

# **BIODIVERSITY OFFSET STRATEGY**

State-approved mining (EPBC 2016/7640)

Yancoal Hunter Valley Operations, New South Wales | October 2017





**Declaration of accuracy**

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

**Signed**

**Full name**

Mark Nolan – Manager, Project Approvals

**Organisation**

HV Operations Pty Ltd (ACN 606 478 399)

Document Title	Version	Date effective	Comment
Biodiversity Offsets Strategy	1	October 2017	Submitted for approval to DoEE, October 2017.

## Executive Summary

This biodiversity offset strategy (BOS) has been prepared in accordance with Conditions 5, 6, 7 and 10 of the final approval decision notice for the HVO<sup>1</sup> State-approved mining project (EPBC 2016/7640), the action.

The action was approved by the Acting Assistant Secretary on 10 October 2016, subject to conditions and the action commenced on 1 November 2016. In accordance with the approval, Wandewoi Biodiversity Area (BA) (owned by Yancoal) will offset approximately 63% (38.3 of 61 hectares (ha) impacted) of the action's impacts on Central Hunter Valley Eucalypt Forest (CHVEF) and 100% of the project's offset requirements for the Swift Parrot. Details of the Wandewoi BA are provided in HVO State-approved mining (EPBC 2016/7640) Preliminary Documentation Report.

A variation to Condition 5, 6, 7 and 9 of EPBC 2016/7640 was sought by the proponent on 15 July 2017 under Section 143(1)(c) of the EPBC Act. Approval of the variation was granted on 11 August 2017. The revised conditions relate to the provision of offsets for the residual impacts of EPBC 2016/7640 on CHVEF, Regent Honeyeater and Green and Golden Bell Frog. These comprise:

Condition 5. To compensate for residual significant impacts to 22.7 ha of Class A condition CHVEF from the Riverview Pit extension area, the person taking the action must identify a direct offset site that meets the requirements of the EPBC Act Offset Policy, and secure the offset into perpetuity under a legally binding agreement within 12 months from the date of approval of the Offset Strategy at Condition 10.

Condition 6. To compensate for residual significant impacts to 68.4 ha of breeding and foraging habitat for the Regent Honeyeater, the person taking the action must identify a direct offset site that meets the requirements of the EPBC Act Offset Policy, and secure the offset into perpetuity under a legally binding agreement within 12 months from the date of approval of the Offset Strategy at Condition 10.

Condition 7. To compensate for residual significant impacts to 2.6 ha of breeding habitat and 102.7 ha of foraging habitat for the Green and Golden Bell Frog, the person taking the action must identify a direct offset site that meets the requirements of the EPBC Act Offset Policy, and secure the offset into perpetuity under a legally binding agreement within 12 months from the date of approval of the Offset Strategy at Condition 10.

Condition 9. The action cannot continue for more than 12 months from the date of approval of the Offset Strategy at Condition 10, unless the direct offset sites required by Conditions 5, 6 and 7 have been secured in perpetuity under a legally binding agreement by the person taking the action.

The variation did not change Condition 10, which comprises:

Condition 10. Within six (6) months from the commencement of the action the person taking the action must prepare and submit an Offset Strategy for the Minister's approval. The Offset Strategy must specify the development of the offset package and how direct offset sites required by Conditions 5, 6 and 7 will be identified, secured and managed into perpetuity. The offset strategy must:

- a. Describe the development of the offset package and identify the proposed direct offset sites required by Conditions 5, 6 and 7, include a

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<sup>1</sup> On 1 September 2017, Rio Tinto's Coal & Allied Hunter Valley mines were acquired by Yancoal Australia Ltd. Yancoal is now the owner and operator of HVO.

detailed description of the direct offset sites and demonstrate how the direct offset sites meet the EPBC Act Offset Policy and provide an adequate offset for the residual significant impacts to protected matters.

b. Include proposed timeframes in which the direct offset sites will be secured by a legal binding agreement and a detailed description of how the legally binding agreement will secure the direct offset sites in perpetuity.

c. Proposed measures for the long term management of the direct offset sites.

The offset strategy approved by the Minister must be implemented.

This BOS has also been prepared in accordance with the above conditions and the Offset Strategy Checklist provided by the Department of Environment and Energy.

The BOS has three objectives:

1. To compensate for residual significant impacts to 22.7 ha of Class A condition CHVEF from the Riverview Pit extension area;
2. To compensate for residual significant impacts to 68.4 ha of breeding and foraging habitat for the Regent Honeyeater; and
3. To compensate for residual significant impacts to 2.6 ha of breeding habitat and 102.7 ha of foraging habitat for the Green and Golden Bell Frog.

A staged process was implemented to identify offset sites that achieve the objectives of the BOS. The first stage comprised a detailed desktop analysis of previous local studies and GIS datasets to identify multiple potential offset sites that contain CHVEF, Regent Honeyeater and/or Green and Golden Bell Frog habitat. A large number of potential offset sites were identified as part of the desktop analysis. The list of these sites was refined to landowners willing to enter into a contract and/or provide access for site assessment purposes.

Preliminary surveys were conducted to determine if the properties identified contained the required biodiversity values. Yancoal then selected four suitable offset sites, namely Mitchelhill BA, Condon View BA and Crescent Head BA (comprising Crescent Head (north) and Crescent Head (south)). These offset sites were selected based on the results of the preliminary surveys, an assessment of land values and the practicality of ongoing management that would be required. Detailed surveys were completed at these sites to determine the extent of CHVEF and Regent Honeyeater habitat, and targeted surveys and habitat assessment for the Green and Golden Bell Frog.

Following the completion of surveys, the Offset Assessment Guide (SEWPaC 2012b) was completed for each of the four properties to determine the percentage of direct offset provided for CHVEF, Regent Honeyeater and Green and Golden Bell Frog. The sites provide a 100% (or higher) direct offset for CHVEF and Regent Honeyeater, and a 99.25% direct offset for the Green and Golden Bell Frog. The residual 0.75% offset for the Green and Golden Bell Frog will be provided through other compensatory measures, which are likely to comprise contribution to a research program.

The primary measures to achieve the strategy's objectives comprise:

- the provision of Mitchelhill BA, Condon View BA and Crescent Head BA as direct offsets for CHVEF, Regent Honeyeater and Green and Golden Bell Frog;
- contribution to a research or conservation program to satisfy the 0.75% residual offset requirement for the Green and Golden Bell Frog;
- implementation of management measures at the direct offset sites, comprising:
  - strategic grazing and weed management to improve the quality of CHVEF and Regent Honeyeater habitat;
- revegetation of corridors through derived native grasslands to increase the area and resilience of CHVEF and Regent Honeyeater habitat;



- investigation of the need for Noisy Miner management in Regent Honeyeater habitat;
- management of Mosquito Fish to create suitable conditions for Green and Golden Bell Frog breeding;
- maintenance of vegetation structure in existing open areas as Green and Golden Bell Frog foraging habitat.

Long-term management of the direct offset sites will be directed by separate Offset Management Plans. The plans will describe the direct offsets and detail the actions that will be implemented to improve and protect CHVEF and the habitat for Regent Honeyeater, Swift Parrot and Green and Golden Bell Frog. The properties will be secured under an appropriate legally binding mechanism.

It should be noted that other matters/ species not offset by the this strategy may also be offset using the properties identified. For example other species credits may be calculated and retired using the offset properties for other projects.

Risk assessment has enabled risks to achievement of strategy objectives to be identified. The key residual risks to achieving the strategy's objectives comprise:

- delays in negotiation with OEH and DoEE regarding a suitable offset mechanism;  
and
- implementation of Offset Management Plans for the proposed offset properties.

Contingency measures in the form of corrective actions have been developed to manage these risks, if required. Where corrective actions have not been identified, commitments have been made to detail these in the respective Offset Management Plans for the proposed offset properties.

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# 1 Introduction

## 1.1 Background

The action is referred to as Hunter Valley Operations – State-approved mining project (EPBC 2016/7640). It comprises the continuation of mining in areas approved by the New South Wales (NSW) State Government after the commencement of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 16 July 2000 and prior to commencement of the *EPBC Amendment Bill 2013* (also known as the water trigger) on 22 June 2013. The action is shown on Figure 1.1.

The action was submitted for determination under the EPBC Act to the former Department of the Environment (DoE) (now the Department of Environment and Energy (DoEE)) on 29 January 2016. On 3 March 2016, the Minister determined that the action was a controlled action under Section 75 of the EPBC Act and was required to be assessed by preliminary documentation under Section 87 of the EPBC Act.

The preliminary documentation was submitted to DoE on 5 May 2016. The preliminary documentation report concluded that the action was likely to result in significant impacts on the following protected matters:

- Central Hunter Valley eucalypt forest and woodland ecological community (CHVEF);
- Regent Honeyeater (*Anthochaera phrygia*);
- Swift Parrot (*Lathamus discolor*); and
- Green and Golden Bell Frog (*Litoria aurea*).

The preliminary documentation report included a preliminary strategy to provide offsets for the above protected matters, in accordance with the EPBC Act Environmental Offsets Policy (SEWPaC 2012).

The action was approved by the Acting Assistant Secretary on 10 October 2016, subject to conditions. The action commenced on 1 November 2016. Condition 4 to 7 of the final approval decision notice provided the offset requirements relevant to the action.

Condition 4 of the final approval decision notice requires that 405.8 ha of land at the Wandewoi BA is secured within three years of the approval date, and that it must include:

- 405.8 ha of CHVEF;
- 175.8 ha of Swift Parrot foraging habitat; and
- 40 ha of regenerating Swift Parrot foraging habitat.

Yancoal owns Wandewoi BA. In accordance with the approval, Wandewoi BA will offset approximately 63% (38.3 of 61 ha impacted) of the action's impacts on CHVEF and 100% of the action's offset requirements for the Swift Parrot. Details of the Wandewoi BA are provided in HVO State-approved mining (EPBC 2016/7640) Preliminary Documentation Report.

A variation to Condition 5, 6, 7 and 9 of EPBC 2016/7640 was sought by the proponent on 15 July 2017 under Section 143(1)(c) of the EPBC Act. The variation was approved on 11 August 2017. The revised conditions relate to the provision of offsets for the residual impacts of EPBC 2016/7640 on CHVEF, Regent Honeyeater and Green and Golden Bell Frog. These comprise:

Condition 5. To compensate for residual significant impacts to 22.7 ha of Class A condition CHVEF from the Riverview Pit extension area, the person taking the action must identify a direct offset site that meets the requirements of the EPBC Act Offset Policy, and secure the offset into perpetuity under a legally binding agreement within 12 months from the date of approval of the Offset Strategy at Condition 10.



Condition 6. To compensate for residual significant impacts to 68.4 ha of breeding and foraging habitat for the Regent Honeyeater, the person taking the action must identify a direct offset site that meets the requirements of the EPBC Act Offset Policy, and secure the offset into perpetuity under a legally binding agreement within 12 months from the date of approval of the Offset Strategy at Condition 10.

Condition 7. To compensate for residual significant impacts to 2.6 ha of breeding habitat and 102.7 ha of foraging habitat for the Green and Golden Bell Frog, the person taking the action must identify a direct offset site that meets the requirements of the EPBC Act Offset Policy, and secure the offset into perpetuity under a legally binding agreement within 12 months from the date of approval of the Offset Strategy at Condition 10.

Condition 9. The action cannot continue for more than 12 months from the date of approval of the Offset Strategy at Condition 10, unless the direct offset sites required by Conditions 5, 6 and 7 have been secured in perpetuity under a legally binding agreement by the person taking the action.

Condition 10 relates to the content of the Biodiversity Offset Strategy and is described in Table 1.1.

## 1.2 Purpose

The purpose of this Biodiversity Offset Strategy (BOS) is to demonstrate:

- compliance with Conditions 5 to 10 of EPBC 2016/7640;
- the development of the offset package;
- how direct offsets will be identified, secured, and managed into perpetuity;
- how indirect offsets have been identified, where required; and
- how the action's residual offset requirements are fulfilled for CHVEF and Regent Honeyeater; and Green and Golden Bell Frog.

## 1.3 Framework

This BOS has been prepared in accordance with Condition 10 of the final approved decision notice and addresses all recommendations in the offset strategy checklist (Table 1.2) provided by DoEE, which was derived from the DoEE Environmental Management Plan Guidelines. Compliance with Condition 10 and the offset strategy checklist is demonstrated in Table 1.1 and 1.2, respectively.

