section 4.2.1;
- Maintain and monitor area in accordance with section entitled 'Monitoring and Maintenance'.

Prior to the planting within designated areas, the following ground preparation works are to be undertaken:

- Any existing hollow logs, regenerated native plants and natural fallen debris are to be retained insitu to retain habitat for reptiles, amphibians, ground dwelling mammals and potentially the Bush Stone-curlew;
- Undertake weed control;
- Undertake follow-up weed treatment where required to remove individuals which have germinated from soil bank resources;
- Provide forest mulch (100mm depth min.) to revegetation area;
- Plant species in accordance with Section 4.2.1 above. It is considered that the revegetation palettes have been designed to achieve canopy closure in the shortest possible time (i.e. by utilization of fast growing and pioneer canopy trees) in order to minimize weed growth and associated competition with planting works.



DETAIL TUBE STOCK PLANTING TYPICAL DETAIL  
nts

N.B. revegetation shall only be necessary potentially within future areas deemed as unsuccessful 'assisted regeneration' sites as discussed in Section 4.2.1. All reconstruction/revegetation works within the OA must be reflective of the pre-clearing regional ecosystem structure and vegetation types as nominated within section 4.2.1 (Supplementary Bushland Modules for Failed Regeneration Sites).

#### PHYTOPHTHORA PROTOCOL

*Phytophthora* is a microscopic soil borne organism which causes environmental damage in natural ecosystems including root rot of a wide variety of native plant species. Where there is a risk of *Phytophthora*, bush regeneration contractors/landscapers must follow hygiene related processes with equipment prior to entering the rehabilitation zone including:

- Cleaning off all dirt from boots on arrival and departure from site;
- Disinfect boots with mentholated spirits;
- Scrub boot with stiff brush and follow similar principle for tools
- Use of Metholated spirits in spray bottle for secateurs, loppers, knives, etc.
- Plants identified to be infected by *Phytophthora* should be treated with a fungicide containing potassium phosphonate in accordance with best practice guidelines

#### MYRTLE RUST PROTOCOL

Myrtle Rust (*Uredo rangelii*) is a newly described fungus that is closely related to the Eucalyptus/Guava rusts. It infects leaves of susceptible plants producing spore-filled lesions on young actively growing leaves, shoots, flower buds and fruits. Leaves may become buckled or twisted and may die as a result of infection. In association with revegetation on site all nursery stock introduced to the property must come only from plant nurseries following the hygiene protocols as set out within the Nursery Industry Myrtle Rust Management Plan-2011 for the prevention of spread of this fungus.

#### HYGIENE MANAGEMENT

Weed colonisation commonly occurs via the movement of vehicles and machinery, stock, native and feral animals throughout a site. Transport of seeds or other weed reproductive material via vehicle tyres can facilitate the spread of weeds to previously unaffected areas, particularly when vehicles are travelling over long distances or travelling from an infested



site into an uninfested area. For this site the risk is reduced as the offset area is comparably small, light machinery/vehicles only will be permitted in the offset area and locally (SEQLD) based contractors are likely to be utilized and as such potentially affected vehicles will not be coming from external bioregions. Regardless a simple hygiene protocol should be implemented that ensures that vehicle and equipment are washed down prior to entering the offset area.

#### 4.2.3 MAINTENANCE AND MONITORING

##### *Maintenance*

- Existing weeds within the offset area are to be treated such that at least 90% of the offset area has been treated within five years of the commencement of this plan.
- Reoccurring or reestablishing weeds are to be treated annually thereafter as required by monitoring results
- Within the rehabilitation zone all fallen debris and hollow logs are to be retained insitu within the to retain habitat for reptiles, amphibians, ground dwelling mammals and potentially the Bush Stone-curlew;
- Planting areas ('reconstruction') are to be regularly watered for a period of twelve weeks
- Replacement planting of stock loss shall occur as required to achieve the performance criteria listed in subsequent section of this report.

##### *Monitoring*

The success of a regeneration project can be assessed by systematic visual monitoring of rehabilitation areas. This need not be an overly time-consuming process and the data generated can then be used to compare the success of various treatments. The measurements to be visually monitored are:

- Estimated average height of plants (height in metres for tree, shrub and groundcover species);
- Dominant species (qualitative description of dominant species within tree, shrub and ground layer);
- Area of ground cover covered by weed species (area in square metres);
- Death or illegal removal of any native plants;
- Incidence of recruitment, both exotic and native (species and quantity estimates of new species noted [i.e. D = dominant, C = codominant, A = associated, S= isolated/suppressed])
- Native fauna presence (native fauna species recorded via observation, track or trace during inspections are to be noted)
- Search for feral predator scats

The simplest of all methods of monitoring a site is to establish permanent photo points and take photographs at regular intervals during the establishment period, and to regularly (i.e. annually) traverse the rehabilitation area(s). In this regard, eleven monitoring points have been established (refer Figure 5 above) which shall be photographed on an annual basis and results recorded for the variables identified to be monitored. Photographs shall be taken at 360 degrees at either the 50m point of the four biocondition sites or centre of each of the seven qualitative/visual assessment sites. The monitoring points will be marked with star pickets or flagging tape to allow easy identification in the field.

The annual monitoring results and photographs shall be maintained for the life of the approval and be included within the annual Compliance Report provided to DoE in

accordance with approval EBPC2015/7485. Two simple routine monitoring forms have been prepared below for this purpose. The form also incorporates additional monitoring statements relating to issues other than regeneration or weed growth (i.e. illegal access, fence condition etc) which may trigger adaptive management/corrective actions.

#### ANNUAL MONITORING SITES

BIOCONDITION SITE	PLANIT VEGETATION COMMUNITY MAPPING (2004)	DNRM REGIONAL ECOSYSTEM MAPPING (2016)	REHABILITATION UNIT	360° PHOTOS TAKEN AT
1	1-Tall Mixed Eucalypt Open Forest/Woodland	12.8.14	RU3	50m point of 0.5ha site
2	2-Open Paddock with Scattered Trees/Regrowth	Regrowth 12.8.14	RU4	50m point of 0.5ha site
3	1a- Tall Wet Sclerophyll Forest	12.9-10.17a	RU2	50m point of 0.5ha site
4	1-Tall Mixed Eucalypt Open Forest/Woodland	12.9-10.17	RU1	50m point of 0.5ha site

REHABILITATION UNIT	QUALITATIVE/ VISUAL MONITORING SITE	PLANIT VEGETATION COMMUNITY MAPPING (2004)	DNRM REGIONAL ECOSYSTEM MAPPING (2016)	360° PHOTOS TAKEN AT
RU1	P1, P6, P7	1-Tall Mixed Eucalypt Open Forest/Woodland	12.9-10.17	centrepoin of 10m x 10m quadrat
RU2	P4, P5	1a- Tall Wet Sclerophyll Forest	12.9-10.17a	centrepoin of 10m x 10m quadrat
RU3	P3	1-Tall Mixed Eucalypt Open Forest/Woodland	12.8.14	centrepoin of 10m x 10m quadrat
RU4	P2	2-Open Paddock with Scattered Trees/Regrowth	Regrowth 12.8.14	centrepoin of 10m x 10m quadrat





MONITORING FORM A-GENERAL [ANNUAL]		
<p><u>General Management</u></p> <p>Has there been a fire within the last period? _____</p> <p>Does the adjacent fire trail require mowing or maintenance to reduce fire risk? _____</p> <p>Is there evidence of rubbish dumping within the management area? _____</p> <p>Is there evidence of plant theft within the management area? _____</p> <p>Does it appear that the management area has been utilized for stockpiling, vehicle parking, building waste dumping, domestic animal walking or stock grazing? _____</p> <p>If yes, acknowledge below what works were undertaken to rectify/restore and the date _____</p>	<p><u>Weeds</u></p> <p>Have any areas of weeds re-established within the management area during the last period? _____</p> <p>What species? _____</p> <p>Estimate the area of new weed coverage in square metres _____</p> <p>What management was undertaken to eradicate these weeds? _____</p> <p>If management was undertaken acknowledge that such was performed in accordance with the weed management plan. _____</p>	<p><u>Vegetation regeneration [10m x 10m quadrat]</u> add additional page if necessary</p> <p>Natural regeneration is occurring in (height range estimate):</p> <ul style="list-style-type: none"><li>- Tree species _____</li><li>- Shrub species _____</li><li>- ground covers _____</li></ul> <p>What are the dominant species within each layer?</p> <ul style="list-style-type: none"><li>- Tree _____</li><li>- Shrub _____</li><li>- ground covers _____</li></ul> <p>Provide a list of flora species (on the back) observed and an estimate of abundance (i.e. D = dominant, C = codominant, A = associated, S= isolated/suppressed) _____</p> <p>Have you noticed any new native plant species since the last inspection? _____</p> <p>If yes name the species or take a photograph _____</p> <p>Acknowledge that the required routine photographs have been taken within the monitoring points _____</p>
<p><u>Biodiversity</u></p> <p>Have you spotted native fauna within the management area during inspection?</p> <p>If yes, what types?</p> <p>Frogs _____</p> <p>Koala _____</p> <p>Kangaroo/wallaby _____</p> <p>Possums/glidens _____</p> <p>Small mammal (i.e. bandicoot, echidna) _____</p> <p>Reptiles (i.e. snakes/lizards) _____</p> <p>Birds of prey _____</p> <p>Large birds (i.e. lorikeets, parrots, coucal) _____</p> <p>Small tree and ground birds (i.e. finches, fairy wrens, treecreepers) _____</p> <p>Flying Foxes _____</p> <p>Pest Animals _____</p> <p>Other _____</p> <p>Confirm that predator scats were searched for within the quadrat and any encountered were sent away for analysis _____</p>	<p><u>Modifications</u></p> <p>Have there been any structural additions (eg. new tracks, fences etc) to the management area since the last visit?</p> <p>What actions were undertaken to remove any illegal modifications?</p>	<p>Are any of the following performance criteria exceeded or not achieved?</p> <p>Declared Weeds? _____</p> <p>Extent of other Weeds? _____</p> <p>Survival Rate of Plants? _____</p> <p>Condition of Plants? _____</p> <p>Canopy Coverage? _____</p> <p>Tree, Small Tree &amp; Shrub Diversity? _____</p> <p>Groundcover Coverage? _____</p> <p>General Coverage/Success? _____</p> <p>If yes, what corrective action was performed (i.e. weed recolonistaion was evident so routine management was performed as per Table 2; garden waste dumping was noted and removed, assisted regeneration was deemed unsuccessful and revegetation of the relevant module was undertaken etc).</p>

## MONITORING FORM B-CONDITION [ANNUAL] (ADAPTED FROM KANOWSKI ET AL, 2010)

### Protocol for assessing site condition

The steps in condition assessment are listed below. A pro-forma for assessing site condition, based on this protocol, is provided on the following page:

1. Obtain any previous condition assessment of the site, including maps, and other relevant documentation of the site.
2. Conduct a field inspection within the management area. Based on the table below determine whether all or part of the site is:
  - o OK ('on track' towards target conditions, requires only routine maintenance);
  - o Uncertain (significant problems identified, requires intervention); or
  - o Poor (major problems identified, likely to fail without major intervention).

Make overall comments on the condition of the monitoring area (MA).

Determine whether the conditions of the monitoring area have changed since last assessment, and comment on any changes.

Complete the table describing the monitoring area condition in detail. Where outcomes vary across the monitoring area, divide the MA into zones ('A' = OK, 'B' = uncertain; 'C' = poor) and record outcomes for each zone separately. Comment on the attributes of each zone, particularly the factors that appear to be affecting outcomes, such as the canopy species mix and cover, regeneration/recruitment rates and heights, weeds, disturbance or maintenance.

