



Biodiversity and Offset Management Plan and Strategy

Number: MGOOC-899305957-16

Owner: [Owner (Office)]

Status: [\[Document Status
\(Office\)\]](#)

Version: [Document Version
(Office)]

Effective: [\[Effective Date\]](#)

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Glossary

Abbreviation	Description
ACARP	Australian Coal Association Research Program
ACHMP	Aboriginal Cultural Heritage Management Plan
AR	Annual Review
BBAM	BioBanking Assessment Methodology
BC Act	<i>Biodiversity Conservation Act 2016</i> (NSW)
BCD	Biodiversity & Conservation Division within the Department (formerly OEH)
BCT	Biodiversity Conservation Trust
BOA	Biodiversity Offset Area
BOMPS	Biodiversity and Offset Management Plan and Strategy
BOS	Biodiversity Offset Strategy
CEEC	Critically Endangered Ecological Community
CHPP	Coal Handling and Preparation Plant
CMO	MGO Complex Compliance Management
COP	Code of Practice
DA	Development Application
DoEE	Commonwealth Department of the Environment and Energy
DPE	NSW Department of Planning and Environment
EEC	Endangered Ecological Community
EMS	Environmental Management System
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)
GCAA	Glencore Coal Assets Australia
GDEs	Groundwater-dependent Ecosystems
GDP	Ground Disturbance Permit
Glencore	Glencore Coal Pty Limited
HMA	Habitat Management Area
HSEC	Health Safety Environment and Community
KTP	Key Threatening Process
MGO	Mount Owen Glendell Operations
MOP	Mining Operations Plans
OEH	NSW Office of Environment and Heritage
PAC	Planning and Assessment Commission
RFS	Rural Fire Service
RMP	Rehabilitation Management Plan
RSF	Ravensworth State Forest

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Abbreviation	Description
SMART Principles	Specific, Measurable, Achievable, Relevant and Timely
SEE (Mod 2)	Mt Owen Continued Operations Project Modification 2 Statement of Environmental Effects
SOP	Standard Operating Procedures
SSD	State Significant Development
SWMP	Surface Water Management Plan
TAP	Threat Abatement Plan
TEC	Threatened Ecological Community
TSC Act	<i>Threatened Species Conservation Act 1995 (NSW)</i>
TSR	Travelling Stock Reserve
Umwelt	Umwelt (Australia) Pty Ltd
VCA	Voluntary Conservation Agreement
WOOP	Western Out of Pit

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1. Commitment and Policy

1.1 Background

Mount Owen Glendell Operations (MGO) is located within New South Wales (NSW), approximately 20 kilometres north-west of Singleton. Mount Owen Pty Limited (Mt Owen), a subsidiary of Glencore Coal Pty Limited (formerly Xstrata Coal Pty Limited) currently owns the three open cut operations in MGO:

- Mount Owen (North Pit) (Development Consent SSD – 5850);
- Ravensworth East (Bayswater North Pit) (Development Consent SSD – 5850); and
- Glendell (Barrett Pit) (Development Consent DA – 80/952).

Mining operations at the MGO include the integrated use of the Mt Owen coal handling and preparation plant (CHPP), coal stockpiles and rail load-out facility.

The Biodiversity and Offset Management Plan and Strategy (BOMPS) documents the strategies and procedures for management of Biodiversity Offsets for MGO, incorporating Mt Owen Mine (SSD 5850) and the Glendell Mine (DA 80/952).

A modification, 'MOD 1', to Mount Owen Continued Operations (MOCO) Development Consent (SSD-5850) was approved by the NSW Department of Planning and Environment (DP&E) on 19 September 2017 for the construction and operation of a water pipeline from Integra Underground Operations to MGO.

A modification, 'MOD 2', to MOCO Development Consent (SSD-5850) was approved by the NSW Department of Planning, Industry and Environment (DPIE) (formerly DP&E) on 4 September 2019 permitting the recovery of an additional 35Mt of ROM Coal from the North Pit and extending Life of Mine to 2037.

An administrative modification to MOCO SSD-5850 (Modification 3) was approved by DPIE on 30 January 2020, which allowed for an additional parcel of land to be added to the Schedule of Lands included in Appendix 1 of SSD-5850 as well as an update to Figure 3 illustrating the land ownership data.

