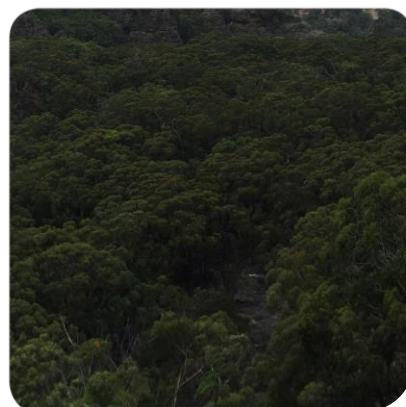
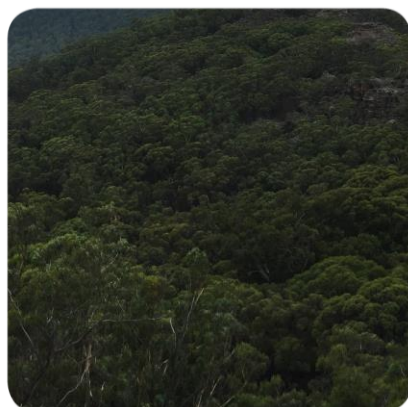
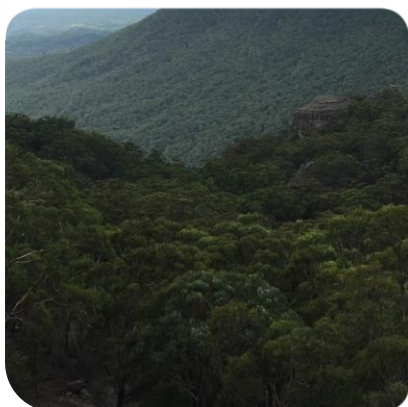
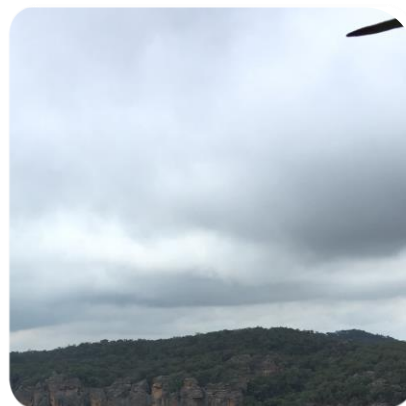
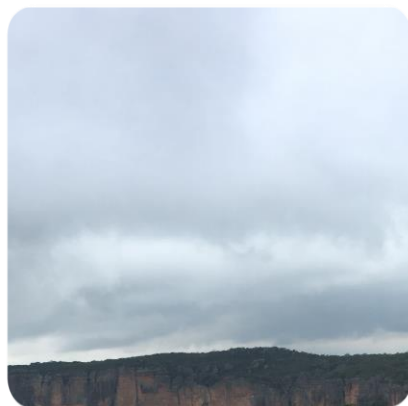
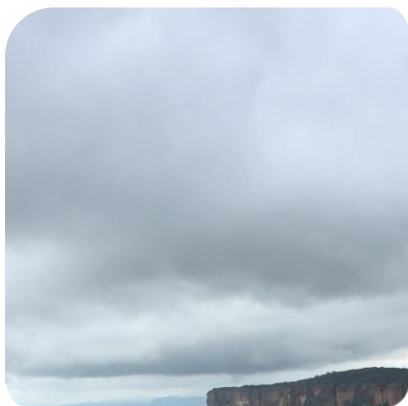


BIODIVERSITY OFFSET STRATEGY *Western Region*

Prepared for **Centennial Coal Pty Limited**

28 FEBRUARY 2019



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Document Status

Version	Purpose of Document	Orig	Review	Review Date
V1	Draft for internal and client review	LE, AB	MA, AB, AR	20/12/2017
V2	Review by OEH	MA	AB	22/12/2017
V3	Submission	LE	AB	23/2/2018
V4	Update Tables 13 and 14 and Appendix 2	LE	MA	15/3/2018
V5	Response to client review	MA	AB	23/3/2018
V6	Minor Amendments following final BioBank Agreements	AB	MA	07/12/2018
V7	Minor Amendments following review by DPE	AR	AB	28/02/2019
V8	Update following Carinya Lot 163 Conservation Agreement	AR	JW	17/11/2020

Approval for Issue

Name	Signature	Date
Arne Bishop		28/02/2019

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Appendix 6 Carinya Lot 163 Biodiversity Offset Management Plan

1.0 Introduction

The Western Region Biodiversity Offset Strategy (WRBOS) has been prepared to provide biodiversity offsetting requirements for five approved Centennial Coal (Centennial)¹ projects located in the western region of NSW. This document identifies the projects requiring offsets and the properties used in satisfying these regulatory requirements. While strict adherence to conditions of consent have been observed in this document, a contemporary approach has been adopted, where possible, to meet Centennial's offsetting obligations (i.e. compliance with more recent biodiversity offsetting policies).

1.1 Subsidence related impacts

The WRBOS does not address the requirements for Springvale Mine SSD5594 pertaining to subsidence related mining impacts. The WRBOS only addresses vegetation clearing related to surface infrastructure. This approach is consistent with Section 2.3.1.2 of the Framework for Biodiversity Assessment (FBA), which states that; 'the FBA does not assess the direct impacts of a project that are not associated with clearing vegetation'. Subsidence related impacts are addressed in the Extraction Plans completed by Springvale Mine for impacts relating to long wall mining. The Extraction Plan is prepared in consultation with DPE and by suitably qualified and experienced persons. The Extraction Plan must address performance criteria for shrub swamps, hanging swamps and biodiversity defined in SSD5594 Schedule 3 Condition 1. Subsequently, Springvale Mine SSD5594 Schedule 3 Conditions 2 to 6 are addressed within the Extraction Plans for the operation related to impacts from mining. Offsets are calculated for each set of longwalls associated with the extraction plans through the maximum offset liability calculations.

1.2 Project Offsetting Commitments

The biodiversity offsetting requirement for each development is outlined in their respective conditions of consent. This WRBOS was initiated in January 2012 for the projects requiring offsets listed below:

- Angus Place Ventilation Facility Mod 2 (06_0021);
- Western Coal Services (SSD_5579);
- Clarence REA (DA 504-00 MOD2);
- Springvale Extension Project and Springvale Bore 8 (SSD_5594); and
- Springvale Water Treatment Project (SSD_7592).

The scope associated with meeting the conditions of consent for each project is outlined in **Section 1.2**. How they are addressed within this document is detailed in **Table 1**.

1.3 Western Region Biodiversity Offset Strategy Scope

This document builds on five years of offset site investigations and consultations with relevant regulators including the NSW Office of Environment and Heritage (OEH), NSW Department of Planning (DP&E) and Commonwealth Department of Environment and Energy (DoEE). In this respect, the WRBOS scope is outlined below:

- Clarify, where appropriate, offsetting alignment with the FBA (**Section 1.3.3.2 FBA**);
- Identify and define the biodiversity values of the proposed biodiversity offset sites at Carinya, Wolgan Road North Lot 56, Springvale Lot 125 and 2 and Pipers Flat Lot 5 (**Section 2 Biodiversity Offset Lands and Section 3 Offset Values Summary**);

¹ Centennial is part of Banpu, a member of the largest independent pan-Asian coal group. Centennial is a coal mining company supplying thermal and coking coal to the domestic and export markets. Centennial is a major supplier to the NSW energy industry supplying approximately 40% of the State's coal-fired electricity.

- Define the key objectives and management actions for Carinya (**Section 2.1.2 Management Objectives**), Wolgan Road North lot 56 (Section 2.2.2 Management Objectives), Springvale Lot 125 and 2 (Section 2.3.2 Management Objectives) and Pipers Flat Lot 5 (Section 2.4.2 Management Objectives);
- Define the process for delivering biodiversity offsets (**Section 4 Securing Biodiversity Offsets**), by:
 - > entering into a Conservation Agreement for land identified in Section 4 Biodiversity Offset Ledger (**Section 4.1 Conservation Agreement**);
 - > payment to the Biodiversity Conservation Trust (BCT) for credits not accounted for within the Biodiversity Offset Ledger (**Section 4.2 BCT Fund Contribution**); and
 - > supplementary measures (**Section 4.3**).

Table 1 Project Biodiversity Offsetting Commitments

Development Consent Condition Reference	Regulatory Context	Development Consent Condition	Section Addressed																																			
Springvale SSD7592 Schedule 3 Condition 7	FBA	Within 2 years of the commencement of construction, unless the Secretary agrees otherwise, the Applicant must retire biodiversity credits of a number and class specified in Tables 2 and 3 below, to the satisfaction of OEH. The retirement of the credits must be carried out in accordance with the NSW Biodiversity Offsets Policy for Major Projects and can be achieved by: a) Acquiring or retiring credits under the biobanking scheme in the TSC Act; b) Making payments into an offset fund that has been established by the NSW Government; or c) Providing suitable supplementary measures.	a) Table 1																																			
			b) Section 4																																			
		<table><caption>Table 2: Ecosystem credit requirements</caption><thead><tr><th>Biometric Vegetation Type</th><th>Impact Area (ha)</th><th>Credits Required</th></tr></thead><tbody><tr><td>HN514 Broad-leaved Peppermint - Red Stringybark grassy open forest on undulating hills, South Eastern Highlands</td><td>0.47</td><td>22</td></tr><tr><td>HN558 Narrow-leaved Peppermint - Mountain Gum – Brown Barrel moist open forest on high altitude ranges, northern South Eastern Highlands</td><td>1.11</td><td>58</td></tr><tr><td>HN570 Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highland</td><td>21.22</td><td>858</td></tr><tr><td>HN572 Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands</td><td>2.12</td><td>24</td></tr><tr><td>HN599 Sydney Peppermint - Narrow-leaved Peppermint shrubby open forest on sheltered slopes of the Newnes Plateau, Sydney Basin</td><td>0.73</td><td>35</td></tr><tr><td>HN600 Sydney Peppermint - Silvertop Ash healthy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin</td><td>1.71</td><td>91</td></tr><tr><td>HN602 Tableland swamp meadow on impeded drainage sites of the western Sydney Basin and South Eastern Highlands</td><td>0.02</td><td>1</td></tr><tr><td>HN630 Phragmites australis and Typha orientalis coastal freshwater wetlands</td><td>0.46</td><td>8</td></tr></tbody></table> <table><caption>Table 3: Species credit requirements</caption><thead><tr><th>Species</th><th>Credits Required</th></tr></thead><tbody><tr><td><i>Eucalyptus cameronii</i> (Capertee Stringybark)</td><td>39</td></tr><tr><td><i>Caesia parviflora</i> var. <i>minor</i> (Pale Grass-lily)</td><td>42</td></tr><tr><td><i>Chalinolobus dwyeri</i> (Large-eared Pied Bat)</td><td>9</td></tr></tbody></table>	Biometric Vegetation Type	Impact Area (ha)	Credits Required	HN514 Broad-leaved Peppermint - Red Stringybark grassy open forest on undulating hills, South Eastern Highlands	0.47	22	HN558 Narrow-leaved Peppermint - Mountain Gum – Brown Barrel moist open forest on high altitude ranges, northern South Eastern Highlands	1.11	58	HN570 Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highland	21.22	858	HN572 Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands	2.12	24	HN599 Sydney Peppermint - Narrow-leaved Peppermint shrubby open forest on sheltered slopes of the Newnes Plateau, Sydney Basin	0.73	35	HN600 Sydney Peppermint - Silvertop Ash healthy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin	1.71	91	HN602 Tableland swamp meadow on impeded drainage sites of the western Sydney Basin and South Eastern Highlands	0.02	1	HN630 Phragmites australis and Typha orientalis coastal freshwater wetlands	0.46	8	Species	Credits Required	<i>Eucalyptus cameronii</i> (Capertee Stringybark)	39	<i>Caesia parviflora</i> var. <i>minor</i> (Pale Grass-lily)	42	<i>Chalinolobus dwyeri</i> (Large-eared Pied Bat)	9	c) Section 4
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Springvale SSD5594 Schedule 4 Condition 15	Offsets Policy EPBC Act	By the end of December 2016, the Applicant shall update the Western Projects Biodiversity Offset Strategy (RPS Australia East Pty Ltd, 1 October 2014) to provide suitable assessment for: a) the clearing of 4 hectares of native vegetation associated with the construction of Bore 8; and b) the clearing of 8.94 hectares of vegetation associated with the surface infrastructure for the development; to the satisfaction of OEH and the Secretary. These offsets must be developed in accordance with the NSW Biodiversity Policy for Major Projects, or its current version.	a) Table 16 b) Table 16 Table 2 Section 4																																			
Springvale SSD5594 Schedule 4 Condition 16	Offsets Policy EPBC Act	By the end of December 2016, unless the Secretary agrees otherwise, the Applicant shall make suitable arrangements to protect the biodiversity offset areas referred to in condition 15(a)&(b) above in perpetuity, to the satisfaction of the Secretary.	Table 16 Section 4																																			
Clarence DA504-00 Schedule 3 Condition 12A	Offsets Policy EPBC Act	By the end of December 2016, the Applicant shall in consultation with OEH, and to the satisfaction of the Secretary: a) provide a Suitable offset to satisfactorily offset clearing 4.1 hectares of Newnes Plateau Narrow-leaved Peppermint – Silver-top Ash Layered Open Forest and the loss of related biodiversity values, including for threatened species; and b) make Suitable arrangement to manage, protect and provide long-term security in perpetuity for this area, consistent with the relevant NSW Offsets policy.	Table 15 Section 4																																			

Development Consent Condition Reference	Regulatory Context	Development Consent Condition	Section Addressed
Angus Place 06_0021 Schedule 3 Condition 24B	Offsets Policy EPBC Act	By the end of December 2016, the Applicant shall, to the satisfaction of the Secretary: a) provide an area that is Suitable in its vegetation types and extent to satisfactorily offset the residual impacts of clearing approximately 15 hectares of native vegetation and associated with the construction and use of the Mod – 2 ventilation facilities and their supporting surface infrastructure and access tracks/roads, including the residual impacts on <i>Persoonia hindi</i> ; and b) make Suitable arrangements to manage, protect and provide long-term security for this area, consistent with the relevant NSW Offsets policy. In determining a Suitable residual offset, the Secretary will have regard to the outcome of the <i>Persoonia hindi</i> Management and research Program, particularly the success of translocation and/or regeneration, and the Proponent's success in implementing the Rehabilitation Management Plan.	a) Table 16 a) Section 4 b) Section 4
Springvale Coal Services SSD5579 Schedule 3 Condition 25	Offsets Policy EPBC Act	By the end of December 2016, the Applicant shall, to the satisfaction of the Director-General: a) Provide an area that is suitable in its vegetation types and extent to the satisfactorily offset the impacts clearing 10.67 hectares of native vegetation (Coxs Permian Red Stringybark – Brittle Woodland); and to manage, protect and provide long-term security for this consistent with the relevant NSW Offsets policy.	Table 16 Section 4
Springvale Coal Services SSD5579 Schedule 3 Condition 28	Offsets Policy EPBC Act	The Applicant shall ensure that the Biodiversity Offset Strategy and Additional Rehabilitation Initiatives areas, in combination, provide suitable habitat for threatened fauna species recorded on the SCSS, namely the: ■ Brown Tree creeper; ■ Gang-gang Cockatoo; ■ Little Eagle; ■ Scarlet Robin; ■ Large-eared Pied Bat; ■ Eastern Falsistrelle; ■ Eastern Bent Wing bat; and ■ Yellow Bellied Sheathail Bat.	Section 4.2.3
Springvale Coal Services SSD5579 Schedule 3 Condition 29	Offsets Policy EPBC Act	The Applicant shall prepare and implement a Biodiversity Management Plan for the development to the satisfaction of the Secretary. This plan must: a) be prepared in consultation with OEH and Forestry Corporation of NSW, and be submitted to the Secretary by the end of December 2016. b) describe the short, medium and long-term measures that would be implemented to: Manage remnant vegetation and habitat on the Site, and ■ implement the Biodiversity Offset Strategy. a) include detailed performance and completion criteria for evaluating the performance of the Biodiversity Offset Strategy, and triggering any necessary remedial action. b) include a detailed description of the measures that would be implemented over the next 3 years (to be updated for each 3-year period following initial preparation of the plan) for: ■ enhancing the quality of existing vegetation and fauna habitat; ■ establishing native vegetation and fauna habitat in the Additional Rehabilitation Initiatives area through focusing on assisted natural regeneration, targeted vegetation establishment and the introduction of naturally scarce fauna habitat features (where necessary); ■ enhancing the landscaping of the Site and along public roads to minimise visual and lighting impacts, particularly along the Castlereagh Highway; ■ protecting vegetation and soil outside the approved disturbance area; ■ maximising the salvage of resources within the approved disturbance area – including tree hollows and vegetative and soil resource s- for beneficial reuse in the biodiversity offset strategy; ■ collecting and propagating seed; ■ minimising the impacts to fauna on Site, including undertaking pre-clearance surveys; ■ managing any potential conflicts between the proposed restoration works in the Additional Rehabilitation Initiatives area and any Aboriginal heritage values (both cultural and archaeological); ■ managing salinity; ■ controlling weeds and feral pests; ■ controlling erosion; ■ controlling access; and ■ managing bushfire risk.	Section 4.2.1
		a) including tree hollows and vegetative and soil resources – for beneficial reuse in the biodiversity offset b) Identify the potential risks to the successful implementation of the Biodiversity Offset Strategy and include a description of the contingency measures that would be implemented to mitigate against these risks.	

Development Consent Condition Reference	Regulatory Context	Development Consent Condition	Section Addressed
Springvale Coal Services SSD5579 Schedule 3 Condition 30	Offsets Policy EPBC Act	<p>c) Include details of who would be responsible for monitoring, reviewing, and implementing the plan.</p> <p>Within 6 months of the approval of the Biodiversity Management Plan, unless the Secretary agrees otherwise, the Applicant shall lodge a Conservation Bond with DP&E to ensure the Biodiversity Offset Strategy is implemented in accordance with the performance and completion criteria of the Biodiversity Management Plan.</p> <p>The sum of the bond shall be determined by:</p> <ul style="list-style-type: none">a) calculating the full cost of implementing the Biodiversity Offset Strategy (other than land acquisition costs); andb) employing a suitably qualified quantity survey to verify the calculated costs. <p>If the offset strategy is completed generally in accordance with the completion criteria in the Biodiversity Management Plan to the satisfaction of the Secretary, the Secretary will release the bond.</p> <p>If the offset strategy is not completed generally in accordance with the completion criteria in the Biodiversity Management Plan, the Director-General will call in all, or part of, the conservation bond, and arrange for the satisfactory completion of the relevant works.</p> <p>Notes:</p> <ul style="list-style-type: none">■ Alternative funding arrangements for long-term management of the Biodiversity Offset Strategy, such as provision of capital and management funding as agreed by OEH as part of a Biobanking Agreement or transfer to the conservation reserve estate can be used to reduce the liability of the conservation bond.■ The sum of the bond may be reviewed in conjunction with any revision to the Biodiversity Management Plan.	Section 4.2.2

An impact register for projects requiring offsets is provided in **Appendix 1**, which includes an equivalence table that reconciles project reported vegetation map units (DEC 2006) with equivalent BioMetric Vegetation Types (BVT) Database. **Appendix 2** summarises the impact assessments and associated offset requirements in terms of biodiversity credits.

1.4 Background

1.4.1 Project History

The time sequence for projects requiring biodiversity offsets is outlined in **Figure 1**. The length of each bar illustrated for each project is a representation of the approvals timespan; from inception (i.e. first registered with the Department of Planning and onset of the environment approvals process) to acquisition of project approval (i.e. provision of conditional consent).

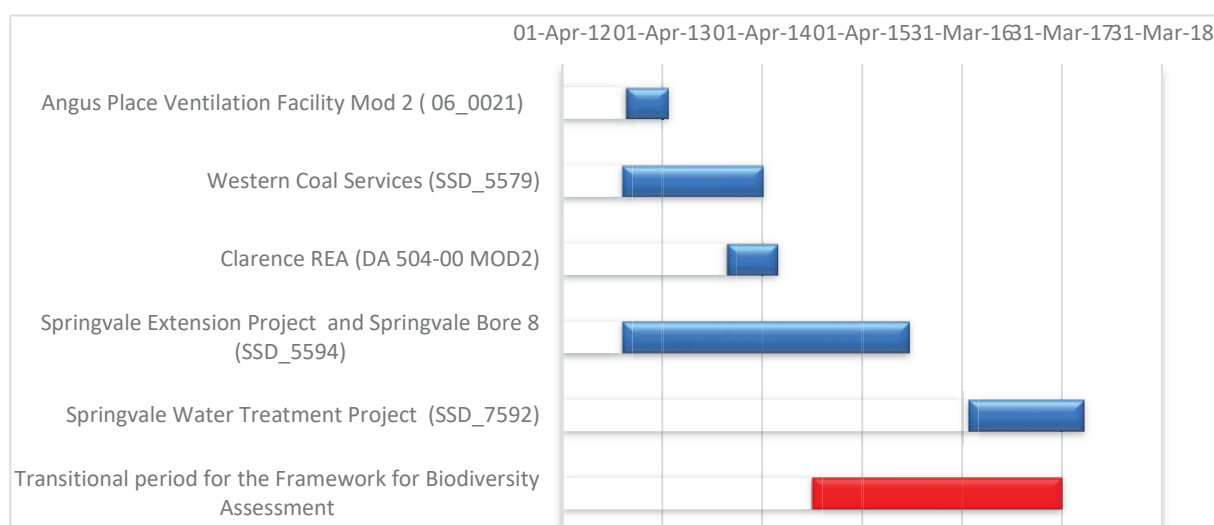


Figure 1 Approvals Timeline for Western Projects post 2012 and Regulatory Framework for Biodiversity Offsetting

The approvals timeframe for western projects partly coincided with the introduction of the NSW Biodiversity Offsets Policy for Major Projects (1 October 2014) and associated FBA. This included a transitional period of approximately 18 months. Further details on the regulatory framework and project specific biodiversity offsetting commitments are provided in the following sections.

1.4.2 Location of Western Region Projects and Offset Sites

Centennial's western region operations in NSW are located in the Lithgow and Mid-Western Local Government Areas. Projects requiring biodiversity offsetting outcomes and reciprocal that are addressed in this strategy are shown in **Figure 2**.







1.4.3 Regulatory Framework

Biodiversity offsets that deliver social, economic and/or environmental co-benefits are encouraged by both the State and Federal governments. These include offsets that increase land connectivity or offsets that protect and manage privately owned land for conservation purposes.

Biodiversity values presented in this document have been quantified in accordance with Part 7A of the *Threatened Species Conservation Act 1995* (TSC Act), otherwise referred to as the Biodiversity Banking and Offsets Scheme or BioBanking, as varied by relevant *in force* biodiversity offsetting policies as listed below:

- NSW Biodiversity Offsets Policy (the 'Offsets Policy') including the FBA; and
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Environmental Offsets Policy.

Legend

-  Angus Place Ventilation Shaft Facility (Excluded from WRBOS)
-  Clarence Colliery Reject Emplacement Area (REA)
-  Springvale Mine Extension Project
-  Springvale Water Treatment Plant
-  Springvale Bore 8
-  Western Coal Services

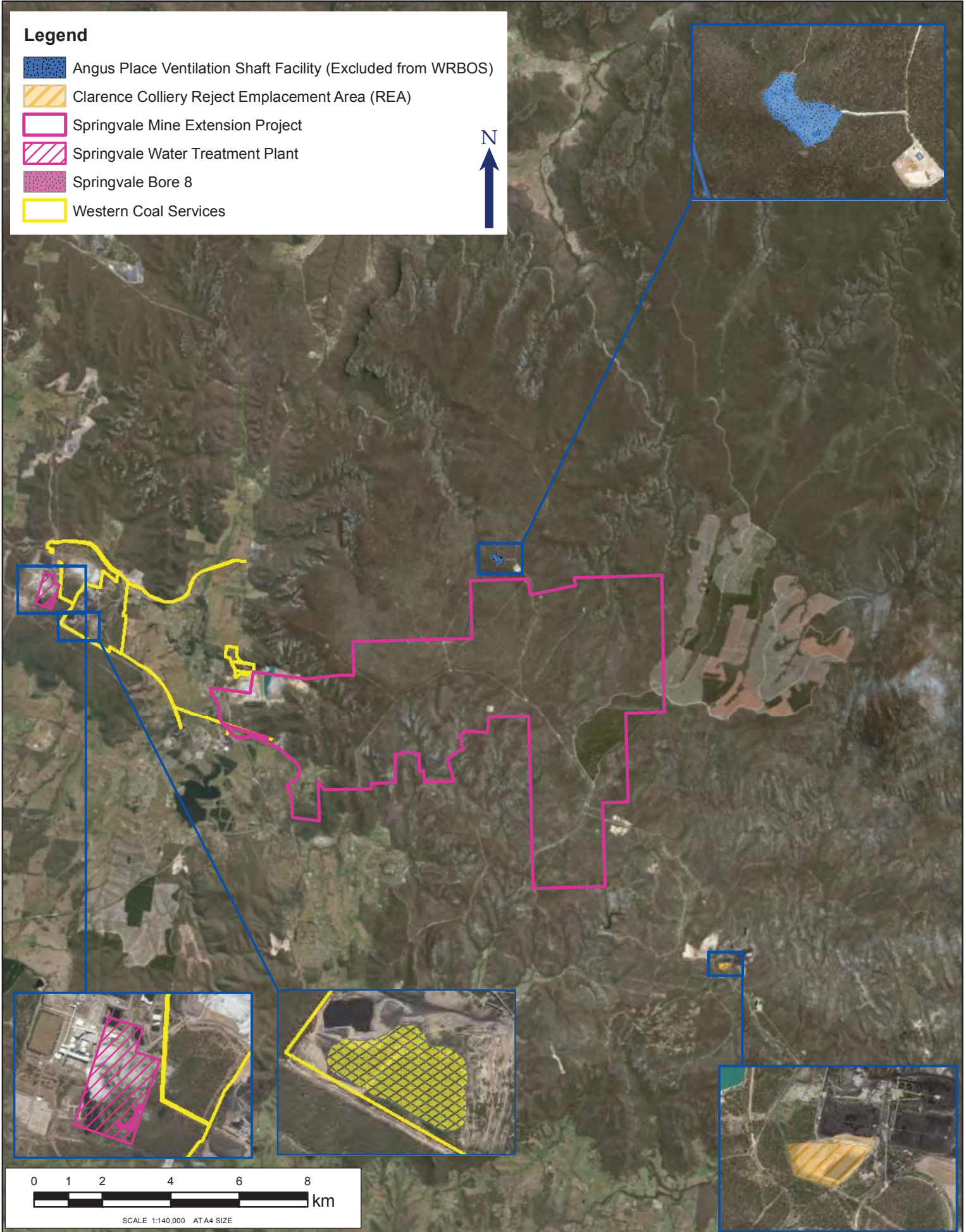


FIGURE 2: PROJECTS INCLUDED IN THE WRBOS

LOCATION: WESTERN REGION	DATUM: GDA94 PROJECTION: MGA Zone 56
JOB NO.: PR 137024	Data Sources: RPS Land and Property 2015
PURPOSE: ECOLOGY	
Technician: james.hugo	Date: 20/2/2018

CLIENT: CENTENNIAL FASSIFERN PTY LTD

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Although the TSC Act has been repealed and replaced by the *Biodiversity Conservation Act 2016* (BC Act) the above framework has been retrospectively applied in the calculation of offsetting obligations as this regulatory framework is consistent with the FBA. An outline of the regulatory framework for determining biodiversity offset liability is outlined in the following sections.

1.4.3.1 NSW Biodiversity Offsets Policy for Major Projects

The Offsets Policy was released by the NSW government in 2014 to standardise biodiversity offsetting for major project approvals. The Offsets Policy is underpinned by six principles, these being:

- Before offsets are considered, impacts must first be avoided and unavoidable impacts minimised through mitigation measures. Only then should offsets be considered for the remaining impacts;
- Offset requirements should be based on a reliable and transparent assessment of losses and gains;
- Offsets must be targeted to the biodiversity values being lost or to higher conservation priorities;
- Offsets must be additional to other legal requirements;
- Offsets must be enduring, enforceable and auditable; and
- Supplementary measures can be used in lieu of offsets.

The principles of the Offsets Policy only apply to the Springvale Water Treatment Project (i.e. biodiversity offsetting for this project was handled in accordance with the FBA). While not explicitly adhered to, Centennial has taken into consideration the offsetting principles for the remaining projects included in the WRBOS. In preparing the WRBOS, Centennial has:

- Retrospectively incorporated the FBA principles, where possible, after first considering the compatibility of a Project's conditions of consent. The WRBOS was originally developed and exhibited prior to the release of the Offset Policy;
- Use 'like for like' offsetting objectives to compensate for biodiversity values directly impacted by a Project. Like for like has been used where possible; however, it has been necessary to vary the like for like at a PCT level in many instances to be replaced with the appropriate formation level vegetation. This has been achieved by the application of the variation rules and by taking into consideration that the WRBOS was original developed and exhibited prior to the Major Projects Offset Policy release; and
- Incorporated the use of mechanisms that would result in enduring conservation outcomes.

Table 2 specifies how the WRBOS relates to these principles.

1.4.3.2 Framework for Biodiversity Assessment

Strict compliance with the FBA is required for SSD7592 (i.e. Stage 3 of the FBA). For the other projects, where compliance with FBA is not required, a contemporary approach has been adopted that is generally consistent with the FBA as agreed during consultation with OEH. The following FBA components have been considered in the preparation of the WRBOS for the projects not bound by this regulatory requirement:

- Document structure and minimum detail for content;
- Management Actions;
- Biodiversity Offset Measures; and
- Inclusion of BioBanking Reports.

Compliance with the FBA for SSD7592 is outlined in the WRBOS where required.

Table 2 NSW Biodiversity Offsets Policy for Major Projects

Principle	How Addressed
Before offsets are considered, impacts must first be avoided and unavoidable impacts minimised through mitigation measures. Only then should offsets be considered for the remaining impacts	Chapter 8 of the Springvale EIS discusses the constraints to the mine design that have been identified and included in mine planning considerations. The proposed avoidance measures have successfully avoided all TSC Act listed threatened flora and fauna species. All direct clearing impacts to Endangered Ecological Communities (EEC) have been avoided, with the exception of 0.22 hectares (ha) of the EEC Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland. Mine design, including positioning of longwalls and reduction in void width ensures that significant subsidence impacts to sensitive biodiversity values are also avoided.
Offset requirements should be based on a reliable and transparent assessment of losses and gains	This report assesses several key variables when considering the suitability offset sites for projects, including: <ul style="list-style-type: none"> ■ vegetation areas; ■ habitat area for fauna species; ■ counts of flora species; and ■ Indicative ecosystem credits and species credits generated using the FBA. These variables have been applied to all projects.
Offsets must be targeted to the biodiversity values being lost or to higher conservation priorities	This report analyses the above variables in terms of the potential to satisfy like for like populations and habitats. Vegetation types within conservation areas have been matched with vegetation types being impacted wherever possible.
Offsets must be additional to other legal requirements	All offsets proposed as part of this Strategy are not part of any other legal requirement of any development project not covered by this Strategy.
Offsets must be enduring, enforceable and auditable	Various protection mechanisms are proposed based on the requirements of each conservation site. All have been demonstrated as enduring, enforceable and auditable in Section 4 .
Supplementary measures can be used in lieu of offsets	Supplementary measures, as identified in this report, have been included to complement the offset strategy and to reduce the monitoring effort required to establish impacts, see Section 4 of this report.
Offsets can be discounted where significant social and economic benefits accrue to NSW as a consequence of the proposal	The offsets required for the projects have been quantified in the context of the biodiversity values, for which the offset land holds high conservation priorities. With the social and economic contributions proposed by the projects (discussed in Chapter 6 of the respective EISs), the offset strategy itself provides significant social and economic benefits to the NSW community through: <ul style="list-style-type: none"> ■ conservation in perpetuity of high priority biodiversity values ■ proximity of offset land to existing reservations ■ provision of financial support to achieve agreed criteria for conservation ■ provision of access to conserved land for tourism and recreational purposes ■ investment in research, recovery and maintenance plans to understand potential threats to conservation outcomes and integrate this understanding with values of adjacent National Parks, World Heritage Areas and National Heritage Places ■ The biodiversity Strategy presented in the respective EISs presents an opportunity cost to Centennial; however, it also provides a long term benefit to the community.

1.4.3.3 EPBC Act Environmental Offsets Policy

Table 3 below identifies the requirements the EPBC Act Offsets Policy and how it relates to the WRBOS.

Table 3 EPBC Act Environmental Offsets Policy

EPBC Act Principle	How Addressed
Suitable offsets must deliver an overall conservation outcomes that improves or maintains the viability of the protected matter	As no direct impacts to protected matters are predicted, and the residual impacts following avoidance and mitigation measures are not significant, direct offsets are not required.
Suitable offsets must be built around direct offsets but may include other compensatory measures	As no direct impacts to protected matters are predicted, and the residual impacts following avoidance and mitigation measures are not significant, direct offsets are not required. Regardless, the offset strategy proposed includes measures to mitigate and if required, offset THPSS EEC. Further compensatory measures will be implemented, supporting clear conservation objectives and reducing the monitoring related impacts to the Newnes Plateau.
Suitable offsets must be of a size and scale proportionate to the residual impacts of the protected matter	The WRBOS has been prepared to analyse the suitability of biodiversity offsets and supplementary measures for the impacts of approved and future project both in terms of size and value.
Suitable offsets must effectively account for and manage the risks of the offset not succeeding	Centennial aims to provide successful offsetting outcomes by providing high conservation value land already owned by the company. Centennial will also develop completion criteria for biodiversity offsets within individual biodiversity offset strategies. In the unlikely event that the offset does not succeed, Centennial will include provision for offset management in the security held by the Division of Resources and Energy under the <i>Mining Act 1992</i> .
Suitable offsets must be additional to what is already required, determined by law or planning regulations, or agreed to under other schemes or programs	The proposed offset lands are not associated with any other offset requirements or proposals.
Suitable offsets must be efficient, effective, timely, transparent, scientifically robust and reasonable	As the land is owned by Centennial, the offset can be secured for the life of the Projects immediately upon grant of consent. The offset land is effective as, outlined in this Strategy, the land provides connectivity to the Airlie State Forest, Ben Bullen State Forest, the Capertee National Park and the Mugii Murum-ban State Conservation Area and the Greater Blue Mountains World Heritage Area. Management actions and completion criteria identified in this Strategy will result in effective and timely offset security.
Suitable offsets must have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced	The offsets lands are owned by subsidiaries of Centennial Company, and as such a baseline condition against which the success of completion criteria can be measured, has been undertaken. This, along with a restrictive covenant arrangement for the land, or consent requirements, will ensure the offset can be measured, monitored and audited in accordance with the completion criteria described in this Strategy.

1.5 Consultation

1.5.1 Overview

Consultation with the NSW OEH, DPE and DoEE is an integral part the WRBOS. The purpose of the consultation undertaken during the EIS process for each Project was to gain in principle agreement for offsetting biodiversity values directly impacted by Centennial operations, thereby providing greater clarity

on how biodiversity offsets would be delivered for future project. Records for consultation undertaken for each Project are included in Chapter 7 of each respective EIS.

1.5.2 Western Region Biodiversity Offset Strategy Development

Centennial commenced consultation on a biodiversity offset strategy for the western region in 2012. Centennial received correspondence from the OEHL on 7 November 2012 recommending the development to a Regional Strategy. Subsequently, a Western Region Biodiversity Offset Strategy was submitted for the Springvale Extension Project SSD5594 develop and submitted in April 2014.

1.5.3 Western Region Biodiversity Offset Package 2016

Centennial met with the OEHL in Dubbo on Wednesday 2 November 2016 to discuss the adequacy of the WRBOP and subsequently provided a reviewed document on the 18 November 2016 incorporating feedback from the meeting. An updated version of the document was submitted on the 23 December 2016 for further adequacy comments.

1.5.4 Western Region Biodiversity Offset Strategy 2017

Centennial has undertaken an extensive revision of the WRBOS in 2017 following correspondence received from OEHL on 21 July 2017 and a meeting with DP&E and OEHL on 10 August 2017. The outcomes of the meeting were:

- Additional lands required to be secured as part of the offset strategy would need to be identified to contain 'like for like' vegetation communities and demonstrate application of variation rules where 'like for like' vegetation communities are not identified in accordance with the FBA;
- Where satisfaction of variation rules are unable to be obtained, remaining biodiversity offset credits may be secured through payment into the Biodiversity Conservation Trust Fund as established under the BC Act; and
- Biodiversity offset lands are to be secured through a Tier 2 Conservation Agreement (Section 5.20 of the BC Act).

A written response to the OEHL feedback on the revised WRBOS, as received on 21 July 2017, is provided in **Table 4**.

