Vegetation Clearance Plan

Hunter Valley Operations (HVO) State-approved mining project | (EPBC 2016/7640)

Prepared for HV Operations | 14 October 2016

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Final

Report J16157RP1 | Prepared for HV Operations | 14 October 2016

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1 Introduction

1.1 Background

The proposed action is referred to as Hunter Valley Operations (HVO) – State-approved mining project (EPBC 2016/7640). The action referred is 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 extension areas are shown on Figure 1.1 to 1.4 and is described in Section 1.2.

The referral of the proposed action was submitted for determination under the EPBC Act to the 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 proposed action is a controlled action under Section 75 of the EPBC Act and decided that the proposed action is to be assessed by preliminary documentation under Section 87 of the EPBC Act.

On 9 March 2016, the DoEE issued formal assessment requirements for a preliminary documentation report. The preliminary documentation report was submitted to DoEE on 21 April 2016. A request for additional information was received from DoE on 27 April 2016 and the preliminary documentation report was amended and submitted on 5 May 2016. Direction to publish was received on 10 May 2016.

DoEE provided preliminary comments as part of its determination process for the proposed action. The DoEE stated that the key issues for assessment comprised Central Hunter Valley Eucalypt Forest and Woodland ecological community (CHVEF), the Regent Honeyeater (*Anthochaera phrygia*), Swift Parrot (*Lathamus discolor*) and Green and Golden Bell Frog (*Litoria aurea*) and that offsets were required for these protected matters.

Rio Tinto Coal Australia (RTCA) received draft approval conditions for the proposed action from DoEE on 26 August 2016. These conditions focus on the management and provision of offsets for CHVEF, Regent Honeyeater, Swift Parrot and Green and Golden Bell Frog.

This Vegetation Clearance Plan (VCP) provides for the effective implementation of measures to manage CHVEF, Regent Honeyeater, Swift Parrot and Green and Golden Bell Frog during the vegetation clearance for the proposed action and has been prepared to meet conditions 1, 2, 21 and 22 of the proposed approval. These conditions are detailed in Section 1.3.

1.2 The proposed action

HVO is an existing open cut coal mine located approximately 24 kilometres (km) north-west of Singleton, NSW. The mining activities at HVO are geographically divided by the Hunter River into HVO North and HVO South, which are integrated at an operational level, and are collectively referred to as the HVO complex. This provides the ability to move material and associated equipment around HVO including run-of-mine (ROM) coal, product coal, coal rejects, overburden and water as required. While HVO is managed as one operation, HVO North and HVO South have separate NSW planning approvals with approval to mine up to 38 million tonnes per annum (Mtpa).

The mine, which first commenced operations over 65 years ago, in 1949, is State significant and has all required State approvals in place. In 2015, HVO produced approximately 13 million tonnes of saleable coal and provided direct employment for approximately 1,500 people.

The HVO complex has developed over time as a number of smaller mines with separate State approvals which were amalgamated. The majority of the State approvals were in place prior to the commencement of the EPBC Act on 16 July 2000, and all those involving coal extraction were in place prior to the commencement of the water trigger on 22 June 2013.

A review was undertaken as part of the referral process to identify any new or modified development consents granted under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) after the commencement of the EPBC Act where the footprint of mining disturbance has increased. The outcomes of the review identified the extension areas.

The proposed action comprises four extension areas for the following mining pits, as shown in Figure 1.1 to Figure 1.4, which are all State-approved areas by the NSW Government:

- West Pit extension area (HVO North);
- Carrington Pit extension area (HVO North);
- Riverview Pit extension area (HVO South); and
- Cheshunt Pit extension area (HVO South).

It is noted that proposed action excludes the southern rail spur and haul road and two mining extension areas approved by the State for the HVO South Coal Project as there are no current plans to develop these mining areas and infrastructure.

In May 2015 the Commonwealth Government listed CHVEF as a critically endangered ecological community (CEEC) under the EPBC Act. An area of approximately 61 hectares (ha) of the CHVEF has been identified within the footprint of the proposed action. Clearance of approximately 61 ha of CHVEF equates to approximately 0.2% of the total occurrence of the CHVEF as mapped by the listing and is likely to have a significant impact on the community.

The proposed action will also result in the clearance of potential habitat for the Green and Golden Bell Frog, a vulnerable species under the EPBC Act. An area of approximately 105.3 ha of potential Green and Golden Bell Frog habitat has been identified within the footprint of the proposed action. Clearance of approximately 105.3 ha of potential Green and Golden Bell Frog habitat has the potential for a significant impact on this species.

An area of approximately 68.4 ha and 68.1 ha of vegetation within the extension areas contains potential habitat for critically endangered species (Regent Honeyeater and Swift Parrot, respectively). The DoEE has deemed that the proposed action is likely to have a significant impact on these species.

A biodiversity offset package has been developed in accordance with the offset principles prescribed in the EPBC Act Environmental Offsets Policy (SEWPaC 2012). The DoEE has accepted the Wandewoi Biodiversity Area as a partial offset for CHVEF and a suitable offset for the Swift Parrot. RTCA is currently assessing additional offset sites to compensate for residual significant impacts on CHVEF, the Regent Honeyeater and Green and Golden Bell Frog, which will be secured under a legally binding agreement within 12 months of project approval.

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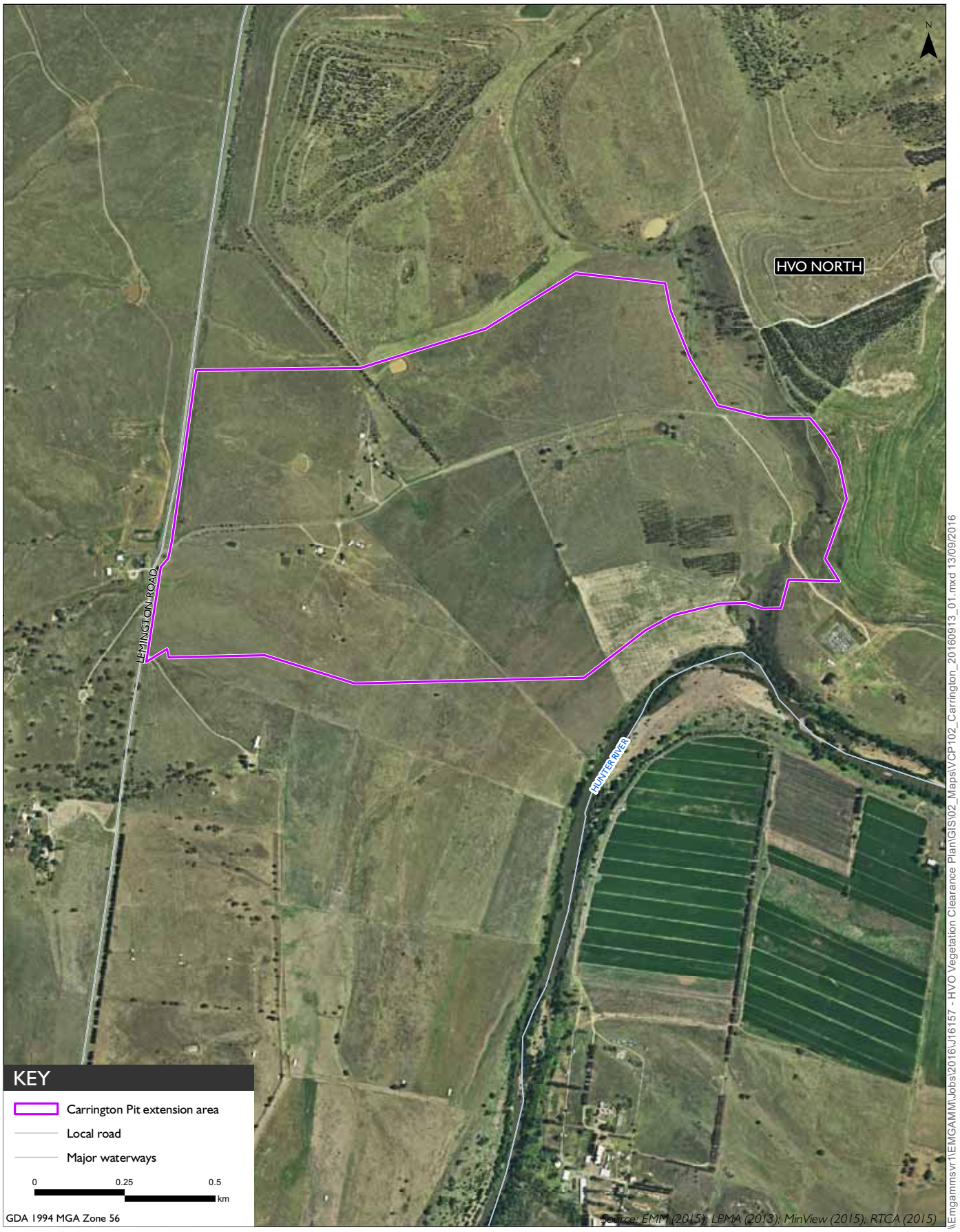
West Pit extension area

Hunter Valley Operations - State-approved mining
Vegetation Clearance Plan

Figure 1.1



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Carrington Pit extension area

Hunter Valley Operations - State-approved mining
Vegetation Clearance Plan

Figure 1.2

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Riverview Pit extension area

Hunter Valley Operations - State-approved mining
Vegetation Clearance Plan

Figure 1.3

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Cheshunt Pit extension area

Hunter Valley Operations - State-approved mining
Vegetation Clearance Plan

Figure 1.4

1.3 Draft conditions of approval

1.3.1 Draft conditions

RTCA received draft approval conditions for the proposed action from DoEE on 26 August 2016. The draft conditions relevant to preparation of this VCP comprise Condition 1, 2, 21 and 22. These draft conditions are provided in Table 1.1, which also describes the section of this VCP where they are addressed.