A modification (Modification 4), 'MOD 4', to Glendell DA 80/952 (Glendell MOD 4) was approved by the DPIE on 4 March 2020 for Glendell Mine. The modification allows for a minor extension of the western boundary of the approved pit shell in order to access an additional 2.5 million tonnes run of mine (Mt ROM) coal from the Barrett Pit within the duration of the current approval (which expires June 2024). This will result in the removal of approximately 7.7 ha from the approved disturbance area, resulting in a net increase (approximately 4.3 ha) in the overall disturbance area associated with the Glendell Mining operations (Umwelt, 2018b, 2019).

A modification, 'MOD 5', to MOCO Development Consent SSD-5850 was approved by the NSW DPIE on 15 January 2021, which removed the Travelling Stock Reserve (TSR) as an Offset property (Umwelt, 2020a). Crown lands did not wish to sell this land parcel, therefore alternative offset arrangements are to be made to ensure Offset requirements in SSD-5850 are met.

A further modification, 'MOD 6' was approved by the DPIE on 3 June 2021. MOD 6 allows the construction and operation of an additional pipeline between MGO and Ravensworth Operations to transfer water under the already approved Greater Ravensworth Area Water and Tailings Sharing System (GRAWTS) (Umwelt 2020b). An additional disturbance area of approximately 7.5 ha is required for the construction and ongoing maintenance of the proposed pipeline.

This BOMPS was updated in November 2019 following approval of MOCO MOD 2. The revised plan was submitted to DPIE in December 2019 for approval. The approval of the plan was put on hold, however, in anticipation of an impending approval of the Glendell MOD 4. This BOMPS therefore incorporate the requirements of MOCO MOD 2, MOD 3, MOD 5 and MOD 6 as well as Glendell MOD 4, and supersedes the previously approved BOMPS (November 2018).

1.2 Purpose

This Biodiversity Offset Management Plan and Strategy (BOMPS) has been prepared to guide the ongoing management of biodiversity at the MGO and the Biodiversity Offset Areas (BOAs) (including corridors) for biodiversity conservation and enhancement purposes (**Figure 1**).

The BOMPS provides a framework for the implementation of:

- Ecological management actions;
- Regeneration and revegetation strategies; and
- Controls and monitoring programs.

MGO BOAs have been established as biodiversity offsets for the predicted ecological impacts of mining operations. The BOAs cover almost 2,000 hectares of land located within and adjacent to the MGO (and in the wider Hunter region). BOAs managed by MGO are identified in **Section 2.2**.

This BOMPS is one of a series of Environmental Management Plans that together form the Environmental Management Strategy for the MGO.