Table 4 Response to OEH Consultation

OEH Comment	Response
<p>1. Centennial Coal to provide documentation that 'all reasonable steps' (in accordance with the NSW Biodiversity Offsets Policy for Major Projects) have been undertaken to attempt to secure like-for-like offsets prior to using offset variation rules.</p>	<p>Matter only relates to SWTP (i.e. requirement to comply with FBA).</p> <p>a) Checking the BioBanking public register and placing an expression of interest for credits wanted on it for at least six months</p> <p>On 23 March 2017 RPS conducted searches on Centennials behalf for the required like for like credits on the OEH BioBank site expression of interest website.</p> <p>On 23 March 2017 RPS advertised on Centennials behalf for like for like credits wanted on the OEH expression of interest website. This has meant that the required six month period concluded on 23 September 2017.</p>
	<p>b) Liaising with an OEH office and relevant local councils to obtain a list of potential sites that may meet the requirements for offsetting</p> <p>Centennial liaised with OEH on 6 July 2017 and the City of Lithgow Council (LCC) on 10 July 2017 in an attempt to locate the like for like credits. OEH advised Centennial on 7 July that they were unaware of the availability of suitable offset sites. The same result was reached with LCC through verbal discussions in September 2017.</p>
	<p>c) Considering properties for sale in the local area</p> <p>On 23 March 2017 RPS advertised on Centennials behalf for credits wanted on the OEH expression of interest website.</p>

OEH Comment	Response
	<p>d) Providing evidence of why offset sites are not feasible; suitable evidence may include:</p> <ul style="list-style-type: none"> i. The willingness of a landowner to sell or establish a biobank site; and ii. The cost of an offset itself should not be a factor unless it can be demonstrated the landowner is charging significantly above market rate. <p>The above process resulted in one person coming forward with 9 credits for a disturbed variant of HN620. However, this is an area which would be too small to develop into a BioBank site and there is an area of HN602 within Wolgan Road offset site which provides suitable offsets at the formation level. Furthermore, the proposed offset area of HN602 adjoins other areas which are proposed to be used as offsets and it aligns with an EEC, namely: <i>Montane peatlands and swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions</i> as listed under the BC Act.</p> <p>Further desktop investigation and field verifications surveys were performed by RPS across other Centennial owned lands to locate like for like credits at the BVT level and at the very least to address any shortfalls at the formation level. See Table 15.</p>
2. Centennial Coal to calculate the credit value (using the BioBanking Credit Calculator) of all offset vegetation zones using field data (collected in accordance with the FBA) from each offset site.	This has been conducted by RPS and the previous notional assessments have been updated with accurate ground truthed datasets (refer to Section 3 and Appendix 2).
3. Centennial Coal to provide all biometric and floristic plot data and spatial files relating to the development and offset sites to OEHL for review.	This is a digital product that will be supplied to OEHL with the final version of the WRBOS.
4. All offset sites should be secured using BioBanking agreements.	Part 7A of the TSC Act was repealed on 25 August 2017. Alternate conservation mechanisms now exist under the BC Act. The preferred conservation mechanism is Conservation Agreement under Section 5.20 of the BC Act (Section 4). The Conservation Agreement was identified as the suitable retirement mechanism by OEHL (Section 1.4.4).
5. Supplementary offset measures are only to be proposed where it can be demonstrated that all	The reasonable steps which have been undertaken have been outlined above in the response to (1) a-d in this table. See Section 4 and Appendix 1 .

OEH Comment	Response
reasonable steps to find appropriate like-for-like offset sites have been undertaken.	
<p>6. Centennial Coal is to find an alternative, suitable offset option for the impact on 123 credits of HN558.</p>	<p>The offset requirement for HN558 has been revised following a critical review of this BVT classification in the impact register (i.e. is the vegetation appropriately classed as 'wet sclerophyll forest (shrubby)'?). A 'similarity assessment' using plot data agglomerative hierarchical clustering techniques was performed in PRIMER concurrently with an application of the Keith (2004) key for vegetation formation (see Appendix 3). This analysis shows HN559 as being the most appropriate BVT classification for vegetation previously aligned with HN558 (i.e. vegetation being impacted belongs to the 'dry sclerophyll forests' vegetation formation, not the 'wet sclerophyll forests (shrubby)' vegetation formation). This revised classification was universally applied to the impacts register with the exception of the Springvale Water Treatment Project (i.e. consent specifically states a requirement to offset impacts on HN558).</p> <p>For similar reasons, a 'similarity assessment' was also applied to vegetation classed as HN590 (i.e. critical review of vegetation assigned to 'wet sclerophyll forests (grassy)' vegetation formation). A similar outcome was concluded for HN590, with a revised vegetation formation ('grassy woodlands') and BVT (i.e. HN572) applied.</p> <p>This analysis was a significant step in demonstrating like-for-like offsets at the formation level. Revised 'like for like' offsetting on this basis is summarised in Table 15.</p>
<p>7. Centennial Coal is to find an alternative, suitable offset option for the impact on 65 credits of HN558.</p>	<p>This deficit has been largely rectified as per above in 6.</p>
<p>8. Centennial Coal is to calculate the number of credits and find an alternative, suitable offset for the impact on 0.07 hectares of HN508.</p>	<p>This has been rectified through further field validation surveys, which has identified like for like credits in the Wolgan Road offset site. See Table 15.</p>
<p>9. Centennial Coal should consider offsetting the 0.16 hectares of HN508 with credits of HN614 as OEH estimates there are 371 surplus HN614 credits at the Carinya Offset Site.</p>	<p>This has been rectified through further field validation surveys, which has identified like for like credits in the Springvale offset site. See Table 15.</p>
<p>10. Centennial Coal is to find alternative, suitable offset options for the impacts on 58 credits of HN558 and 8 credits of HN630.</p>	<p>This has been rectified through the reclassification of HN558 (see Appendix 3) and further field validation surveys, which has identified like for like credits at the formation level available at Wolgan Road and Carinya offset sites. See Table 15.</p>

OEH Comment	Response
11. Centennial Coal is to find alternative, suitable offset options for the impact on 81 credits of HN558 and 14 credits of HN590.	This has been rectified through further field surveys identifying like for like credits at the formation level available at Wolgan Road and Carinya offset site. However, there is an overall deficit of 46 credits for HN558, which are not available and may require supplementary measures or an offset fund deposit (Section 4 and Appendix 2)

1.5.5 Western Region Biodiversity Offset Strategy 2018

Correspondence from the submission of the December 2017 WRBOS was provided by the OEH on 1 February 2018. This version of the WRBOS addresses the requirements and discrepancies raised by OEH in that letter. The outcomes of the correspondence are summarised as follows:

- The provision of credits of HN570 variation has been replaced by the provision of 513 HN570 like for like credits from Pipers Flat Lot 5 DP858201.
- 39 *Veronica blakelyi* credits cannot be offset for the required 42 *Caesia parviflora var. minor* credits, however a research program has been supported as a supplementary measure for the loss of *C. parviflora var. minor* by OEH. Subsequently, the WRBOS adopts this supplementary measure to offset the loss of *C. parviflora var. minor*.

A written response to the OEH feedback on the revised 2017 WRBOS, as received on 1 February 2018, is provided in **Table 5**.

Table 5 Response to 2018 OEH Consultation

OEH Comment	Response
<p>1. Reclassification of HN558 to HN599 and HN590 to HN570</p> <p>OEH accepted the use of BVTs that align most closely to the vegetation surveyed for the WRBOS. OEH accept the use of BVT HN559 and HN572 for calculation of offsets in the WRBOS due to their fit against flora data.</p>	<p>Appendix 3 Critical Review of HN558 and HN590 is attached to this WRBOS. No further action is required.</p>
<p>2. Revised credit ledger and application of variation rules approved by the FBA.</p> <p>OEH was satisfied that the variations proposed in the WRBOS meet the requirements of section 10.5.4.2 of the FBA aside from one not meeting requirement (c). In the case of HN570, variation applied to HN534 for 58 credits and HN544 for 454 credits is not accepted.</p>	<p>Like for like credits were sought from additional Centennial owned lands. Specifically, the required 513 credits of HN570 were located at Pipers Flat Lot 5 Offset Site which has now been included in the WRBOS.</p>
<p>3. <i>Caesia parviflora var. minor</i></p> <p>OEH did not accept the application of the species credit variation rules for <i>Vernonia blakelyi</i> and <i>Caesia parviflora var. minor</i> as the life-form for <i>V. blakelyi</i> and <i>C. parviflora var. minor</i> were not the same. Instead, OEH was in support of a research program as a supplementary measure for the loss of <i>C. parviflora var. minor</i>.</p>	<p>Centennial is satisfied with the supplementary measure proposed by OEH and will include this measure within the WRBOS to offset the loss of <i>Caesia parviflora var. minor</i>. The research areas provided by OEH, and Centennial's proposed focus from OEH feedback is presented in Section 4.3.2.</p> <p>However, it should be noted that, the Bionet Atlas data stipulates that <i>Veronica blakelyi</i> is both a Shrub and a Forb life-form and <i>Caesia parviflora var. minor</i> is a Forb life-form.</p>
<p>4. Securing Offset Agreements</p> <p><u>Biobanking Agreements</u> Biobanking agreements are required for any projects approved after October 2014, including the Springvale Water Treatment Project (SSD7592) and Springvale Mine Extension Project (SSD5594).</p>	<p>BioBanking Agreements have been established for BA425 Wogan Road North Lot 56; BA425 Springvale Lot 125; and BA 448 5Pipers Flat Lot 5 accordingly.</p>

OEH Comment	Response
<p><u>Conservation Agreements</u></p> <p>Conservation agreements can be used to secure offsets where conditions of consent were issued prior to the commencement of the Biodiversity Offsets Policy for Major Projects in October 2014. These include Clarence (DA 504-00), Western Coal Services (SSD5579) and Angus Place Ventilation Facility (06_0021).</p>	

1.6 Assumptions and Limitations

1.6.1 Datasets

The WRBOS has been prepared from a variety of information sources with the purpose of the document designed to illustrate how Centennial Coal would deliver biodiversity offsets on a project by project basis. The validation surveys conducted by RPS in 2017 (i.e. vegetation mapping, plot data and targeted surveys) have been used to update prior strategies that were based on notional datasets. The validation works have increased the accuracy of ecosystem and species credit calculations.

Benchmark data or local data from nearby developments have been used to estimate biodiversity credits liability for projects included in this strategy as the impacts on these Projects has already occurred (i.e. vegetation already cleared).

1.6.2 Biodiversity Reforms

Biodiversity Reforms gazetted on 25 August 2017 including the BC Act and the *Local Land Services Amendment Act 2016*. The assessment framework established through these reforms will not be retrospectively applied to previously approved projects. However, the delivery of biodiversity offsetting outcomes specified in this document is to comply with in force options specified under the BC Act as legislation regulating prior offset mechanisms are no longer available.

1.6.3 Credit Calculations

Credit calculations for impact and offset sites are included in **Appendix 2**. The credit calculations were conducted using version 4 of the BioBanking Credit Calculator and for impact sites which were linear in nature the linear tool was used. As previously stated, where impact areas were already disturbed benchmark or nearby plot data in the same BVTs was used.

1.6.4 Successive Review of the Biodiversity Offset Strategy

Centennial first submitted the Western Region Biodiversity Offset Package (BOP) in 2014 to address the offset requirements for the Springvale Extension Project. The BOP was written prior to the NSW Biodiversity Offsets Policy for Major Projects and the EPBC Act Environmental Offsets Policy being in force (October 2014). At that time, neither offsetting framework was specified in the terms of reference for the assessment of this project. OEHL has since made it evident that as the Springvale Extension Project was approved post October 2014, the project will require credits to be retired using a Biobank agreement and is required to comply with the NSW Biodiversity Offsets Policy for Major Projects

2.0 Biodiversity Offset Lands

The purpose of the WRBOS is to demonstrate the suitability of offset sites, as listed in **Table 6**, thereby satisfy the conditions of consent for each project specified in **Section 1.1**.

Table 6 Biodiversity Offset Sites included in the WRBOS

Site	Lot and DP
Carinya	Lot 163 DP48336 (land area partly comprising offset)
Wolgan Road North Lot 56	Lot 56 DP751636 (land area partly comprising offset)
Springvale Lots 125, 1 and 2	Lot 125 DP751651 (land area comprising offset) Lot 2 DP835651 (land area partly comprising offset)
Pipers Flat Lot 5	Lot 5 DP858201 (land area partly comprising offset)

Direct offset areas deliver conservation outcomes through maintaining or enhancing vegetation and habitat through land management activities and selected targeted actions consistent with relevant Save Our Species programs. The following sections describe each offset site displayed on **Figure 3** in terms of their respective management objectives, biodiversity values and management focus. Conservation mechanisms proposed for each offset site is outlined in **Section 4**.

The following sections describe each of the offset sites in terms of their location, broad management objectives, current biodiversity values and biodiversity offsetting values including FBA compliant credit calculations for BVTs and threatened species habitat not predicted by BVTs (i.e. species credits). **Section 4** provides details on the conservation mechanisms and management requirements delivering the biodiversity offset outcomes within these lands.

2.1 Carinya

2.1.1 Location

The Carinya Offset lands comprise one lot (**Table 7**) located in Central Western NSW as shown in **Figure 4**. The land is located between the Airly State Forest, Capertee National Park and Mugii Murum-ban State Conservation Area. It is proposed the area will make a substantial contribution in connectivity between these existing biodiversity conservation areas. Land within this lot is only partially being offset.

2.1.2 Management Objectives

Key enhancement and management objectives of the site are:

- Exclude commercial apiaries;
- Exclude miscellaneous feral species;
- Fox control;
- Slashing;
- Feral and/or over-abundant native herbivore control;
- Removal of grazing pressures;
- Weed removal / control; and
- Rabbit control.

2.1.3 Current Biodiversity Values

Two native vegetation types have been identified (**Table 7**) and mapped within the Carinya Offset Site (**Figure 4**) as displayed in **Table 7**.

Table 7 Vegetation within the Carinya Offset Site

BVT	Map Unit (MU) (DEC 2006)	Area (ha)
HN534	MU 21 Capertee – Wolgan Slopes Red Box – Grey Gum – Stringybark Grassy Open Forest MU 21 Derived Capertee – Wolgan Slopes Red Box – Grey Gum – Stringybark Grassy Open Forest MU 21 Type 2 Derived Capertee – Wolgan Slopes Red Box – Grey Gum – Stringybark Grassy Open Forest (Bracken Fern) MU 38 Capertee Grey Gum – Narrow-leaved Stringybark – Scribbly Gum – Callitris – Ironbark Shrubby open Forest MU 38 Derived Capertee Grey Gum – Narrow-leaved Stringybark – Scribbly Gum – Callitris – Ironbark Shrubby open Forest	97.50
HN544	MU 42 Capertee Hills White Box – Tumbledown Redgum Ironbark – Callitris Shrubby Woodland	35.05
Total		132.55

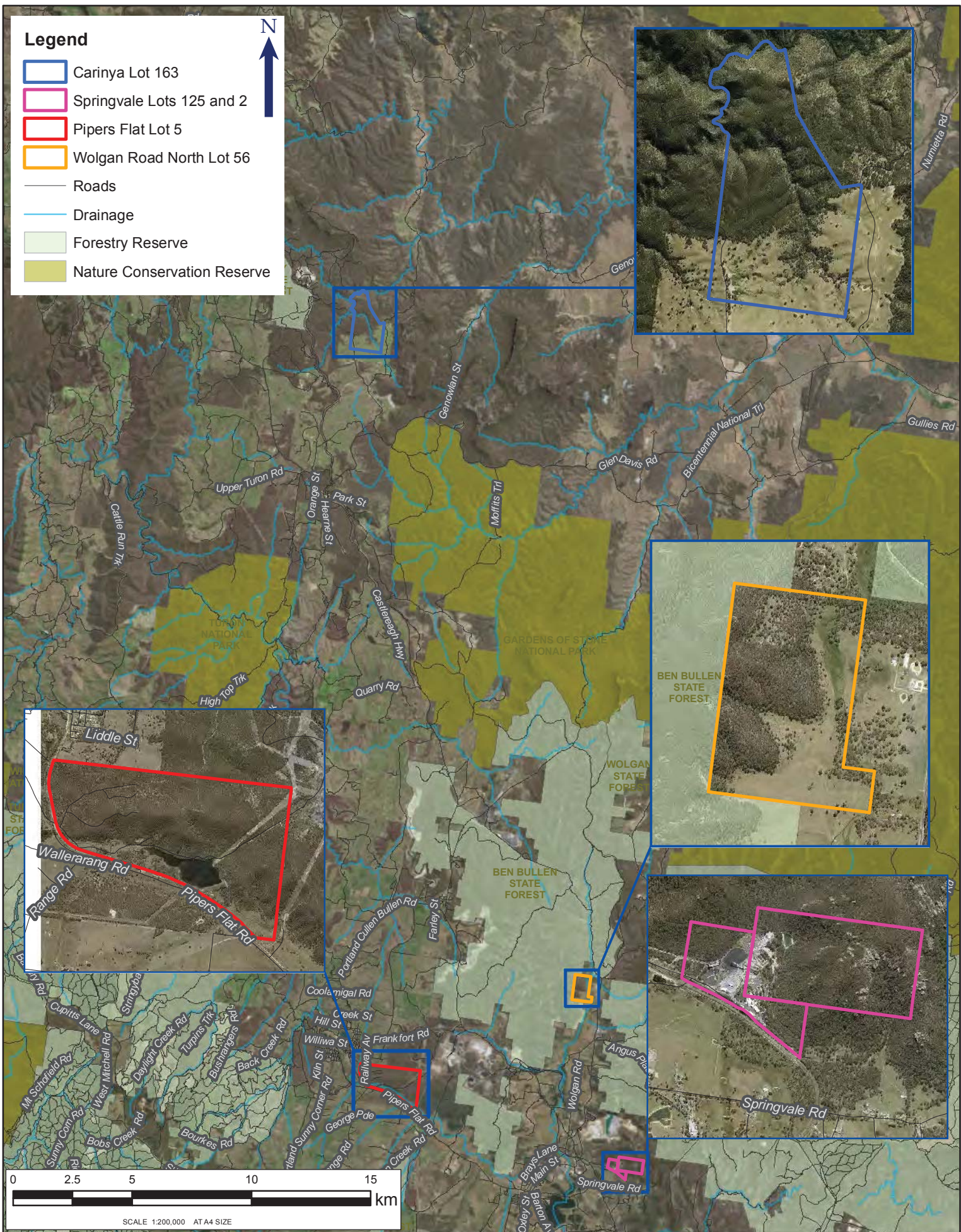


FIGURE 3: WESTERN REGION BIODIVERSITY OFFSETS

LOCATION: WESTERN REGION	DATUM: GDA94
	PROJECTION: MGA Zone 56
JOB NO.: PR 137024	Data Sources:
PURPOSE: ECOLOGY	RPS
Technician: Natalie Wood	Land and Property 2015
Date: 31/10/2018	

CLIENT: CENTENNIAL FASSIFERN PTY LTD

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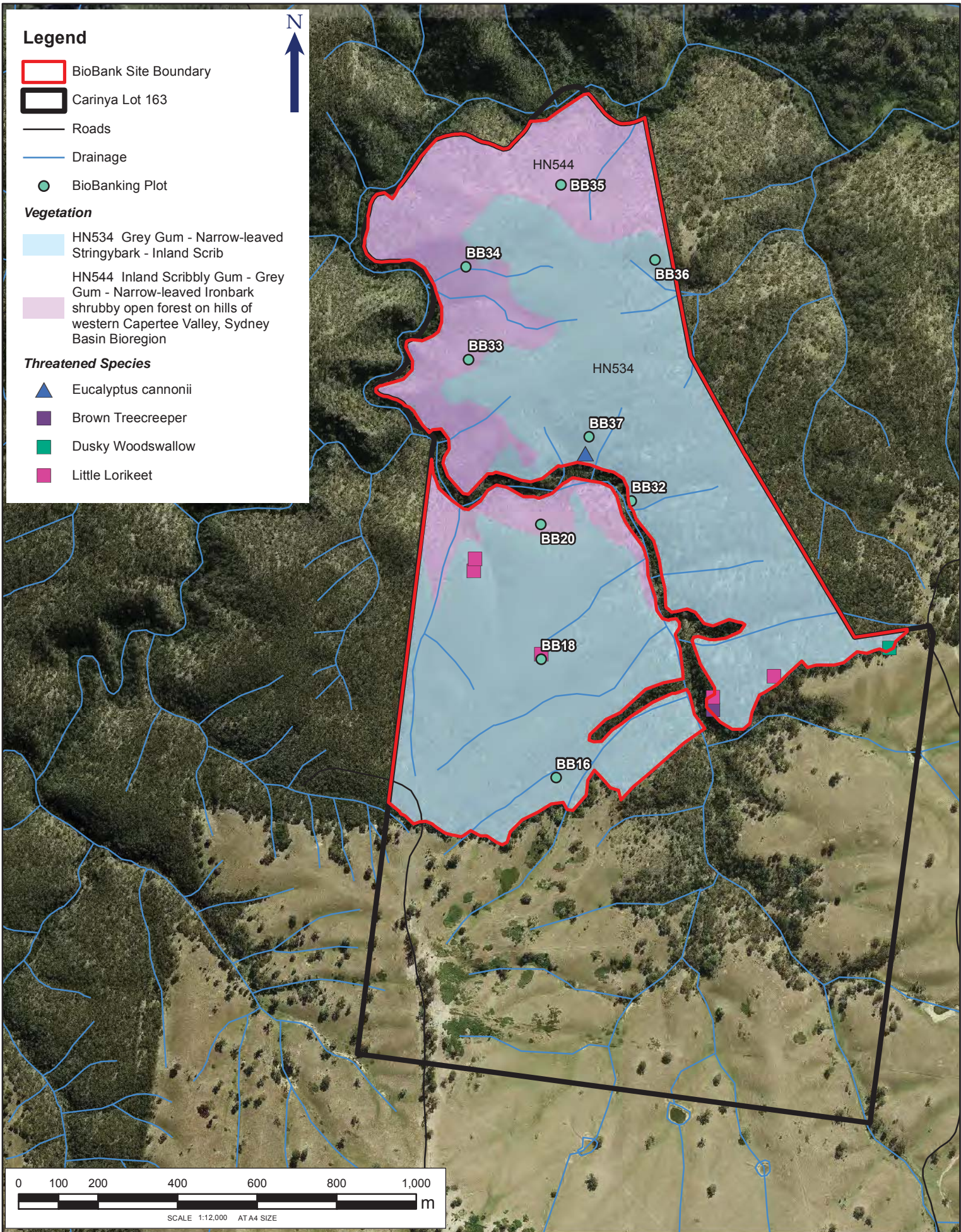


FIGURE 4: CARINYA BIODIVERSITY OFFSET LANDS

LOCATION: CARINYA LOT 163	DATUM: GDA94
	PROJECTION: MGA Zone 56
JOB NO.: PR 137024	Data Sources:
PURPOSE: ECOLOGY	RPS
Technician: james.hugo	Land and Property 2015
Date: 23/2/2018	

CLIENT: CENTENNIAL FASSIFERN PTY LTD

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Native vegetation associated with overcleared landscapes occurs within the Carinya Offset lands. Land cover that typically occurred on these overcleared areas was typically characterised by grassy woodlands, which are now commonly represented by scattered trees and disturbed (derived) grasslands as shown in **Plate 1**.



Plate 1 Box-Gum Woodland within the Carinya Offset Site

The site includes riparian vegetation of Torbane Creek. The creek contains Capertee - Wolgan Riparian Rough-barked Apple - River Oak Open Forest in good condition (**Plate 2**).



Plate 2 Riparian vegetation along Torbane Creek

The contiguous remnant vegetation within the northern portion of these lots is in good condition and, where vegetated, is assumed to be in a condition consistent with the neighbouring Airly State Forest, Muggi Murumban State Conservation Area and Capertee National Park (**Plate 3**).



Plate 3 Dry woodland within Carinya Offset adjacent to Capertee National Park and Airly State Forest

HN534 is habitat for *Eucalyptus cannonii* (Capertee Stringybark) (**Plate 4**) with multiple records for this species collected from within these vegetation communities in the locality.



Plate 4 *Eucalyptus cannonii* fruit within the Carinya Offset site

2.1.4 Biodiversity Offset Values

This site is comprised of a variety of vegetation communities. The site provides habitat for threatened flora and fauna species listed under the BC Act and EPBC Act. The offset value of this site includes:

- Known habitat for threatened species; and
- Wildlife linkages between Airly State Forest, Capertee National Park and Mugii Murum-ban State Conservation Area.

Site investigations have confirmed the presence of three threatened fauna species listed as vulnerable under the BC Act including:

- Brown Treecreeper (*Climacteris picumnus*) Vulnerable under the BC Act;
- Dusky Woodswallow (*Artamus cyanopterus*) Vulnerable under the BC Act; and
- Little Lorikeet (*Glossopsitta pusilla*) Vulnerable under the BC Act.

2.1.5 Credit Calculations

The 132.55 hectares of offset lands listed above (**Table 8**) (excluding exotic vegetation) have been calculated to generate 1,632 ecosystem credits. The summary in **Table 8** below provides the ecosystem credits generated for each BVT, including the vegetation condition) at the Carinya Offset Site and the associated development consent allocated to this offset. No credits remain as the site will be secured using a Conservation Agreement where further credits can be retired.

Table 8 Credit Calculations from Carinya Lot 163 Site

BVT	Credit Calculations
HN534 Moderate/Good	Credits Available - 1229
	Credits Utilised - 1225 6 ecosystem credits are to provide offsets for the Springvale Extension Project (SSD5594 – Schedule 4 Condition 15 (b)); 204 ecosystem credits are to provide offsets for the Clarence REA (DA 504-00 MOD2 2 Condition 12A (a) and (b)); 292 ecosystem credits are to provide offsets for the Western Coal Services (SSD5579 - Condition 25 (a) and (b)); 191 ecosystem credits are to provide offsets for the Springvale Bore 8 (SSD5594 Schedule 4 - Condition 15 (a)); and 532 ecosystem credits are to provide offsets for the Angus Place Ventilation Facility ((project application: 06_0021) Mod 2 - Condition 24B (a) and (b)).
	Credits Remaining - 0
HN544 Moderate/Good	Credits Available - 403
	Credits Utilised - 403 403 ecosystem credits are to provide offsets for the Western Coal Services (SSD5579 - Condition 25 (a) and (b)).
	Credits Remaining - 0

2.2 Wolgan Road North Lot 56 Offset Site

2.2.1 Location

The Wolgan Road North Lot 56 Offset Site is bounded on its western and north-eastern boundary by Ben Bullen State Forest. The eastern boundary of the site is bounded by Wolgan Road, with remnant vegetation along Lambs Creek connecting the site to the Newnes State Forest, approximately 500m to the east.

2.2.2 Management Objectives

Key enhancement and management objectives of the site are:

- Control of feral pigs;
- Feral and/or over-abundant native herbivore control;
- Fox control;
- Exclude commercial apiaries;
- Exclude miscellaneous feral species;
- Removal of grazing pressures;
- Riparian restoration along Coxs River and drainage lines;
- Native species planting within derived native grasslands, including *Eucalyptus aggregata* and *Eucalyptus cannonii*; and
- Weed removal / control.

Conservation management actions will be discussed in consultation with the BCT and OEH to further develop enhancement and management objectives of the site.

2.2.3 Current Biodiversity Values of the Offset Site

Eight native vegetation types have been identified (Table 9) and mapped (Figure 5).

Table 9 Vegetation within the Wolgan Road North Lot 56 Offset Site

BVT	Map Unit (MU) (DEC 2006)	Area (ha)
HN504	MU 15 Tableland Hollows Black Gum – Black Sally Open Forest EEC ² MU 15 Derived Tableland Hollows Black Gum – Black Sally Open Forest	7.07
HN508	MU 43 Pagoda Rock Sparse Shrubland	0.25
HN570	MU 37 Coxs Permian Red Stringybark – Brittle Gum Woodland MU 37 Derived Coxs Permian Red Stringybark – Brittle Gum Woodland	27.14
HN572	MU 11 Tableland Gully Snow Gum – Ribbon Gum Montane Grassy Forest EEC ² MU 11 Derived Tableland Gully Snow Gum – Ribbon Gum Montane Grassy Forest	8.19
HN590	MU 35 Tableland Gully Mountain Gum – Broad-leaved Peppermint Grassy Forest	0.25
HN599	MU 8 Newnes Sheltered Peppermint – Brown Barrel Shrubby Forest;	2.68
HN600	MU 28 Sandstone Plateau and Ridge Scribbly Gum – Silvertop Ash Shrubby Woodland MU 29 Sandstone Slopes Sydney Peppermint Shrubby Forest MU 30 Exposed Blue Mountains Sydney Peppermint – Silvertop Ash Shrubby Woodland	7.74
HN602	MU 53 Mountain Hollow Grassy Fen EEC ³	3.90
Total		57.22

² Part of the *Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland* endangered ecological community (EEC) as listed under the BC Act

³ Part of the *Montane peatlands and swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions* as listed under the BC Act

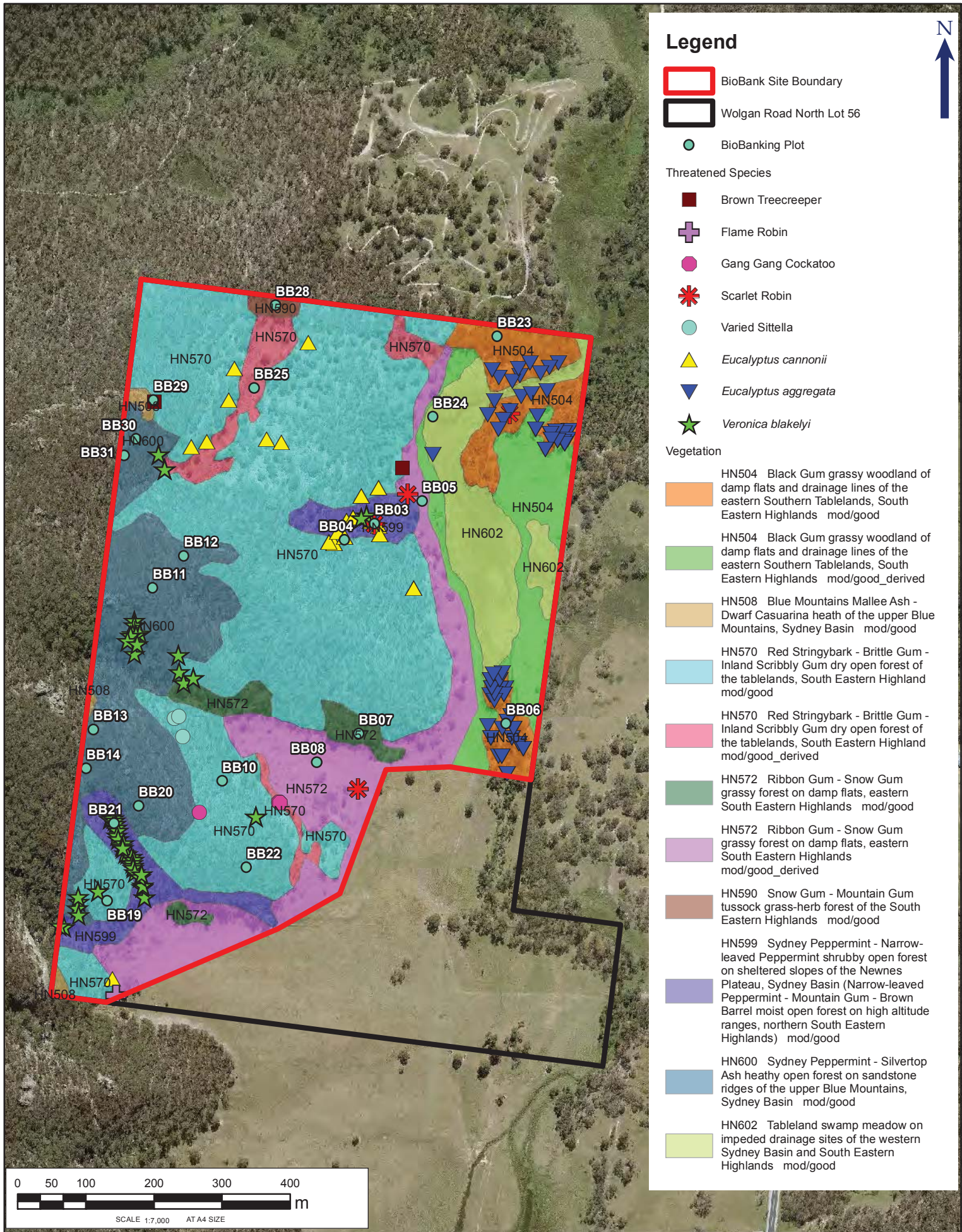


FIGURE 5: WOLGAN ROAD NORTH LOT 56 OFFSET SITE

LOCATION: WOLGAN ROAD NORTH LOT 56	DATUM: GDA94 PROJECTION: MGA Zone 56
JOB NO.: PR 137024	Data Sources: RPS Land and Property 2015
PURPOSE: ECOLOGY	
Technician: james.hugo	Date: 20/2/2018

CLIENT: CENTENNIAL FASSIFERN PTY LTD

RPS AUSTRALIA EAST PTY LTD (ABN 44 140 292 762)
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This site contains a length of the Coxs River and Lambs Creek. The western half of this site contains predominately dry sclerophyll woodlands on relatively steep slopes (**Plates 5 and 6**).



Plate 5 Typical Dry Woodland Habitat within the Wolgan Road North Lot 56 Offset Site



Plate 6 Pagoda within the Wolgan Road North Lot 56 Offset Site

The low-lying areas surrounding the river comprise MU15 Tableland Hollows Black Gum - Black Sally Open Forest, which is listed as an EEC (**Plate 7**).



Plate 7 Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland and derived grasslands EEC containing *Eucalyptus aggregata* within the Wolgan Road North Lot 56 Offset Site

Approximately 15.26 ha of this EEC is mapped (MU11 and MU15). This site also contains 3.90 ha of MU53 Mountain Hollow Grassy Fen along Lambs Creek (**Plate 8**).



Plate 8 Montane Peatlands and Swamps EEC within the Wolgan Road North Lot 56 Offset Site

The ridge tops offer areas of dry woodland (**Plate 5**) and rocky habitats, including some pagodas (**Plate 6**).

The Wolgan Road North Lot 56 Offset Site contains a rather large population of a species credit species which is not currently proposed to be used for offsetting purposes. Specifically, it is *Veronica blakelyi* (**Plate 9**) with a population estimate of 192 individual plants recorded to date. However, this number is not likely to account for all individuals of this species within this site.



Plate 9 *Veronica blakelyi* within the Wolgan Road North Lot 56 Offset Site

2.2.4 Biodiversity Offset Values

Site investigations have confirmed the presence of five threatened fauna species listed as vulnerable under the BC Act and/or EPBC Act including:

- Brown Treecreeper (*Climacteris picumnus*) Vulnerable under the BC Act;
- Gang-Gang Cockatoo (*Callocephalon fimbriatum*) Vulnerable under the BC Act;
- Flame Robin (*Petroica phoenicea*) Vulnerable under the BC Act;
- Scarlet Robin (*Petroica boodang*) Vulnerable under the BC Act; and
- Varied Sittella (*Daphoenositta chrysoptera*) Vulnerable under the BC Act.

Three threatened flora species were recorded on site including:

- *Veronica blakelyi* (Vulnerable under the BC Act);
- *Eucalyptus cannonii* (Vulnerable under the BC Act); and
- *Eucalyptus aggregata* (Vulnerable under the BC Act and EPBC Act).

MU15 Tableland Hollows Black Gum - Black Sally Open Forest occurring within the site is commensurate with the BC Act listed Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland EEC. The incidence of MU53 Mountain Hollow Grassy Fen along Lambs Creek within the site is commensurate with the BC Act listed Montane Peatlands and Swamps EEC.

2.2.5 Credit Calculations

The 57.22 ha of offset lands listed above have been calculated to generate 739 ecosystem credits. The summary in **Table 10** below provides the ecosystem credits generated for each vegetation community

(expressed in BVT, including the vegetation condition) at the Wolgan Road North Lot 56 Offset Site and the name of the development consent (or site if approval is pending) that it is providing an offset for.