Draw a map of the MA showing any variation in outcomes. Calculate the area of each zone and the proportion of the site in each one. Make recommendations for maintenance, where relevant. The rating system is closely linked to maintenance requirements:

- o Zone A = routine maintenance only required;
- o Zone B = additional maintenance required, more than routine (need to describe);
- o Zone C = major maintenance effort required (need to describe).

Note that what comprises 'routine' maintenance will often change (e.g. from regular spraying to spot-checking and control of weeds) as site works progress. However, should a major disturbance occur during the project timeframe, routine maintenance may revert to regular broad-scale weed control.

If desired, calculate an overall 'site condition' score. This score reflects the proportion of the site in good, uncertain or poor condition, and ranges from 0% (when the entire site is in poor condition) to 100% (when the entire site is 'on track' to target conditions).

Various intermediate scores are possible (e.g. a score of 50% could mean 50% of the site is 'OK' and the rest 'poor'; it could also mean that 40% is 'OK', 20% 'uncertain', and the rest 'poor'). To calculate the score, multiply the percentage of the site zoned as A, B or C by a suggested 'condition rating' for each zone: Zone A (OK) = 1; Zone B (uncertain) = 0.5; Zone C (poor) = 0, and add the products.

### Criteria for assessing the condition of established sites after initial canopy closure.

Rating / zone	Status	Canopy cover	Ground cover	Problem weeds	Recruitment (e.g. seedlings)	Maintenance requirements
<b>A</b>	<b>OK</b> On track to target conditions	>70%	Mostly leaf litter, bare soil, woody debris and recruits.	Not present or minor occurrence.	Numerous recruits of native species given site location and stage of development.	Routine maintenance only.
<b>B</b>	<b>Uncertain</b> if will develop towards target conditions. Significant problems.	50-70%	Mixed or patchy leaf litter / bare soil and grass.	If present, have the potential to impede site development.	Not many recruits of native species given location or stage of development; exotic species may be common recruits.	Extra effort required to fix problems, additional to routine maintenance.
<b>C</b>	<b>Poor</b> Major problems. Likely to fail.	<50%	Mostly dense grass or weeds.	May be common, or likely to impede site development.	Very little recruitment of native species and/ or recruitment dominated by exotic species.	Major effort required to address problems.

### Notes

**Canopy cover:** Shade cast by vegetation >2 m height if the sun is directly overhead. Typically, canopy cover must exceed 70% to suppress vigorous grasses and light-demanding weeds.

**Ground cover:** Includes various plant life forms, organic debris, and soil and rocks. Important components of ground cover to consider when assessing condition include, (i) leaf litter (or mulch), (ii) bare soil, and (iii) grass and weeds. These components reflect canopy closure and/ or maintenance and affect plant recruitment and growth.

**Problem weeds:** Plants that may degrade the canopy or other elements of vegetation structure, suppress planted trees or prevent the establishment or growth of recruits (e.g. some vines, grasses, scramblers: the actual species will vary with locality).





MONITORING FORM B-CONDITION FOR 10M X 10M MONITORING SITE

PROJECT DESCRIPTION

Project name: Finch Road Offset		Project ID: EPBC2015/7485
Site location centrepoint (MGAz56):		Monitoring Site ID:
Type of on-grounds: Monitoring of Assisted Natural Regeneration	Years since site commenced:	When was this site last assessed?
Current assessment conducted by:	Date of current assessment:	
Overall comments on site condition:		
Has the condition of the site changed since last assessment? YES ..... or NO ..... If Yes, briefly describe changes in this box, and provide details in table below.		

DESCRIPTION OF SITE CONDITION Complete table annually. Also draw map and take photographs.

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
A = OK on track towards target								(should be routine: describe if necessary)
B = Uncertain significant problems								(describe)
C = Poor major problems, likely to fail								(describe)
Overall Condition Score (ranges from 0-100%) Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%								..... %

MAP OF SITE CONDITION [SUPPORT WITH IMAGES]

Draw a map of the monitoring site, showing variation in outcomes as zones (Zone A = OK, Zone B = Uncertain, Zone C = Poor).

#### 4.2.4 REHABILITATION PERFORMANCE CRITERIA

The following performance criteria are to be achieved within offset area in relation to weed management and assisted natural regeneration:

- The contractor undertaking regeneration works is to be a suitably qualified professional.
- Existing native vegetation to be retained
- Weed inspection (and treatment where necessary) will occur annually.
- No declared Class I or Class II weeds are to be present within the offset area within five years of the commencement of this plan and are to be eradicated as they are discovered annually thereafter
- Environmental weed species (woody weeds, all vines and herbaceous groundcovers/grasses) are to have initial treatment throughout at least 90% of the offset area within five years of the commencement of this plan.
- A significant reduction in the extent of other weed species within the offset as compared to its current state is to be evident. In practice it is noted that the removal of all individuals of all weed species is unachievable. Therefore it is considered appropriate that the following performance criteria be adopted for the 112ha offset area:
  - All large weed trees are to be treated within the first five years;
  - Scattered woody weed shrubs may occur but not covering an area greater than 5000m<sup>2</sup> in any one location and not covering a combined area greater than 25000m<sup>2</sup> which represents 2.3% of the entire extent of the offset area;
  - Scattered groundcover weed species but not covering an area greater than 5000m<sup>2</sup> in any one location and not covering a combined area greater than 25000m<sup>2</sup> which represents 2.3% of the entire extent of the offset area.
- All weed treatment must be performed in a manner which does not promote erosion or instability of gully banks or soil.
- A survival rate of at least ninety percent of revegetated plants (where planted as a corrective action to failed assisted regeneration efforts) is to occur within the first 12 months of planting. Stock to exhibit fair or healthy conditions:

Condition	Descriptor
Healthy	Leaves green, no abnormal leaf loss
Fair	Leaves green, some yellowing of leaves, but <20% of canopy affected
Poor	Many leaves yellow or brown, substantial reduction in canopy extent since last measurement
Dead	Leaves brown or absent, little of the canopy remaining

#### Assisted Natural Regeneration Criteria

- Increases in habitat condition (quality) are to occur from the baseline scores within all monitored areas including:
  - The four 0.5 hectare biocondition transect sites
  - The seven 10m x 10m qualitative/visual monitoring sites

Biocondition monitoring shall be undertaken from within the first year of commencement of construction of the Canungra Rise Estate and every three years thereafter. After the first two rounds of biocondition monitoring (i.e. six years after commencement construction) success of the natural regeneration effort shall be assessed in association with the annual visual monitoring plots and biocondition assessments as outlined within the attached Offset Management Plan.

This shall be determined via the cover of the natural regeneration zones with native species. In order for assisted natural regeneration to be considered successful the following is to be present over the majority of the monitored sites within the offset area:

- generally 1 plant per square metre to the rehabilitation zone (or establishment of leaf litter/natural debris and/or foliage projection cover typical to surrounding areas of the pre-clearing regional ecosystem)



- An increase in biocondition score within the biocondition monitoring transects
- An increase in qualitative/visual condition score within the visual monitoring quadrats
- Assisted regeneration areas must exhibit recruitment of species typically occurring within pre clearing regional ecosystems (i.e. RE12.8.14, 12.9-10.17, 12.9-10.17a species).

#### *Adaptive Management/Corrective Actions*

The following corrective actions are to be implemented in instances of non-compliance with the performance requirements:

- If retained trees show signs of ill health (i.e. poor or dead), a horticulturalist is to be employed to identify likely causes and to recommend mitigation measures to improve regeneration conditions
- In the event of increased weed cover or non-response of treated areas during annual monitoring:
  - Re-treat the area and increase the re-inspection/re-application rate to ensure any juvenile recruitment is eradicated before it can become established
  - Investigate alternative weed management regimes or techniques for species which do not respond to treatment
  - Develop and implement an updated weed control table.
  - Revise hygiene protocols
- If evidence of excessive spraying exists or if off target damage is evident, revegetation will be required to ensure all areas of the OA are stable and not at increased risk of erosion due to off target damage.
- All areas within the rehabilitation zone which have been disturbed by construction activities associated with the development are identified as reconstruction areas and will require revegetation treatment according to section 4.2.2
- Any assisted natural regeneration areas which are considered failed, bare or denuded (six years after commencement of construction for the relevant stage) shall be addressed via reconstructive management (i.e. revegetation). This revegetation will be implemented and maintained for 3 months to ensure plants take hold.
- Where planted specimens fail to strike within 12 months of plantings, supplementary plantings are to be undertaken
- If regular increases in height and crown cover extent of revegetation areas are not recorded within 18 months of planting a horticulturalist is to be contracted to identify likely causes and to recommend measures (i.e. fertiliser application, increased watering etc) to encourage increased growth.

#### 4.2.5 REHABILITATION STAGING

The Canungra Rise e is a staged development which will be undertaken over approximately 5-10 years and includes a large offset area which requires management in comparison to the actual physical area of disturbance.

It is proposed that initial weed control and assisted rehabilitation measures be commenced in association with the commencement of construction as required by the EPBC approval but it will take a period of five years before all areas of the offset (117 hectares) receives treatment. Logically this will occur from west to east with approximately 23 hectares to be treated each year for the first five years. After the first five years of initial treatment annual control will be undertaken across the entire offset as determined by the monitoring results.

Despite the above, however, the described and mapped priority management areas (refer Section 4) must receive initial treatment within the first three years regardless of the intended east to west staging as these areas contain declared and significantly invasive weeds which can degrade habitat rapidly.

Please note that some components of the rehabilitation plan will be tied to the roll-out of construction for a development stage (i.e. erection of temporary tree protection fencing, salvage of hollow logs). A summary of staging of rehabilitation planning, weed management /rehabilitation works, monitoring and evaluation of success taking into consideration the staging plan for the development, is provided in Table 4.