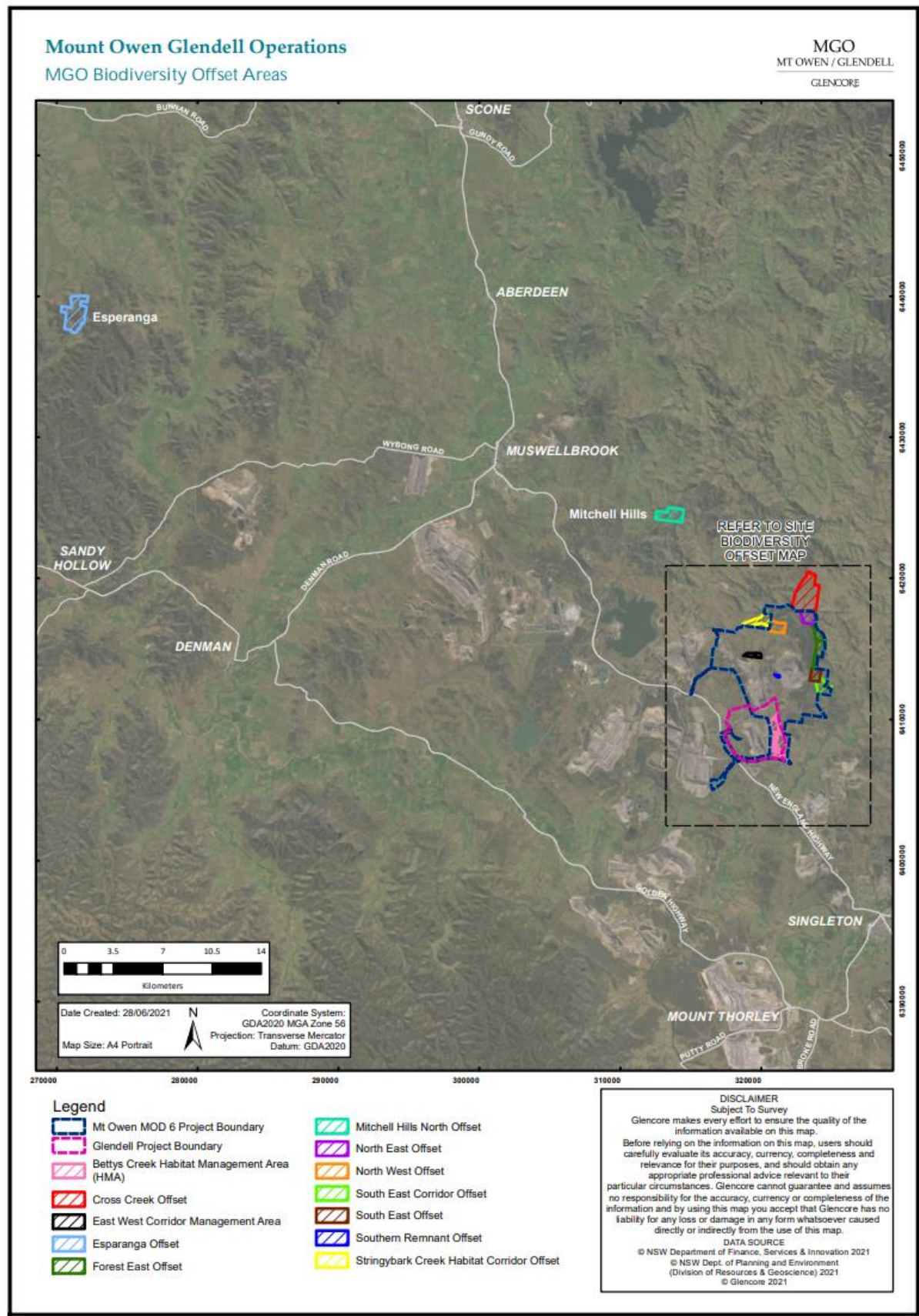


Figure 1.1 MGO Biodiversity Offset Areas

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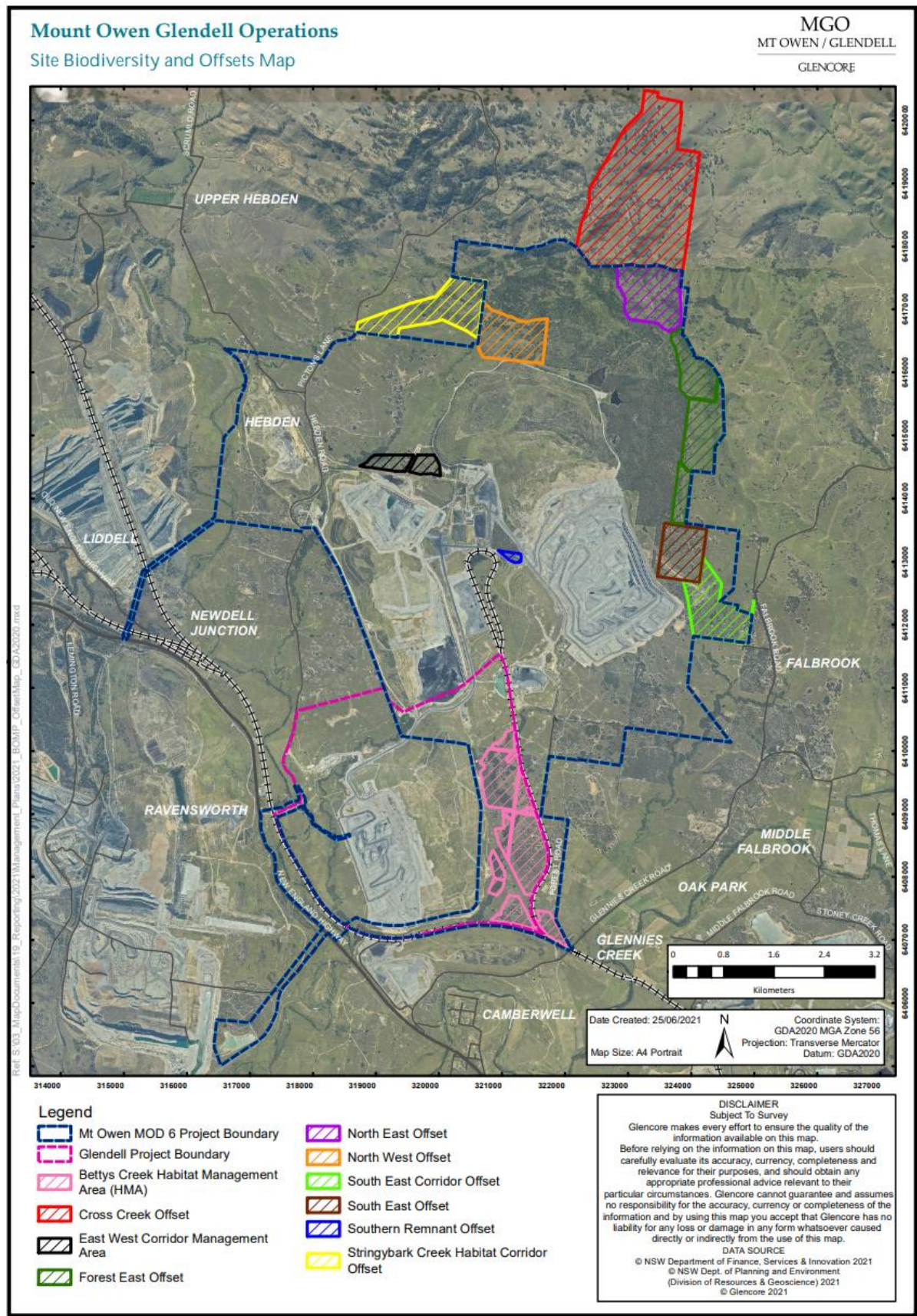


