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# Biodiversity Offset Strategy

**BYLONG COAL PROJECT**

**Biodiversity Offset Strategy**

For:

**Hansen Bailey**

March 2016

**Final**



**PO Box 2474  
Carlingford Court 2118**

**Report No. 12052RP4**

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The preparation of this report has been in accordance with the brief provided by the Client and has relied upon the data and results collected at or under the times and conditions specified in the report. All findings, conclusions or recommendations contained within the report are based only on the aforementioned circumstances. The report has been prepared for use by the Client and no responsibility for its use by other parties is accepted by Cumberland Ecology.

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2	27/01/2016	K. Wolf	Amended draft
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Approved by: Dr. David Robertson

Position: Director

Signed: 

Date: 22 March, 2016

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# Glossary of Terms

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AHD	Australian Height Datum
BAR	Biodiversity Assessment Report
BBAM	BioBanking Assessment Methodology
BOR	Biodiversity Offsets Report
BOS	Biodiversity Offset Strategy
CEEC	Critically Endangered Ecological Community
DP&E	NSW Department of Planning and Environment
EEC	Endangered Ecological Community
EIA	Ecological Impact Assessment
EIS	Environmental Impact Statement
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
FBA	Framework for Biodiversity Assessment
IBRA	Interim Biogeographic Regionalisation for Australia
LGA	Local Government Area
NSW	New South Wales
NSW Offset Policy for Major Projects	NSW Biodiversity Offset Policy for Major Projects
OEH	NSW Office of Environment and Heritage
PCT	Plant Community Type
the Project	The Bylong Coal Project
Project Disturbance Boundary	The area directly impacted by the Project and includes the Open Cut Mining Areas, internal access roads and the associated Mining Infrastructure Areas. For the purposes of this assessment, the term Project Disturbance Boundary is equivalent to the term ' <i>development site</i> ' used within the FBA.
Subsidence Study Area	The area predicted and mapped as being indirectly impacted by subsidence
TSC Act	NSW <i>Threatened Species Conservation Act 1995</i>
VIS	Vegetation Information System
WorleyParsons	WorleyParsons Services Pty Ltd

## Introduction

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Cumberland Ecology was commissioned by Hansen Bailey on behalf of WorleyParsons Services Pty Ltd (WorleyParsons) to prepare a Biodiversity Offset Strategy (BOS) for the Bylong Coal Project (the 'Project'). The Project involves the construction and operation of an open cut and underground mining operation for a period of approximately 25 years. This BOS will form part of the Response to Submissions being prepared by Hansen Bailey to support an application for State Significant Development Consent under Division 4.1 of Part 4 of the New South Wales (NSW) *Environmental Planning and Assessment Act 1979*.

### 1.1 Purpose

The purpose of this BOS is to document the findings of an assessment of the proposed offsets for the Project in accordance with the Framework for Biodiversity Assessment (FBA). Specifically, the objectives of this BOS are to:

- Identify the proposed offset sites; and
- Document the ecosystem credits and species credits generated at each proposed offset site.

### 1.2 Requirement for BOS

A Biodiversity Offsets Report (BOR) was prepared for the Project which documented the strategy for offsetting impacts of the Project identified within the Ecological Impact Assessment (EIA) and provided detailed information on the offsets package. The BOR was included within the Environmental Impact Statement (EIS) prepared for the Project. An indicative credit requirement for both the impact and proposed offset sites was calculated using the FBA and presented within the BOR. An assessment of the Project offsets against the principles within the *NSW Biodiversity Offset Policy for Major Projects* (NSW Offset Policy for Major Projects) was also provided within the EIA and BOR.

Following consultation with the NSW Department of Planning and Environment (DP&E) and NSW Office of Environment and Heritage (OEH), it was recommended that the assessment of direct impacts of the Project associated with vegetation clearing be further assessed in accordance with the NSW Offset Policy for Major Projects, which includes the requirement to prepare a Biodiversity Assessment Report (BAR) and an associated BOS. OEH confirmed that the Project will be treated as a 'transitional project' under the NSW Offset Policy for

Major Projects and is therefore afforded a level of flexibility in meeting the requirements in this policy.

### **1.3 Interaction with BAR**

In accordance with the FBA, a BAR is required to be prepared to assess the Project's impact to biodiversity values within the Project Disturbance Boundary. The BAR is used to determine impacts that require further consideration and provision of detailed information, impacts that require offsetting, impacts that do not require offsetting and impacts and impacts that do not need to be assessed. The BAR also provides the credit liability of the Project. This BOS has been prepared to demonstrate how the Project proposes to offset the ecosystem credits and species credits identified within the BAR.

### **1.4 Calculated Offset Requirement**

The offset requirement was determined within the Biodiversity Assessment Report (BAR) prepared for the Project. Impacts of the Project occur within the following thresholds:

- Impacts that require further consideration:
  - Regional biodiversity link (20 m riparian buffer either side of a fourth order stream);
  - Box Gum Woodland and Derived Native Grassland (5,259 credits);
  - Regent Honeyeater (13,174 credits);
- Impacts that require an offset:
  - Native vegetation (14,835 credits);
  - Brush-tailed Rock-wallaby (688 credits);
  - Large-eared Pied Bat (728 credits);
  - Eastern Bentwing-bat (728 credits);
  - Eastern Cave Bat (728 credits);
- Impacts that do not require an offset:
  - Native vegetation with a site value score of < 17;
- Impacts that do not require further assessment;
  - Cleared land.

**Table 1.1** summarises the ecosystem credits and species credits required to offset the direct impact of vegetation clearing within the Project Disturbance Boundary as calculated within the BAR. The impacts to the regional biodiversity link, Box Gum Woodland and Derived Native Grassland and the Regent Honeyeater require further consideration by the consent authority. However, the calculated credit requirement for these matters are also included in **Table 1.1**.

**Table 1.1 Summary of ecosystem credits and species credits required by the Project**

Plant Community Type	Area (ha)	Credits Required
<b>Ecosystem Credits</b>		
HU547: Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion	57.58	152
HU690: Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	500.48	11,143
HU714: Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	16.42	295
HU732: Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion	22.78	593
HU824: White Box - Black Cypress Pine shrubby woodland of the Western Slopes	113.93	6,431
HU 869: Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	42.38	1,480
<b>Ecosystem Credits Total</b>		<b>20,094</b>
<b>Species Credits</b>		
Regent Honeyeater ( <i>Anthochaera phrygia</i> )	171.09	13,174
Brush-tailed Rock-wallaby ( <i>Petrogale penicillata</i> )	26.45	688
Large-eared Pied Bat ( <i>Chalinolobus dwyeri</i> )	56.00	728
Eastern Bentwing-bat ( <i>Miniopterus schreibersii</i> subsp. <i>oceanensis</i> )	56.00	728
Eastern Cave Bat ( <i>Vespadelus troughtoni</i> )	56.00	728
<b>Species Credits Total</b>		<b>16,046</b>

## **1.5 Conservation Measures Proposed to Provide Offsets**

In accordance with the FBA, the following options are available for the Project to satisfy the offset requirements identified within the BAR:

- Retirement of credits;
- Ecological rehabilitation of previously mined land; and
- Supplementary measures.

The offset strategy for the Project entails the protection and management of six offset sites for permanent conservation. As the Project is being assessed as a “transitional project” in accordance with the NSW Offset Policy for Major Projects, a number of mechanisms to permanently secure the offset sites are being considered, including BioBanking Agreements and Voluntary Conservation Agreements. The final outcome will depend on negotiations with relevant regulatory agencies.

# Offset Site Identification

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## 2.1 Introduction

The proposed offsets for the Project comprise the following sites:

- Offset Area 1;
- Offset Area 2;
- Offset Area 3;
- Offset Area 4;
- Offset Area 5; and
- Yarran View Offset Area.

Offset Areas 1-5 comprise land in the immediate vicinity ( $\leq 3$  km) of the Project Disturbance Boundary and are collectively referred to as the Onsite Offset Areas. The Yarran View Offset Area is located approximately 9 km south of the Project Disturbance Boundary and is referred to as the Offsite Offset Area. The location of the Onsite Offset Areas and Offsite Offset Area in relation to the Project Disturbance Boundary are shown in **Figure 2.1**.

Further details of each of the offset sites are provided below. The BOR also provides a description of the vegetation and fauna habitats within the offset sites as well as threatened species occurrences. All areas of native vegetation will be managed for biodiversity. Areas mapped as “cultivated land” and “other” (roads, dams, planted vegetation, railway, quarry) have been excluded from the offset calculations.

## 2.2 Offset Area 1

**Total Area:** 762 ha

**Land Owner:** KEPCO Bylong Australia Pty Ltd

**Lot/DP:** Lot 11, 12, 37, 38, 39, 40, 41, 52, 65, 68, 70, 71, 72, 76 and 86 DP 755420

**Zoning:** RU1- Primary Production

**Location:** Upper Bylong, less than one kilometre east of the Project Disturbance Boundary

**LGA:** Mid-western Regional

**IBRA Bioregion:** Sydney Basin

**IBRA Subregion:** Kerrabee

**Major Catchment Area:** Hunter / Central Rivers

Offset Area 1 comprises valley floors, foothills, upper slopes and hill top areas. The valley floor extends north/south through the offset as well as to the east in the northern portion of the offset. The lower lying portions of the offset occur at approximately 300 m Australian Height Datum (AHD) and have largely been cleared for agriculture.

Bylong River also occurs in the northern portion of the offset, meandering from east to west. Numerous topographic highs occur within the offset, with the highest point occurring in the central eastern portion at 530 m AHD, and sandstone cliffs are present. Intact native vegetation extends from the foothills up to the hill top areas. These areas comprise structurally diverse vegetation including formations along gullies, slopes, ridgelines and plateaus. The eastern and southern boundaries of Offset Area 1 adjoin Wollemi National Park. The location of Offset Area 1 is shown in **Figure 2.2**.

## **2.3 Offset Area 2**

**Total Area:** 526 ha

**Land Owner:** KEPCO Bylong Australia Pty Ltd

**Lot/DP:** Lot 94 (part) DP 45337; Lot 96 DP 45338; Lot 1 DP 498907; Lot 1 (part) and 2 DP 618119; Lot 9, 57 (part) and 87 DP 755438

**Zoning:** RU1- Primary Production

**Location:** Upper Bylong, adjoining the southern boundary of the Project Disturbance Boundary

**LGA:** Mid-western Regional

**IBRA Bioregion:** Sydney Basin

**IBRA Subregion:** Kerrabee

**Major Catchment Area:** Hunter / Central Rivers

Offset Area 2 comprises valley floors, foothills, upper slopes and hill top areas. The valley floor extends north/south through the eastern portion of the offset with smaller valleys extending west. The lowest lying portions of the offset occur at approximately 310 m AHD and have largely been cleared for agriculture.

A cleared plateau at approximately 350 m AHD occurs in the southern portion of the offset. Numerous topographic highs occur within the offset, with the highest point occurring in the south eastern corner at 580 AHD, and sandstone cliffs are present. Intact native vegetation extends from the foothills up to the hill top areas. These areas comprise structurally diverse vegetation including formations along gullies, slopes, ridgelines and plateaus. The location of Offset Area 2 is shown in **Figure 2.3**.

## 2.4 Offset Area 3

**Total Area:** 458 ha

**Land Owner:** KEPCO Bylong Australia Pty Ltd

**Lot/DP:** Lot 52, 53, 54, 61, 62, 63, 85, 87 and 111 DP 755417; Lot 1 DP 1100343

**Zoning:** RU1- Primary Production

**Location:** Bylong, <1 km west of the Project Disturbance Boundary

**LGA:** Mid-western Regional

**IBRA Bioregion:** Sydney Basin

**IBRA Subregion:** Kerrabee

**Major Catchment Area:** Hunter / Central Rivers

Offset Area 3 comprises valley floors, foothills, upper slopes and hill top areas. The valley floor extends across the northern and central portions of the offset with a smaller valley extending south in the eastern portion. The lowest lying portions of the offset occur at approximately 280 m AHD and have largely been cleared for agriculture. Two topographic highs occur within the southern portion of the offset at 530 m AHD.

Intact native vegetation extends from the foothills up to the hill top areas. These areas comprise structurally diverse vegetation including formations along gullies and slopes. An elevated plateau with a degraded access track has been cleared within the southern portion of the offset. The location of Offset Area 3 is shown in **Figure 2.4**.

## 2.5 Offset Area 4

**Total Area:** 380 ha

**Land Owner:** KEPCO Bylong Australia Pty Ltd

**Lot/DP:** Lot 1 DP 199850; Lot 1 DP 420435; Lot 8, 13, 14, 15, 21, 27, 28, 29, 45, 69, 70 and 71 DP 755419; Lot 1 DP 1088401

**Zoning:** RU1- Primary Production

**Location:** Bylong, 3 km west of the Project Disturbance Boundary

**LGA:** Mid-western Regional

**IBRA Bioregion:** Sydney Basin

**IBRA Subregion:** Kerrabee

**Major Catchment Area:** Hunter / Central Rivers

Offset Area 4 comprises valley floors with some elevated areas. The valley floor extends across much of the offset with elevated areas occurring along the southern boundary. The lowest lying portions of the offset occur at approximately 290 m Australian Height Datum (AHD) and the highest points occur at 370 m AHD.

The majority of the offset has been cleared for agriculture, however there are fragments of woodland scattered across the offset. Growee River occurs in the eastern portion of the offset, meandering from south to north. The location of Offset Area 4 is shown in **Figure 2.5**.

## 2.6 Offset Area 5

**Total Area:** 1,512 ha

**Land Owner:** KEPCO Bylong Australia Pty Ltd

**Lot/DP:** Lot 2 (part) DP 222796; Lot 1 DP 512928; Lot 3, 4, 5, 6, 7, 21, 23, 24, 25, 46 and 47 DP 755420; Lot 86, 187 and 188 DP 755421; Lot 1 (part) DP 1094509; Lot 1 (part) DP 1146893

**Zoning:** RU1- Primary Production

**Location:** Bylong/Upper Bylong, adjoining the northern boundary of the Project Disturbance Boundary

**LGA:** Mid-western Regional

**IBRA Bioregion:** Sydney Basin

**IBRA Subregion:** Kerrabee

**Major Catchment Area:** Hunter / Central Rivers

Offset Area 5 comprises valley floors, foothills, upper slopes and hill top areas. The valley floor extends east/west through the offset, widening in the west. The lower lying portions of the offset occur at approximately 260 m AHD and have largely been cleared for agriculture. Dry Creek occurs in the northern portion of the offset, with a number of drainage lines flowing into this watercourse.