TABLE 4: SCHEDULE OF RESTORATION WORKS

[✓] denotes a required or routine inspection and/or rehabilitation action [X] denotes a routine inspection but implementation of reactive action/maintenance where the inspection indicates that a performance criteria has not been achieved (i.e. weeds have recolonised after initial treatment and re-treatment is required; assisted regeneration failed and reconstruction/landscaping is required)																						
TASKS		YEARS																				
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1.	Undertake baseline surveys	✓																				
2.	Prepare Weed and Rehabilitation Management Plan	✓																				
3.	Survey boundary of offset and prepare Voluntary Declaration (refer Offset Management Plan)	✓																				
4.	Hire Bush Regenerator Contractor/Weed Control Contractor	✓																				
5.	Installation of tree protection fencing excluding construction zone from Offset area (N.B. performed on a construction stage by stage basis)	✓																				
6.	Remove rubbish/dumping from the offset area (N.B. performed on a construction stage by stage basis)		✓																			
7.	Salvage hollow limbs and logs from development envelope and relocate into offset area habitats (N.B. performed on a construction stage by stage basis)		✓																			
8.	Undertake initial weed treatment within the offset area focussing immediately on priority management areas and extending to less infested areas as a result of annual monitoring surveys. Ensure that: <ul style="list-style-type: none"><li>Environmental weed species (woody weeds, all vines and herbaceous groundcovers/grasses) are to have initial treatment throughout at least 90% (i.e. 100 hectares) of the offset area within five years of the commencement of this plan.</li><li>A significant reduction in the extent of other weed species within the offset as compared to its current state is to be evident. In practice it is noted that the removal of all individuals of all weed species is unachievable. Therefore it is considered appropriate that the following performance criteria be adopted for the 112ha offset area:<ul style="list-style-type: none"><li>All large weed trees are to be treated within the first five years;</li><li>Scattered woody weed shrubs may occur but not covering an area greater than 5000m<sup>2</sup> in any one location and not covering a combined area greater than 25000m<sup>2</sup> which represents 2.3% of the entire extent of the offset area;</li><li>Scattered groundcover weed species but not covering an area greater than 5000m<sup>2</sup> in any one location and not covering a combined area greater than 25000m<sup>2</sup> which represents 2.3% of the entire extent of the offset area.</li></ul></li></ul>		✓	✓	✓	✓	✓															
9.	Undertake visual/qualitative surveys of 10m x 10m monitoring plots (refer section 4.2.3 and Attachment 3 of OMP) to enable direct comparison following commencement of weed management/rehabilitation works		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
10.	Evaluate 10m x 10m monitoring quadrat results against weed management and rehabilitation performance criteria		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
11.	Undertake additional weed treatment where identified as necessary as a result of monitoring [re-inspect after one month to retreat regrowth/regeneration of weeds where needed]						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
12.	Assess 0.5 hectare biocondition transect sites (refer section 5 of OMP and Attachment 2 of OMP) to enable direct comparison following commencement of weed management/rehabilitation works				✓		✓			✓			✓			✓			✓			
13.	Evaluate success of 'assisted natural regeneration' works and identify any areas of failure in accordance with Section 4.2.1						✓			✓			✓			✓			✓			
14.	For failed regeneration sites prepare area for reconstruction/revegetation including: <ul style="list-style-type: none"><li>Arrange for required tubestock with species and densities to be selected in accordance with Section 4.2.1 and 4.2.2</li><li>arranging for mulch</li><li>scarification of compacted topsoil (as necessary)</li><li>excavate tubestock planting holes</li><li>apply sustained release fertiliser</li></ul>						X			X			X			X			X			
15.	Undertake tubestock planting and water/maintain for three months						X			X			X			X			X			
16.	Undertake routine monitoring of any required restoration/revegetation areas in association with annual visual/qualitative 10m x 10m monitoring plots							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
17.	Assess survival and health of planted stock within reconstruction/revegetation areas and apply fertiliser or replace as necessary							X			X			X			X			X		
18.	Assess success of weed management/rehabilitation management plan against Performance Criteria		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
19.	Implement corrective actions where necessary and identified as a result of monitoring		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
20.	Include monitoring results within Annual Compliance Report(refer Section 7 of OMP)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
21.	Seek formal completion of the Weed and Rehabilitation Management Plan in association with the completion of the Offset Management Plan from DoE.																					✓

## 5.0 REFERENCES

Big Scrub Rainforest Landcare Group (2005) Subtropical Rainforest Restoration: A Practical Manual and Data Source for Landcare Groups, Land Managers and Rainforest Regenerators. BSRLG, Bangalow.

Bradley, J. (1988) Bringing back the bush: The Bradley method of bush regeneration. Lansdowne Publishing Pty. Ltd. The Rocks, NSW.

Buchanan, R. A. (1989) Bush Regeneration: Recovering Australian Landscapes. TAFE Student Learning Publications, NSW.

Chenoweth EPLA and Bushland Restoration Services (2012) South East Queensland Ecological Restoration Framework: Manual. Prepared on behalf of SEQ Catchments and South East Queensland Local Governments, Brisbane

DNRME/Qld Herbarium (Batianoff, George N. and Butler, Don W) (2002) Batianoff, George N. and Butler, Don W. (2002). Assessment of Invasive naturalized plants in south-east Queensland. Appendix. Plant Protection Quarterly 17, 27-34.

Eyre, T.J., Kelly, A.L, Neldner, V.J., Wilson, B.A., Ferguson, D.J., Laidlaw, M.J. and Franks, A.J. (2015). BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual. Version 2.2. Queensland Herbarium, Department of Science, Information Technology, Innovation and Arts, Brisbane.

Eyre, T.J., Kelly, A.L., and Neldner, V.J. (2011). Method for the Establishment and Survey of Reference Sites for BioCondition. Version 2.0. Department of Environment and Resource Management (DERM), Biodiversity and Ecological Sciences Unit, Brisbane.

GCCC (2007) Guideline for the Preparation of a Rehabilitation Plan in Open Space Management Guideline. GCCC, Nerang.

Greening Australia (1995) Local Greening Plans: A Guide for Vegetation and Biodiversity Management. Greening Australia, Canberra

Kanowski, J., Catterall, C. P., Freebody, K., Freeman, A. N. D. and Harrison, D. A. (2010) Monitoring

Mann, M. (2000) Toxicological Impact of Agricultural Surfactants on Australian Frogs (PHD Thesis). Curtin University of Technology, Perth

NSW Agriculture (2004) Noxious and Environmental Weed Control Handbook: A Guide to Weed Control in Non-Crop, Aquatic and Bushland Situations.

Nufarm Australia Limited (undated) Roundup Biactive Herbicide by Monsanto NRA Approval No. 48518/1102

Nursery and Garden Industry Queensland (2011) Australian Nursery Industry Myrtle Rust Uredo rangelii Management Plan 2011. Nursery and Garden Industry Australia, Sydney.

Revegetation Projects in Rainforest Landscapes. Toolkit Version 3. Reef and Rainforest Research Centre Limited, Cairns

Robertson, M. (1994) Stop Bushland Weeds: A guide to successful weeding in South Australia's bushland. The Nature Conservation Society of South Australia Inc.

Ryan, T.S. (ed.) (2012) Technical Descriptions of Regional Ecosystems of Southeast Queensland. Queensland Herbarium, Department of Science, Information Technology, Innovation and the Arts: Brisbane

TSC (2009) Site Action Plan Guideline to Guide Ecological Restoration Planning and Ongoing Management of Native Vegetation and Fauna Habitat. Tweed-Byron Bush Futures Project.



**ATTACHMENT 5**

**FIELD DATA SHEETS**

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# BIOCONDITION SITE ASSESSMENT DATASHEET



Queensland Government

## OFFICE USE ONLY

Entered:.....  
Checked:.....  
Corrected:.....

Site ID: Finch Road offset

DATE: 4/10/2016

BioCon survey number: Bio 1

OBSERVERS: GD

## SITE INFORMATION

General habitat survey number: .....

LOCATION: (GPS reference)

Bioregion: 12

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: MGA256 Location derivation: GPS

Road: zone: .. easting: .. northing: .. Plot Centre Direction: .. m at 203°SW degrees

Plot Origin: zone: 56 easting: 516 928 northing: 6902 805 Accuracy: 4

Plot Centre zone: 56 easting: 516 899 northing: 6902 771 Accuracy: 5

Plot bearing: 203°SW Plot alignment description: slight downhill slope

Locality description (include tenure and reserve number): Canberra Rise Offset within Lot 91

## REGIONAL ECOSYSTEM AND TREE HEIGHTS:

Habitat Description Eucalypt Open Forest to Woodland Few weeds. Shrub layer typically sparse.  
Grassy understorey

Regional Ecosystem: 12.8.14 Tree Canopy (EDL\*) height: 14.0 Tree subcanopy and/or emergent ht: S: N/A E: N/A

## SITE PHOTOS:

(Photo Numbers)

Plot centre:

North ☒

South ☒

East ☒

West ☒

Landscape photo(s): ☒

Spot photo(s): ☒

## 50 x 20m area:

(NB: All logs >10cm, >0.5m within 50 x 20m area measured to the plot boundary)

### Coarse woody debris:

Length: 7.2, 5.4, 6.2, 3.2, 3.0, 1.1

Tree g. within canopy: Recruitment?

*E. tereticornis* HHH III ✓

*E. microcarpa* I

*E. crebra* HHH III ✓

*C. citridora* II ✓

*A. subulbina* HH ✓

*E. meliodora* HHH ✓

Site Total:

Per ha Total: Excel

## 100 x 50m area:

(NB: \*Ecologically Dominant Layer. Tree defined as single stemmed over 2m. All tree species in the 100 x 50m (not just EDL species)

### Total native tree spp richness: HHH HHH II

*E. tereticornis* *A. melanoxylon*

*E. microcarpa* *Alb. toulouga*

*A. dipetala* *C. tessellata*

*E. crebra* *Alb. littoralis*

*A. subulbina* *C. intermediaria*

*C. citridora* *E. meliodora*

Total: 12

### Proportion of dominant canopy (EDL)

species with evidence of recruitment: 50 %

## 50 x 10m area: Native Plant Spp Richness:

(NB: List species if known or count if unknown. Shrub is defined as single stemmed below 2m or multi-stemmed from base or below 20cm)

Total

Shrub spp. richness: HHH I

*E. tereticornis*, *Acacia subulbina*, *Acacia maidenii*, *Acacia dipetala*, *Acacia melanoxylon*

*Acacia dealbata*

6

Grass spp. richness: HH

*Imperata cylindrica*, *Themeda danthonioides*, *Cymbopogon citratus*, *Poa sp.*, *Polypogon monspeliensis*

5

Forbs and others spp. richness: HHH HHH

*Desmodium sp.*, *Alcea sp.*, *Scandaria rotundifolia*, *Wombat berry*, *Phytolacca sp.*, *Sedum sp.*, *Cyperus gracilis*

*Procyon sp.*, *Callitriche pubescens*, *Hebebergia violacea*

10

Non-native plant cover (%): ~ 5%

*Lantana camara*, *L. montevidensis*, *Pottoson's curse*, *Lespedeza alpestris*

*Croton med.*, *Bidens pilosa*, *Thistle*, *Senna floribunda*, *Ficus*

5%



move to avoid log & tree:

\*attributes are essential to assess as used in scoring, however assessment of all attributes improves your ability to more accurately visualise proportions of each of the attributes.

Kick Report

**Total large trees:**

37

No. of large non-eucalypt trees: 0/10

(Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present \*If trees are in the same layer and continuous along the transect you can group them)

present \*If trees are in the same layer and continuous along the transect you can group them)

Exc  
telomeres  
cells  
ET  
2x ET  
Ang  
Ang  
Emell  
E. crebra

Total C:	38.1
Total S:	—
Total E:	—

\* denote as native or exotic. Only native shrub cover is used in the scoring.

Acacia  
Latana  
Angophora

Total native:	1.2
Total exotic:	2.1

# BIOCONDITION SITE ASSESSMENT DATASHEET



Queensland Government

## OFFICE USE ONLY

Entered:.....  
Checked:.....  
Corrected:.....

Site ID: Finch Road/Conunga Rise offset

DATE: 4/10/2016

BioCon survey number: 8102

OBSERVERS: GP

## SITE INFORMATION

General habitat survey number:.....

**LOCATION:** (GPS reference) **Bioregion:** 12

**Datum:** ☐ AGD84 ☐ GDA94 (WGS84) OTHER: MGA94Z56 **Location derivation:** CP

**Road:** zone: 56 **easting:** 516792 **northing:** 6902694 **Plot Centre Direction:** CP **m at** 5 **degrees**

**Plot Origin:** zone: 56 **easting:** 516792 **northing:** 6902694 **Accuracy:** 5

**Plot Centre:** zone: 56 **easting:** 516766 **northing:** 6902736 **Accuracy:** 4

**Plot bearing:** 360° NW **Plot alignment description:** downhill + across slope

**Locality description (include tenure and reserve number):** Finch Road Conunga Rise offset Lot 9167  
Freehold

## REGIONAL ECOSYSTEM AND TREE HEIGHTS:

**Habitat Description:** Reserve on the edge of forest/woodland. Few large trees. Typically sparse + grassy understorey. Rocks regularly at surface.