**Table 1.1 BOS compliance with Condition 10**

Condition	Page/section addressed in this strategy
10. Within six (6) months from the commencement of the action the person taking the action must prepare and submit an Offset Strategy for the Minister's approval. The Offset Strategy must specify the development of the offset package and how direct offset sites required by Conditions 5, 6 and 7 will be identified, secured and managed into perpetuity. The offset strategy must:	
a) Describe the development of the offset package and identify the proposed direct offset sites required by Conditions 5, 6 and 7, include a detailed description of the direct offset sites and demonstrate how the direct offset sites meet the EPBC Act Offset Policy and provide an adequate offset for the residual significant impacts to protected matters.	Chapter 3, 4 and 5
b) Include proposed timeframes in which the direct offset sites will be secured by a legal binding agreement and a detailed description of how the legally binding agreement will secure the direct offset sites in perpetuity.	Section 6.1 and 6.2
c) Proposed measures for the long term management of the direct offset sites.	Section 6.3 to 6.5
The offset strategy approved by the Minister must be implemented.	The offset strategy will be implemented following approval by the Minister



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Source: EMM (2017), GA (2016), LMPA (2011), OEH (2016)

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**KEY**

- West Pit extension area
- Carrington Pit extension area
- Riverview Pit extension area
- Cheshunt Pit extension area
- Rail line
- Main road
- Major waterway
- Cadastral boundary
- NPWS reserve

The action  
HVO State-approved mining project (EPBC 2016/2640)  
Biodiversity offset strategy  
Figure 1.1





**Table 1.2 BOS compliance with offset strategy checklist**

Recommendations	Page/section addressed in this strategy
1. The strategy includes an Approval Holder Declaration signed by the approval holder (not consultant/agent).	Page 1
2. The strategy includes an executive summary which states the relevant approval conditions, outlines the objective/s of the strategy, the primary measures to achieve the strategy's objectives and key residual risks/barriers to achieving the strategy's objectives.	Page E.3
3. The offset strategy implements the EPBC Offset Policy and Offsets Assessment Guide. The strategy must justify user inputs to the guide, including: <ul style="list-style-type: none"> <li>a) for context, outline the attributes of each of the: <ul style="list-style-type: none"> <li>- condition classes for each ecological community;</li> <li>- condition classes used to determine the species habitat (stocking rate, site context, site condition);</li> </ul> </li> <li>b) correlate the impact site/s, and current and proposed future condition classes of the offset site/s, with the above categories;</li> <li>c) identify quantifiable ecological improvements to the offset site/s to meet the future condition.</li> <li>d) provide scientific evidence or agreement<sup>2</sup> that substantiates the time until ecological benefit and confidence in result values used in the offset guide; and</li> <li>e) substantiate risk of loss values used in the offset guide.</li> </ul>	Section 5.2
4. The strategy describes the proposed offset properties, including nature, location, tenure, connectivity, capacity to meet multiple offset requirements and potential for inclusion in the nature conservation reserve system.	Chapter 4
5. The strategy includes a schedule of conservation commitments required to establish and manage the offset site/s, and to monitor the effectiveness of interventions to achieve future condition. The schedule includes: <ul style="list-style-type: none"> <li>a) a process and timeframes for securing, under legally binding instrument, the offset site/s for biodiversity conservation purposes, in perpetuity;</li> <li>b) an outline of the short, medium and long term management arrangements for the offset site/s in order to achieve future condition commitments;</li> <li>c) commitments to engage qualified ecologists/appropriate experts to conduct ecological monitoring, survey and performance evaluation activities; and</li> <li>d) commitments to an approach to monitoring and detecting change in environmental condition due to offset management actions, that accounts for climatic variability, and that is capable of demonstrating attainment of proposed future condition (completion criteria).</li> </ul>	Chapter 6

<sup>2</sup> See <http://www.environment.gov.au/climate-change/publications/fact-sheet-confidence-likelihood>



**Table 1.2 BOS compliance with offset strategy checklist**

Recommendations	Page/section addressed in this strategy
6. The strategy assesses the risk of failure to achieve the offset objectives. The strategy: <ul style="list-style-type: none"> <li>a) identifies unplanned events or circumstances that prejudice attainment of the proposed offset objectives. The events or circumstances include legal and land planning factors;</li> <li>b) includes a qualitative assessment of the likelihood and consequence of those events or circumstances and, assuming management measures will be implemented, the residual risk of failure to achieve those objectives;</li> <li>c) characterising risk as low, medium, high or severe, and derived from likelihood (highly likely, likely, possible, unlikely, rare) and consequence (minor, moderate, high, major and critical); and</li> <li>d) explaining how conclusions about risks (consequence, likelihood, risk level) have been reached.</li> </ul>	Chapter 7
7. The strategy manages the risk of failure by: <ul style="list-style-type: none"> <li>a) specifying values or circumstances that will trigger contingency response/corrective actions;</li> <li>b) describing corrective actions that are likely to be effective and appropriate; and</li> <li>c) ensuring adequate corrective actions are proposed to avoid a high or severe risk.</li> </ul>	Section 7.2
8. The strategy specifies reporting commitments, including: <ul style="list-style-type: none"> <li>a) who the report is provided to;</li> <li>b) where applicable, reporting to the Department required by the conditions of approval;</li> <li>c) annual performance reports, realisation of key risks, incidents, non-compliance and implementation of corrective actions.</li> </ul>	Chapter 8
9. The strategy specifies accountabilities for implementing offset measures, including corrective actions.	Section 7.2
10. The strategy includes maps, plans, figures, images and sections to show the offset sites in a state and regional context, and <ul style="list-style-type: none"> <li>a) are scaled to enable the reader to identify, based on local landmarks (trees, fences, structures) the location of features being shown on the map etc;</li> <li>b) include appropriate standard metric scales to represent the information (for example 1:25 000, 1:10 000 and 1:5000). Datum – plans and cross sections refer to AHD;</li> <li>c) have metric measurements, graphic bar scales, local grid lines and standards and north point or orientation of sections (include a key) are used throughout; and</li> <li>d) include title blocks in the lower right hand corner with the following information: EPBC number and project name, title and number of the strategy, author, scale, date, source and date of data.</li> </ul>	Figure 4.1 to 4.4
11. The strategy cites recognized scientific or statutory literature that support the effectiveness of the strategy to achieve its objectives, e.g. scientific papers, published guidelines, recovery plans, conservation advices.	Section 5.2
12. The strategy uses the terms ‘will’ and ‘must’ when committing to strategy actions, instead of ‘where possible’, ‘as required’, ‘to the greatest extent possible’, ‘should’ or ‘may’.	Chapter 6 and 7
13. The footer or header of each page of the strategy states the name of the project, the date of the strategy and sequential page numbering.	Throughout BOS
14. The strategy includes a glossary of terms, acronyms, terms open to	Table 8.2

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**Table 1.2** BOS compliance with offset strategy checklist

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Recommendations	Page/section addressed in this strategy
different interpretations or not in common use, technical or defined in the approval conditions.	
15. The strategy includes implementation, risk assessment and contingency, and reporting schedules prepared in accordance with Appendix A.	Section 6.4 and Chapter 7

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## 2 Unavoidable loss and offset obligations

Unavoidable biodiversity loss of the action comprises:

- 61 ha of CHVEF;
- 68.4 ha of Regent Honeyeater habitat;
- 68.1 ha of Swift Parrot habitat; and
- 105.3 ha of Green and Golden Bell Frog habitat.

Condition 4 of the final approval decision notice requires that 405.8 ha of land is secured at the Wandewoi BA, and that it must include:

- 405.8 ha of CHVEF;
- 175.8 ha of Swift Parrot foraging habitat; and
- 40 ha of regenerating Swift Parrot foraging habitat.

Wandewoi BA will offset approximately 63% (38.3 of 61 ha impacted) of the action's impacts on CHVEF and 100% of the action's offset requirements for the Swift Parrot. Accordingly, offset sites are required to compensate for the action's residual impacts on 22.7 ha of CHVEF, 68.4 ha of Regent Honeyeater and 105.3 ha of Green and Golden Bell Frog habitat.

Conditions 5 to 7 of EPBC 2016/7640 state the unavoidable loss and offset obligations relating to the action. These are presented in Section 1.1.

Chapter 3 of the BOS describes how direct offset sites have been identified that will compensate for the action's residual significant impacts on CHVEF, Regent Honeyeater and Green and Golden Bell Frog. Chapter 4 demonstrates the proposed offset sites' compliance with the EPBC Act Environmental Offset Policy (SEWPaC 2012a) and Section 6.1 describes how the proposed offset sites will be secured under a legally binding agreement.

## 3 Offset identification

### 3.1 Overview

The process to identify direct offset sites for CHVEF, Regent Honeyeater and Green and Golden Bell Frog includes two stages. These comprise:

- Stage 1:
  - GIS analysis to identify potentially suitable land; and
  - subsequent approach to the landowners to determine their willingness to engage with Yancoal.
- Stage 2:
  - verification of site values;
  - assessment of site values against the EPBC Offset Assessment Guide; and
  - negotiation of terms for an agreement or purchase.

The staged identification process is detailed in the following sections.

### 3.2 Stage 1

#### 3.2.1 Central Hunter Valley Eucalypt Forest and Woodland

Stage 1 commenced in February 2016 and concluded in November 2016. GIS datasets (DoE 2015; Peake 2006, OEH 2012) were analysed to identify the likely distribution of CHVEF across its distribution. Privately-owned land parcels within the distribution of CHVEF were then identified using GIS.

In excess of 140 private properties were identified as potentially containing CHVEF. However, only 10% were large enough (100 ha or greater) to provide an economically viable offset in terms of ongoing management. Fourteen such properties were identified from this analysis. An external agent was engaged to approach landowners to determine their willingness to enter into a contractual agreement or potentially sell their land. The list was refined to landowners willing to enter into a contract and/or provide access for surveys during Stage 2.

#### 3.2.2 Regent Honeyeater

A previous study (Cumberland Ecology 2015) and regional vegetation mapping (OEH 2012) were reviewed for land adjacent to the Yancoal-owned Condon View BA (Figure 4.2) to determine its potential suitability as an offset for the Regent Honeyeater. Atlas of NSW Wildlife (OEH 2016) records were reviewed for sites on the refined list of landowners with potential for CHVEF on their properties, to determine local occupation patterns of the Regent Honeyeater, and the potential for these sites to provide a suitable Regent Honeyeater offset.



### 3.2.3 Green and Golden Bell Frog

A desktop study was completed (EMM 2016) to identify potential offset sites for the Green and Golden Bell Frog across NSW. The desktop study considered the following resources:

- Atlas of NSW Wildlife (OEH 2016) records;
- Management Plan: The Green and Golden Bell Frog Key Populations within the Crookhaven River Floodplain (DECC 2007); and
- Green and Golden Bell Frog Recovery Plan (Draft) (DEC 2005).

Sixteen broad areas were identified for further investigation, which were adjacent to key Green and Golden Bell Frog populations and/or had large aggregations of Green and Golden Bell Frog records on the Atlas of NSW Wildlife. These land parcels were considered likely to contain potential breeding (wetlands, swamps) and foraging (adjacent grasslands) habitat for the Green and Golden Bell Frog. An external agent was engaged to approach landowners within these areas to determine their willingness to enter into a contractual agreement or potentially sell their land. The list was refined to landowners willing to enter into a contract and/or provide access for surveys during Stage 2.

## 3.3 Stage 2

Preliminary surveys were conducted by EMM ecologists at potentially suitable properties, to determine if they contained CHVEF, Regent Honeyeater habitat and Green and Golden Bell Frog habitat.

Yancoal then selected four suitable offset sites (described in Chapter 4) based on the results of the preliminary surveys, an assessment of land values and the practicality of ongoing management that would be required.

Surveys were completed at these sites to determine the extent of CHVEF and Regent Honeyeater habitat, and targeted surveys and habitat assessment for the Green and Golden Bell Frog.

Following the completion of surveys, the Offset Assessment Guide (SEWPaC 2012b) was completed for each of the four properties to determine the percentage of direct offset provided for CHVEF, Regent Honeyeater and Green and Golden Bell Frog.

## 4 Proposed offset properties

### 4.1 Overview

Four suitable offset properties were identified, comprising:

- Mitchelhill BA (Figure 4.1);
- Condon View BA (Figure 4.2);
- Crescent Head (north) (Figure 4.3); and
- Crescent Head (south) (Figure 4.4).

The nature, location, tenure, connectivity, capacity to meet the action's offset requirements and the potential for inclusion in the nature conservation reserve system of these proposed offset properties are described in the following sections.

### 4.2 Offset properties

#### 4.2.1 Mitchelhill BA

Mitchelhill BA is a Yancoal-owned property in Muscle Creek, approximately 6 km south-east of Muswellbrook (Figure 4.1). The property contains CHVEF and habitat for the Regent Honeyeater. It is proposed that Mitchelhill BA is used to provide the residual offset for CHVEF and a portion of the residual offset for the Regent Honeyeater. Table 4.1 describes the site's values, its capacity to meet the action's offset requirements and potential for inclusion in the nature conservation reserve system.