Table 1.1 Draft conditions as described in the proposed approval

Draft condition	Section addressed in VCP
1. The person taking the action must not clear more than 54.4 ha of the Central Hunter Valley Eucalypt Forest and Woodland (CHVEF) ecological community from the Riverview Pit and 6.6 ha of the CHVEF ecological community from within the West Pit and must limit all vegetation clearing to within the project disturbance boundaries defined at Schedule 1, Figures 1 - 4.	Section 2.1 and Section 3.1
2. The person taking the action must prepare and submit a Vegetation Clearance Plan (VCP) for the Minister's approval to mitigate impacts of the action on the CHVEF ecological community, the Regent Honeyeater (*Anthochaera phrygia*), Swift Parrot (*Lathamus discolor*) and the Green and Golden Bell Frog (*Litoria aurea*). The VCP must include:	This plan
a. Clear delineation of vegetation to be cleared, as per the disturbance boundary shown in Schedule 1 Figures 1-4, and vegetation that is to be retained.	Section 2.1
b. Pre-clearance survey methods, which must include but not be limited to the following requirements:	Chapter 3
i. A qualified ecologist must undertake a pre-clearance survey within 24 hours prior to the removal of potential foraging, nesting or breeding habitat for the Regent Honeyeater or foraging habitat for the Swift Parrot in areas identified in Schedule 2, Figures 1-5.	Chapter 3
ii. If during pre-clearance surveys, Regent Honeyeater or Swift Parrot individuals are identified within the clearance area, the VCP must specify the use of a two stage clearing protocol where non-habitat trees are cleared 24 hours prior to any habitat trees being cleared, to encourage fauna to move out of a habitat area.	Section 3.2 and 3.3
iii. In the event an active Regent Honeyeater nest is identified during pre-clearance surveys, vegetation clearing and overburden removal within 100 m of the active nest should be delayed up until the Regent Honeyeater nest is no longer actively being used.	Section 3.2
iv. A qualified ecologist must undertake pre-clearance surveys immediately prior to the removal of potential breeding habitat for the Green and Golden Bell Frog. Surveys are to be undertaken within all breeding habitat areas identified in Schedule 2 Figure 2 as well as a 200 m buffer around each potential breeding habitat area.	Section 3.3
v. Pre-clearance survey methods for the Green and Golden Bell Frog must meet the survey effort requirements for the Green and Golden Bell Frog stipulated in the Survey Guidelines for Australia's threatened frogs (Commonwealth of Australia 2010).	Section 3.3
vi. In the event Green and Golden Bell Frog individuals, metamorphs or tadpoles are located during pre-clearance surveys, they are to be handled and translocated in accordance with the Hygiene protocols for the control of diseases in frogs (Department of Environment and Climate Change 2008).	Section 3.3
c. Include measures to avoid, suppress and control the spread of plant pathogens (such as *Phytophthora cinnamomi*) and chytrid fungus that may degrade habitat for protected matters.	Chapter 4
The action must not commence until the VCP, required by Condition 2, has been approved by the Minister.	Chapter 6
21. The person taking the action must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement the VCP, Offset Strategy and Biodiversity Offset Management Plan required by this approval, and make them available upon request to the Department. Such records may be subject to audit by the Department or an independent auditor in accordance with section 458 of the EPBC Act, or used to	Chapter 5

Table 1.1 Draft conditions as described in the proposed approval

Draft condition	Section addressed in VCP
verify compliance with the conditions of approval. Summaries of audits will be posted on the Department's website. The results of audits may also be publicised through the general media.	
22. Within three months of every 12 month anniversary of the commencement of the action, the person taking the action must publish a report on their website addressing compliance with each of the conditions of this approval, including implementation of any management plans as specified in the conditions. Documentary evidence providing proof of the date of publication and non-compliance with any of the conditions of approval must be provided to the Department at the same time as the compliance report is published. Reports must remain on the website for the period this approval has effect. The approval holder may cease preparing and publishing compliance reports required by this condition with written agreement of the Minister to do so.	Chapter 5

1.3.2 Relevant definitions in the draft conditions

Definitions relevant to the draft conditions are shown in Table 1.2.

Table 1.2 Definitions relevant to draft conditions

Term of reference	Definition
A qualified ecologist	Means a person who has a minimum of 5 years experience in locating, capturing, handling, caring for and the safe release of native animals.
The Department	The Australian Government Department or any other agency that is responsible for administering the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).
Habitat trees	Are to be determined by a qualified fauna spotter catcher or ecologist prior to vegetation clearance works.
The Minister	Is the Commonwealth minister responsible for administering the *Environment Protection and Biodiversity Conservation Act 1999* and includes the delegate of the Minister.
Non-habitat trees	Are to be determined by a qualified fauna spotter catcher or ecologist prior to vegetation clearance works.
Person taking the action	Is the person to whom the approval is granted as identified on the approval notice for EPBC 2016/7640.
Protected matter/s	Means any matter protected under the provisions of the *Environment Protection and Biodiversity Conservation Act 1999* for which this approval applies. These are: Central Hunter Valley eucalypt forest and woodland ecological community, Regent Honeyeater, Swift Parrot and the Green and Golden Bell Frog.
Active Regent Honeyeater nest	Is present when adult Regent Honeyeater birds are observed flying to and from, or sitting on a nest.
Regent Honeyeater nest is no longer actively being used	Is present when the young have left the nest and Regent Honeyeaters are no longer seen coming or going from the nest for 2 days.

2 Vegetation and habitat to be cleared

2.1 Vegetation to be cleared

2.1.1 Overview

A total of 547.8 ha of native and exotic vegetation will be removed from the West Pit, Riverview Pit, Carrington Pit and Cheshunt Pit extension areas. These areas are listed in Table 2.1 and are shown on Figures 2.1 to 2.4. No vegetation is to be retained within the extension areas.

Table 2.1 Summary of native and exotic vegetation in the extension areas

Vegetation community	Extent in extension areas (ha)				
	West Pit proposed action area	Riverview Pit proposed action area	Carrington Pit proposed action area	Cheshunt Pit proposed action area	Total
Narrow-leaved Ironbark Woodland (poor condition)	2.3	-	0.2	0.9	3.4
Narrow-leaved Ironbark Woodland (good condition) (CEEC)*	6.6	-	-	-	6.6
Grey Box - Buloke Regeneration	0.2	-	-	-	0.2
Rough-barked Apple Woodland	1.3	-	-	-	1.3
Derived native grassland	92.6	11.2	0.9	-	104.7
Narrow-leaved Ironbark Grey Box Woodland (CEEC)*	-	54.4	-	-	54.4
Eucalypt plantation	-	-	2.7	-	2.7
Windbreak	-	-	0.5	-	0.5
Exotic pasture	-	-	363.4	9.6	373
Forest Red Gum Woodland	-	-	-	1	1
Total	103	65.6	367.7	11.5	547.8

2.1.2 CHVEF

CHVEF was listed as a CEEC on 7 May 2015 (TSSC 2015) under the EPBC Act. The current extent of CHVEF is estimated to be 33,124 ha, and is estimated to have declined by approximately 65% since European arrival in Australia (Peake 2006). CHVEF occurs primarily in the Central Hunter region of the Hunter Valley.

CHVEF comprises eucalypt woodland and open forests varying between 10 - 30 m in height, with a variably dense shrub layer and a grassy understorey. Across its range one or more eucalypt species, comprising Narrow-leaved Ironbark (*Eucalyptus crebra*), Spotted Gum (*Corymbia maculata*), Slaty Gum (*E. dawsonii*) and Grey Box (*E. moluccana*), dominate its canopy layer. Other species that may be locally dominant comprise Buloke (*Allocasuarina luehmanii*), Rough-barked Apple (*Angophora floribunda*), Slaty Red Gum (*E. glaucina*), Blakely's Red Gum (*E. blakelyi*), Kurrajong (*Brachychiton populneus* subsp. *populneus*), Black Cypress Pine (*Callitris endlicheri*) and Cooba (*Acacia salicina*). White Box (*E. albens*) and Grey Gum (*E. punctata*) are occasionally present in the community.

The Commonwealth Conservation Advice for the community (TSSC 2015) focuses legal protection on patches that are the most functional, relatively natural and in comparatively good condition. Only stands that meet the key diagnostic characteristics and the minimum conditions for moderate quality in accordance with the Commonwealth Conservation Advice (TSSC 2015) represent the EPBC Act listed community. Plate 2.1 shows the key diagnostic characteristics of the listed community.

1.5.1 Key diagnostic characteristics

The *Key diagnostic characteristics* of this ecological community are as follows:

- It occurs in the Hunter River catchment (typically called the Hunter Valley region);

AND

- It typically occurs on lower hillslopes and low ridges, or valley floors in undulating country; on soils derived from Permian[8] sedimentary rocks;

AND

- It does not occur on alluvial flats, river terraces, aeolian sands[9], Triassic sediments, or escarpments[10];

AND

- It is woodland or forest, with a projected canopy cover[11] of trees of 10% or more; or with a native tree density of at least 10 native tree stems per 0.5 ha (at least 20 native tree stems/ha) that are at least one metre in height[12];

AND

- The canopy of the ecological community is dominated[13] by one or more of the following four eucalypt species: *Eucalyptus crebra* (narrow-leaved ironbark), *Corymbia maculata* (syn. *E. maculata*) (spotted gum), *E. dawsonii* (slaty gum) and *E. moluccana* (grey box);
  - OR
  - a fifth species, *Allocasuarina luehmannii* (bulloak, buloke) dominates in combination with one or more of the above four eucalypt species, in sites previously dominated by one or more of the above four eucalypt species[14];

AND

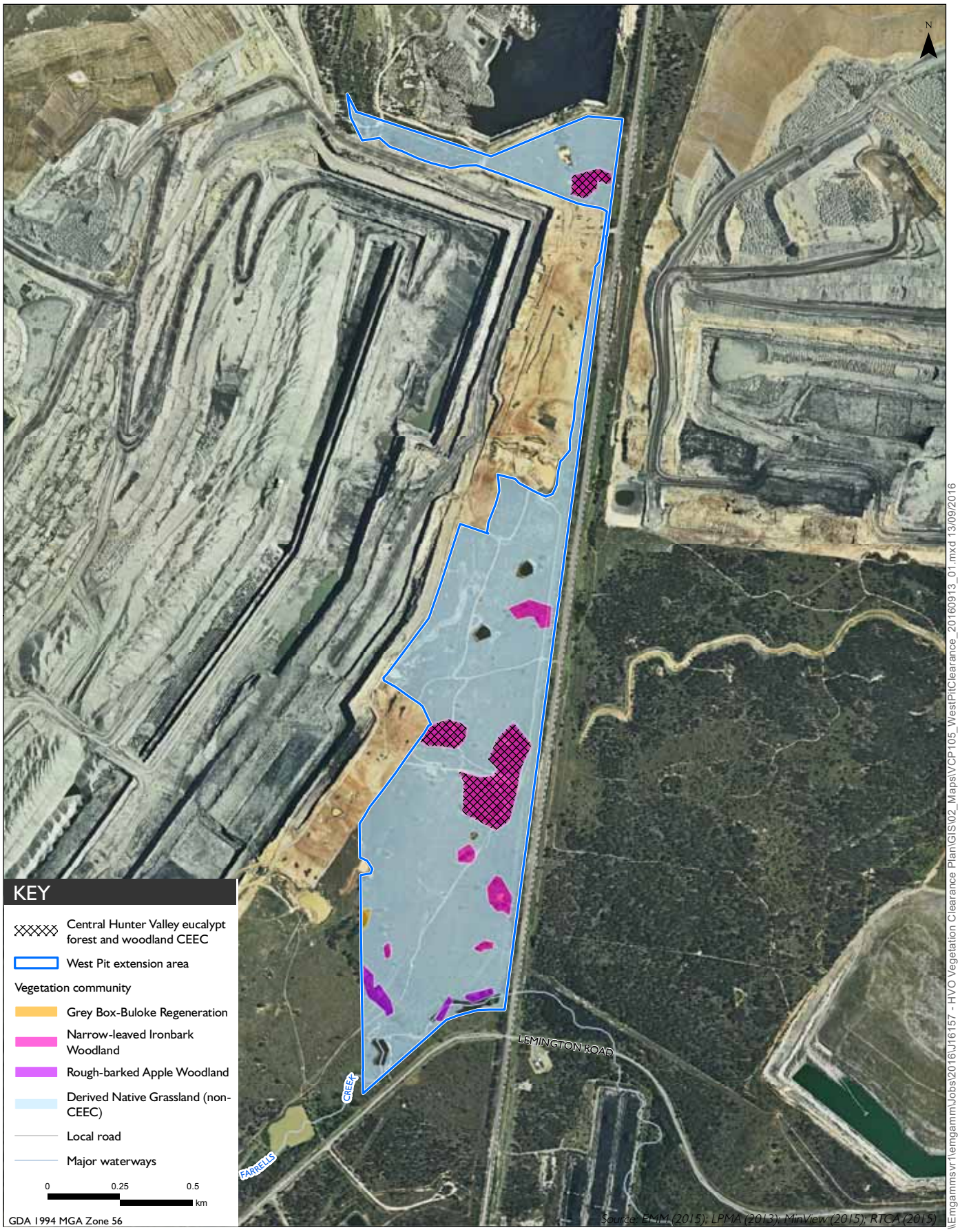
- *Allocasuarina torulosa* (forest oak/ she-oak, rose she-oak/oak), *Eucalyptus acmenoides* (white mahogany) and *E. fibrosa* (red/broad-leaved ironbark) are largely absent[15] from the canopy of a patch[16];

AND

- A ground layer is present (although it may vary in development and composition), as a sparse to thick layer of native grasses **and** other native herbs and/or native shrubs.