Table 10 Credit Calculations from Wolgan Road North Lot 56

BVT	Credit Calculations
HN508 Moderate/Good	Credits Available – 105
	Credits Utilised - 22 22 ecosystem credits are to provide offsets for the Springvale Water Treatment Project (SSD7592 Schedule 3 Condition 7).
	Credits Remaining - 83
HN544 Moderate/Good	Credits Available - 33
	Credits Utilised – 33 ecosystem credits are to provide offsets for the Springvale Extension Project (SSD5594 – Schedule 4 Condition 15 (b)).
	Credits Remaining - 0
HN570	Credits Available - 320
	Credits Utilised - 320 320 ecosystem credits are to provide offsets for the Springvale Water Treatment Project (SSD7592 Schedule 3 Condition 7).
	Credits Remaining - 0
HN572 Moderate/Good	Credits Available - 107
	Credits Utilised - 53 24 ecosystem credits are to provide offsets for the Springvale Water Treatment Project (SSD7592 Schedule 3 Condition 7); and 29 ecosystem credits are to provide offsets for the Angus Place Ventilation Facility ((project application: 06_0021) Mod 2 - Condition 24B (a) and (b)).
	Credits Remaining - 54
HN599 Moderate/Good	Credits Available – 34
	Credits Utilised - 34 ecosystem credits are to provide offsets for the Springvale Extension Project ((SSD5594 – Schedule 4 Condition 15 (b)).
	Credits Remaining – 0
HN600 Moderate/Good	Credits Available – 110
	Credits Utilised – 110 ecosystem credits are to provide offsets for the Springvale Extension Project ((SSD5594 – Schedule 4 Condition 15 (b)).
	Credits Remaining - 0

BVT	Credit Calculations
HN602 Moderate/Good	Credits Available –57
	Credits Utilised – 9 9 ecosystem credits are to provide offsets for the Springvale Water Treatment Project (SSD7592 Schedule 3 Condition 7).
	Credits Remaining - 48

2.3 Springvale Lot 125

2.3.1 Location

The Springvale Lot 125 Offset Site is situated to the east, south and west of the Springvale Mine Pit Top off Springvale Road. The sites are bound to the north and east by vegetated private properties. Sawyers Swamp occurs approximately 1 km to the north of Lot 125 DP751651 which then continues into Newnes State Forest.

2.3.2 Management Objectives

Key enhancement and management objectives of the site are:

- Exclude commercial apiaries;
- Exclude miscellaneous feral species;
- Feral and/or over-abundant native herbivore control;
- Fox control;
- Weed removal / control; and
- Rabbit control.

2.3.3 Current Biodiversity Values

Five native vegetation types have been identified (**Table 11**) and mapped (**Figure 6**) within the Springvale Lot 125 Offset Site.

Table 11 Vegetation within the Springvale Lot 125 Offset Site

BVT	Map Unit (MU) (DEC 2006)	Area (ha)
HN508	MU 43 Pagoda Rock Sparse Shrubland MU 44 Sandstone Plateaux Tea Tree – Dwarf Sheoak – Banksia Rocky Heath	7.28
HN558	MU 4 Sheltered Gully Brown Barrel Ferny Forest	1.07
HN599	MU 8 Newnes Sheltered Peppermint – Brown Barrel Shrubby Forest;	3.16
HN600	MU 28 Sandstone Plateau and Ridge Scribbly Gum – Silvertop Ash Shrubby Woodland	35.01
Total		46.52

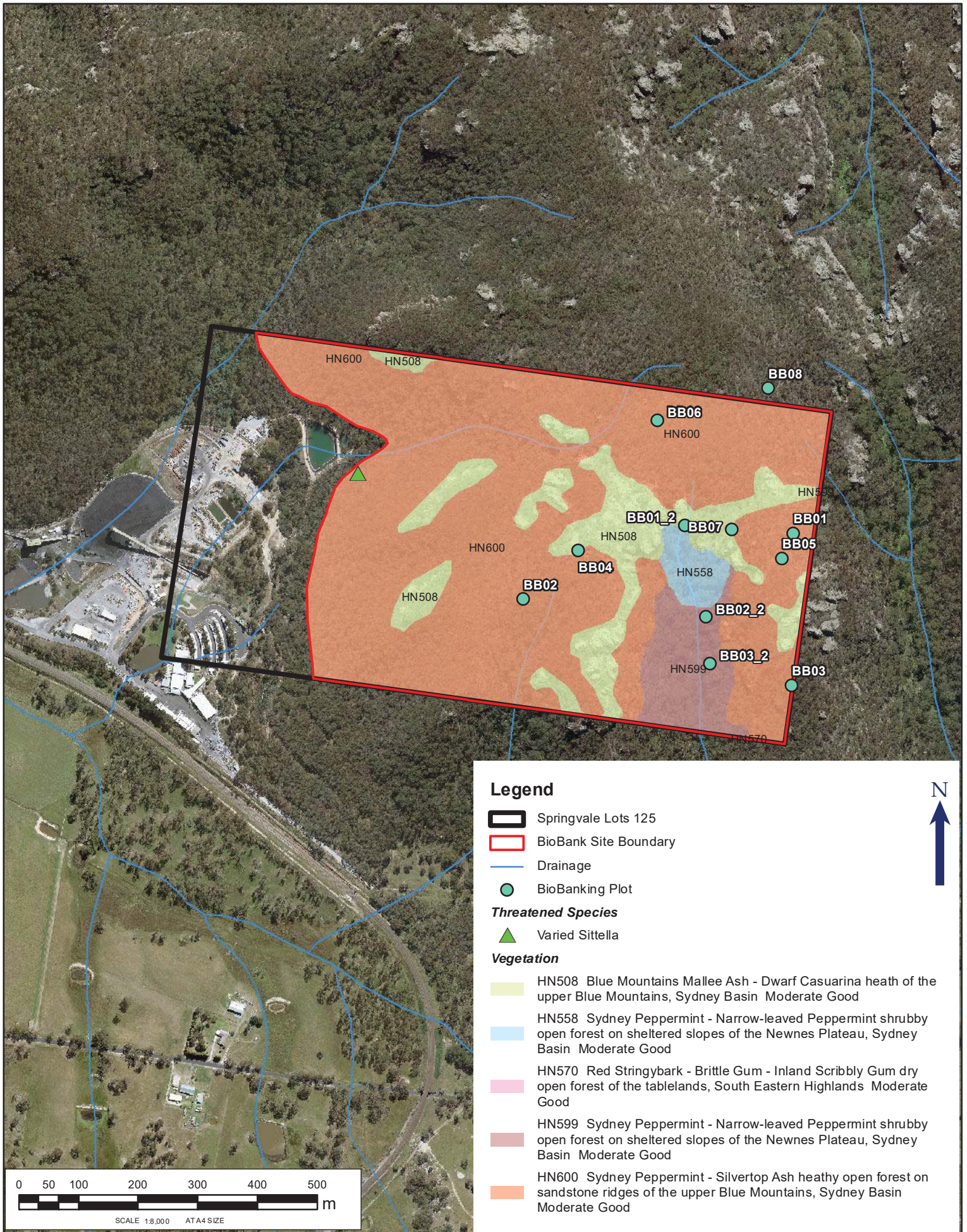
The site contains a combination of lower lying vegetation on flats, including areas of cleared lands, which extend into ridges and pagodas with surrounding woodland and forest vegetation. The northern half of this site contains predominately dry sclerophyll woodlands on relatively steep slopes (**Plates 10 to 14**).



Plate 10 Typical Dry Exposed Woodland Habitat MU 28 within the Springvale Lot 125 Offset Site



Plate 11 MU 4 Sheltered Gully Brown Barrel Ferny Forest



**FIGURE 6: SPRINGVALE LOT 125
OFFSET SITE BIODIVERSITY VALUES**

LOCATION:	SPRINGVALE LOT 125	DATUM: GDA94
JOB NO.: PR 137024		PROJECTION: MGA Zone 56
PURPOSE: ECOLOGY		Data Sources: RPS Land and Property 2015
Technician: mark.aikens	Date: 7/12/2018	

CLIENT: CENTENNIAL FASSIFERN PTY LTD

RPS AUSTRALIA EAST PTY LTD (ABN 44 140 292 762)
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Plate 12 Pagoda within the Springvale Lot 125 Offset Site



Plate 13 MU 11 Tableland Gully Snow Gum – Ribbon Gum Montane Grassy Forest

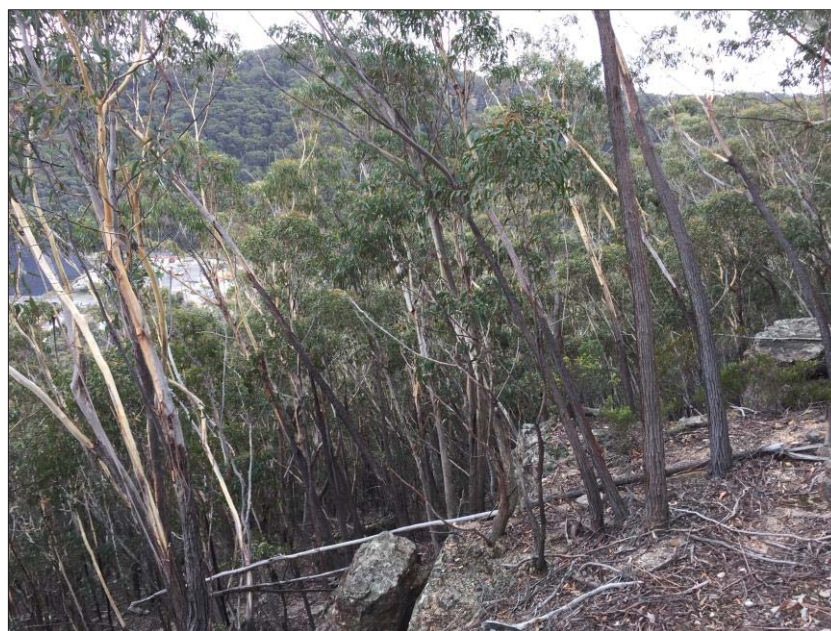


Plate 14 MU 30 Shrubby Woodland within the Springvale Lot 125 Offset Site

2.3.4 Biodiversity Offset Values

Two threatened fauna species were detected during site investigations including:

- Gang-Gang Cockatoo (*Callocephalon fimbriatum*) Vulnerable under the BC Act; and
- Varied Sittella (*Daphoenositta chrysoptera*) Vulnerable under the BC Act.

2.3.5 Credit Calculations

The 46.52 ha of offset lands listed above have been calculated to generate 542 ecosystem credits. The summary in **Table 12** below provides the ecosystem credits generated for each vegetation community (expressed in both MU and BVT, including the vegetation condition) at the Springvale Offset Site and the name of the development consent (or site if approval is pending) that it is providing an offset for.

Table 12 Credit Calculations from Springvale Lot 125

BVT	Credit Calculations
HN508 Moderate/Good	Credits Available: - 95
	Credits Utilised - 5 <ul style="list-style-type: none"> ■ 5 ecosystem credits are to provide offsets for the Angus Place Ventilation Facility ((project application: 06_0021) Mod 2 - Condition 24B (a) and (b)).
	Credits Remaining - 90
HN558 Moderate/Good	Credits Available – 12

BVT	Credit Calculations
	Credits Utilised – 12 <ul style="list-style-type: none"> 12 ecosystem credits are to provide offsets for the Springvale Water Treatment Project ((SSD7592 Schedule 3 Condition 7).
	Credits Remaining – 0
HN599 Moderate/Good	Credits Available - 31
	Credits Utilised – 31 <ul style="list-style-type: none"> 31 ecosystem credits are to provide offsets for the Springvale Water Treatment Project ((SSD7592 Schedule 3 Condition 7).
	Credits Remaining - 0
HN600 Moderate/Good	Credits Available - 404
	Credits Utilised – 360 <ul style="list-style-type: none"> 95 ecosystem credits are to provide offsets for the Springvale Water Treatment Project ((SSD7592 Schedule 3 Condition 7); and 265 ecosystem credits are to provide offsets for the Springvale Extension Project ((SSD5594 – Schedule 4 Condition 15 (b)).
	Credits Remaining - 44

2.4 Pipers Flat Lot 5 Offset Site

2.4.1 Location

The Pipers Flat Lot 5 Offset Site is situated to the immediate southwest of Western Coal Services site. The site is bound to the north east by vegetated lands that tentatively connect to larger tracts of vegetation. These tentative connections though are divided by roads and rail lines. To the north, west and south are primarily agricultural lands with little vegetation. A train line runs adjacent to the southern boundary of the lot.

2.4.2 Management Objectives

Conservation management actions as detailed in BioBanking Agreement 448, reviewed in consultation with OEH are:

- installation of signage;
- installation of fencing as required;
- weed removal / control:
 - > targeting Blackberry (*Rubis fruitcosus*), Spear thistle (*Cirsium vlgare*), Contoneaster (*Cotoneaster glaucophyllus*), English Ivy (*Hedera helix*), Narrow-leaf pivet (*Ligustrum sinense*), St. Hohns Wort (*Hypericum perforatum*), Kikuyu (*Pennisetm clandestinum*), Sweet Briar (*Rosa rbiginosa*) and Fireweed (*Senecio madagascariensis*), PineTree (*Pinus radiate*), Patersons curse (*Echium platnigenium*) and Purpletop (*Verbena boneariensis*)
 - > year 1 primary treatment in Autumn and Spring, year 2 to year 5 secondary treatment in Autumn and Spring and every year thereafter maintenance annually in Spring.

- fire for conservation:
 - > development of fire plan considering ecological outcomes and prescribed fire regimes;
 - > biometric monitoring following fire to identify response from fire;
 - > consultation with neighbouring State Forest on works;
 - > incorporate ecological or cool burns as practical; and
 - > consideration of *Veronica blakelyi* and *Eucalyptus canonii* in fire regimes.
- erosion control;
- retention of bush rocks and all timber;
- monitoring and reporting:
 - > annual BioBanking Reporting;
 - > 5 yearly biometric monitoring; and
 - > record keeping of all management actions undertaken.

2.4.3 Current Biodiversity Values

One native vegetation type has been identified and mapped (**Figure 7**) within the Pipers Flat Lot 5 Offset Site, specifically HN570 Red Stringybark – Brittle Gum – Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion (**Plate 15**).



Plate 15 HN570 within Pipers Flat Lot 5 offset site

2.4.4 Biodiversity Offset Values

Two threatened fauna species were detected during site investigations including:

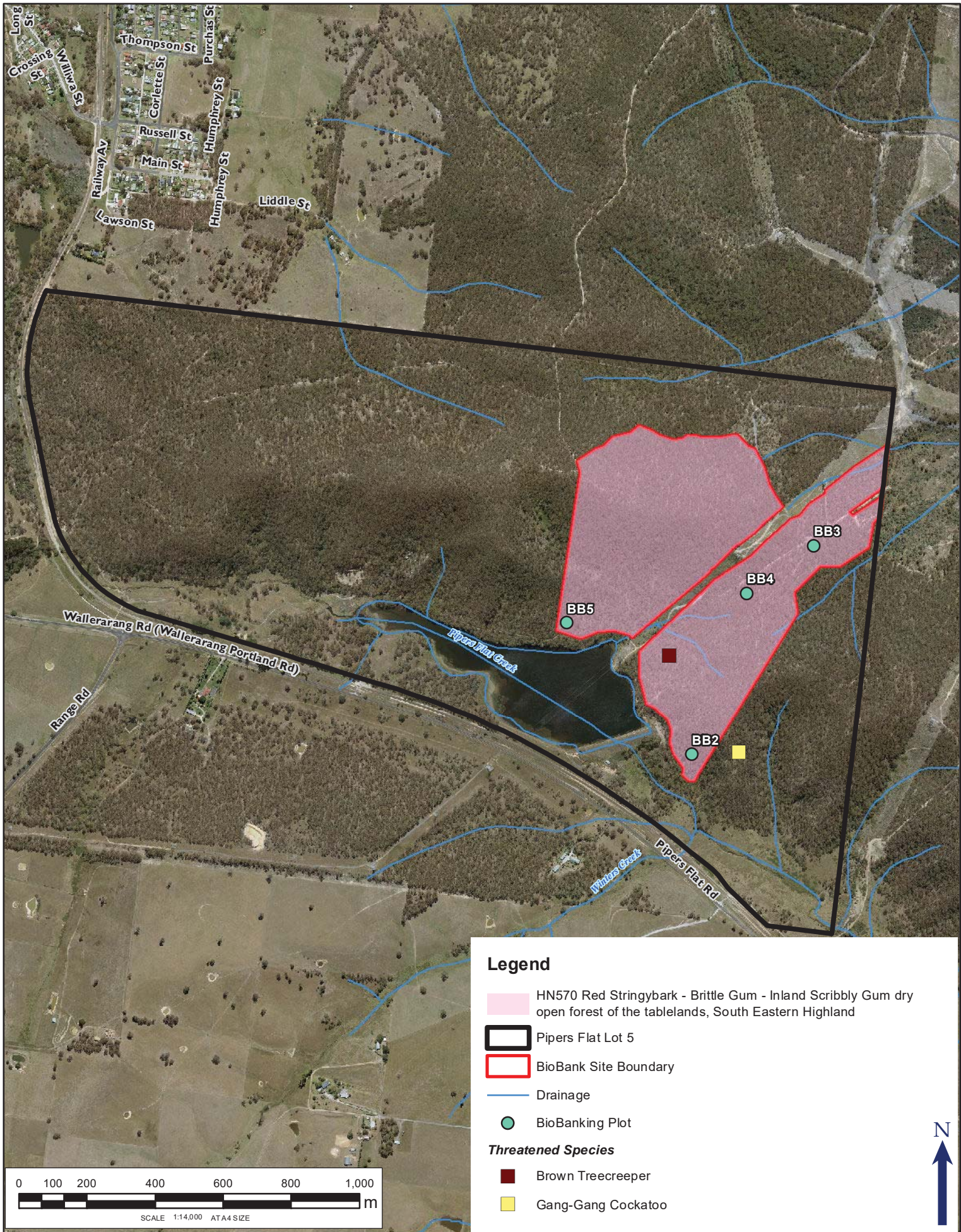
- Gang-Gang Cockatoo (*Callocephalon fimbriatum*) Vulnerable under the BC Act; and
- Brown Treecreeper (*Climactus picumnus victoriaea*) Vulnerable under the BC Act.

2.4.5 Credit Calculations

The 49.99 ha of offset lands listed above have been calculated to generate 567 ecosystem credits. The summary in **Table 13** below provides the ecosystem credits generated for this vegetation community at the Pipers Flat Lot 5 Offset Site and the name of the development consent (or site if approval is pending) that it is providing an offset for.

Table 13 Credit Calculations from Carinya Lot 163 Site

BVT	Credit Calculations
HN570 Moderate/Good	Credits Available - 567
	Credits Utilised - 538 538 ecosystem credits are to provide offsets for the Springvale Water Treatment Project (SSD7592 Schedule 3 Condition 7).
	Credits Remaining - 29



3.0 Biodiversity Offset Ledger

In order to retain consistency with the offset methodologies of the NSW Biodiversity Offsets Policy for Major Projects and EPBC Act Environmental Offsets Policy, the calculation of threatened flora and fauna offset values has been performed on the following basis:

- Flora: the number of credits generated by the recorded individuals; and
- Fauna: habitat in hectares using BVTs as habitat surrogates.

Summary metrics for threatened significant flora and fauna values found within the offset sites as well as the flora and fauna values that were used as offsets (as this differs) are provided in **Tables 14** and **15**.

Table 14 Offset Summary: Threatened Flora

Threatened Species	Credits required	Total species credits generated				Species credits used			
		Wolgan	Springvale	Pipers Flat	Total	Wolgan	Springvale	Pipers Flat	Residual
<i>Eucalyptus aggregata</i> (Black Gum) ^{4, 5}	0	433	-	-	433	-	-	-	433
<i>Eucalyptus cannonii</i> (Cannon's Stringybark) ⁴	39	99	-	-	99	39	-	-	60
<i>Persoonia hindi</i> ^{6, 7}	4,004	-	-	-	-	-	-	-	-
<i>Caesia parviflora</i> var. <i>minor</i> ^{6, 7}	42	-	-	-	-	-	-	-	-
<i>Veronica blakelyi</i> ⁴	0	1,363	-	-	1,363	42	0	-	1,321

⁴ Listed as vulnerable under the BC Act

⁵ Listed as vulnerable under the EPBC Act

⁶ Listed as endangered under the BC act

⁷ Residual species credit requirements are discussed in **Section 4** Supplementary Offset Measures

Table 15 Offset Summary: Threatened Fauna

Formation	BVT	Fauna Habitat Suitability	Area used (ha)
Dry Sclerophyll Forests (Shrubby subformation)	HN599, HN600, HN570, HN534, HN544, HN510	Woodland Birds, Arboreal Mammals, Forest Owls, microchiropteran bats, Giant Burrowing Frog and Stuttering Frog (in proximity to water courses).	264.63
Freshwater Wetlands	HN602	Amphibians	3.90
Grassy Woodlands	HN572, HN501, HN504, HN506	Woodland Birds, Arboreal Mammals, Forest Owls, microchiropteran bats.	15.26
Heathlands	HN508	Eastern Pygmy Possum, Burrowing Frog and Stuttering Frog (in proximity to water courses).	7.53
Wet Sclerophyll Forests (Shrubby subformation)	HN558		1.07
Wet Sclerophyll Forests (Grassy subformation)	HN590	Woodland Birds, Arboreal Mammals, Forest Owls, microchiropteran bats, Giant Burrowing Frog and Stuttering Frog (in proximity to water courses).	0.25

This regional strategy has investigated several different variables to assess the suitability of the compensatory habitat initiatives being proposed. This includes standard area comparisons of vegetation, habitats and number of species lost and gained. Additional comparative detail at the vegetation formation and BVT level is provided in **Appendix 2**.

3.1.1 Habitats and Species

The broader formation class category has been used in **Table 16** to assess the potential gains to threatened fauna habitat. This shows that most broad vegetation formations are being compensated for by this strategy with the exception of the Wet Sclerophyll Forests (Shrubby subformation). However, the habitat this formation provides to locally occurring fauna species crosses other habitats that are being offset at a ratio greater than the impact.

3.1.2 Vegetation Communities

A comparative analysis of the vegetation losses and gains in **Table 17** has been undertaken to assess the appropriateness of the conservation sites in terms of area. **Table 17** shows that an overall 1:4.1 conservation outcome. Notably, positive gains in offsets are proposed for all EECs. **Table 18** summarises the BVTs mapped within each offset site with **Table 18** reconciling of what has been used and what is remaining.

Table 16 Biodiversity Offsets Ledger: Fauna Habitat/ Ecosystem Credits

Project Consent	Map Unit	BVT	Vegetation Community Name	TEC Equivalent	Impact Area (ha)	Credits required	Credits per hectare	BVT Offsetting options	Available formation offsets	Like for like credits allocated				Credit profile like for like	Credit profile not like for like	Formation level credits allocated				Total Credits Required	Credit Balance	Credits Outstanding
Springvale Water Treatment Project - SSD7592																						
Schedule 3 - Condition 7	MU 33	HN514	Broad-leaved Peppermint - Red Stringybark grassy open forest on undulating hills, south eastern highlands		0.47	22	47	HN514, HN573, HN614	HN504	0	0	0	0	0	No	Formation HN504	22	0	0	22	22	22
Schedule 3 - Condition 7	MU 07	HN558	Narrow-leaved Peppermint - mountain Gum - Brown Barrel moist open forest on high altitude ranges, northern South Eastern highlands		1.11	58	52	HN558, HN507, HN516, HN601	HN558	0	12	0	0	12	Partly (17% yes, 83% outstanding)	None available	0	0	0	0	58	12
Schedule 3 - Condition 7	MU 37	HN570	Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern highland (poor condition)		21.22	858	40	HN570, HN543	HN534, HN544, HN570, HN599, HN600	320	0	0	0	858	Partly (40% yes 60% formation)	Formation HN534 and HN599	0	0	0	0	858	858
				Tablelands Snow Gum, Black Sallee, Candebark and Ribbon Gum Grassy Woodland in the South eastern South Eastern Basin, South East Corner and NSW South Western Slopes Bioregions																		
Schedule 3 - Condition 7	MU 11	HN572	Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands		2.12	24	11	HN572	HN501, HN504, HN514, HN572, HN614	24	0	0	0	24	Yes	None available	0	0	0	0	24	24
Schedule 3 - Condition 7	MU 08	HN599	Sydney Peppermint - Narrow-leaved Peppermint shrubby open forest on sheltered slopes of the Newnes Plateau, Sydney Basin		0.73	35	48	HN599, HN600	HN534, HN544, HN570, HN599, HN600	0	31 HN599, 4 HN600	0	0	35	Yes	None available	0	0	0	0	35	35
Schedule 3 - Condition 7	MU 26, MU 29	HN600	Sydney Peppermint - Silvertop Ash healthy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin		1.71	91	53	HN600, HN599	HN534, HN544, HN570, HN599, HN600	0	91	0	0	91	Yes	None available	0	0	0	0	91	91
				Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions																		
Schedule 3 - Condition 7	MU 53	HN602	Tableland swamp meadow on impeded drainage sites of the western Sydney Basin and South Eastern Highlands		0.02	1	50	HN602	HN602	1	0	0	0	1	Yes	None available	0	0	0	0	1	1
Schedule 3 - Condition 7	NA	HN630	Phragmites australis and Typha orientalis coastal freshwater wetlands		0.46	8	17	HN630, HN520	HN602	0	0	0	0	0	No	Formation HN602	8	0	0	0	8	8
Total					27.84	1097								1021						30	1097	1051
Springvale Extension Project - SSD5594																						

Project Consent	Map Unit	BVT	Vegetation Community Name	TEC Equivalent	Impact Area (ha)	Credits required	Credits per hectare	BVT Offsetting options	Available formation offsets	Like for like credits allocated				Credit profile like for like	Credit profile not like for like	Formation level credits allocated					Total Credits Required	Credit Balance	Credits Outstanding
										Volgan Road	Springvale	Carinya	Pipers Flat	Total formation credits allocated			Volgan Road	Springvale	Carinya	Pipers Flat	Total formation credits allocated		
Schedule 4 - Condition 15 (b)	MU 07	HN559	Narrow-leaved Peppermint - Silvertop Ash - Mountain Grey Gum shrubby open forest of the upper Blue Mountains, Sydney Basin Bioregion		0.86	51	59	HN559, HN599, HN600	HN534, HN544, HN570, HN599, HN600	34(HN599), 10(HN600)	1	0	0	45	Partly (91% yes, 9% outstanding)	Formation HN534	0	0	6	0	6	51	51
Schedule 4 - Condition 15 (b)	MU 26	HN600	Sydney Peppermint - Silvertop Ash healthy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin		8.01	364	45	HN600, HN599	HN534, HN544, HN570, HN599, HN600	100	264	0	0	364	Yes	NA	0	0	0	0	0	364	364
Schedule 4 - Condition 15 (b)	MU 44	HN508	Blue Mountains Mallee Ash - Dwarf Casuarina heath of the upper Blue Mountains, Sydney Basin		0.07	3	43	HN508, HN509, HN522, HN632	HN508	3	0	0	0	3	Yes	NA	0	0	0	0	0	3	3
Total					8.94	418								412							6	418	418
Clarence DA 504-00																							
Condition 12A (a) and (b)	MU 26	HN600	Sydney Peppermint - Silvertop Ash healthy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin		4.1	204	50	HN600, HN599	HN534, HN544, HN570, HN599, HN600	0	0	0	0	0	No	Formation HN534	0	0	204	0	204	204	204
Total					4.1	204				0	0	0	0	0			0	204			204	204	204
Western Coal Services SSD5579																							
Condition 25 (a) and (b):	MU 37	HN570	Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern highland		10.67	695	65	HN570, HN543	HN534, HN544, HN570, HN599, HN600	0	0	0	0	0	No	Formation HN534	0	0	403 HN544, 292 HN534	0	695	695	695
Total					10.67	695								0							695	695	695
Springvale SSD5594																							
Springvale Bore 8 - SSD5594 - Schedule 4 - Condition 15 (a)	MU 07	HN559	Narrow-leaved Peppermint - Silvertop Ash - Mountain Grey Gum shrubby open forest of the upper Blue Mountains, Sydney Basin Bioregion		1.65	77	47	HN600, HN599	HN534, HN544, HN570, HN599, HN600	0	0	0	0	0	No	Formation HN534	0	0	77	0	77	77	77

Project Consent	Map Unit	BVT	Vegetation Community Name	TEC Equivalent	Impact Area (ha)	Credits required	Credits per hectare	BVT Offsetting options	Available formation offsets	Like for like credits allocated				Credit profile like for like	Credit profile not like for like	Formation level credits allocated				Total Credits Required	Credit Balance	Credits Outstanding
										Wolgan Road	Springvale	Carinya	Pipers Flat			Total like for like credits allocated	Wolgan Road	Springvale	Carinya			
Springvale Bore 8 - SSD5594 - Schedule 4 - Condition 15 (a)	MU 28	HN600	Sydney Peppermint - Silvertop Ash healthy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin		2.35	114	49	HN600, HN599	HN534, HN544, HN570, HN599, HN600	0	0	0	0	0	No	Formation HN534	0	0	114	0	114	114
Total					4	191							0				0	0		191	191	
Angus Place PA 06_0021																						
Condition 24B (a) and (b)	MU 07	HN559	Narrow-leaved Peppermint - Silvertop Ash - Mountain Grey Gum shrubby open forest of the upper Blue Mountains, Sydney Basin Bioregion		6.07	277	46	HN600, HN599	HN534, HN544, HN570, HN599, HN600	0	0	0	0	0	No	Formation HN534	0	0	277	0	277	277
Condition 24B (a) and (b)	MU 14	HN572	Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands	Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregions	0.54	21	54	HN572	NA	21	0	0	0	0	No	None available	0	0	0	0	21	21
Condition 24B (a) and (b)	MU 45	HN508	Blue Mountains Mallee Ash - Dwarf Casuarina heath of the upper Blue Mountains, Sydney Basin		0.11	5	45	HN508, HN509, HN522, HN632	HN508	0	5	0	0	0	No	None available	0	0	0	0	5	5
Condition 24B (a) and (b)	MU 30	HN600	Sydney Peppermint - Silvertop Ash healthy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin		5.64	255	45	HN600, HN599	HN534, HN544, HN570, HN599, HN600	0	0	0	0	0	No	Formation HN534	0	0	255	0	255	255
Sub-total					12.36	558		0		21	5			26						532	558	558
TOTAL					67.91	3163								1459						1658	3163	3117
																						-46

Table 17 BVT Summary: Impact – Biodiversity Offsets Ledger

BVT	BVT Name	Threatened Ecological Community Equivalent	Impact (ha)	Offset Area (ha)	Balance (ha)	Ratio	Comment
HN504	Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands, South Eastern Highlands	Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland ⁸	0	1.48	1.48	-	Formation level offset
HN508	Blue Mountains Ash – Dwarf Casuarina heath of the upper Blue Mountains Sydney Basin Bioregion		0.18	0.63	0.49	1:3.7	-
HN514	Broad-leaved Peppermint - Red Stringybark grassy open forest on undulating hills, South Eastern Highlands		0.47	0	-0.47	-	Not in offset area
HN534	Grey Gum - Narrow-leaved Stringybark - Inland Scribbly Gum shrubby open forest of the western Capertee Valley, Sydney Basin		0	97.18	120.74	-	Formation level offset
HN544	Inland Scribbly Gum - Grey Gum - Narrow-leaved Ironbark shrubby open forest on hills of western Capertee Valley, Sydney Basin		0	35.05	35.5	-	Formation level offset
HN558	Narrow-leaved Peppermint - Mountain Gum - Brown Barrel moist open forest on high altitude ranges, northern South Eastern Highlands		1.11	1.07	0.04	1:1	-
HN559	Narrow-leaved Peppermint – Silvertop Ash – Mountain Grey Gum Shrubby open forest of the upper Blue Mountains, Sydney Basin Bioregion		8.58	0	-0.86	-	Not in offset area
HN570	Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highland		31.89	71.92	-0.79	1:1	-
HN572	Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands	Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland ⁸	2.66	3.44	-1.16	1:0.5	-
HN599	Sydney Peppermint - Narrow-leaved Peppermint shrubby open forest on sheltered slopes of the Newnes Plateau, Sydney Basin (Narrow-leaved Peppermint - Mountain Gum - Brown Barrel moist open forest on high altitude ranges, northern South Eastern Highlands)		0.73	5.84	5.11	1:8	-
HN600	Sydney Peppermint - Silvertop Ash healthy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin		21.81	41.07	23.42	1:2.1	-
HN602	Tableland swamp meadow on impeded drainage sites of the western Sydney Basin and South Eastern Highlands	Montane Peatlands and Swamps	0.02	0.62	0.65	1:33.5	-
HN630	Phragmites australis and <i>Typha orientalis</i> coastal freshwater wetlands		0.46	0	-0.46	-	Not in offset area
Total			67.91	258.30	190.39	1:3.8	-

⁸ Listed as an endangered ecological community on the BC Act

Table 18 BVT Summary: Offset Sites

BVT	Map Unit	Community Name	Threatened Ecological Community Equivalent	Carinya	Wolgan North	Springvale	Pipers Flat	Total
HN504	MU15	Tableland Hollows Black Gum - Black Sally Open Forest	Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland ⁸	0	7.07	0	0	7.07
HN508	MU43	Pagoda Rock Sparse Shrubland		0	0.25	7.28	0	7.53
HN534	MU21	Capertee – Wolgan Slopes Red Box – Grey Gum – Stringybark Grassy Open Forest		97.50	0	0	0	97.5
HN544	MU42	Capertee Hills White Box - Tumbledown Redgum - Ironbark - Callitris Shrubby Woodland		35.05	0	0	0	35.05
HN558	MU4	Narrow-leaved Peppermint – Mountain Gum – Brown Barrel moist open frost on high altitude ranges, northern South Eastern highlands Bioregion		0	0	1.07	0	1.07
HN570	MU37	Coxs Permian Red Stringybark - Brittle Gum Woodland		0	27.14	0	49.99	77.13
HN572	MU11	Tableland Gully Snow Gum - Ribbon Gum Montane Grassy Forest	Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland ⁸	0	8.19	0	0	8.19
HN574	MU54	Capertee - Wolgan Riparian Rough-barked Apple - River Oak Open Forest		0	0	0	0	0
HN590	MU35	Tableland Gully Mountain Gum - Broad-leaved Peppermint Grassy Forest		0	0.25	0	0	0.25
HN599	MU08	Newnes Sheltered Peppermint - Brown Barrel Shrubby Forest		0	2.68	3.16	0	5.84
HN600	MU28	Sandstone Plateau and Ridge Scribbly Gum - Silver-top Ash Shrubby Woodland		0	7.74	35.01	0	42.75
HN602	MU53	Mountain Hollow Grassy Fen	Montane Peatlands and Swamps ⁸	0	3.90	0	0	3.9
Total				132.55	57.22	46.52	49.99	286.28

Where Carinya Lot 163 is conserved under a Conservation Agreement, the Conservation Agreement will specify the management actions, performance criteria and completion criteria in perpetuity. Where the site is provided to NPWS for inclusion in the Capertee National Park the management of the site will be undertaken by NPWS in perpetuity.

4.1.4 Finalisation of Conservation Agreement

The Conservation Agreement for Carinya Lot 163 was finalised in October 2020. The Carinya Lot 163 Biodiversity Offset Management Plan is provided in Appendix 6 in accordance with Section 4.1.4.1 Western Coal Services Biodiversity Management Plan below. A draft Conservation Bond has been calculated in accordance with Section 4.1.4.2 Western Coal Services Conservation Bond below.

- 3 ecosystem credits from HN508 - Moderate/Good Wolgan Road offset site.

Of the above proposed offset BVTs, HN599, HN600 and HN508 are 'like for like' at a BVT level when compared to the development requirements. However, the HN534 is like for like at a formation level.

Springvale Bore 8 (Schedule 4, Condition 15).

In order to offset the loss of 3.93 ha (4ha in SSD_5594) of vegetation clearing which constitutes the requirement for 191 ecosystem credits the following has been provided as an offset:

- 191 ecosystem credits from HN534 - Moderate/Good Carinya offset site.

Of the above the proposed offset BVT is considered to be 'like for like' at a BVT level when compared to the development requirements. However, the HN534 is 'like for like' at a formation level.

Angus Place Ventilation Facility (project application: 06-0021) Condition 24B.

Condition 24B(a) states that the Applicant shall "*provide an area that is suitable in its vegetation types and extent to satisfactorily offset the residual impacts of clearing approximately 15 hectares of native vegetation...*". Calculations of the vegetation being removed for the project equate to 12.36 ha, therefore offset provided have been made for 12.36.

In order to offset the loss of 12.36 ha of vegetation clearing which constitutes the requirement for 558 ecosystem credits the following has been provided as an offset:

- 532 ecosystem credits from HN534 - Moderate/Good Carinya offset site;
- 21 ecosystem credits from HN572 – Moderate/Good Wolgan North Lot 56 offset site; and
- 5 ecosystem credits from HN508 - Moderate/Good Springvale Lot 125 and 2 offset site.