**Table 4.1** Description of site values at Mitchelhill BA

Attribute	Description
Current site use	The site contains a large area of woodland. Parts of the site have been cleared for grazing. Cattle grazing is in operation at the site.
Description of CHVEF	<p>The site is located in the Hunter River catchment of the Hunter Valley. The vegetation is located on low hillslopes and not alluvial plains and has a woodland structure with a projected canopy cover of greater than 10%.</p> <p>The vegetation is dominated by key diagnostic species including Narrow-leaved Ironbark (<i>Eucalyptus crebra</i>), Grey Box (<i>E. moluccana</i>) and/or Spotted Gum (<i>Corymbia maculata</i>). The community has a sparse shrub layer comprising Blackthorn (<i>Bursaria spinosa</i>) and Mock Olive (<i>Notelaea microcarpa</i> var. <i>microcarpa</i>), and an understorey comprising a variety of native grasses and forbs. CHVEF is in good condition at the site, with few weeds observed during surveys.</p> <p>In consideration of the above, vegetation at the site satisfies the key diagnostic characteristics in Section 1.5.1 of the Approved Conservation Advice (including listing advice) for Central Hunter Valley Eucalypt Forest and Woodland ecological community (TSSC 2015). The site contains 132 ha of CHVEF, shown on Figure 4.1.</p>

**Table 4.1 Description of site values at Mitchelhill BA**

Attribute	Description
Description of habitat values for the Regent Honeyeater	<p>CHVEF is present at the site. Section 1.4 of the <i>Approved Conservation Advice (including listing advice) for Central Hunter Valley Eucalypt Forest and Woodland ecological community</i> (TSSC 2015) recognises the community as containing an important source of winter-flowering eucalypts for the Regent Honeyeater. In addition, the <i>National Recovery Plan for the Regent Honeyeater</i><sup>5</sup> recognises areas containing Ironbark in the Hunter Valley as important foraging habitat for the species, and identifies Spotted Gum as a key nectar-producing tree for the Regent Honeyeater. The survey confirmed the presence of important foraging habitats for the Regent Honeyeater, comprising CHVEF, Ironbark and Spotted Gum trees.</p> <p>The site is within approximately 30 km of the Hunter Valley key breeding area, as identified in the <i>National Recovery Plan for the Regent Honeyeater</i> (DoE 2016). The site also contains mature trees with rough bark (Ironbarks) that are identified in the <i>National Recovery Plan for the Regent Honeyeater</i> as a species in which Regent Honeyeaters can build their nests. Given the above, it is possible that breeding may occur within the site.</p>
Threatening processes in operation	<p>The key threat to CHVEF and Regent Honeyeater habitat across their distributions is land clearing and fragmentation. Parts of Mitchelhill BA have been cleared previously for agricultural uses. Clearing and agricultural use of the land commenced prior to the EPBC Act in 2000, and therefore could continue without approval under the act. Land clearing has occurred previously at the site for agriculture. Clearing of CHVEF can also occur if it is an allowable activity under the <i>NSW Local Land Services Act 2013</i> (LLS Act) as it parts have regrown since 1990. Protection of the site under a legally binding mechanism will prevent future clearing of CHVEF for agriculture and improve its condition through weed control and stock management.</p>
Capacity to meet the action's offset requirements	<p>The site is likely to contain habitat critical to the survival of the Regent Honeyeater in accordance with Section 3.4.6 of the <i>National Recovery Plan for the Regent Honeyeater</i>, (DoE 2016) as it contains potential breeding and foraging habitat in an area where the species is likely to occur.</p> <p>The site provides 132 ha of vegetation consistent with the <i>Approved Conservation Advice (including listing advice) for Central Hunter Valley Eucalypt Forest and Woodland ecological community</i> (TSSC 2015). CHVEF at the site will be protected by implementation of a legally binding mechanism that prevents further vegetation clearing in the 132 ha and its condition will be improved over time through weed control and stock management.</p> <p>The site provides 132 ha of vegetation likely to provide foraging habitat for the Regent Honeyeater given:</p> <ul style="list-style-type: none"> <li>• the presence of CHVEF, identified as containing important Regent Honeyeater habitat in the <i>Approved Conservation Advice (including listing advice) for Central Hunter Valley Eucalypt Forest and Woodland ecological community</i> (TSSC 2015);</li> <li>• the presence of Ironbarks, identified as potential nesting habitat in the <i>National Recovery Plan for the Regent Honeyeater</i> (DoE 2016); and</li> <li>• the presence of Spotted Gums, identified as a key nectar-producing species in the <i>National Recovery Plan for the Regent Honeyeater</i> (DoE 2016).</li> </ul>
Potential for inclusion in conservation reserve system	<p>Mitchelhill BA is not located adjacent to a national park or nature reserve, and therefore cannot be added to an existing conservation reserve. National parks and nature reserves are usually established at a minimum size of 500 ha, and therefore it would not be appropriate to reserve the 132 ha of land at Mitchelhill BA. Mitchelhill BA would form part of a protected network of biodiversity areas owned by Yancoal across NSW.</p>

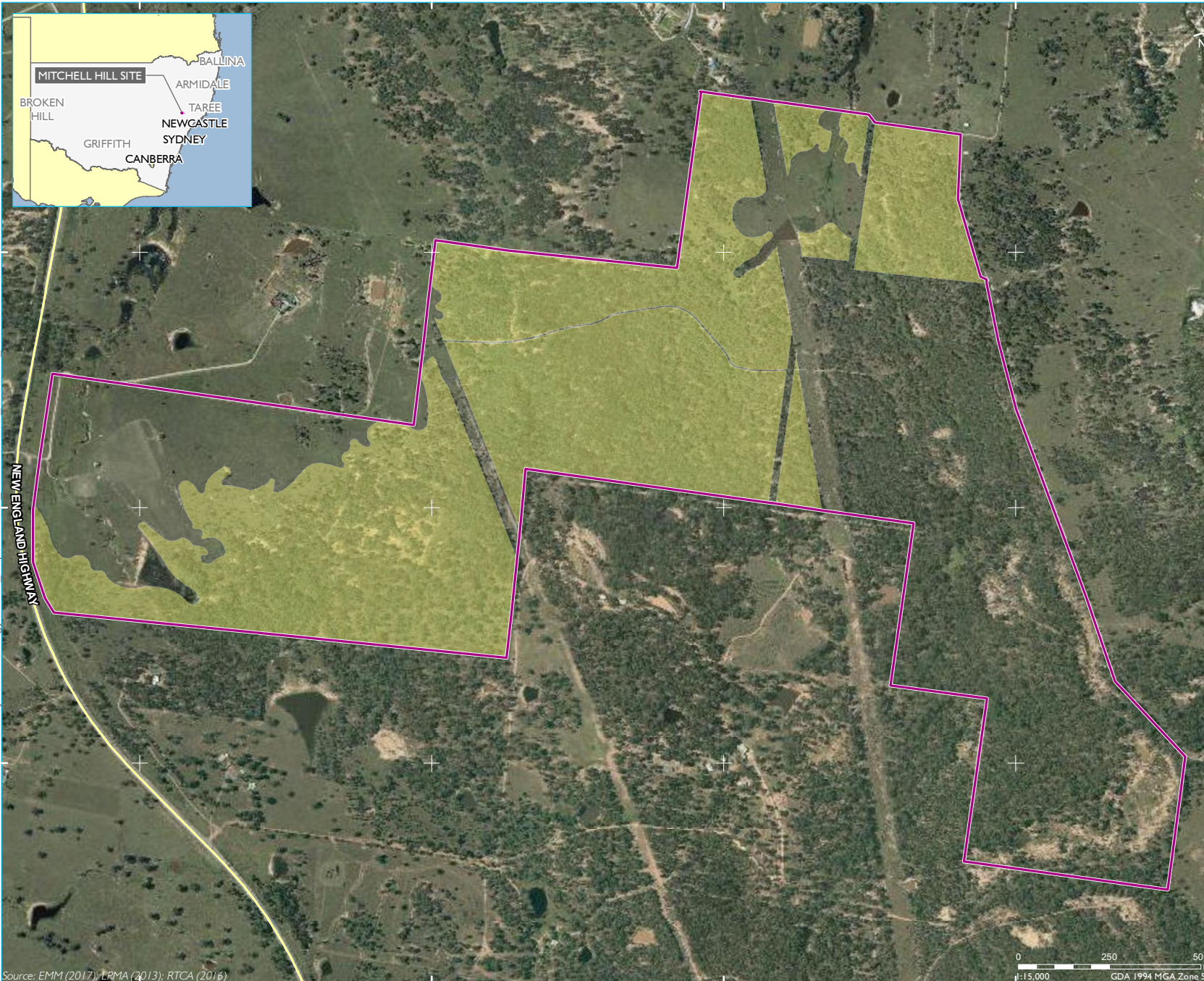


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KEY

- Mitchell Hill site
- Major road
- Local road
- CHVEF and Regent Honeyeater habitat (132 ha)

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 Source: EMM (2017); LPMA (2013); RTCA (2016)

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Proposed offset for CHVEF and Regent Honeyeater habitat at Mitchell Hill

HVO State-approved mining project (EPBC 2016/2640)  
Biodiversity offset strategy  
Figure 4.1



## 4.2.2 Condon View BA

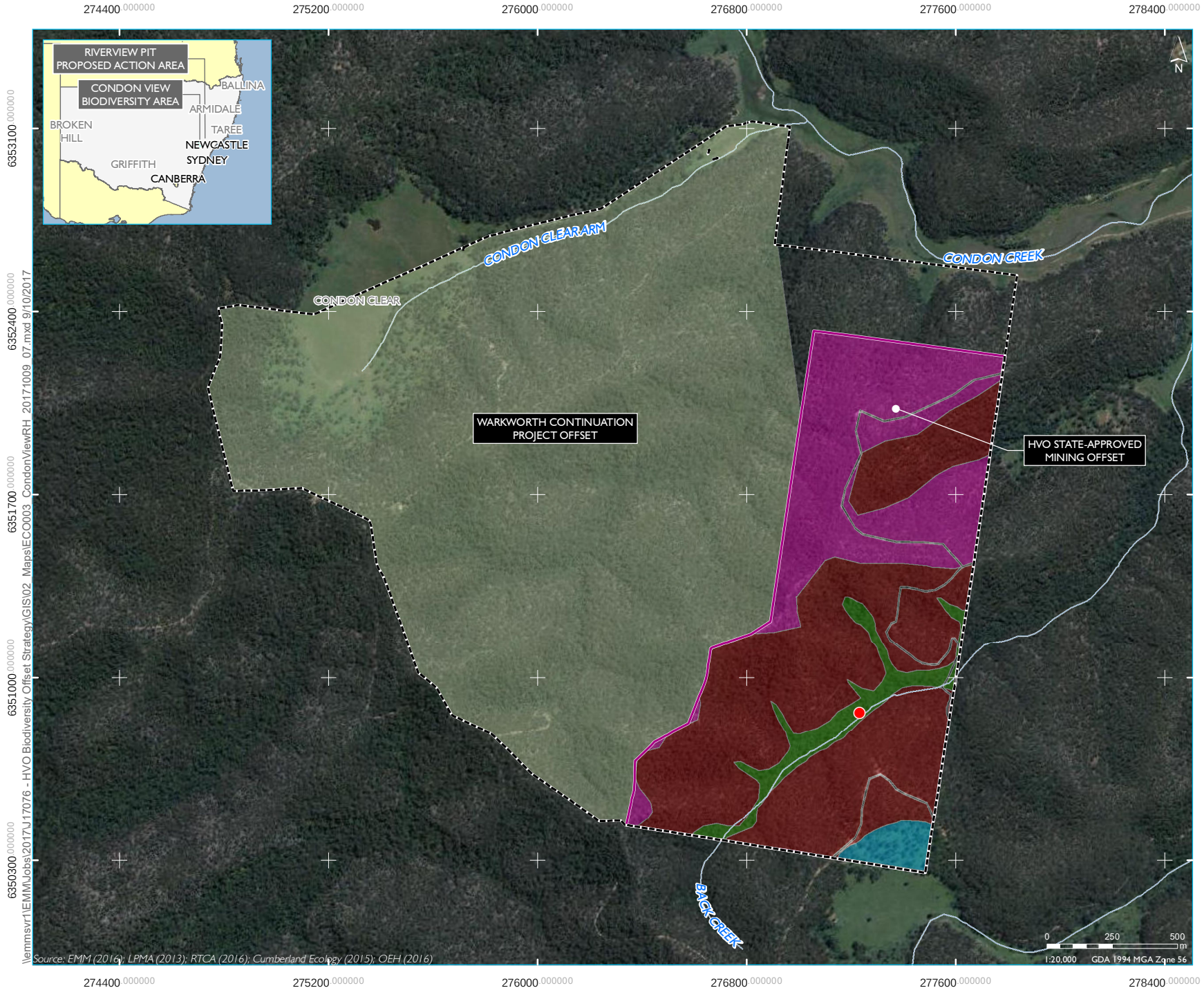
Condon View BA is a Yancoal-owned property, approximately 4 km west of Putty (Figure 4.2). The former Commonwealth Department of the Environment (now DoEE) approved use of the western part of Condon View BA as an offset for the Regent Honeyeater and Swift Parrot in relation to the Warkworth Continuation Project (EPBC 2009/5081). The dedication of the north-eastern part of Condon View BA is proposed as an offset for the Regent Honeyeater relating to the action.

Table 4.2 describes the site's values, its capacity to meet the action's offset requirements and potential for inclusion in the nature conservation reserve system.