Numerous topographic highs occur within the offset, with the highest point occurring in the southern eastern portion at 490 m AHD, and sandstone cliffs are present. Intact native vegetation extends from the foothills up to the hill top areas. These areas comprise structurally diverse vegetation including formations along gullies, slopes, ridgelines and plateaus. The northern boundary of Offset Area 5 adjoins Goulburn River National Park. The location of Offset Area 5 is shown in **Figure 2.6**.

To account for the potential impacts above the Subsidence Study Area within Offset Area 5, the total land area contributing to the offset site by this portion of the offset has been discounted by 10%. That is, 1,064 ha of land above the Subsidence Study Area and within Offset Area 5 has been assigned a value of 958 ha. The discount applied to Offset Area 5 is considered conservative given the minor anticipated extent of impacts to vegetation and habitat within the portion of the offset occurring within the Subsidence Study Area, as well as proposed management actions that will be implemented to address such issues.

## 2.7 Yarran View Offset Area

**Total Area:** 443 ha

**Land Owner:** KEPCO Bylong Australia Pty Ltd

**Lot/DP:** Lot 64, 65, 66, 67, 68, 86, 96, 120 and 121 DP 755432; Lot 63, 63, 69, 70 DP 755438

**Zoning:** RU1- Primary Production

**Location:** Lee Creek, 9 km south of the Project Disturbance Boundary

**LGA:** Mid-western Regional

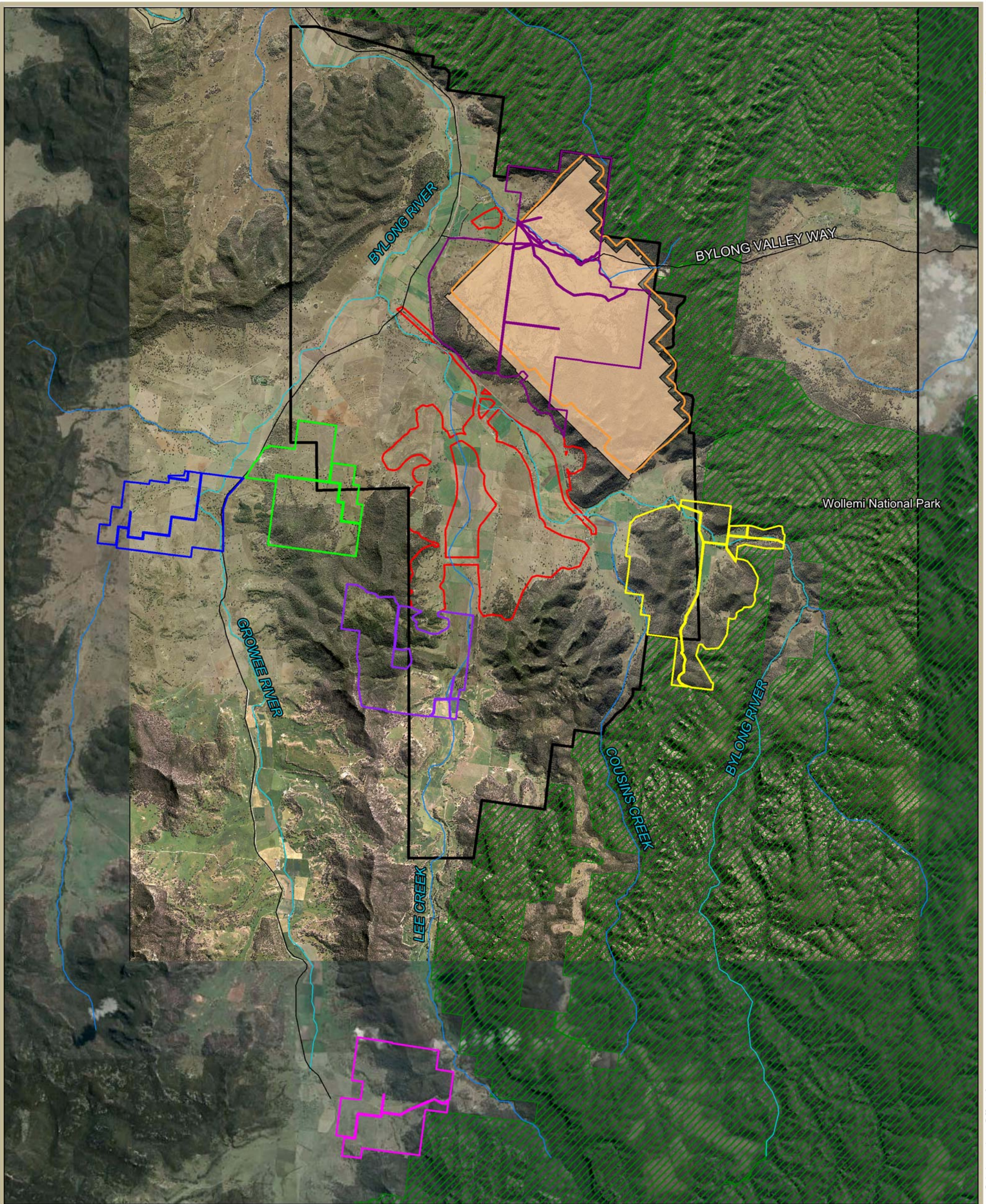
**IBRA Bioregion:** Sydney Basin

**IBRA Subregion:** Kerrabee

**Major Catchment Area:** Hunter / Central Rivers

The Yarran View Offset comprises valley floors, foothills, upper slopes and hill stop areas. The narrow valley flora extends across the central portion of the offset. The lowest lying portions of the offset occur at approximately 380 m AHD and have largely been cleared for agriculture. Two topographic highs occur within the north eastern portion of the offset occur at 640 m AHD.

The offset also rises to 520 m AHD in the south eastern portion. Intact native vegetation extends from a number of the foothills up to the hill top areas. These areas comprise structurally diverse vegetation including formations along gullies and slopes. Some scattered patches of vegetation also occur on the undulating topography of the lower slopes. The location of Yarran View Offset Area is shown in **Figure 2.7**.



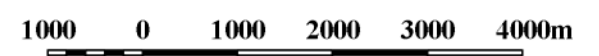
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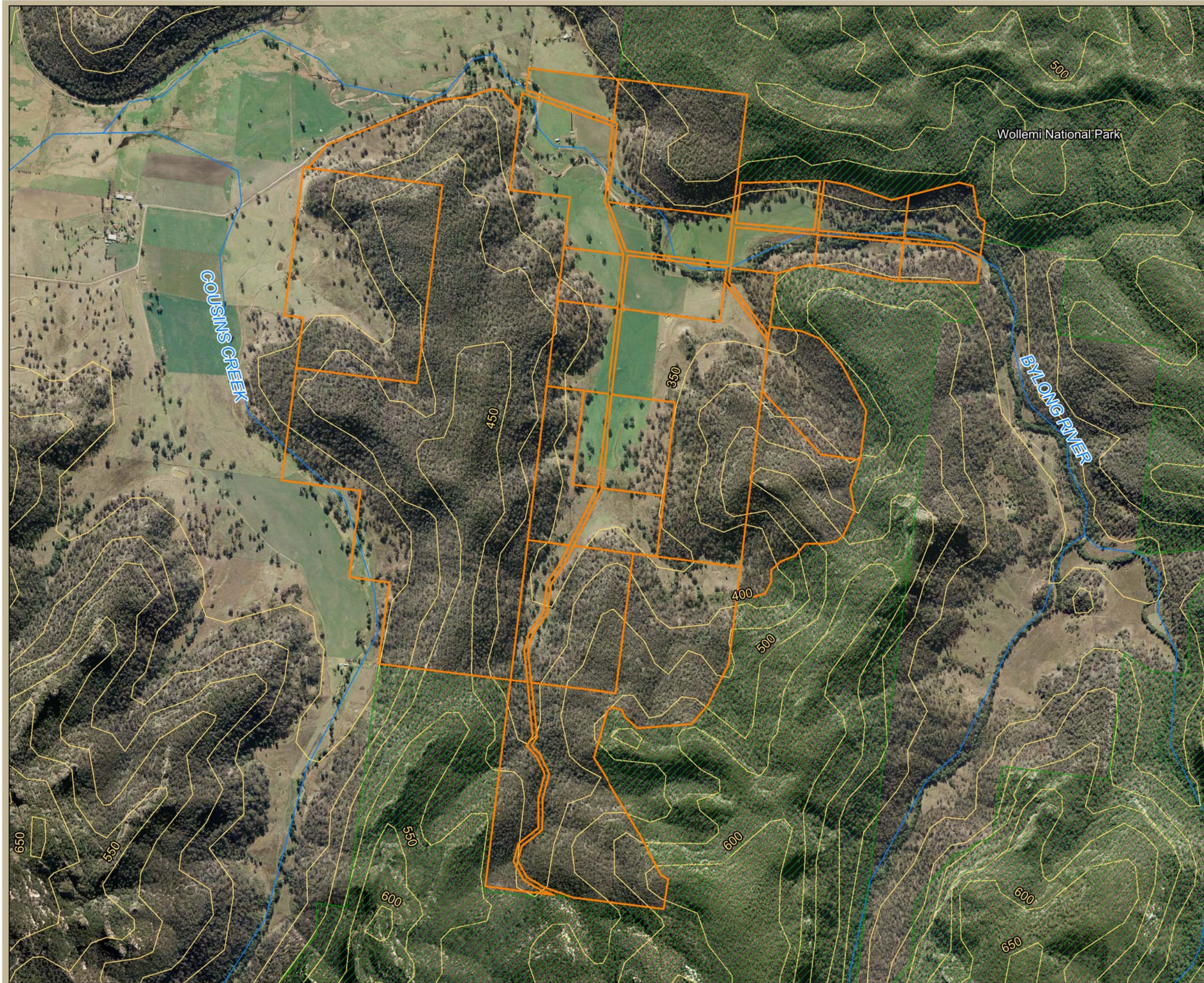
- |                              |                            |                            |
|------------------------------|----------------------------|----------------------------|
| Study Area                   | <b>Onsite Offset Areas</b> | <b>Offsite Offset Area</b> |
| Project Disturbance Boundary | Offset Area 1              | Yarran View Offset Area    |
| Subsidence Study Area        | Offset Area 2              |                            |
| Underground Extraction Area  | Offset Area 3              |                            |
| National Parks               | Offset Area 4              |                            |
| Road                         | Offset Area 5              |                            |
| Waterway                     |                            |                            |

Image Source:  
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**Figure 2.1. Location of the Onsite and Offsite Offset Areas**





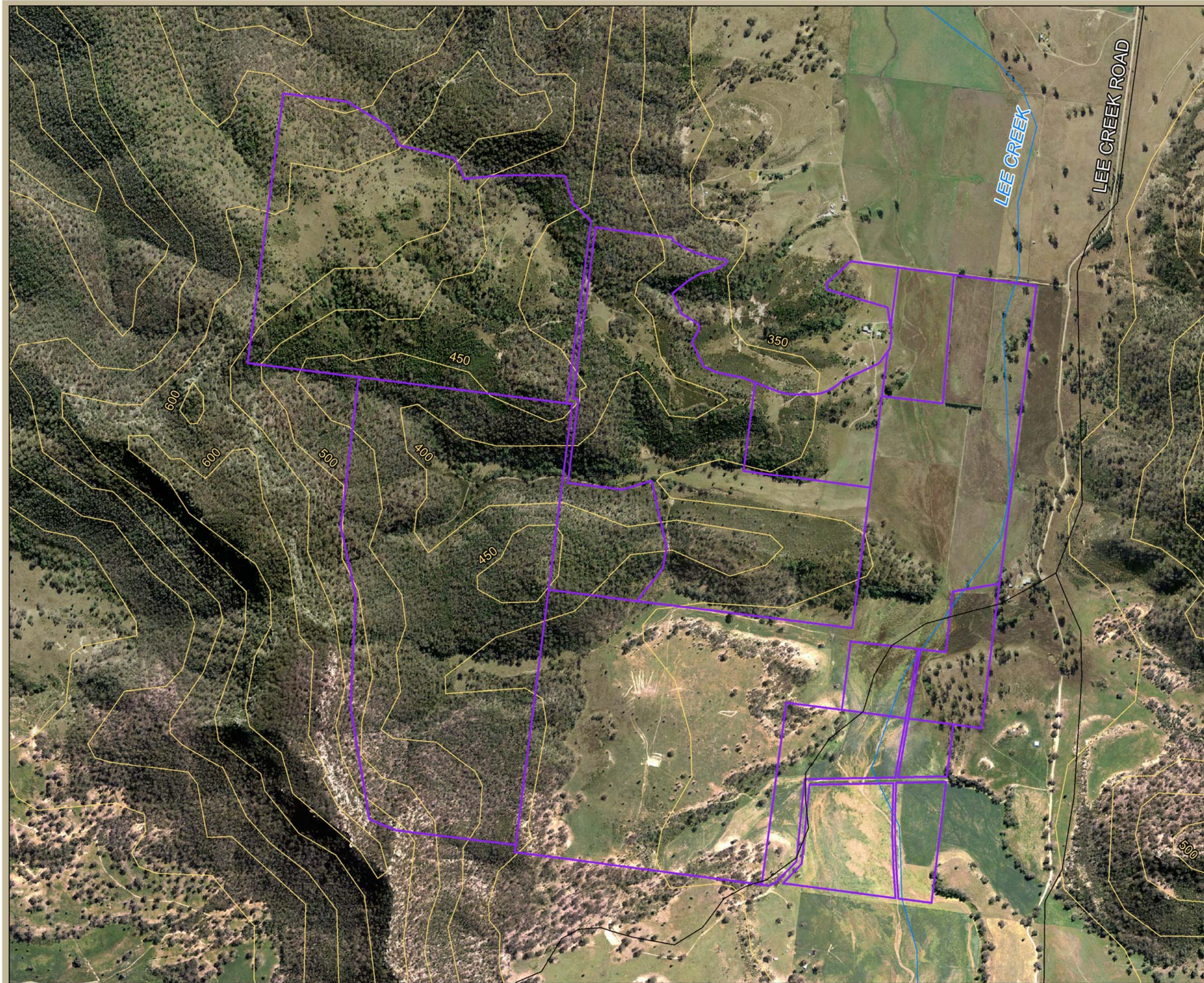
**Legend**  
 [Orange Outline] Offset Area 1  
 [Green Hatched] National Park  
 [Blue Line] Waterway