Of the above proposed offset BVTs, HN572 and HN508 are considered to be 'like for like' at a BVT level when compared to the development requirements. However, HN534 is only like for like at a formation level.

Approximately 4,004 residual species credits of *Persoonia hindii* are required following the initial translocation program and regeneration monitoring. However, there is further a translocation and research into the species which is considered adequate for offsetting the remaining 4,004 species credits (refer to **Section 4.1** for further details).

Springvale Western Coal Services (SSD5579 Condition 25)

In order to offset the loss of 10.67 ha of vegetation clearing which constitutes the requirement for 695 ecosystem credits the following has been provided as an offset:

- 292 ecosystem credits from HN534 - Moderate/Good Carinya Offset site; and
- 403 ecosystem credits from HN544 – Moderate/Good Carinya Offset site

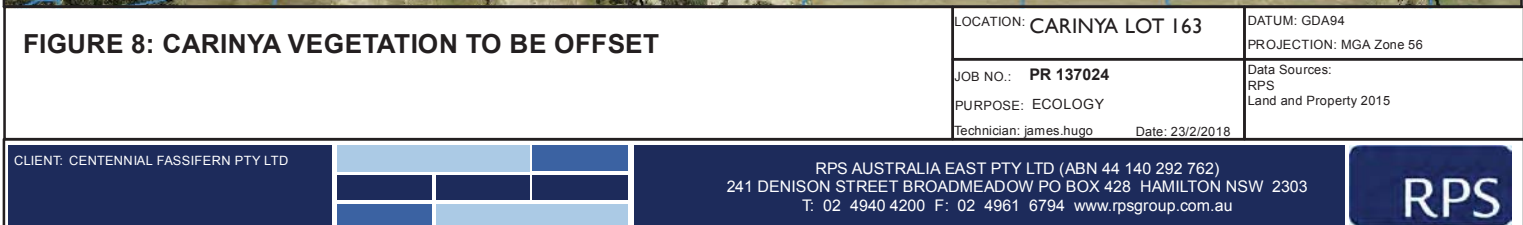
Of the above proposed offsets, the HN534 and HN544 are only like for like at a formation level.

Clarence Reject Emplacement Project DA 504-00 MOD 2 Condition 12A

In order to offset the loss of 4.1 ha of vegetation clearing which constitutes the requirement for 204 ecosystem credits the following has been provided as an offset:

- 204 ecosystem credits from HN534 - Moderate/Good Carinya Offset site.

The proposed offset BVT is not considered to be 'like for like' at a BVT level when compared to the development requirement. However, the HN534 is like for like at a formation level.



Legend

BioBank Site Boundary

Vegetation Zone

- 1 HN600 Moderate Good
- 2 HN508 Moderate Good
- 3 HN558 Moderate Good
- 4 HN599 Moderate Good

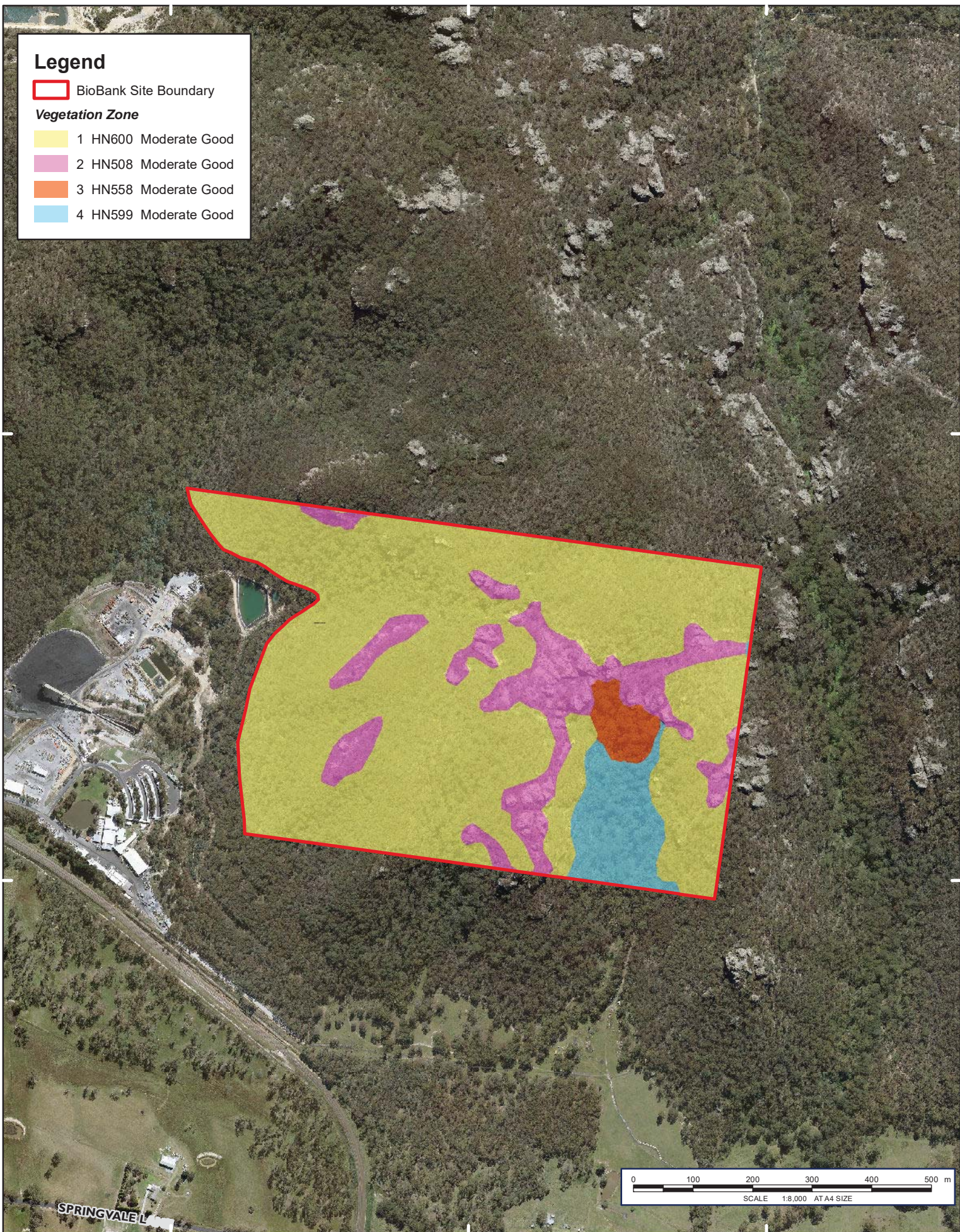


FIGURE 10: SPRINGVALE LOTS 125 AND 2 VEGETATION TO BE OFFSET



LOCATION: SPRINGVALE LOT 125	DATUM: GDA94 PROJECTION: MGA Zone 56
JOB NO.: PR 137024	Data Sources: RPS, Client
PURPOSE: BIOBANKING ASSESSMENT	
Technician: Natalie Wood	Date: 13/11/2018

CLIENT: CENTENNIAL FASSIFERN PTY LTD

RPS AUSTRALIA EAST PTY LTD (ABN 44 140 292 762)
241 DENISON STREET BROADMEADOW PO BOX 428 HAMILTON NSW 2303
T: 02 4940 4200 F: 02 4961 6794 www.rpsgroup.com.au

RPS

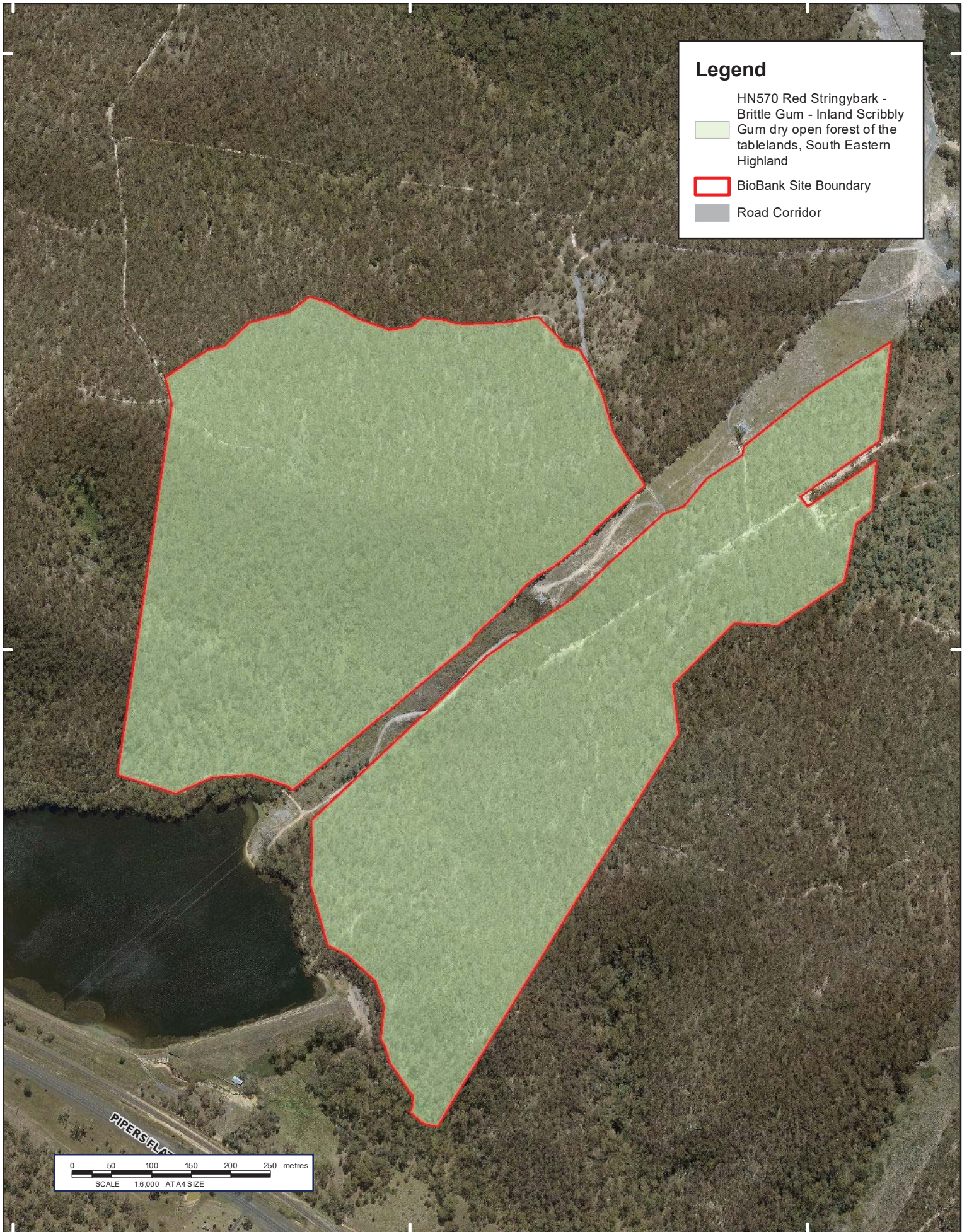


FIGURE 11: PIPERS FLAT LOT 5 VEGETATION TO BE OFFSET



LOCATION: PIPERS FLAT LOT 5	DATUM: GDA94 PROJECTION: MGA Zone 56
JOB NO.: PR 137024	Data Sources: RPS, Client
PURPOSE: BIOBANKING ASSESSMENT	
Technician: mark.atkins	Date: 20/11/2018

CLIENT: CENTENNIAL FASSIFERN PTY LTD

RPS AUSTRALIA EAST PTY LTD (ABN 44 140 292 762)
241 DENISON STREET BROADMEADOW PO BOX 428 HAMILTON NSW 2303
T: 02 4940 4200 F: 02 4961 6794 www.rpsgroup.com.au

RPS

4.0 Securing Biodiversity Offsets

Conservation agreements can be used to secure offsets where conditions of consent were issued prior to the commencement of the Biodiversity Offsets Policy for Major Projects in October 2014. These include Clarence (DA 504-00), Western Coal Services (SSD5579) and Angus Place Ventilation Facility (06_0021). Refer to Section 1.4.1 and **Figure 1** for further information pertaining to the time sequence of biodiversity offset requirements in relation to each project. For the remaining Projects at Springvale (SSD5594 and SSD7592) the offsets are being secured through BioBanking Agreements. Following these two approved pathways for securing the offset liability, there was a minor residual deficit which has been dealt with by paying into the Biodiversity Conservation Fund and the use of supplementary measures.

The management obligations, performance and completion criteria, reporting and review requirements for biodiversity offset sites are listed within the conservation agreement. The obligations are required in perpetuity under the conservation agreement.

4.1 Carinya Lot 163

4.1.1 Conservation Agreement

The *Biodiversity Conservation Act* 2016 (BC Act) has been applied for the retirement of credits of Carinya Lot 163. A Conservation Agreement under the BC Act Application was submitted to the Biodiversity Conservation Trust (BCT) (on behalf of the Minister for the Environment) in 2018.

The total area of biodiversity offset site Carinya Lot 163 is 162 ha, greater than the 132.55 ha identified in Section 2.1. The area is greater allowing for inclusion of biodiversity values within the site that are not required by Centennial but within the fenced boundary.

The conservation management actions for Carinya Lot 163 are listed in Section 2.1.

The Conservation Agreement mechanism was identified by OEH. Following the application to the BCT in March 2018, discussions with the BCT raised the potential transfer of Carinya Lot 163 to the Capertee National Park.

4.1.2 Transfer of Carinya Lot 163 to Capertee National Park

Following the raising of the transfer to the Capertee National Park by the BCT, Centennial met onsite with OEH and National Parks and Wildlife Service (NPWS) in 2019. The transfer of Carinya Lot 163 to the Capertee National Park is preferred by OEH and NPWS than a Conservation Agreement. The transfer will transfer ownership and management control of the land to NPWS.

The transfer of Carinya Lot 163 to the Capertee National Park will require payment for the ongoing management of the land by NPWS. NPWS is currently reviewing the payment value.

The transfer requires final approval by Centennial. It is proposed the management of the site will be through the Capertee National Park Plan of Management Intent, not under SSD5579 Schedule 3 Condition 29 Western Coal Services Biodiversity Management Plan.

4.1.3 Biodiversity Offset Management Plan

An internal Centennial Biodiversity Offset Management Plan (BOMP) was developed for management of Carinya Lot 163 under a Conservation Agreement, with the document content to be incorporated within the Conservation Agreement. The internal document was reviewed following discussions with the BCT, and has subsequently been provided for NPWS review.

The objective of the management actions at Carinya Lot 163 is to enhance existing native vegetation and habitat for fauna. Where the site will be held and managed by NPWS the performance and completion criteria apply for site management up until transfer. The performance and completion criteria where the site is transferred to the Capertee National Park is provided in **Table 19**, or as otherwise finalised with NPWS.

Where Carinya Lot 163 is conserved under a Conservation Agreement, the Conservation Agreement will specify the management actions, performance criteria and completion criteria provided in **Table 20**.

Table 19 – Performance and Completion Criteria transfer to Capertee National Park

Management Goal	Long term Target/Indicator	Action	Performance Criteria	Completion Criteria	Specification	Timing
Human Disturbance Impacts Mitigated and Restrict Access to Site	Installation of fence and gates	Install fence and gate		Fence installed	1 line plain wire (top wire) 4 lines Barb Wire 2 gates	Complete
	Cattle not present on property	Remove cattle	Cattle removed		All cattle removed	Complete
Removal/Reduction of external threats	Management of pest species	Engage pest management contractor	Vertebrate pest species list	Implementation of pest species programs with neighbouring landholders	In accordance with <i>Biosecurity Act 2015</i> NSW	To be confirmed with OEH
	Management of weeds	Engage pest management contractor	Completion of monitoring reports	Recommendations of monitoring reports implemented		Completed weed survey

Table 20 – Performance and Completion Criteria ConservationA greement

Management Goal	Long term Target/Indicator	Action	Performance Criteria	Completion Criteria	Specification	Timing
Administration	Management Plan of Property	Internal Centennial Management Plan developed		Management Plan Developed	Implementing requirements of Conservation Agreement	Year 1
		Review of Management Plan		Management Plan reviewed Annually to include outcomes of non-compliance, incidents and audits		Annually to Year 20
	Annual Report	Prepare annual report of work completed	Annual Report	Annual Report submitted to the BCT	As required by the Biodiversity Conservation Trust	Annually to Year 20

Management Goal	Long term Target/Indicator	Action	Performance Criteria	Completion Criteria	Specification	Timing
Habitat Complexity	Increase in habitat complexity trending to analogue site +/- 20%	Undertake baseline monitoring event		Completion of baseline monitoring event		Year 1
		Monitor outcomes of passive restoration	Completion of monitoring reports	Reported in monitoring reports		Years 1, 5, 10, 15, 20
Human Disturbance Impacts Mitigated and Restrict Access to Site	Installation of fence and gates	Install fence and gate		Fence installed	1 line plain wire (top wire) 4 lines Barb Wire 2 gates	Completed
		Install signage on access points to the property		Signage Installed		Year 1
	Restricted Access Implemented	Develop key register of biodiversity offset lock		Development of biodiversity offset key register		Year 1
		Install locks on access points		Locks installed		Year 1
	Restricted Access Communicated	Record locations of signage, fences and gates on property		Figure showing signage, fences and gates on property		Year 1
	Restricted Access Monitored	Assess every 6 months condition of gates, fences and signage Check for evidence of unauthorised access and presence of cattle	6 monthly inspection completed	No presence of unauthorised access in Year 5		Every 6 months until year 20
	Restricted Access Implemented	Induction for personnel to property	Induction developed	No presence of unauthorised access in Year 5		Year 1
	Areas of erosion and potential salinity are addressed	Assess every 6 months areas of potential erosion	6 monthly inspection completed	No presence of unauthorised access in Year 5		Year 1

Management Goal	Long term Target/Indicator	Action	Performance Criteria	Completion Criteria	Specification	Timing
Removal/Reduction of external threats	Cattle not present on property	Remove cattle	Inspections identify no cattle	Cattle observations at year 5 identify no stock access	All cattle removed	Year 1
	Reduction in native herbivores comparable to +/- 20% analogue site Management of pest species in the landscape in conjunction with neighbouring landholders	Identify presence and impact of native and exotic pest species through camera monitoring	6 monthly inspection completed			Undertaken in conjunction with Monitoring Program
		Engage pest management contractor to review 5 year targeted pest species program with neighbouring landholders	Completion of monitoring reports	Recommendations of reports implemented		
		Monitor outcomes of targeted pest program	Vertebrate pest species list	Implementation of pest species programs with neighbouring landholders	In accordance with <i>Biosecurity Act 2015</i> NSW	Year 1, 5, 10, 15, 20
	Reduction in weed species comparable to +/- 20% analogue site	Complete baseline weed species monitoring event	Completion of monitoring reports	Recommendations of reports implemented		Year 1, 5, 10, 15, 20
		Targeted weed programs in accordance with baseline weed monitoring event outcomes	Engagement of contractor	Baseline weed species report	In accordance with Centennial standard	Completed
		Monitor outcomes of targeted weed program	Completion of monitoring reports	Completion of targeted weed program	Autumn & Spring Year 1 to 4 Every 3 Years from Year 5	Year 1, 5, 10, 15, 20
				Recommendations of monitoring reports implemented		Year 1, 5, 10, 15, 20

Management Goal	Long term Target/Indicator	Action	Performance Criteria	Completion Criteria	Specification	Timing
	Bush Fire Management for managing ecological gains	Develop Bush Fire Plan for ecological community and threatened species outcomes	Engage consultant to review if prepared by Centennial, or prepare Bush Fire Plan	Bush Fire Plan Developed		Year 1
	Bush Fire Management for ecological gains	Undertake ecological bushfire in accordance with Management plan		Every 15 years		Year 10, every 15 Years

4.1.3.1 Western Coal Services Biodiversity Management Plan

Western Coal Services (SSD5579 Schedule 3 Condition 29) Biodiversity Management Plan (BMP) requires the development of a Biodiversity Management Plan for the site by December 2016. Centennial submitted the Western Region Biodiversity Management Plan to DPE in December 2016, and an update in April 2017 for approval. Centennial is currently revising the Western Region Biodiversity Management Plan in accordance with its operational Annual Reviews in 2019.

The Western Coal Services (WCS) BMP requires incorporation of the following management areas:

- Management of vegetation and habitat on the site;
- Western Coal Services Additional Rehabilitation Initiatives (located on Western Coal Services Site);
- Landscaping of the site and along the Castlereagh Highway; and the
- Biodiversity Offset Strategy.

At the time of the WCS BMP preparation, an offset site was identified on WCS as a supplementary measure. During the consultation with OEH, the offset site on WCS was removed.

As the management actions are prescribed within the Conservation Agreement if managed by Centennial or within the Capertee National Park Plan of Management Intent by NPWS the management of the site will not be within the Western Coal Services Biodiversity Management Plan.

4.1.3.2 Western Coal Services Conservation Bond

Where the transfer of Carinya Lot 163 to NPWS is undertaken for inclusion within the Capertee National Park, the ongoing management will be undertaken by NPWS.

Centennial will request from DPE that the Conservation Bond required by Western Coal Services SSD5579 Schedule 4 Condition 30 is satisfied by payment to NPWS. This request will be made following transfer of the land to NPWS.

Where Centennial manages the land under a Conservation Agreement a Conservation Bond will be calculated by a suitably qualified quantity surveyor to calculate the cost for the implementation of management actions. The Conservation Bond will be lodged upon the finalisation of a Draft Conservation Agreement from the BCT.

4.1.3.3 Western Coal Services Habitat for Threatened Fauna Species

Section 28 of the WCS Development Consent (SSD_5579) states that: *'the Applicant shall ensure that the Biodiversity Offset Strategy and Additional Rehabilitation Initiatives areas, in combination, provide suitable habitat for threatened fauna species recorded on the SCSS, namely the:*

- Brown Treecreeper;
- Gang-gang Cockatoo;
- Little Eagle;
- Scarlet Robin;
- Large-eared Pied Bat;
- Eastern Falsistrelle;
- Eastern Bent Wing Bat; and
- Yellow Bellied Sheath-tail Bat.

The offsets which are being provided for the Western Coal Services credit liability are located at Carinya Lot 163. The credits being utilised at Carinya Lot 163 consist of 695 formation level credits which is made up of 403 Credits of HN534 and 292 Credits of HN544. Both HN 534 and HN544 are listed on the OEH BioNET website as providing habitat for almost all of the above listed threatened species, with the exception of the Brown Treecreeper. Furthermore, field validation surveys over the Carinya site recorded four of the seven species including the Brown Treecreeper. Therefore, the Carinya Lot 163 offset site provides suitable habitat for all of the above listed threatened species which were recorded on the SCSS.

4.2 Pipers Flat Lot 5

A BioBanking Agreement has been executed for Pipers Flat Lot 5 (BA448). Centennial is completing application forms for the retirement of the biodiversity offset credits within this WRBOS.

The BioBanking Agreement requires the Total Fund Deposit be submitted on retirement of the biodiversity credits for management of the land in perpetuity.

4.2.1 Biodiversity Offset Management Plan

The management actions and corresponding Total Fund Deposit are listed in Pipers Flat Lot 5 (BA448). Reporting and review of the management plan below is undertaken with the BCT annually.

The following management plans and actions are within Pipers Flat Lot 5 (BA448):

- Standard Management Plan:
 - > Management of human disturbance with installation of signage in year 1 and ongoing maintenance;
 - > Retention of regrowth an native vegetation in perpetuity;
 - > Erosion Control in perpetuity;
 - > Retention of Rocks in perpetuity;
- Weed Management Plan:
 - > Weeds to be managed are: Blackberry (*Rubis fruitcosus*), Prickley Pear (*Opuntia stricta*), Spear thistle (*Cirsium vlgare*), Scotch thistle (*Cirsium vulgare*), Couch (*Dactylis glomerata*), Paspalum (*Paspalum dilatatum*), Kikuyu (*Pennisetm clandestinum*), Tree of Heaven (*Ailanthus altissimus*) Sweet Briar (*Rosa rbiginosa*), St Johns Wort (*Hypericum perforatum*) and Fireweed (*Senecio madagascariensis*) (commenced 2019);
 - > Methods of control: Herbicide, manual removal;
 - > Timing: Year 1 Spring and Summer, Year 2 onwards Annually in perpetuity;
 - > Monitoring: Initial weed survey, annual targeted searches;
- Fire for Conservation Management Plan:
 - > Development of detailed Fire Management Plan (Year 1);
 - > Completion of burn (Year 15);
 - > Methods of burning: ecological fire, cool burn;
 - > Monitoring: Biometric monitoring following burn, every 5 years;
- Management of Feral and Overabundant Herbivores, Vertebrate Pest Management Plan:
 - > Undertaking of control activities for fox, rabbits, wild dog, goats and pigs in collaboration with LLS and adjacent landholders;
 - > Timing: Year 1 in perpetuity;

- > Monitoring using cameras (ongoing) and visual inspections (every 6 months) in perpetuity
- Monitoring:
 - > 6 visual monthly inspections in perpetuity;
 - > Baseline biometric survey in Year 1, Year 5 and thereafter every 5 years in perpetuity;
- Record Keeping:
 - > All management actions in perpetuity;
- Reporting:
 - > Annual reporting of all management actions and outcomes in perpetuity to the BCT;
 - > Annual summary of site management and response in Springvale and SWTP Annual Review;
- Review: Review of BioBanking Management Plans every 4 to 6 years with BCT.

4.3 Springvale Lot 125

A BioBanking Agreement has been executed for Springvale Lot 125 (BA425). Centennial is completing application forms for the retirement of the biodiversity offset credits within this WRBOS.

The BioBanking Agreement requires the Total Fund Deposit be submitted on retirement of the biodiversity credits for management of the land in perpetuity.

The management actions and corresponding Total Fund Deposit are listed in Pipers Flat Lot 5 (BA448). Reporting and review of the management plan below is undertaken with the BCT annually.

The following management plans and actions are within Pipers Flat Lot 5 (BA448):

- Standard Management Plan:
 - > Management of human disturbance with installation of signage in year 1 and ongoing maintenance;
 - > Retention of regrowth and native vegetation in perpetuity;
 - > Erosion Control in perpetuity;
 - > Retention of Rocks in perpetuity;
- Weed Management Plan:
 - > Weeds to be targeted: Galium spp, Flatweed (*Hypochaeris radicata*), Phyllanthus spp., Pittosporum spp., Poaceae indeterminate and Veronica spp.; and
 - > Methods of control: Herbicide, manual removal;
 - > Timing: Year 1 in Spring and Summer, annually in perpetuity;
 - > Monitoring: Initial weed survey, annual targeted searches;
- Fire for Conservation Management Plan:
 - > Development of detailed Fire Management Plan (Year 1);
 - > Completion of burn (Year 15);
 - > Methods of burning: ecological fire, cool burn;
 - > Monitoring: Biometric monitoring following burn, every 5 years;
- Management of Feral and Overabundant Herbivores, Vertebrate Pest Management Plan:
 - > Undertaking of control activities for fox, rabbits, wild dog, goats and pigs in collaboration with LLS and adjacent landholders;

- > Timing: Year 1 in perpetuity;
- > Monitoring using cameras (ongoing) and visual inspections (every 6 months) in perpetuity
- Monitoring:
 - > 6 visual monthly inspections in perpetuity;
 - > Baseline biometric survey in Year 1, Year 5 and thereafter every 5 years in perpetuity;
- Record Keeping:
 - > All management actions in perpetuity;
- Reporting:
 - > Annual reporting of all management actions and outcomes in perpetuity to the BCT;
 - > Annual summary of site management and response in Springvale and SWTP Annual Review;
- Review: Review of BioBanking Management Plans every 4 to 6 years with BCT.

4.4 Wolgan Road Lot 56

A BioBanking Agreement has been executed for Wolgan Road Lot 56(BA427). Centennial is completing application forms for the retirement of the biodiversity offset credits within this WRBOS.

The BioBanking Agreement requires the Total Fund Deposit be submitted on retirement of the biodiversity credits for management of the land in perpetuity.

The management actions and corresponding Total Fund Deposit are listed in Pipers Flat Lot 5 (BA448). Reporting and review of the management plan below is undertaken with the BCT annually.

The following management plans and actions are within Pipers Flat Lot 5 (BA448):

- Standard Management Plan:
 - > Management of human disturbance with installation of signage in year 1 and ongoing maintenance;
 - > Retention of regrowth an native vegetation in perpetuity;
 - > Erosion Control in perpetuity;
 - > Retention of Rocks in perpetuity;
- Weed Management Plan:
 - > Identification of target weeds for control: targeting Blackberry (*Rubis fruitcosus*), Spear thistle (*Cirsium vlgare*), Kikuyu (*Pennisetm clandestinum*), Sweet Briar (*Rosa rbiginosa*) and Fireweed (*Senecio madagascariensis*);
 - > Methods of control: Herbicide, manual removal;
 - > Timing: Year 1 to 5 Autumn and Spring and every year thereafter in perpetuity;
 - > Monitoring: Initial weed survey, annual targeted searches;
- Native Vegetation Planting:
 - > native planting following weed treatment to include *Eucalyptus aggregata*, *Eucalytpus bridgesian*, *Eucalyptus cannonii*, *Eucalyptus dalympleana*, *Eucalyptus dives*, *Eucalyptus pauciflora*, *Eucalyptus ribida*, *Eucalyptus stellulata*, *Eucalyptus viminalis*, *Acacia dealbata* and *Ajuga australis*.
- Fire for Conservation Management Plan:
 - > Development of detailed Fire Management Plan (Year 1);

- > Consultation with neighbouring State Forest on works;
- > Completion of burn (Year 15);
- > Consideration of *Veronica blakelyi* and *Eucalyptus canonii* in fire regimes.
- > Methods of burning: ecological fire, cool burn;
- > Monitoring: Biometric monitoring following burn, every 5 years;
- Management of Feral and Overabundant Herbivores, Vertebrate Pest Management Plan:
 - > Undertaking of control activities for fox, rabbits, wild dog, goats and pigs in collaboration with LLS and adjacent landholders;
 - > Timing: Year 1 in perpetuity;
 - > Monitoring using cameras (ongoing) and visual inspections (every 6 months) in perpetuity
- Monitoring:
 - > 6 visual monthly inspections in perpetuity;
 - > Baseline biometric survey in Year 1, Year 5 and thereafter every 5 years in perpetuity;
- Record Keeping:
 - All management actions in perpetuity;
- Reporting:
 - Annual reporting of all management actions and outcomes in perpetuity to the BCT;
 - Annual summary of site management and response in Springvale and SWTP Annual Review;
- Review: Review of BioBanking Management Plans every 4 to 6 years with BCT.

4.5 BCT Fund Contribution

A credit deficit of 46 ecosystem credits exists for HN558 (SWTP). A monetary contribution equal to the credit deficit is proposed to address this shortfall. An additional allocation for the Large-eared Pied Bat (9 credits) is also included. **Appendix 4** contains the results of the Payment Calculator for this deficit, which indicates that \$193,421.12 (incl. GST) will be required to redress this negative shortfall.

4.6 Supplementary Offset Measures

Throughout the development of the regional strategy, Centennial has undertaken a review of the Priority Actions for species and communities of concern to the OEH and DoEE. This review has identified a number of threatened species where actions for recovery can be supported by additional investment in research. These species are:

- *Persoonia hindii*; and
- *Caesia parviflora* var. *minor*.

Contributing research funding towards furthering recovery plans for the threatened species listed above is proposed. This research may include mapping the extent of species distribution in a regional context, include trials for the establishment of species habitat, studies of the nature, form and function of species within the landscape, ecology of fire and its impact on species and communities, seed collection and propagation techniques, habitat requirements, methods to communicate research findings, and short and long term goals to measure the effectiveness of the research.

Centennial acknowledges that the existing approval condition requiring both the Angus Place and Springvale operations to develop and implement a *Persoonia hindii* Research and Management Plan is ongoing. The outcomes of this research and monitoring program are ongoing and would provide information to inform future management decisions regarding potential impacts to *Persoonia hindii*.

4.6.1 *Persoonia hindii*

Summarised here is the current status of the monitoring and translocation programs and to analyse its efficacy and potential for addressing residual offset requirements for the loss of *P. hindii* as a result of the Angus Place Ventilation Shaft. *P. hindii* is analysed below in terms of the previous and future programs which have or will contribute to the residual impacts following avoidance measures, translocation and advances in scientific understanding of the ecology of this species including, life cycle and physiology.

The aim of the information provided herewith is to provide enough information for the Secretary to decide whether the existing and future programs are sufficient as offsets in relation to Schedule 3, Condition 24B of the Development Consent conditions (06_0021) as outlined in **Table 1**.

4.6.1.1 *Persoonia hindii* research and monitoring program

A *Persoonia hindii* (*P. hindii*) monitoring program was designed to comply with Condition 24A (e) and (h) of the Development Consent conditions (06_0021) for the Angus Place ventilation shaft facility. The survey and monitoring program has been implemented in-line with the procedures established by Sustainable Minerals Institute (SMI) Centre for Mined Land Rehabilitation (SMI CMLR) The University of Queensland (UQ). developed by the, The University of Queensland SMI CMLR in 2015 (UQ 2015), which was then performed by Gingra Ecological Surveys (2016), and has most recently by RPS (2017c).

Key components of the survey and monitoring are:

- Targeted threatened flora searches to determine the extent of *P. hindii* rehabilitation at shaft site (S4 within Environmental Study Area (ESA) 9), switch yard (ESA6), substation (ESA7/ ESA8 and alternative site ESA10), power supply corridor (ESA1, ESA2 and ESA3) and widened access track (ESA5);
- Undertake monitoring of the *P. hindii* translocation program; and
- Undertake monitoring of the *P. hindii* disturbance program.

The 2017 monitoring of the translocation program (RPS 2017c) indicates an overall success rate of 15.6% across all translocation treatments. This is a slight decline from 2016 survey (16.7%), and increase from the December 2014 survey (5.3%). Translocation through treatment 'A' (with existing soil intact) has continually indicated a better outcome than the other translocation treatments with the most recent 2017 monitoring period reporting a 37.5% success rate. Plants that were translocated through treatments 'B' (shoot reduction and minimal intact soil), and 'C' (trimmed of shoot material and bare rooted) responded poorly with 88.5% of the individuals continually being recorded dead following translocation in 2013. The failure of the translocation process could be attributed to the season that the translocation occurred (summer) and that the plants were not provided any water immediately before, during or after the translocation process (*Vallee et.al., 2004*).

The monitoring of the disturbance program indicates that the population of *P. hindii* in the control plots have increased on average from 47.25 individuals in 2015 to 50.75 individuals in 2017. Similarly, the population average of *P. hindii* in impact plots have increased slightly from an average of 41 individuals in 2015 to 50.75 individuals in 2017. Overall, *P. hindii* has fared better in control plots, with flushing, fruiting, and number of individuals higher on average than that in impact plots since monitoring began.

4.6.1.2 *Persoonia hindii* Rare Native Plant Research Program

In September 2016, Australian Coal Administration Research Program (ACARP) agreed to provide strategic funding to the RBGD&T to include high interest native *Persoonia* species of concern into mine site restoration programs through; propagation, translocation and field re-introduction programs. The program for

several *Persoonia* species of concern includes aims to identify best practice for germinating and propagating *P. hindii* for the purpose of translocations back into the environment.

In consultation with the Office of Environment and Heritage (OEH) and Royal Botanical Garden and Domain Trust (RBG&DT) at Mt Annan, agreement was made that root system ecology is best assessed in nursery to minimise natural population disturbance. This will be assessed as mature plants are accumulated and managed by the RBG&DT. This report proposes that suitable habitat not currently containing *P. hindii* be identified to support the RBG&DT relocation program of propagated *P. hindii* back onto Newnes Plateau.

A status update of this component of the program is outlined below.

4.6.1.2.1 Phase I:

The research program has been completed and the associated draft report is currently in preparation.

4.6.1.2.2 Phase II:

Phase II of the project has commenced (i.e. *P. hindii* in rehabilitation). The timeline for phase II is as follows:

- Two years' preparation until translocation in May 2019;
- Translocation is set to commence in May 2019;
- One year to monitor translocated *P. hindii* and prepare the project report; and
- Final Report available to go onto the ACARP website following completion of monitoring.

Background preparation to characterise the sites for field implementation, which will include the following:

- Soil testing;
- Climate monitoring;
- Land aspect;
- Microbial characterisation; and
- Habitat structure light availability.

The Royal Botanic Gardens and Domain Trust, Sydney, have succeeded in the propagation and potting of approximately 690 individual specimens of *P. hindii* to date, of these likely to be translocated onto the Newnes Plateau. These propagated individuals provide the opportunity for the administration of a translocation program to offset individuals that were removed as part of the Mod 2 Vent Shaft Facility at Angus Place.