**Regional Ecosystem:** Now Ben **Tree Canopy (EDL\*) height:** 12.6 **Tree subcanopy and/or emergent ht:** S: 5-10 E: 17.4

## SITE PHOTOS:

**Plot centre:** North ☒ South ☒ East ☒ West ☒

**(Photo Numbers)**

**Landscape photo(s):** ☒ **Spot photo(s):** ☐

## 50 x 20m area:

(NB: All logs >10cm, >0.5m within 50 x 20m area measured to the plot boundary)

### Coarse woody debris:

**Length:** 1, 2.2, 7.9, 5.1, 4.5, 3.2, 2.1, 1.1, 7, 3, 0.7, 3.4, 2.5, 2.1, 2.3, 2.6, 4, 3.4, 4, 5.2, 2.4, 1.5, 2.5, 1.0,

**Site Total:** Excl. 1.1m  
**Per ha Total:** 1.1m

## 100 x 50m area:

(NB: \*Ecologically Dominant Layer. Tree defined as single stemmed over 2m. All tree species in the 100 x 50m (not just EDL species)

### Total native tree spp richness:

Acacia melanoxylon, Acacia dipetala, Allocasuarina torulosa, Corymbia tessellata, Eucalyptus tereticornis, E. crebra, E. cunninghamii, Eucalyptus melliodora, Eucalyptus biturbata, Corymbia ciliolata, Alphitonia excelsa, Alphitonia subvelutina

**Total:** 12

### Proportion of dominant canopy (EDL) species with evidence of recruitment:

33 %

## 50 x 10m area: Native Plant Spp Richness:

(NB: List species if known or count if unknown. Shrub is defined as single stemmed below 2m or multi-stemmed from base or below 20cm)

	Total
<b>Shrub spp. richness:</b> <u>11</u> <u>Acacia dipetala, Acacia longissima, Corymbia tessellata, Corymbia laurina, Corymbia citrifolia, Allocasuarina 3pp, Acacia melanoxylon</u>	<u>7</u>
<b>Grass spp. richness:</b> <u>11</u> <u>Eleusine indica, Lolium rigidum, Themeda triandra, Poa spp., Cymbopogon refractus, Ottochloa gracillima</u>	<u>6</u>
<b>Forbs and others spp. richness:</b> <u>11</u> <u>Desmodium, Pennycuik, Yellow bellflower, Lamandra filiformis, Cyperus gracill, White foot, Sporobolus rostratus, Lamandra longifolia, Adiantum hypoleucum, Pteridium spp, Smilax australis, Dianella longifolia?</u>	<u>12</u>
<b>Non-native plant cover (%):</b> <u>lathyrus curse, guinea grass, bidens pilosa, balloon cotton, Lantana camara, blue bellflower, groundsel, fireweed</u>	<u>5%</u>



222

\*attributes are essential to assess as used in scoring, however assessment of all attributes improves your ability to more accurately visualise proportions of each of the attributes.

Excel spreadsheet

**Total large trees:**

26

No. of large non-eucalypt trees: N/A

(Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present \*If trees are in the same layer and continuous along the transect you can group them)

present \*If trees are in the same layer and continuous along the transect you can group them)

B6  
B6  
B6  
B6  
Eu(CrB)  
Eu multibm  
x 2  
Eu  
sken

Total C: 18.7  
Total S: —  
Total E: 21.7

\* denote as native or exotic. Only native shrub cover is used in the scoring.

Blue  
Gru  
A  
melrose  
SCACIA  
ONISSEN

Total native:	2.9
Total exotic:	—

# BIOCONDITION SITE ASSESSMENT DATASHEET



Queensland Government

OFFICE USE ONLY Entered:..... Checked:..... Corrected:.....	Site ID: <u>CHUNGRA RISE OFFSET</u>	BioCon survey number: <u>P103</u>
	DATE: <u>5/10/2016</u>	OBSERVERS: <u>GD</u>

## SITE INFORMATION

General habitat survey number: .....

**LOCATION:** (GPS reference) **Bioregion:** 12

**Datum:** ☐ AGD84 ☐ GDA94 (WGS84) OTHER: MGA97 **Location derivation:** GPS

**Road:** zone: .. easting: .. northing: .. **Plot Centre Direction:** .. m at .. degrees

**Plot Origin:** zone: 56 easting: 516359 northing: 6902507 **Accuracy:** 8m

**Plot Centre:** zone: 56 easting: 516340 northing: 6902546 **Accuracy:** 5m

**Plot bearing:** 205 WNW **Plot alignment description:** CROSS SLOPE STEEP HEADING WEST

**Locality description (include tenure and reserve number):** FREEHOLD CHUNGRA RISE OFFSET LOT 9  
NORTH OF EX-RIFLE RANGE

Koala scrub grey gum

## REGIONAL ECOSYSTEM AND TREE HEIGHTS:

**Habitat Description:** VERY TALL OPEN FOREST IRONBARKS, GREY GUM, PROSHROX, WET SCLEROPHYLL  
SMALL TREE LAYER OF Regenerating canopy spp + wattles + rainforest spp  
deep leaf litter

**Regional Ecosystem:** 12-9-16-17A **Tree Canopy (EDL\*) height:** 25.0 **Tree subcanopy and/or emergent ht:** S: 3-8m E: N/A

## SITE PHOTOS:

**(Photo Numbers)** **Plot centre:** North ☒ South ☒ East ☒ West ☒

**Landscape photo(s):** ☒ **Spot photo(s):** ☒

## 50 x 20m area:

(NB: All logs >10cm, >0.5m within 50 x 20m area measured to the plot boundary)

### Coarse woody debris:

**Length:** 9.2, 1.5, 2.3, 5.0, 7.5, 32.5, 0.5, 10.2

**Site Total:** 16  
**Per ha Total:** 16

## 100 x 50m area:

(NB: \*Ecologically Dominant Layer. Tree defined as single stemmed over 2m. All tree species in the 100 x 50m (not just EDL species)

### Total native tree spp richness:

Amphora leucopy, Juncus pseudocarpus, Lophoceros confusus, Eucalyptus siderophloeus, Eucalyptus major, Backhausia myrtifolia, Acacia longifolia, Acacia x2, Alphitonia excelsa, Flindersia, Myrsine spp, denhamia celastroides, E. cinerea, C. calceolaria

**Total:** 16

### Proportion of dominant canopy (EDL) species with evidence of recruitment:

16 %

## 50 x 10m area: Native Plant Spp Richness:

(NB: List species if known or count if unknown. Shrub is defined as single stemmed below 2m or multi-stemmed from base or below 20cm)

**Total**

<b>Shrub spp. richness:</b> <u>16</u>	<u>Backhausia myrtifolia, denhamia celastroides, Acacia longifolia, Euc major, Acacia melanoxylon, Acacia modiolii, Acacia dyakina, Allocasuarina dealbata, Backhausia myrtifolia, Lophoceros confusus, Pterocarya stanleyana, Alphitonia excelsa, Celerywood, denhamia celastroides, Coriaria avicula, Eucalyptus siderophloeus</u>	<u>20</u>
<b>Grass spp. richness:</b> <u>5</u>	<u>Phalaris glauca, Oplismenus sp., Lophoceros gracilis, Themeda triandra, ?</u>	<u>5</u>
<b>Forbs and others spp. richness:</b> <u>16</u>	<u>Lonicera filiformis, Cyperus gracilis, Lobelia sparsiflora, Gompholobos, Smilacina, Hardwood, Desmodium rhynchospora, Lonicera bulbifera, Gnaphalium, Adiantum, Cestrum, Calceolaria, Ficus vine, Goodenia, Lonicera, Cestrum, Cyperus</u>	<u>16</u>

**Non-native plant cover (%):** Lantana camara, Passiflora robusta, Oxalis corniculata 40 %

Syncom standishii, Psidium, Grevillea, Flindersia, Cryptocarya laevigata

Mosses Lantana



103

103

103

103

103

# BIOCONDITION SITE ASSESSMENT DATASHEET



Queensland Government

## OFFICE USE ONLY

Entered: .....  
Checked: .....  
Corrected: .....

Site ID: CANUNGRA site offset

DATE: 4/10/2016

BioCon survey number: 4

OBSERVERS: gd

## SITE INFORMATION

General habitat survey number: .....

LOCATION: (GPS reference)

Bioregion: .....

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: MGAG4 Location derivation: GPS

Road: zone: .. easting: .. northing: .. Plot Centre Direction: .. m at .. degrees

Plot Origin: zone: 56 easting: 516606 northing: 6901918 Accuracy: 5

Plot Centre zone: .. easting: 516571 northing: 6901999 Accuracy: 4

Plot bearing: 128° SW Plot alignment description: North facing slope across contour

Locality description (include tenure and reserve number): Freehold Canungra Rise offset Lot 171/216

## REGIONAL ECOSYSTEM AND TREE HEIGHTS:

Habitat Description: tall to very tall open forest. Mixed Eucalypt. Small tree layer of regenerating canopy species. shrubs sparse. grassy ground layer  
→ niches & str. rich

Regional Ecosystem: 9-10.17 Tree Canopy (EDL\*) height: 24.4 Tree subcanopy and/or emergent ht: S: 4-8 E: N/A

## SITE PHOTOS:

Plot centre:

(Photo Numbers)

North ☒

South ☒

East ☒

West ☒

Landscape photo(s): ☒

Spot photo(s): ☐

## 50 x 20m area:

(NB: All logs >10cm, >0.5m within 50 x 20m area measured to the plot boundary)

### Coarse woody debris:

Length: 2.1, 3.4, 1.0, 4.5, 3.1, 2.9, 4.0, 3.9, 0.9, 1.7, 1.8, 1.0, 2.1, 8.0, 3.2, 1.4, 2.3, 7.0, 2.1, 1.5, 2.8, 0.9, 1.4, 2.0, 2.2, 7.7, 6.2, 1.8, 2.0, 5.4, 8.8, 6.1, 12.1,

Site Total: .....  
Per ha Total: Extrapolated

## 100 x 50m area:

(NB: \*Ecologically Dominant Layer. Tree defined as single stemmed over 2m. All tree species in the 100 x 50m (not just EDL species)

### Total native tree spp richness: ### ### 1111

\* F. microcarpa, \* C. b. confertifolia, \* F. acuminata, \* C. ciliolata, Acacia dipetala, A. torulosa, \* Angophora subvelutina, Alphitonia bursifolia, Malloides phillyria, \* E. coccinea, \* F. canna, ribbonwood, \* F. taitiana

Total: 19

### Proportion of dominant canopy (EDL) species with evidence of recruitment: 67 %

## 50 x 10m area: Native Plant Spp Richness:

(NB: List species if known or count if unknown. Shrub is defined as single stemmed below 2m or multi-stemmed from base or below 20cm)

Total

Shrub spp. richness: ### ### 111

Acacia dipetala, Corymbia tessellata, Fraxina torulosa, Corymbia intermedia, F. canna, Isopoda, F. microcarpa, Alphitonia bursifolia, Alphitonia excelsa, Alphitonia torulosa, Acacia leiocalyx, Acacia longissima, Malloides phillyria, Grassia latifolia

13

Grass spp. richness: ###

Imperata cylindrica, 3?, Themeda triarica, Microchloa sp. poides, Opisaurus spp.

5

Forbs and others spp. richness: ### ### 1

diandra laevis, Smilax australis, Geitophora symyosum, Lomandra longifolia, Glycine tabacina, natix scopulorum, Desmodium rhinoceros, Gossypium, monardella berryi, Altridum esculentum, Stephania japonica

11

Non-native plant cover (%):

Lantana monticola [detected], L. canna, Pellaea canna, red bell grass, S. dens pilosa, balloon cotton, passiflora subpeltata, camphor laurel, Solanum perfoliatum

10-15 %  
(15)



B16 2

\*attributes are essential to assess as used in scoring, however assessment of all attributes improves your ability to more accurately visualise proportions of each of the attributes.