Plate 2.1 Key diagnostic characteristics of CHVEF (source: TSSC 2015)

The Narrow-leaved Ironbark Woodland in the West Pit proposed action area (Figure 2.1) and Narrow-leaved Ironbark Grey Box Woodland in the Riverview Pit proposed action area (Figure 2.2) represent CHVEF. A total of 61 ha of CHVEF will be removed for the proposed action, comprising 6.6 ha from the West Pit proposed action area and 54.4 ha from the Riverview Pit proposed action area.



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Note: a patch is defined as a discrete and mostly continuous area of the ecological community

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CHVEF to be cleared in the West Pit extension area

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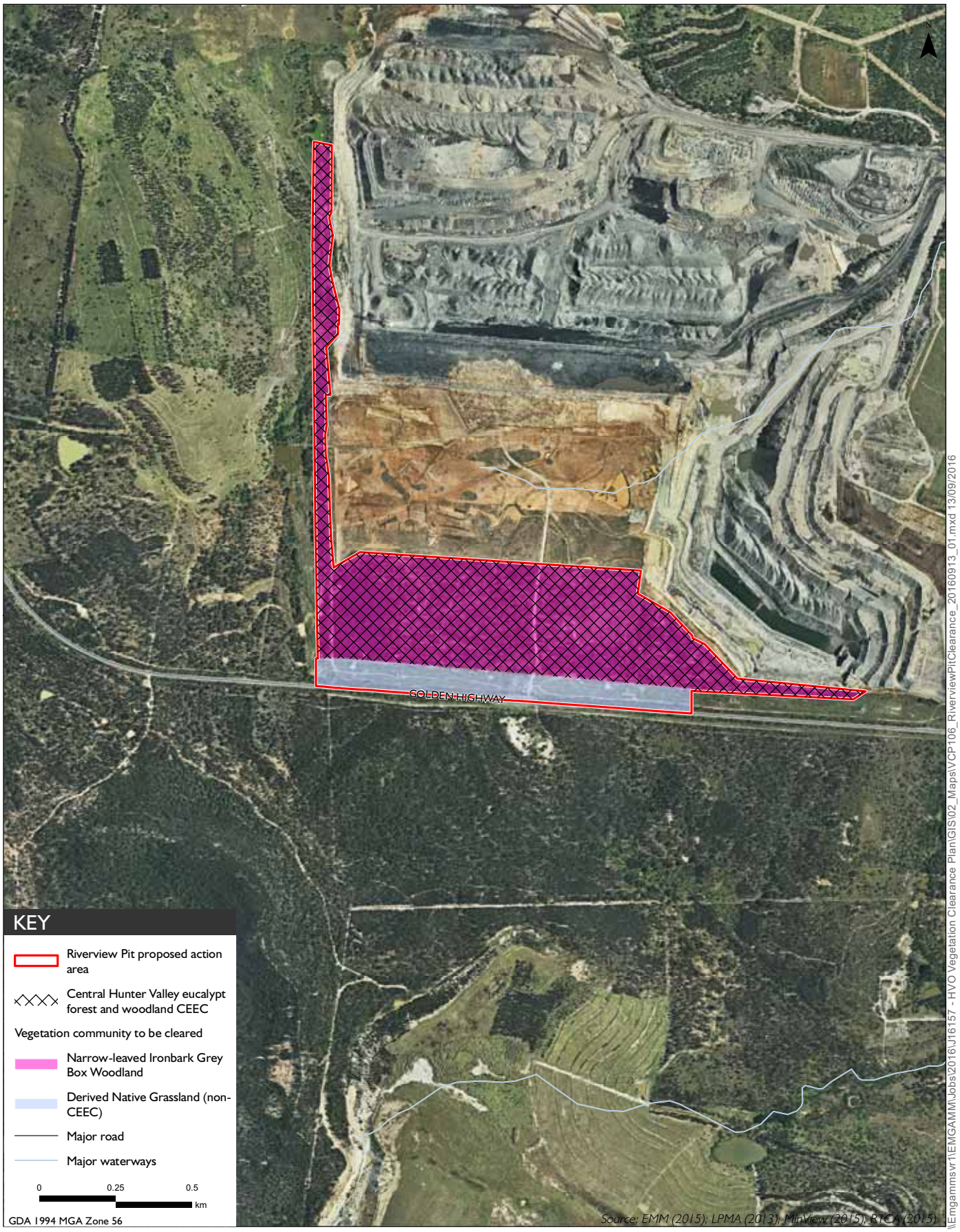
Figure 2.1



Note: a patch is defined as a discrete and mostly continuous area of the ecological community

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CHVEF to be cleared in the Riverview Pit proposed action area

Hunter Valley Operations - State-approved mining Vegetation Clearance Plan

Figure 2.2

2.2 Habitat to be cleared

2.2.1 Overview

Habitat for the Regent Honeyeater, Swift Parrot and Green and Golden Bell Frog will be removed from the West Pit, Riverview Pit, Carrington Pit and Cheshunt Pit extension areas. These areas are listed in Table 2.1 and are shown on Figures 2.7 to 2.11.

Table 2.2 Summary of habitat to be removed from the extension areas

Listed species	Extent in extension areas (ha)				
	West Pit proposed action area	Riverview Pit proposed action area	Carrington Pit proposed action area	Cheshunt Pit proposed action area	Total
Regent Honeyeater	10.2	54.4	2.9	0.9	68.4
Swift Parrot	8.9	54.4	2.9	1.9	68.1
Green and Golden Bell Frog	105.3	-			105.3

2.2.2 Regent Honeyeater

The Regent Honeyeater was originally listed as endangered on 11 July 2000 and was upgraded to critically endangered on 8 July 2015. The species occurs from south-east Queensland, NSW, the Australian Capital Territory and central Victoria (Plate 2.2). Typical habitat comprises box-ironbark eucalypt woodland and dry sclerophyll forest, but the species will also use riparian and lowland coastal forests, farmland, roadside reserves, travelling stock routes and planted vegetation. It feeds on nectar-producing eucalypts and mistletoes. It has rapidly declined in the past few decades due to clearing, fragmentation and habitat degradation. Regent Honeyeaters occur as a single, contiguous population across their range. The population has been estimated at up to 1,500 individuals (DoE 2016).

The *National Recovery Plan for the Regent Honeyeater* (DoE 2016) identifies habitat critical to the survival of the species as:

- any breeding areas or regions where the species is likely to occur; and
- any newly discovered breeding or foraging locations that extend the likely range of the Regent Honeyeater.

An indicative map is provided in the recovery plan (DoE 2016) that models breeding areas and regions where the species is likely to occur, reproduced below as Plate 2.2. The closest breeding area to the proposed action is in the Capertee Valley to the west of Wollemi National Park.

The *draft National Recovery Plan for the Regent Honeyeater* (DoE 2016) states that key nectar-producing plants or feed trees for the Regent Honeyeater comprise:

- Mugga Ironbark (*Eucalyptus sideroxylon*);
- Yellow Box (*E. melliodora*);
- White Box (*E. albens*);
- Yellow Gum (*E. leucoxylon*);

- Spotted Gum (*Corymbia gummifera*);
- Swamp Mahogany (*E. robusta*);
- Blakely's Red Gum (*E. blakelyi*);
- Needle-leaf Mistletoe (*Amyema cambagei*) on River She-oak (*Casuarina cunninghamiana*);
- Box-leaf Mistletoe (*A. miquellii*); and
- Long-flower Mistletoe (*Dendropthoe vitellina*).

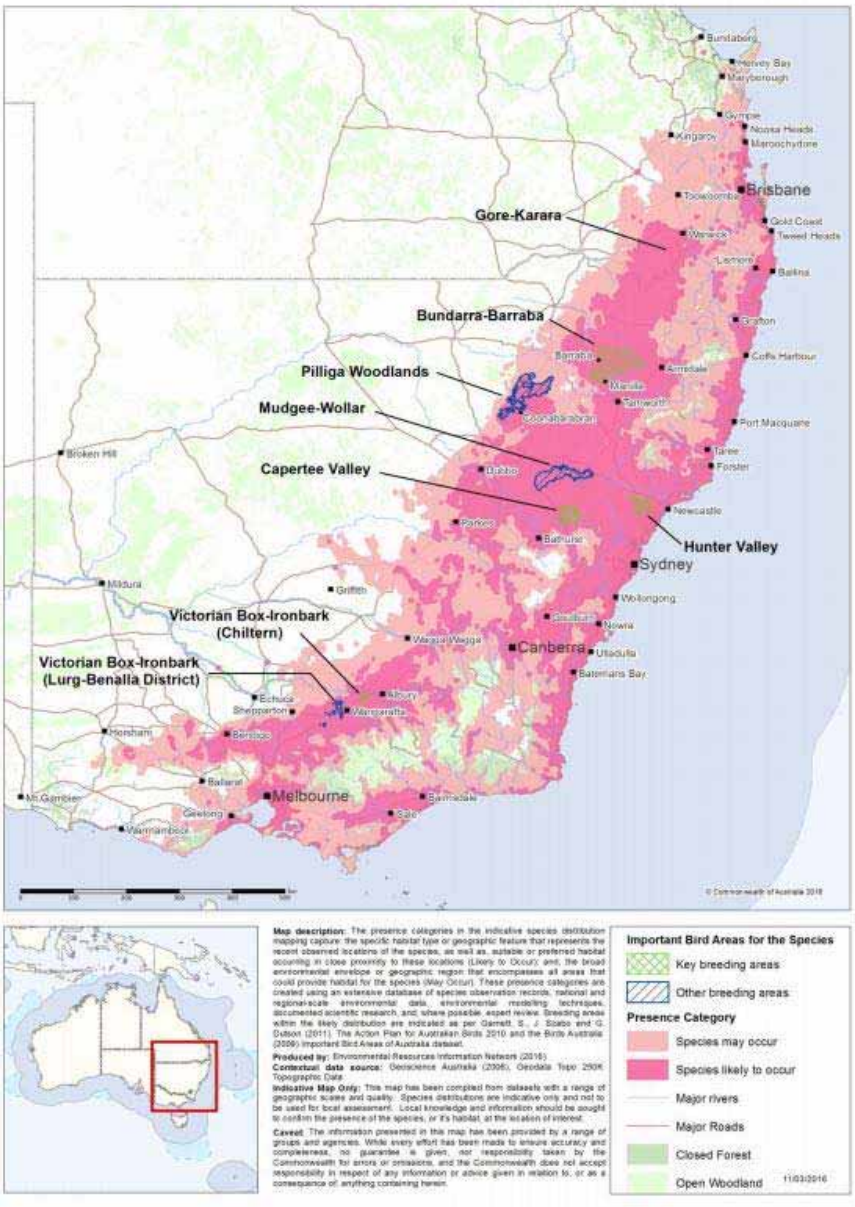


Plate 2.2 Modelled distribution of the Regent Honeyeater (source: DoE 2016)

Regent Honeyeater habitat to be removed from the extension areas comprises:

- Narrow-leaved Ironbark Woodland and Rough-barked Apple Woodland in the West Pit extension area;
- Narrow-leaved Ironbark Grey Box Woodland in the Riverview Pit extension area;
- Narrow-leaved Ironbark Woodland and Eucalypt plantation in the Carrington Pit extension area; and
- Narrow-leaved Ironbark Woodland in the Cheshunt Pit extension area.