4.6.1.3 Residual *P. hindii*

An initial translocation program was conducted in 2013 in order to satisfy the Angus Place PA 06_0021 conditions of consent for Mod 2 of the Vent Shaft Facility at Angus Place.

The status and monitoring report (RPS 2017c) has addressed the fact that survival rates of individuals translocated in the first translocation event in 2013 were low, with recent results reporting a 13.3% survival rate overall.

Our assertion is that these translocation results can be improved in future programs via alteration to the methodology to better suit potential survivorship. Two key amendments to the initial translocation that would be likely to improve the results include:

- Initial translocation efforts must include and be followed by an adequate watering program;
- Implementation of exclusion zones such as fencing would prevent herbivorous predation in the early stages of translocation; and

- Plant physiology studies to determine the impact on stomatal conductance, photosynthesis and leaf diffusion resistance of this species may provide further indication of growth limitation in associated with the effects adjacent to Sunnyside Ridge Road.

Ongoing monitoring of the translocation project will provide further information on the life cycle of this species and the efficacy of this program. Considering that the translocation event took place in November 2013, the actual impact could now be defined as the translocated individuals that were unsuccessful in persisting (i.e. the number of individuals which are declared as the residual impact). This currently equates to 52 individuals which would constitute the requirement for an offset consisting of 4004 'like for like' species credits under the FBA, 2014. In other words, the loss of one individual generates the requirement for 77 credits to account for the offset liability.

The proposed translocation program by RBGD&T will result in up to 690 *P. hindii* being translocated into appropriate habitat on the Newnes Plateau. The gain of one individual on an offset site would result in the production of 7 credits per individual. Therefore, if 100% of individuals are successful in surviving the translocation this would equate to the production of approximately 4,830 credits. If only 37.5 % were successful (e.g. as per Treatment A, RPS 2017c), this would result in the production of approximately 1811 credits. This equates to an estimated survival rate range of between 259 and 690 individuals.

If this were a simple credit liability calculation between a development site and an offset site the offset ratio has been calculated to be approximately 11:1 on the basis of the above scenarios. Therefore, the loss of 52 individuals within the development footprint would require 572 individuals to offset the loss.

However, it is anticipated that the actual number of individuals which successfully survive the translocation is going to fall somewhere in the middle of the range of 259 and 690 individuals. If this was the case this would equate to an offset ratio of between 4.98:1 and 13.27:1.

There is potential that the proposed RBG&DT translocation may result in a shortfall in terms of credits if the success rate of the translocation is commensurate with the success rate of the previous translocation.

Given that the RBG&DT will be taking findings from the initial translocation into consideration and having conducted further research of their own, they are more likely to have a much higher success rate. Furthermore, it should also be noted that the works conducted by RBG&DT have contributed to advances in the knowledge and understanding of the ecology of the species.

4.6.2 *Caesia parviflora* var. *minor*

A requirement to retire 42 species credits for the *assumed* loss of three individual *Caesia parviflora* var. *minor* arising from the construction of the SWTP (impact assessment was based on the assumed loss of three plants). However, surveys within the three offset properties were unable to locate a suitable like for like offset outcome for this species. As outlined in Section 1.4 Consultation, OEH have identified a research program may form part of a suitable supplementary measure of this WRBOS.

On 23 March 2017 RPS conducted searches on Centennial's behalf for the required like for like credits on the OEH BioBank site expression of interest website. When these searches were not successful in locating like for like credits RPS advertised on Centennial's behalf for like for like credits wanted on the OEH expression of interest website. Therefore, the required six month period in line with the variation rules concluded on 23 September 2017. The variation of the Offset rules (as stated in Section 10.5.7 of the FBA), has been applied and it is considered to be within these rules to use 42 species credits for *Veronica blakelyi* which have been generated at Wolgan Road North Lot 56 Offset Site (i.e. plants species with the same growth form or life form).

In addition, Centennial have proposed to undertake a supplementary measure and conduct a *Caesia parviflora* var. *minor* research program to investigate this species which has been assigned to the data-deficient species management stream under the Saving our Species program. Due to the unknowns at this stage the details about the objectives of the proposed program will be devised in collaboration with the relevant OEH Saving our Species personnel. It is also recognised that the saving our species program has

identified an aim to address key knowledge gaps for this species, which once resolved, can inform effective management of this species.

Consultation has been undertaken with the OEH Natural Heritage Project Officer responsible for *Caesia parviflora* var. *minor* to understand priorities for research. In response to this initial consultation, OEH have suggested the following areas of research for *Caesia parviflora* var. *minor*:

- Survey to establish the distribution and abundance of the taxon;
- Study into the species regeneration response to fire and other forms of disturbance;
- Ex-situ collection of seed and plant material, and investigation into germination cues, and ways to propagate the taxon; and
- Genetic and taxonomic studies to determine the appropriate taxonomy of the species.

Centennial Coal is commencing a *Caesia parviflora* var. *minor* genetic research program in 2019. The research program will determine if *Caesia parviflora* var. *minor* is in fact genetically distinct from *Caesia parviflora* will enter into a commitment to address at least one of the above areas of research as part of implementing the WRBOS. Centennial will supply outcomes of the research program to OEH Natural Heritage Project Officer responsible for *Caesia parviflora* var. *minor*.

5.0 BIBLIOGRAPHY

Centennial Springvale (2016) Exploration Activities and Minor Surface Infrastructure Management Plan. Springvale Colliery, Lidsdale NSW.

Department of Environment and Climate (DEC) (2006) The Vegetation of the Western Blue Mountains including the Capertee, Cox's, Jenolan and Gurnang Areas, DEC and CMA.

Gingra Ecological Services (2016) *Newnes plateau Persoonia Hindii monitoring 2015-2016*. Unpublished report prepared for Centennial Angus Place Colliery

Keith, D., (2004). *Ocean shores to desert dunes, the native vegetation of New South Wales and the ACT*. Office of Environment and Heritage – National Parks and Wildlife Service, Hurstville

RPS (2014a) *Springvale Mine Extension Project – Flora and Fauna Assessment Report*, prepared for Springvale Coal Pty Ltd by RPS.

RPS (2016). *Western Region Biodiversity Offset Package*. Unpublished draft report prepared for Centennial Coal, Fassifern.

RPS (2017a) Airly Land Management Site: Land Management Plan. Unpublished draft report prepared for Centennial Coal, Fassifern.

RPS (2017b) Wolgan Road Land Management Site: Land Management Plan. Unpublished draft report prepared for Centennial Coal, Fassifern.

RPS (2017c). *Persoonia hindii* Status and Monitoring report: Angus Place. Unpublished draft report prepared for Centennial Coal, Angus Place.

The University of Queensland (2015) *Persoonia Pindii: Monitoring, Management and Research Program*. Unpublished report prepared for Centennial Angus Place Colliery

Vallee, L, Hogbin, T., Monks, L. , Makinson, B. , Matthes, M., and Rossetto, M. (2004) *Guidelines for the Translocation of Threatened Plants in Australia*. Second Edition, Australian Network for Plant Conservation, Canberra.

Appendix I

Project Register – Statement of Impacts

Equivalence Table: DEC (2006) map units to BVTs

The calculation of ecosystem credits for native vegetation impacted by each project requires, in some circumstances, the conversion of vegetation units reported in the projects assessment documentation (i.e. DEC (2006) map units) to an equivalent vegetation type listed in the BVT Database (DECC 2009).

‘Best fit’ BVTs were selected using parameters such as overstorey and understorey floristics, soil landscape, location and topographic position. The conversion of vegetation communities to BVT is provided in **Table A1.1**. BVT equivalents are subsequently adopted throughout the statement of impacts for each project

Table A1.1 Native Vegetation Type Equivalences: Western Blue Mountains Map Units (DEC 2006) to BVTs (DECC 2009)

Map Units (MU) (DEC 2006)	Map Unit Description	Vegetation Formation	BVT	BVT Description
MU 7	Newnes Plateau Narrow-Leaved Peppermint – Mountain Gum – Brown Stringybark Layered Forest	Dry Sclerophyll Forests (Shrubby subformation)	HN559 (previously HN558)	Narrow-leaved Peppermint – Silvertop Ash – Mountain Grey Gum Shrubby open forest of the upper Blue Mountains, Sydney Basin Bioregion
MU 8	Newnes Sheltered Peppermint – Brown Barrel Shrubby Forest	Dry Sclerophyll Forests (Shrubby subformation)	HN599 (previously HN558)	Sydney Peppermint - Narrow-leaved Peppermint shrubby open forest on sheltered slopes of the Newnes Plateau, Sydney Basin (Narrow-leaved Peppermint - Mountain Gum - Brown Barrel moist open forest on high altitude ranges, northern South Eastern Highlands)
MU 11	Tableland Gully Snow Gum - Ribbon Gum Montane Grassy Forest	Grassy Woodlands	HN572	Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands
MU13	Tableland Gully Ribbon Gum - Blackwood - Apple Box Forest	Grassy Woodlands	HN501	Apple Box - Broad-leaved Peppermint dry open forest of the Abercrombie-Tarlo area, South Eastern Highlands
MU 14	Tableland Mountain Gum - Snow Gum - Daviesia Montane Open Forest	Grassy Woodlands	HN572	Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands
MU 15	Tableland Hollows Black Gum - Black Sally Open Forest	Grassy Woodlands	HN504	Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands, South Eastern Highlands
MU 20	Capertee Rough-barked Apple - Redgum - Yellow Box Grassy Woodlands (EEC)	Grassy Woodlands	HN506	Blakely's Red Gum - Yellow Box - Rough-barked Apple grassy woodland of the Capertee Valley, Sydney Basin Bioregion
MU 21	Capertee - Wolgan Slopes Red Box - Grey Gum - Stringybark Grassy Open Forest	Dry Sclerophyll Forests (Shrubby subformation)	HN534	Grey Gum - Narrow-leaved Stringybark - Inland Scribbly Gum shrubby open forest of the western Capertee Valley, Sydney Basin
MU 26	Newnes Plateau Narrow-Leaved Peppermint – Silvertop Ash Layered Open Forest	Dry Sclerophyll Forests (Shrubby subformation)	HN600	Sydney Peppermint - Silvertop Ash heathy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin
MU 26a	Newnes Plateau Narrow-Leaved Peppermint – Silvertop Ash Layered Open Forest (Gentle Depressions)	Dry Sclerophyll Forests (Shrubby subformation)	HN600	Sydney Peppermint - Silvertop Ash heathy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin

Map Units (MU) (DEC 2006)	Map Unit Description	Vegetation Formation	BVT	BVT Description
MU 28	Sandstone Plateau and Ridge Scribbly Gum – Silvertop Ash Shrubby Woodland	Dry Sclerophyll Forests (Shrubby subformation)	HN600 (originally HN599)	Sydney Peppermint - Silvertop Ash heathy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin (Sydney Peppermint - Narrow-leaved Peppermint shrubby open forest on sheltered slopes of the Newnes Plateau, Sydney Basin)
MU 29	Sandstone Slopes Sydney Peppermint Shrubby Forest	Dry Sclerophyll Forests (Shrubby subformation)	HN600 (originally HN599)	Sydney Peppermint - Silvertop Ash heathy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin (Sydney Peppermint - Narrow-leaved Peppermint shrubby open forest on sheltered slopes of the Newnes Plateau, Sydney Basin)
MU 30	Exposed Blue Mountains Sydney Peppermint - Silver-top Ash Shrubby Woodland	Dry Sclerophyll Forests (Shrubby subformation)	HN600	Sydney Peppermint - Silvertop Ash heathy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin
MU32	Tableland Hills Scribbly Gum - Narrow-leaved Stringybark Shrubby Open Forest	Dry Sclerophyll Forests (Shrubby subformation)	HN570	Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands
MU 33	Tableland Broad-leaved Peppermint - Brittle Gum - Red Stringybark Grassy Open Forest	Grassy Woodlands	HN514	Broad-leaved Peppermint - Red Stringybark grassy open forest on undulating hills, South Eastern Highlands
MU 35	Tableland Gully Mountain Gum - Broad-leaved Peppermint Grassy Forest	Wet Sclerophyll Forests (Grassy subformation)	HN590	Snow Gum - Mountain Gum tussock grass-herb forest of the South Eastern Highlands
MU 37	Coxs Permian Red Stringybark - Brittle Gum Woodland	Dry Sclerophyll Forests (Shrubby subformation)	HN570	Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highland
MU 38	Capertee Grey Gum - Narrow-leaved Stringybark - Scribbly Gum - Callitris - Ironbark Shrubby Open Forest	Dry Sclerophyll Forests (Shrubby subformation)	HN534	Grey Gum - Narrow-leaved Stringybark - Inland Scribbly Gum shrubby open forest of the western Capertee Valley, Sydney Basin
MU 42	Capertee Hills White Box - Tumbledown Redgum - Ironbark - Callitris Shrubby Woodland	Dry Sclerophyll Forests (Shrubby subformation)	HN544	Inland Scribbly Gum - Grey Gum - Narrow-leaved Ironbark shrubby open forest on hills of western Capertee Valley, Sydney Basin
MU 43	Pagoda Rock Sparse Shrubland	Heathlands	HN508	Blue Mountains Mallee Ash - Dwarf Casuarina heath of the upper Blue Mountains, Sydney Basin
MU 44	Sandstone Plateaux Tee Tree – Dwarf Sheoak – <i>Banksia</i> Rocky Heath	Heathlands	HN508	Blue Mountains Mallee Ash - Dwarf Casuarina heath of the upper Blue Mountains, Sydney Basin

Map Units (MU) (DEC 2006)	Map Unit Description	Vegetation Formation	BVT	BVT Description
MU 45	Newnes Plateau Tea Tree - Banksia - Mallee Heath	Heathlands	HN508	Blue Mountains Mallee Ash - Dwarf Casuarina heath of the upper Blue Mountains, Sydney Basin
MU 53	Mountain Hollow Grassy Fen	Freshwater Wetlands	HN602	Tableland swamp meadow on impeded drainage sites of the western Sydney Basin and South Eastern Highlands
MU 54	Capertee – Wolgan Riparian Rough-Barked Apple – River Oak Open Forest	Forested Wetlands	HN574	River Oak open forest of major streams, Sydney Basin and South East Corner

Springvale Mine Extension Project

The Project involves the extension of current mining operations, using longwall mining techniques, to the east and the south-west of the existing workings. The mining activities included:

- Continued extraction of up to 4.5 million tonnes per annum (Mtpa) of ROM coal from the Lithgow Seam underlying the Project Application Area;
- Development of underground access headings and roadways from the current mining area to the east to allow access to the proposed mining areas;
- Secondary extraction undertaken by retreat longwall mining technique for the proposed longwalls LW416 to LW432 and LW501 to LW503;
- Continuation of the use of existing ancillary surface facilities at the Springvale pit-top;
- Continuation of management of the handling of ROM coal through a crusher and screening plant at the Springvale pit-top, and the subsequent loading of the coal onto the existing overland conveyor system for dispatch to offsite locations;
- Continuation of operation and maintenance to the existing ancillary surface infrastructure for ventilation, electricity, water, materials supply, and communications at the Springvale pit-top and on Newnes Plateau;
- Installation and operation of two additional dewatering bore facilities (Bores 9 and 10) on Newnes Plateau and the associated power and pipeline infrastructure, and upgrade of the existing tracks and construction of two new sections of access tracks to Bores 9 and 10 facilities;
- Construction of a downcast ventilation borehole at the Bore 10 facility location;
- Establishment of a services borehole area;
- Upgrade of the existing Springvale Delta Water Transfer Scheme (SDWTS) comprising construction of new sections of the trenched pipelines to increase the water delivery capacity of SDWTS from the existing 30 ML/day to up to 50 ML/day;
- Management of mine inflows using a combination of direct water transfer to the Wallerawang Power Station, via the SDWTS, and discharge through Angus Place Mine's licensed discharge point LDP001 and Springvale Mine's LDP009;
- Continuation to existing and initiate new environmental monitoring programs;
- Continuation of 24 hours per day, seven days per week operation;
- Continuation to provide employment to a full time workforce of up to 310 persons;
- Progressive rehabilitation of disturbed areas at infrastructure sites no longer required for mining operations;
- life-of-mine rehabilitation undertaken at the Springvale pit-top and the Newnes Plateau infrastructure disturbance areas to create final landforms commensurate with the surrounding areas and the relevant zonings of the respective areas; and
- Transfer of the operational management of coal processing and distribution infrastructure to the WCS Project.

Avoidance

Avoidance measures, as presented in the Springvale Extension Project EIS can be summarised as:

- Identification of environmental study areas around proposed infrastructure areas;

- Following environmental baseline monitoring and surveys, environmental constraints were presented on a plan with the proposed infrastructure areas;
- A review infrastructure and environmental constraints plan was undertaken, as an iterative process to as far as practical and feasible to reduce direct impact to environmental values.

Impact Assessment

The Project proposes minor impact on native vegetation. **Table A1.2** outlines the area of direct impact (clearing) of native vegetation which totalled approximately 8.94 ha. However, more recent calculations which are contained in the approved Exploration Activities and Minor Surface Infrastructure Management Plan (Centennial Springvale 2016) have ascertained that the actual clearing of native vegetation is approximately 8.00 hectares.

Table A1.2 Springvale Mine Extension Project Vegetation Impacts

BVT	Map Unit (MU) (DEC 2006)	Impact Area (ha)
HN559 Narrow-leaved Peppermint – Silvertop Ash – Mountain Grey Gum Shrubby open forest of the upper Blue Mountains, Sydney Basin Bioregion	MU7 Newnes Plateau Narrow-leaved Peppermint - Mountain Gum - Brown Stringybark Layered Forest	0.86
HN600 Sydney Peppermint - Silvertop Ash heathy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin	MU26 Newnes Plateau Narrow-leaved Peppermint - Silver-top Ash Layered Open Forest	5.05
HN600 Sydney Peppermint - Silvertop Ash heathy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin	MU26a Newnes Plateau Gum Hollows variant: Brittle Gum - Mountain Gum, Scribbly Gum - Snow Gum Shrubby Open Forest	0.96
HN600 Sydney Peppermint - Silvertop Ash heathy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin	MU28 Sandstone Plateau And Ridge Scribbly Gum - Silver-top Ash Shrubby Woodland	2.00
HN508 Blue Mountains Mallee Ash - Dwarf Casuarina heath of the upper Blue Mountains, Sydney Basin	MU44 Sandstone Plateaux Tea Tree - Dwarf Sheoak - Banksia Rocky Heath	0.07
Sub-total (native vegetation)		8.94
-	59 Non-native Vegetation - Pine plantation / woodlot / shelter	0.05
-	62 Cleared and Severely Disturbed Lands	0.05
Impact Total		8.95

Mitigation Measures

Proposed direct and indirect impact mitigation measures for this project are summarised in **Table A1.3**.

Table A1.3 Springvale Mine Extension Project Mitigation Measures

Impact	Mitigation Measure
Impacts to flora (loss of species and habitat)	For those areas where hard surfaces are required, undertake stockpiling of soil to enable reestablishment of viable habitat following infrastructure decommissioning.
	During clearing, and where it would not interfere with operations, the removal of vegetation should be limited to above ground parts as much as possible. This will enable any vegetation that is able to resprout once works are completed to do so.
Impacts to fauna (loss of species and habitat)	Where possible, clearing activities will be timed to avoid removal of hollow-bearing trees during the breeding season of threatened species.
	Employment of best practice methods for felling of hollow-bearing trees.
	Prioritise the retention of hollow-bearing tree within Asset Protection Zones associated with the dewatering bore sites.
	Placement of hollow logs and felled hollow-bearing trees within adjacent uncleared vegetation to provide additional habitat resources for terrestrial fauna.
Erosion and Sedimentation	Limiting the amount of exposed surfaces that may become eroded by weather and operations.
	Installation of erosion and runoff control measures around cleared and operational areas.
Dust	Implementation of dust control measures to protect adjacent retained vegetation communities
Weed Incursion	Strict weed management, monitoring and control practices should to be implemented to minimise the spread of exotic species into natural areas within the sites.

Springvale Bore 8

The Project involved the construction and operation of additional surface mine dewatering facility, referred to as Bore 8, along with associated infrastructure an underground cable, water pipeline and access track. Bore 8, a fenced compound with a footprint of 0.32 ha houses four boreholes installed with submersible pumps, an associated switch room with power control equipment for the operation of pumps and a sump. The access track is 3.5km long and 10m wide. 11kV cables and water pipelines will be buried in the infrastructure corridor alongside the access track. Total area of disturbance for the borehole and associated infrastructure is approximately 4 ha.

Upon completion, the disturbance area will be partially rehabilitated, leaving a final footprint of 0.32 ha at Bore 8. An Asset Protection Zone of 20m around the perimeter has been established.

Bore 8 is required to facilitate the progress of coal extraction further to the east of existing workings at Springvale. Approval was granted on 8 March 2013.

Impact Assessment

The Project proposed to impact on native vegetation and one threatened flora species. **Table A1.4** outlines the approved area of impact on native vegetation which equates to approximately 3.93 ha.

Approximately 1,445 individual *Persoonia hindii* plants were recorded in the Study Area, with a total of 93 individual plants proposed to be removed. Following approval, but prior to construction, consideration was given to avoiding as many *P. hindii* as possible. The avoidance measures were successful in avoiding all *P. hindii* stems.

Table A1.4 Springvale Bore 8 Vegetation Impacts

BVT	Map Unit (MU) (DEC 2006)	Impact Area (ha)
HN558 Narrow-leaved Peppermint - Mountain Gum - Brown Barrel moist open forest on high altitude ranges, northern South Eastern Highlands	MU7 Newnes Plateau Narrow-leaved Peppermint - Mountain Gum - Brown Stringybark Layered Forest	1.65
HN600 Sydney Peppermint - Silvertop Ash heathy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin	MU28 Sandstone Plateau and Ridge Scribbly Gum - Silver-top Ash Shrubby Woodland	1.79
HN600 Sydney Peppermint - Silvertop Ash heathy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin	MU30 Exposed Blue Mountains Sydney Peppermint - Silver-top Ash Shrubby Woodland	0.49
Sub-total (native vegetation)		3.93
HN600 Sydney Peppermint - Silvertop Ash heathy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin	Conditions of consent erroneously state 4 ha will be offset	0.07
Impact Total		4.00

Compensatory measures for this Springvale Bore 8 impacts to compensate for the loss of native vegetation as a result of the Project are presented in **Table A1.5** below.

Table A1.5 Springvale Bore 8 Compensatory Measures

Title	Compensation Measure
Rehabilitation Management Plan	<ul style="list-style-type: none"> ■ A description of how the performance of the rehabilitation would be monitored and assessed; ■ A description of measures for soil erosion and sediment control; ■ Outline provisions for progressive rehabilitation of temporarily disturbed areas and final rehabilitation following decommissioning of the Bore 8 facilities; and ■ Includes a timetable for the implementation of the components of the Plan.
<i>Persoonia hindii</i> Management and Research program	<ul style="list-style-type: none"> ■ Timetable to undertake surveys and mapping of <i>P. hindii</i> to establish its distribution and population across the Newnes Plateau; ■ The measures for the translocation of all stems (ramets) of <i>P. hindii</i> found in the area of disturbance associated with the widening of access tracks for Bore 8, to nearby areas with similar physical and biological habitat features; ■ Trials to assess whether such translocated <i>P. hindii</i> stems can be successfully returned to their original locations as a component of the rehabilitation of these areas; ■ A study of the rhizomatous habit of <i>P. hindii</i> and how this may affect the success of the species in translocation and/or re-colonising disturbed areas; ■ A monitoring program to study the <i>P. hindii</i> stems before and after translocation; ■ A monitoring program to measure the ability of the residual <i>P. hindii</i> population along the disturbed areas of the Bore 8 access track and construction site to regenerate; and ■ Include shots and long-term goals to measure the effectiveness of the Program.

Angus Place Ventilation Facility

The following activities and infrastructure were proposed to enable the successful construction and implementation of the ventilation facility, known as Angus Place Colliery Ventilation Site, its supporting infrastructure and the Subsidence Assessment Area. The proposed infrastructure was in addition to the existing use of the Angus Place Colliery site.

- Development of underground access headings from Longwall 910 up to the proposed ventilation facility site;
- Continuation of underground roadways to develop gate roads from the ventilation shaft;
- Construction and operation of a ventilation facility, consisting of both upcast (exhaust) and downcast (intake) shafts;
- Implementation of ventilation facility backup generator and an above ground self bunded diesel storage tank (20,000L);
- Construction and operation of an air compressor station;
- Implementation of several surface to mine service boreholes;
- Personnel amenities such as a demountable first aid room and sanitary facilities;
- Permanent hardstand access arrangements and standing areas. Construction of adequate security fencing;
- Water management control ponds;
- Construction of fire tanks to protect assets from bushfire impacts;
- Shaft spoil emplacement area;
- New access track from Sunnyside Ridge Road to the proposed ventilation facility;
- Construction and operation of two electrical substations;
- Provision of electrical power supply from existing overhead power lines to the ventilation facility;
- Switchyard at the existing power line to link to the proposed extension of the electrical power supply;
- Buried cables; and
- Boreholes to supply services such as concrete, ballast, stone dust, emulsion, electricity, communications and compressed air.

Approval for Angus Place Colliery Modification 2 – Ventilation project was granted on the 22 April 2013.

Impact Assessment

The Project had a minor impact on native vegetation and one threatened flora species. **Table A1.6** describes the native vegetation loss arising from the construction of the ventilation project. The impact area was calculated by comparing the predicted impact footprint, as prepared for the impact assessment, with high resolution imagery flown after the construction works (i.e. 7cm CIR imagery flown in December 2015).

Table A1.6 Angus Place Ventilation Facility Vegetation Impacts

BVT	Map Unit (MU) (DEC 2006)	Impact Area (ha)
HN559 Narrow-leaved Peppermint – Silvertop Ash – Mountain Grey Gum shrubby open forest of the upper Blue Mountains, Sydney Basin Bioregion	MU7 Newnes Plateau Narrow-leaved Peppermint - Mountain Gum - Brown Stringybark Layered Forest	6.07
HN590 Snow Gum - Mountain Gum tussock grass-herb forest of the South Eastern Highlands	MU14 Tableland Mountain Gum - Snow Gum - Daviesia Montane Open Forest	0.54
HN600 Sydney Peppermint - Silvertop Ash heathy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin	MU26a Newnes Plateau Gum Hollows variant: Brittle Gum - Mountain Gum, Scribbly Gum - Snow Gum Shrubby Open Forest	5.64
HN508 Blue Mountains Mallee Ash - Dwarf Casuarina heath of the upper Blue Mountains, Sydney Basin	MU45 Newnes Plateau Tea Tree - Banksia - Mallee Heath	0.11
Total Impact		12.36

Approximately 1,269 individuals of *Persoonia hindii* stems were proposed to be removed as a result of the Project. Following approval, but prior to construction, consideration was given to avoiding as many *P. hindii* as possible. Ultimately, 60 *P. hindii* stems were translocated as part of this project, with the remainder avoided. As aforementioned, of these transplanted individuals there was a 16.7% success rate (i.e. 10 survived).

Section 24A. (h) of the *Persoonia hindii* Management and Research Program states to:

include a monitoring program to measure the ability of the residual Persoonia hindii population along the disturbed areas of the ventilation facilities access tracks/roads and construction site to regenerate.

Furthermore, Section 24B of the Angus Place Ventilation Facility (project application: 06_0021)- Mod – 2 states that:

In determining a suitable residual offset, the Secretary will have regard to the outcomes of the Persoonia hindii Management and Research Program, particularly the success of translocation and/or regeneration, and the Proponent's success in implementing the Rehabilitation Management Plan.

A transect survey has been conducted to determine the efficacy of regeneration in a representative sample of the disturbance footprint. However, to date no surveys of the entire site/impact area have been undertaken in order to quantify how many individuals have been successful in regenerating back into the impact area. Therefore, until such a survey has been conducted a conservative number of ten individuals have been assumed to have successfully recruited back into the disturbance footprint. Consequently, the conservative number of potentially impacted individuals is considered to be approximately 40. Further surveys of the regeneration and monitoring of the success of the translocation combined with additional compensatory measures provided by the *Persoonia hindii* Management and Research Program may further reduce this number at a later date.

Compensatory Measures

Centennial Angus Place has undertaken a number of measures to compensate for the loss of native vegetation and individual *P. hindii* as a result of the Project. Measures were also undertaken to prevent any indirect impacts that were considered a potential risk from the Project.

Table A1.7 Angus Place Ventilation Shaft Compensatory Measures

Title	Compensatory Measure
Rehabilitation Management Plan	<ul style="list-style-type: none"> ■ A description of how the performance of the rehabilitation would be monitored and assessed; ■ A description of measures for soil erosion and sediment control; ■ Outline provisions for progressive rehabilitation of temporarily disturbed areas and final rehabilitation following decommissioning of the these facilities; and ■ Includes a timetable for the implementation of the components of the Plan.
<i>Persoonia hindii</i> Management and Research program	<ul style="list-style-type: none"> ■ Inclusion of a timetable to undertake surveys and mapping of <i>P. hindii</i> to establish its distribution and population across the Newnes Plateau; ■ The measures for the translocation of all stems (ramets) of <i>P. hindii</i> found in the area of disturbance associated with the widening of access tracks to the Mod – 2 ventilation facilities, to nearby areas with similar physical and biological habitat features; ■ Trails to assess whether such translocated <i>P. hindii</i> stems can be successfully returned to their original locations as a component of the rehabilitation of these areas; ■ A study of the rhizomatous habit of <i>P. hindii</i> and how this may affect the success of the species in translocation and/or re-colonising disturbed areas; ■ A monitoring program to study the <i>P. hindii</i> stems before and after translocation; ■ A monitoring program to measure the ability of the residual <i>P. hindii</i> population along the disturbed areas of the ventilation facility's access track and construction site to regenerate; and ■ Include shots and long-term goals to measure the effectiveness of the Program.
Construction Environmental Management Plan	<p>Identification of environmental impacts and potential impacts of these activities and describe measures it mitigate and manage these impacts, including impacts associated with:</p> <ul style="list-style-type: none"> ■ Noise emissions; ■ Visual amenity; ■ Night lighting; ■ Air quality; ■ Traffic management; ■ Public safety; ■ Bushfire management; ■ Waste and hazardous materials management; ■ Vegetation removal (including identification of tree hollows, provision for the salvage (where feasible), and provision for their relocation and/or replacement in adjacent woodland); and ■ Erosion and sediment control.

Springvale Western Coal Services

The project aimed to improve existing facilities to meet future market demands, both export and domestic. Specifically, the Western Coal Services Project involved:

- Upgrades to the existing washery, workshops and infrastructure within the site by constructing a new washery adjacent to the existing facility that will remain operational to provide a total processing capacity of up to 7 Mtpa.
- Construction of processing infrastructure such as additional conveyors and transfer points and other coal handling requirements to cater for the upgraded washery facility within the existing disturbance footprint of the site.
- Extending and enlarging an existing reject emplacement area to enable sufficient reject disposal capacity for a 25 year life.
- Increasing the utilisation of the return side of the existing overland conveyor system to enable up to 6.3 Mtpa of coal to be delivered to Lidsdale Siding.
- Construction of a private haul road, approximately 1.3 km in length, linking the site with the existing private haul road from Angus Place Colliery to Mt Piper Power Station. This private road will cross a section of the existing Pine Dale Mine operation and over the Castlereagh Highway.
- Improvement of the current water management systems on the site by separating clean and dirty water streams prior to either reuse or discharge off site.
- Integration of the existing approved transport and processing of coal at Springvale Coal Mine and Angus Place Colliery into the one consent.
- Integration of the remaining rehabilitation, monitoring, water management and reporting requirements associated with the Lamberts Gully Mine which occupies the site.
- Continuation of the use of all existing approved infrastructure, facilities and activities associated with the transport and processing of coal from each mine gate and the point of delivery to the site. This infrastructure includes the existing conveyors, private haul roads, Kerosene Vale Stockpile area, reject emplacement areas, services, access roads, car parks and buildings.

Impact Assessment

Table A1.8 outlines the area of impact on native (and regenerating) vegetation which totalled approximately 41.34 ha. Of this, approximately 0.05 ha of MU 11 Tableland Gully Snow Gum – Ribbon Gum Montane Grassy Forest, which is commensurate with the EEC Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregions will be removed to allow for the Project.

Table A1.8 Western Coal Services

BVT	Map Unit (MU) (DEC 2006)	Impact Area (ha)
HN572 Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands	MU11 Tableland Gully Snow Gum - Ribbon Gum Montane Grassy Forest	0.05
HN570 Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highland	MU37 Cox's Permian Red Stringybark - Brittle Gum Woodland	10.62
Total		10.67

Note: Conditions of consent erroneously state that 10.67ha of Coxs Permian Red Stringybark - Brittle Gum Woodland will be offset. Consequently, calculations are conducted on this basis.

Compensatory Measures

As a result of direct impacts upon native vegetation and fauna habitat, and potential indirect impacts, a number of compensatory measures have been undertaken to ameliorate these impacts. A BMP prepared for the development includes (but was not limited to) the measures presented in **Table A1.9** below.

Table A1.9 Compensatory Measures

Title	Compensatory Measure
Biodiversity Management Plan	<p>Management of:</p> <ul style="list-style-type: none"> ■ Short, medium and long-term management of remnant vegetation and habitat on site; ■ A detailed performance criteria for evaluating the performance of the Biodiversity Offset Strategy, and triggering any necessary remedial action; ■ A description of the measures that would be implemented over the next 3 years for: ■ Enhancing the quality of existing vegetation and fauna habitat; ■ Establishing native vegetation and fauna habitat in the Additional Rehabilitation Initiatives area through focusing on assisted natural regeneration, targeted vegetation establishment and the introduction of naturally scarce fauna habitat features; ■ Enhancing the landscaping of the site and along public roads to minimise visual and lighting impacts, particularly along Castlereagh highway; ■ The protection of vegetation and soil outside the approved disturbance area; ■ Maximise the salvage of resources within the approved disturbance area-including tree hollows and vegetative and soil resources; ■ Collecting and propagating seed; ■ Minimising impacts on fauna; ■ Controlling, salinity, weeds, feral pests, erosion, access and bushfire risk. ■ Monitoring program to report on the effectiveness of these measures.
	<p>A BMP was prepared for the development that included (but was not limited to) the following measures:</p> <ul style="list-style-type: none"> ■ Short, medium and long-term management of remnant vegetation and habitat on site; ■ A detailed performance criteria for evaluating the performance of the Biodiversity Offset Strategy, and triggering any necessary remedial action; ■ A description of the measures that would be implemented over the next 3 years for: ■ Enhancing the quality of existing vegetation and fauna habitat; ■ Establishing native vegetation and fauna habitat in the Additional Rehabilitation Initiatives area through focusing on assisted natural regeneration, targeted vegetation establishment and the introduction of naturally scarce fauna habitat features; ■ Enhancing the landscaping of the site and along public roads to minimise visual and lighting impacts, particularly along Castlereagh highway; ■ The protection of vegetation and soil outside the approved disturbance area; ■ Maximise the salvage of resources within the approved disturbance area-including tree hollows and vegetative and soil resources; ■ Collecting and propagating seed; ■ Minimising impacts on fauna; ■ Controlling, salinity, weeds, feral pests, erosion, access and bushfire risk. ■ Monitoring program to report on the effectiveness of these measures.
	<ul style="list-style-type: none"> ■ Additional rehabilitation initiatives have been taken including the establishment and enhancement of locally endemic native vegetation species on Lamberts Gully Creek catchment, as well as improving fauna habitat values.

Clarence Reject Emplacement Area

The development within the site was for an additional reject emplacement area (REA), referred to as REA 6, to be used by Clarence Colliery to store waste rock as a result of ongoing mining operations. This required the removal of the majority of vegetation situated within the site boundary.

Impact Assessment

The project resulted in the removal of 4.1 ha of native vegetation defined as Newnes Plateau Narrow-leaved Peppermint – Silvertop Ash Layered Open Forest (MU26). This vegetation community is not commensurate with any BC Act and/or EPBC Act listed ecological community.

A total of 16 hollow bearing trees were removed, reducing the available amount of roosting habitat for a number of threatened fauna species. The removed vegetation was also considered foraging habitat for a range of native fauna within the local area.

No threatened flora were removed as a result of the project. No significant impacts to threatened flora, fauna and/or ecological communities were expected to occur as a result of the REA 6 operation.

Compensatory Measures

To compensate for the removal of 4.1 ha of native vegetation to accommodate for the REA, as outlined in **Table A1.10**, a number of measures have been undertaken. This includes future rehabilitation objectives defined within a Mining Operations Plan to ensure the REA site will be appropriately rehabilitated at the completion of the sites use.