**Table 4.2 Description of site values at Condon View BA**

Attribute	Description
Current site use	<p>Condon View BA (Figure 4.2) is owned by Yancoal and has been dedicated as an offset site. The Commonwealth Department of the Environment approved use of the western part of Condon View BA as an offset for the Regent Honeyeater and Swift Parrot in relation to the Warkworth Continuation Project.</p> <p>Yancoal propose to dedicate the eastern part of Condon View BA as an offset for the Regent Honeyeater in relation to the HVO State-approved mining project. The northern part of the site has been cleared previously and exists as derived native grassland, while the remainder of the site contains native vegetation. The dedication of the eastern part of the site as an offset will extend the network of protected Regent Honeyeater habitats in the locality.</p>
Description of habitat values for the Regent Honeyeater	<p>The site contains Broad-leaved Ironbark (<i>E. fibrosa</i>) and Narrow-leaved Stringybark (<i>E. eugenioides</i>), that are recognised in the <i>National Recovery Plan for the Regent Honeyeater</i> (DoE 2016) as regionally important foraging resources that support regular Regent Honeyeater breeding events.</p> <p>The Capertee Valley is recognised as a key breeding area in the <i>National Recovery Plan for the Regent Honeyeater</i> (DoE 2016). The site is east of the Capertee Valley, and is connected via large tracts of native vegetation in Wollemi National Park. Therefore, the site is connected to a key breeding area for the Regent Honeyeater.</p> <p>The site is intersected by several waterways that contain mature Rough-barked Apple (<i>Angophora floribunda</i>) trees. The <i>National Recovery Plan for the Regent Honeyeater</i> (DoE 2016) identifies that Regent Honeyeaters have been recorded nesting in Rough-barked Apple trees. Given the proximity to a known breeding area, the presence of tree species that Regent Honeyeaters have been recorded nesting in and the previous record of the Regent Honeyeater from the site, it is highly likely that breeding could occur within the site.</p> <p>The Regent Honeyeater was recorded at the site in 1996 (Figure 4.2). Scattered records exist between 1992 and 2000 east of the site, extending into Yengo National Park. There are a number of records from the Regent Honeyeater breeding area in Glen Davis (Capertee Valley), west of the site. Therefore, the site may represent a stepping stone in a dispersal corridor for the Regent Honeyeater from breeding habitat west of Wollemi National Park through to non-breeding habitat in Yengo National Park.</p>
Capacity to meet the action's offset requirements	<p>The site is likely to contain habitat critical to the survival of the Regent Honeyeater in accordance with Section 3.4.6 of the <i>National Recovery Plan for the Regent Honeyeater</i> (DoE 2016) as it contains potential breeding and foraging habitat in an area where the species has been recorded. The site will be protected under a legally binding mechanism that will prevent key threats comprising future habitat clearing and fragmentation.</p>
Potential for inclusion in conservation reserve system	<p>Condon View BA is located directly adjacent to Wollemi National Park, and therefore there is potential for inclusion in the conservation reserve system, should the proponent wish to do this in the future. Condon View BA would form part of a protected network of biodiversity areas owned by Yancoal across NSW.</p>





- KEY**
- Warkworth Continuation Project offset area
  - Condon View Biodiversity Area
  - Regent Honeyeater offset (168 ha)
  - Location of sighting of Regent Honeyeater (OEH, 2016)
  - Major waterway
- Surveyed vegetation communities (Cumberland Ecology, 2015)
- HN577: Rough-barked Apple - Grey Gum grassy open forest of the hinterland hills of the Central Coast, Sydney Basin Bioregion
  - HN578: Rough-barked Apple - Red Gum grassy woodland of the MacDonalld River Valley on the Central Coast, Sydney Basin Bioregion
  - HN605: Turpentine - Grey Myrtle forest of sheltered sandstone gullies of the Central Coast hinterland, Sydney Basin Bioregions
  - HN612: Yellow Bloodwood - Ironbark shrubby woodland of the dry hinterland of the Central Coast, Sydney Basin Bioregion

Proposed Regent Honeyeater offset at Condon View Biodiversity Area

HVO State-approved mining project (EPBC 2016/2640) Biodiversity offset strategy Figure 4.2

Source: EMM (2016); LPMA (2013); RTCA (2016); Cumberland Ecology (2015); OEH (2016)





### 4.2.3 Crescent Head (north)

Crescent Head (north) is a Yancoal-owned property, approximately 16 km east of Kempsey (Figure 4.3). The property contains habitat for the Green and Golden Bell Frog. It is proposed that Crescent Head (north) is used to provide a portion of the residual Green and Golden Bell Frog offsets for the action. Table 4.3 describes the site's values, its capacity to meet the action's offset requirements and potential for inclusion in the nature conservation reserve system.

**Table 4.3 Description of site values at Crescent Head (north)**

Attribute	Description
Current site use	This site is currently for sale and has development approval to build a property which will likely result in loss of potential foraging habitat for the species.
Description of habitat values for the Green and Golden Bell Frog	<p>The site is dominated by swamp sclerophyll forest with smaller patches of littoral rainforest on areas of high relief. Cleared areas occur along tracks and around the periphery of the site; these include a mixture of native grassland, pasture grasses and sedgeland areas. Weed species include Small-leaved Privet (<i>Ligustrum sinense</i>). The majority of the site is likely to provide suitable foraging habitat for the Green and Golden Bell Frog as there is a high diversity of native flora species and likely a corresponding diversity and abundance of invertebrate prey.</p> <p>One large permanent dam exists within the property, with the Cape Waterlily (<i>Nymphaea capensis</i>) present throughout. Emergent vegetation was limited to small patches of dense Spike Rush species (<i>Eleocharis sp.</i>), with no submerged aquatic species observed. No tadpoles or frogs of any species were observed, and the dam was found have a very high abundance of the exotic Mosquito Fish (<i>Gambusia holbrooki</i>). It is likely that the presence of the Mosquito Fish will substantially reduce or eliminate successful Green and Golden Bell Frog breeding within the dam, particularly as there are limited aquatic refuge areas. Furthermore, the dam is likely to be a permanent resource with the population of Mosquito Fish also correspondingly permanent.</p> <p>A cluster of records occur within 2 to 5km of the site (refer to Figure 2). It is likely that this population is extant and utilises dune swales for breeding. Given the close proximity of this population it is likely that Green and Golden Bell Frog may forage within the site, albeit intermittently.</p>
Threatening processes in operation	<p><i>Predation by Gambusia holbrooki</i> (Mosquito Fish) is listed as a key threatening process under the NSW <i>Biodiversity Conservation Act 2016</i>. Although this process is not listed under the EPBC Act, it is directly relevant to the suitability of potential Green and Golden Bell Frog offset sites given its link to the decline of the species.</p> <p>The Mosquito Fish is a small freshwater fish originally introduced into Australia in the 1920s. It was originally imported as an aquarium fish, however some were released into creeks around Sydney, Melbourne and Brisbane.</p> <p>The Mosquito Fish is now widespread in NSW and is an aggressive and voracious predator of native fauna, particularly threatened frogs. Presence of the Mosquito Fish has been linked to the decline of the Green and Golden Bell Frog. Breeding by the Green and Golden Bell Frog is almost completely restricted to water bodies lacking Mosquito Fish (NSWSC 1999).</p> <p>Mosquito Fish were abundant in dams and waterways of this property, and therefore would likely prevent successful Green and Golden Bell Frog breeding.</p>
Capacity to meet the action's offset requirements	The site is likely to provide foraging habitat for the Green and Golden Bell Frog given the presence of native vegetation and good connectivity to a population of the species. Breeding resources for the species are likely to be hampered by very abundant Mosquito fish. Management actions to improve the site could include planting of emergent vegetation and submerged vegetation, whilst controlling the Mosquito Fish.
Potential for inclusion in conservation reserve system	Crescent Head (north) is directly west of Hat Head National Park, and therefore there is potential for inclusion in the conservation reserve system, should the proponent wish to do this in the future. Crescent Head (north) would form part of a protected network of biodiversity areas owned by Yancoal across NSW.

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Source: EMM (2017); GA (2016); LMPA (2011); OEH (2016)

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**KEY**

- Green & Golden Bell Frog record
- Green and Golden Bell Frog habitat (52.79 ha) - Rowe property
- Main road
- Local road
- Major waterway
- Cadastral boundary
- NPWS reserve

**Proposed Green and Golden Bell Frog offset - Crescent Head (north)**

HVO State-approved mining project (EPBC 2016/2640)  
 Biodiversity offset strategy  
 Figure 4.3





#### 4.2.4 Crescent Head (south)

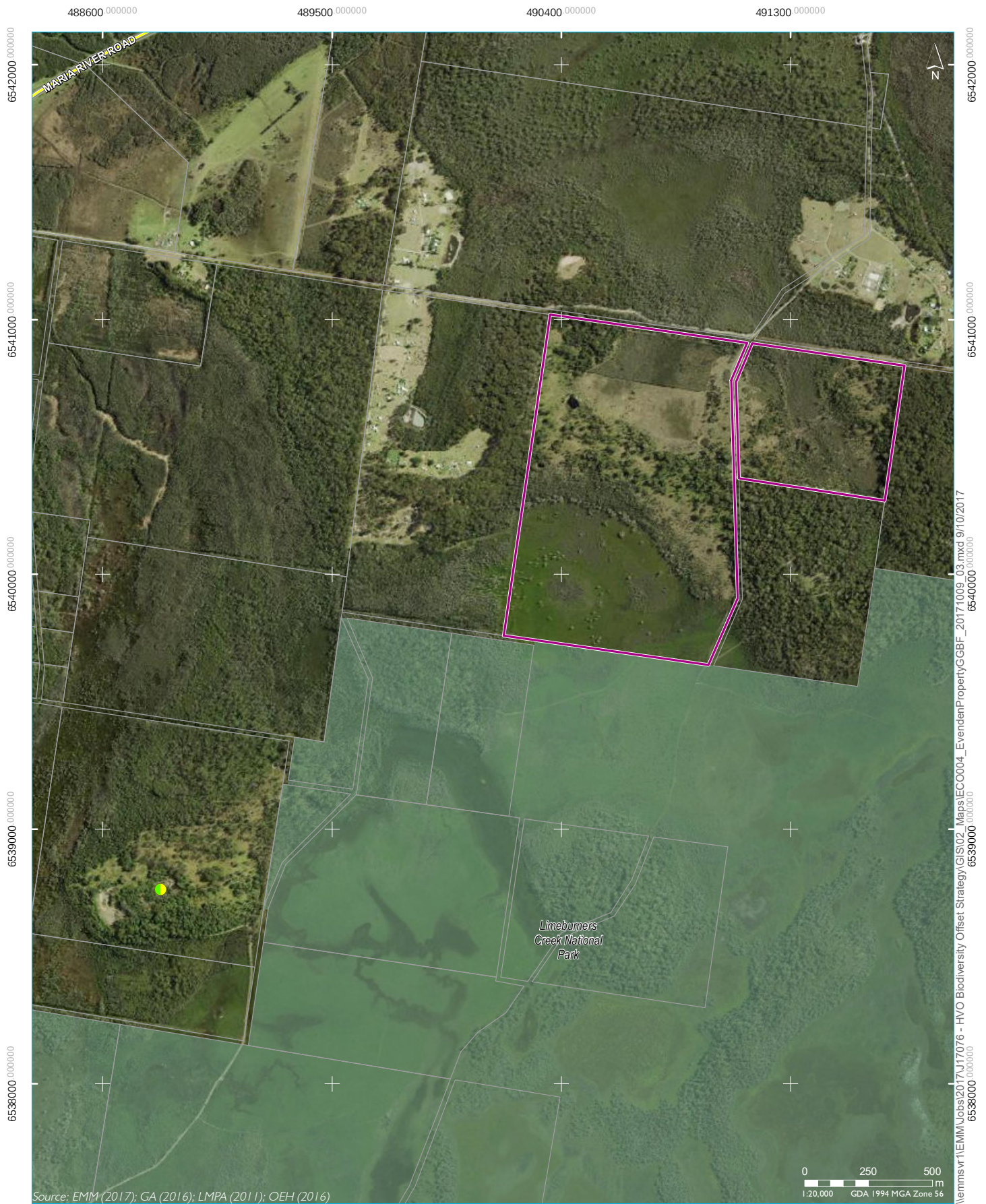
Crescent Head (south) is a Yancoal-owned property, approximately 18 km north of Port Macquarie. The property contains habitat for the Green and Golden Bell Frog. It is proposed that Crescent Head (south) is used to provide a portion of the residual Green and Golden Bell Frog offsets for the proposed action. Table 4.4 describes the site's values, its capacity to meet the proposed action's offset requirements and potential for inclusion in the nature conservation reserve system.