Figure 1.2 Site Biodiversity Offset Areas

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1.3 Objectives

The objective of this BOMPS is to provide short to long term direction for the management and enhancement of the ecological values of the MGO BOAs and onsite management of biodiversity, as well as provide a detailed description of the measures to be implemented to achieve this over the next three year period (2021-2023). The BOAs subject to this document will be implemented for the life of mine.

Table 1.1 below outlines the objectives of this BOMPS, where they are addressed in this document and the relevant mining phase timeframe for achieving these objectives (mine planning, pre-clearance, active mining and/or closure).

Table 1.1 – Objectives of the BOMPS

No.	Objective	Relevant Mine Phase for Objective Implementation	Relevant Section of Plan
1	Re-establish and maintain stable landforms, landscapes and fully functioning ecosystems	Closure	Section 2 Section 4 Refer to MOP
2	Maintain, and where practicable, enhance the biodiversity, including the genetic diversity of native fauna and flora species to ensure their long term viability	Pre-clearance Active Mining	Section 3 Section 4
3	Maintain and enhance habitat for native fauna to improve the likelihood of their long term survival	Pre-clearance Active Mining	Section 3 Section 4
4	Implement targeted strategies for the conservation and management of threatened species, populations and communities and their habitats	Mine Planning Pre-clearance Active Mining	Section 3 Section 4
5	Control, and where practicable, eradicate threats to threatened species, populations and communities and their habitats	Pre-clearance Active Mining	Section 3 Section 4
6	Implement monitoring requirements to provide information to assist management of threatened species, populations and communities, their habitats and ecosystems	Pre-clearance Active Mining	Section 5
7	Develop a woodland ecosystem resilient to threats which is self-sustaining in the long term	Closure	Section 3 Section 4 Refer to RMP
8	Facilitate the establishment of vegetation corridors, where possible, creating links to areas of remnant vegetation surrounding MGO	Active Mining Closure	Section 3.2.4 Section 4.1.1 Section 4.8
9	Guide the implementation of the Mount Owen Biodiversity Offset Strategy	Mine Planning Pre-clearance Active Mining	Throughout
10	Develop objectives and identify mechanisms for the long term security of biodiversity offset areas	Mine Planning	Section 1.7

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No.	Objective	Relevant Mine Phase for Objective Implementation	Relevant Section of Plan
11	Identify and implement best practice biodiversity conservation, rehabilitation and reforestation measures	Pre-clearance Active Mining Closure	Throughout

This BOMPS has been prepared in consideration of the NSW Department of Planning and Infrastructure (DP&I) (now DPIE), Best Practice Guidelines (DP&I 2014) for the preparation of BOMPS in the Hunter Valley. A summary of consultation with external stakeholders is provided in **Section 1.6**.

1.4 Statutory Requirements

Both Mt Owen (**SSD-5850**) and Glendell Mine (**DA 80/952**) development approvals stipulate requirements related to this BOMPS.