Table A1.10 Compensatory Measures

Title	Compensatory Measure
Pre and during clearing	<ul style="list-style-type: none"> ■ Clearing works will be supervised by a qualified ecologist to ensure previously identified habitat trees are 'soft-felled' and any fauna is handled appropriately, including the relocation of any arboreal mammals. ■ Machinery working within the site will be clean before commencing work. ■ Erosion and sediment controls will be implemented in accordance with mitigation ■ Implement measures in Section 7 of the EIS to prevent run-off or sediment flows from impacting upon the adjacent THPSS community. ■ Felled hollow-bearing trees will either be relocated to vegetated areas adjacent to the site or within areas currently under rehabilitation to assist in conservation efforts for threatened fauna species. ■ The base of the REA VI will be compacted and clay lined to create a low permeability (effectively impermeable) barrier restricting potential seepage of leachate water into the near surface groundwater Table.
Ecological Monitoring of neighbouring swamp	<ul style="list-style-type: none"> ■ A rapid assessment on established cross-sections within the THPSS community will be undertaken annually in summer months to monitor the integrity of the swamp.
Management Activities	<ul style="list-style-type: none"> ■ Ongoing weed monitoring and management will be undertaken within REA VI to control invasive weeds.
During Operations	<ul style="list-style-type: none"> ■ Leachate water will be collected and transferred for treatment. ■ Clean water will be directed around the site.

Springvale Water Treatment Project

Project description

Springvale and Angus Place Collieries operate a water management scheme, referred to as the Springvale Water Treatment Project (SWTP), for the management of safe water levels in the underground workings at both mines. The SWTP incorporates a network of pipelines connecting the dewatering bore facilities on the Newnes Plateau to Springvale Mine's licensed discharge points (LDP) (i.e. LDP009 and LDP010), where the mine water is currently discharged into Coxs River via the Swayers Swamp Creek.

EnergyAustralia owns and operates the Mount Piper Power Station (MPPS), about eight kilometres west of the Springvale Mine pit top. MPPS has a high demand for make-up water for use in the cooling tower system. Water is currently drawn from the Coxs River and Fish River water supply schemes. MPPS operates as a zero discharge site with no release of water or by-products (e.g. brine) from the cooling tower system to receiving waters. MPPS has an existing brine management system for the treatment and disposal of brine on site.

The Project involves establishing a pipeline and ancillary facilities to transfer water from existing dewatering facilities on the Newnes Plateau for treatment and reuse at MPPS. An overview of the Project is as follows:

- A system to transfer up to 36 ML/day of dewatered mine water from the existing gravity tank forming part of Springvale Mine's approved dewatering facilities on the Newnes Plateau, to a new water treatment plant at the MPPS site;
- A new water treatment plant incorporating desalination processes to reduce the salinity of mine water to a standard suitable for either industrial reuse or environmental release;
- Transfer of treated water from the water treatment plant to the MPPS cooling tower to contribute to the demand for make-up water;
- Transfer of any excess treated water to the Springvale Coal Services site (Western Coal Services Project, SSD5579) for direct environmental release to Wangcol Creek;
- Transfer of the saline brine stream from the water treatment plant to the MPPS cooling tower blowdown system for integration with existing treatment and brine disposal practices;
- Installation of a crystalliser to provide further treatment of the additional salt load generated within the MPPS cooling tower blowdown system; and
- A truck turning bay and pipeline storage area along the southern alignment only.

Impact Assessment

Impact avoidance opportunities are proposed to reduce the loss of biodiversity values within the Study Area (i.e. use of existing disturbed lands and pre-clearance surveys to avoid threatened plant and hollow-bearing trees). Impact minimisation and mitigation measures are also recommended to further minimise the potential flora and fauna impacts of the clearing, construction and operation of the proposal.

Vegetation Loss

Native vegetation loss for the SWTP is quantified in **Table A1.11**.

Table A1.11 Native vegetation loss for the SWTP

BVT	Map Unit (MU) (DEC 2006)	Impact Area (ha)
HN514 Broad-leaved Peppermint - Red Stringybark grassy open forest on undulating hills, South Eastern Highlands	MU 33 Tableland Broad-leaved Peppermint - Brittle Gum - Red Stringybark Grassy Open Forest	0.47
HN558 Narrow-leaved Peppermint - Mountain Gum - Brown Barrel moist open forest on high altitude ranges, northern South Eastern Highlands	MU 7 Newnes Plateau Narrow-leaved Peppermint - Mountain Gum - Brown Stringybark Layered Forest	1.11
HN570 Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highland (Poor Condition)	MU 37 Cox's Permian Red Stringybark - Brittle Gum Woodland	21.22
HN572 Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands	MU11 Tableland Gully Snow Gum - Ribbon Gum Montane Grassy Forest	2.12
HN599 Sydney Peppermint - Narrow-leaved Peppermint shrubby open forest on sheltered slopes of the Newnes Plateau, Sydney Basin	MU 8 Newnes Sheltered Peppermint – Brown Barrel Shrubby Forest	0.73
HN600 Sydney Peppermint - Silvertop Ash heathy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin	MU 26 Newnes Plateau Narrow-leaved Peppermint - Silver-top Ash Layered Open Forest	1.71
	MU 28 Sandstone Plateau and Ridge Scribbly Gum – Silvertop Ash Shrubby Woodland	
	MU 29 Sandstone Slopes Sydney Peppermint Shrubby Forest	
HN602 Tableland swamp meadow on impeded drainage sites of the western Sydney Basin and South Eastern Highlands	MU 53 Mountain Hollow Grassy Fen	0.02
HN630 <i>Phragmites australis</i> and <i>Typha orientalis</i> coastal freshwater wetlands	Typha Phragmites Wetland	0.46
Total Impact		27.84

Threatened flora and fauna species

Provided in **Table A1.12** is a summary of the impacts on individual threatened flora and fauna species.

Table A1.12 Impact Summary for threatened flora and fauna species

Species	Loss
<i>Eucalyptus cannonii</i> (Capertee Stringybark)	3 individuals (assumed)
<i>Caesia parviflora</i> var. <i>minor</i> (Pale Grass-lily)	3 individuals (assumed)
Large-eared Pied Bat (<i>Chalinolobus dwyeri</i>)	0.73 ha (core habitat)

Impacts on *Persoonia hindii* are being avoided through the careful placement and construction of the pipeline within areas of known habitat.

Mitigation

Mitigation measures for the Project are to be implemented through a Construction Environmental Management Plan (CEMP). The following mitigation measures are recommended for inclusion in the CEMP to reduce the impacts of clearing, construction and operation of the proposed development:

- The clearing of native vegetation should be minimised as far as is practicable. Unnecessary vegetation clearing should be minimised by fencing the clearing limit.

- All contractors will be specifically advised of the designated work area. The following activities are not to occur outside of designated work areas to minimise impacts on native vegetation:
 - > Vehicle movements;
 - > Storage and mixing of materials;
 - > Vehicle parking;
 - > Liquid disposal;
 - > Machinery repairs and/or refuelling;
 - > Combustion of any material;
 - > Inappropriate stockpiling of soil, rubble or debris; and/or
 - > Any filling or excavation including trenching, topsoil skimming and/or surface excavation.
- All construction and operational vehicles/machinery will use designated access tracks. Speeds will be limited to 20 kilometres per hour to reduce the potential of fauna strike and to reduce dust generation.
- Plant and machinery will be cleaned of any foreign soil and propagative material prior to being transported to the construction areas to prevent the spread of weeds and potential importation of *Phytophthora*.
- If machinery is transported from an area of confirmed infection of *Phytophthora* or *Chytrid* fungus to the construction areas, stringent wash down will be completed before leaving the area, removing all soil and vegetative material from cabins, trays, and under carriages.
- To minimise potential impacts on adjacent conservation lands and wetland habitats all liquids (fuel, oil, cleaning agents, drilling liquids etc.) will be stored appropriately and disposed of at suitably licensed facilities. Spill management procedures will be implemented as required. Rubbish will be collected and removed from the Project Application area.
- Appropriate erosion and sediment control measures will be managed via the implementation of an erosion and sediment control plan, in accordance with best management practices, such as the:
 - > Best Practice Erosion and Sediment Control Guidelines (IECA, 2008); and
 - > Managing Urban Stormwater: Soils and Construction 4th Ed. 'The Blue Book' (Landcom 2004).

It is imperative that the plan ensures that any offsite discharge of stormwater (freshwater) does not significantly impact upon the adjoining aquatic environments.
- Construction personnel will be trained adequately in pest management and hygiene procedures.
- Weed management procedures will be implemented to prevent the spread of weeds both inside the Project Application Area and outside. Ongoing weed monitoring to be implemented and potential weed infestations appropriately managed to minimise the spread of weeds on the Project area. Management of noxious weeds are to be undertaken in accordance with the Noxious Weeds Act 1993. Weed monitoring should occur throughout the construction and operation phase and weed removal will be carried out as necessary.
- Where possible, clearing activities should be timed to avoid removal of hollow-bearing trees during breeding season of threatened species (avoiding winter and spring).
- An ecologist is to perform pre-clearance surveys with the construction manager to identify key areas of impact avoidance including threatened plant species. Impact assessment assumptions for threatened plant loss are to be validated through this pre-clearance survey.
- A qualified ecologist is to be present to supervise hollow-bearing tree clearing within the Project Application Area and that vegetation clearing is undertaken in the following manner:

- > Hollow-bearing trees are to be clearly marked (spray paint or flagging tape) within the disturbance footprint prior to any vegetation clearing commencing.
- > Non habitat vegetation should be removed at least one day prior to felling of hollow-bearing trees to encourage resident fauna to self relocate before felling of remaining habitat trees.
- > Immediately prior to the felling of hollow-bearing trees, trees should be given two sharp taps with the machinery arm/bucket to encourage fauna to escape. After waiting 1–2 minutes after tapping the tree, the hollow-bearing tree should be felled as gently as possible.
- > An ecologist is to inspect each felled hollow-bearing tree (once safe) to recover any injured fauna and seek appropriate treatment, and relocate uninjured fauna into vegetation to be retained within the Project Application Area.
- > Felled timber is to be left in place for one night after all other vegetation is removed to allow any remaining fauna to vacate hollows.

Residual Impacts Summary

Threatened Flora

In order to retain consistency with the offset methodologies of the NSW Biodiversity Offsets Policy for Major Projects and EPBC Act Environmental Offsets Policy, impacts to threatened flora have been assessed as the number of recorded individuals. These are displayed in **Table A1.13** below.

Table A1.13 Centennial Western Projects – Threatened Flora Impacts Summary

Species	Springvale	Springvale Bore 8	Angus Place MOD 2 - Ventilation Facility	Western Coal Services	Clarence Colliery REA 6	Springvale Water Treatment	Total
<i>Eucalyptus cannonii</i> (V)						3	3
<i>Caesia parviflora</i> var. <i>minor</i> (E)						3	3
<i>Persoonia hindii</i> (E)			40				40

Threatened Fauna

In order to retain consistency with the offset methodologies of the NSW Biodiversity Offsets Policy for Major Projects and EPBC Act Environmental Offsets Policy, impacts to threatened fauna has been assessed as the area of habitat in hectares to be lost.

Suitable habitats for fauna species often cross several of the vegetation communities listed in **Table A1.14**. As later detailed in this report, these vegetation communities have been classified based on the 'best fit' vegetation type listed in the BioBank Vegetation Types Database (OEH 2009). Parameters used to choose the 'best fit' Vegetation Type included overstorey and understorey floristics, soil landscape, location and topographic position. The BioBank Vegetation Types and by extension the vegetation communities, can be broadly categorised by 'Vegetation Formation'. This broader formation class category has been used in **Table A1.14** to assess the potential losses to threatened fauna habitat.

Table A1.14 Centennial Western Projects – Fauna Impacts Summary

Formation	BVT	Fauna Habitat Suitability	Impact (ha)
Dry Sclerophyll Forests (Shrubby subformation)	HN599, HN600, HN570, HN534, HN544, HN510, HN514	Woodland Birds, Arboreal Mammals, Forest Owls, microchiropteran bats, Giant Burrowing Frog and Stuttering Frog (in proximity to water courses).	63.46
Forested Wetlands	HN574	Woodland Birds, Arboreal Mammals, Forest Owls, microchiropteran bats, Giant Burrowing Frog and Stuttering Frog (in proximity to water courses).	0
Freshwater Wetlands	HN602	Amphibians	0.48
Grassy Woodlands	HN572, HN501, HN504, HN506	Woodland Birds, Arboreal Mammals, Forest Owls, microchiropteran bats.	2.71
Heathlands	HN508	Eastern Pygmy Possum, Burrowing Frog and Stuttering Frog (in proximity to water courses).	0.18
Wet Sclerophyll Forests (Grassy subformation)	HN558	Woodland Birds, Arboreal Mammals, Forest Owls, microchiropteran bats, Giant Burrowing Frog and Stuttering Frog (in proximity to water courses).	1.11
Total			67.91

Native vegetation

The combined clearing footprint of all projects is provided in **Table A1.15** below. The projects covered by the WRBOS have resulted in the clearing of 67.91 ha of native vegetation.

Table A1.15 Centennial Western Projects - Vegetation Impacts Summary

BVT	Map Unit	DEC (2006) Community Name	Springvale Mine Extension Project	Springvale Bore 8	Angus Place MOD 2 Ventilation Facility	Western Coal Services	Clarence Colliery REA6	Springvale Water Treatment	TOTAL
HN508	MU44	Sandstone Plateaux Tea Tree - Dwarf Sheoak - Banksia Rocky Heath	0.07						0.07
HN508	MU45	Newnes Plateau Tea Tree - Banksia - Mallee Heath			0.11				0.16
HN514	MU33	Tableland Broad-leaved Peppermint - Brittle Gum - Red Stringybark Grassy Open Forest						0.47	0.47
HN558	MU07	Newnes Plateau Narrow-leaved Peppermint - Mountain Gum - Brown Stringybark Layered Forest						1.11	1.11
HN559	MU07	Newnes Plateau Narrow-leaved Peppermint - Mountain Gum - Brown Stringybark Layered Forest	0.86	1.65	6.07				8.58
HN570	MU37	Coxs Permian Red Stringybark - Brittle Gum Woodland				10.62		21.22 ⁹	31.84
HN572	MU11	Tableland Gully Snow Gum - Ribbon Gum Montane Grassy Forest ¹⁰				0.05		2.12	2.17
HN572	MU14	Tableland Mountain Gum - Snow Gum - Daviesia Montane Open Forest			0.54				0.54
HN599	MU8	Newnes Sheltered Peppermint - Brown Barrel Shrubby Forest						0.73	0.73
HN600	MU26	Newnes Plateau Narrow-leaved Peppermint - Silver-top Ash Layered Open Forest	5.05	0.07			4.1	1.61 ¹¹	10.83

⁹ 'Best fit' BVT for "MU58 Acacia thickets"¹⁰ An endangered ecological community listed under the BC Act as Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland¹¹ Includes a patch of MU35 Tableland Gully Mountain Gum – Broad-leaved Peppermint Grassy Forest (HN590) of 0.05 ha

BVT	Map Unit	DEC (2006) Community Name	Springvale Mine Extension Project	Springvale Bore 8	Angus Place MOD 2 Ventilation Facility	Western Coal Services	Clarence Colliery REA6	Springvale Water Treatment	TOTAL
HN600	MU26a	Newnes Plateau Gum Hollows variant: Brittle Gum - Mountain Gum, Scribbly Gum - Snow Gum Shrubby Open Forest	0.96		5.64				6.60
HN600	MU28	Sandstone Plateau And Ridge Scribbly Gum - Silver-top Ash Shrubby Woodland	2.00	1.79					3.79
HN600	MU29	Sandstone Slopes Sydney Peppermint Shrubby Forest						0.10	0.10
HN600	MU30	Exposed Blue Mountains Sydney Peppermint - Silver-top Ash Shrubby Woodland		0.49					0.49
HN602	MU53	Mountain Hollow Grassy Fen						0.02	0.02
HN630	NA	<i>Phragmites australis</i> wetland						0.46	0.46
	Total		8.94	4.00	12.36	10.67	4.1	27.84	67.91

Appendix 2

BioBanking Credit Calculations

Ecosystem Credit Balance

With reference to the BBAM (2008) and BBAM (2014), an ecosystem credit created from a BioBank site is a matching ecosystem credit to credits generated from a development site if it shares the same vegetation type and occurs within the same CMA subregion/IBRA subregion.

Tables A2.1 and **A2.2** quantify the ecosystem credit calculations for the impact areas and regional offset sites identified Section 2. **Table A2.3** provides a credit ledger at a BVT level.

Table A2.1 Cumulative Ecosystem Credits Required by the Developments

BVT	Formation	BVT Name	TEC Equivalent	Springvale Extension	Springvale Bore 8	Angus Place MOD 2 - Ventilation Facility	Western Coal Services	Clarence Colliery REA	Springvale Water Treatment	Total
HN514	Grassy Woodlands	Broad-leaved Peppermint - Red Stringybark grassy open forest on undulating hills, South Eastern Highlands							22	22
HN572	Grassy Woodlands	Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands				21			24	45
HN559	Dry Sclerophyll Forests (Shrubby subformation)	Narrow-leaved Peppermint – Silvertop Ash – Mountain Grey Gum Shrubby open forest of the Upper Blue Mountains, Sydney basin Bioregion		51	77	277				405
HN570	Dry Sclerophyll Forests (Shrubby subformation)	Red Stringybark – Brittle Gum – Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highland					695		858	1,553
HN599	Dry Sclerophyll Forests (Shrubby subformation)	Sydney Peppermint – Narrow-leaved Peppermint shrubby open forest on sheltered slopes of the Newnes Plateau, Sydney Basin (Narrow-leaved Peppermint – Mountain Gum – Brown Barrel moist open forest on high altitude ranges, northern South Eastern Highlands)							35	35
HN600	Dry Sclerophyll Forests (Shrubby subformation)	Sydney Peppermint – Silvertop Ash heathy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin		364	114	255		204	91	1,028
HN602	Freshwater Wetlands	Tableland swamp meadow on impeded drainage sites of the western Sydney Basin and South Eastern Highlands	Montane Peatlands and Swamps (BC Act)						1	1
HN630	Freshwater Wetlands	<i>Phragmites australis</i> and <i>Typha orientalis</i> coastal freshwater wetlands							8	8
HN508	Heathlands	Blue Mountains Ash – Dwarf Casuarina Heath of the upper Blue Mountains, Sydney Basin Bioregion		3		5				8
HN558	Wet Sclerophyll Forests (Shrubby subformation)	Narrow-leaved Peppermint – Mountain Gum – Brown Barrel moist open forest on high altitude ranges, northern South Eastern Highlands							58	58
Total				418	191	558	695	204	1,097	3,163

Table A2.2 Total Cumulative Ecosystem Credits Generated by the Offset Sites

BVT	Formation	BVT Name	TEC Equivalent	Carinya	Wolgan Road	Springvale	Pipers Flat	Total
HN504	Grassy Woodlands	Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands, South Eastern Highlands	Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland (BC Act)	0	105	0	0	105
HN572	Grassy Woodlands	Ribbon Gum – Snow Gum grassy forest on damp flats, eastern South Eastern Highlands	Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland (BC Act)	0	107	0	0	107
HN534	Dry Sclerophyll Forests (Shrubby subformation)	Grey Gum – Narrow-leaved Stringybark – Inland Scribbly Gum shrubby open forest of the western Capertee Valley, Sydney Basin		1,229	0	0	0	1,229
HN544	Dry Sclerophyll Forests (Shrubby subformation)	Inland Scribbly Gum – Grey Gum – Narrow-leaved Ironbark shrubby open forest on hills of western Capertee Valley, Sydney Basin		403	0	0	0	403
HN558	Wet Sclerophyll Forests (Shrubby subformation)	Narrow-leaved Peppermint – Mountain Gum – Brown barrel moist open forest on high altitude ranges, northern South Eastern Highlands Bioregion		0	0	12	0	12

BVT	Formation	BVT Name	TEC Equivalent	Carinya	Wolgan Road	Springvale	Pipers Flat	Total
HN570	Dry Sclerophyll Forests (Shrubby subformation)	Red Stringybark – Brittle Gum – Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highland		0	320	0	567	887
HN599	Dry Sclerophyll Forests (Shrubby subformation)	Sydney Peppermint – Narrow-leaved Peppermint shrubby open forest on sheltered slopes of the Newnes Plateau, Sydney Basin (Narrow-leaved Peppermint – Mountain Gum – Brown Barrel moist open forest on high altitude ranges, northern South Eastern Highlands)		0	34	31	0	65
HN600	Dry Sclerophyll Forests (Shrubby subformation)	Sydney Peppermint – Silvertop Ash heathy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin		0	110	404	0	514
HN602	Freshwater Wetlands	Tableland swamp meadow on impeded drainage sites of the western Sydney Basin and South Eastern Highlands	Montane Peatlands and Swamps (BC Act)	0	57	0	0	57
HN508	Heathlands	Blue Mountains Ash – Dwarf Casuarina Heath of the upper Blue Mountains, Sydney Basin Bioregion		0	3	95	0	98
HN590	Wet Sclerophyll Forests (Grassy subformation)	Snow Gum – Mountain Gum tussock grass-herb forest of the South Eastern Highlands Bioregion		0	3	0	0	3
Total				1,632	739	542	567	3,480

Table A2.3 Regional Biodiversity Strategy Ecosystem Credit Balance

BVT	Formation	BVT Name	TEC Equivalent	Total Required (Development)	Total Generated (Conservation)	Total Used (Conservation)	Balance (total required development and total used conservation)
Grassy Woodlands							
HN504	Grassy Woodlands	Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands, South Eastern Highlands	Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland (TSC Act)	0	105	22	
HN514	Grassy Woodlands	Broad-leaved Peppermint – Red Stringybark grassy open forest on undulating hills, South Eastern Highlands		22	0	0	0
HN572	Grassy Woodlands	Ribbon Gum – Snow Gum grassy forest on damp flats, eastern South Eastern Highlands	Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland (TSC Act)	45	107	45	
Dry Sclerophyll Forests (Shrubby subformation)							
HN634	Dry Sclerophyll Forests (Shrubby subformation)	Grey Gum – Narrow-leaved Stringybark – Inland Scribbly Gum shrubby open forest of the western Capertee Valley, Sydney Basin		0	1,229	1,225	
HN544	Dry Sclerophyll Forests (Shrubby subformation)	Inland Scribbly Gum – Grey Gum – Narrow-leaved Ironbark shrubby open forest on hills of western Capertee Valley, Sydney Basin		0	403	403	
HN559	Dry Sclerophyll Forests (Shrubby subformation)	Narrow-leaved Peppermint – Silvertop Ash – Mountain Grey Gum shrubby open forest of the upper Blue Mountains, Sydney Basin Bioregion		405	0	0	4
HN570	Dry Sclerophyll Forests (Shrubby subformation)	Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highland		1,553	887	838	
HN599	Dry Sclerophyll Forests (Shrubby subformation)	Sydney Peppermint - Narrow-leaved Peppermint shrubby open forest on sheltered slopes of the Newnes Plateau, Sydney Basin (Narrow-leaved Peppermint - Mountain Gum - Brown Barrel moist open forest on high altitude ranges, northern South Eastern Highlands)		35	65	65	

BVT	Formation	BVT Name	TEC Equivalent	Total Required (Development)	Total Generated (Conservation)	Total Used (Conservation)	Balance (total required development and total used conservation)
HN600	Dry Sclerophyll Forests (Shrubby subformation)	Sydney Peppermint - Silvertop Ash healthy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin		1,028	514	470	
Freshwater Wetlands							
HN602	Freshwater Wetlands	Tableland swamp meadow on impeded drainage sites of the western Sydney Basin and South Eastern Highlands	Montane Peatlands and Swamps (BC Act)	1	57	9	0
HN630	Freshwater Wetlands	<i>Phragmites australis</i> and <i>Typha orientalis</i> coastal freshwater wetlands		8	0	0	
Heathlands							
HN508		Blue Mountains Ash – Dwarf Casuarina Heath of the upper Blue Mountains, Sydney Basin Bioregion		8	98	8	0
Wet Sclerophyll Forests (Shrubby subformation)							
HN558	Wet Sclerophyll Forests (Shrubby subformation)	Narrow-leaved Peppermint - Mountain Gum - Brown Barrel moist open forest on high altitude ranges, northern South Eastern Highlands		58	12	12	-46
Wet Sclerophyll Forest (Grassy subformation)							
HN590	Wet Sclerophyll Forest (grassy subformation)	Snow Gum – Mountain Gum tussock grass-herb forest of the South Eastern Highlands Bioregion		0	3	0	0
Total				3,163	4,176	3,117	-46

From **Table A2.3** it can be deduced that the offset strategy mostly meets the offsetting needs of the western projects on a 'like for like' basis with the exception of a 46 ecosystem credit deficit for HN558 and certain formation level trading. This 'like for like' deficit was further analysed at the formation level in a manner consistent with the FBA (i.e. formation level), in order to see if there is broader alignment between the development and conservation ecosystem credit requirements (see **Table A2.4**). The formation level analysis below in **Table A2.4** shows that the 'impact' 'offset' 'ledger' is satisfied for four of the five formation types. Consequently, it can be shown at this level that the majority of the habitats for threatened species are similar to the habitats of the offset areas.

Table A2.4 Formation Ecosystem Credit Balance

Formation	Total Required (Development)	Total Generated (Conservation)	Balance
Grassy Woodlands	67	212	145
Dry Sclerophyll Forests (Shrubby subformation)	3,021	3,794	773
Freshwater Wetlands	9	57	48
Heathlands	8	98	90
Wet Sclerophyll Forests (Shrubby subformation)	58	12	-46
Wet Sclerophyll Forests (Grassy subformation)	0	3	3

Species Credit Balance

An analysis of species credits was also performed for development and offset sites (**Tables A2.5** and **A2.6**). A 'like for like' offset outcome was not possible for all species. Use of FBA variation trading rules is required to remedy the offsetting ledger (**Table A2.7**).

Table A2.5 Cumulative Species Credits Required by the Developments

Species Scientific Name	Common Name	Springvale	Springvale Bore 8	Angus Place MOD 2 Ventilation Facility	Western Coal Services	Clarence Colliery REA	Springvale Water Treatment	Total
<i>Caesia parviflora</i> var. <i>minor</i>	Small Pale Grass-Lilly	0	0	0	0	0	42	42
<i>Eucalyptus cannonii</i>	Capertee Stringybark	0	0	0	0	0	39	39
<i>Persoonia hindii</i>		0	0	4,004	0	0	0	4,004
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	0	0	0	0	0	9	9
Total		0	0	4,004	0	0	90	4,094

Table A2.6 Cumulative Species Credits Generated by the Conservation Sites

Species Scientific Name	Common Name	Carinya	Wolgan Road North Lot 56	Springvale Lot 125 and 2	Pipers Flat Lot 5	Total
<i>Caesia parviflora</i> var. <i>minor</i>		0	0	0	0	0
<i>Eucalyptus aggregata</i>	Black Gum	0	433	0	0	433
<i>Eucalyptus cannonii</i>	Capertee Stringybark	0	99	0	0	340
<i>Persoonia hindii</i>		0	0	0	0	0
<i>Veronica blakelyi</i>		0	1,363	0	0	1,363
Total		0	1,895	29	0	8,702

Table A2.7 Regional Biodiversity Strategy Species Credit Balance

Species Scientific Name	Common Name	Total Required (Development)	Total Generated (Conservation)	Trading
<i>Caesia parviflora</i> var. <i>minor</i>		42	0	None supplementary rules
<i>Eucalyptus aggregata</i>	Black Gum	0	433	-
<i>Eucalyptus cannonii</i>	Capertee Stringybark	39	340	39 credits of <i>Eucalyptus cannonii</i>
<i>Persoonia hindii</i>		4,004	0	-
<i>Veronica blakelyi</i>		0	1,363	
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	9	0	0 credits of Large-eared Pied Bat – payment into BCT Fund
Total		4,094	2,136	

Appendix 3

Critical Review of HN558 and HN590

Newcastle Office

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Meeting Date:	14/12/2017
To:	Centennial Coal Pty Ltd
From:	Mark Aitkens and Arne Bishop
Subject:	Reclassification of HN558 to HN559 and HN590 to HN572

1 Background

The Western Regional Biodiversity Offset Strategy (WRBOS) aims to satisfy the biodiversity offset requirements in the relevant conditions of consent for the following Centennial projects:

- Springvale Water Treatment Project SSD-7592;
- Springvale Extension Project SSD-5594;
- Clarence DA 504-00;
- Western Coal Services SSD-5579;
- Springvale SSD-5594; and
- Angus Place PA 06_0021.

In preparing the WRBOS it was noted that some prior impact assessments identified the loss of a vegetation community; MU7 Newnes Plateau Narrow-leaved Peppermint – Mountain Gum– Brown Stringybark Layered Forest (DEC 2006). DEC (2006) nominate MU7 as belonging to the “Southern Tableland Wet Sclerophyll Forest” vegetation class; this being part of the Wet Sclerophyll Forests (shrubby sub-formation) formation.

Similarly, DEC (2006) aligned MU 14 Tableland Mountain Gum – Snow Gum – Daviesia Montane Open Forest (DEC 2006) with ‘Subalpine Woodland’ class with subsequent Biometric Vegetation Types (BVT) alignment erroneously linked to the Wet Sclerophyll Forests (Grassy sub-formation) (i.e. HN590 Snow Gum - Mountain Gum tussock grass-herb forest of the South-Eastern Highlands).

Vegetation formation and BVT classifications for MU7 and MU14 are considered to be erroneous and, as such, have profoundly influenced the determination of biodiversity offsets in the WRBOS. Misguided offsetting outcomes have resulted including unreconciled ‘like for like’ offsetting deficits where there is a lack of tradeable BVTs aligned with the ‘wet sclerophyll forest’ vegetation formation.

2 Purpose of Memo

This memo provides an alternative formation level classification for MU7 and MU14, as such, it provides alternative BioMetric Vegetation Types (BVTs) for consideration in the ‘like for like’ and formation level offsetting calculations. The analysis approach is outlined below:

- Critically review the relevant literature (i.e. DEC 2006);

- Report the results of a hierarchical agglomerative cluster analysis of presence absence floristic plot data, including SIMPROF analysis, to examine floristic assemblages on the Newnes Plateau;
- Report the results of a SIMPER analysis used to define diagnostic floristics of statistically significant SIMPROF groupings; thus assist 'best fit' BVT selection;
- Apply Keith (2004) vegetation formation key to Newnes Plateau occurrences of MU7 and MU14 following detailed consideration of the literature (e.g. DEC 2006) and empirical analysis; and
- Identify the 'best fit' BVT together with notes on making the selection.

3 Method

A hierarchical agglomerative cluster analysis was performed using the Bray Curtis similarity coefficient to objectively classify presence absence plot data (n = 64) obtained from 11 DEC (2006) map units occurring on the Newnes Plateau. Vegetation types selected in the analysis belong to three vegetation formations as listed below in **Table 1**.

Table 1 Current Vegetation formation, DEC (2006) class and Map Units and BVT classifications

Vegetation Formation (Keith 2004)	Vegetation Class (DEC 2006)	Map Unit (MU) DEC (2006)	BVT
Wet Sclerophyll Forests (Shrubby)	Southern Tableland Wet Sclerophyll Forest	MU4 Sheltered Gully Brown Barrel Ferny Forest	HN558
		MU7 Newnes Plateau Narrow-leaved Peppermint – Mountain Gum– Brown Stringybark Layered Forest	HN558
Grassy Woodlands	Subalpine Woodland	MU14 Tableland Mountain Gum – Snow Gum – Daviesia Montane Open Forest	HN590
Dry Sclerophyll forests (shrubby)	Montane Dry Sclerophyll Forests	MU8 Newnes Sheltered Peppermint – Brown Barrel Shrubby Forest	HN599
		MU26 Newnes Plateau Narrow-leaved Peppermint – Silvertop Ash Layered Open Forest	HN600

Hierarchical agglomerative cluster analysis was performed in PRIMER version 6.1.13 with PERMANOVA version 1.0.3 (Plymouth Marine Laboratory, Plymouth, United Kingdom and see Clarke and Gorley 2006). Presence / absence data was analysed to minimise the influence of observer bias (i.e. plot data collected over multiple years by multiple observers). Dummy data was also used in the analysis.

A SIMPROF analyses was performed to examine for statistically significant evidence of genuine clusters in the plot data, which are a priori unstructured (i.e. single samples from each of a number of sites). A 'factor' was generated from this analysis to denote groups of similarity.

The cluster analysis was graphically represented (i.e. dendrogram) including the SIMPROF results (i.e. green dotted lines represent statistically differing groups). Higher level dichotomies in the dendrogram have been interpreted as data separations at the vegetation formation and class levels.

A SIMPER analysis was performed using the SIMPROF generated 'factor' (i.e. statistically differing plot clusters). Diagnostic plant species were delineated from this analysis and then used to identify the most appropriate vegetation class and BioMetric Vegetation Type (BVT) using:

- DEC (2006) 'best fit' map unit;
- Keith (2004) key to vegetation formations; and
- BVT database.

The revised BVT classification was reviewed against commentary for MU7 and related vegetation types described in DEC (2006).

4 Results

4.1 Literature

Keith (2004) describes 'wet sclerophyll forests' in the vegetation formation identification key as follows:

"Tall forests (typically >30m) dominated by tall straight-trunked eucalypts, usually with soft-leaved shrubs, ferns or herbs in the understorey. Largely confined to moderately fertile soils in sheltered locations on the coast and escarpment where average annual rainfall exceeds 900mm. Excludes riverine forests west of the Great Dividing Range that lack the understorey characteristics described above."

Conversely, Keith (2004) describes 'dry sclerophyll forests' in the same identification key as follows:

"Forests or rarely woodlands with an abundance of hard-leaved (sclerophyllous) shrubs in the understorey. Only rarely dominated by 'box' eucalypts. Ground cover often sparse and typically dominated by sclerophyllous sedges, but may sometimes include reasonably continuous swards of grasses. Confined to the coast, tablelands, and the western slopes where average rainfall exceeds 500 mm, largely on infertile sandy or loamy soils."

According to Mitchell (2002), the Newnes Plateau landscape is generally described as follows:

"Undulating high level plateau with shallowly incised swampy streams and occasional relic sand dunes on horizontal Triassic quartz sandstones and shale, general elevation 1000m, local relief <100m. Thin stony yellow red sands, deep yellow earths, podsoles on dunes and yellow or grey texture-contrast soils on shale unit. Woodland of stunted scribbly gum (Eucalyptus sclerophylla), snow gum (Eucalyptus pauciflora), Blue Mountains ash (Eucalyptus oreades), silvertop ash (Eucalyptus sieberi), grey ironbark (Eucalyptus paniculata), red bloodwood (Corymbia gummifera) and grass trees (Xanthorrhoea sp.) with numerous other shrubs. Patches of dwarf casuarina (Allocasuarina nana) heath on very exposed and eroded aspects, sedge swamps with marginal heath form linear patterns in open valleys."

DEC (2006) makes the following observations of the Newnes Plateau and vegetation types found there:

- Comprised of Narrabeen sediments deposited in the Triassic era;
- Mean annual rainfall of 1071.9 mm (Weather station: Newnes Forest 063062);
- The Newnes Plateau is very typical of the upper Blue Mountains, while the valleys of the Cox's and of the Tuglow are typical of the elevated tableland areas; and
- Vegetation described as "High Elevation Tableland Exposed Grassy Forests" (*sic* Grassy Woodlands formation) was reported in Figure 3.1 (i.e. dendrogram). This vegetation cluster comprises the floristically similar vegetation units MU7, MU14 and MU35.

- Vegetation described as “Tableland Sheltered Forests” was reported in Figure 3.1. This vegetation cluster comprises the floristically similar vegetation units MUs 4, 5 and 6; and
- There are no matching regional map unit names for MU7, MU8, MU14 and MU26.

Contradictory information emerges between Figure 3.1 and Table 3.3 in DEC (2006). Table 3.3 assigns MU7 to “Southern Tableland Wet Sclerophyll Forest” (a class under the ‘Wet Sclerophyll Forest’ formation); this being inconsistent with where the dendrogram (Figure 3.1) has clusters this map unit (i.e. MU7 clusters with MU14, which is assigned to the “Subalpine Woodlands” class in Table 3.3). Also noteworthy is the ‘user’ defined reclassification of MU35 from the same cluster comprising MU7 and MU14 to “Southern Tableland Dry Sclerophyll Forest” (a class under the “Dry Sclerophyll Forests formation”).

Commentary on MU7 in the vegetation profile notes the following in respect to the uncertainty of classifying this map unit:

“The community loosely compares to the Cool Montane Wet Forest of Tindall et al. (2004) and is most likely a member of the Southern Tableland Wet Sclerophyll Forests of Keith (2004). However, further work may confirm suggestions that it is restricted to the Newnes Plateau on the enriched sandstone” (DEC 2006).