Image Source:  
 Data Source:  
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Figure 2.2. Location of Offset Area 1

250 0 250 500 750 1000m



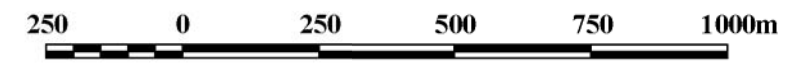
- Legend**
- Offset Area 2
  - Road
  - Waterway

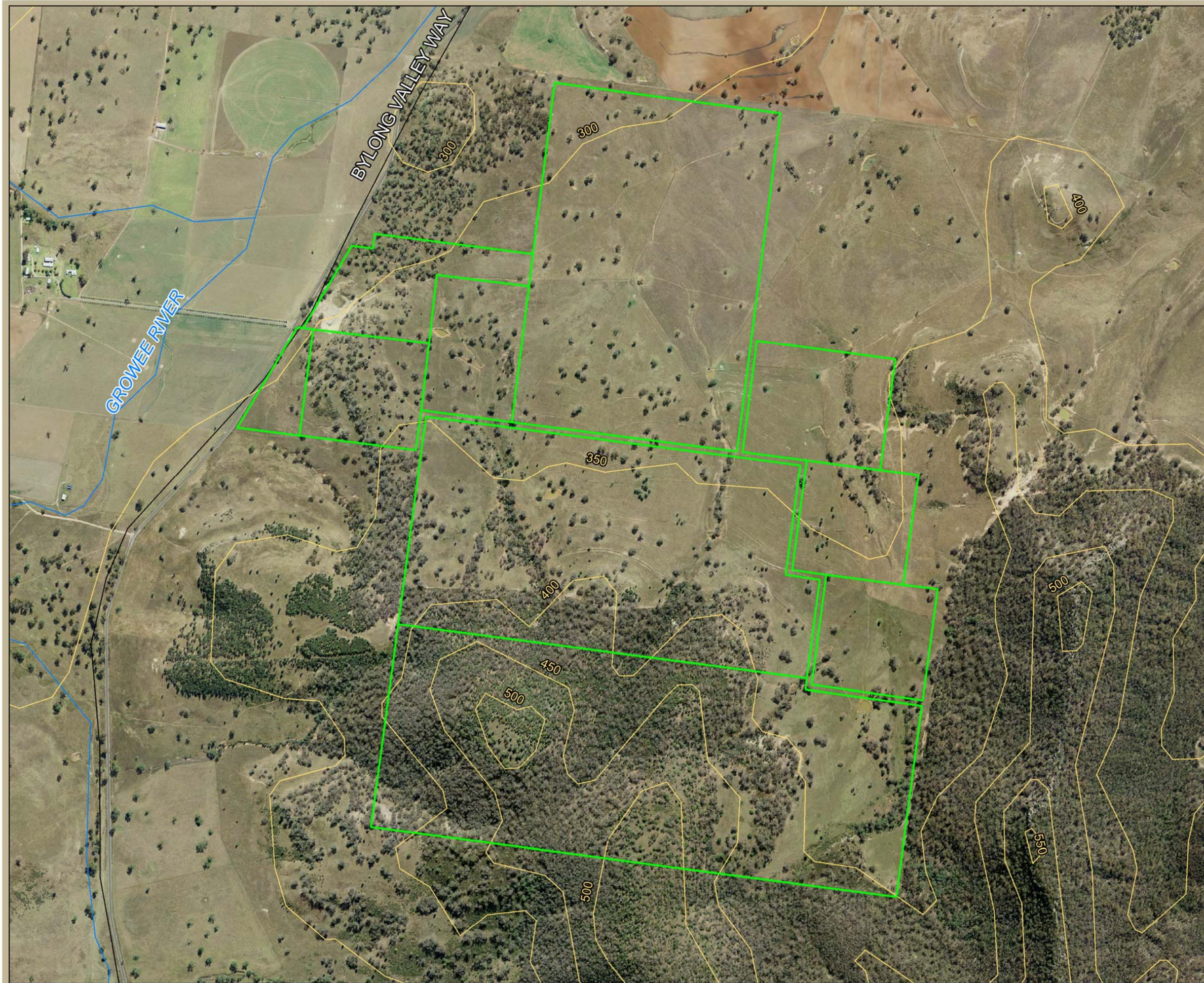


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Figure 2.3. Location of Offset Area 2





**Legend**

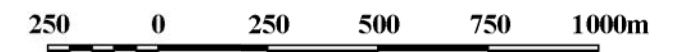
- Offset Area 3
- Road
- Waterway

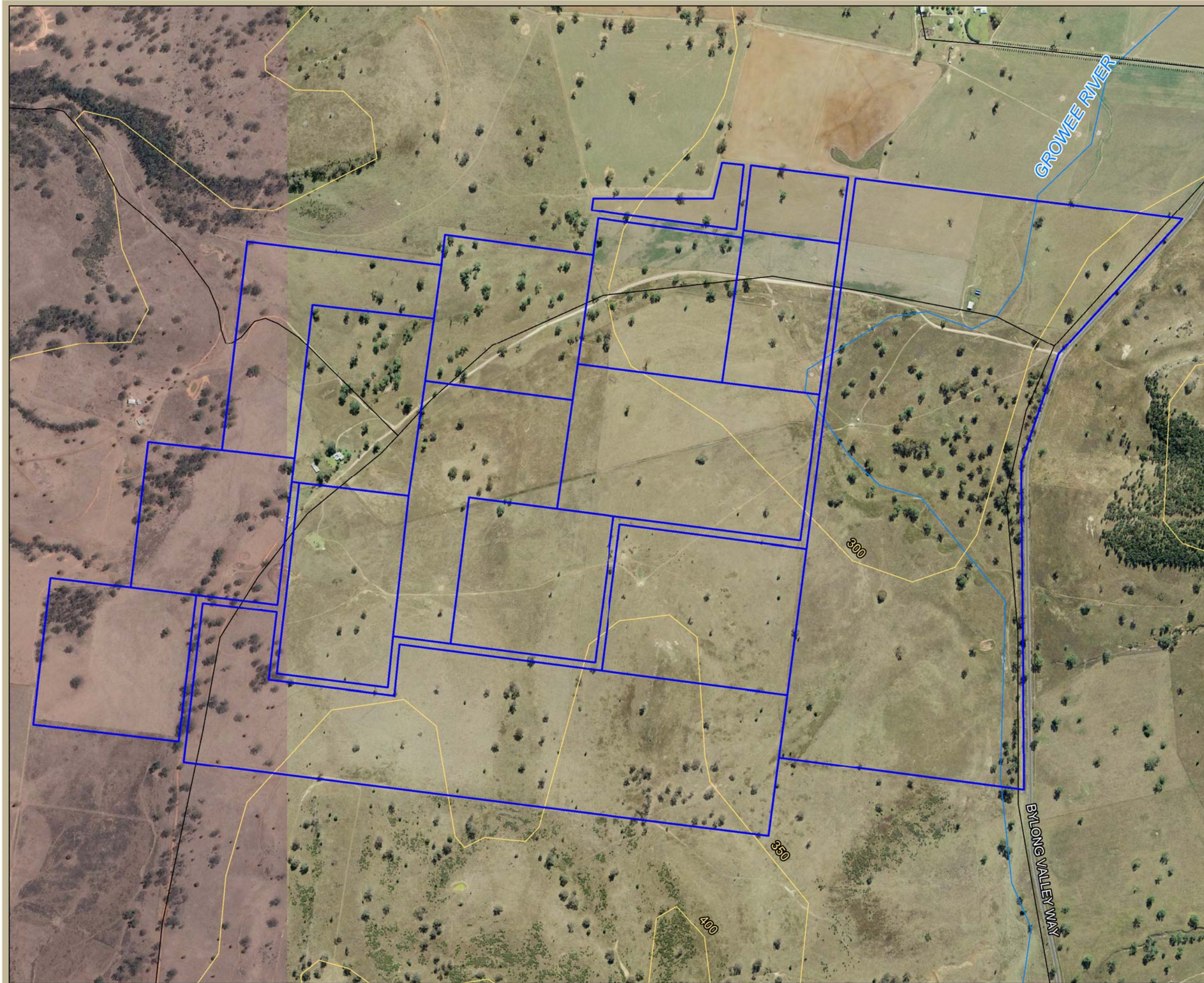


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Figure 2.4. Location of Offset Area 3





- Legend**
- Offset Area 4
  - Road
  - Waterway

Grid North

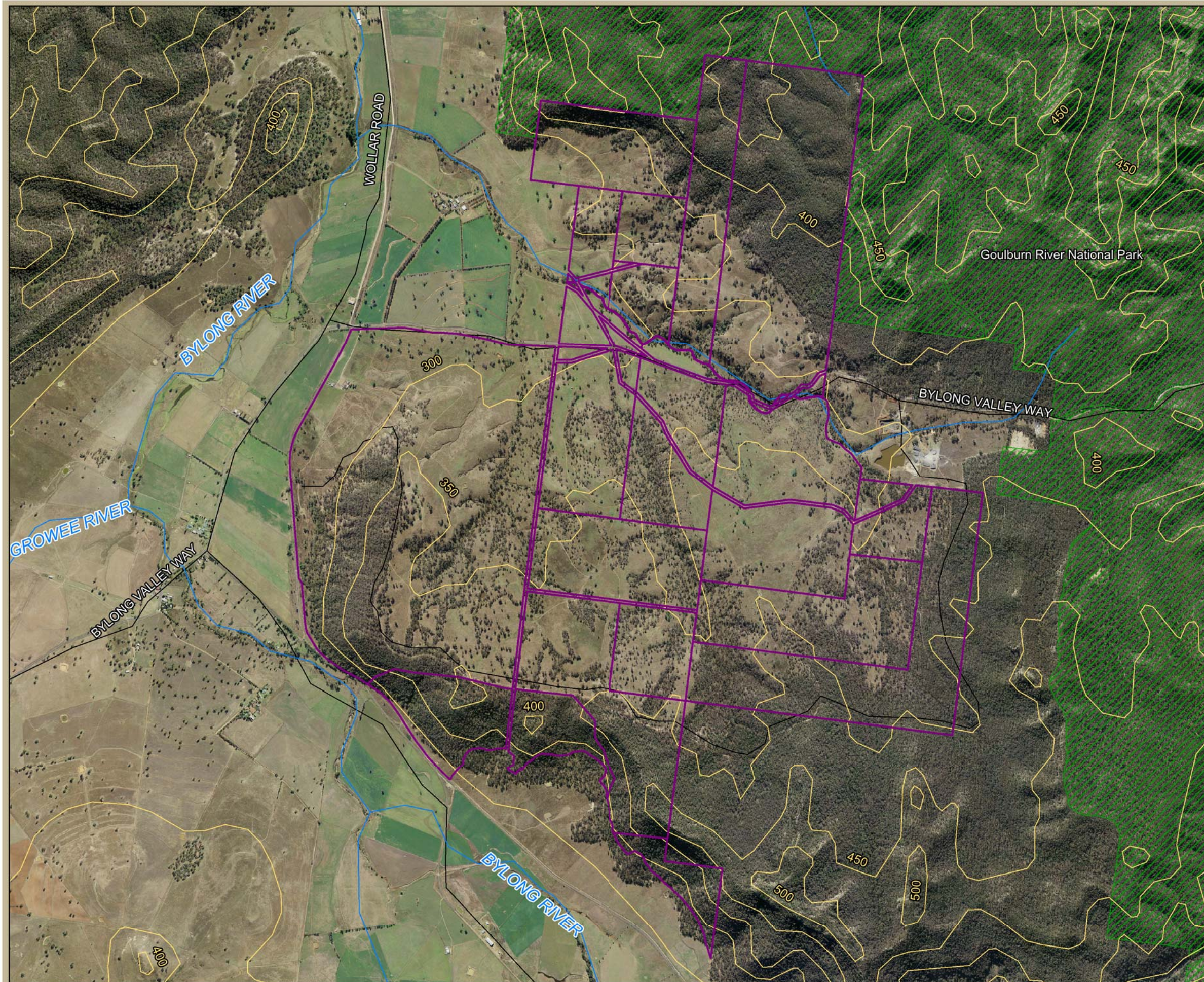
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Figure 2.5. Location of Offset Area 4