These areas total 68.4 ha and are shown on Figure 2.3 to 2.6.

2.2.3 Swift Parrot

The Swift Parrot was listed as an endangered species under the EPBC Act on 16 July 2000. Its conservation status is currently being reviewed, to determine its eligibility for listing as a critically endangered species. It breeds in Tasmania in summer and the entire population migrates north to mainland Australia during winter (Plate 2.3). The proposed action is within its non-breeding distribution.

When on the mainland, the species disperses widely, following eucalypt flowering events in Victoria and NSW. In NSW, Swift Parrots forage in forests and woodlands on the coast and western slopes. The population is estimated at approximately 2,000 breeding individuals (Birds Australia 2011).

The *National Recovery Plan for the Swift Parrot (Lathamus discolor)* (Birds Australia 2011) identifies key foraging species for the Swift Parrot as:

- Mugga Ironbark;
- Yellow Box;
- Inland Grey Box (*E. microcarpa*);
- White Box;
- Blackbutt (*E. pilularis*);
- Forest Red Gum (*E. tereticornis*);
- Spotted Gum; and
- Swamp Mahogany.

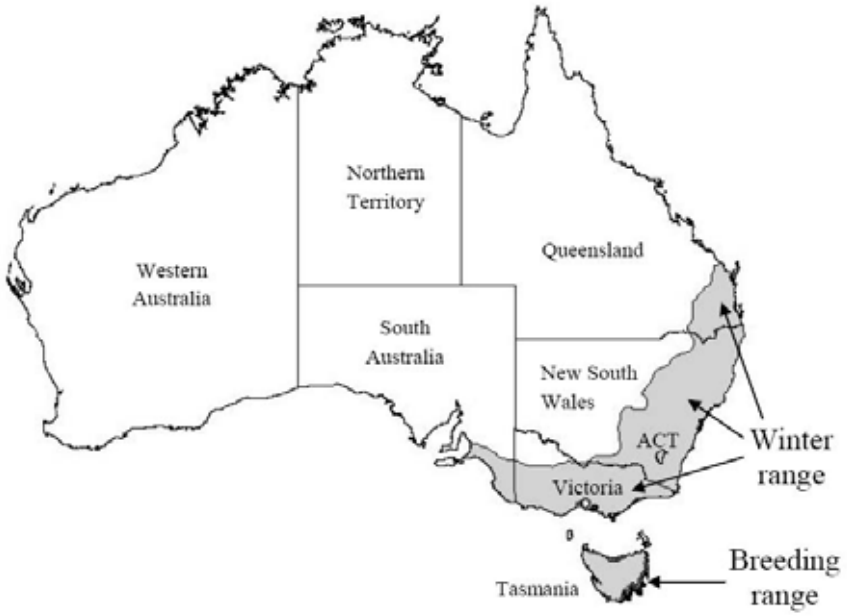


Plate 2.3 Distribution of the Swift Parrot (source: Birds Australia 2011)

The closest record of the species to the proposed action is approximately 13 km north-east of the West Pit extension area.

Swift Parrot habitat to be removed from the extension areas comprises:

- Narrow-leaved Ironbark Woodland in the West Pit extension area;
- Narrow-leaved Ironbark Grey Box Woodland in the Riverview Pit extension area;
- Narrow-leaved Ironbark Woodland and Eucalypt plantation in the Carrington Pit extension area; and
- Narrow-leaved Ironbark Woodland and Forest Red Gum Woodland in the Cheshunt Pit extension area.

These areas total 68.1 ha and are shown on Figure 2.3 to 2.6.

2.2.4 Green and Golden Bell Frog

The Green and Golden Bell Frog was listed as a vulnerable species under the EPBC Act on 16 July 2000. It was formerly distributed from the NSW north coast near Brunswick Heads south along the coast to Victoria, and inland to Bathurst, Tumut and the ACT. The species has experienced large declines and is currently limited to isolated populations throughout its range. A number of 'key' populations have been identified, one of which is in the Upper Hunter Region. The Upper Hunter population occurs at, or in the vicinity of, Ravensworth and Liddell and the bordering areas of the Singleton and Muswellbrook local government areas (DECC 2007). It is one of two inland populations of this species and is known from approximately eight verified locations (Plate 2.2). It has been known to often be absent from certain habitat components for several years before re-appearing, probably as a result of climatic circumstances and/or seasonal life cycle changes (DECC 2007).

DEWHA (2009) defines a current population as a site at which one or more Green and Golden Bell Frogs have been detected on at least one occasion since 1995, even if they have not recently been discovered at the site, due to the tendency of the species towards local extinction and recolonisation cycles. Despite significant survey effort at a number of sites, in recent years there have only been sporadic records of low numbers of Green and Golden Bell Frogs across the known distribution of the Upper Hunter population.

The *Management Plan: The Green and Golden Bell Frog Key Population in the Upper Hunter* (DECC 2007) identifies five different habitat types used by the species in the Upper Hunter Region, as presented in Table 2.3.

Table 2.3 Green and Golden Bell Frog habitat types in the Upper Hunter region

Habitat type	Description
Breeding	Permanent waterbodies such as farm dams, sewage treatment plant ponds and the margins of Lake Liddell. Ephemeral breeding habitat includes ponds, dams and depressions in open pastures that fill after heavy rain. Most of these habitat areas are human constructions made for other purposes.
Foraging	Native or introduced grassland, tussock vegetation, emergent sedges and reeds, and vegetated dams or ponds not subject to cattle grazing.
Shelter	Rock piles, fallen timber, tussock-forming vegetation, crevices and cracks in the ground within areas of foraging habitat.
Movement	Wet areas including creeklines, drains and periodically damp areas.
Overwintering	Similar to shelter habitat.

Notes: 1. Source: DECC (2007).

The species has been previously recorded at Lake Liddell, Bayswater Power Station, Cumnock Colliery, Ravensworth East Mine and south of Ravensworth State Forest (Plate 2.2). Two records of the species exist east of the West Pit proposed action area, with a single individual recorded on 11 December 2000 and 22 July 2008.

There is no potential habitat for the Green and Golden Bell Frog in the Cheshunt Pit and Riverview Pit extension areas given the absence of waterbodies. It is noted that there are three dams in the Carrington Pit proposed action area, however these have no emergent vegetation and very high turbidity and, therefore, would not provide suitable conditions for foraging or tadpole growth.

The West Pit proposed action area contains a small area of potential breeding habitat and a large area of potential foraging habitat for the Green and Golden Bell Frog, shown on Figure 2.11. Table 2.4 details the potential Green and Golden Bell Frog habitat types in the West Pit proposed action area.

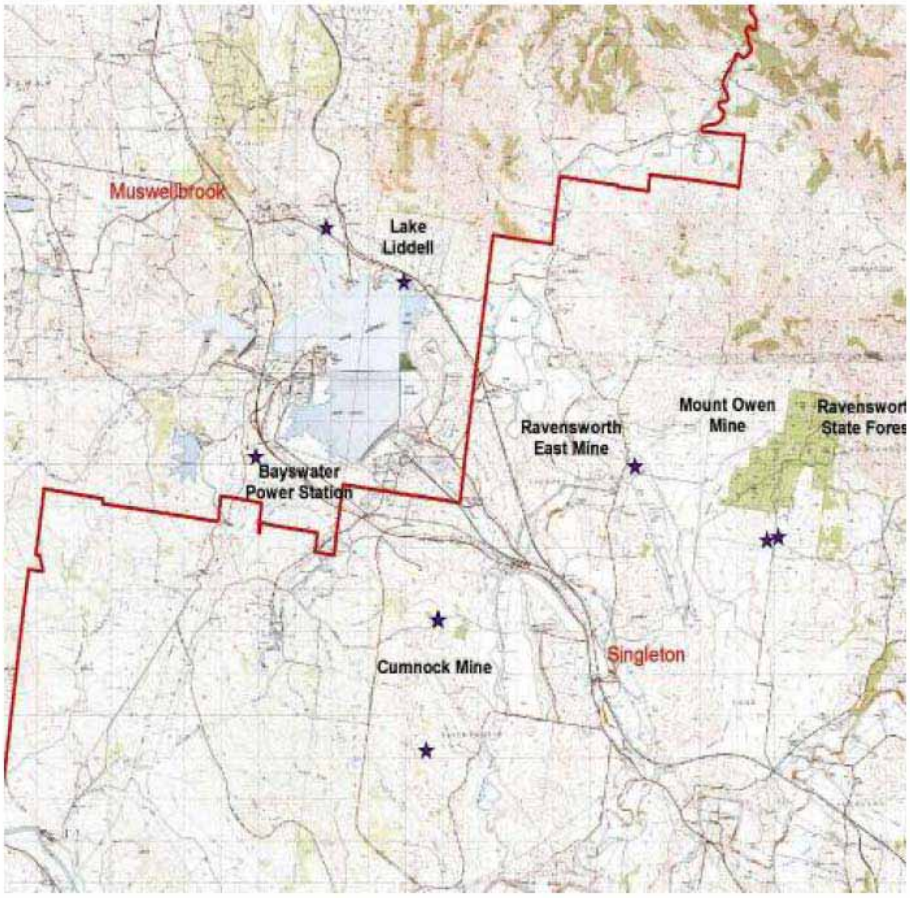


Plate 2.4 Recorded sightings of the Green and Golden Bell Frog in the Upper Hunter (source: DECC 2007

Table 2.4 Green and Golden Bell Frog potential habitat types in West Pit proposed action area

Habitat type	Description	Approximate area (ha)
Potential breeding (high condition)	One shallow dam and pools in Farrells Creek with abundant emergent and fringing vegetation and patches of open water. Emergent vegetation is suitable for basking and includes *Eleocharis sphacelata,* Bullrush (*Typha orientalis*), Pin Rush (*Juncus usitatus*), Slender Knotweed (*Persicaria decipiens*), *Schoenoplectrus mucronatus, Baumea juncea,* Swamp Lily (*Ottelia ovalifolia*) and Water Primrose (*Ludwigia peploides*). Fallen timber, bark and rocks surround the dam. Large numbers of Broad-palmed Frog (*Litoria latopalmata*) tadpoles, metamorphs and frogs recorded.	1.5
Potential breeding (moderate condition)	One dam with a shallow side and a steep side, but little emergent and fringing vegetation. Emergent vegetation, where present, comprises *Eleocharis sphacelata,* Pin Rush and Swamp Lily. Few Broad-palmed Frog tadpoles recorded.	0.3
Potential breeding (low condition)	Dams with little to no emergent vegetation, and very high water turbidity. No tadpoles, metamorphs or frogs recorded. These dams have been included as a precautionary measure given the proximity to previous Green and Golden Bell Frog records.	0.8
Potential foraging	Native and introduced grassland surrounding dams. One large pile of fallen timber and debris located between two dams.	102.7
Approximate area of potential habitat	**-**	**105.3**

A high number of tadpole, metamorph and adult Broad-palmed Frogs (*Litoria latopalmata*) were recorded, with a smaller number of Eastern Dwarf Sedge Frogs (*L. fallax*) and Common Eastern Froglets (*Crinia signifera*).