**Table 4.4 Description of site values at Crescent Head (south)**

Attribute	Description
Current site use	Parts of this site have been historically cleared with a tea tree plantation in the north of the site. The site does not appear to be currently utilised for any agriculture. It remains unknown whether any development or other actions are proposed for this site.
Description of habitat values for the Green and Golden Bell Frog	<p>The southern half of the site is dominated by coastal heath swamp with the northern half a mosaic Pink Bloodwood -Blackbutt Shrubby Open Forest. Patches of Tea Tree (<i>Leptospermum sp.</i>) and derived grassland also occur with exotic grass also present such as <i>Sporobolous</i>. The majority of the site is likely to provide suitable foraging habitat for the Green and Golden Bell Frog, with a range of microhabitats present including woody debris, dense vegetation and more open areas for basking.</p> <p>Potential breeding habitat included six dams which were scattered within the northern half of the site. Three of the dams contain permanent water with vegetation including the Cape Waterlily, several species of Spike Rush and other sedge species. Submerged aquatic species were also present.</p> <p>The Mosquito Fish were present in all of the permanent dams; however the abundance observed was low compared to Crescent Head (north). There was also a much higher vegetation complexity which may provide a refuge for tadpoles. Three of the dams were dominated by dense Spike Rush and contained very shallow water. These dams are likely to dry occasionally. Whilst these appear to provide less optimal breeding habitat for the Green and Golden Bell Frog, owing to the lack of open water areas they may provide semi-permanent/ephemeral breeding areas with reduced predation from Mosquito Fish.</p> <p>No tadpoles were observed in any of the dams despite dip netting and visual searches around the periphery of all dams during both diurnal and nocturnal periods. Moderate abundances of the Dwarf Green Tree Frog (<i>Litoria fallax</i>) were found resting of emergent vegetation; however calling was subdued to non-existent. The Broad Palmed Frog (<i>Litoria latopalmata</i>) was also observed in terrestrial habitats both during the day and night, with none heard calling.</p> <p>The site visit was preceded by a prolonged dry period and the water levels within the dams were lower than typical, judging from the vegetation compositions. It is likely that the surveys were not conducted when frogs were actively breeding within the site, and therefore difficult to detect.</p> <p>The closest record is 2 km to the south-east from 2005. The record states that evidence of breeding was recorded. The location of the record is well connected to the Crescent Head (south) property with continuous vegetation and no barriers to Green and Golden Bell Frog movement. Furthermore, survey effort is likely to be low in this region given the lack of development and more Green and Golden Bell Frog populations may occur within the locality.</p>
Threatening processes in operation	<p><i>Predation by Gambusia holbrooki</i> (Mosquito Fish) is listed as a key threatening process under the NSW <i>Biodiversity Conservation Act 2016</i>. Although this process is not listed under the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>, it is directly relevant to the suitability of potential Green and Golden Bell Frog offset sites given its link to the decline of the species.</p> <p>The presence of Mosquito Fish in several of the dams may lower the habitat value of the site. However, there is still the potential that successful breeding may occur due to the other otherwise optimal nature of the habitat, and refuge areas present. There is also the potential that breeding may occur in the more ephemeral dams in which Mosquito Fish are likely to be periodically eliminated by wetting and drying cycles.</p>

**Table 4.4** Description of site values at Crescent Head (south)

Attribute	Description
Capacity to meet the proposed action's offset requirements	The site is likely to provide foraging habitat for the Green and Golden Bell Frog given the presence of native vegetation and good connectivity to a population of the species. It is unclear whether Green and Golden Bell Frogs are breeding within in the study area and further work is likely to be required to determine this. The presence of Mosquito Fish in several of the dams may lower the habitat value; however there is still the potential that successful breeding occurs due to the other otherwise optimal nature of the habitat, and refuge areas present. There is also the potential that breeding may occur in the more ephemeral dams in which Mosquito Fish are likely to be periodically eliminated.
Potential for inclusion in conservation reserve system	Crescent Head (south) is directly north of Limeburners Creek National Park, and therefore there is potential for inclusion in the conservation reserve system, should the proponent wish to do this in the future. Crescent Head (south) would form part of a protected network of biodiversity areas owned by Yancoal across NSW.



**KEY**

- Green & Golden Bell Frog record
- Green and Golden Bell Frog habitat (136.71 ha) - Evenden property
- Main road
- Cadastral boundary
- NPWS reserve

Proposed Green and Golden Bell Frog offset  
- Crescent Head (south)

HVO State-approved mining project (EPBC 2016/2640)  
Biodiversity offset strategy  
Figure 4.4



## 5 User inputs and applying the offsets guide

### 5.1 Policy framework

#### 5.1.1 EPBC Act Environmental Offsets Policy

The EPBC Act Environmental Offsets Policy (DSEWPaC 2012a) outlines the Commonwealth Government's approach to the use of environmental offsets under the EPBC Act. The policy has five key aims. These are to:

1. ensure the efficient, effective, timely, transparent, proportionate, scientifically robust and reasonable use of offsets under the EPBC Act;
2. provide proponents, the community and other stakeholders with greater certainty and guidance on how offsets are determined and when they may be considered under the EPBC Act;
3. deliver improved environmental outcomes by consistently applying this policy;
4. outline the appropriate nature and scale of offsets and how they are determined; and
5. provide guidance on acceptable delivery mechanisms for offsets.

For an offset to comply with the policy, it must:

1. deliver an overall conservation outcome that improved or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed action;
2. be built around direct offsets but may include other compensatory measures;
3. be in proportion to the level of statutory protection that applies to the protected matter;
4. be of a size and scale proportionate to the residual impacts on the protected matter;
5. effectively account for and manage the risks of the offset not succeeding;
6. be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs (this does not preclude the recognition of state or territory offsets that may be suitable as offsets under the EPBC Act for the same action);
7. be efficient, effective, timely, transparent, scientifically robust and reasonable; and
8. have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.

The policy requires that offset sites provide a minimum 90% direct offset, with a maximum 10% offset provided by other compensatory measures. Other compensatory measures are those actions that do not directly offset the impacts on the protected matter, but are anticipated to lead to benefits for the impacted protected matter, eg funding for research or educational programs.

The policy outlines criteria for the delivery of other compensatory measures, through research programs and educational programs.



## Research programs:

1. will be tailored to at least a postgraduate education level, however there will be scope to engage other education levels in educational programs;
2. will present findings that can be peer reviewed;
3. will publish findings in an internationally recognised peer-reviewed scientific journal or be of a standard that would be acceptable for publication in such a journal. Publications should be submitted to free open access journals. Data and information collected should have creative commons licensing and be free and accessible; and
4. research outputs should inform future management decisions on the protected matter and where possible be readily applicable to other similar matters.

## Educational programs:

1. will be likely to vary in scope, mode of delivery and duration according to the target audience and the protected matter (for instance, school or community programs, signage or printed materials);
2. should seek to attain measurable outcomes. Note that it may be difficult to ascertain the scope of influence of educational programs as it can be difficult to link education activities to behavioural change and subsequent improvement in the viability of the protected matter; and
3. should be targeted toward behavioural change and subsequent improvement in the viability of the protected matter.

Other compensatory measures should relate to the impacted aspect of the protected matter. For example, research into effective re-vegetation techniques for a particular ecological community may be an appropriate component of an offsets package for an action that involves clearing of that ecological community.

Compliance of the offset strategy with the policy is addressed in Section 5.2.2. Other compensatory measures for the Green and Golden Bell Frog are discussed in Section 5.2.1 iii.

### 5.1.2 Offsets Assessment Guide

The Offsets Assessment Guide (DSEWPaC 2012b) is a calculation tool that determines the capacity of proposed offset sites to compensate for significant impacts on protected matters. The guide is based on eight variables, comprising:

1. annual probability of extinction - the average chance that a species or ecological community will be completely lost in the wild each year;
2. protected matter attributes - the options provided to calculate offsets, ie the area of an ecological community impacted, the area of habitat impacted for a threatened species, or specific protected matter attributes including the number of nest hollows, habitat condition, birth rate, mortality rate and the number of individual plants or animals;
3. quality - comprising site condition (ie the condition of habitat relevant to the protected matter), site context (ie the level of connectivity relevant to the needs of the protected matter) and species stocking rate (ie the number of individuals present and/or the importance of the habitat in the context of the species ecological requirements);

4. time over which loss is averted - the risk of loss with and without conservation of the proposed offset;
5. time until ecological benefits are achieved - the estimated time in years for habitat quality to improve at the proposed offset. This factor considers the future quality of the site with and without conservation of the proposed offset;
6. risk of loss - the chance that habitat at the proposed offset site will be completely lost;
7. confidence in result - the level of certainty about the success of the proposed offset; and
8. net present value - a form of discounting that incorporates the calculations for the annual probability of extinction (1), the time over which loss is averted (4) and the time until ecological benefit (5).

The guide calculates the percentage of direct offset provided by a proposed offset site. A minimum of 90% direct offsets and maximum of 10% indirect offsets are required to adequately compensate for significant impacts, in accordance with the guide and policy.

Compliance of the offset strategy with the guide is addressed in Section 5.2.2.

### 5.1.3 Determining confidence levels

Condition 10d requires that scientific evidence or agreement that substantiates the time until ecological benefit and confidence in result values used in the offset assessment guide is provided in this BOS. The offset assessment checklist (Table 1.2) provides a method for determining the confidence levels for future condition, shown in Plate 5.1. Confidence levels are determined using a combination of the level of scientific agreement and evidence.

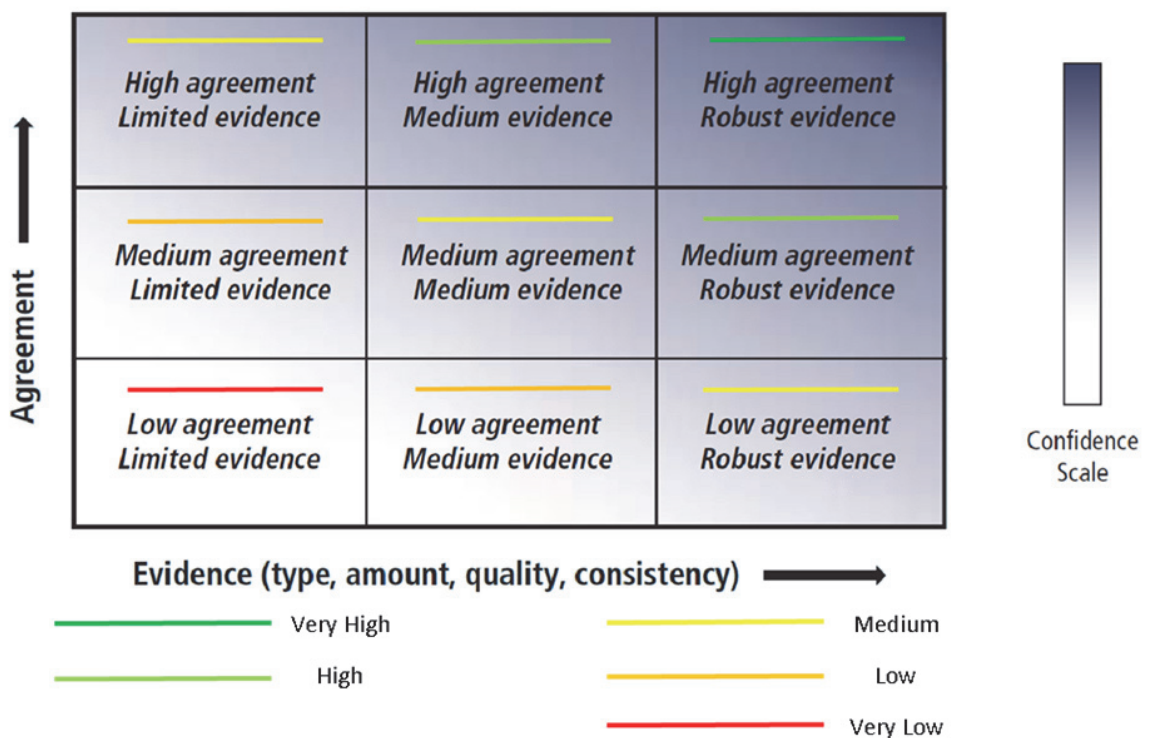


Plate 5.1.1 Determining confidence levels (source: IPCC 2013)

Guidance is also provided in the offset assessment checklist (Table 1.2) in determining the confidence levels in the desired result, as a percentage (Table 5.1).

**Table 5.1 Standard terms used to define likelihood1**

Term	Likelihood of the outcome
Virtually certain	>99% probability
Extremely likely	>95% probability
Very likely	>90% probability
Likely	>66% probability
More likely than not	>50% probability
About as likely as not	33 to 66% probability
Unlikely	<33% probability
Extremely unlikely	<5% probability
Exceptionally unlikely	<1% probability

Notes 1. Source: IPCC (2003)

The guidance in Plate 5.1 and Table 5.1 has been used to determine the confidence for each of the offset calculations provided in Section 5.2.

## 5.2 Application of the policy and guide

### 5.2.1 Offset calculations

Offset calculations have been completed in the Offsets Assessment Guide for CHVEF, Regent Honeyeater and Green and Golden Bell Frog. The calculations and justification for the variables entered are provided in the following sections. The offset calculation spreadsheets are provided in Appendix A.

#### CHVEF

The variables used to perform CHVEF offset calculations for Mitchelhill BA is provided in Table 5.2. Mitchelhill BA will provide a direct 100.6% offset for CHVEF. The area shown as a proposed offset is indicative at this stage and would be finalised during preparation of the offset management plan for Mitchelhill BA.