I:\...112052\Figures\RP4\_BOS\20160127\Figure 2.5. Location\_Offset Area 4



- Legend**
- Offset Area 5
  - National Park
  - Road
  - Waterway

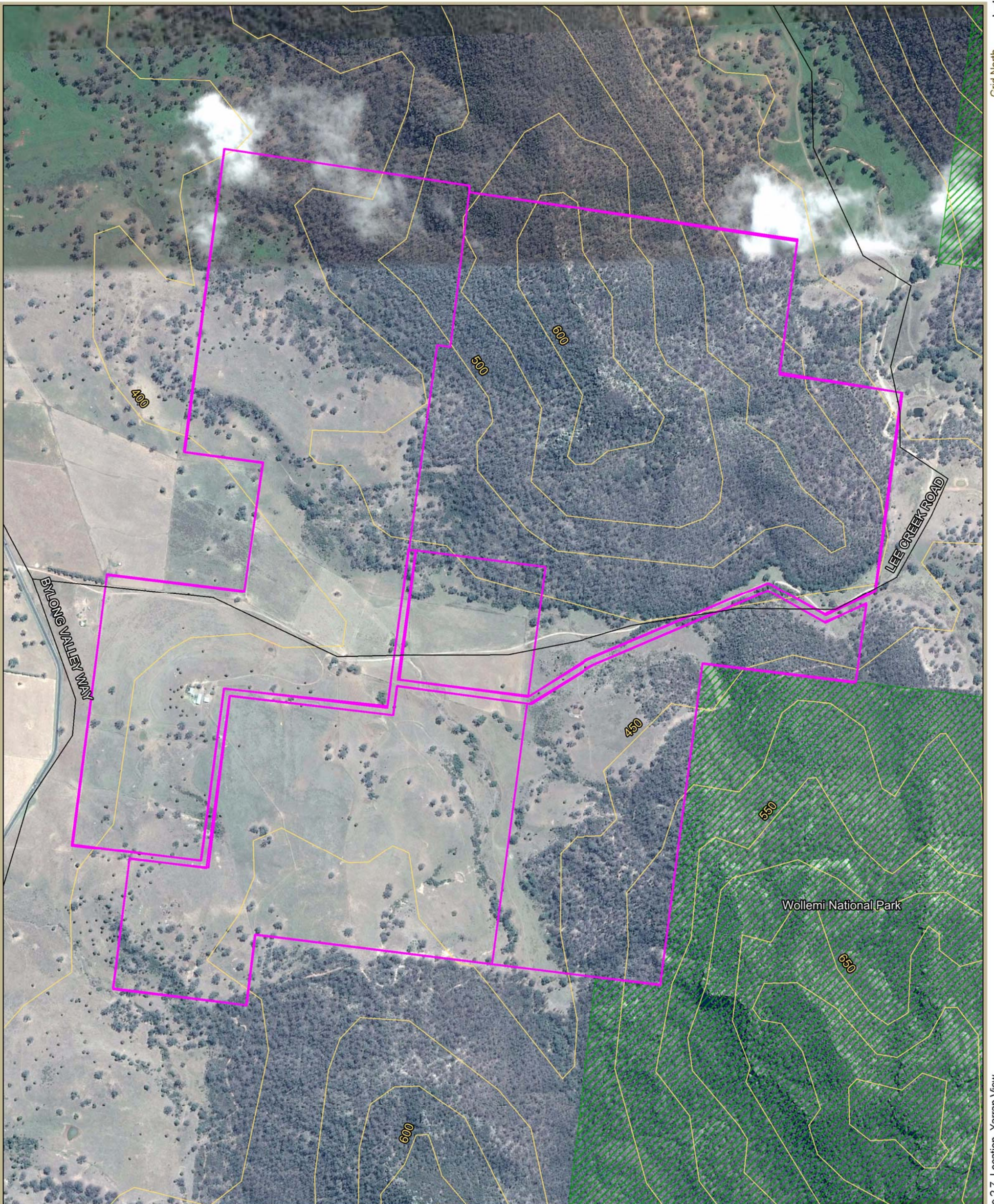
Grid North

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Figure 2.6. Location of Offset Area 5





- Legend**
- Yarran View Offset Area
  - National Park
  - Road

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 Image © 2014 CNES/Astrium

Data Source:  
 NPWS Estate 2012  
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Figure 2.7. Location of Yarran View Offset Area



## Improvement in Biodiversity Values

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### 3.1 Introduction

In accordance with the FBA, the offset sites were assessed using the BioBanking Assessment Methodology (BBAM). This chapter presents the indicative improvement in biodiversity values at each offset site based on data collected for the EIA and BOR. The values presented within this chapter are considered to be indicative as further assessment of the offset sites will be required to meet minimum survey requirements should the Project proceed and the offset sites secured through a BioBanking Agreement.

The Biodiversity Credit Reports generated for each of the offset sites, including ecosystem credits and species credits, are provided in **Appendices A-F**.

### 3.2 Management Actions

The offset sites do not have any existing obligations and management actions relating to the improvement of biodiversity values. Management actions proposed for offset sites secured under a BioBanking Agreement include standard management actions prescribed by the BBAM and additional management actions for Plant Community Types (PCTs) and species credit species prescribed within the BioBanking Credit Report for each offset site. Any BARs prepared for the offset sites will include a management plan that will stipulate in detail the management actions and reporting criteria. Management actions for offset sites secured under another type of mechanism will be incorporated into a Biodiversity Management Plan for the Project.

#### 3.2.1 *Standard Management Actions*

The following standard management actions have been identified for the offset sites as prescribed in the BBAM, and include the following obligations:

- Management of grazing for conservation;
- Weed control;
- Ecological fire management;
- Management of human disturbance;

- Retention of regrowth and remnant native vegetation;
- Replanting or supplementary planting where natural regeneration will not be sufficient;
- Retention of dead timber;
- Erosion control; and
- Retention of rocks.

These management actions are required to create biodiversity credits and will be undertaken across all offset sites.

### 3.2.2 Additional Management Actions

In addition to the standard management actions, the BioBanking Credit Report generated for each offset site prescribes additional management actions for each PCT and species credit species assessed within the offset site. **Table 3.1** outlines the additional management actions required for PCTs and **Table 3.2** outlines the additional management actions required for species credit species.

**Table 3.1 Additional management actions for PCTs**

PCT	Exclude commercial apiaries	Exclude miscellaneous feral species	Feral and/or over-abundant native herbivore control	Fox Control	Slashing
<b>OFFSET AREA 1</b>					
HU599	X	X	X	X	X
HU690	X	X	X	X	X
HU702	X	X	X	X	X
HU714	X	X	X	X	X
HU732	X	X	X	X	X
HU824	X	X	X	X	X
HU826	X	X	X	X	X
HU869	X	X	X	X	X
HU886	X	X	X	X	X
HU891	X	X	X	X	X
HU893		X	X	X	X
<b>OFFSET AREA 2</b>					
HU690	X	X	X	X	X
HU702	X	X	X	X	X

**Table 3.1 Additional management actions for PCTs**

PCT	Exclude commercial apiaries	Exclude miscellaneous feral species	Feral and/or over-abundant native herbivore control	Fox Control	Slashing
HU714	X	X	X	X	X
HU799	X	X	X	X	X
HU824	X	X	X	X	X
HU869	X	X	X	X	X
HU870		X	X	X	X
HU910	X	X	X	X	X
<b>OFFSET AREA 3</b>					
HU547	X	X	X	X	X
HU690	X	X	X	X	X
HU732	X	X	X	X	X
HU824	X	X	X	X	X
HU869	X	X	X	X	X
<b>OFFSET AREA 4</b>					
HU690	X	X	X	X	X
HU714	X	X	X	X	X
HU732	X	X	X	X	X
<b>OFFSET AREA 5</b>					
HU690	X	X	X	X	X
HU702	X	X	X	X	X
HU714	X	X	X	X	X
HU732	X	X	X	X	X
HU824	X	X	X	X	X
HU869	X	X	X	X	X
HU888	X	X	X	X	X
HU891	X	X	X	X	X
HU893		X	X	X	X
HU910	X	X	X	X	X
<b>YARRAN VIEW OFFSET AREA</b>					
HU690	X	X	X	X	X
HU702	X	X	X	X	X
HU714	X	X	X	X	X

**Table 3.1 Additional management actions for PCTs**

PCT	Exclude commercial apiaries	Exclude miscellaneous feral species	Feral and/or over-abundant native herbivore control	Fox Control	Slashing
HU824	X	X	X	X	X
HU869	X	X	X	X	X

**Table 3.2 Additional management actions for species credit species**

Species	Exclude miscellaneous feral species	Feral and/or over-abundant native herbivore control	Fox Control
<b>OFFSET AREA 1</b>			
Regent Honeyeater	X	X	
Brush-tailed Rock-wallaby		X	X
Large-eared Pied Bat		X	
Eastern Bentwing-bat		X	
Eastern Cave Bat		X	
<b>OFFSET AREA 2</b>			
Regent Honeyeater	X	X	
Brush-tailed Rock-wallaby		X	X
Large-eared Pied Bat		X	
Eastern Bentwing-bat		X	
Eastern Cave Bat		X	
<b>OFFSET AREA 3</b>			
Regent Honeyeater	X	X	
<b>OFFSET AREA 4</b>			
Regent Honeyeater	X	X	
<b>OFFSET AREA 5</b>			
Ozothamnus tessellatus		X	
Regent Honeyeater	X	X	
Large-eared Pied Bat		X	
Eastern Bentwing-bat		X	
Eastern Cave Bat		X	
<b>YARRAN VIEW OFFSET AREA</b>			
Regent Honeyeater	X	X	
Large-eared Pied Bat		X	

**Table 3.1 Additional management actions for PCTs**

PCT	Exclude commercial apiaries	Exclude miscellaneous feral species	Feral and/or over-abundant native herbivore control	Fox Control	Slashing
Eastern Bentwing-bat			X		
Eastern Cave Bat					

### 3.3 Ecosystem Credits Generated

Ecosystem credits generated for vegetation zones identified within each offset site are shown in **Table 3.3**. This table also includes the area of each vegetation zone, the landscape value score, current site value, future site value and averted loss. All the offset sites are located on land zoned RU1 (primary production) and are therefore considered to have a high risk of decline in site value score.

For all offset sites, this assessment assumed a default increase in site values. A total of 48,974 ecosystem credits are estimated to be generated within the offset sites (presented at the end of **Table 3.3**).

**Table 3.3 Ecosystem credits generated within the offset sites**

Vegetation Zone	PCT	Area (ha)	Landscape Value Score	Current Site Value	Future Site Value	Averted Loss in Site Value	Credits Generated
<b>OFFSET AREA 1</b>							
1	HU599	13.28	27.9	52	67.33	11.67	182
2	HU714	25.57	27.9	64.93	96.35	9.55	440
3	HU732	6.11	27.9	74.48	100	10.16	97
4	HU732	8.04	27.9	74.48	100	10.16	128
5	HU690	39.33	27.9	67.71	78.91	10.94	492
6	HU824	158.73	27.9	68.89	86	11.33	2,236
7	HU869	140.8	27.9	61.56	90.22	10.67	2,366
8	HU690	0.88	27.9	72.22	84.11	11.63	11
9	HU824	3.13	27.9	62.67	77.33	11.56	42
10	HU893	1.5	27.9	56	83.33	8.33	24
11	HU891	167.1	27.9	65.33	90.22	12.55	2,730
12	HU891	20.88	27.9	63.11	88.67	11.44	339
13	HU886	11.34	27.9	56.67	83.33	12	189

**Table 3.3 Ecosystem credits generated within the offset sites**

Vegetation Zone	PCT	Area (ha)	Landscape Value Score	Current Site Value	Future Site Value	Averted Loss in Site Value	Credits Generated
14	HU702	14.01	27.9	84.38	100	15.11	205
15	HU826	3.56	27.9	63.02	84.55	9.55	52
16	HU714	20.42	27.9	10.94	26.82	1.3	230
17	HU732	7.25	27.9	11.46	27.69	1.56	83
18	HU732	2.18	27.9	13.02	29.43	2.08	25
19	HU690	30.17	27.9	25	38.45	2.08	328
20	HU690	0.38	27.9	19.79	41.06	2.34	5
21	HU869	3.25	27.9	12	31	1.33	39
22	HU690	8.69	27.9	18.75	39.32	2.08	110
<b>OFFSET AREA 2</b>							
1	HU714	14.13	23.7	64.93	96.35	9.55	228
2	HU690	16.29	23.7	67.71	78.91	10.94	187
3	HU824	135.59	23.7	68.89	86	11.33	1,767
4	HU714	2.69	23.7	76.04	100	10.94	39
5	HU869	17.26	23.7	61.56	90.22	10.67	272
6	HU824	46.93	23.7	62.67	77.33	11.56	586
7	HU824	46.71	23.7	81.78	92	15	571
8	HU702	0.43	23.7	84.38	100	15.11	6
9	HU799	13.17	23.7	90.1	100	17.96	170
10	HU910	14.9	23.7	75.17	96.88	14.23	222
11	HU870	23.22	23.7	66	81.33	11.33	292
12	HU714	10.74	23.7	10.94	26.82	1.3	110
13	HU690	18.11	23.7	25	38.45	2.08	178
14	HU690	20.93	23.7	17.19	35.68	1.3	228
15	HU690	34.15	23.7	19.79	41.06	2.34	404
16	HU824	0.23	23.7	38.67	51	5.34	2
17	HU910	4.64	23.7	28.12	45.57	5.72	54
<b>OFFSET AREA 3</b>							
1	HU732	4.85	26.1	74.48	100	10.16	75
2	HU690	56.78	26.1	67.71	78.91	10.94	685
3	HU824	111.72	26.1	68.89	86	11.33	1,523
4	HU869	2.3	26.1	61.56	90.22	10.67	38

**Table 3.3 Ecosystem credits generated within the offset sites**

Vegetation Zone	PCT	Area (ha)	Landscape Value Score	Current Site Value	Future Site Value	Averted Loss in Site Value	Credits Generated
5	HU690	4.44	26.1	72.22	84.11	11.63	55
6	HU547	0.12	26.1	38.54	60.33	3.3	2
7	HU824	4.82	26.1	62.67	77.33	11.56	63
8	HU824	13.72	26.1	81.78	92	15	176
9	HU732	2.47	26.1	11.46	27.69	1.56	27
10	HU690	145.72	26.1	25	38.45	2.08	1,517
11	HU690	7.01	26.1	17.19	35.68	1.3	80
12	HU690	10.77	26.1	19.79	41.06	2.34	134
13	HU690	90.16	26.1	18.75	39.32	2.08	1,099
14	HU547	0.54	26.1	18.23	39.32	1.82	7
<b>OFFSET AREA 4</b>							
1	HU714	7.32	40.4	90.1	100	17.96	125
2	HU732	19.77	40.4	74.48	100	10.16	376
3	HU690	5.56	40.4	67.71	78.91	10.94	87
4	HU690	1.71	40.4	72.22	84.11	11.63	27
5	HU714	32.48	40.4	10.94	26.82	1.3	468
6	HU732	47.84	40.4	11.46	27.69	1.56	696
7	HU732	11.33	40.4	9.9	25.09	1.05	160
8	HU732	24.72	40.4	13.02	29.43	2.08	364
9	HU690	34.33	40.4	25	38.45	2.08	480
10	HU690	16.84	40.4	17.19	35.68	1.3	253
11	HU690	108.79	40.4	19.79	41.06	2.34	1,741
12	HU690	0.48	40.4	18.75	39.32	2.08	8
<b>OFFSET AREA 5</b>							
1	HU714	12.14	24.3	64.93	96.35	9.55	198
2	HU910	1.21	24.3	25.52	38.28	4.43	13
3	HU732	107.65	24.3	74.48	100	10.16	1,614
4	HU690	377.51	24.3	67.71	78.91	10.94	4,383
10	HU893	1.21	24.3	56	83.33	8.33	18
11	HU891	51.62	24.3	65.33	90.22	12.55	797
13	HU888	27.68	24.3	54.67	80.44	9	409
15	HU714	1.65	24.3	10.94	26.82	1.3	17