General commentary provided DEC (2006) for ‘wet sclerophyll’, ‘dry sclerophyll’, and ‘grassy woodland’ formations of the Newnes Plateau are provided below. Text in **bold** is provided for emphasis:

Southern Tableland Wet Sclerophyll Forests in Section 4.1.6 of DEC (2006):

*“Southern Tableland Wet Sclerophyll Forests of Keith (2004) implies a tall mesic forest, however, they are more commonly tall open eucalypt forests with a herbaceous or ferny understorey. They all occur on higher elevations of the eastern tableland with rainfall exceeding 900 mm per year. Six Map Units (4, 5, 6, 7, 8, 9) fall within this Statewide Vegetation Class. **The analysis clusters these Map Units into the primary substrates on which they grow, therefore they are split into different parts of the dendrogram.**”*

Including MU7:

*“Map Unit 7 is another tall forest found on the Newnes Plateau. This community is restricted to the highest elevations on the enriched sandstone capping of the central plateau. Tall stands of E. blaxlandii, E. radiata, E. dalrympleana and E. oreades are distinctive in otherwise exposed locations. **The ground cover is grassy and the shrub layer is sparse and is not typical of other montane sandstone vegetation. It shares more in common with the tall forests of the metamorphosed sediments of the Jenolan and Oberon Plateau. For this reason it has been aligned to the Southern Tableland Wet Sclerophyll Forests rather than the Sydney Montane Dry Sclerophyll Forests of Keith (2004). The community is likely to be restricted to the Newnes Plateau.**”*

Sydney Montane Dry Sclerophyll Forests in Section 4.1.1 of DEC (2006):

*“The Sydney Montane Dry Sclerophyll Forests occupy higher elevation positions (mostly above 900 metres altitude) on **sandstones of the Triassic era Narrabeen sediments**. These communities defined by Map Units 26, 27, 28, 29 and 30 are characterised by the distinctive sclerophyllous understorey of sandstone environments. The density of the shrub layer varies between the map units however each invariably included species of legumes (*Acacia*, *Dillwynia*, *Pultenaea*) and *Proteaceae* (*Hakea*, *Isopogon*, *Petrophile*, *Telopea*). **This collection of communities is also united by some similarities in the canopy with silvertop ash (*Eucalyptus sieberi*) a common member.** Most are likely to be referable to the Blue Mountains Ridgetop Forest of Tindall et al. (2004) **however those associated with the highest elevations of the Newnes Plateau are less strongly associated.**”*

Including MU26:

“Map Unit 26 describes several combinations of tree species of quite different appearance, although each share similar overall floristic composition. A low open woodland of twisted white-trunked gums (scribbly

Appendix 6

Carinya Lot 163 Biodiversity Offset Management Plan



Carinya Lot 163

**Biodiversity Offset
Management Plan**

November 2020

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Attachment 1 – Consultation Log

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Attachment 2 - List of Actions

Carinya Lot 163 - Biodiversity Offset Management Plan

Acronym	Definition
AHD	Australian Height Datum
AWS	Automatic Weather Station
BAM	Biodiversity Assessment Method (State of NSW 2017), or most current version
BC Act	<i>Biodiversity Conservation Act 2016</i>
BCD	NSW Biodiversity Conservation Department, formerly NSW Office of Environment and Heritage (OEH)
DPIE	NSW Department of Planning, Infrastructure and Environment
Habitat	The natural environment in which an organism lives, or the physical environment that surrounds a species population.
LCC	Lithgow City Council
LEP	Local Environment Plan
LGA	Local Government Area
Management Plan	This Management Plan
MOP	Mining Operations Plan
MU	Mapping unit
Native Vegetation	Any of the following types of plants native to New South Wales: (a) trees (including any sapling or shrub or any scrub), (b) understorey plants. (c) groundcover (being any type of herbaceous vegetation), (d) plants occurring in a wetland. As defined by the <i>Local Land Services Act 2011</i>
NPWS	National Parks and Wildlife Service
NSW	New South Wales
Perpetuity	No end date
RBMP	Regional Biodiversity Management Plan
Site	Biodiversity Offset Site Carinya Lot 163
Strategy	Western Region Biodiversity Offset Strategy (RPS April 2019)
TARP	Trigger Action Response Plan
Weed	A weed is a plant growing where it is not wanted. A plant that is considered a weed in one situation may not be considered a weed in other contexts

DOCUMENT CONTROL

Document Details	Name	Carinya Lot 163 – Biodiversity Offset Management Plan
	Author	Centennial
	Revision No	1
	Document Status	Draft (submission to NSW Department of Planning, Industry and Environment (DPIE) for approval)
Review Details	Trigger for Change	Changes Made
	January 2019	Requirements Western Region Biodiversity Offset Strategy (Draft)
	December 2019/ January 2020	Final draft following request to NSW Biodiversity Conservation Trust (BCT) to progress Conservation Agreement
	June 2020	Final draft after BCT comment and inclusion of April 2020 ecological survey outcomes, submission to DPIE for approval
	November 2020	Addressing requirements of final Conservation Agreement

1.0 Background

1.1 Introduction

Centennial holds operations in the Local Government Areas (LGA's) of Lithgow City Council (LCC) and Mid-Western Regional Council.

The biodiversity offset site, Carinya Lot 163 (part of Lot 163 DP48336) (the site) is located off Torbane Road, Capertee in the LCC LGA (Figure 1). The site is surrounded by the Capertee National Park to the north and Centennial grazing land to the south. The biodiversity offset site is surrounded by strategic rugged and heavily vegetated conservation land within the Airly State Forest to the west, Capertee National Park to the north and Mugii Murum-ban State Conservation Area to the east.

The site is 156 ha, incorporating 132.5ha of land required to satisfy Centennial's biodiversity offset obligations (Section 1.2). The additional land was included to allow practical management of the biodiversity offset site.

This Biodiversity Offset Management Plan (Management Plan) describes implementation of the Western Region Biodiversity Offset Strategy (RPS 2019) (Strategy) for the site.

1.2 Biodiversity Offset Site Requirement

1.2.1 Western Region Biodiversity Management Plan

Centennial submitted the Western Region Biodiversity Management Plan (RBMP) (RPS 2019) to the Department of Planning, Industry and Environment (DPIE) for approval in December 2016. The RBMP was updated and resubmitted to DPIE in April 2017 and September 2019. The RBMP describes how biodiversity conditions of the development consent for Centennial's western region operations of Angus Place Colliery, Clarence Colliery, Springvale Mine and Springvale Coal Services Site have been satisfied.

The RBMP describes the principles of biodiversity management that must be implemented by Centennial's western region operations. A site specific appendix is included for each operation that details the background, development consent conditions and how they have been addressed. Also included is baseline ecological environment, land management objectives, land management actions and site specific actions required but not included in the main document as well as a monitoring plan.

1.2.2 Western Region Biodiversity Offset Strategy

The Strategy was approved by DPIE in April 2019. The Strategy was developed and submitted to satisfy Centennial's biodiversity obligations under the following development consents and respective conditions:

- Angus Place PA06_0021 Schedule 3 Condition 24B;
- Clarence DA504-00 Schedule 3 Condition 12A;
- Springvale SSD-5594 Schedule 4 Condition 15 (Bore 8 and Springvale Extension Project);
- Springvale Coal Services SSD-5579 Schedule 3 Condition 25; and

- Springvale Water Treatment Project SSD-7592 Schedule 3 Condition 7.

This Management Plan is an Appendix to the Strategy. The Strategy Table of Contents will be updated following approval of this Management Plan.

2.0 Conservation Agreement

The retirement of the site is through Conservation Agreement CA0292 (Agreement) with the NSW Biodiversity Conservation Trust (BCT) under the *Biodiversity Conservation Act 2016*.

The management of the site is in accordance with this Management Plan and the Agreement. Where there is a discrepancy between this Management Plan and the Agreement, the Agreement will prevail.

2.1 Conservation Agreement Conditions

The requirements of the draft Agreement Conditions, and how they have been addressed is listed in Table 1.

Table 1 – Biodiversity Conservation Agreement Standard Conditions and how addressed in this Management Plan

Conservation Agreement Condition	How addressed in this Plan
Land is protected in perpetuity	Section 4.1 Conservation Agreement Commencement
Restriction on development on the land	Section 4.1.1 Restrictions on Land
Refraining from or not to permit activities on the land	Sections 4.1.1 Restrictions on Land
Requiring the landowner to undertake activities	Section 4.2 Management Activities
Requiring the owner to carry out specified activities	As described within this document, tabled in Attachment 3
Requiring the owner to permit access of the land by specified persons	To be prescribed within Conservation Agreement

2.2 Purpose

The purpose of this Management Plan is to document the management of the site in accordance with the Agreement and demonstrate compliance with conditions of consent for Western Coal Services (SSD-5579). The conditions of consent and how they have been addressed are listed in Table 2.

Table 2 – Western Coal Services Conditions of Development Consent

Condition Number	Condition	Addressed in Management Plan
Biodiversity Offset Strategy		
Schedule 3 Condition 25	By the end of December 2016, the Applicant must, to the satisfaction of the Secretary:	

Condition Number	Condition	Addressed in Management Plan
(a)	Provide an area that is suitable in its vegetation types and extent to satisfactorily offset the impacts of clearing 10.67 hectares of native vegetation (Coxs Permian Red Stringybark – Brittle Gum Woodland); and	The Strategy was approved by the Secretary on 23 April 2019 for Schedule 3 Condition 25 (a). Table 8 Credit Calculations identify the allocation of the credits at Carinya Lot 163 for Western Coal Services credit requirements.
(b)	Make suitable arrangements to manage, protect and provide long-term security for this area, consistent with the relevant NSW Offsets policy.	The Strategy was approved by the Secretary on 23 April 2019 for Schedule 3 Condition 25 (b). The Strategy 'Section 4.1 Carinya Lot 163' identifies the securing mechanism for the site as a Agreement, or alternate transfer to the Capertee National Park. Centennial may transfer the land to the Capertee National Park in the future, if agreed with the NSW National Parks & Wildlife Service.
Habitat for Threatened Fauna Species		
Schedule 3 Condition 28	<p>The Applicant must ensure that the Biodiversity Offset Strategy and Additional Rehabilitation Initiatives areas, in combination, provide suitable habitat for threatened fauna species recorded on the SCSS, namely the:</p> <ul style="list-style-type: none"> • Brown Treecreeper; • Gang-gang Cockatoo; • Little Eagle; • Scarlet Robin; • Large-eared Pied Bat; • Eastern Falsistrelle; • Eastern Bent Wing bat; and • Yellow Bellied Sheath-tail Bat. 	The Strategy 'Section 4.1.3.3 Western Coal Services Habitat for Threatened Fauna Species' demonstrates biodiversity offset site Carinya Lot 163 provides habitat for the listed species.
Biodiversity Management Plan		
Schedule 3 Condition 29	The Applicant must prepare and implement a Biodiversity Management Plan for the development to the satisfaction of the Secretary. This plan must:	<p>The RBMP, described in Section 1.2.1 of this Management Plan has been submitted to the Secretary, but has not yet been approved. The management of the Western Coal Services site is addressed in Appendix H of the RBMP.</p> <p>The management of this biodiversity offset site is</p>

Condition Number	Condition	Addressed in Management Plan
		addressed within the Strategy and this Management Plan.
(a)	Be prepared in consultation with BCD and Forestry Corporation of NSW and be submitted to the Director-General by the end of December 2016.	Appendix A of the RBMP outlines consultation undertaken with BCD and Forestry Corporation of NSW. 'Section 1.5 Consultation of the Strategy' provides consultation undertaken with BCD. Attachment 1 of this Management Plan lists consultation undertaken in the development and finalisation of this document with BCD and the Biodiversity Conservation Trust (BCT).
(b)	Describe the short, medium and long-term measures that would be implemented to: Manage remnant vegetation and habitat on the Site; and	The RBMP 'Section 4.3 Surface Disturbance activities' and 'Appendix H Western Coal Services' describe the short, medium and long term measures for the management of remnant habitat at Western Coal Services.
	Implement the Biodiversity Offset Strategy.	The Strategy 'Section 4.1.3 Carinya lot 163' specified the requirements of the site. This Management Plan lists the actions required to implement the Strategy which are compiled in 'Attachment 3 Actions required by this Management Plan'. The management measures are identified by the year of commencement, and frequency in perpetuity.
(c)	Include detailed performance and completion criteria for evaluating the performance of the Biodiversity Offset Strategy and triggering any necessary remedial action.	This Management Plan 'Section 5' lists performance and completion criteria for the site. 'Section 6.2 Trigger Action Response Plan', and supporting Attachment 2 Trigger Action Response Plan (TARP) list the management actions, monitoring requirements and corrective actions.
(d)	Include a detailed description of the measures that would be implemented over the next 3 years (to be updated for each 3-year	The RBMP 'Appendix H Western Coal Services' lists the requirements for management at the operation, including the integrated management with the

Condition Number	Condition	Addressed in Management Plan
	<p>period following initial preparation of the plan) for:</p> <ul style="list-style-type: none"> • Enhancing the quality of existing vegetation and fauna habitat; • Establishing native vegetation and fauna habitat in the Additional Rehabilitation Initiatives area through focusing on assisted natural regeneration, targeted vegetation establishment and the introduction of naturally scarce fauna habitat features (where necessary); • Enhancing the landscaping of the Site and along public roads to minimise visual and lighting impacts, particularly along the Castlereagh Highway; • Protecting vegetation and soil outside the approved disturbance area; • Maximising the salvage of resources within the approved disturbance area – including tree hollows and vegetative and soil resources – for beneficial reuse in the biodiversity offset strategy; • Collecting and propagating seed; • Minimising the impacts to fauna on Site, including undertaking pre-clearance surveys; • Managing any potential conflicts between the proposed restoration works in the Additional Rehabilitation Initiatives area and any Aboriginal heritage values (both cultural and archaeological); • Managing salinity; • Controlling weeds and feral pests; • Controlling erosion; • Controlling access; and • Managing bushfire risk. 	<p>Western Coal Services Mining Operations Plan (MOP).</p> <p>This Management Plan lists completion of land management activities to enhance the quality of existing vegetation and native fauna habitat in 'Section 4 Conservation Management', including:</p> <ul style="list-style-type: none"> • restriction of access; • weed management; • pest animal management; • erosion, • planning for ecological burning; and • monitoring of biodiversity. <p>The frequency of the management measures are listed by commencement year, and frequency of completion. The management measures are in perpetuity.</p>

Condition Number	Condition	Addressed in Management Plan
(e)	Include a program to monitor and report on the effectiveness of these measures, and progress against the detailed performance and completion criteria.	The RBMP 'Appendix H Western Coal Services' includes the management actions, timing of actions and monitoring of actions to demonstrate success. The Western Coal Services MOP specifies detailed performance and completion criteria for rehabilitation areas.
(f)	Identify the potential risks to the successful implementation of the Biodiversity Offset Strategy and include a description of the contingency measures that would be implemented to mitigate against these risks.	This Management Plan 'Section 4.4 Risks of Implementation of Conservation Agreement and Management Plan' identifies the potential risks for management to the site and a description of contingency measures.
(g)	Include details of who would be responsible for monitoring, reviewing, and implementing the plan.	This Management Plan 'Section 8 Roles and Responsibilities' documents the responsible person for monitoring, reviewing and implementing the plan.
Conservation Bond		
Schedule 3 Condition 30	Within 6 months of the approval of the Biodiversity Management Plan, unless the Secretary agrees otherwise, the Applicant shall lodge a Conservation Bond with DP&E to ensure the Biodiversity Offset Strategy is implemented in accordance with the performance and completion criteria of the Biodiversity Management Plan. The sum of the bond shall be determined by:	The Strategy 'Section 4.1.3.2 Western Coal Services Conservation Bond' identifies the Conservation Bond will be submitted to the Secretary on completion of a Draft Agreement.
(a)	calculating the full cost of implementing the Biodiversity Offset Strategy (other than land acquisition costs); and	This Management Plan 'Section 5.1 Conservation Bond' identifies a Bond estimate is being provided to the Secretary at the time of this Management Plan request for approval. The site does not require active restoration due to its high biodiversity values.
(b)	employing a suitably qualified quantity survey to verify the calculated costs.	This Management Plan 'Section 5.1 Conservation Bond' provides the value is being undertaken by employing a suitably qualified quantity surveyor.

Condition Number	Condition	Addressed in Management Plan
	<p>If the offset strategy is completed generally in accordance with the completion criteria in the Biodiversity Management Plan to the satisfaction of the Secretary, the Secretary will release the bond.</p> <p>If the offset strategy is not completed generally in accordance with the completion criteria in the Biodiversity Management Plan, the Director-General will call in all, or part of, the conservation bond, and arrange for the satisfactory completion of the relevant works.</p> <p>Notes:</p> <p>Alternative funding arrangements for long-term management of the Biodiversity Offset Strategy, such as provision of capital and management funding as agreed</p>	

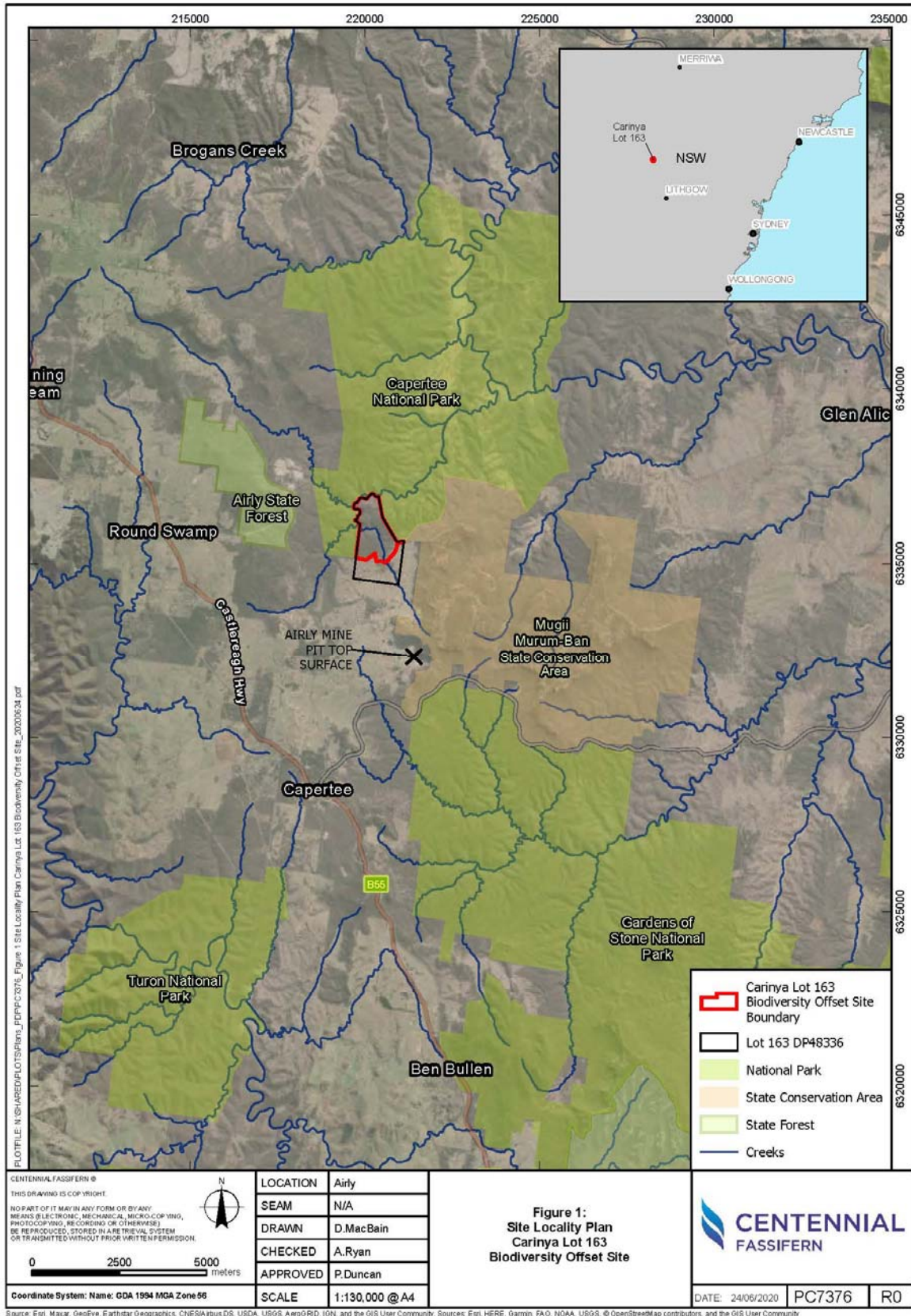


Figure 1 – Locality Plan

3.0 Baseline Values

3.1 Climate

The climate of the site is cool-temperate, characterised by cold winters and warm summers. The local climate is influenced by topography, altitude and aspect.

The mean maximum temperature and mean minimum temperature (in degrees Celsius) is provided in Table 3 from the Nullo Mountain Automatic Weather Station (AWS) (BOM 2019). The temperature data utilised below has been collated from 1991 to 2019. The highest maximum temperatures occur in November and December and the coldest months occur in June and July.

Table 3 – Nullo Mountain AWS Temperature (Deg C)

	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Annual Average
Mean High Temp	24.3	22.9	20.2	16.9	13.0	9.7	9.3	10.9	14.3	17.6	20.0	22.4	16.8
Max High Temp	36.4	37.4	32.0	27.7	21.0	16.8	17.3	20.6	26.4	28.1	34.2	32.7	
Mean Min Temp	13.8	13.3	11.5	8.6	5.7	3.5	2.5	3	5.6	8	10.1	11.9	8.1
Mean Min Temp	4.4	3.8	2.5	-0.8	-2.2	-3.4	-3.6	-4.1	-3.7	-1.1	0.2	1.8	

Note: Nullo Mountain AWS temperature data collected between 1991 and 2019

The average yearly rainfall in millimetres (mm) is 926.9mm. This information has been provided by the Nullo Mountain Automatic Weather Station (AWS) (BOM 2019) and is presented in Table 4.

Table 4 - Nullo Mountain AWS Rainfall (mm)

	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Annual Average
Mean Rainfall	100.9	97.0	93.3	55.3	54.8	76.8	59.0	52.4	70.3	68.8	95.9	89.5	943.6
Median Rainfall	99.2	94.6	75.0	54.8	51.2	60.3	55.1	40.3	55.2	69.2	90.2	94.2	926.9
Mean days of rainfall > / 1	8.0	7.5	8.2	5.5	5.8	8.5	7.4	6.2	6.5	7.2	8.3	8.0	87.1

Note: Nullo Mountain AWS rainfall data collected between 1994 and 2019

3.2 Topography

The site is characterised by steep and rugged topography, as well as lower lying, undulating areas. The topography is dominated by Mount Airly to the west and Genowlan Mountain to the east. Site elevation varies from over 1,000 m Australian Height Datum (AHD) to less than 400 m AHD in the south-eastern section of the site.

3.3 Geology and Soils

The Blue Mountains area comprises typically of deep incised gorges with sandstone bedrock, steep sided cliffs and pagodas, narrow incised valleys with spring fed creek lines and inter-bedded sandstone conglomerate rocks. The geology for the site is primarily an undifferentiated mix of sandstone, claystone, siltstone, formed on the Narrabeen Group.

The site is situated on siltstone/mudstone lithology with fine light sandy clay loam to approximately 20cm and light medium clay to approximately 100cm (Kovac, Murphy and Lawrie 1989).

3.4 Land Use

Approximately 95% of the site is vegetated and historically undisturbed. This vegetated area is largely free from weeds and was historically fenced and inaccessible to cattle.

The site and surrounding land parcels held by Centennial were previously Crown lease and were used for grazing purposes.

The portion of previous pasture within the site is primarily cleared. Areas of pests and weeds are located within the pasture areas.

3.5 Vegetation

Vegetation recorded within the site comprises four native vegetation types, listed in Table 5 and shown on Figure 2.

Table 5 – Native Vegetation Types

Vegetation Type	Area (ha)
HN506 Blakely's Red Gum - Yellow Box - Rough-barked Apple grassy woodland of the Capertee Valley, Sydney Basin Bioregion	4.8
HN 534 Grey Gum - Narrow-leaved Stringybark - Inland Scribbly Gum shrubby open forest of the western Capertee Valley, Sydney Basin	109.7
HN544 – Inland Scribbly Gum – Grey Gum – Narrow-leaved Ironbark shrubby open forest on hills of western Capertee Valley, Sydney Basin Bioregion	35
HN574 – River Oak open forest of major streams, Sydney Basin and South East Corner	6.5
Total Area (ha)	156

3.6 Threatened Flora

One threatened flora species has been recorded in the site, being Capertee stringybark (*Eucalyptus cannonii*) which is listed as vulnerable under the BC Act. The location of the species is shown on Figure 2.

3.7 Threatened Fauna

A total of eight threatened fauna species have been recorded on the site. These are listed in Table 6 and shown on Figure 2.

Table 6 – Threatened Fauna Species

Common Name	Species Name	Listing BC Act
Black-chinned honeyeater (eastern subsp.)	<i>Melithreptus gularis gularis</i>	Vulnerable
Brown Treecreeper	<i>Climacteris picumnus victoriae</i>	Vulnerable
Diamond Firetail	<i>Stagonopleura guttata</i>	Vulnerable
Dusky Woodswallow	<i>Artamus cyanopterus</i>	Vulnerable
Gang-Gang Cockatoo	<i>Callocephalon fimbriatum</i>	Vulnerable
Little Lorikeet	<i>Glossopsitta pusilla</i>	Vulnerable
Scarlet Robin	<i>Petroica boodang</i>	Vulnerable
Speckled Warbler	<i>Chthonicola sagittata</i>	Vulnerable

3.8 Habitats

The site contains a number of habitat types which support a variety of native fauna, including threatened species. Broadly, the habitat types consist of open forest/woodland habitats, native grasslands, and ephemeral creeks and streams.

3.8.1 Terrestrial Habitat

The terrestrial habitats located within the site primarily comprise open forest/woodland with a small patch of native grassland located along the southern boundary. The open forest/woodland areas comprise a mix of grassy and shrubby understory throughout the variable landscape. The open forest/woodland featuring a shrubby understorey is situated on the slopes of the rolling hills, while the grassy understory variants can be found along drainage lines and steep rocky slopes that lead into Oaky Creek, Torbane Creek and Green Creek.

The open forest/woodland areas provide foraging habitat for birds, as well terrestrial and arboreal mammals. Landscape formations such as steep slopes, deep gullies and pagodas typically favour species such as red-necked wallabies (*Macropus rufogriseus*), swamp wallabies (*Wallabia bicolor*) and the common wombat (*Vombatus ursinus*) which browse from a variety of plant types. Observations of grazing species such as eastern kangaroos (*Macropus giganteus*) were limited where these species typically prefer to feed in open grassland and woodland habitats located to the south of the site.

The open forest/woodland areas provide important nesting/roosting habitat and foraging resources for a range of arboreal mammals (such as possums and gliders), micro-bats and bird species. Foraging resources include foliage, seeds, pollen, nectar and invertebrates. Diverse guilds of woodland bird species detected over the site feed on seeds, pollen and nectar of canopy and understorey vegetation and glean insects from the bark and foliage.

Hollow-bearing trees are commonly observed but in low density throughout the landscape. While open forest/woodland areas generally feature a variety of size classes, larger hollows (typically used by large forest owls, cockatoos and larger glider species) are rarely observed. Smaller hollows that are more commonly observed provide nesting habitat for small birds and mammals (including micro-bats).

Slopes occurring along the northern extent include a number of large caves containing scats of micro-bats, while deep gullies and creeks provide important flyways throughout areas of high-quality habitat.

The site features an abundance of native grass tussocks through woodland and grassland habitats, as well as fallen timber and loose bark which provides refuge and basking habitat for a variety of reptiles and amphibians known to occur throughout the broader locality.

3.8.2 Aquatic Habitat

Aquatic habitats suitable for some amphibian species are present within Oaky Creek, Torbane Creek and Green Creek as well as scattered small bodies of water.

Oaky creek runs to the northeast, from the junction of Torbane Creek and Green Creek (both of which intersect the site) and provides large pools of water in the north of the site. Green Creek also provides large pools of water and is considered a permanent water source within the site. Torbane Creek runs towards the northwest and is considered ephemeral.

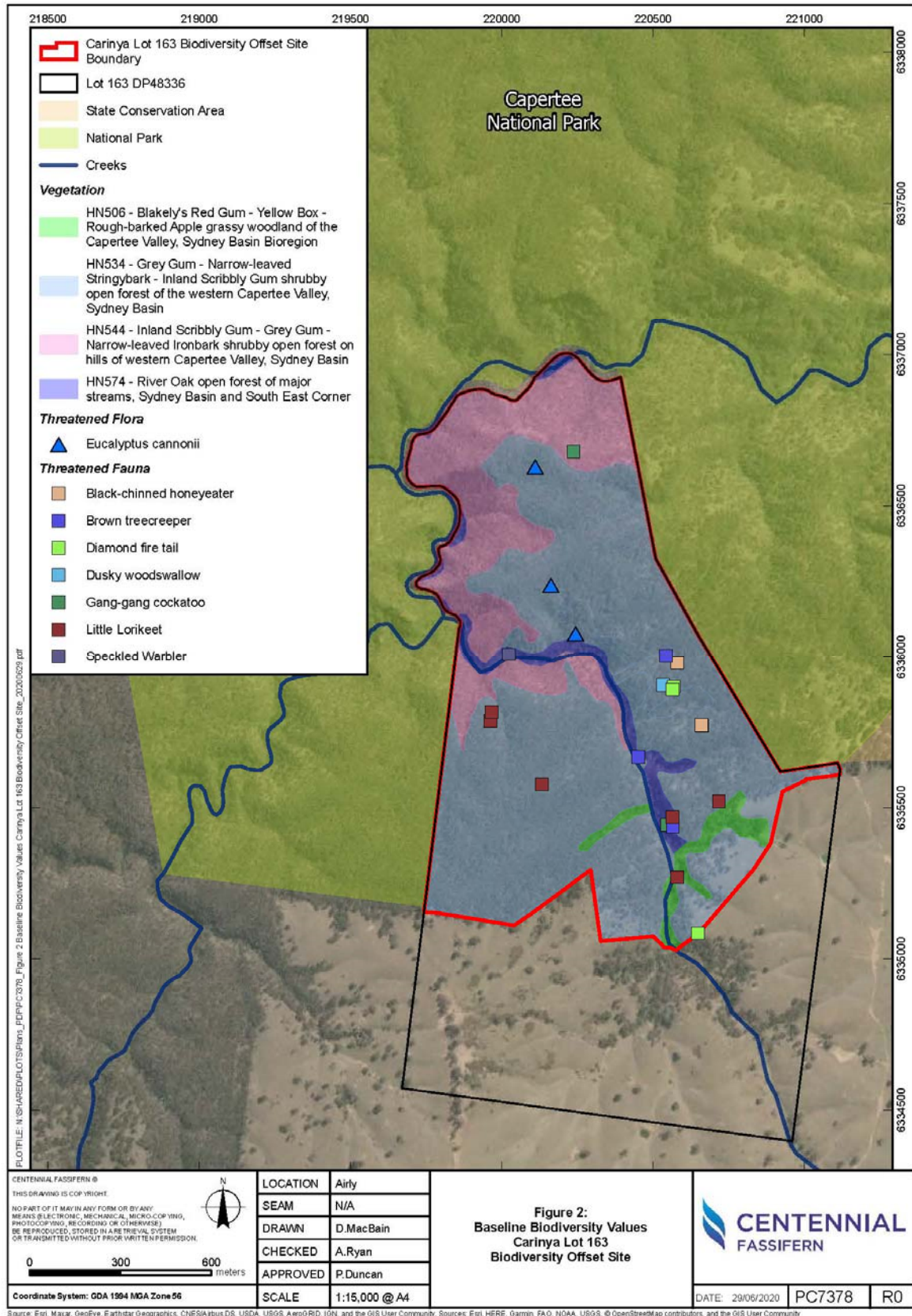


Figure 2 – Baseline Biodiversity Values

4.0 Conservation Management

4.1 Conservation Agreement Commencement

The management of the site commenced in 2017. The Agreement will be placed on the land title and be applied in perpetuity. The objectives of a Agreement are to:

- conserve regionally, nationally or globally outstanding ecosystems, species (occurrences or aggregations) and/ or geodiversity features: these attributes will have been formed mostly or entirely by non-human forces and will be degraded or destroyed when subjected to all but very light human impact;
- protect the long-term ecological integrity of natural areas that are undisturbed by significant human activity, free of modern infrastructure and where natural forces and processes predominate, so that current and future generations have the opportunity to experience such areas;
- maintain, conserve and restore species and habitats;
- protect and sustain important landscapes/seascapes and the associated nature conservation and other values created by interactions with humans through traditional management practices; and
- protect natural ecosystems and use natural resources sustainably, when conservation and sustainable use can be mutually beneficial.

4.1.1 Restrictions on Land

The following activities will not be permitted on the site unless prescribed by the Agreement, or authorised by emergency works or other activity approval which is reported to the BCT:

- cultivate the land, sow crops or plant or promote growth of exotic plants;
- graze livestock or permit livestock or non-native fauna to occupy the Conservation Area;
- carry out, or allow to be carried out, any development in, on, under or in relation to the site;
- construct any infrastructure, including tracks or fences, excluding maintenance of existing fences and tracks;
- carry out earthworks, including soil disturbance or removal of rock;
- remove fallen timber, dead wood or other dead vegetation;
- use fertilisers;
- use herbicides; and
- subdivide the land.

4.2 Management Activities

Management activities are to be undertaken as described below. The performance and completion criteria resulting from the completion of, or impact from management actions are presented in Section 5. Management actions required to be undertaken are listed in Attachment 3.

4.2.1 Site Access and Security

Measures to prevent unauthorised access are required to protect the biodiversity values within the site. A fence occurs on the southern boundary of the site and three gates provide access to the site from Centennial owned land, shown on Figure 3. Biodiversity offset signs are installed at the gate locations.

The following immediate actions will be undertaken for the site (shown on Figure 4):

- replacement of wire on the top strand of the eastern bound boundary fence in 2020;
- replacement of two gates, and maintenance of one gate in 2020;
- removal and disposal of historical fence line on the eastern boundary in 2022;

The maintenance of site security includes:

- inspections undertaken 6 monthly identifying the condition of the gates and fences, access track condition;
- maintenance of gates and fences every 5 years (or as required if maintenance is required less than 5 years);
- replacement of biodiversity offset signage every 10 years in accordance with manufacturers guidelines.

4.2.2 Heritage Sites

There are no Aboriginal cultural heritage sites or historic heritage sites located on the site.

4.2.3 Weed Management

A baseline weed survey has been completed by a bush regeneration contractor, informing the priorities for weed management (The Bush Doctor 2019). The site is largely free of weeds, and existing weeds are primarily concentrated towards the open grasslands on the south of the site as shown in Figure 6. Where weeds occur, the key weed species are St John's wort (*Hypericum perforatum*), tree of heaven (*Ailanthus altissima*), blackberry (*Rubus fruticosus* agg.), riparian weeds, serrated tussock (*Nassella trichotoma*) and prickly pear (*Opuntia* spp.).

The baseline weed survey has identified weeds will be targeted annually in Autumn and Spring and will collect weed treatment data for the areas treated, the method of treatment used (mechanical, chemical, and if so, what chemicals) and the estimated hours of treatment in the areas. Following the completion of weed management activities, an annual weed treatment report will be prepared summarising the outcomes of the treatment conducted and recommended a treatment program for the coming year.

Completion of weed management activities will be dependent on weather conditions including extended drought and extended wet periods. These such conditions make the treatment of target weed species ineffective.

4.2.4 Pest Animal Management

Pest animal management will be undertaken in consultation with BCD, Local Land Services and neighbouring landholders by an experienced and licenced pest management contractor.

Due to the location of the site adjacent to the Capertee National Park, the objective of pest animal management at the site is for achieving landscape pest programs.

A baseline pest report (Apex 2020) identified target pest animals and their suggested control method, as shown in Table 7 below.

The annual priorities for pest animal management will change dependent on the key threats and targeted programs by neighbouring landowners.

Table 7 – Pest Species and Control Methods

Common Name	Species Name	Control Methods
Avian Pests		Shooting
Cat	<i>Felis catus</i>	Shooting Trapping
European Red Fox	<i>Vulpes vulpes</i>	Baiting Shooting Trapping
European Wild Rabbit	<i>Oryctolagus cuniculus</i>	Fumigation Harbour control Shooting
Feral/wild dog	<i>Canis lupus familiaris</i>	Baiting Shooting Trapping

4.2.5 Erosion

There are currently no erosion control actions to be undertaken at the commencement of site management. The monitoring of erosion of site will however, be undertaken during the usual 6 month inspections as well as during the biodiversity surveys that occur every 5 years. These 5 yearly biodiversity surveys focus on the three site access areas (gates 1, 2 and 3).