**Table 5.2 Credit calculation summary for CHVEF at Mitchelhill BA**

Input parameter/value output	Values
<b>Impact calculator</b>	
Quantum of impact (ha)	22.9
Total quantum of impact (ha)	18.3
Quality (scale 0-10)	8
<b>Offset calculator</b>	
Time over which loss is averted (years)	20
Time until ecological benefit (years)	10
Start area (ha)	132
Start quality (0-10)	8. The site contains a large patch of CHVEF, which varies from Class A to B high quality condition.
Future quality without offset (scale of 0-10)	6. Cattle grazing occurs at the site. The Approved Conservation Advice for CHVEF (TSSC 2015) identifies grazing as an activity that can extensively modify the structure and composition of the community. As cattle grazing would continue under the current management regime at the site, the condition of CHVEF would likely decline.
Future quality with offset (scale of 1-10)	9. The implementation of offset management actions (Table 6.2) would improve the condition of CHVEF at the site.
Risk of % loss without offset	0%. There are no current development applications on the site.

**Table 5.2 Credit calculation summary for CHVEF at Mitchelhill BA**

Input parameter/value output	Values
Risk of % loss with offset	0%. In the very unlikely event that the offset was to be lost to future development, it must be offset at an extremely high ratio.
Confidence in result (%)	<b>Very likely</b> (90%). CHVEF is existing at the site and is in good condition. This condition will also be improved over time through the implementation of management actions.
Net present value (adjusted ha)	18.4
<b>% of impact offset</b>	100.6%
<b>Confidence levels for future condition</b>	
Degree of scientific agreement (high/medium/low)	<p><b>High agreement.</b></p> <p>Appendix E of the Approved Conservation Advice for CHVEF states that vegetation clearing and landscape fragmentation, invasive flora species and detrimental grazing, mowing and slashing regimes are key threats to the community.</p> <p>The protection of CHVEF at the site will prevent future vegetation clearing and fragmentation. Management intervention would likely consist of the strategic grazing to improve the condition and extent of native groundcovers, and targeted removal of the scattered weeds that occur. As the control of key threats identified in the Approved Conservation Advice for CHVEF will be addressed, the degree of scientific agreement is high.</p>
Degree of evidence (robust/medium/limited)	<p><b>Robust evidence.</b></p> <p>The protection and management of CHVEF at Mitchelhill BA under a legally binding agreement addresses three of the highest recovery priorities identified in Section 4.3.1 of the Approved Conservation Advice for CHVEF. These comprise:</p> <ol style="list-style-type: none"> <li>1. avoidance of further clearance and fragmentation of the ecological community;</li> <li>2. implement effective control and management techniques for invasive species;</li> <li>3. strategically manage grazing; and</li> <li>4. regeneration, revegetation and rehabilitation of the ecological community with an appropriate mix of species.</li> </ol> <p>Accordingly, there is a robust degree of evidence that the proposed protection and management of CHVEF at Mitchelhill BA would achieve beneficial outcomes for the community.</p>
<b>Confidence level (very high/high/medium/low/very low)</b>	<b>Very high</b>

### Regent Honeyeater

The variables used to perform Regent Honeyeater offset calculations for Mitchelhill BA and Condon View BA is provided in Table 5.3. Combined, the sites will provide a 100.5% direct offset for the Regent Honeyeater. The area shown as a proposed offset is indicative at this stage and would be finalised during preparation of the offset management plan for Mitchelhill BA and Condon View BA.

**Table 5.3 Credit calculation summary for Regent Honeyeater habitat at Mitchelhill BA and Condon View BA**

Input parameter/value output	Mitchelhill BA	Condon View BAa	Total
<b>Impact calculator</b>			
Quantum of impact (ha)	68.4	68.4	-
Total quantum of impact (ha)	34.2	34.2	-
Quality (scale 0-10)	5	5	-
<b>Offset calculator</b>			
Time over which loss is averted	20	20	
Time until ecological benefit	10. The aim is to improve the condition of Regent Honeyeater habitat through the implementation of offset management actions.	0. The aim is to maintain the condition of Regent Honeyeater habitat through the protection of existing Regent Honeyeater habitat and improve habitat condition through management.	-
Start area (ha)	132	168	300
Start quality (0-10)	8. A large area of suitable foraging and breeding habitat for the Regent Honeyeater is present at the site.	9. A large area of suitable foraging and breeding habitat for the Regent Honeyeater is present at the site.	-
Future quality without offset (scale of 0-10)	6. Grazing of livestock is occurring within Regent Honeyeater habitats at Mitchelhill BA. The National Recovery Plan for the Regent Honeyeater (DoE 2016) identifies livestock grazing as an activity that leads to soil compaction, simplification of structural diversity and restriction of shrub and sapling regrowth, leading to the reduction of suitable habitat quality. Livestock grazing would continue at the site without offsetting, which would cause a decline in habitat quality for the Regent Honeyeater.	8. No site management is currently being conducted. Parts of the site have been cleared, and the site is also adjacent to cleared areas. These disturbed areas would likely be subject to edge effects including weed invasion and the presence of aggressive native species including the Noisy Miner in the future, which could lead to a decline in the current condition of Regent Honeyeater habitat at the site.  The National Recovery Plan for the Regent Honeyeater (DoE 2016) identifies habitat degradation and competition from the Noisy Miner as key threats to the species. Without offset, no management measures would be implemented to address these future threats and maintain the current habitat quality.	-
Future quality with offset (scale of 1-10)	9. The implementation of offset management measures (Table 6.2) would improve the condition and increase the area of Regent Honeyeater habitat at the site.	9. The existing condition of Regent Honeyeater habitat at the site would be maintained through the implementation of management measures (Table 6.2).	-
Risk of % loss without offset	0%. There are no current development applications on	0%. There are no current development applications on	-

**Table 5.3 Credit calculation summary for Regent Honeyeater habitat at Mitchelhill BA and Condon View BA**

Input parameter/value/output	Mitchelhill BA	Condon View BAa	Total
	the site.	the site.	
Risk of % loss with offset	0%. In the very unlikely event that the offset was to be lost to future development, it must be offset at an extremely high ratio.	0%. In the very unlikely event that the offset was to be lost to future development, it must be offset at an extremely high ratio.	-
Confidence in result (%)	<b>Very likely</b> (90%). Regent Honeyeater habitat is existing at the site given the presence of CHVEF and Ironbarks, and this habitat will be improved over time.	<b>Very likely</b> (90%). Regent Honeyeater habitat is existing at the site given the presence of key nectar-producing trees, nesting trees and previous site records. This habitat will be improved over time.	-
Net present value (adjusted ha)	18.5	15.9	-
<b>% of impact offset</b>	53.9%	46.6%	100.5%
<b>Confidence levels for future condition</b>			
Degree of scientific agreement (high/medium/low)	<b>High agreement.</b> Habitat loss and fragmentation is recognised as a key threat to the species survival in the National Recovery Plan for the Regent Honeyeater. The protection of Regent Honeyeater habitat at Mitchelhill BA under a legally binding agreement will prevent future habitat loss and fragmentation for the species. The offset addresses a key threat to the species identified in its recovery plan, and therefore the degree of scientific agreement is high.	<b>High agreement.</b> Habitat loss and fragmentation is recognised as a key threat to the species survival in the National Recovery Plan for the Regent Honeyeater. The protection of Regent Honeyeater habitat at Condon View BA under a legally binding agreement will prevent future habitat loss and fragmentation for the species. The offset addresses a key threat to the species identified in its recovery plan, and therefore the degree of scientific agreement is high.	
Degree of evidence (robust/medium/limited)	<b>Robust evidence.</b> The site contains habitat critical to the survival of the species as it contains potential breeding and foraging habitat in an area where the species is likely to occur. Action 1c in the National Recovery Plan for the Regent Honeyeater requires the protection of such areas. The offset addresses a key recovery action for the species identified in its recovery plan, and therefore the degree of evidence is robust.	<b>Robust evidence.</b> The site contains habitat critical to the survival of the species as it contains potential breeding and foraging habitat in an area where the species has been recorded. Action 1c in the National Recovery Plan for the Regent Honeyeater requires the protection of such areas. The offset addresses a key recovery action for the species identified in its recovery plan, and therefore the degree of evidence is robust.	
<b>Confidence level (very high/high/medium/low/very low)</b>	<b>Very high</b>	<b>Very high</b>	

## Green and Golden Bell Frog

The variables used to perform Green and Golden Bell Frog offset calculations in the Offsets Assessment Guide for Crescent Head (north) and Crescent Head (south) is provided in Table 5.4. Combined, the sites will provide a 99.25% direct offset for the Green and Golden Bell Frog.

**Table 5.4 Credit calculation summary for Green and Golden Bell Frog habitat at Crescent Head (north) and Crescent Head (south)**

Input parameter/value output	Crescent Head (north)	Crescent Head (south)	Total
<b>Impact calculator</b>			
Quantum of impact (ha)	105.3	105.3	-
Total quantum of impact (ha)	63.21	63.21	-
Quality (scale 0-10)	6	6	-
<b>Offset calculator</b>			
Time over which loss is averted (years)	20	20	-
Time until ecological benefit (years)	10	10	-
Start area (ha)	52.79	136.71	189.5
Start quality (0-10)	5. The site contains suitable habitat, however potential breeding habitats are heavily infested with Mosquito Fish.	6. The site contains suitable habitat, however some areas of potential breeding habitat are infested with Mosquito Fish.	-
Future quality without offset (scale of 0-10)	4. The likelihood of Green and Golden Bell Frog breeding events is low under the existing management regime.	5. The likelihood of Green and Golden Bell Frog breeding events is low to moderate under the existing management regime.	-
Future quality with offset (scale of 1-10)	7. The likelihood of Green and Golden Bell Frog breeding events will increase with Mosquito Fish management (Table 6.2).	8. The likelihood of Green and Golden Bell Frog breeding events will increase with Mosquito Fish management (Table 6.2).	-
Risk of % loss without offset	5%. The site is mostly forested and a permit to build would unlikely result in major losses of habitat.	20%. The site was previously subject to agricultural practices which if to occur again, has potential to cause major habitat losses for the Green and Golden Bell Frog.	-
Risk of % loss with offset	0%. In the very unlikely event that the offset was to be lost to future development, it must be offset at an extremely high ratio.	0%. In the very unlikely event that the offset was to be lost to future development, it must be offset at an extremely high ratio	-
Confidence in result (%)	<b>Very likely (90%).</b> A high confidence level has been determined by combining the degree of scientific agreement and evidence, shown below.	<b>Very likely (90%).</b> A high confidence level has been determined by combining the degree of scientific agreement and evidence, shown below.	-



**Table 5.4 Credit calculation summary for Green and Golden Bell Frog habitat at Crescent Head (north) and Crescent Head (south)**

Input parameter/value output	Crescent Head (north)	Crescent Head (south)	Total
Net present value (adjusted ha)	16.38	45.86	-
<b>% of impact offset</b>	23.53%	75.72%	99.25%
<b>Confidence levels for future condition</b>			
Degree of scientific agreement (high/medium/low)	<p><b>Medium agreement.</b></p> <p>The scientific community is in a high level of agreement that the presence of the Mosquito Fish in Green and Golden Bell Frog habitats in NSW has been an important factor in their decline, along with habitat destruction and modification (Mahony 1993; Daly 1995; Morgan 1995; Goldingay 1996; Mahony 1996; Morgan and Buttemer 1996; Osborne et al 1996; Pyke and White 1996, 2010; Gillespie 1997; Tyler 1997; Goldingay and Lewis 1999).</p> <p>The <i>Approved NSW Threat Abatement Plan for Predation by <i>Gambusia holbrooki</i></i> (NPWS 2003) states that the most effective control method is physical control (draining and drying of dams and waterways). The threat abatement plan states that this technique is feasible if the water level can be easily manipulated and the reintroduction from upstream or downstream can be controlled.</p> <p>Where Mosquito Fish cannot be eradicated, supplementary Green and Golden Bell Frog habitat can be created adjacent to the area that prevents Mosquito Fish invasion. The <i>Best practice guidelines for Green and Golden Bell Frog habitat</i> (DECC 2008) state that raised ponds can be created that would prevent fish and other frogs from entering. It is feasible to create alternative Green and Golden Bell Frog breeding ponds at the site that are not infested by Mosquito Fish.</p>	<p><b>Medium agreement.</b></p> <p>The scientific community is in a high level of agreement that the presence of the Mosquito Fish in Green and Golden Bell Frog habitats in NSW has been an important factor in their decline, along with habitat destruction and modification (Mahony 1993; Daly 1995; Morgan 1995; Goldingay 1996; Mahony 1996; Morgan and Buttemer 1996; Osborne et al 1996; Pyke and White 1996, 2010; Gillespie 1997; Tyler 1997; Goldingay and Lewis 1999).</p> <p>The <i>Approved NSW Threat Abatement Plan for Predation by <i>Gambusia holbrooki</i></i> (NPWS) states that the most effective control method is physical control (draining and drying of dams and waterways). This technique is feasible if the water level can be easily manipulated and the reintroduction from upstream or downstream can be controlled. The water level in ephemeral dams within the site could be manipulated such that they are dried out to eradicate Mosquito Fish.</p>	-

**Table 5.4 Credit calculation summary for Green and Golden Bell Frog habitat at Crescent Head (north) and Crescent Head (south)**