**Table 3.3 Ecosystem credits generated within the offset sites**

Vegetation Zone	PCT	Area (ha)	Landscape Value Score	Current Site Value	Future Site Value	Averted Loss in Site Value	Credits Generated
16	HU732	17.71	24.3	11.46	27.69	1.56	186
18	HU690	159.02	24.3	25	38.45	2.08	1,583
17	HU732	83.36	24.3	9.9	25.09	1.05	845
19	HU690	120.2	24.3	17.19	35.68	1.3	1,325
5	HU824	82.32	24.3	68.89	86	11.33	1,085
6	HU714	3.13	24.3	90.1	100	17.96	41
7	HU869	198.8	24.3	61.56	90.22	10.67	3,162
8	HU690	6.77	24.3	72.22	84.11	11.63	81
9	HU824	0.95	24.3	62.67	77.33	11.56	12
12	HU891	94.96	24.3	63.11	88.67	11.44	1,455
14	HU702	10.59	24.3	84.38	100	15.11	146
20	HU714	0.37	24.3	9.9	25.09	1.05	4
21	HU869	20.22	24.3	12	31	1.33	226
22	HU690	12.12	24.3	18.75	39.32	2.08	142
<b>YARRAN VIEW OFFSET AREA</b>							
1	HU714	10.82	22.5	73.44	89.06	7.29	123
2	HU690	19.3	22.5	85.24	100	17.1	262
3	HU824	172.86	22.5	64.44	85.56	12.66	2,432
4	HU869	52.42	22.5	62.67	90.22	11.23	803
5	HU824	8.02	22.5	26	53.22	2.67	105
6	HU702	3.21	22.5	69.79	90.62	11.98	44
7	HU714	18.29	22.5	11.98	27.69	1.82	183
8	HU690	132.38	22.5	11.46	27.69	1.56	1,333
9	HU869	1.08	22.5	13.33	33.22	1.66	12
<b>TOTALS</b>							
Offset Area 1		687					10,353
Offset Area 2		420					5,316
Offset Area 3		455					5,481
Offset Area 4		311					4,785
Offset Area 5		1,391					17,742
Yarran View Offset Area		418					5,297
<b>GRAND TOTAL</b>		<b>3,683</b>					<b>48,974</b>

### 3.4 Species Credits Generated

Species credits generated within each offset site are shown in **Table 3.4**. This table also includes the area of habitat or number of individuals recorded. This assessment has assumed the presences of a number of species within each of the offsets based on the presence of suitable habitat features, known records in adjacent areas and connectivity to these records. An expert report will be required for species assumed to be present within the offset sites (Regent Honeyeater, Brush-tailed Rock-wallaby and Eastern Cave Bat) to enable inclusion of the generated credits.

Two individuals of *Acacia pendula* have been recorded within Offset Area 5 on elevated land in grazing paddocks. Although under current legislation these individuals form part of the endangered 'Acacia pendula population in the Hunter catchment', they are not considered to be natural components of the landscape. As such, species credits for these individuals have not been calculated.

**Table 3.4 Species credits generated within the offset sites**

Scientific Name	Common Name	Presence	Number or Area of Habitat (ha)	Credits Generated
<b>OFFSET AREA 1</b>				
<i>Cymbidium canaliculatum</i> population in the Hunter Catchment		Known	8 individuals	57
<i>Tylophora linearis</i>		Known	2 individuals	14
<i>Pomaderris queenslandica</i>		Known	1 individual	7
<i>Anthochaera phrygia</i>	Regent Honeyeater	Assumed*	457.50 ha	3,248
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	Assumed*	577.90	4,103
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	Known	577.90	4,103
<i>Miniopterus schreibersii</i> subsp. <i>oceanensis</i>	Eastern Bentwing-bat	Known	577.90	4,103
<i>Vespadelus troughtoni</i>	Eastern Cave Bat	Known	577.90	4,103
<b>OFFSET AREA 2</b>				
<i>Cymbidium canaliculatum</i> population in the Hunter Catchment		Known	11 individuals	78
<i>Anthochaera phrygia</i>	Regent Honeyeater	Assumed*	220.42 ha	1,565
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	Assumed*	127.01	902
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	Known	127.01	902
<i>Miniopterus schreibersii</i> subsp. <i>oceanensis</i>	Eastern Bentwing-bat	Known	127.01	902
<i>Vespadelus troughtoni</i>	Eastern Cave Bat	Assumed*	127.01	902

**Table 3.4 Species credits generated within the offset sites**

Scientific Name	Common Name	Presence	Number or Area of Habitat (ha)	Credits Generated
<b>OFFSET AREA 3</b>				
<i>Cymbidium canaliculatum</i> population in the Hunter Catchment		Known	2 individuals	14
<i>Anthochaera phrygia</i>	Regent Honeyeater	Assumed*	177.80 ha	1,262
<b>OFFSET AREA 4</b>				
<i>Anthochaera phrygia</i>	Regent Honeyeater	Assumed*	34.36 ha	244
<b>OFFSET AREA 5</b>				
<i>Cymbidium canaliculatum</i> population in the Hunter Catchment		Known	12.80 individuals+	91 <sup>^</sup>
<i>Tylophora linearis</i>		Known	1 individual	7
<i>Ozothamnus tessellatus</i>		Known	6 individuals	43
<i>Anthochaera phrygia</i>	Regent Honeyeater	Assumed*	747.89 ha+	5,310
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	Known	308.05+	2,187
<i>Miniopterus schreibersii</i> subsp. <i>oceanensis</i>	Eastern Bentwing-bat	Known	308.05+	2,187
<i>Vespadelus troughtoni</i>	Eastern Cave Bat	Assumed*	308.05+	2,187
<b>YARRAN VIEW OFFSET AREA</b>				
<i>Cymbidium canaliculatum</i> population in the Hunter Catchment		Known	6 individuals	43
<i>Anthochaera phrygia</i>	Regent Honeyeater	Assumed*	206.20 ha	1,464
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	Known	18.52	131
<i>Miniopterus schreibersii</i> subsp. <i>oceanensis</i>	Eastern Bentwing-bat	Known	18.52	131
<i>Vespadelus troughtoni</i>	Eastern Cave Bat	Assumed*	18.52	131
<b>TOTALS</b>				
<i>Cymbidium canaliculatum</i> population in the Hunter Catchment			39.80 individuals+	283
<i>Tylophora linearis</i>			3 individuals	21
<i>Ozothamnus tessellatus</i>			6 individuals	43
<i>Pomaderris queenslandica</i>			1 individual	7
<i>Anthochaera phrygia</i>	Regent Honeyeater		1,844	13,093
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby		705	5,005
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat		1,031	7,323

**Table 3.4 Species credits generated within the offset sites**

Scientific Name	Common Name	Presence	Number or Area of Habitat (ha)	Credits Generated
<i>Miniopterus schreibersii</i> subsp. <i>oceanensis</i>	Eastern Bentwing-bat		1,031	7,323
<i>Vespadelus troughtoni</i>	Eastern Cave Bat		1,031	7,323

\* An expert report is required for species assumed to be present within offset sites

+ Includes a 10% reduction in the total area of habitat or number of individuals occurring within the Subsidence Study Area

^ Value calculated manually using equation 11 of the BBAM as value has two decimal places cannot be entered in the BioBanking Credit Calculator

### 3.5 Justification for any Variation to Offset Rules

Where suitable credits cannot be acquired by the proponent, there are provisions within Section 10.5 of the FBA to allow for variations of the offset rules. A separate set of rules applies to ecosystem credits and species credits. The proposed variations for the Project are detailed below.

#### 3.5.1 Ecosystem Credits

Of the ecosystem credits assessed for the Project, there is a shortfall for only one PCT, namely HU547 (Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion).

For ecosystem credits, the consent authority may approve the following variations:

- A variation of the offset rules for matching ecosystem credits; and/or
- A supplementary measure to be proposed as an offset for the PCT where the PCT is associated with an Endangered Ecological Community (EEC) or Critically Endangered Ecological Community (CEEC).

Although the HU547 is associated with the EEC *Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions*, as noted within the Vegetation Information System (VIS) Classification Database, it has been assessed as non-conforming within the Project Disturbance Boundary (see Section 3.4.2 of the EIA). As such, under the rules of the FBA, supplementary measures would not be allowed to address the shortfall of HU547 credits.

The sections below outline how the variation to the offset rules for matching ecosystem credits has been considered and the variation proposed for the Project. As the Project will be treated as a 'transitional project' a level of flexibility to the variation to offset rules is being sought. Use of HU690 credit is proposed to address the shortfall in HU547 credits.

*i. Application of Variation of the Offset Rules for Matching Ecosystem Credits*

The consent authority may approve a variation of the offset rules for matching ecosystem credits, by allowing ecosystem credits created for a PCT from the same vegetation formation as the required ecosystem credit to be proposed as part of the BOS. To enable application of the variation rules the BOS must demonstrate the following:

- All reasonable steps to secure a matching ecosystem credit have been taken by the proponent; and
- The required ecosystem credit is not for a PCT associated with a CEEC listed under the NSW *Threatened Species Conservation Act 1995* (TSC Act) or an ecological community listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act); and
- The PCT from the same vegetation formation has a percent cleared value of the PCT in the major catchment area equal or greater than the percent cleared of the PCT to which the required ecosystem credit relates; or
- Where the required ecosystem credit is for a PCT that is associated with a CEEC/Endangered Ecological Community (EEC), the PCT from the same formation is also associated with a CEEC/EEC.

The sections below outline how these items were considered for the Project. Based on consideration of these four items, there are limited suitable alternative PCTs available for use under the offset variation rules.

*a. Reasonable Steps to Secure a Matching Ecosystem Credit*

Matching ecosystem credits include HU547 within the Kerrabee subregion or the same PCT within an adjoining subregion. The adjoining subregions all occur within the Hunter Central-Rivers or Central West major catchment areas. Therefore, matching ecosystem credits include both HU547 and CW138 in the Kerrabee subregion or adjoining subregion.

Actions undertaken to date to secure a matching ecosystem credit for HU547/CW138 include:

- Checking the Biodiversity Credits Register for HU547 (0 results) and CW138 (0 results);
- Checking the BioBank Site Expression of Interest Register for HU547 (0 results) ) and CW138 (1 result dated 20 February 2012, however no credit value provided and site unsurveyed);
- Checking the Credits Wanted Register for HU547 (one result dated 21 September 2015) and CW138 (0 results);
- Several high level desktop analyses and site specific inspections of potential offset properties since 2013;

- Detailed assessment of six offset sites identified for inclusion within the offset strategy for the Project.
- b. Required PCT is not for a PCT Associated with a CEEC under the TSC Act or an Ecological Community Listed under the EPBC Act

The required PCT (HU547) is not associated with a CEEC under the TSC Act or a TEC under the EPBC Act.

- c. Alternative PCT has a Percent Cleared Value in the Major Catchment Area Equal or Greater than the Percent Cleared of the Required PCT

The required PCT (HU547) is within the Grassy Woodlands formation and has a 95% cleared value in the major catchment, which represents one of the highest percent cleared values. The proposed alternative PCT (HU690) is also within the Grassy Woodlands formation, however it has a 90% cleared value in the major catchment, which is below the requirement of the offset variation rules.

A review of potential alternative PCTs was undertaken as part of this assessment using the VIS Classification Database. No other PCTs within the Grassy Woodlands formation exist within the Hunter-Central Rivers major catchment. A total of 19 PCTs that have a percent cleared value of 95% or higher within a major catchment occur across NSW. This includes PCTs that occur within the Central West, Hawkesbury-Nepean, Lachlan, Murray, Murrumbidgee, Namoi and Southern Rivers major catchment areas. A number of these PCTs are associated with various EECs/CEECs, including the TSC Act EEC *White Box Yellow Box Blakely's Red Gum Woodland* and the EPBC Act CEEC *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Box Gum Woodland and Derived Native Grassland)*.

Portions of the alternative PCT (HU690) are associated with Box Gum Woodland and Derived Native Grassland. The use of HU690 is considered appropriate given that alternative PCTs allowed under the variation rules are also associated with this EEC.

- d. Alternative PCT is Associated with a CEEC/EEC if Required PCT is Associated with a PCT

Portions of the alternative PCT (HU690) are associated with the Box Gum Woodland and Derived Native Grassland EEC.

The required PCT (HU547) is associated with the EEC *Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions*. However, as noted above, the occurrence within the Project Disturbance Boundary was assessed as not conforming to the EEC.

ii. *Proposed Variation to Offset Rules*

The proposed variation to utilise excess HU690 credits to address the shortfall of 143 HU547 credits is not allowed under the rules of the FBA. However, as the Project will be treated as a 'transitional project' a level of flexibility to the variation to offset rules is being sought.