Free Spins!

**Total large trees:**

42.

(Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present \*If trees are in the same layer and continuous along the transect you can group them)

Emiro  
Emiro  
+ F. G. G.  
Bushbon  
Emiro  
Emiro  
Emiro  
F. G. G.  
C. C. L.  
Emiro

Lutea  
 Fremont  
 Lutea  
 Smilge  
 Angophora  
 Aca

## Location

Site No. P1 Recorder: GD Day/Date: 5-10-16

Purpose: Baseline monitoring weed management/rehabilitation and habitat condition quadrat 10m x 10m + 50 records

Locality: (inc. distance/direction to nearest town) CANUNGRA FINCH ROAD

GPS coordinates centre patch: Zone 5 6 E 0516173 N 6902620 Datum: MGA94Z56

## Vegetation structure

Stratum	Height Interval Estimate (m)	Est. cover density (D,M,S,V)
E	-	-
T <sub>1</sub>	12-15	M
T <sub>2</sub>	4-8	M
S <sub>1</sub>	0.3-2.5	S-D
G	0-0.5	M-S

Healthy leaf litter

Structural formation: (including height)

Mid high to tall Euc open forest

Ecologically dominant layer: T<sub>1</sub>

Refer Walker & Hopkins 1998 Tables  
14a, 15 & 17

EVIDENCE OF KOALAS	PRESENT?
SCRATCH	✓
SCAT	✓
SIGHTING	

## Plant species

Record relative (numerical) dominance for each stratum;  
d – dominant; c – codominant; a – associated; s – suppressed.

Str.	Rel. dom	Scientific Name
T <sub>1</sub>	D	Stringbarks <i>E. acuminata</i> , <i>E. crebra</i>
T <sub>1</sub>	A	ironbark <i>E. crebra</i>
T <sub>1</sub>	A	spotted gum <i>C. chlorocery</i>
T <sub>1</sub>	A	blue gum <i>E. tereticornis</i>
T <sub>2</sub>	S	L. confertus
T <sub>2</sub>	C	Acacia spp v2
T <sub>2</sub>	S	Becerra's Ti. species
T <sub>2</sub>	S	Foliarbark
T <sub>2</sub>	S	Alphitonia excelsa
S	D	L. lanka
S	S	Fraxi lanka
S	S	Bryonia oblongifolia
G	C	Impatiens cylindrica
G	C	Thymelia fraxi
G	C	POA spp
G	S	desmodium phytodaphnum
G	A	Lomandra filiformis
G	S	Yellow buttons
G	A	Lomandra longifolia
G	S	L. monteydensis
G	S	white root
G	S	fire weed
G	C	good leaf litter colour. fallen debris common

## Geology, landform and other notes

Geology mapping: DNRM (2002 & 2005) Geological Survey of QLD, SEQLD Region Geoscience Data Set

Geology code and rock types: RJbw: Quartzose sandstone, siltstone, shale conglomerate, coal. SEDIMENTARY ROCK

Landform: North Facing slope

Field observation and notes: good condition excluding lanka

Landzone: 9-10

## Applied RE code

RE code:

12.9-10.17





### MONITORING FORM B-CONDITION FOR 10M X 10M MONITORING SITE

#### PROJECT DESCRIPTION

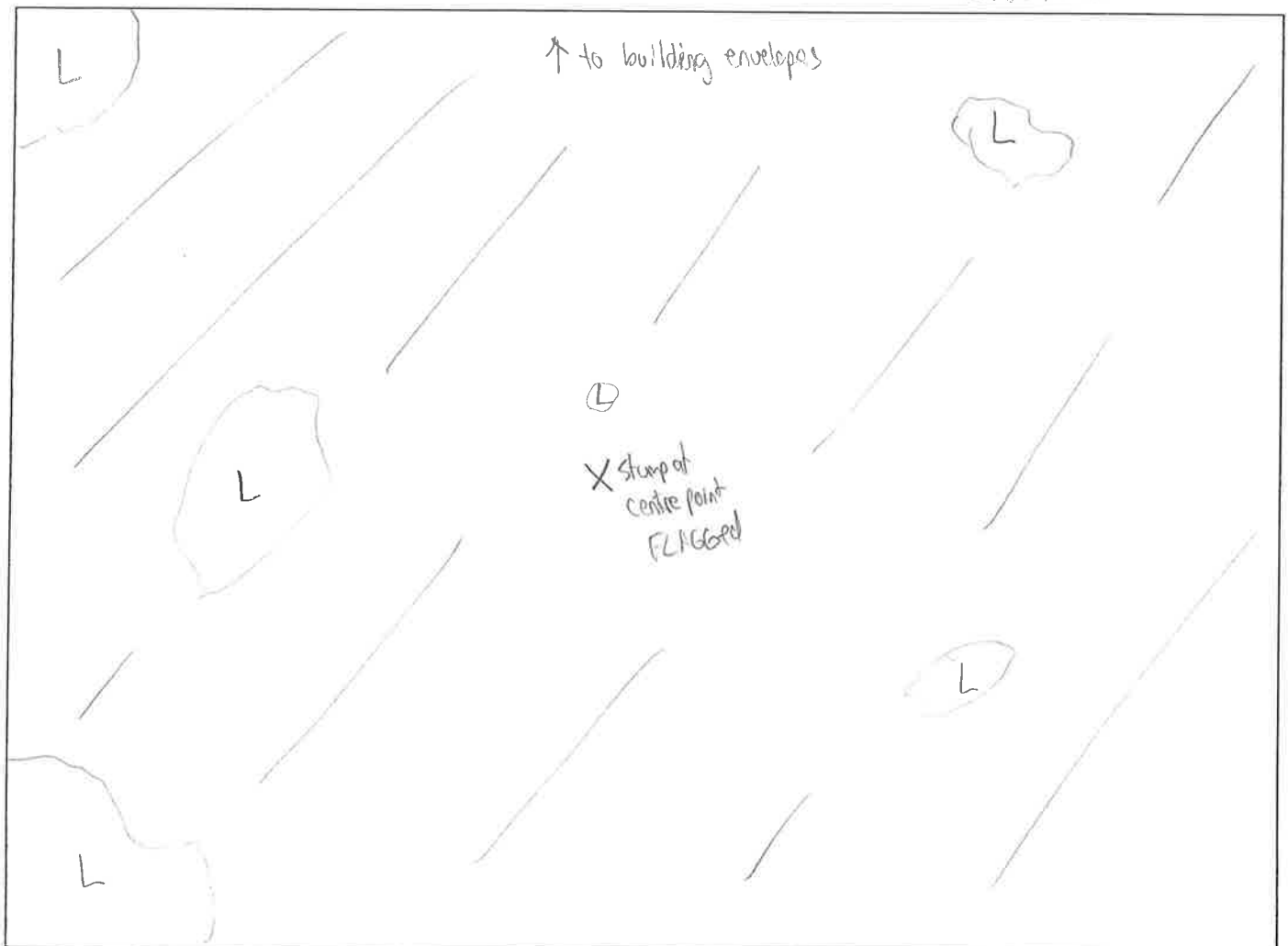
Project name: Finch Road Offset		Project ID: EPBC2015/7485
Site location centrepoint (MGA256): 516173 6902620		Monitoring Site ID: P1
Type of on-grounds: Monitoring of Assisted Natural Regeneration	Years since site commenced: 0	When was this site last assessed? 09/02/14
Current assessment conducted by: gpt	Date of current assessment: 5-10-16	
Overall comments on site condition: Generally good condition re 12.9-10.17. koala habitat. LANTANA species spreading from lower slope		
Has the condition of the site changed since last assessment? YES or NO If Yes, briefly describe changes in this box, and provide details in table below. Disagree.		

#### DESCRIPTION OF SITE CONDITION Complete table annually. Also draw map and take photographs.

Rating/zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
A = OK on track towards target	80	Most of Plot typical to 12.9-10.17	40-50	typical grass/with good leaf litter		All EDC trees recruiting		Routine Lantana control. (should be routine: describe if necessary)
B = Uncertain significant problems	20	scattered Lantana clumps.	40-50	leaf litter, grass, native shrubs	Lantana	11	Lantana may suppress in future	Routine Lantana control. Delayed weed. (describe)
C = Poor major problems, likely to fail	-	-	-	-	-	-	-	- (describe)
Overall Condition Score (ranges from 0-100%) Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%								80%

#### MAP OF SITE CONDITION [SUPPORT WITH IMAGES]

Draw a map of the monitoring site, showing variation in outcomes as zones (Zone A = OK, Zone B = Uncertain, Zone C = Poor).



↓  
to Fire trail

L = Lantana clumps  
= otherwise healthy  
12.9-10.17

## Location

Site No. P2 Recorder: GD Day/Date: 5-10-16

Purpose Baseline monitoring weed management/rehabilitation and habitat condition quadrat 10m x 10m

Locality: (inc. distance/direction to nearest town) CANUNGRA FINCH ROAD

GPS coordinates centre patch: Zone 5 6 E 0516442 N 6902647 Datum: MGA94Z56

## Vegetation structure

Stratum	Height Interval Estimate (m)	Est. cover density (D,M,S,V)
E	<u>&gt;20</u>	<u>US</u>
T <sub>1</sub>	<u>15-20</u>	<u>S-NB</u>
T <sub>2</sub>	<u>7-5</u>	<u>S</u>
S <sub>1</sub>	<u>0.5-2</u>	<u>Native S</u> <u>Calam D</u> <u>S-M</u>
G	<u>0-0.5</u>	

### Structural formation: (including height)

Tall open woodland - scattered trees

### Ecologically dominant layer:

T<sub>1</sub>

Refer Walker & Hopkins 1998 Tables  
14a, 15 & 17

GS. asperum  
GS. L. longifolia

EVIDENCE OF KOALAS	PRESENT?
SCRATCH	
SCAT	
SIGHTING	

## Plant species

Record relative (numerical) dominance for each stratum;  
d - dominant; c - codominant; a - associated; s - suppressed.