In addition to this the Commonwealth EPBC Approval (EPBC 2013/6978) includes a range of conditions relating to the implementation of biodiversity mitigation and offsetting measures detailed in SSD 5850. MOCO MOD 2 was determined not to be a controlled action under the EPBC Act on 15 December 2017. The area applicable to EPBC Approval 2013/6978 is shown in **Figure 2.1**.

These are summarised in **Table 1.2** and **Table 1.3** below.

Table 1.2 - Relevant Development Consent Conditions for Mt Owen (SSD 5850)

Mount Owen Continued Operations (SSD 5850)	Condition	Relevant Section of Plan																														
Condition 27. Biodiversity Offset Strategy	<p>The Applicant must implement the Biodiversity Offset Strategy described in the EIS, summarised in Table 9 and shown conceptually in either Appendix 5 and 7.</p> <p><i>Table 9: Summary of the Biodiversity Offset Strategy</i></p> <table> <tr> <th>Area</th><th>Offset Name ^a</th><th>Size hectares (ha)</th></tr> <tr> <td rowspan="5">On-site Offsets</td><td>Northwest Offset</td><td>71.4</td></tr> <tr> <td>Northeast Offset</td><td>83.6</td></tr> <tr> <td>Southeast Offset</td><td>58.3</td></tr> <tr> <td>Forest East Offset</td><td>110.9</td></tr> <tr> <td>Southeast Corridor Offset</td><td>74.1</td></tr> <tr> <td rowspan="6">Off-site Offsets</td><td>Southern Remnant Offset</td><td>4.0</td></tr> <tr> <td>Cross Creek Offset</td><td>367.0</td></tr> <tr> <td>Stringybark Creek Habitat Corridor Offset</td><td>97.5</td></tr> <tr> <td>Rehabilitation Woodland</td><td>518.0</td></tr> <tr> <td>Esparanga Offset</td><td>303.0</td></tr> <tr> <td>Mitchell Hills Offset</td><td>143.7</td></tr> <tr> <td colspan="2">Total Area</td><td>1831.5</td></tr> </table> <p>^a To identify the areas referred to in Table 9, see the applicable figures in Appendices 5 and 7.</p>	Area	Offset Name ^a	Size hectares (ha)	On-site Offsets	Northwest Offset	71.4	Northeast Offset	83.6	Southeast Offset	58.3	Forest East Offset	110.9	Southeast Corridor Offset	74.1	Off-site Offsets	Southern Remnant Offset	4.0	Cross Creek Offset	367.0	Stringybark Creek Habitat Corridor Offset	97.5	Rehabilitation Woodland	518.0	Esparanga Offset	303.0	Mitchell Hills Offset	143.7	Total Area		1831.5	Section 1.7
Area	Offset Name ^a	Size hectares (ha)																														
On-site Offsets	Northwest Offset	71.4																														
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	Esparanga Offset	303.0																														
	Mitchell Hills Offset	143.7																														
Total Area		1831.5																														
Condition 27A. Biodiversity Offset Strategy	The Applicant must rehabilitate the Rehabilitation Woodland offset area required in Table 9 above to a level that meets the ECC listing criteria for the Central Hunter Ironbark – Spotted Gum – Grey Box Forest EEC.	Section 1.7																														

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Mount Owen Continued Operations (SSD 5850)	Condition	Relevant Section of Plan
Condition 28. Threatened Species	The Applicant must ensure that the Biodiversity Offset Strategy summarised in Table 9 and the Rehabilitation Strategy for the development focus on the regeneration, enhancement and/or re-establishment of: <ul style="list-style-type: none"> a) significant and/or threatened flora communities, including: <ul style="list-style-type: none"> • Central Hunter Grey Box — Ironbark Woodland EEC; and • Central Hunter Ironbark — Spotted Gum — Grey Box Forest EEC 	Section 4.8.3
	(b) habitat and/or foraging resources for other significant and/or threatened flora and fauna species, including: <ul style="list-style-type: none"> • Spotted-Tailed Quoll; • Squirrel Glider; • Koala; • New Holland Mouse; • Grey-Headed Flying-Fox; • Yellow-Bellied Sheath-tail-Bat; • East-Coast Freetail Bat; • Large-Eared Pied Bat; • Eastern Bentwing-Bat; • Little Bentwing-Bat; • Southern Myotis; • Greater Broadnosed-Bat; • Green and Golden Bell frog; 	Section 4.8.4
Condition 29A Mod 2 Biodiversity Offset Strategy	Within 12 months of commencing mining operations in the Mod 2 disturbance area, unless otherwise agreed by the Secretary, the Applicant must provide a Mod 2 Biodiversity Offset Strategy for approval by the Secretary. This strategy must: <ul style="list-style-type: none"> (a) recalculate, if necessary, in accordance with the BC Act, the number of credits required under condition 29B of Schedule 3; (b) describe how the biodiversity credits in Table 9A (or as recalculated) will be identified, secured and retired; and (c) be prepared in accordance with the <i>NSW Biodiversity Offset Policy for Major Projects</i> and to the satisfaction of BCD. 	Section 1.8
Condition 29B Mod 2 Biodiversity Offset Strategy	Within 24 months of commencing mining operations in the Mod 2 disturbance area, unless otherwise agreed by the Secretary, the Applicant must retire the biodiversity credits specified in Table 9A below (or the equivalent number of credits calculated in accordance with the BC Act) as set out in the Mod 2 Biodiversity Offset Strategy.	Section 1.8