Despite the presence of potentially suitable habitat, the high dip netting, active searching and call playback effort employed; no tadpole, metamorph or adult Green and Golden Bell Frogs were recorded during surveys in the West Pit proposed action area. Green and Golden Bell Frogs have a long larval life span of 2.5 to 11 months after which metamorphosis occurs (Anstis 2002). There was significant rainfall in January with 103.4 mm falling between 4 and 7 January and 48.8 mm between 22 and 24 January 2016. Therefore, if Green and Golden Bell Frogs were present during the significant rains in January 2016, tadpoles should have been detected during the dip netting that was undertaken in February 2016 around the margin of each dam and creek pool in the West Pit proposed action area over a two day period.

The lack of detection of the species during previous surveys (EMM 2013; Travers 2013; Niche 2015) and the surveys on 29 February and 1 March 2016 despite the presence of potentially suitable habitat suggests that the population in this area may be extinct, and has likely declined due to the chytrid fungus.

The NSW Declining Frog Working Group Meeting was held in June 2014 which was attended by frog researchers from the University of Newcastle and frog experts to discuss the viability of the Upper Hunter population. The following conclusions of relevance to the proposed action were drawn from the meeting (Niche 2015):

- population modelling indicates that the extinction probability for this part of the Hunter Valley is 100% in 20 years time;
- local declines are likely to have resulted from the chytrid fungus for which there is currently no known mitigation;

- the remaining larger and/or viable populations for the Green and Golden Bell Frog appear to either fall within 10 km of the coast or where pollution has suppressed the chytrid fungus (eg old mine sites or contaminated industrial sites). The HVO complex is located well beyond 10km from the coast and so is not within the zone where populations can now be expected; and

- given the lack of records within the locality and the wide-ranging extinctions of populations of this species in all locations more than 10km from the coast, it is considered unlikely that the species occurs at the site or is likely to colonise it in the foreseeable future.

Given that the last record of the species was from 2011/2012, that several years have often passed between records of the species in the Upper Hunter (DECC 2007) and that the species has a tendency towards local extinctions and recolonisation cycles (DEWHA 2009), it is possible that the population still persists in the region. Accordingly, a precautionary approach has been taken and it is assumed that the Green and Golden Bell Frog may occur in the West Pit proposed action area.

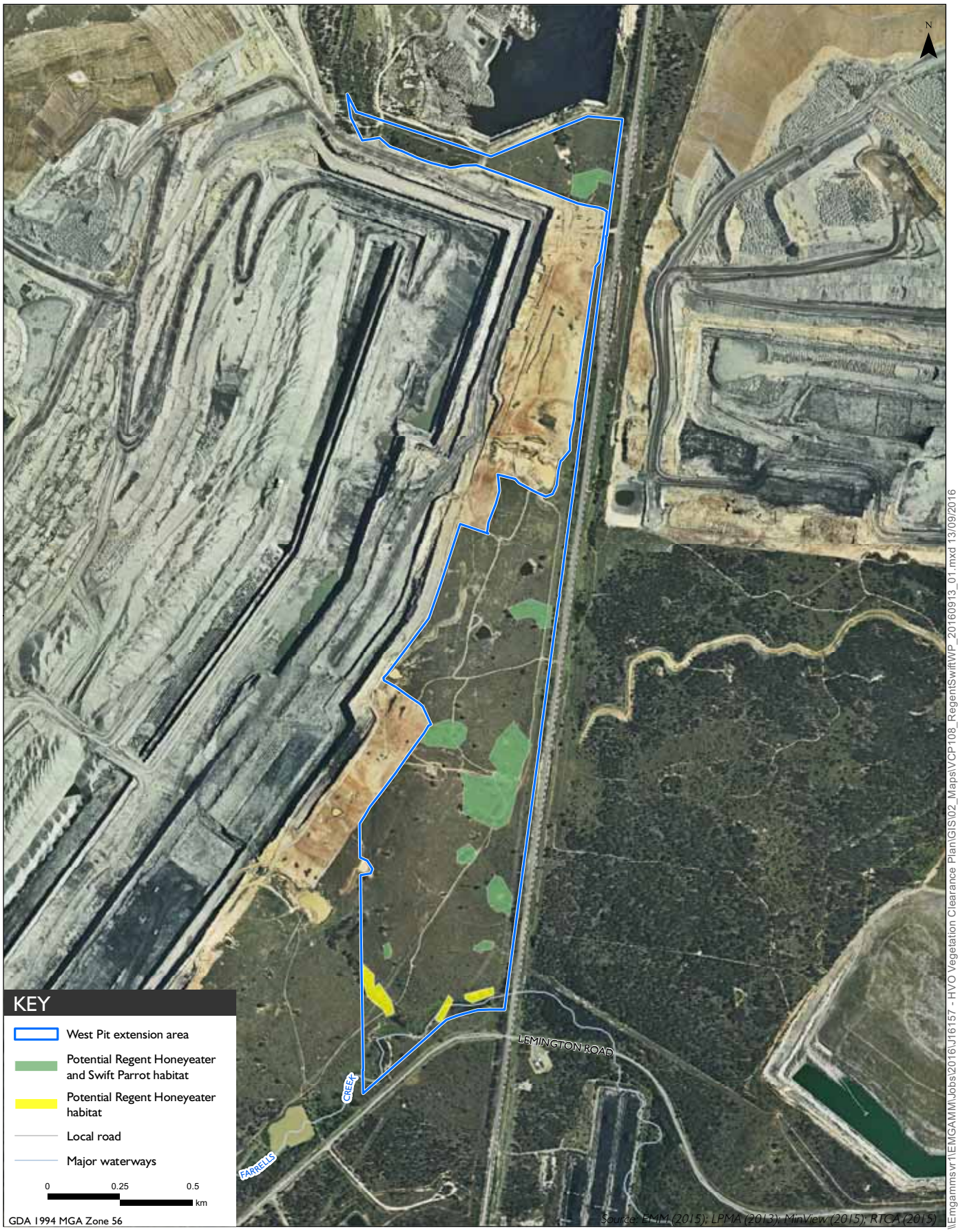
Green and Golden Bell Frog habitat to be removed from the West Pit extension area is shown on Figure 2.11.

2.3 Overview of listed species habitat requirements and activity periods

Table 2.5 provides an overview of the listed species habitat requirements, activity periods, and timing of their occupation in the extension areas.

Table 2.5 Overview of listed species habitat requirements and activity periods

Species	Foraging habitat	Foraging habitat occupation timing	Nesting/breeding habitat	Nesting/breeding habitat occupation timing
Regent Honeyeater	Forests and woodlands in West Pit, Riverview Pit, Carrington Pit and Cheshunt Pit.	April (recorded at Warkworth) to November (end of breeding season).	Forests and woodlands in West Pit, Riverview Pit, Carrington Pit and Cheshunt Pit.	August (moves into core breeding areas). September to November (breeding season).
Swift Parrot	Forests and woodlands in West Pit, Riverview Pit, Carrington Pit and Cheshunt Pit.	February to September.	N/A. Breeds and nests in Tasmania.	N/A. Breeds and nests in Tasmania.
Green and Golden Bell Frog	DNG in West Pit.	June to July (in torpor, sheltering underneath ground debris), August to May in foraging habitat.	Dams and creeks in West Pit.	August to February (peak between October and February).



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Potential Regent Honeyeater and Swift Parrot habitat to be removed in the West Pit extension area

Hunter Valley Operations - State-approved mining
Vegetation Clearance Plan
Figure 2.3

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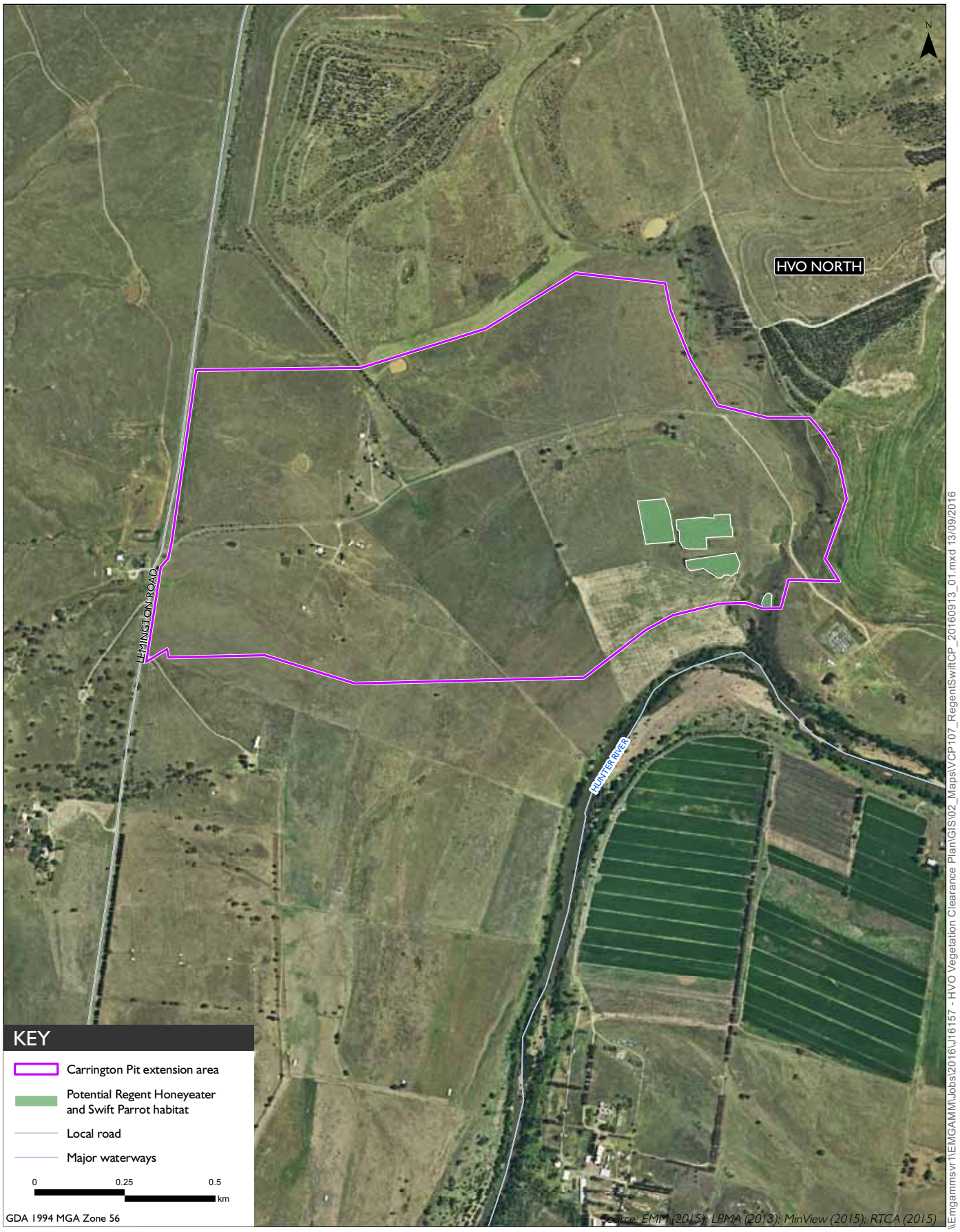
COAL & ALLIED