Str.	Rel. dom	Scientific Name
E	D	<u>Corymbia citriodora/henryi</u>
T <sub>1</sub>	D	<u>C. chinensis/henryi</u>
T <sub>1</sub>	A	<u>F. c. lepra</u>
T <sub>1</sub>	S	<u>E. b. tuberosa</u>
T <sub>1</sub>	S	<u>E. teretiflorus</u>
T <sub>2</sub>	S	<u>Ficus spp.</u>
T <sub>2</sub>	D	<u>Acacia spp</u> x2 <u>dispersing, microphylla, F. b. h. h. h.</u>
T <sub>2</sub>	A	<u>regeneration</u>
T <sub>2</sub>	A	<u>Alphitonia excelsa</u>
S	D	<u>Lantana</u>
S	S	<u>Senna pendula</u>
S	S	<u>Stachytarpheta jamaicensis</u>
S	S	<u>P. thymifolium</u> spp
S	S	<u>Calliandra</u>
S	S	<u>Flammula</u>
S	S	<u>Adiantum</u>
S	S	<u>exotic grasses (Rhodes grass)</u>
G	A	<u>Impatiens cylindrica</u>
G	D	<u>Thunbergia</u>
G	A	<u>L. Alliflorus</u>
G	S	<u>plectranthus</u> spp
G	S	<u>glycine</u>
G	S	<u>stephanotis</u>
G	S	<u>desmodium</u> spp
G	C	<u>leaf litter &amp; wood debris. Exposed boulders</u>

## Geology, landform and other notes

Geology mapping: DNRM (2002 & 2005) Geological Survey of QLD, SEQLD Region Geoscience Data Set

Geology code and rock types: TQcb-SEQ - Colluvium basalt - soil, clay, cobbles and boulders

Landform: gently sloping NW to dry gully

Field observation and notes: Lantana abundant. Numerous exposed boulders typical to land zone 8

Landzone: 8

## Applied RE code

RE code: Now Rem Regrowth D.S.H. ecotone with 10-9-10 17 to the west. Localised grassland





### MONITORING FORM B-CONDITION FOR 10M X 10M MONITORING SITE

#### PROJECT DESCRIPTION

Project name: Finch Road Offset		Project ID: EPBC2015/7485
Site location centrepoint (MGA256):		Monitoring Site ID: P2
Type of on-grounds: Monitoring of Assisted Natural Regeneration	Years since site commenced: 0	When was this site last assessed? Baseline
Current assessment conducted by: GD	Date of current assessment: 5-10-16	
Overall comments on site condition: Regrowth Ec RS 14 dominated by Spotted Gum. Numerous exposed boulders		
Has the condition of the site changed since last assessment? YES or NO If Yes, briefly describe changes in this box, and provide details in table below. Baseline		

#### DESCRIPTION OF SITE CONDITION Complete table annually. Also draw map and take photographs.

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
A = OK on track towards target	50%	Generally, ok VIZ FDR coverage, grass & leaf litter cover.	20 - 30 %	Typically 30-40% cover plants & boulders leaf litter	LANTANA	Present but low recruitment		Positive Lantana (should be routine: describe if necessary)
B = Uncertain significant problems	50%	LANTANA THICKETS	20-30 %	"	"	Very low in thicket areas	Suppressive	Lantana ASAP. (describe)
C = Poor major problems, likely to fail								(describe)
Overall Condition Score (ranges from 0-100%) Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%								75%

#### MAP OF SITE CONDITION [SUPPORT WITH IMAGES]

Draw a map of the monitoring site, showing variation in outcomes as zones (Zone A = OK, Zone B = Uncertain, Zone C = Poor).

OFFSITE FARM

REFER PHOTOS



□ = relatively good Regrowth Ec woodland

▣ = Regrowth Ec woodland with canopy cover but natural regeneration threatened by Lantana

## Location

Site No. P3 Recorder: GD Day/Date: 5-10-16

Purpose Baseline monitoring weed management/rehabilitation and habitat condition quadrat 10m x 10m

Locality: (inc. distance/direction to nearest town) CANUNGRA FINCH ROAD

GPS coordinates centre patch: Zone 5 6 E 0 5 1 7 1 4 4 N 6 9 0 2 8 5 0 Datum: MGA94Z56

## Vegetation structure

Stratum	Height Interval Estimate (m)	Est. cover density (D,M,S,V)
E	—	—
T <sub>1</sub>	15-20	M-S
T <sub>2</sub>	3-8	M-S
S <sub>1</sub>	0.5-2	VS (dominant layer)
G	0-0.5	M-D

Structural formation: (including height)

Tall-very tall woodland

Ecologically dominant layer: T<sub>1</sub>

Refer Walker & Hopkins 1998 Tables 14a, 15 & 17

EVIDENCE OF KOALAS	PRESENT?
SCRATCH	<input checked="" type="checkbox"/>
SCAT	<input checked="" type="checkbox"/>
SIGHTING	<input type="checkbox"/>

## Plant species

Record relative (numerical) dominance for each stratum;  
d – dominant; c – codominant; a – associated; s – suppressed.

Str.	Rel. dom	Scientific Name
T <sub>1</sub>	d	Eucalyptus
T <sub>1</sub>	s	C. citriodora
T <sub>2</sub>	d	sparsely regenerating Euc
T <sub>2</sub>	s	Acacia spp. etc
T <sub>2</sub>	s	Corymbia intermedia
S	d	Lantana
S	a	other weeds balloon cotton solanum hispidum Lemnanea
S	a	Sema pendula
S	s	Frema tomentosa
G	a	Impatiens glandulifera
G	d	weeds - annual rye grass, polyporus culm, crab tree
G	s	Silene spaldingii, Solanum elaeagnifolium, exotic/petiole grasses
G	s	passiflora subpetiolaris, thistle, silver cholla, mediana
G	s	Kikuyu
G	s	Thymus triandrus
G	s	Smilax australis
G	s	Centella asiatica
G	s	Poa spp
G	s	Conoclinium filiforme
G	s	Cyperus gracilis
G	s	Stypania japonica

## Geology, landform and other notes

Geology mapping: DNRM (2002 & 2005) Geological Survey of QLD, SEQLD Region Geoscience Data Set

Geology code and rock types: TQcb-SEQ - Colluvium basalt - soil, clay, cobbles and boulders

Landform: TOP OF RIDGE

Field observation and notes: look lower strata.

Landzone: 8

## Applied RE code

RE code:

12.8.14





**MONITORING FORM B-CONDITION FOR 10M X 10M MONITORING SITE**

**PROJECT DESCRIPTION**

Project name: Finch Road Offset		Project ID: EPBC2015/7485
Site location centrepoint (MGAz56): 517199 6920856		Monitoring Site ID: P3
Type of on-grounds: Monitoring of Assisted Natural Regeneration	Years since site commenced: 0	When was this site last assessed? BASELINE
Current assessment conducted by: GP	Date of current assessment: 6-10-16	
Overall comments on site condition: POOR RECRUITMENT Beneath canopy, weeds prevalent. Euc woodland cover		
Has the condition of the site changed since last assessment? YES ..... or NO ..... If Yes, briefly describe changes in this box, and provide details in table below.		

**DESCRIPTION OF SITE CONDITION** Complete table annually. Also draw map and take photographs.

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
A = OK on track towards target	35	Weeds. Poor Recruitment of Euc.	40-60	Native 35% 90-100% cover	Numerous Refer list	Poor		weed management monitor recruitment (should be routine: describe if necessary)
B = Uncertain significant problems	65	Weeds suppressing natural Regen	0-20	Weeds 65% 90-100% cover	Numerous Refer list	Poor		Weed management fishp. (describe)
C = Poor major problems, likely to fail								(describe)
Overall Condition Score (ranges from 0-100%) Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%								6.7%

**MAP OF SITE CONDITION** [SUPPORT WITH IMAGES] Refer Photos

Draw a map of the monitoring site, showing variation in outcomes as zones (Zone A = OK, Zone B = Uncertain, Zone C = Poor).



- ☐ Native ground covers or canopy cover with some native edl and/or small tree recruitment
- ☒ Some native trees but overstratification suppressed with weeds or no Euc cover and weed groundstrata cover

## Location

Site No. P4

Recorder: GD

Day/Date: 5-10-16

Purpose

Baseline monitoring weed management/rehabilitation and habitat condition quadrat 10m x 10m

Locality: (inc. distance/direction to nearest town)

CANUNGRA FINCH ROAD

GPS coordinates centre patch:

Zone

5

6

E

5

1

6

4

3

9

N

6

9

0

2

4

5

3

Datum: MGAg4256

## Vegetation structure

Stratum	Height Interval Estimate (m)	Est. cover density (D,M,S,V)
E	>20	S
T <sub>1</sub>	15-20	M-S
T <sub>2</sub>	5-8	D
S <sub>1</sub>	0.5-2	M-O
G	<0.5	M deepleaf litter

Structural formation: (including height)

Very tall open woodland

Ecologically dominant layer: T<sub>1</sub>

Refer Walker & Hopkins 1998 Tables 14a, 15 & 17

## Plant species

Record relative (numerical) dominance for each stratum;

d – dominant; c – codominant; a – associated; s – suppressed.

Str.	Rel. dom	Scientific Name
E	D	<i>Eucalyptus grandis</i>
T <sub>1</sub>	A	<i>E. grandis</i>
T <sub>1</sub>	A	<i>L. robusta</i>
T <sub>1</sub>	A	<i>E. siderophloia</i>
T <sub>2</sub>	A	Regenerating T <sub>1</sub> species
T <sub>2</sub>	D	[RIPARIAN] RAINFALL SPP
T <sub>2</sub>	D	<i>Mallophila philipensis</i> , <i>Glochidion ferrugineum</i> , <i>dysoxylum</i>
T <sub>2</sub>	D	<i>White cedar</i> , <i>Fend mueleriana</i> , <i>Croton veraxii</i>
T <sub>2</sub>	D	<i>Acronychid</i> spp., <i>Backhousia</i> / <i>deep yellow</i> , <i>S. oleosa</i>
T <sub>2</sub>	D	<i>Acacia maiden</i> , <i>Acacia dispersa</i> / bush lime
S	A	<i>dysoxylum fraserianum</i> , <i>cordyline</i> / <i>deep yellow</i>
S	A	<i>Mallophila philipensis</i> , <i>Glochidion ferrugineum</i> , <i>backhousia myrtifolia</i> , <i>native</i> / <i>hibiscus</i>
S	D	weeds / <i>fringing</i>
S	D	weeds / <i>calamagrostis</i> , <i>cahya</i> , <i>camphor laurel</i> , <i>Devil's</i>
G	A	weeds / <i>midwood</i> , <i>passiflora subpeltata</i> / <i>croton</i>
G	S	wandering Jew
G	A	<i>adiantum</i> x 2, <i>gentiana</i> / <i>stiltus</i> / <i>water fern</i>
G	A	<i>birds involute</i> , <i>golden plectrum</i> , <i>small</i> / <i>australis</i> , <i>tropis</i> / <i>Stenders</i>
G	A	<i>Birds</i> / <i>stiltus</i> , <i>maclura cochinchinensis</i> / <i>top</i> / <i>vine</i>
G	S	<i>domatic vine</i> , <i>pleiosyne</i> / <i>australis</i>
G	S	<i>Lomandra</i> / <i>hystrix</i>
G	S	<i>Opismenus</i> / <i>acutus</i>
G	D	LEAF LITTER & ROCKS

EVIDENCE OF KOALAS

PRESENT?

SCRATCH

SCAT

SIGHTING

## Geology, landform and other notes

Geology mapping:

DNRM (2002 & 2005) Geological Survey of QLD, SEQLD Region Geoscience Data Set

Geology code and rock types:

RJbw: Quartzose sandstone, siltstone, shale conglomerate, coal. SEDIMENTARY ROCK

Landform:

weel thickets especially lantana on higher banks.

Field observation and notes:

intermittent gully with Euc overstorey + regenerating dry rainforest.

Landzone:

9-10

## Applied RE code

RE code:

12.9-10.179



**MONITORING FORM B-CONDITION FOR 10M X 10M MONITORING SITE**

**PROJECT DESCRIPTION**

Project name: Finch Road Offset		Project ID: EPBC2015/7485
Site location centrepoint (MGA256): 516 439 6902453		Monitoring Site ID: R4
Type of on-grounds: Monitoring of Assisted Natural Regeneration	Years since site commenced: 0	When was this site last assessed? BASELINE
Current assessment conducted by: GP	Date of current assessment: 6-10-16	
Overall comments on site condition: Excellent Rainforest Regeneration adjacent stream. Weeds (Lantana) suppression of Euc forest on higher banks & heady up slope particularly north.		
Has the condition of the site changed since last assessment? YES or NO If Yes, briefly describe changes in this box, and provide details in table below. BASELINE		

**DESCRIPTION OF SITE CONDITION** Complete table annually. Also draw map and take photographs.

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
A = OK on track towards target	60%	Sheltered areas regenerating with RF	T <sub>1</sub> 20-40 T <sub>2</sub> 100	100% flora or leaf litter	Mistleweed	Good	Lantana, encroaching	(should be routine: describe if necessary)
B = Uncertain significant problems	40%	Lantana, particularly north bank	T <sub>1</sub> 20-30%	poor: spalled by lantana	Lantana	poor	Poor edl recruitment resulting in limited shading	LANTANA ASAP (describe)
C = Poor major problems, likely to fail								(describe)
Overall Condition Score (ranges from 0-100%) Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%								80%

**MAP OF SITE CONDITION [SUPPORT WITH IMAGES]**

Draw a map of the monitoring site, showing variation in outcomes as zones (Zone A = OK, Zone B = Uncertain, Zone C = Poor).