The alternative PCT (HU690) is the same formation (Grassy Woodlands) and same class (Western Slopes Grassy Woodland) as the required PCT (HU547). Despite the alternative PCT (HU690) having a slightly lower (by 5%) percent cleared value in the major catchment than the required PCT (HU547), it is associated with Box Gum Woodland and Derived Native Grassland, which is a TSC Act listed EEC and an EPBC Act listed CEEC. Some of the alternative PCTs allowed under the rules of the FBA are also associated with Box Gum Woodland and Derived Native Grassland. Additionally, as outlined within Section 3.4.2 of the EIA, the community is related to the Western Hunter Flats Fuzzy Box Woodland community mapped by OEH within the north-western portion of Wollemi National Park, which is considered to have affinities with the Box Gum Woodland and Derived Native Grassland EEC/CEEC. As such, the use of HU690 is considered an appropriate alternative of provision of land-based offsets to address the shortfall of credits for HU547.

### **3.5.2 Species Credits**

Of the species credits assessed for the Project, there is a shortfall for only one species, namely the Regent Honeyeater. For species credits, the consent authority may approve the following variations:

- A variation of the offset rules for matching species credits; and/or
- A supplementary measure to be proposed as an offset for the species impacted by the development.

The consent authority may approve a variation of the offset rules for matching species credits, by allowing species credits created for a different species to that impacted by the development so long as the impacted species is not listed under the EPBC Act or listed as critically endangered under the TSC Act. As the Regent Honeyeater is listed under the EPBC Act and is listed as critically endangered under the TSC Act, the offset rules cannot be applied. Additionally, as the Regent Honeyeater has been assessed as a "matter for further consideration", supplementary measures cannot be used.

Under the rules of the FBA, neither a variation to the offset rules nor the use of supplementary measures is allowed to address the shortfall of Regent Honeyeater credits for the Project. However, as the Project will be treated as a 'transitional project' a level of flexibility for the provision of Regent Honeyeater credits is sought.

A revised assessment of the potential reduction in value of Offset Area 5 is provided within the Response to Submissions main volume. This revised assessment, indicates that the 10% reduction in area applied to the portion of Offset Area 5 occurring within the Subsidence Study Area is conservative. Should the value of Offset Area 5 only be reduced by the

predicted amount within the revised assessment, Offset Area 5 would provide over 300 additional credits for the Regent Honeyeater.

An outcome for the Regent Honeyeater will need to be determined in consultation with DP&E as the impacts fall into the category of requiring further consideration by the consent authority.

## Credit Summary

### 4.1 Ecosystem Credits

**Table 4.1** compares the ecosystem credits required to offset the loss of native vegetation and associated habitat within the Project Disturbance Boundary to the ecosystems credits generated by the offset sites. This table indicates that the Project will generate a surplus of ecosystem credits for all except one of the PCTs impacted within the Project Disturbance Boundary. A shortfall of 143 credits exists for HU547. A variation to the offset rules for ecosystem credits is proposed for this PCT (refer to **Section 3.5.1**), which is proposed to involve the use of additional HU690 ecosystem credits to offset the shortfall for HU547.

The offset sites also generate species credits for a number of species not assessed as impacted within the Project Disturbance Boundary.

**Table 4.1 Summary of ecosystem credit balance**

PCT Code	PCT Name	Credits Required	Credits Generated	Credit Balance
HU547	Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion	152	9	-143*
HU599	River Red Gum/ River Oak riparian woodland wetland in the Hunter Valley		182	182
HU690	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	11,143	17,218	6,075^
HU702	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion		401	401
HU714	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	295	2,206	1,911
HU732	Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion	593	4,676	4,083

**Table 4.1 Summary of ecosystem credit balance**

PCT Code	PCT Name	Credits Required	Credits Generated	Credit Balance
HU799	Grey Gum - Grey Box shrub - grass open forest on sandstone ranges of the Sydney Basin		170	170
HU824	White Box - Black Cypress Pine shrubby woodland of the Western Slopes	6,431	10,600	4,169
HU826	Narrow-leaved Ironbark - Grey Gum - Native Olive woodland of Central Hunter		52	52
HU869	Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	1,480	6,918	5,438
HU870	Narrow-leaved Ironbark - Black Pine - Narrow-leaved Wattle shrub - grass open forest on sandstone slopes of the upper Hunter and Sydney Basin		292	292
HU886	Red Ironbark - Grey Gum - Black Pine heathy woodland on sandstone ranges of the Sydney Basin		189	189
HU888	Red Ironbark - Brown Bloodwood - Black Pine heathy open forest on sandstone ranges of the Sydney Basin		409	409
HU891	Caley's Ironbark - Red Ironbark - Currawang shrubby woodland on sandstone ranges of the Sydney Basin		5,321	5,321
HU893	Dywer's Red Gum - Fringe Myrtle heathy open woodland on sandstone plateau of the upper Hunter and Sydney Basin		42	42
HU910	Blakely's Red Gum - Rough-barked Apple shrubby woodland of central and upper Hunter		289	289

\* Credit shortfall proposed to be offset by excess HU690 credits

^ Total excess credits following use of HU690 credits for the HU547 shortfall is 5,932

#### 4.1.1 Species Credits

**Table 4.2** compares the species credits required to offset the loss of species credit species within the Project Disturbance Boundary to the species credits generated by the offset sites. This table indicates that the offset sites will generate a surplus of species credits for all except one of the species credit species impacted within the Project Disturbance Boundary. A shortfall of 81 credits exists for the Regent Honeyeater. As the variation rules cannot be applied to this species as described in **Section 3.5.2**, and the Project is being assessed as a 'transitional project', a level of flexibility for the provision of Regent Honeyeater credits is sought.

The offset sites also generate species credits for a number of species not assessed as impacted within the Project Disturbance Boundary.

**Table 4.2 Summary of species credit balance**

Scientific Name	Common Name	Credits Required	Credits Generated	Credit Balance
<i>Cymbidium canaliculatum</i> population in the Hunter Catchment			283	283
<i>Tylophora linearis</i>			21	21
<i>Ozothamnus tessellatus</i>			43	43
<i>Pomaderris queenslandica</i>			7	7
<i>Anthochaera phrygia</i>	Regent Honeyeater	13,174	13,093	-81
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	688	5,005	4,317
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	728	7,323	6,595
<i>Miniopterus schreibersii</i> subsp. <i>oceanensis</i>	Eastern Bentwing-bat	728	7,323	6,595
<i>Vespadelus troughtoni</i>	Eastern Cave Bat	728	7,323	6,595

## Conclusion

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A detailed assessment of the biodiversity offsets for the Project was presented within the BOR and included within the EIS. Following consultation with the DP&E and OEH, it was recommended that the assessment of offsets sites for the Project be further assessed in accordance with the NSW Offset Policy for Major Projects. As such, this BOS has been prepared as a supplementary assessment of the biodiversity offsets required to compensate for the direct vegetation clearing within the Project Disturbance Boundary.

Although the Project will be treated as a 'transitional project' under the NSW Offset Policy for Major Projects and is therefore afforded a level of flexibility in meeting the requirements in this policy, this assessment has sought to comply with the requirements as far as practicable. This assessment includes a revised assessment of the credit balance for the Project.

When assessed using BBAM, the offset sites are estimated to provide a total of 48,974 ecosystem credits and 40,421 species credits for a number of threatened flora and fauna species. Assessment of the offset sites has indicated that the offsets proposed for the Project will adequately offset these residual impacts.

The results of this assessment indicate that the proposed biodiversity offsets for the Project will generate a surplus of ecosystem credits for all except one of the PCTs impacted within the Project Disturbance Boundary. A shortfall of 143 credits exists for HU547, which is proposed to be offset with additional HU690 credits. The biodiversity offsets will also generate a surplus of species credits for all except one of the species credit species impacted within the Project Disturbance Boundary. A shortfall of 81 credits exists for the Regent Honeyeater. An outcome for the Regent Honeyeater will need to be determined in consultation with DP&E as the impacts fall into the category of requiring further consideration by the consent authority. The offset sites also generate ecosystem credits and species credits for a number of PCTs and species not assessed as impacted within the Project Disturbance Boundary.

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*Appendix A*

# Biodiversity Credit Report: Offset Area 1

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This report identifies the number and type of credits required at a BIOBANK SITE

Date of report: 3/03/2016

Time: 5:54:29PM

Calculator version: v4.0

## Biobank details

**Proposal ID:** 0057/2015/1544B

**Proposal name:** 12052 - OA1 (V1=current; V2=OEH review, V3=RTS)

**Proposal address:** TBC TBC NSW 2000

**Proponent name:** TBC

**Proponent address:** TBC TBC NSW 2000

**Proponent phone:** TBC

**Assessor name:** David Robertson

**Assessor address:** PO BOX 2474 Carlingford Court NSW 2118

**Assessor phone:** 02 9868 1933

**Assessor accreditation:** 0057

### Additional information required for approval:

- Use of local benchmark
- Expert report...
- Request for additional gain in site value

## Ecosystem credits summary

Plant Community type	Area (ha)	Credits created
Caley's Ironbark - Red Ironbark - Currawang shrubby woodland on sandstone ranges of the Sydney Basin	187.98	3,069.00
Dywer's Red Gum - Fringe Myrtle heathy open woodland on sandstone plateau of the upper Hunter and Sydney Basin	1.50	24.00
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	144.05	2,405.00
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	79.45	946.00
Narrow-leaved Ironbark - Grey Gum - Native Olive woodland of Central Hunter	3.56	52.00
Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bio	14.01	205.00
Red Ironbark - Grey Gum - Black Pine heathy woodland on sandstone ranges of the Sydney Basin	11.34	189.00
River Red Gum / River Oak riparian woodland wetland in the Hunter Valley	13.28	182.00
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	45.99	670.00
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	161.86	2,278.00
Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion	23.58	333.00
<b>Total</b>	<b>686.60</b>	<b>10,353</b>

## Credit profiles

**1. River Red Gum / River Oak riparian woodland wetland in the Hunter Valley, (HU599)**

Number of ecosystem credits created	182
IBRA sub-region	Kerrabee - Hunter/Central Rivers

**2. Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion, (HU732)**

Number of ecosystem credits created	333
IBRA sub-region	Kerrabee - Hunter/Central Rivers

**3. Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley, (HU690)**

Number of ecosystem credits created	946
IBRA sub-region	Kerrabee - Hunter/Central Rivers

**4. Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion, (HU714)**

Number of ecosystem credits created	670
IBRA sub-region	Kerrabee - Hunter/Central Rivers

**5. Narrow-leaved Ironbark - Grey Gum - Native Olive woodland of Central Hunter, (HU826)**

Number of ecosystem credits created	52
IBRA sub-region	Kerrabee - Hunter/Central Rivers

**6. Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bio, (HU702)**

Number of ecosystem credits created	205
IBRA sub-region	Kerrabee - Hunter/Central Rivers

**7. White Box - Black Cypress Pine shrubby woodland of the Western Slopes, (HU824)**

Number of ecosystem credits created	2,278
IBRA sub-region	Kerrabee - Hunter/Central Rivers

**8. Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin, (HU869)**

Number of ecosystem credits created	2,405
IBRA sub-region	Kerrabee - Hunter/Central Rivers

**9. Red Ironbark - Grey Gum - Black Pine heathy woodland on sandstone ranges of the Sydney Basin, (HU886)**

Number of ecosystem credits created	189
IBRA sub-region	Kerrabee - Hunter/Central Rivers

**10. Caley's Ironbark - Red Ironbark - Currawang shrubby woodland on sandstone ranges of the Sydney Basin, (HU891)**

Number of ecosystem credits created

3,069

IBRA sub-region

Kerrabee - Hunter/Central Rivers

**11. Dywer's Red Gum - Fringe Myrtle heathy open woodland on sandstone plateau of the upper Hunter and Sydney Basin, (HU893)**

Number of ecosystem credits created

24

IBRA sub-region

Kerrabee - Hunter/Central Rivers

## Species credits summary

Common name	Scientific name	Extent of impact Ha or individuals	Number of species credits created
Brush-tailed Rock-wallaby	<i>Petrogale penicillata</i>	577.90	4,103
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	577.90	4,103
Regent Honeyeater	<i>Anthochaera phrygia</i>	457.50	3,248
Eastern Bentwing-bat	<i>Miniopterus schreibersii</i> subsp. <i>oceanensis</i>	577.90	4,103
Eastern Cave Bat	<i>Vespadelus troughtoni</i>	577.90	4,103
Cymbidium canaliculatum population in the Hunter Catchment	Cymbidium canaliculatum population in the Hunter Catchment	8.00	57
Scant Pomaderris	<i>Pomaderris queenslandica</i>	1.00	7
<i>Tylophora linearis</i>	<i>Tylophora linearis</i>	2.00	14

## Additional management actions

Additional management actions are required for:

Vegetation type or threatened species	Management action details
Brush-tailed Rock-wallaby	Feral and/or over-abundant native herbivore control
Brush-tailed Rock-wallaby	Fox control
Caley's Ironbark - Red Ironbark - Currawang shrubby woodland on sandstone ranges of the Sydney Basin	Exclude commercial apiaries
Caley's Ironbark - Red Ironbark - Currawang shrubby woodland on sandstone ranges of the Sydney Basin	Exclude miscellaneous feral species
Caley's Ironbark - Red Ironbark - Currawang shrubby woodland on sandstone ranges of the Sydney Basin	Feral and/or over-abundant native herbivore control
Caley's Ironbark - Red Ironbark - Currawang shrubby woodland on sandstone ranges of the Sydney Basin	Fox control
Caley's Ironbark - Red Ironbark - Currawang shrubby woodland on sandstone ranges of the Sydney Basin	Slashing
Dywer's Red Gum - Fringe Myrtle heathy open woodland on sandstone plateau of the upper Hunter and Sydney Basin	Exclude miscellaneous feral species
Dywer's Red Gum - Fringe Myrtle heathy open woodland on sandstone plateau of the upper Hunter and Sydney Basin	Feral and/or over-abundant native herbivore control
Dywer's Red Gum - Fringe Myrtle heathy open woodland on sandstone plateau of the upper Hunter and Sydney Basin	Fox control
Dywer's Red Gum - Fringe Myrtle heathy open woodland on sandstone plateau of the upper Hunter and Sydney Basin	Slashing
Eastern Bentwing-bat	Feral and/or over-abundant native herbivore control