Potential Regent Honeyeater and Swift Parrot habitat to be removed in the Riverview Pit extension area

Hunter Valley Operations - State-approved mining Vegetation Clearance Plan

Figure 2.4



Potential Regent Honeyeater and Swift Parrot habitat to be removed in the Carrington Pit extension area

Hunter Valley Operations - State-approved mining
Vegetation Clearance Plan

Figure 2.5

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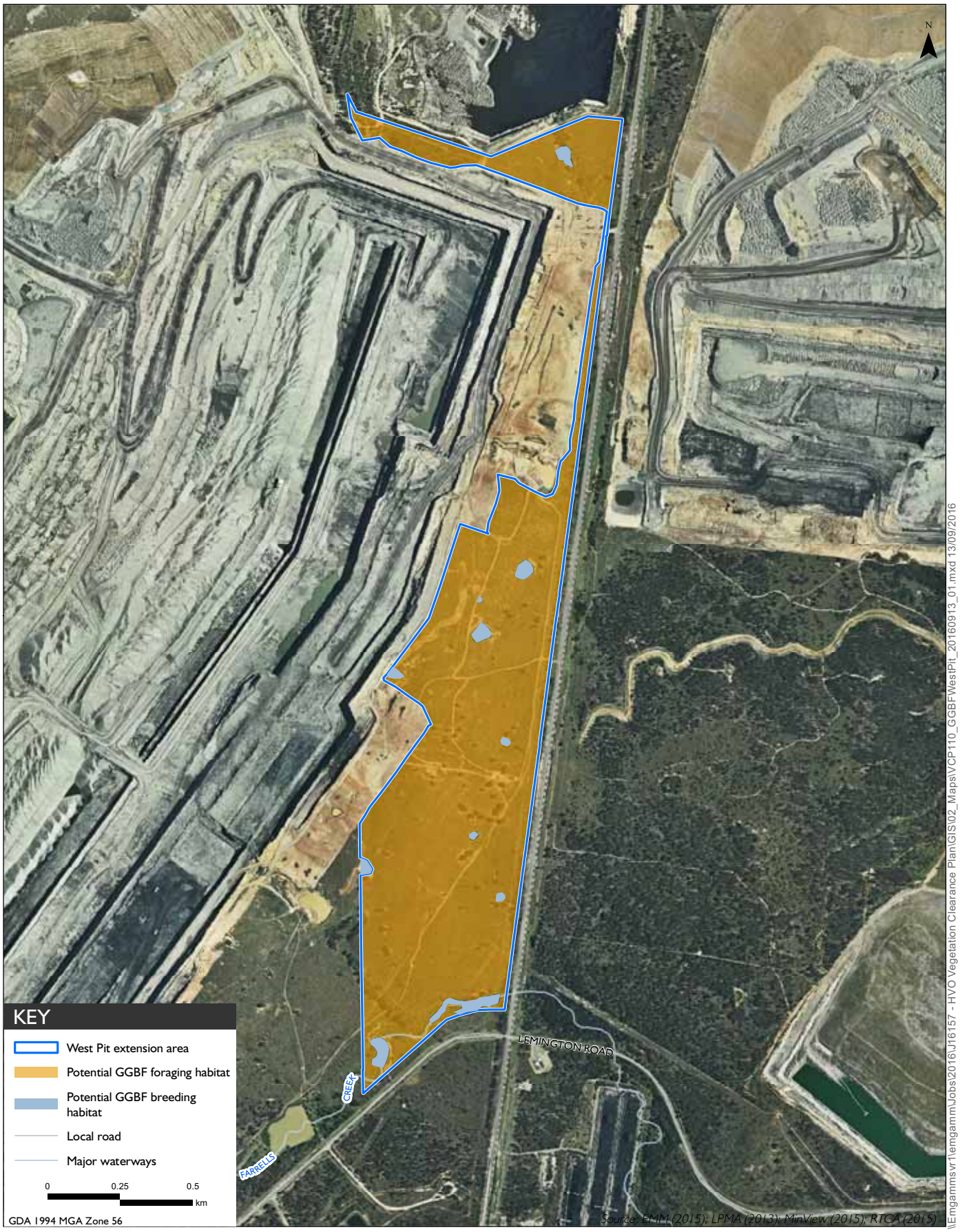
Potential Regent Honeyeater and Swift Parrot habitat to be removed in the Cheshunt Pit extension area

Hunter Valley Operations - State-approved mining
Vegetation Clearance Plan
Figure 2.6



COAL & ALLIED

Potential Green and Golden Bell Frog to be removed in the West Pit extension area

Hunter Valley Operations - State-approved mining
Vegetation Clearance Plan

Figure 2.7

3 Clearance protocols

3.1 Overview

Clearance protocols for the proposed action will consist of existing measures implemented at the HVO complex, and those developed specifically to mitigate potential impacts of the proposed action on matters of national environmental significance (MNES). These measures are described in the following sections.

3.2 Existing clearance protocols

The HVO complex has existing clearance protocols that will continue to be implemented during the proposed action to mitigate its impacts, namely the Ground Disturbance Permit (GDP) approval process. The GDP approval process ensures that:

- the proponent's key stakeholders are notified of work which will disturb land;
- works are assessed for potential impacts; and
- appropriate controls upon the work are identified and implemented.

The GDP approval process applies to:

- all areas of land owned and managed by the proponent or land not owned by the proponent under Exploration Licence in the Upper Hunter Valley that have not previously been disturbed by mining or mining associated activities;
- rehabilitated areas, except for rehabilitation maintenance works where approval has been obtained from the Environmental Specialist Rehabilitation; and
- areas where there is real or potential risk of environmental impacts.

A GDP will be completed prior to works commencing in the extension areas. The GDP will clearly identify all areas of CHVEF and/or listed species habitats to be impacted during clearance, and the specific measures that will be implemented during clearance to mitigate impacts on MNES.

3.3 Clearance protocols developed for the proposed action

Pre-clearance surveys are required for the CHVEF, Regent Honeyeater, Swift Parrot and Green and Golden Bell Frog. The sections below provide the measures that will be implemented for CHVEF in accordance draft condition 1, to mitigate the impacts of the proposed action. It also provides an overview of the species requirements and activity periods and describes the pre-clearance survey methods and timing for each species. A pre-clearance checklist is provided in Appendix A.

3.3.1 CHVEF

The proponent will not clear more than 54.4 ha of CHVEF from the Riverview Pit extension area and 6.6 ha of CHVEF from the West Pit extension area. All clearing will be limited to the project disturbance boundaries shown on Figure 1.1 and 1.3.

In order to minimise clearance impacts and avoid unnecessary disturbance on CHVEF outside the project disturbance boundary, clearance limits will be clearly identified on plans and on the ground (using durable markers and or signage) in the Riverview Pit and West Pit extension areas.

3.3.2 Regent Honeyeater

i Pre-clearance survey timing

A qualified ecologist will undertake a pre-clearance survey within 24 hours prior to the commencement of removal of potential foraging, nesting or breeding habitat for the Regent Honeyeater.

ii Pre-clearance survey methods

The following sections describe the methods that will be used during pre-clearance surveys in Regent Honeyeater foraging, breeding and nesting habitat, to mitigate the potential impacts of the proposed action on the species.

A qualified ecologist will undertake pre-clearance searches to identify if Regent Honeyeaters are present in the clearance area, in the habitats identified on Figure 2.3 to 2.6. Methods will consist of timed area searches to identify if any individuals are present within the clearance area.

If Regent Honeyeaters **are not found** within the clearance area, then searches for Regent Honeyeater habitat trees and active nests are not required.

If Regent Honeyeaters **are found** within the clearance area, a qualified ecologist will undertake:

- targeted searches for Regent Honeyeater habitat trees; and
- targeted searches to detect active Regent Honeyeater nests in breeding habitat areas.

Active Regent Honeyeater nests are defined as nests that adult Regent Honeyeaters are observed flying to and from, or sitting on a nest.

If habitat trees and/or active Regent Honeyeater nest/s are found in the clearance area, a qualified ecologist will:

- mark each habitat tree with flagging tape and spray paint (eg with a 'H', denoting habitat tree);
- delineate a 100 m buffer around the active Regent Honeyeater nest with exclusion fencing (eg helicopter tape with exclusion zone signage); and
- record the location of habitat trees and/or active nests for use during clearance and reporting.

This pre-clearance protocol for the Regent Honeyeater is illustrated in Plate 3.1.

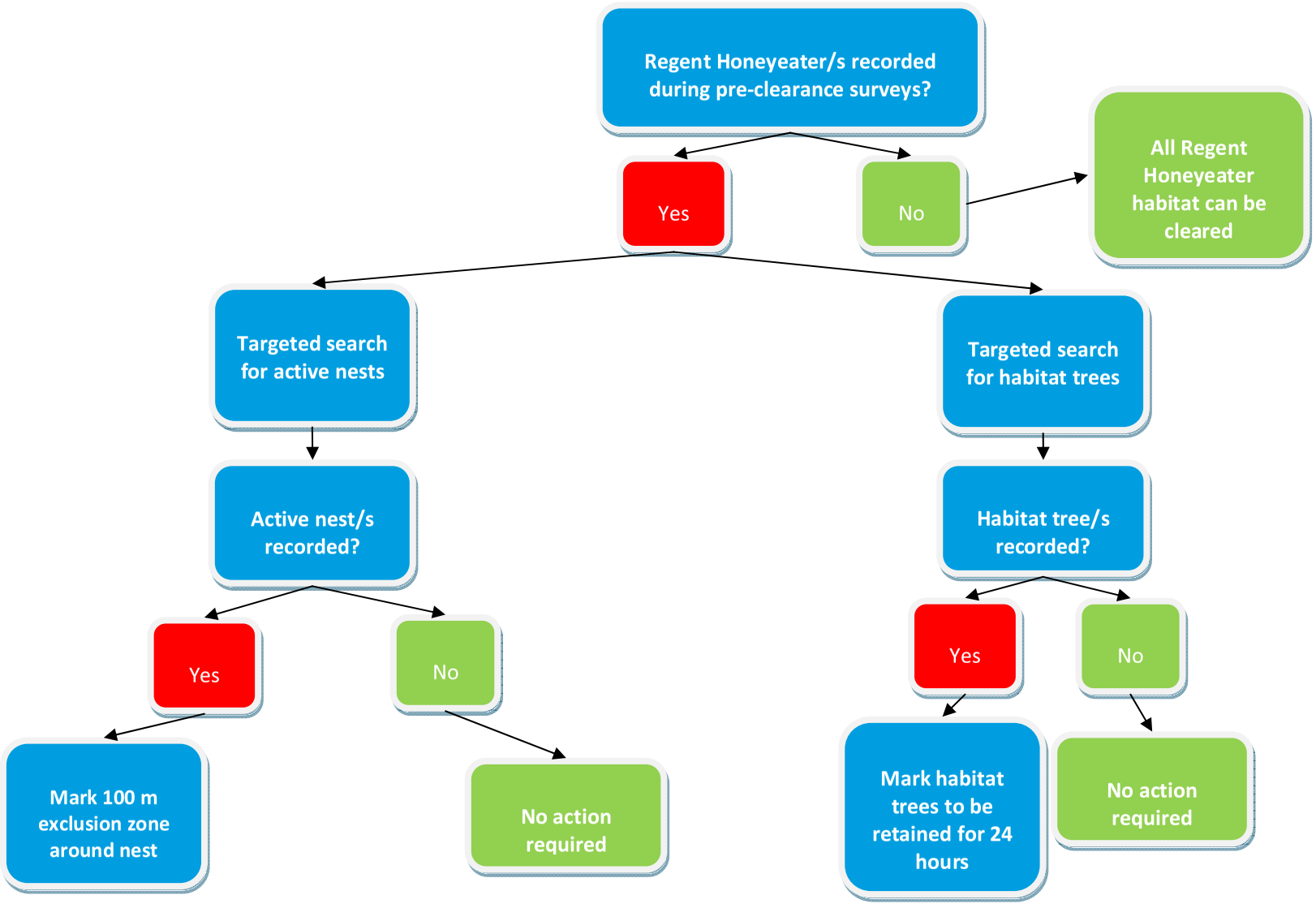


Plate 3.1 **Pre-clearance survey process for the Regent Honeyeater**

iii Management during clearance

In the event that Regent Honeyeaters are identified within the clearance area during pre-clearance surveys, the qualified ecologist will notify the Environmental Advisor that a two-stage clearance protocol must be implemented, and if any habitat trees and/or active Regent Honeyeater nests are present in the clearance area.