☑ Lantana & weed thickets suppressing

☐ good T<sub>2</sub> cover & rainforest regenerating. Good leaf litter & debris



## Location

Site No. 25  
Purpose

Recorder: GD

Day/Date: 6-10-16

Baseline monitoring weed management/rehabilitation and habitat condition quadrat 10m x 10m

Locality: (inc. distance/direction to nearest town)

CANUNGRA FINCH ROAD

GPS coordinates centre patch:

Zone 5 6 E

0 5 1 6 7 9 1 N

6 9 0 2 4 1 S

Datum: MGA94Z56

## Vegetation structure

Stratum	Height Interval Estimate (m)	Est. cover density (D,M,S,V)
E	<u>&gt;20</u>	<u>V</u>
T <sub>1</sub>	<u>10-15</u>	<u>M</u>
T <sub>2</sub>	<u>6-10</u>	<u>M-D</u>
S <sub>1</sub>	<u>0.5-2</u>	<u>M</u>
G	<u>&lt;0.5</u>	<u>M-D</u>

Structural formation: (including height)

tall open forest

Ecologically dominant layer: T<sub>1</sub>

Refer Walker & Hopkins 1998 Tables 14a, 15 & 17

EVIDENCE OF KOALAS	PRESENT?
SCRATCH	<input checked="" type="checkbox"/>
SCAT	<input checked="" type="checkbox"/>
SIGHTING	<input type="checkbox"/>

## Plant species

Record relative (numerical) dominance for each stratum;

d – dominant; c – codominant; a – associated; s – suppressed.

Str.	Rel. dom	Scientific Name
E	D	<u>Eucalyptus</u>
T <sub>1</sub>	C	<u>stringybarks</u> <u>Eucalyptus</u> <u>Eucalyptus</u>
T <sub>1</sub>	C	<u>E. microcarpa</u>
T <sub>1</sub>	A	<u>Corymba haysi</u>
T <sub>1</sub>	A	<u>E. crebra</u>
T <sub>1</sub>	A	<u>E. major</u>
T <sub>1</sub>	S	<u>L. confertus</u>
T <sub>2</sub>	D	<u>Regenerating T</u>
T <sub>2</sub>	A	<u>Alphitonia excelsa</u>
T <sub>2</sub>	A	<u>Acacia dispersa</u>
T <sub>2</sub>	A	<u>Allocasuarina torulosa</u>
S	S	<u>Ochna serrulata</u>
S	D	<u>Regenerating T<sub>1</sub> &amp; T<sub>2</sub></u>
S	A	<u>Acacia falcata</u>
S	A	<u>Bursaria spinosa</u>
S	A	<u>Lantana</u>
S	A	<u>Breynia oblongifolia</u>
S	S	<u>Cyclophylla compositoides</u>
S	S	<u>dogwood</u>
S	S	<u>euroschinus falcata</u>
G	S	<u>Passiflora suberosa</u>
G	D	<u>Native grasses</u> <u>Imperata cylindrica</u> <u>Themeda triandra</u>
G	A	<u>Poa sp.</u>
G	A	<u>Chenopodium minus</u> <u>+ D. carolin</u>
G	A	<u>Conoclinium</u> <u>lana</u>
G	A	<u>Yellow buttercup</u>
G	S	<u>Native grasses</u> <u>pleurothymus</u> <u>desmodium rhodanthum</u> <u>woolbush</u> <u>honey</u> <u>tape vine</u> <u>sliver</u> <u>Smilax australis</u>

## Geology, landform and other notes

DNRM (2002 & 2005) Geological Survey of QLD, SEQLD Region Geoscience Data Set

Geology mapping:

Geology code and rock types:

RJbw: Quartzose sandstone, siltstone, shale conglomerate, coal. SEDIMENTARY ROCK

Landform:

Ridge/Narrow steep slope north & south

Remnant Eucalypt Forest. Few weeds. Excellent EOL Recruitment

Field observation and notes:

Landzone: 9-10

## Applied RE code

RE code:

R-9-10.7



**MONITORING FORM B-CONDITION FOR 10M X 10M MONITORING SITE**

**PROJECT DESCRIPTION**

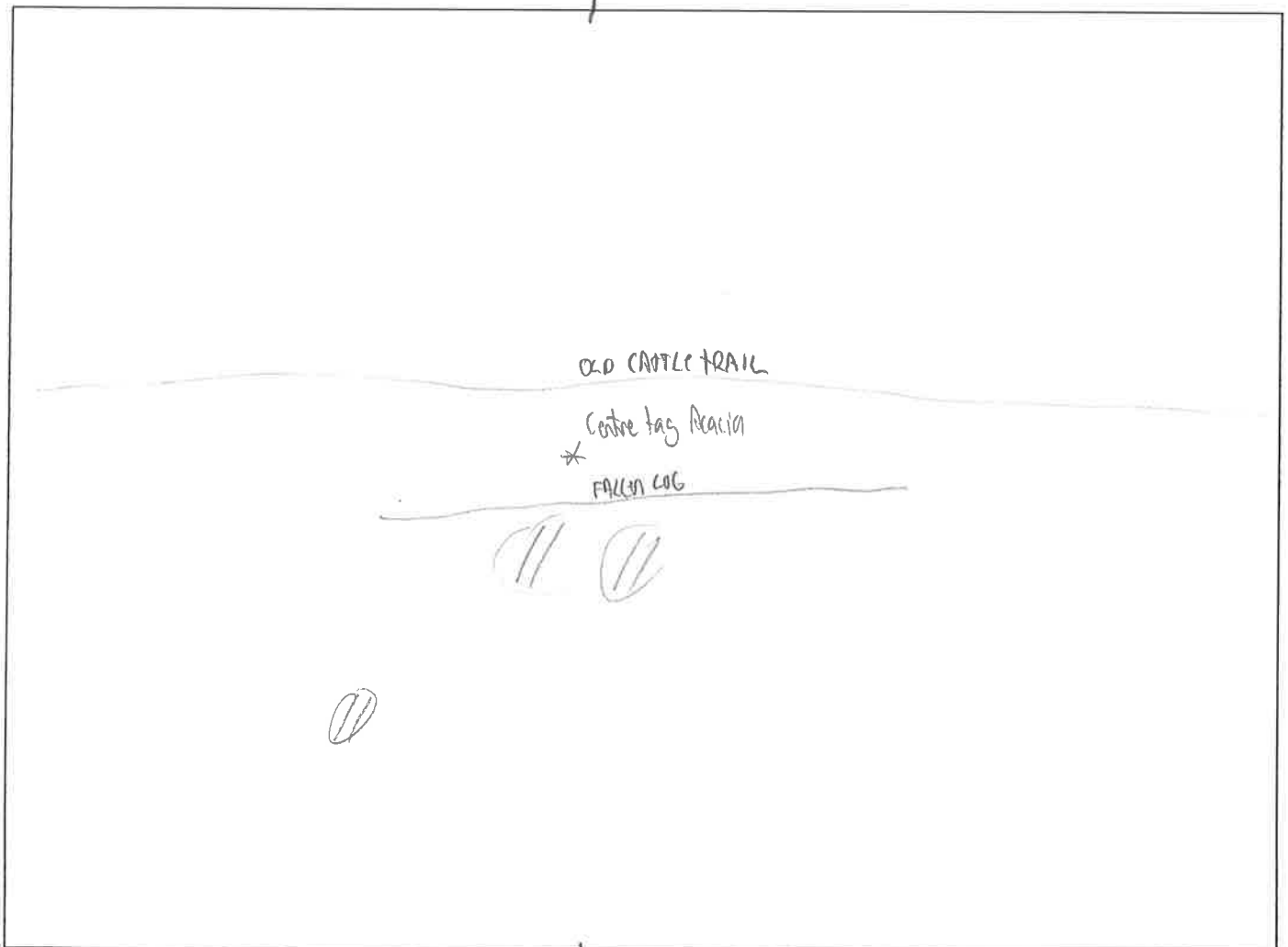
Project name: Finch Road Offset		Project ID: EPBC2015/7485	
Site location centrepoint (MGA255): 516 791 6902 415		Monitoring Site ID: P5	
Type of on-grounds: Monitoring of Assisted Natural Regeneration	Years since site commenced: 0	When was this site last assessed? 13/SEP/10	
Current assessment conducted by: GP	Date of current assessment: 6-10-16		
Overall comments on site condition: Good condition Fuc Forest, HIGH Recruitment of EDC. LANTANA & FALLON debris abundant.			
Has the condition of the site changed since last assessment? YES or NO If Yes, briefly describe changes in this box, and provide details in table below. N/A			

**DESCRIPTION OF SITE CONDITION** Complete table annually. Also draw map and take photographs.

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
A = OK on track towards target	95	Minor erosion on ridge trail	60-70%	90% leaf litter + grasses	LANTANA	Excellent EDC Regrowth		(should be routine: describe if necessary)
B = Uncertain significant problems	5	Minor LANTANA + PASSIFLORA	11	"	"	11		Routine LANTANA control
C = Poor major problems, likely to fail								(describe)
Overall Condition Score (ranges from 0-100%) Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80% 97.5								

**MAP OF SITE CONDITION [SUPPORT WITH IMAGES]**

Draw a map of the monitoring site, showing variation in outcomes as zones (Zone A = OK, Zone B = Uncertain, Zone C = Poor).



## Location

Site No. P16 Recorder: GD Day/Date: 5-10-16

Purpose Baseline monitoring weed management/rehabilitation and habitat condition quadrat 10m x 10m

Locality: (inc. distance/direction to nearest town) CANUNGRA FINCH ROAD

GPS coordinates centre patch: Zone 

5	6
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 E 

5	1	6		3	2	4
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 N 

6	9	0	2	0	9	3
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 Datum: MGA94Z56

## Vegetation structure

Stratum	Height Interval Estimate (m)	Est. cover density (D,M,S,V)
E	—	—
T <sub>1</sub>	20 - 30	M
T <sub>2</sub>	8 - 10	D
S <sub>1</sub>	0.5 - 2.5	M-D
G	< 0.5	M-D

**Structural formation:** (including height)

VERY TALL FOREST

**Ecologically dominant layer:**

Refer Walker & Hopkins 1998 Tables  
14a, 15 & 17

EVIDENCE OF KOALAS	PRESENT?
SCRATCH	
SCAT	
SIGHTING	

## Plant species

Record relative (numerical) dominance for each stratum;  
**d** – dominant; **c** – codominant; **a** – associated; **s** – suppressed.