Input parameter/value output	Crescent Head (north)	Crescent Head (south)	Total
Degree of evidence (robust/medium/limited)	<p><b>Robust evidence.</b></p> <p>Green and Golden Bell Frog are likely to forage at the site given the suitable habitat present, the numerous records surrounding the site and the high degree of connectivity of the vegetation and habitat at the site to the surrounding areas where the Green and Golden Bell Frog has been recorded (Figure 4.3). Green and Golden Bell Frogs are unlikely to breed due to the abundance of Mosquito Fish that prey on Green and Golden Bell Frog tadpoles.</p> <p>If Mosquito Fish can be eradicated, it is likely that Green and Golden Bell Frogs will breed at the site. Green and Golden Bell Frogs have successfully recolonised ponds where Mosquito Fish have been eliminated, eg Narawang Wetlands at Homebush (O'Meara and Darcovich 2008). Recolonisation has been demonstrated for a sympatric species, the Southern Bell Frog (<i>Litoria raniformis</i>) in Tasmania following the eradication of Mosquito Fish from breeding ponds.</p>	<p><b>Robust evidence.</b></p> <p>Green and Golden Bell Frogs are likely to forage and breed at the site given the suitable habitat present, the records surrounding the site and the high degree of connectivity of the vegetation and habitat at the site to the surrounding areas where the Green and Golden Bell Frog has been recorded, and Limeburners Creek National Park which contains a large area of suitable Green and Golden Bell Frog habitat (Figure 4.4).</p> <p>Although Mosquito Fish that prey on Green and Golden Bell Frog tadpoles are present at the site, Green and Golden Bell Frog breeding would still be possible due to the presence of refuge areas in ephemeral dams in which Mosquito Fish are likely to be periodically eliminated due to wetting and drying cycles. Control of Mosquito Fish would allow for successful Green and Golden Bell Frog breeding events.</p> <p>If Mosquito Fish can be eradicated, it is likely that Green and Golden Bell Frogs will breed at the site. Green and Golden Bell Frogshave successfully recolonised ponds where Mosquito Fish have been eliminated by draining and re-filling, eg Narawang Wetlands at Homebush (O'Meara and Darcovich 2008). Recolonisation has been demonstrated for a sympatric species, the Southern Bell Frog (<i>Litoria raniformis</i>) in Tasmania following the eradication of Mosquito</p>	-

**Table 5.4 Credit calculation summary for Green and Golden Bell Frog habitat at Crescent Head (north) and Crescent Head (south)**

Input parameter/value output	Crescent Head (north)	Crescent Head (south)	Total
		Fish from breeding ponds.	
<b>Confidence level (very high/high/medium/low/very low)</b>	<b>High</b>	<b>High</b>	-

Crescent Head (north) and Crescent Head (south) provide a 99.25% direct offset for the action. Accordingly, other compensatory measures will be applied to offset the residual 0.75%. The value and scope of the indirect offset is being finalised with DoEE.

The scope of other compensatory measures is likely to include a research program into the effective control of Mosquito Fish, although contributions to existing Green and Golden Bell Frog conservation programs may be a suitable alternative.

The scope of this proposal would be finalised following approval of the Crescent Head Offset Management Plan.

### 5.2.2 Compliance with the policy and guide

The Commonwealth offset principles prescribed in the EPBC Act Environmental Offsets Policy (SEWPaC 2012a) have been considered in the formulation of this BOS, as demonstrated in Table 5.5.

**Table 5.5 Compliance with offset principles**

No.	Principle	Compliance
1	Deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed action	<p>Mitchelhill BA will protect and restore CHVEF and Regent Honeyeater habitat in a fragmented agricultural landscape. The offset will increase the connections to vegetation to the south including at Lake Liddell, Plashett Reservoir, and Wandewoi BA. Mitchelhill BA would also protect these areas in perpetuity and reduce the current risks to CHVEF and the Regent Honeyeater from key threatening processes.</p> <p>The protection of the eastern part of Condon View BA will avert the loss of an important stepping stone in a Regent Honeyeater dispersal corridor from breeding habitat west of Wollemi National Park to non-breeding habitat in Yengo National Park to the east. Weed control and the addition of key feed trees would increase the area of available habitat at the site.</p> <p>The protection of Green and Golden Bell Frog habitats at Crescent Head (north) and Crescent Head (south) will provide important benefits to the species through extension of the protected area network. The properties are located directly adjacent to Hat Head and Limeburners National Parks in which the Green and Golden Bell Frog occur.</p> <p>Accordingly, the proposed offset site will deliver an overall conservation outcome that improves the viability of protected matters impacted by the proposed action.</p>

**Table 5.5 Compliance with offset principles**

No.	Principle	Compliance
2	Be built around direct offsets but may include other compensatory measures	<p>The offset package is based on direct, land-based offsets that meet or exceed the 100% offset requirement under the EPBC Act Environmental Offset Policy for CHVEF and Regent Honeyeater. A 99.25% direct offset will be provided for the Green and Golden Bell Frog, while the remaining 0.75% will be provided as other compensatory measures.</p> <p>Accordingly, the BOS is built around direct offsets, and includes minimal other compensatory measures.</p>
3	Be in proportion to the level of statutory protection that applies to the protected matter	The EPBC Act Environmental Offset Policy and offset calculator have been used to determine if adequate offsets have been provided for MNES. The calculator accounts for the various levels of statutory protection for each MNES and therefore the d BOS.
4	Be of a size and scale proportionate to the residual impacts on the protected matter	The EPBC Act Environmental Offset Policy and offset calculator determine if the offset proposed is proportionate to the residual impacts to each MNES. The offset package exceeds the requirements of the policy for all MNES and is considered to be suitable to compensate for the residual significant impacts of the action.
5	Effectively account for and manage the risks of the offset not succeeding	The EPBC Act Environmental Offset Policy accounts for uncertainty with the offsets within the calculations. This includes assessing the risk of the offset not succeeding. The proponent is committed to the preparation and implementation of an offset management plan, to ensure that the policy is met for all MNES impacted or potentially impacted. The biodiversity values discussed in this offset package will be managed for conservation in the long-term to compensate for the impacts of the proposed action. The offset management plan will detail the monitoring and an adaptive management framework to ensure that additional measures are implemented, should this be required.
6	Be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs (this does not preclude the recognition of state or territory offsets that may be suitable as offsets under the EPBC Act for the same action)	<p>Mitchelhill BA, Crescent Head BA (north) and Crescent Head BA (south) are owned by Yancoal. While Condon View BA is owned by Yancoal, the eastern portion of the site is not currently subject to any conservation agreement, or managed for conservation.</p> <p>As the proposed offset sites are not currently managed for conservation, they are additional to any other requirements, and when secured as an offset, will be used to offset impacts on those MNES which are also listed in NSW under the <i>Biodiversity Conservation Act 2016</i> (BC Act).</p> <p>In addition, the proposed biodiversity offsets are likely to contain habitat for a number of threatened species and communities listed under the NSW <i>Biodiversity Conservation Act 2016</i>. Ecosystem and species credits for NSW listed species will be calculated and retired at a later stage. Species credits will not be generated for the protected matters impacted by the proposed action.</p>
7	Be efficient, effective, timely, transparent, scientifically robust and reasonable	The proposed offsets will be delivered following approval of the BOS. The adequacy of the offset package proposed has been assessed against Commonwealth requirements and is considered to adequately compensate for the impacts of the proposed action on MNES.
8	Have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced	The proposed offsets will be protected into the future through secure land tenure for ongoing conservation management through an appropriate legally binding mechanism.



## 6 Long-term management arrangements for the properties

### 6.1 Overview

Long term management of the direct offset sites will be directed by an Offset Management Plan. The Offset Management Plan is required to be prepared by 10 October 2017, in accordance with Condition 11 of the final approval decision notice. Separate plans will be prepared for the offset sites contained within the individual Biodiversity Areas. The purpose of the plans will be to describe the direct offsets and detail the actions that will be implemented to improve and protect CHVEF and the habitat for Regent Honeyeater, Swift Parrot and Green and Golden Bell Frog.

### 6.2 Offset security

The direct offsets have been secured by purchasing the properties and will be subject to a legally binding mechanism. The legally binding mechanisms currently administered by the NSW government include:

- Voluntary Conservation Agreement in accordance with Section 69B of *the NSW National Parks and Wildlife Act 1974*;
- Biodiversity Stewardship Agreement in accordance with Part 5 Division 2 of the *NSW Biodiversity Conservation Act 2016*;
- A public positive covenant and/or restriction on the use of the land being registered against the land titles; and
- Transfer to the State of NSW (eg State Forest, National Park or Crown Reserve).

The above mechanisms will be reviewed to determine their suitability. Other mechanisms acceptable to the Commonwealth Minister for Environment and Energy may also be explored for long-term protection of the direct offsets. Yancoal are in discussions with the administering agency, the Office of Environment and Heritage, to determine a fit for purpose mechanism to protect the direct offsets. Alternatively, there are provisions within the EPBC Act that could legally protect the direct offsets, these options are to be discussed with DoEE.

The direct offset sites and the legally binding agreements must be agreed to by the Minister in accordance with Condition 8 of the final approval decision notice. In accordance with Condition 9 the action cannot continue for more than 12 months from the date of approval of the Offset Strategy at Condition 10, unless the direct offset sites required by Conditions 5, 6 and 7 have been secured in perpetuity under a legally binding agreement by the person taking the action.

It should be noted that other matters/ species not offset by this strategy may also be offset using the properties identified. For example other species credits may be calculated and retired using the offset properties for other projects.

### 6.3 Schedule

The indicative BOS implementation schedule is provided in Table 6.1.



## 6.4 Proposed management measures

Management measures will be implemented to establish and manage the proposed offsets, and to monitor the efficacy of management measures in achieving future site condition values. An outline of the short, medium and long-term management measures proposed to achieve future condition commitments are provided in Table 6.2.

It is intended that management actions and performance management measures would be detailed in the respective offset management plans for the proposed offset properties that provide measurable targets against which the efficacy of management measures can be evaluated.

**Table 6.2 Proposed management measures**

Offset area	Listed species or community	Final condition score	Final condition objective	Threats to recovery to be addressed through implementation of management actions	Management action	Timeframe	Performance evaluation
Mitchelhill BA	CHVEF	9	To provide Class A high quality CHVEF	Detrimental grazing, mowing and slashing regimes (TSSC 2015)	Strategic grazing management to prevent soil erosion and compaction, and improve understorey condition and sapling recruitment	Short-term	Monitor vegetation condition
				Invasive flora species (TSSC 2015)	Weed management to reduce competition with CHVEF species and stimulate sapling recruitment	Short to medium term	Monitor vegetation condition
				Vegetation clearing and landscape fragmentation (TSSC 2015)	Revegetate corridors through derived native grasslands with representative CHVEF species to increase resilience of CHVEF	Medium term	Monitor revegetation success
	Regent Honeyeater	9	To protect and improve suitable foraging and breeding habitat for the Regent Honeyeater	Habitat degradation (DoE 2016)	Strategic grazing management to prevent soil erosion and compaction, and improve feed tree recruitment	Short-term	Monitor vegetation condition
				Habitat degradation (DoE 2016)	Weed management to reduce competition and improve feed tree recruitment	Short to medium term	Monitor vegetation condition
				Habitat loss and fragmentation (DoE 2016)	Revegetate corridors through derived native grasslands with Regent Honeyeater nesting and foraging trees to increase the area of habitat	Medium term	Monitor revegetation success
			Competition (DoE 2016)	Investigate the need for Noisy Miner management	Medium to long term	The need for management is identified	
Condon View BA	Regent Honeyeater	9	To protect and maintain suitable foraging and breeding habitat for the Regent Honeyeater	Habitat degradation (DoE 2016)	Weed management to reduce competition and improve feed tree recruitment	Short to medium term	Monitor vegetation condition
				Habitat loss and fragmentation (DoE 2016)	Revegetate degraded areas with Regent Honeyeater nesting and foraging trees to increase the area of habitat	Medium term	Monitor revegetation success
				Competition (DoE 2016)	Investigate the need for Noisy Miner management	Medium to long term	The need for management is identified



**Table 6.2 Proposed management measures**

Offset area	Listed species or community	Final condition score	Final condition objective	Threats to recovery to be addressed through implementation of management actions	Management action	Timeframe	Performance evaluation	
Crescent Head (north)	Green and Golden Bell Frog	7	To provide suitable foraging and breeding habitat for the Green and Golden Bell Frog	Predation by introduced fish (DECC 2007)	Manage Mosquito Fish to improve breeding habitat	Short to medium term	Monitor Mosquito Fish in breeding habitat	
					Creation of alternative breeding habitats	Short to medium term	Monitor Mosquito Fish in breeding habitat	
					Habitat loss, habitat modification and disturbance (DECC 2007)	Maintain existing open areas (ie foraging habitats)	Short to long term	Monitor vegetation structure in open areas
					Targeted breeding, foraging, refuge and connectivity habitat enhancement guided by <i>Best Practice Guidelines for Green and Golden Bell Frog habitat</i>	Short to long term	Offline pond design with consideration to breeding habitat principles outlined in <i>Best Practice Guidelines for Green and Golden Bell Frog Habitat</i> .	
Crescent Head (south)	Green and Golden Bell Frog	8	To provide suitable foraging and breeding habitat for the Green and Golden Bell Frog	Predation by introduced fish (DECC 2007)	Manage Mosquito Fish to improve breeding habitat	Short to medium term	Monitor Mosquito Fish in breeding habitat	
					Creation of alternative breeding habitats	Short to medium term	Offline pond design with consideration to breeding habitat principles outlined in <i>Best Practice Guidelines for Green and Golden Bell Frog Habitat</i> .	