Eastern Cave Bat	Feral and/or over-abundant native herbivore control
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	Exclude commercial apiaries
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	Exclude miscellaneous feral species
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	Feral and/or over-abundant native herbivore control
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	Fox control
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	Slashing
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Exclude commercial apiaries
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Exclude miscellaneous feral species
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Feral and/or over-abundant native herbivore control
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Fox control
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Slashing
Large-eared Pied Bat	Feral and/or over-abundant native herbivore control
Narrow-leaved Ironbark - Grey Gum - Native Olive woodland of Central Hunter	Exclude commercial apiaries
Narrow-leaved Ironbark - Grey Gum - Native Olive woodland of Central Hunter	Exclude miscellaneous feral species
Narrow-leaved Ironbark - Grey Gum - Native Olive woodland of Central Hunter	Feral and/or over-abundant native herbivore control
Narrow-leaved Ironbark - Grey Gum - Native Olive woodland of Central Hunter	Fox control
Narrow-leaved Ironbark - Grey Gum - Native Olive woodland of Central Hunter	Slashing
Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bio	Exclude commercial apiaries
Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bio	Exclude miscellaneous feral species
Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bio	Feral and/or over-abundant native herbivore control
Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bio	Fox control

Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bio	Slashing
Red Ironbark - Grey Gum - Black Pine heathy woodland on sandstone ranges of the Sydney Basin	Exclude commercial apiaries
Red Ironbark - Grey Gum - Black Pine heathy woodland on sandstone ranges of the Sydney Basin	Exclude miscellaneous feral species
Red Ironbark - Grey Gum - Black Pine heathy woodland on sandstone ranges of the Sydney Basin	Feral and/or over-abundant native herbivore control
Red Ironbark - Grey Gum - Black Pine heathy woodland on sandstone ranges of the Sydney Basin	Fox control
Red Ironbark - Grey Gum - Black Pine heathy woodland on sandstone ranges of the Sydney Basin	Slashing
Regent Honeyeater	Exclude miscellaneous feral species
Regent Honeyeater	Feral and/or over-abundant native herbivore control
River Red Gum / River Oak riparian woodland wetland in the Hunter Valley	Exclude commercial apiaries
River Red Gum / River Oak riparian woodland wetland in the Hunter Valley	Exclude miscellaneous feral species
River Red Gum / River Oak riparian woodland wetland in the Hunter Valley	Feral and/or over-abundant native herbivore control
River Red Gum / River Oak riparian woodland wetland in the Hunter Valley	Fox control
River Red Gum / River Oak riparian woodland wetland in the Hunter Valley	Slashing
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Exclude commercial apiaries
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Exclude miscellaneous feral species
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Feral and/or over-abundant native herbivore control
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Fox control
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Slashing
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	Exclude commercial apiaries
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	Exclude miscellaneous feral species

White Box - Black Cypress Pine shrubby woodland of the Western Slopes	Feral and/or over-abundant native herbivore control
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	Fox control
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	Slashing
Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion	Exclude commercial apiaries
Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion	Exclude miscellaneous feral species
Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion	Feral and/or over-abundant native herbivore control
Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion	Fox control
Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion	Slashing

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*Appendix B*

# Biodiversity Credit Report: Offset Area 2

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This report identifies the number and type of credits required at a BIOBANK SITE

Date of report: 3/03/2016

Time: 5:55:15PM

Calculator version: v4.0

## Biobank details

**Proposal ID:** 0057/2015/1534B

**Proposal name:** 12052 - OA2 (V1=current; V2=draft; V3=OEH review; V4=RTS)

**Proposal address:** TBC TBC NSW 2000

**Proponent name:** TBC

**Proponent address:** TBC TBC NSW 2000

**Proponent phone:** TBC

**Assessor name:** David Robertson

**Assessor address:** PO BOX 2474 Carlingford Court NSW 2118

**Assessor phone:** 02 9868 1933

**Assessor accreditation:** 0057

### Additional information required for approval:

- Use of local benchmark
- Expert report...
- Request for additional gain in site value

## Ecosystem credits summary

<b>Plant Community type</b>	<b>Area (ha)</b>	<b>Credits created</b>
Blakely's Red Gum - Rough-barked Apple shrubby woodland of central and upper Hunter	19.54	276.00
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	17.26	272.00
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	89.48	997.00
Grey Gum - Grey Box shrub - grass open forest on sandstone ranges of the Sydney Basin	13.17	170.00
Narrow-leaved Ironbark - Black Pine - Narrow-leaved Wattle shrub - grass open forest on sandstone slopes of the upper Hunter and Sydney Basin	23.22	292.00
Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bio	0.43	6.00
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	27.56	377.00
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	229.46	2,926.00
<b>Total</b>	420.12	5,316

## Credit profiles

**1. Grey Gum - Grey Box shrub - grass open forest on sandstone ranges of the Sydney Basin, (HU799)**

Number of ecosystem credits created	170
IBRA sub-region	Kerrabee - Hunter/Central Rivers

**2. Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley, (HU690)**

Number of ecosystem credits created	997
IBRA sub-region	Kerrabee - Hunter/Central Rivers

**3. Blakely's Red Gum - Rough-barked Apple shrubby woodland of central and upper Hunter, (HU910)**

Number of ecosystem credits created	276
IBRA sub-region	Kerrabee - Hunter/Central Rivers

**4. Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion, (HU714)**

Number of ecosystem credits created	377
IBRA sub-region	Kerrabee - Hunter/Central Rivers

**5. Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bio, (HU702)**

Number of ecosystem credits created	6
IBRA sub-region	Kerrabee - Hunter/Central Rivers

**6. White Box - Black Cypress Pine shrubby woodland of the Western Slopes, (HU824)**

Number of ecosystem credits created	2,926
IBRA sub-region	Kerrabee - Hunter/Central Rivers

**7. Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin, (HU869)**

Number of ecosystem credits created	272
IBRA sub-region	Kerrabee - Hunter/Central Rivers

**8. Narrow-leaved Ironbark - Black Pine - Narrow-leaved Wattle shrub - grass open forest on sandstone slopes of the upper Hunter and Sydney Basin, (HU870)**

Number of ecosystem credits created	292
IBRA sub-region	Kerrabee - Hunter/Central Rivers

## Species credits summary

Common name	Scientific name	Extent of impact Ha or individuals	Number of species credits created
Regent Honeyeater	<i>Anthochaera phrygia</i>	220.42	1,565
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	127.01	902
Eastern Bentwing-bat	<i>Miniopterus schreibersii</i> subsp. <i>oceanensis</i>	127.01	902
Brush-tailed Rock-wallaby	<i>Petrogale penicillata</i>	127.01	902
Eastern Cave Bat	<i>Vespadelus troughtoni</i>	127.01	902
Cymbidium canaliculatum population in the Hunter Catchment	Cymbidium canaliculatum population in the Hunter Catchment	11.00	78

## Additional management actions

Additional management actions are required for:

Vegetation type or threatened species	Management action details
Blakely's Red Gum - Rough-barked Apple shrubby woodland of central and upper Hunter	Exclude commercial apiaries
Blakely's Red Gum - Rough-barked Apple shrubby woodland of central and upper Hunter	Exclude miscellaneous feral species
Blakely's Red Gum - Rough-barked Apple shrubby woodland of central and upper Hunter	Feral and/or over-abundant native herbivore control
Blakely's Red Gum - Rough-barked Apple shrubby woodland of central and upper Hunter	Fox control
Blakely's Red Gum - Rough-barked Apple shrubby woodland of central and upper Hunter	Slashing
Brush-tailed Rock-wallaby	Feral and/or over-abundant native herbivore control
Brush-tailed Rock-wallaby	Fox control
Eastern Bentwing-bat	Feral and/or over-abundant native herbivore control
Eastern Cave Bat	Feral and/or over-abundant native herbivore control
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	Exclude commercial apiaries
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	Exclude miscellaneous feral species
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	Feral and/or over-abundant native herbivore control
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	Fox control
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	Slashing
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Exclude commercial apiaries

Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Exclude miscellaneous feral species
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Feral and/or over-abundant native herbivore control
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Fox control
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Slashing
Grey Gum - Grey Box shrub - grass open forest on sandstone ranges of the Sydney Basin	Exclude commercial apiaries
Grey Gum - Grey Box shrub - grass open forest on sandstone ranges of the Sydney Basin	Exclude miscellaneous feral species
Grey Gum - Grey Box shrub - grass open forest on sandstone ranges of the Sydney Basin	Feral and/or over-abundant native herbivore control
Grey Gum - Grey Box shrub - grass open forest on sandstone ranges of the Sydney Basin	Fox control
Grey Gum - Grey Box shrub - grass open forest on sandstone ranges of the Sydney Basin	Slashing
Large-eared Pied Bat	Feral and/or over-abundant native herbivore control
Narrow-leaved Ironbark - Black Pine - Narrow-leaved Wattle shrub - grass open forest on sandstone slopes of the upper Hunter and Sydney Basin	Exclude miscellaneous feral species
Narrow-leaved Ironbark - Black Pine - Narrow-leaved Wattle shrub - grass open forest on sandstone slopes of the upper Hunter and Sydney Basin	Feral and/or over-abundant native herbivore control
Narrow-leaved Ironbark - Black Pine - Narrow-leaved Wattle shrub - grass open forest on sandstone slopes of the upper Hunter and Sydney Basin	Fox control
Narrow-leaved Ironbark - Black Pine - Narrow-leaved Wattle shrub - grass open forest on sandstone slopes of the upper Hunter and Sydney Basin	Slashing
Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bio	Exclude commercial apiaries
Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bio	Exclude miscellaneous feral species
Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bio	Feral and/or over-abundant native herbivore control
Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bio	Fox control
Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bio	Slashing

Regent Honeyeater

Exclude miscellaneous feral species

Regent Honeyeater	Feral and/or over-abundant native herbivore control
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Exclude commercial apiaries
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Exclude miscellaneous feral species
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Feral and/or over-abundant native herbivore control
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Fox control
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Slashing
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	Exclude commercial apiaries
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	Exclude miscellaneous feral species
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	Feral and/or over-abundant native herbivore control
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	Fox control
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	Slashing

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*Appendix C*

**Biodiversity Credit Report: Offset Area 3**

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This report identifies the number and type of credits required at a BIOBANK SITE

Date of report: 3/03/2016

Time: 5:57:19PM

Calculator version: v4.0

## Biobank details

**Proposal ID:** 0057/2015/1531B

**Proposal name:** 12052 - OA3 (V1=current; V2=draft; V3=OEH review; V4=RTS)

**Proposal address:** TBC TBC NSW 200

**Proponent name:** TBC

**Proponent address:** TBC TBC NSW 2000

**Proponent phone:** TBC

**Assessor name:** David Robertson

**Assessor address:** PO BOX 2474 Carlingford Court NSW 2118

**Assessor phone:** 02 9868 1933

**Assessor accreditation:** 0057

### Additional information required for approval:

- Use of local benchmark
- Expert report...
- Request for additional gain in site value

## Ecosystem credits summary

Plant Community type	Area (ha)	Credits created
Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion	0.66	9.00
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	2.30	38.00
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	314.88	3,570.00
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	130.26	1,762.00
Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion	7.32	102.00
<b>Total</b>	<b>455.42</b>	<b>5,481</b>

## Credit profiles

### 1. Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion, (HU547)

Number of ecosystem credits created	9
IBRA sub-region	Kerrabee - Hunter/Central Rivers

### 2. Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion, (HU732)

Number of ecosystem credits created	102
IBRA sub-region	Kerrabee - Hunter/Central Rivers

### 3. Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley, (HU690)

Number of ecosystem credits created	3,570
IBRA sub-region	Kerrabee - Hunter/Central Rivers

### 4. White Box - Black Cypress Pine shrubby woodland of the Western Slopes, (HU824)

Number of ecosystem credits created	1,762
IBRA sub-region	Kerrabee - Hunter/Central Rivers

### 5. Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin, (HU869)

Number of ecosystem credits created	38
IBRA sub-region	Kerrabee - Hunter/Central Rivers

## Species credits summary

Common name	Scientific name	Extent of impact Ha or individuals	Number of species credits created
Regent Honeyeater	<i>Anthochaera phrygia</i>	177.80	1,262
Cymbidium canaliculatum population in the Hunter Catchment	Cymbidium canaliculatum population in the Hunter Catchment	2.00	14

## Additional management actions

Additional management actions are required for:

Vegetation type or threatened species	Management action details
Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion	Exclude commercial apiaries
Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion	Exclude miscellaneous feral species
Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion	Feral and/or over-abundant native herbivore control
Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion	Fox control
Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion	Slashing
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	Exclude commercial apiaries
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	Exclude miscellaneous feral species
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	Feral and/or over-abundant native herbivore control
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	Fox control
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	Slashing
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Exclude commercial apiaries
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Exclude miscellaneous feral species
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Feral and/or over-abundant native herbivore control
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Fox control
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Slashing
Regent Honeyeater	Exclude miscellaneous feral species
Regent Honeyeater	Feral and/or over-abundant native herbivore control

White Box - Black Cypress Pine shrubby woodland of the Western Slopes	Exclude commercial apiaries
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	Exclude miscellaneous feral species
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	Feral and/or over-abundant native herbivore control
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	Fox control
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	Slashing
Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion	Exclude commercial apiaries
Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion	Exclude miscellaneous feral species
Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion	Feral and/or over-abundant native herbivore control
Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion	Fox control
Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion	Slashing

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*Appendix D*

# Biodiversity Credit Report: Offset Area 4

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This report identifies the number and type of credits required at a BIOBANK SITE

Date of report: 3/03/2016

Time: 5:58:26PM

Calculator version: v4.0

## Biobank details

**Proposal ID:** 0057/2015/1527B

**Proposal name:** 12052 - OIA4 (V1=current; V2=draft; V3=OEH review; V4=RTS)

**Proposal address:** TBC TBC NSW 2000

**Proponent name:** TBC

**Proponent address:** TBC TBC NSW 2000

**Proponent phone:** TBC

**Assessor name:** David Robertson

**Assessor address:** PO BOX 2474 Carlingford Court NSW 2118

**Assessor phone:** 02 9868 1933

**Assessor accreditation:** 0057

### Additional information required for approval:

- Use of local benchmark
- Expert report...
- Request for additional gain in site value