Str.	Rel. dom	Scientific Name
E	S	Boop Pine [dead]
T <sub>1</sub>	D	Lopholobium confertum
T <sub>1</sub>	A	Euc. macrocarpa
T <sub>1</sub>	S	Euc. siderophloia
S	T <sub>2</sub>	Mel. bracteata
A	T <sub>2</sub>	Slender tree, white cedar, Red Ash, Ficus coronata
S	T <sub>2</sub>	Native Hb. leaves
S	T <sub>2</sub>	Myrsine sp. flavum,
A	T <sub>2</sub>	Acacia x 2
A	T <sub>2</sub>	Saccharum myrtellia,
A	T <sub>2</sub>	Boop Pine.
S	D	Acacia maidenii, Saccharum myrtellia, Peromyscus obscurus, Phyllostachys bambusoides, Pandanus elatus, Pittosporum undulatum, Ficus bark, malvastrum phillipensis, Myrsine sp. flavum, native holly, Berytus obscurus, eucalyptus wood.
S	D	Lantana canaliculata, eucalyptus wood.
G	A	Lomandra myrtella, Adiantum x 2, grasses, ferns, perennials, opulenta, oculus, Ray Fern
G	S	weeds, Ceratophyllum, mistle, Lantana, bilberry, rats tail grass,
G	A	Trophis scandens, Rhus, tapeworm, geltonoplerium cynosura,

### Geology, landform and other notes

Geology mapping: DNRM (2002 & 2005) Geological Survey of QLD, SEQLD Region Geoscience Data Set

Geology code and rock types: R/bw: Quartzose sandstone, siltstone, shale conglomerate, coal. SEDIMENTARY ROCK

Landform: narrow gully.

Rocky gully with Boxwood/grey gum overstorey. Regenerating RF beneath head thickets [Lantana] on both banks limiting recruitment.

Field observation and notes:

Landzone: 9-10

## Applied RE code

RE code: 12-9-10-17A





### MONITORING FORM B-CONDITION FOR 10M X 10M MONITORING SITE

#### PROJECT DESCRIPTION

Project name: Finch Road Offset		Project ID: EPBC2015/7485
Site location centrepoint (MGAz56): 516 324 6902093		Monitoring Site ID: P6
Type of on-grounds: Monitoring of Assisted Natural Regeneration	Years since site commenced: 0	When was this site last assessed? 6/11
Current assessment conducted by: 60	Date of current assessment: 6-10-16	
Overall comments on site condition: Excellent RF Regen on rocky/gully. Lantana suppression on bus banks leading uphill		
Has the condition of the site changed since last assessment? YES ..... or NO ..... If Yes, briefly describe changes in this box, and provide details in table below.		

#### DESCRIPTION OF SITE CONDITION Complete table annually. Also draw map and take photographs.

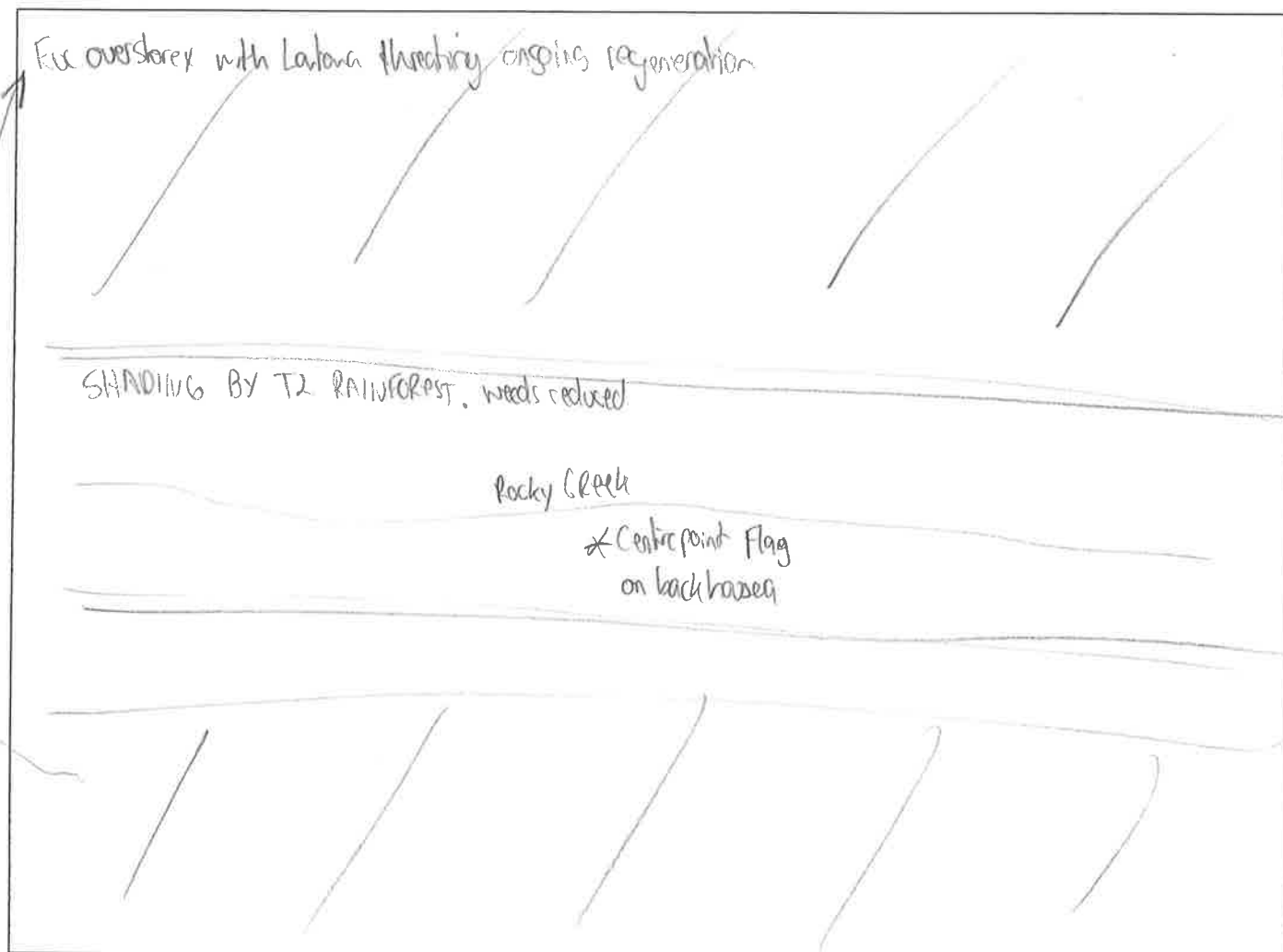
Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
A = OK on track towards target	50	Exc overstorey with Rainforest small tree layer shading	100	100% plants or leaf litter	Lantana mistlewood	good	Lantana encroaching	(should be routine: describe if necessary)
B = Uncertain significant problems	50	Dense Lantana thickly threatening regeneration	40-50	poor native grass cover	LANTANA	OK but becoming limited in areas of Lantana thickets		LANTANA CONTROL ASAP (describe)
C = Poor major problems, likely to fail				scattered				(describe)
Overall Condition Score (ranges from 0-100%) Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%								75%

#### MAP OF SITE CONDITION (SUPPORT WITH IMAGES)

Draw a map of the monitoring site, showing variation in outcomes as zones (Zone A = OK, Zone B = Uncertain, Zone C = Poor).

Refer PHOTOS

↑ Steep Slope South



## Location

Site No. 17 Recorder: GD Day/Date: 5-10-16

Purpose Baseline monitoring weed management/rehabilitation and habitat condition quadrat 10m x 10m

Locality: (inc. distance/direction to nearest town) CANUNGRA FINCH ROAD

GPS coordinates centre patch: Zone 5 6 E 0516437 N 6901955 Datum: MGA94Z56

## Vegetation structure

Stratum	Height Interval Estimate (m)	Est. cover density (D,M,S,V)
E	—	—
T <sub>1</sub>	4-6	M-D
T <sub>2</sub>	2-10	M-D
S <sub>1</sub>	0.5-2	M-D
G	<0.5	S-M

Structural formation: (including height)

Tall open eucalypt forest

Ecologically dominant layer: T<sub>1</sub>

Refer Walker & Hopkins 1998 Tables  
14a, 15 & 17

EVIDENCE OF KOALAS	PRESENT?
SCRATCH	
SCAT	<input checked="" type="checkbox"/>
SIGHTING	

## Plant species

Record relative (numerical) dominance for each stratum;  
d – dominant; c – codominant; a – associated; s – suppressed.

Str.	Rel. dom	Scientific Name
T <sub>1</sub>	C	Stringybarks <i>F. acuminata</i> , <i>F. cornuta</i>
T <sub>1</sub>	C	<i>C. intermedia</i>
T <sub>1</sub>	S	<i>F. crebra</i>
T <sub>1</sub>	S	<i>F. tetralix</i>
T <sub>1</sub>	S	<i>C. hirsuta</i>
T <sub>2</sub>	D	<i>Regenbush T<sub>1</sub></i>
T <sub>2</sub>	A	<i>Allocasuarina sp. x2</i>
T <sub>2</sub>	A	<i>Allocasuarina torulosa</i>
T <sub>2</sub>	S	<i>Alphitonia excelsa</i>
S	D	<i>Regenbush T<sub>1</sub>, T<sub>2</sub></i>
S	S	<i>Lantana</i>
S	S	<i>Leucopogon juniperinus</i>
S	A	<i>Cyclophylla campocrocid</i>
S	A	<i>Bryonia oblongifolia</i>
S	S	<i>Acacia</i>
G	S	<i>Lepidopanax laterale</i>
G	S	<i>Creeping Lantana</i>
G	A	<i>Lomandra laevis</i> , <i>L. multiflora</i> , <i>L. filiformis</i>
G	S	<i>Gordonia rostrata</i>
G	D	<i>Thymela laevis</i> , <i>Impatiens cylindrica</i> , <i>entolasia stricta</i>
G	S	<i>Bimelia longifolia</i>
G	S	<i>Wombat berry</i>
G	S	<i>Yellow buttons</i>
G	S	<i>Smilax australis</i>

## Geology, landform and other notes

Geology mapping: DNRM (2002 & 2005) Geological Survey of QLD, SEQLD Region Geoscience Data Set

Geology code and rock types: TQcb<sup>2</sup>SEO - Colluvium basalt - soil, clay, cobbles and boulders

Landform: BROAD RIDGE

Forest in good condition with excellent regeneration. Minor LANTANA

Field observation and notes:

Landzone: 9

## Applied RE code

RE code: 12 9-16.17



**MONITORING FORM B-CONDITION FOR 10M X 10M MONITORING SITE**

**PROJECT DESCRIPTION**

Project name: Finch Road Offset		Project ID: EPBC2015/7485	
Site location centrepoint (MGAz56): 516437 6901955		Monitoring Site ID: P7	
Type of on-grounds: Monitoring of Assisted Natural Regeneration	Years since site commenced: 0	When was this site last assessed? 11/11	
Current assessment conducted by: ga	Date of current assessment: 6-10-16		
Overall comments on site condition: Excellent condition throughout. Very isolated stems of Lantana & creeping Lantana			
Has the condition of the site changed since last assessment? YES ..... or NO ..... If Yes, briefly describe changes in this box, and provide details in table below. 11/11			

**DESCRIPTION OF SITE CONDITION** Complete table annually. Also draw map and take photographs.

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
A = OK on track towards target	100%	Healthy Remnant Forest	60-70	100% plant or leaf litter	Lantana, creeping Lantana	Excellent		Nil (should be routine: describe if necessary)
B = Uncertain significant problems					No suppression			(describe)
C = Poor major problems, likely to fail								(describe)
Overall Condition Score (ranges from 0-100%) Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%								100%

**MAP OF SITE CONDITION (SUPPORT WITH IMAGES)**

Draw a map of the monitoring site, showing variation in outcomes as zones (Zone A = OK, Zone B = Uncertain, Zone C = Poor).

REFER IMAGES. 100% good condition

old cattle track

X FLAG ON stringybark