The two-stage clearance protocol for habitat trees comprises:

- Stage 1: Non-habitat trees will be cleared 24 hours prior to any habitat trees being cleared, to encourage Regent Honeyeaters to move out of the habitat area. Habitat trees recorded by the qualified ecologist will be retained for a period of at least 24 hours.
- Stage 2: Habitat trees will be removed.

The two-stage clearance protocol for active Regent Honeyeater nests comprises:

- Stage 1: Clearing and overburden removal is delayed in the 100 m buffer area until the active Regent Honeyeater nest is no longer actively being used. Nest activity will be monitored by the Environmental Advisor, who will notify the qualified ecologist when nesting has appeared to cease. The qualified ecologist will complete a final pre-clearance inspection to confirm that the active Regent Honeyeater nest is no longer actively being used.
- Stage 2: Trees containing Regent Honeyeater nests no longer actively being used can be removed.

The two-stage clearance protocol for the Regent Honeyeater is illustrated in Plate 3.2.

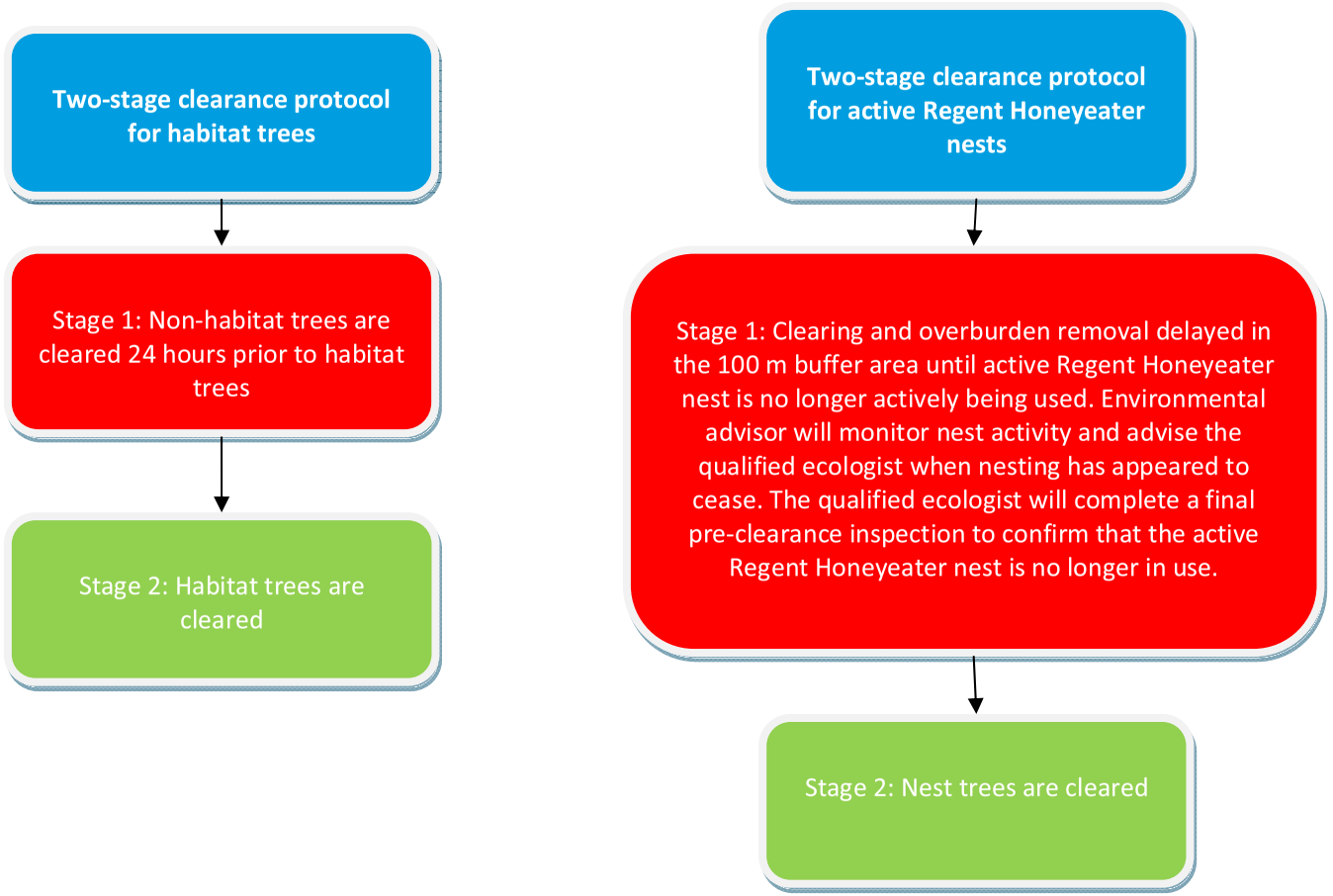


Plate 3.2 Two-stage clearance protocol for the Regent Honeyeater

3.3.3 Swift Parrot

i Pre-clearance survey timing

A qualified ecologist will undertake a pre-clearance survey of the habitats on Figure 2.3 to 2.6 within 24 hours prior to the removal of potential foraging habitat for the Swift Parrot.

ii Pre-clearance survey methods

The following section describes the methods that will be used during pre-clearance surveys in Swift Parrot foraging habitat, to mitigate the potential impacts of the proposed action on the species.

A qualified ecologist will undertake pre-clearance searches to identify if Swift Parrots are present in the clearance area, in the habitats identified on Figure 2.3 to 2.6. Methods will consist of timed area searches to identify if any individuals are present within the clearance area.

If Swift Parrots **are not found** within the clearance area, then searches for Swift Parrot habitat trees are not required.

If Swift Parrots **are found** within the clearance area, targeted searches for Swift Parrot habitat trees will be undertaken by a qualified ecologist.

If habitat trees are found within the clearance area, a qualified ecologist will mark the trees with flagging tape and spray paint (eg with a 'H', denoting habitat tree).

The Swift Parrot pre-clearance protocol is illustrated in Plate 3.3.

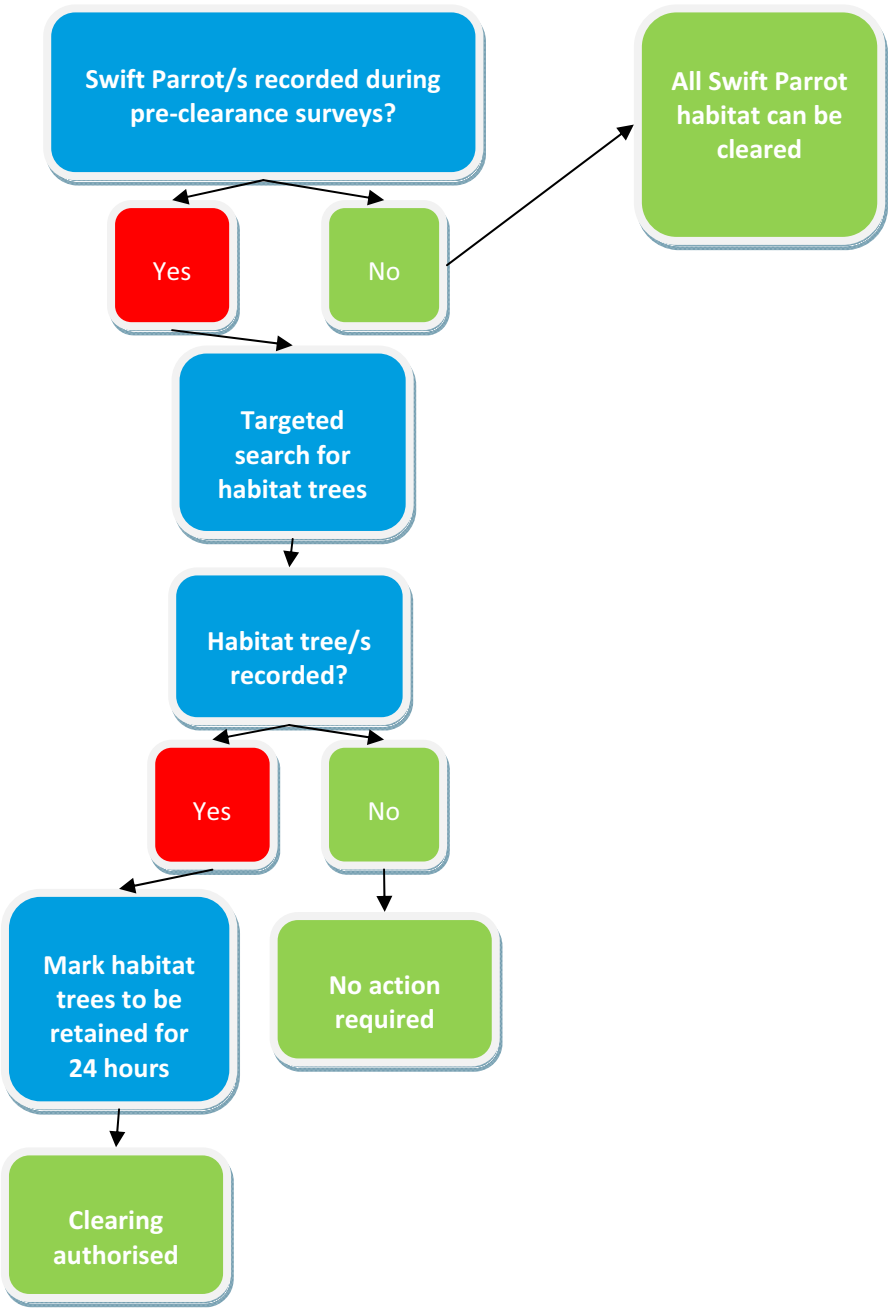


Plate 3.3 Pre-clearance protocol for the Swift Parrot

iii Management during clearance

In the event that Swift Parrots are identified within the clearance area during pre-clearance surveys, the qualified ecologist will notify the Environmental Advisor that a two-stage clearance protocol must be implemented, and if any habitat trees are present.

The two-stage clearance protocol for habitat trees comprises:

- Stage 1: Non-habitat trees will be cleared 24 hours prior to any habitat trees being cleared, to encourage Swift Parrots to move out of the habitat area. Habitat trees recorded by the qualified ecologist will be retained for a period of at least 24 hours in the event that Swift Parrots are recorded in the clearance area.