4.2.6 Bush Fire

A Bush Fire Plan is being prepared by a qualified and experienced Bush Fire Planner. The Bush Fire Plan will:

- describe the landscape and biodiversity values of the site;
- identify an ecological burn strategy include burn planning, fire management zones, bushfire risk assessment and performance and completion criteria;
- a checklist of requirements for preparation of an ecological burn including environmental approvals, development of burn plan, completion of the burn and reporting of the burn outcomes; and
- list the requirements for monitoring, auditing and reviewing the Bush Fire Plan.

Actions required for Bush Fire include:

- completion of an ecological burn in Year 15;
- review of the Bush Fire Plan every 5 years by a qualified and experienced Bush Fire Planner; and
- inspections undertaken six monthly including internal access tracks.

4.3 Six Monthly Inspections

Incidental observations will be undertaken at the site during implementation of management activities.

Formal inspections are undertaken at 6 monthly intervals at site which document the:

- Date and person completing the inspection and their Company/Role;
- Weather and recent climatic patterns;
- Reported incidents in the past 6 months;
- List of contractors undertaking works the week of the inspection;
- Record in a checklist of the following conditions, and identification of additional management actions where the conditions are not acceptable:
 - site access is possible by 4WD vehicle;
 - biodiversity offset signage visible and in good condition;
 - photograph and record condition of site gates and fencing;
 - indications of unauthorised access
 - indications of stock presence on the site;
 - evidence of erosion;
 - disturbance of native vegetation;
 - bush fires;
 - fertiliser usage;
 - evidence of new weed species;
 - condition of internal access tracks;
 - presence of pest animal species;
- Record log of all management actions undertaken in the past 6 months.

4.4 Risks of Implementation of Conservation Agreement and Management Plan

The following risks (and a description of controls) have been identified for implementation of this Management Plan:

- the implementation of this plan does not occur;
the completion of six-monthly inspections and annual external reporting;
annual reporting to the BCT and DPIE;
- unexpected weeds or pest species;
management in accordance with directions of specialist bush regeneration consultants;
- failure of the management measures;
undertaking of ecological surveys providing feedback for adaptive management.
- funding allocations; and
review of this management plan by stakeholders and experienced bush regeneration contractor;

- failure to retire the land;

the finalisation of the Agreement is being undertaken with the BCT. The progress of these discussions is presented in Annual Review for Clarence and Springvale. Attachment 1 Consultation Log documents consultation undertaken in the finalisation of this Management Plan.

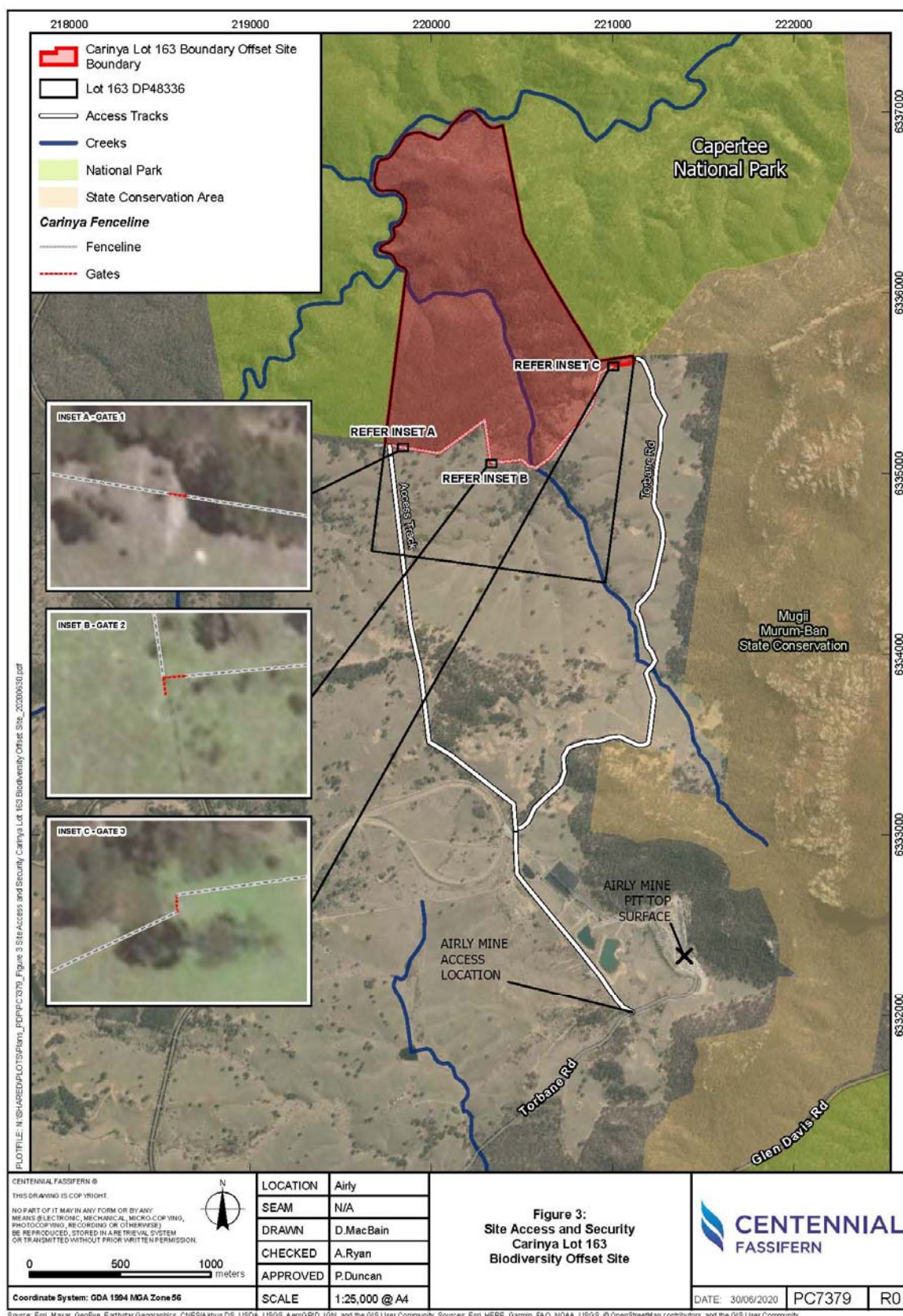


Figure 3 – Site Access and Security

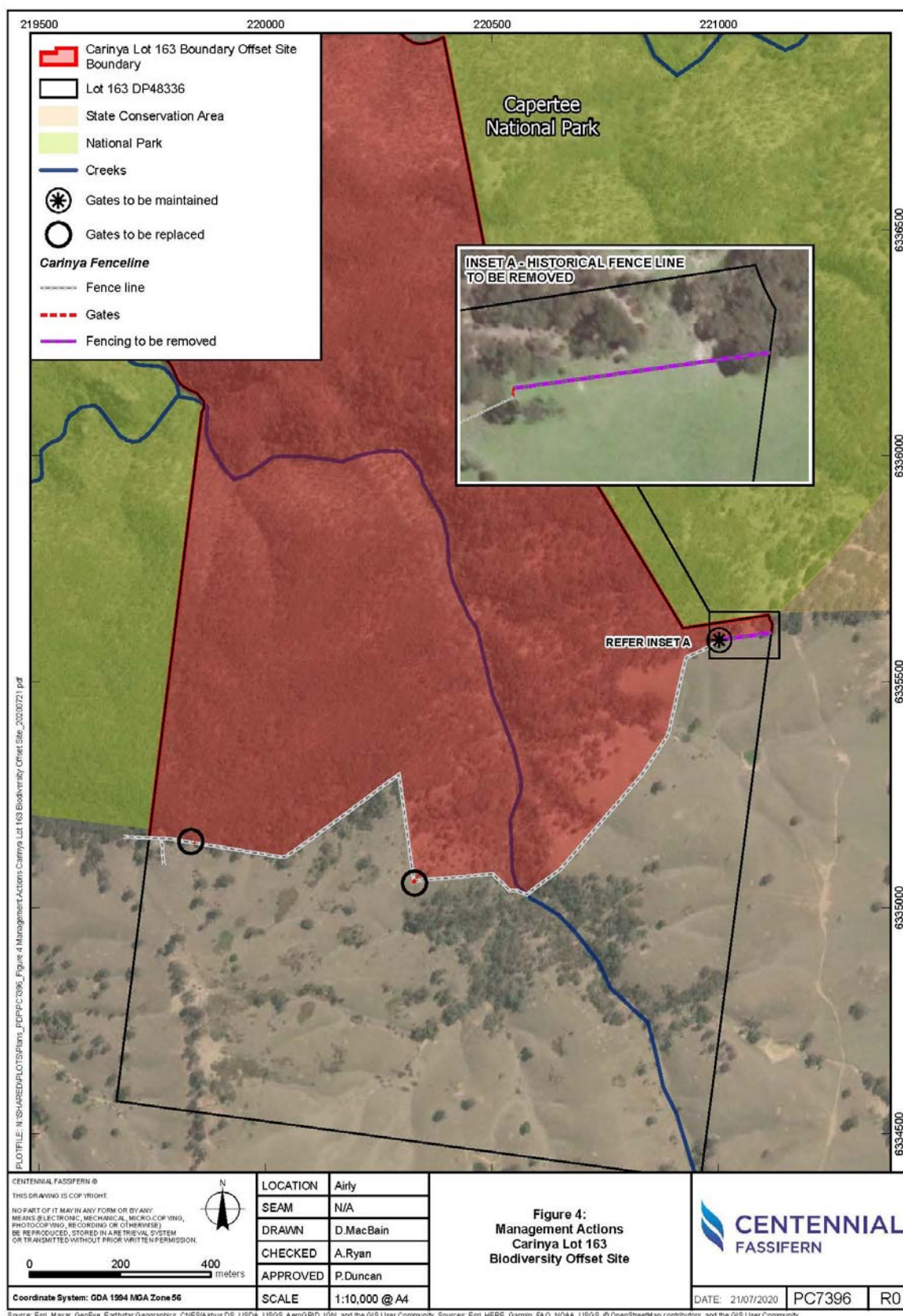


Figure 4 – Management Actions

4.5 Biodiversity Monitoring Methodology

4.5.1 BioBanking Assessment Method (BBAM)

Site surveys were undertaken for the assessment of the site in accordance with the BioBanking Assessment Method (NSW Office of Environment and Heritage (OEH) (2014).

4.5.2 Biodiversity Assessment Method (BAM)

The ongoing monitoring of the biodiversity offset site will be through the Biodiversity Assessment Method (BAM) (OEH 2017). Four baseline monitoring plots were established on the biodiversity offset site in April 2020. The monitoring plots were established in different vegetation classes (in accordance with advice from the BCT) and individual plot locations were determined based on priorities for managing biodiversity value, being the influence of grasslands.

Biodiversity monitoring will be completed every five years using the BAM (or most current equivalent) to document the condition of the vegetation and habitats of the site and to provide feedback on ecological outcomes following the implementation of management actions (Section 4.2).

The locations of the monitoring plots are identified in Table 8 and shown on Figure 5 with the associated results shown in Table 9 and 10.

Table 8 – Monitoring Plot Locations

Monitoring Site	Habitat	Plot/Transect Start Location		Plot/Transect End Location	
		<u>Easting</u>	<u>Northing</u>	<u>Easting</u>	<u>Northing</u>
C01	Woodland	219997	6335325	219955	6335306
C02	Grassland (Naturally Regenerating)	220067	6335119	220110	6335144
C03	Woodland	220659	6335778	220609	6335771
C04	Grassland	220887	6335513	220830	6335510

Table 9 – Baseline Monitoring Results (Floristic Composition)

Monitoring Site	Native Flora Species	Introduced Species	Total Flora Diversity
C01	32	1	33
C02	32	1	33
C03	33	0	33
C04	29	9	38

Table 10 – Baseline Monitoring Results (Vegetation Integrity)

Monitoring Site	C01	C03	C02	C04
Tree Richness	5	4	5	0

Monitoring Site	C01	C03	C02	C04
Shrub Richness	8	8	8	0
Grass/Grass-like Richness	9	9	9	13
Forb Richness	9	9	8	13
Fern Richness	1	1	1	0
Other Richness	0	0	0	2
Tree PFC (%)	60.6	40.2	30.6	0
Shrub PFC (%)	13.6	10.4	13.6	0
Grass/Grass-like PFC (%)	15.6	24	15.6	85.3
Forb PFC (%)	11.7	5.1	11.6	13.6
Fern PFC (%)	0.2	2	0.2	0
Other PFC (%)	0	0	0	0.2
No. Large Trees*	0	0	0	0
Hollow Bearing Trees	2	1	0	0
Total Length of Fallen Logs (m)	97	85	19	0
Litter Cover (%)	70	59	28	2
Regeneration of overstory	Yes	Yes	Yes	No
High Threat Weed Cover	0	0	0	0

* > 80 cm DBH

PFC Percent Foliage Cover

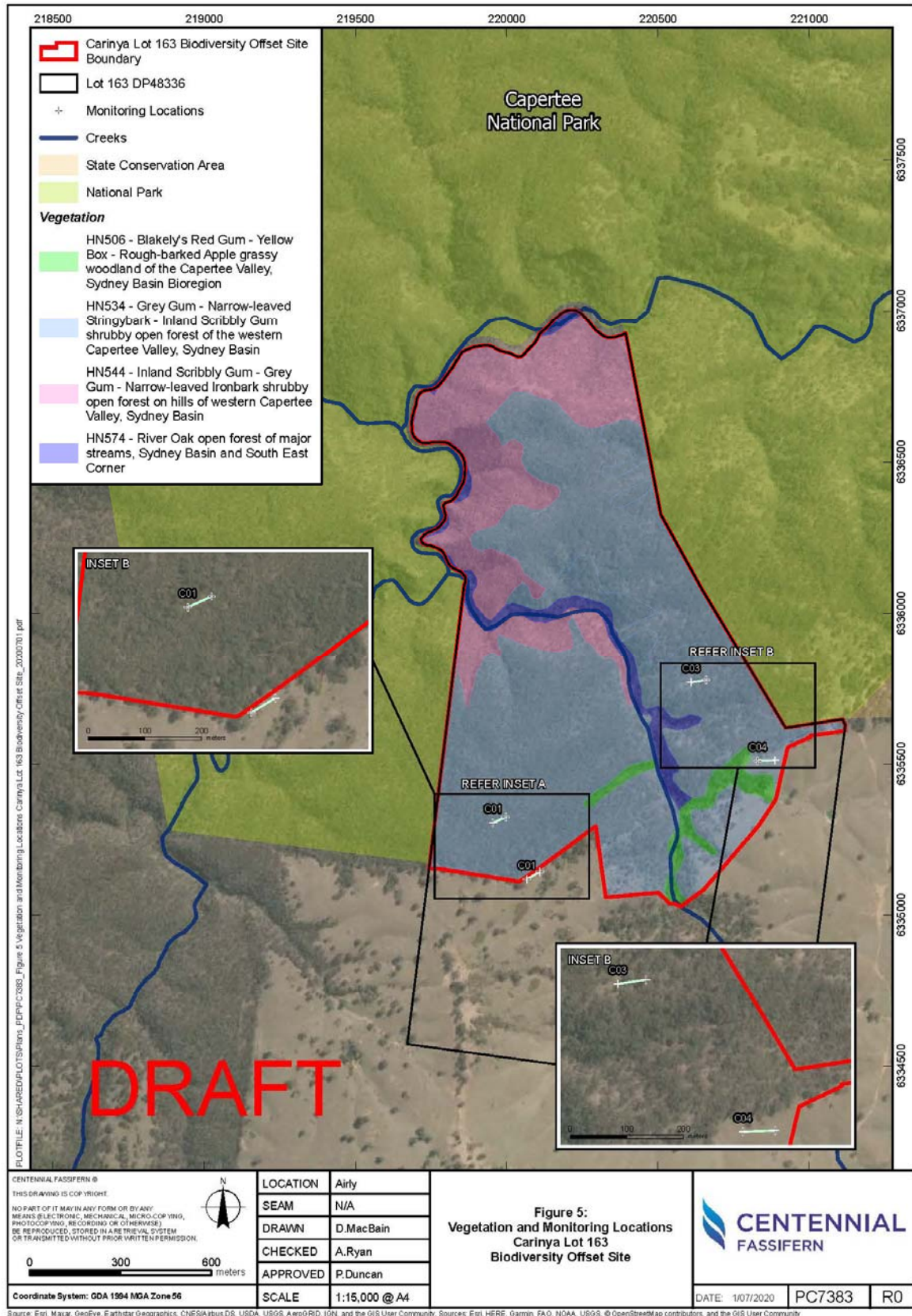


Figure 5 – Monitoring Locations

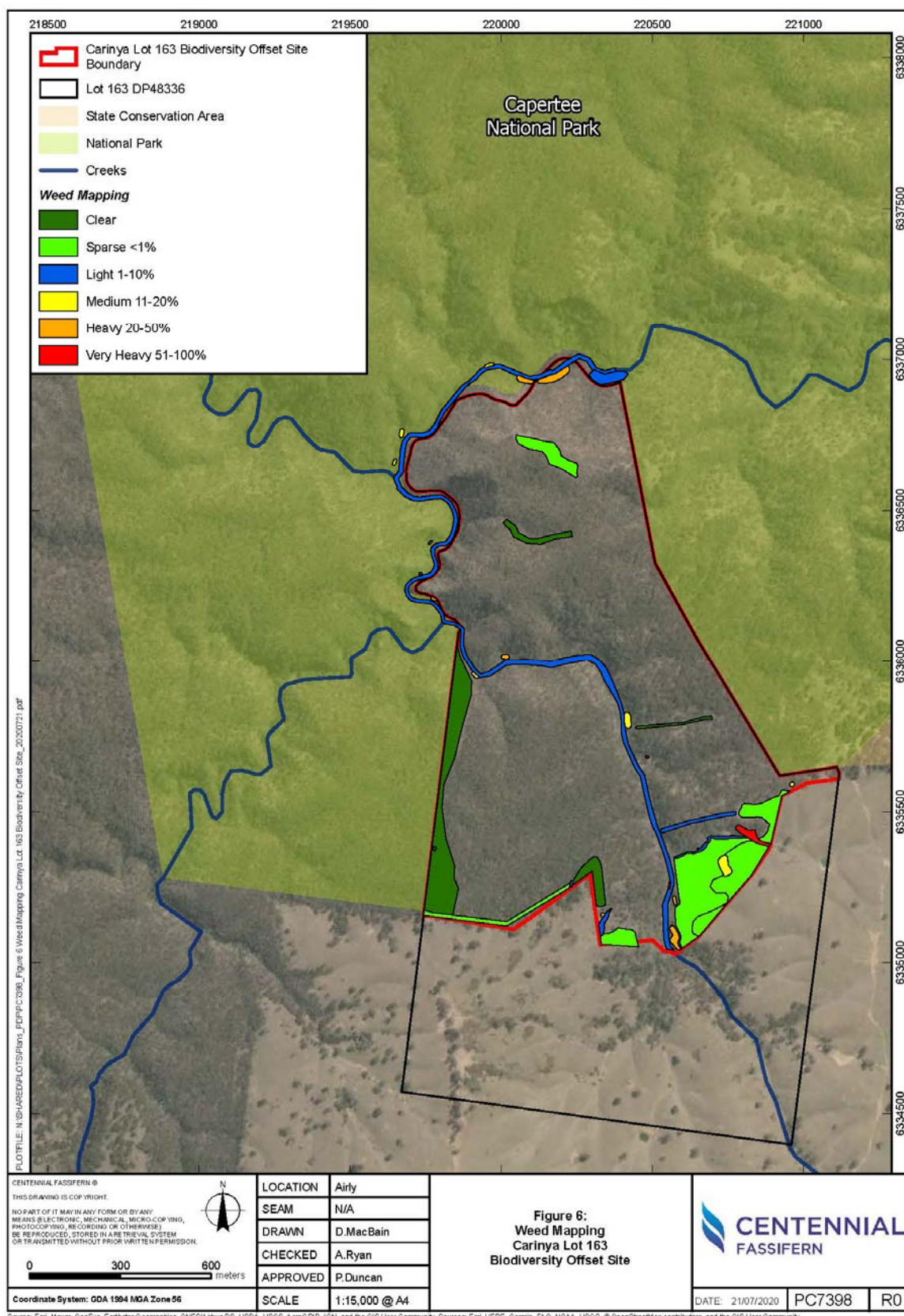


Figure 6 – Weed Mapping

5.0 Performance and Completion Criteria

Performance and completion criteria have been developed in consideration of the Society for Ecological Restoration (SERA) Standards for Ecological Restoration in Australia Guidelines (2017). Performance and completion criteria for management of the site under a Agreement are presented in Table 11.

5.1 Conservation Bond

A draft Conservation Bond calculation is submitted to the Secretary with this Management Plan. The Conservation Bond is proposed to include the completion of management actions for the first 10 years of the Management Plan. The site has no active restoration. Management activities are limited to limiting human disturbance and maintaining site security, weed management, pest management and ecological monitoring.

The conservation Bond will be calculated by a suitably qualified quantity surveyor.

Table 11 – Performance and Completion Criteria

Management Goal	Long term Target/Indicator	Action	Performance Criteria	Completion Criteria	Specification	Timing
Administration and Reporting	Annual Report - BCT	Prepare annual report	Annual Report submitted to the BCT	*	As specified in the Agreement	Annually
	Annual Report - DPIE	Prepare annual report	Annual Review submitted to DPIE by Angus Place Mine, Clarence Colliery, Springvale Mine and Western Coal Services	*	Summary of: - status of management actions - performance of biodiversity offset management - non-compliances	Annually
Biodiversity Monitoring	Trend of biodiversity values maintained or improved	Monitor and trend outcomes of management actions	Monitoring Report completed	*	As per Section 4.5.2 Biodiversity Assessment Method	Year 5 (2025) then every 5 years
	Configuration of existing fences	Replacement of top wires on eastern boundary	Top two barb wires replaced with plain wire	Plain wire installed	As per Section 4.2.1 Site Access and Security	Year 1 (2020)
	Removal of historical fences	Removal of fences on northern-western boundary		Fences removed	As per Section 4.2.1 Site Access and Security	Year 3 (2023)
	Restricted Access Implemented	Maintenance of 3 access gates		Gates 1 and 2 replaced Gate 3 gate post maintained	As per Section 4.2.1 Site Access and Security	Year 1 (2020)
	Restricted Access Maintained	Replace signage	Signage replaced	*	As per Section 4.2.1 Site Access and Security	Every 10 years, starting year 10 (2029)
	Restricted Access Maintained	Maintain fencing and gates	Gates and fences are maintained to be stock proof Works completed as identified during 6 monthly inspections	*	As per Section 4.2.1 Site Access and Security	Every 5 years, starting year 5 (2024)
	Restricted Access Monitored	Assess every 6 months condition of gates, fences and signage Check for evidence of unauthorised access and presence of cattle	6 monthly inspection completed	*	As per Section 4.3 Six Monthly Inspection	Every 6 months
	Areas of erosion are addressed	Assess every 6 months areas of potential erosion	6 monthly inspection completed	*	As per Section 4.2.5 Erosion	Every 6 months
	Access Roads are managed	Access to the site is monitored and reported	6 monthly inspection completed	*	Areas where access is limited due to access road condition is reported and actioned	Every 6 months
Removal/Reduction of external threats	Cattle not present on site	Remove cattle	6 monthly inspection completed	*	As per Section 4.3 Six Monthly Inspection	Every 6 months

Management Goal	Long term Target/Indicator	Action	Performance Criteria	Completion Criteria	Specification	Timing
	Monitoring and Response to non-native pest species	Monitor non-native pest species	6 monthly inspection completed	*	As per Section 4.2.1 Site Access and Security	Every 6 months
		Integrate with neighbour's pest management		Records maintained of correspondence	As per Section 4.2.1 Site Access and Security	Ongoing
	Reduction in weed species	Targeted weed programs in accordance with baseline weed event outcomes	Completion of targeted weed program	*	As per Section 4.2.3 Weed Management	Annually
		Monitor outcomes of targeted weed program	Completion of monitoring reports	*	As per Section 4.2.3 Weed Management	Annually
	Bush Fire Management for ecological gains	Develop Bush Fire Plan for ecological community and threatened species outcomes		Bushfire Plan Developed	As per Section 4.2.6 Bush Fire	Year 1 (2020)
		Review of Bush Fire Plan	Bush Fire Plan Reviewed	*	As per Section 4.2.6 Bush Fire	Year 5 (2020) and then every 5 years
		Inspection of internal access tracks	6 monthly inspection completed	*	As per Section 4.3 Six Monthly Inspection	Every 6 months
		Undertake ecological bushfire management in accordance with Management plan	Burn Completed	*	As per Section 4.2.6 Bush Fire	Year 10 (2029), every 15 Years

*Actions are undertaken in perpetuity

6.0 Environmental Management

6.1 Adaptive Management Framework

To account for uncertainties and to improve management response the site will implement the Centennial Adaptive Management Framework.

The framework consists of the traditional adaptive management model, complemented by management outcomes. The adaptive management framework actions relevant to biodiversity are detailed below with their requirements:

- Describe - the baseline data;
- Model – the baseline data requirements for land management decisions based on the existing site conditions and best practice procedures;
- Do – implement the works program in this Management Plan;
- Learn – through the outcomes of management actions, results from inspections and reports;
- Monitor and evaluate the biological response using management action reports from contractors, inspection reports and ecological reports;
- Consult – incorporate input from specialist contractors, consultants, neighbouring land managers NPWS and Centennial grazing tenants; and
- Monitor and Manage - biodiversity management objectives are monitored to evaluate progress. The information is used to increase our understanding of the biodiversity values of the site and enhancement from land management activities.

6.2 Trigger Action Response Plan

A Trigger Action Response Plan (TARP) for the site is provided in Attachment 2. The TARP provides action responses for monitoring results which are found to be:

- in normal range;
- approaching trigger levels; and
- exceedances of trigger levels.

Accurate identification of trigger events provides for early responses to emerging risks. As well as identifying the initial trigger for response, the ecological monitoring program provides the primary means to monitor the effectiveness of the response actions including those developed through the adaptive management framework.

6.3 Non-Conformance and Corrective Actions

Any non-conformances will be managed in accordance with the non-conformance protocol in Figure 6.

Compliance inspections will be required six-monthly to check the status of the site against implementation of the Management Plan and response to management actions..

Any non-compliance in accordance with the Agreement will be reported as per the requirements of the Agreement.

Any non-compliances will be investigated as per Accident / Investigation procedure. Records of all non-compliances will be maintained in the Environment and Community Database.

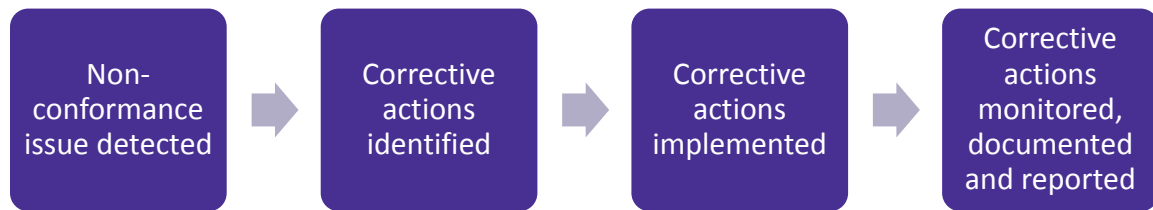


Figure 7 – Non-Conformance and Corrective Actions Procedure

6.4 Review

6.4.1 Continual improvement of performance

Centennial will investigate and implement ways to improve the biodiversity outcomes over time. The feedback from biodiversity monitoring will provide confirmation and where necessary, redirection of management actions.

6.4.2 Environmental auditing

This Management Plan must be audited annually during the submission of the Agreement Annual Report. The annual review will include the following:

- amendments to licensing or statutory approvals;
- summary of any complaints or incidents relating to the performance of the biodiversity management system over the reporting period;
- summary of the monitoring results collected over the reporting period and assessment against any relevant criteria;
- evaluation of any trends in the monitoring results occurring across the site over the life of the operation;
- non-compliance recorded during the reporting period and the actions taken to ensure compliance;
- identification of any discrepancies between the predicted and actual impacts of operations and an analysis of the potential cause of any significant discrepancies; and

- summary of the management actions to be implemented over the next year to improve the environmental performance of the site.

This Management Plan may be audited by the BCT, DPIE or BCD at any time.

6.5 Document control

The final Management Plan will be made publicly available on Centennial's website.

7.0 Health & Safety

The implementation of this Management Plan is undertaken in accordance with contractors inducted by the Centennial Non-Operational Properties Induction.

The response to emergencies including bushfire, lightning and potential or actual incidents to persons safety will be completed in accordance with the Non-Operational Properties Induction.

8.0 Roles and Responsibilities

The roles and responsibilities for the implementation of this Management Plan is provided in Table 12. The allocation of budgets to complete the management actions is by the Clarence and Springvale Mine Managers.

Table 12 – Roles and Responsibilities

Title	Position Description	Responsibilities
Mine Managers	This is the person nominated by Centennial to authorise budgets for management of the site	<ul style="list-style-type: none"> • To provide the resources for implementation of this Plan
Operations Environment and Community Coordinators	This is the person nominated by Centennial to co-ordinate and manage environmental requirements in each respective operation	<ul style="list-style-type: none"> • Report on the implementation of this Plan in Annual Reviews • Provide feedback and comment on documentation and works completed • Schedule works required under this plan • Undertake reporting and reviews of this Management Plan • Liaise with the BCT on the implementation of land management actions
Consultants, Contractors & Visitors	Any individual undertaking works	<ul style="list-style-type: none"> • Ensure activities excluded in this Plan are adhered • Report any incidents or non-conformances

REFERENCES

Apex (2020) *Baseline Pest Species Report Biodiversity Offset: Carinya Lot 163* prepared by Apex Predator Solutions for Centennial Coal Pty Limited.

Bureau of Meteorology (BOM) (2019) Nullo Mountain Automatic Weather Station (AWS) Accessed: http://www.bom.gov.au/climate/averages/tables/cw_062100_All.shtml

Kovac M., Murphy B.W. and Lawrie J.A., (1989). *Soil Landscapes of the Bathurst 1:250,000 Sheet map, Soil Conservation Service of NSW*, Sydney Lithgow City Council (2014) Land Zoning Map – Sheet LZN_001. Accessed online: http://www.legislation.nsw.gov.au/maps/46b633c3-8330-4913-9dde-9a36caf74e03/4870_COM_LZN_001_160_20140430.pdf

NSW Biodiversity Conservation Trust *Template Conservation Agreement*.

NSW Office of Environment and Heritage (2014) *BioBanking Assessment Methodology*.

NSW Office of Environment and Heritage (2017) *Biodiversity Assessment Method*.

RPS (2019) *Western Region Biodiversity Offset Strategy*, prepared by RPS Australia East Pty Ltd for Centennial Coal Company Pty Limited.

RPS (2019) *Western Region Biodiversity Management Plan*, prepared by RPS Australia East Pty Ltd for Centennial Coal Company Pty Limited.

Society for Ecological Restoration Australia (SERA) (2017) *Standards for ecological restoration in Australia*, Society for Ecological Restoration Australia.

The Bush Doctor (2019) *Carinya Offset Biodiversity Weed Survey* prepared by RPS Australia East Pty Ltd for Centennial Coal Company Pty Limited.

Attachment 1 – List of Actions

Table 1 – Actions Required by this Management Plan

Management Plan Section	Action Required	Timing of Action	Responsibility
Section 4	Execution of Conservation Agreement	2020	Environment and Community Coordinator
Section 5 – Administration	Review of this Management Plan to include outcomes of non-compliance, incidents and audits	Annually	Environment and Community Coordinator
Table 5 – Annual Report	Annual Report to be submitted to BCT following Conservation Agreement execution in accordance with the requirements of the Agreement	Annually	Environment and Community Coordinator
Table 5 – Annual Review	Annual Review summary submitted to DPIE of: -status of Conservation Agreement -status of actions required by this Management Plan -non-compliances	Annually	Environment and Community Coordinator
Table 5 – Ecological Monitoring	Undertake ecology surveys in Year 5, and thereafter every 5 years. Ecology to survey to be completed using BAM methodology. Ecology survey to provide: -summary of management actions completed and contribution to ecological gains -commentary on ecological response to ongoing climatic conditions e.g. extended dry periods, events such as bushfires -update of Management Plan to incorporate changes to the biodiversity values of the site and review of management actions	2025, then every 5 years in perpetuity	Environment and Community Coordinator
Table 5 – Human Disturbance	Replacement of top 2 wires on eastern boundary fence	2020	Environment and Community Coordinator
Table 5 – Human Disturbance	Removal of fences on north-western boundary	2023	Environment and Community Coordinator

Management Plan Section	Action Required	Timing of Action	Responsibility
Table 5 – Human Disturbance	Replacement of gates 1 and 2 Maintenance of gate post gate e	2020	Environment and Community Coordinator
Table 5 – Human Disturbance	Maintenance of biodiversity offset fencing and signage. Inspection and if required replacement of 3 access gates to the site. Replacement of 2 top wire strands with plan wire on eastern boundary.	2020	Environment and Community Coordinator
Table 5 – Human Disturbance	Maintenance of fencing and gates	Every 5 years, starting Year 2025	Environment and Community Coordinator
Table 5 – Human Disturbance	Replacement of signage	Every 10 years, starting year 2029	Environment and Community Coordinator
Table 5 – Removal/Reduction of External Threats	Monitor and if appropriate undertake pest animal management activities	Annually	Environment and Community Coordinator
Table 5 – Reduction of External Threats	Undertake pest management activities by engaging pest management contractor or supporting neighbouring land manager's pest management programs.	Annually	Environment and Community Coordinator
Table 5 – Removal/Reduction of External Threats	Develop Bush Fire Management Plan. To be prepared by appropriately qualified professional.	2020	Environment and Community Coordinator
Table 5 – Removal/Reduction of External Threats	Undertake ecological burn	2035	Environment and Community Coordinator
Section 4.5 Six Monthly Inspections	Undertake 6 monthly site inspections. Inspection must include: -management actions required to be completed -management actions completed -justification for management actions not being completed -audit of information required for the site management including purchase orders, contractors works and their reports	6 monthly	Environment and Community Coordinator

Management Plan Section	Action Required	Timing of Action	Responsibility
	<ul style="list-style-type: none">-condition of restricted access requirements for fencing, gates and signage-condition of tracks-photographic record of fuel load-presence of new weeds and pest species-identified activities of neighbouring landowners-photographic monitoring locations		

Attachment 2 – Consultation Log

Table 1 – Consultation Log

Date	Consultation
December 2016	Draft Western Region Biodiversity Management Plan submitted to DPIE for approval
April 2017	Revised Draft Western Region Biodiversity Management Plan submitted
July 2017	Voluntary Undertaking Signed
February 2018	Letter from BCD (formerly OEH) accepting in principle arrangements Carinya Lot 163 within the Western Region Biodiversity Offset Strategy
January 2019	Site Inspection with BCD (formerly OEH) and NPWS of site
April 2019	Approval of Western Region Biodiversity Offset Strategy
September 2019	Revised Draft Western Region Biodiversity Management Plan submitted
November 2019	Notification to NPWS transfer to Capertee National Park
Jan 2020 – June 2020	Consultation with BCT progression of Conservation Agreement
November 2020	Submission of Final Management Plan to DPIE for approval

Attachment 3 – Trigger Action Response Plan

Aspect	Normal	Trigger 1	Trigger 2	Notifications in response
Ecological Values	Monitoring identifies trend ecological values are maintained or improved	Trend is decreasing ecological values using BAM monitoring method Action: Investigate reason for trend. Implement appropriate mitigation control.	Investigation under Trigger 1 requires review of Management Plan. Action: Review and if required update management plan.	Trigger 1: Notify Environmental Coordinator Trigger 2: Notify Mine Manager. Actions to be reported in Annual Report to BCT. If management plan changes are significant submit revised plan to DPIE for approval.
Human Disturbance and Restricted Access	Fencing and signage is in place. Gates are locked. No evidence of unauthorised access.	Unauthorised access or evidence of unauthorised access is known, no impact to the site. Action: Review induction requirements for site. Seek confirmation of authorised persons.	Impacts occurred from unauthorised access. Action: Report to the BCT. Replace damaged fencing, signage and gates. Obtain advice for repair works.	Trigger 1: Notify Environmental Coordinator. Trigger 2: Notify Mine Manager. Notify BCT.
Removal/Reduction of external threats	No new threats occur for weeds, pests, bushfire.	Notification of new weed or pest, notification for hazard reduction control. Action: Review requirements. Implement appropriate mitigation control.	Weed, pest or bush fire event. Action: Follow directions of government agency.	Trigger 1: Notify Environmental Coordinator. Trigger 2: Notify Mine Manager. Notify BCT.