**Table 6.2 Proposed management measures**

Offset area	Listed species or community	Final condition score	Final condition objective	Threats to recovery to be addressed through implementation of management actions	Management action	Timeframe	Performance evaluation
				Habitat loss, habitat modification and disturbance (DECC 2007)	Maintain existing open areas (ie foraging habitats)	Short to long term	Monitor vegetation structure in open areas
					Targeted breeding, foraging, refuge and connectivity habitat enhancement guided by <i>Best Practice Guidelines for Green and Golden Bell Frog habitat</i>	Short to long term	Offline pond design with consideration to breeding habitat principles outlined in <i>Best Practice Guidelines for Green and Golden Bell Frog Habitat.</i>

## 6.5 Management action implementation

The implementation of management objectives and completion criteria for the proposed offsets are provided in Table 6.3.

**Table 6.3 Implementation schedule**

Objective1	Offset property	Start condition	Future condition	Completion criteria
1 To compensate for residual significant impacts to 22.7 ha of Class A condition CHVEF from the Riverview Pit extension area	Mitchelhill BA	8	9	The offset contains Class A high quality CHVEF
2 To compensate for residual significant impacts to 68.4 ha of breeding and foraging habitat for the Regent Honeyeater	Mitchelhill BA	8	9	The offset provides suitable foraging and breeding habitat for the Regent Honeyeater
	Condon View BA	9	9	
3 To compensate for residual significant impacts to 2.6 ha of breeding habitat and 102.7 ha of foraging habitat for the Green and Golden Bell Frog	Crescent Head (north)	5	7	The offset provides suitable foraging and breeding habitat for the Green and Golden Bell Frog
	Crescent Head (south)	6	8	

*Note 1. Offset objectives are derived from the Condition 5 to 7 of EPBC 2016/7640.*

## 6.6 Performance evaluation

Table 6.2 provides an outline of the proposed performance evaluation measures. It is intended that these measures would be described in detail in the offset management plans to be prepared for each proposed offset property. Monitoring of vegetation condition would be completed in accordance with the Biodiversity Assessment Method (OEH 2017) and other suitable monitoring methods. Any threatened species monitoring conducted would be completed in accordance with relevant state and Commonwealth survey guidelines.

## 7 Risk assessment and corrective actions

### 7.1 Risk framework

The risk of failure to achieve the offset objectives has been determined using the risk framework provided in the offset strategy checklist, and shown in Table 7.1.

**Table 7.1 Risk framework**

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

The risk level is determined by combining the likelihood and the consequence of the objective not being achieved. Table 7.2 provides the criteria to determine the level of likelihood and Table 7.3 provides the criteria for determining the level of consequence.

**Table 7.2 Criteria to determine likelihood**

Qualitative measure of likelihood (how likely is it that this event/circumstances will occur after management actions have been put in place/are being implemented)	
Highly likely	Is expected to occur in most circumstances
Likely	Will probably occur during the life of the project
Possible	Might occur during the life of the project
Unlikely	Could occur but considered unlikely or doubtful
Rare	May occur in exceptional circumstances

**Table 7.3 Criteria to determine consequence**

Qualitative measure of consequences (what will be the consequence/result if the issue does occur)	
Minor	Minor incident of environmental damage that can be reversed
Moderate	Isolated but substantial instances of environmental damage that could be reversed with intensive efforts
High	Substantial instances of environmental damage that could be reversed with intensive efforts
Major	Major loss of environmental amenity and real danger of continuing
Critical	Severe widespread loss of environmental amenity and irrecoverable environmental damage

A risk assessment is provided in Section 7.2 using the criteria provided in Table 7.1 to 7.3.

### 7.2 Risk assessment and corrective actions

Table 7.4 provides an assessment of the risk of failure to achieve the offset objectives, using the criteria in Table 7.1 to 7.3. The assessment also identifies the circumstances that will trigger the implementation of corrective actions, and describes these corrective actions.



**Table 7.4 Risk assessment and management**

Objective	Event or circumstance <sup>1</sup>	Likelihood	Consequence	Risk level	Trigger	Corrective action/s
1 To compensate for residual significant impacts to 22.7 ha of Class A condition CHVEF from the Riverview Pit extension area	Delays in negotiation with OEH and DoEE regarding a suitable offset mechanism	Possible	Medium	Medium	Delay in securing offset site under legally binding agreement	Additional consultation with OEH and DoEE
	Proposed management measures are unsuccessful	Possible	Minor	Low	Acceptable targets are not achieved	To be detailed in the Mitchelhill BA OMP
2 To compensate for residual significant impacts to 68.4 ha of breeding and foraging habitat for the Regent Honeyeater	Delays in negotiation with OEH and DoEE regarding a suitable offset mechanism	Possible	Medium	Medium	Delay in securing offset site under legally binding agreement	Additional consultation with OEH and DoEE
	Proposed management measures are unsuccessful	Possible	Minor	Low	Acceptable targets are not achieved	To be detailed in the Mitchelhill BA and Condon View BA OMPs
3 To compensate for residual significant impacts to 2.6 ha of breeding habitat and 102.7 ha of foraging habitat for the Green and Golden Bell Frog	Delays in negotiation with OEH and DoEE regarding a suitable offset mechanism	Possible	Medium	Medium	Delay in securing offset site under legally binding agreement	Additional consultation with OEH and DoEE
	Mosquito Fish Management unsuccessful	Likely	Moderate	Medium	Mosquito Fish management is not achieved	To be detailed in the Crescent Head OMP

Note 1. Assumes effective implementation of management measures, as described in the plan.

## 8 Reporting

Reporting requirements relating to the BOS are provided in Table 8.1.

<b>No.</b>	<b>Type of report</b>	<b>Approval condition</b>	<b>Timing</b>	<b>Reporting authority</b>
1	Compliance with approval	22	Within three months of every 12 month anniversary of the commencement of the action	DoEE
2	Independent compliance audit	23	Upon direction of the Minister	DoEE
3	Biodiversity offset management plan	11	Within 12 months from the date of approval	DoEE

## References

Cumberland Ecology 2015, *Assessment of the suitability of Condon View as an offset for the Regent Honeyeater and Swift Parrot EPBC Offset Assessment*, report to Rio Tinto Coal Australia Pty Ltd.

Department of Environment and Climate Change 2007, *Management Plan: The Green and Golden Bell Frog Key Populations within the Crookhaven River Floodplain*, Department of Environment and Climate Change NSW, Sydney.

Department of Environment and Conservation 2005, *Green and Golden Bell Frog Recovery Plan (Draft)*, Department of Environment and Conservation NSW, Hurstville.

Department of the Environment (DoE) 2015, *Central Hunter Valley Eucalypt Forest and Woodland ecological community*, <http://www.environment.gov.au/biodiversity/threatened/communities/maps/pubs/130-map.pdf>, viewed April 2017.

DoE 2016, *National Recovery Plan for the Regent Honeyeater (Anthochaera phrygia)*, Department of the Environment, Canberra.

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## Glossary

The table below provides a glossary of terms used in the BOS.

### Glossary of terms

<b>Term</b>	<b>Definition</b>
Department	the Australian Government Department or any other agency that is responsible for administering the EPBC Act.
Direct offset site	An offset site that is required by Conditions 4, 5, 6, and 7 that will protect and improve habitat for the relevant protected matter.
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth).
EPBC Act Offset Policy	The Australian Government Department of Sustainability, Environment, Water Population and Communities (2012) <i>Environment Protection and Biodiversity Conservation Act 1999</i> Environmental Offsets Policy. Commonwealth of Australia, Canberra.
Legally binding agreement/s	A legal mechanism that has been agreed by the Minister to secure and protect an offset site in perpetuity under NSW State legislation.
Minister	The Commonwealth minister responsible for administering the EPBC Act.
Person taking the action	The person to whom the approval is granted as identified on the approval notice for EPBC 2016/7640.
Protected matter/s	Any matter protected under the provisions of the EPBC Act for which the approval applies. These are CHVEF, Regent Honeyeater and Green and Golden Bell Frog.



## Appendix A - Offset calculations

# Offsets Assessment Guide

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

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	RE & SP
EPBC Act status	Critically Endangered
Annual probability of extinction Based on IUCN category definitions	6.8%

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

Impact calculator						
Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
<i>Ecological communities</i>						
Area of community	No		Area			
			Quality			
			Total quantum of impact	0.00		
<i>Threatened species habitat</i>						
Area of habitat	Yes	Regent Honeyeater	Area	68.4	Hectares	
			Quality	5	Scale 0-10	
			Total quantum of impact	34.20	Adjusted hectares	
<i>Threatened species</i>						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g. Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator																				
Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source
<i>Ecological Communities</i>																				
Area of community	No			Secured offsets	Risk-related time horizon (max. 20 years)		Start area (hectares)	Risk of loss (% without offset)	0.0	Risk of loss (% with offset)	0.0	Raw gain	Confidence in result (%)	Adjusted gain	Net present value	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source	
								Future area without offset (adjusted hectares)		Future area with offset (adjusted hectares)										
								Time until ecological benefit		Start quality (scale of 0-10)										Future quality without offset (scale of 0-10)
<i>Threatened species habitat</i>																				
Area of habitat	Yes	34.20	Adjusted hectares	Secured offsets	Time over which loss is averted (max. 20 years)	20	Start area (hectares)	134	Risk of loss (% without offset)	20%	Risk of loss (% with offset)	0%	Raw gain	Confidence in result (%)	Adjusted gain	Net present value	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source
						Future area without offset (adjusted hectares)		107.2	Future area with offset (adjusted hectares)	134.0										
						Time until ecological benefit		10	Start quality (scale of 0-10)	8	Future quality without offset (scale of 0-10)	7								
<i>Threatened species</i>																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g. Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary							
Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost (\$)		
					Direct offset (\$)	Other compensatory measures (\$)	Total (\$)
Birth rate	0				\$0.00		\$0.00
Mortality rate	0				\$0.00		\$0.00
Number of individuals	0				\$0.00		\$0.00
Number of features	0				\$0.00		\$0.00
Condition of habitat	0				\$0.00		\$0.00
Area of habitat	34.2	16.14	47.20%	No	\$0.00	#DIV/0!	#DIV/0!
Area of community	0				\$0.00		\$0.00
					\$0.00	#DIV/0!	#DIV/0!



# Offsets Assessment Guide

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

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	RE & SP
EPBC Act status	Critically Endangered
Annual probability of extinction Based on IUCN category definitions	6.8%

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

Impact calculator						
Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
<i>Ecological communities</i>						
Area of community	No		Area			
			Quality			
			Total quantum of impact	0.00		
<i>Threatened species habitat</i>						
Area of habitat	Yes	Regent Honeyeater	Area	68.4	Hectares	
			Quality	5	Scale 0-10	
			Total quantum of impact	34.20	Adjusted hectares	
<i>Threatened species</i>						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g. Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator																				
Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source
<i>Ecological Communities</i>																				
Area of community	No			Secured offsets	Risk-related time horizon (max. 20 years)		Start area (hectares)	Risk of loss (% without offset)	0.0	Risk of loss (% with offset)	0.0	Raw gain	Confidence in result (%)	Adjusted gain	Net present value	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source	
								Future area without offset (adjusted hectares)		Future area with offset (adjusted hectares)										
								Time until ecological benefit		Start quality (scale of 0-10)										Future quality without offset (scale of 0-10)
<i>Threatened species habitat</i>																				
Area of habitat	Yes	34.20	Adjusted hectares	Secured offsets	Time over which loss is averted (max. 20 years)	20	Start area (hectares)	153	Risk of loss (% without offset)	20%	Risk of loss (% with offset)	0%	Raw gain	Confidence in result (%)	Adjusted gain	Net present value	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source
						Future area without offset (adjusted hectares)		122.4	Future area with offset (adjusted hectares)	153.0										
						Time until ecological benefit		10	Start quality (scale of 0-10)	5	Future quality without offset (scale of 0-10)	7								
<i>Threatened species</i>																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g. Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary							
Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost (\$)		
					Direct offset (\$)	Other compensatory measures (\$)	Total (\$)
Birth rate	0				\$0.00		\$0.00
Mortality rate	0				\$0.00		\$0.00
Number of individuals	0				\$0.00		\$0.00
Number of features	0				\$0.00		\$0.00
Condition of habitat	0				\$0.00		\$0.00
Area of habitat	34.2	18.43	53.89%	No	\$0.00	#DIV/0!	#DIV/0!
Area of community	0				\$0.00		\$0.00
					\$0.00	#DIV/0!	#DIV/0!