## Ecosystem credits summary

Plant Community type	Area (ha)	Credits created
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	167.71	2,596.00
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	39.80	593.00
Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion	103.66	1,596.00
<b>Total</b>	<b>311.17</b>	<b>4,785</b>

## Credit profiles

### 1. Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion, (HU732)

Number of ecosystem credits created	1,596
IBRA sub-region	Kerrabee - Hunter/Central Rivers

### 2. Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley, (HU690)

Number of ecosystem credits created	2,509
IBRA sub-region	Kerrabee - Hunter/Central Rivers

### 3. Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley, (HU690)

Number of ecosystem credits created	87
IBRA sub-region	Kerrabee - Hunter/Central Rivers

### 4. Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion, (HU714)

Number of ecosystem credits created	468
IBRA sub-region	Kerrabee - Hunter/Central Rivers

### 5. Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion, (HU714)

Number of ecosystem credits created	125
IBRA sub-region	Kerrabee - Hunter/Central Rivers

## Species credits summary

Common name	Scientific name	Extent of impact Ha or individuals	Number of species credits created
Regent Honeyeater	Anthochaera phrygia	34.36	244

## Additional management actions

Additional management actions are required for:

Vegetation type or threatened species	Management action details
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Exclude commercial apiaries
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Exclude miscellaneous feral species
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Feral and/or over-abundant native herbivore control
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Fox control
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Slashing
Regent Honeyeater	Exclude miscellaneous feral species
Regent Honeyeater	Feral and/or over-abundant native herbivore control
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Exclude commercial apiaries
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Exclude miscellaneous feral species
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Feral and/or over-abundant native herbivore control
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Fox control
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Slashing
Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion	Exclude commercial apiaries
Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion	Exclude miscellaneous feral species

Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion	Feral and/or over-abundant native herbivore control
Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion	Fox control
Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion	Slashing

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*Appendix E*

# Biodiversity Credit Report: Offset Area 5

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This report identifies the number and type of credits required at a BIOBANK SITE

Date of report: 3/03/2016

Time: 5:59:05PM

Calculator version: v4.0

## Biobank details

**Proposal ID:** 0057/2015/1524B

**Proposal name:** 12052 - OA5 (V1=current; V2=OEH review; V3=RTS)

**Proposal address:** TBC TBC NSW 2000

**Proponent name:** TBC

**Proponent address:** TBC TBC NSW 2000

**Proponent phone:** TBC

**Assessor name:** David Robertson

**Assessor address:** PO BOX 2474 Carlingford Court NSW 2118

**Assessor phone:** 02 9868 1933

**Assessor accreditation:** 0057

### Additional information required for approval:

- Use of local benchmark
- Expert report...
- Request for additional gain in site value

## Ecosystem credits summary

Plant Community type	Area (ha)	Credits created
Blakely's Red Gum - Rough-barked Apple shrubby woodland of central and upper Hunter	1.21	13.00
Caley's Ironbark - Red Ironbark - Currawang shrubby woodland on sandstone ranges of the Sydney Basin	146.58	2,252.00
Dywer's Red Gum - Fringe Myrtle heathy open woodland on sandstone plateau of the upper Hunter and Sydney Basin	1.21	18.00
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	219.02	3,388.00
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	675.62	7,514.00
Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bio	10.59	146.00
Red Ironbark - Brown Bloodwood - Black Pine heathy open forest on sandstone ranges of the Sydney Basin	27.68	409.00
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	17.29	260.00
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	83.27	1,097.00
Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion	208.72	2,645.00
<b>Total</b>	<b>1,391.19</b>	<b>17,742</b>

## Credit profiles

**1. Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion, (HU732)**

Number of ecosystem credits created	2,645
IBRA sub-region	Kerrabee - Hunter/Central Rivers

**2. Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley, (HU690)**

Number of ecosystem credits created	7,514
IBRA sub-region	Kerrabee - Hunter/Central Rivers

**3. Blakely's Red Gum - Rough-barked Apple shrubby woodland of central and upper Hunter, (HU910)**

Number of ecosystem credits created	13
IBRA sub-region	Kerrabee - Hunter/Central Rivers

**4. Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion, (HU714)**

Number of ecosystem credits created	260
IBRA sub-region	Kerrabee - Hunter/Central Rivers

**5. Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bio, (HU702)**

Number of ecosystem credits created	146
IBRA sub-region	Kerrabee - Hunter/Central Rivers

**6. White Box - Black Cypress Pine shrubby woodland of the Western Slopes, (HU824)**

Number of ecosystem credits created	1,097
IBRA sub-region	Kerrabee - Hunter/Central Rivers

**7. Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin, (HU869)**

Number of ecosystem credits created	3,388
IBRA sub-region	Kerrabee - Hunter/Central Rivers

**8. Red Ironbark - Brown Bloodwood - Black Pine heathy open forest on sandstone ranges of the Sydney Basin, (HU888)**

Number of ecosystem credits created	409
IBRA sub-region	Kerrabee - Hunter/Central Rivers

**9. Caley's Ironbark - Red Ironbark - Currawang shrubby woodland on sandstone ranges of the Sydney Basin, (HU891)**

Number of ecosystem credits created	2,252
IBRA sub-region	Kerrabee - Hunter/Central Rivers

**10. Dywer's Red Gum - Fringe Myrtle heathy open woodland on sandstone plateau of the upper Hunter and Sydney Basin, (HU893)**

Number of ecosystem credits created

18

IBRA sub-region

Kerrabee - Hunter/Central Rivers

## Species credits summary

Common name	Scientific name	Extent of impact Ha or individuals	Number of species credits created
Large-eared Pied Bat	Chalinolobus dwyeri	308.05	2,187
Regent Honeyeater	Anthochaera phrygia	747.89	5,310
Eastern Cave Bat	Vespadelus troughtoni	308.05	2,187
Eastern Bentwing-bat	Miniopterus schreibersii subsp. oceanensis	308.05	2,187
Tylophora linearis	Tylophora linearis	1.00	7
Ozothamnus tessellatus	Ozothamnus tessellatus	6.00	43

## Additional management actions

Additional management actions are required for:

Vegetation type or threatened species	Management action details
Blakely's Red Gum - Rough-barked Apple shrubby woodland of central and upper Hunter	Exclude commercial apiaries
Blakely's Red Gum - Rough-barked Apple shrubby woodland of central and upper Hunter	Exclude miscellaneous feral species
Blakely's Red Gum - Rough-barked Apple shrubby woodland of central and upper Hunter	Feral and/or over-abundant native herbivore control
Blakely's Red Gum - Rough-barked Apple shrubby woodland of central and upper Hunter	Fox control
Blakely's Red Gum - Rough-barked Apple shrubby woodland of central and upper Hunter	Slashing
Caley's Ironbark - Red Ironbark - Currawang shrubby woodland on sandstone ranges of the Sydney Basin	Exclude commercial apiaries
Caley's Ironbark - Red Ironbark - Currawang shrubby woodland on sandstone ranges of the Sydney Basin	Exclude miscellaneous feral species
Caley's Ironbark - Red Ironbark - Currawang shrubby woodland on sandstone ranges of the Sydney Basin	Feral and/or over-abundant native herbivore control
Caley's Ironbark - Red Ironbark - Currawang shrubby woodland on sandstone ranges of the Sydney Basin	Fox control
Caley's Ironbark - Red Ironbark - Currawang shrubby woodland on sandstone ranges of the Sydney Basin	Slashing
Dwyer's Red Gum - Fringe Myrtle heathy open woodland on sandstone plateau of the upper Hunter and Sydney Basin	Exclude miscellaneous feral species
Dwyer's Red Gum - Fringe Myrtle heathy open woodland on sandstone plateau of the upper Hunter and Sydney Basin	Feral and/or over-abundant native herbivore control
Dwyer's Red Gum - Fringe Myrtle heathy open woodland on sandstone plateau of the upper Hunter and Sydney Basin	Fox control

Dywer's Red Gum - Fringe Myrtle heathy open woodland on sandstone plateau of the upper Hunter and Sydney Basin	Slashing
Eastern Bentwing-bat	Feral and/or over-abundant native herbivore control
Eastern Cave Bat	Feral and/or over-abundant native herbivore control
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	Exclude commercial apiaries
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	Exclude miscellaneous feral species
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	Feral and/or over-abundant native herbivore control
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	Fox control
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	Slashing
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Exclude commercial apiaries
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Exclude miscellaneous feral species
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Feral and/or over-abundant native herbivore control
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Fox control
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Slashing
Large-eared Pied Bat	Feral and/or over-abundant native herbivore control
Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bio	Exclude commercial apiaries
Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bio	Exclude miscellaneous feral species
Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bio	Feral and/or over-abundant native herbivore control
Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bio	Fox control
Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bio	Slashing
Ozothamnus tessellatus	Feral and/or over-abundant native herbivore control
Red Ironbark - Brown Bloodwood - Black Pine heathy open forest on sandstone ranges of the Sydney Basin	Exclude commercial apiaries

Red Ironbark - Brown Bloodwood - Black Pine heathy open forest on sandstone ranges of the Sydney Basin	Exclude miscellaneous feral species
Red Ironbark - Brown Bloodwood - Black Pine heathy open forest on sandstone ranges of the Sydney Basin	Feral and/or over-abundant native herbivore control
Red Ironbark - Brown Bloodwood - Black Pine heathy open forest on sandstone ranges of the Sydney Basin	Fox control
Red Ironbark - Brown Bloodwood - Black Pine heathy open forest on sandstone ranges of the Sydney Basin	Slashing
Regent Honeyeater	Exclude miscellaneous feral species
Regent Honeyeater	Feral and/or over-abundant native herbivore control
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Exclude commercial apiaries
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Exclude miscellaneous feral species
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Feral and/or over-abundant native herbivore control
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Fox control
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Slashing
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	Exclude commercial apiaries
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	Exclude miscellaneous feral species
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	Feral and/or over-abundant native herbivore control
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	Fox control
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	Slashing
Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion	Exclude commercial apiaries
Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion	Exclude miscellaneous feral species
Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion	Feral and/or over-abundant native herbivore control

Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion

Fox control

Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion	Slashing
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*Appendix F*

**Biodiversity Credit Report: Yarran View  
Offset Area**

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This report identifies the number and type of credits required at a BIOBANK SITE

Date of report: 3/03/2016

Time: 5:59:38PM

Calculator version: v4.0

## Biobank details

**Proposal ID:** 0057/2015/1535B  
**Proposal name:** 12052 - Offset YV (V1=current; V2=OEH review; V3=RTS)  
**Proposal address:** TBC TBC NSW 2000

**Proponent name:** TBC  
**Proponent address:** TBC TBC NSW 2000  
**Proponent phone:** TBC

**Assessor name:** David Robertson  
**Assessor address:** PO BOX 2474 Carlingford Court NSW 2118  
**Assessor phone:** 02 9868 1933  
**Assessor accreditation:** 0057

### Additional information required for approval:

- Use of local benchmark
- Expert report...
- Request for additional gain in site value

## Ecosystem credits summary

Plant Community type	Area (ha)	Credits created
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	53.50	815.00
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	151.68	1,595.00
Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bio	3.21	44.00
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	29.11	306.00
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	180.88	2,537.00
<b>Total</b>	<b>418.38</b>	<b>5,297</b>

## Credit profiles

### 1. Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley, (HU690)

Number of ecosystem credits created	1,595
IBRA sub-region	Kerrabee - Hunter/Central Rivers

### 2. Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion, (HU714)

Number of ecosystem credits created	306
IBRA sub-region	Kerrabee - Hunter/Central Rivers

### 3. Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bio, (HU702)

Number of ecosystem credits created	44
IBRA sub-region	Kerrabee - Hunter/Central Rivers

### 4. White Box - Black Cypress Pine shrubby woodland of the Western Slopes, (HU824)

Number of ecosystem credits created	2,537
IBRA sub-region	Kerrabee - Hunter/Central Rivers

### 5. Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin, (HU869)

Number of ecosystem credits created	815
IBRA sub-region	Kerrabee - Hunter/Central Rivers

## Species credits summary

Common name	Scientific name	Extent of impact Ha or individuals	Number of species credits created
Eastern Bentwing-bat	Miniopterus schreibersii subsp. oceanensis	18.52	131
Large-eared Pied Bat	Chalinolobus dwyeri	0.00	131
Large-eared Pied Bat	Chalinolobus dwyeri	18.52	131
Regent Honeyeater	Anthochaera phrygia	206.20	1,464
Cymbidium canaliculatum population in the Hunter Catchment	Cymbidium canaliculatum population in the Hunter Catchment	6.00	43
Eastern Cave Bat	Vespadelus troughtoni	18.52	131

## Additional management actions

Additional management actions are required for:

Vegetation type or threatened species	Management action details
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	Exclude commercial apiaries
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	Exclude miscellaneous feral species
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	Feral and/or over-abundant native herbivore control
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	Fox control
Grey Box - Slaty Box shrub - grass woodland on sandstone slopes of the upper Hunter and Sydney Basin	Slashing
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Exclude commercial apiaries
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Exclude miscellaneous feral species
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Feral and/or over-abundant native herbivore control
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Fox control
Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Slashing
Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bio	Exclude commercial apiaries
Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bio	Exclude miscellaneous feral species

Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bio	Feral and/or over-abundant native herbivore control
Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bio	Fox control
Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bio	Slashing
Regent Honeyeater	Exclude miscellaneous feral species
Regent Honeyeater	Feral and/or over-abundant native herbivore control
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Exclude commercial apiaries
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Exclude miscellaneous feral species
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Feral and/or over-abundant native herbivore control
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Fox control
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Slashing
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	Exclude commercial apiaries
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	Exclude miscellaneous feral species
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	Feral and/or over-abundant native herbivore control
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	Fox control
White Box - Black Cypress Pine shrubby woodland of the Western Slopes	Slashing