- Stage 2: Habitat trees will be removed.

The two-stage clearance protocol for the Swift Parrot is illustrated in Plate 3.4.

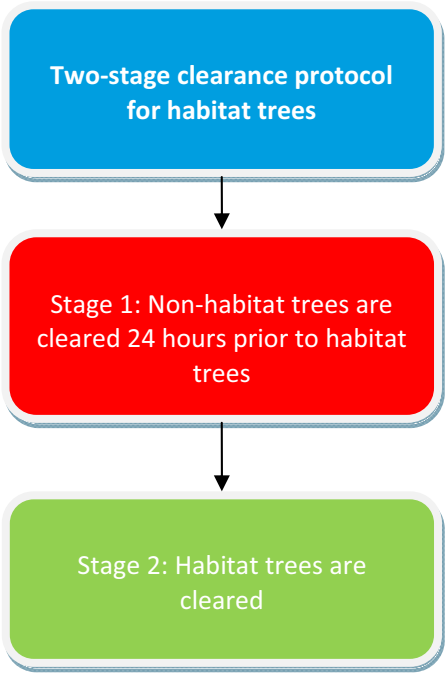


Plate 3.4 Two-stage clearance protocol for the Swift Parrot

3.3.4 Green and Golden Bell Frog

i Pre-clearance survey timing

A qualified ecologist will undertake a pre-clearance survey immediately prior to the removal of potential breeding habitat for the Green and Golden Bell Frog.

ii Pre-clearance survey methods

Pre-clearance survey methods for the Green and Golden Bell Frog will meet the survey effort requirements for the Green and Golden Bell Frog stipulated in the *Survey Guidelines for Australia's threatened frogs* (Commonwealth of Australia 2010). Pre-clearance surveys will be undertaken in all breeding habitats identified on Figure 2.7 and a 200 m buffer around each potential breeding habitat area, within the West Pit extension area.

The following methods will be used to detect Green and Golden Bell Frogs during breeding habitat pre-clearance surveys, in the habitats identified on Figure 2.7 and the 200 m buffer area:

- dip-netting of all breeding habitats to determine if tadpoles or metamorphs are present;
- searches during the day underneath ground debris (ie fallen logs and rocks);
- searches of trees around dams and creeks for basking frogs in the afternoon; and

- targeted spotlighting, call broadcasting and active searches over a minimum of four nights in accordance with the survey effort requirements for the Green and Golden Bell Frog stipulated in the *Survey Guidelines for Australia's threatened frogs* (Commonwealth of Australia 2010).

In the event that Green and Golden Bell Frog individuals, metamorphs or tadpoles are located during pre-clearance surveys, no clearing of breeding habitats will occur until such time that appropriate translocation protocols are developed, in accordance with the *Hygiene protocols for the control of diseases in frogs* (Department of Environment and Climate Change 2008).

If the frogs are recorded during pre-clearance surveys, the most appropriate location for translocation would be the Ravensworth Green and Golden Bell Frog offset site, directly east of the West Pit extension area. Negotiations will need to be undertaken with HV Operations and Glencore prior to any translocation.

iii Management during pre -clearance

Measures that will be implemented during clearance to minimise the risk of pathogen transfer will comprise:

- handling of frogs, tadpoles and metamorphs only when necessary, and by a qualified ecologist;
- the qualified ecologist will clean and/or disinfect their hands (or use a new pair of disposable gloves) each time a frog is handled;
- the qualified ecologist will clean and/or disinfect their dip-net and boots when moving between dams and creeks;
- the qualified ecologist will place each frog/tadpole or metamorph collected in its own disposable holding bag, and bags will not be re-used; and
- the qualified ecologist will translocate each frog/tadpole or metamorph to the translocation site.

Frogs will be released by the qualified ecologist in the afternoon or evening to target the time of day when the species is most active, to reduce the risk of predation.

4 Pathogen management

4.1 Overview

This chapter includes measures to avoid, suppress and control the spread of fungal pathogens that affect plants and animals, comprising:

- the Root Rot Fungus (*Phytophthora cinnamomi*) which can affect retained native vegetation and threatened species habitats; and
- Amphibian Chytrid Fungus (*Batrachochytrium dendrobatoides*), which can affect adjacent populations of Green and Golden Bell Frogs.

The following sections provide an overview of the life cycle, transmission pathways and control measures for fungal pathogens that will be implemented prior to and during vegetation clearance for the proposed action.

4.2 Root Rot Fungus

4.2.1 Life cycle and transmission pathways

Phytophthora cinnamomi root rot is a plant disease that is caused by the Root Rot Fungus. It is a form of dieback that affects native plants and ecosystems in Australia. In Australia, the disease infects a range of woody perennial plant species and can be a major threat to rare and endangered species (DEH 2004).

The Root Rot Fungus grows through the root system (and sometimes stem) of the plant, preventing it from absorbing water and nutrients, which can lead to dieback. Signs of dieback can include wilting and yellowing of the foliage, followed by the foliage drying out and darkening of roots. Infected plants usually die from the disease (DEH 2004).

Once the fungus has spread through the root system of the plant, it releases spores into the surrounding soil during warm and wet conditions, and is spread easily through stormwater and drainage water. Some spores can survive for long periods of time in soil or dead plant material. When conditions become more favourable, the dormant spores germinate and can infect new plants (DEH 2004).

In NSW, the Root Rot Fungus has been recorded on the east coast, with some occurrences recorded inland. The closest record of Root Rot Fungus to the HVO complex is in East Maitland, approximately 60 km south-east. It is a poorly studied fungus, and therefore a conservative approach is usually taken with respect to controlling its spread (DEH 2004).

4.2.2 Control measures

Management and control of Root Rot Fungus is difficult, and the only way to reduce its impact is to limit its spread (DEH 2004). The fungus has potential to be spread offsite by clearing machinery as a result of vegetation and soil disturbance during clearance. Wash-down facilities can be used to remove all soil and mud from clearing machinery prior to leaving the HVO complex, which minimises the risk of spreading the Root Rot Fungus offsite.

The HVO complex has an established and permanent wash-down facility, which will continue to be used to minimise the potential spread of the Root Rot Fungus offsite.

4.3 Amphibian Chytrid Fungus

4.3.1 Life cycle and transmission pathways

Amphibian Chytrid Fungus causes the disease, Chytridiomycosis, in frogs. It invades the skin of frogs, metamorphs and tadpoles, and can result in a high rate of mortality. Chytridiomycosis has been recorded from over 40 frog species in Australia, one of which is the Green and Golden Bell Frog.

Chytrid fungus is known to be in the Upper Hunter region, and is thought to be responsible for the Green and Golden Bell Frog population decline. The infective stage of the Amphibian Chytrid Fungus requires water. Spores are released from an infected frog into dams and creeks which can infect other frogs in the same area. The disease can also be transferred to other frog habitats via frog handling or on vehicle tyres/tracks.

4.3.2 Control measures

Measures are required for equipment, clearing machinery and frog handling to effectively control Amphibian Chytrid Fungus during vegetation clearance. These measures are described in the following sections.

i Equipment

Equipment including dip nets or hand tools used by the qualified ecologist will be cleaned and disinfected at the commencement of pre-clearance surveys or fieldwork and at the end of each day.

ii Clearing machinery

Clearing machinery will visit the permanent wash-down facility prior to exiting the HVO complex.

iii Frog handling

Frog handling will be conducted in accordance with the measures provided in Section 3.3.4.

5 Records and reporting

5.1 Overview

The proponent will maintain accurate records associated with the implementation of this VCP, and make them available upon request to the DoEE. Within three months of every 12 month anniversary of the proposed action's implementation (however only within 12 month periods during which clearing has occurred), the proponent will publish a report on its website assessing compliance with this VCP.

Evidence of the date of publication and any non-compliance with the VCP will be provided to the DoEE at the same time as the compliance report is published. Reports will remain on the website for the period of the approval. This section describes the documentation and reporting measures that will be implemented during the proposed action.

5.2 Records

A checklist will be kept to records the following activities, for use in reporting:

- the timing, methods and effort used when conducting pre-clearance surveys in the extension areas;
- the locations of any Regent Honeyeater or Swift Parrot individuals recorded during pre-clearance surveys and clearance, habitat trees, and nests built by the species;
- the locations of any Green and Golden Bell Frog adults, metamorphs or tadpoles recorded during pre-clearance surveys and/or clearance;
- the dates and times the permanent wash-down facility was used to remove soil and mud from clearing machinery after leaving frog habitats, and prior to exiting the HVO complex; and
- the dates and times that disinfection methods were used for equipment, clearing machinery and frog handling.

5.3 Reporting

A compliance report will be published on the proponent's website within three months of every 12 month anniversary of the proposed action's implementation (however only during 12 month periods during which clearing has occurred). The compliance report will include all data collected in accordance with Section 5.2. Any non-compliances with the VCP will also be included in the compliance report.

All non-compliances will be reported through HVO's incident reporting system, and the appropriate corrective actions identified and implemented.

6 Implementation, timing and responsibility

Table 6.1 provides a summary of the:

- pre-clearance survey methods described in Chapter 3;
- pathogen management measures described in Chapter 4; and
- documentation and reporting requirements described in Chapter 5.

It summarises the actions, outcomes, timing and responsibility of all measures to support effective implementation.

Table 6.1 Implementation, timing and responsibility

Action	Outcome	Timing	Responsibility
1. A GDP will be completed and approved prior to any clearance in the extension areas.	Specific measures are implemented to mitigate the impacts of the proposed action on MNES.	Prior to any clearance	Environmental advisor
2. Conduct pre-clearance surveys for CHVEF in accordance with Section 3.1.1	No more than 54.4 ha and 6.6 ha of CHVEF is removed from the Riverview Pit and West Pit extension areas, respectively	Prior to any clearance in the Riverview Pit and West Pit extension areas	Environmental advisor
3. Identify clearance limits on plans and on the ground	No more than 54.4 ha and 6.6 ha of CHVEF is removed from the Riverview Pit and West Pit extension areas, respectively	Prior to vegetation clearance	Environmental advisor
4. Conduct pre-clearance surveys for listed species in accordance with Section 3.3, 3.4 and 3.5	Appropriate pre-clearance surveys are implemented to minimise impacts to listed threatened species	Prior to vegetation clearance	Environmental advisor Qualified ecologist
5. Manage listed species during vegetation clearance in accordance with Section 3.3.4, 3.4.4 and 3.5.4	Injury and mortality of listed species is minimised during clearance operations	During vegetation clearance	Environmental advisor Qualified ecologist
6. All clearing machinery involved in vegetation and/or topsoil clearance in the extension areas will visit the wash-down facility for cleaning prior to existing the HVO complex	The risk of spreading the Root Rot Fungus offsite is minimised	During vegetation and topsoil clearance	Environmental advisor
7. Disinfection measures are implemented in accordance with Section 4.1.2	The risk of spreading Amphibian Chytrid Fungus offsite is minimised.	During vegetation and topsoil clearance	Environmental advisor Qualified ecologist
8. Records will be kept in accordance with Section 5.2	Compliance with the conditions of approval	Prior to and during the proposed action	Environmental advisor Qualified ecologist

Table 6.1 Implementation, timing and responsibility

Action	Outcome	Timing	Responsibility
8. Publish the annual compliance report on the proponent's website	Compliance with the conditions of approval	Within three months of every 12 month anniversary of the proposed action's implementation, in 12 month periods when clearing has occurred	Environmental advisor Principal advisor project approvals

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