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	<p><i>Table 9A: Biodiversity credit requirements</i></p> <table><tr><th>Credit Type</th><th>Credits Required</th></tr><tr><td colspan="2"><i>Ecosystem Credits</i></td></tr><tr><td>HU815 – Spotted Gum – Narrow-leaved Ironbark – Red Ironbark Shrub – Grass Open Forest Slopes of the Central and Lower Hunter</td><td>984</td></tr><tr><td>HU906 – Bull Oak Grassy Woodland of the Central Hunter Valley</td><td>66</td></tr><tr><td>HU945 – Swamp Oak – Weeping Grass Grassy Riparian Forest of the Hunter Valley</td><td>12</td></tr><tr><td colspan="2"><i>Species Credits</i></td></tr><tr><td>Brush-tailed Phascogale</td><td>177</td></tr></table> <p><i>Note: The credits in Table 9A were calculated in accordance with Framework for Biodiversity Assessment of the NSW Biodiversity Offset Policy for Major Projects (OEH, 2014) and may need to be converted to reasonably equivalent 'biodiversity credits', within the meaning of the BC Act, to facilitate retirement.</i></p> <p><i>Table 9A: Biodiversity credit requirements</i></p> <table><tr><th>Credit Type</th><th>Credits Required</th></tr><tr><td colspan="2"><i>Ecosystem Credits</i></td></tr><tr><td>HU815 – Spotted Gum – Narrow-leaved Ironbark – Red Ironbark Shrub – Grass Open Forest Slopes of the Central and Lower Hunter</td><td>984</td></tr><tr><td>HU906 – Bull Oak Grassy Woodland of the Central Hunter Valley</td><td>66</td></tr><tr><td>HU945 – Swamp Oak – Weeping Grass Grassy Riparian Forest of the Hunter Valley</td><td>12</td></tr><tr><td colspan="2"><i>Species Credits</i></td></tr><tr><td>Brush-tailed Phascogale</td><td>177</td></tr></table> <p><i>Note: The credits in Table 9A were calculated in accordance with Framework for Biodiversity Assessment of the NSW Biodiversity Offset Policy for Major Projects (OEH, 2014) and may need to be converted to reasonably equivalent 'biodiversity credits', within the meaning of the BC Act, to facilitate retirement.</i></p> <p>The retirement of the biodiversity credits specified in Table 9A must be carried out in accordance with the Biodiversity Offsets Scheme of the BC Act, to the satisfaction of the BCT.</p>	Credit Type	Credits Required	<i>Ecosystem Credits</i>		HU815 – Spotted Gum – Narrow-leaved Ironbark – Red Ironbark Shrub – Grass Open Forest Slopes of the Central and Lower Hunter	984	HU906 – Bull Oak Grassy Woodland of the Central Hunter Valley	66	HU945 – Swamp Oak – Weeping Grass Grassy Riparian Forest of the Hunter Valley	12	<i>Species Credits</i>		Brush-tailed Phascogale	177	Credit Type	Credits Required	<i>Ecosystem Credits</i>		HU815 – Spotted Gum – Narrow-leaved Ironbark – Red Ironbark Shrub – Grass Open Forest Slopes of the Central and Lower Hunter	984	HU906 – Bull Oak Grassy Woodland of the Central Hunter Valley	66	HU945 – Swamp Oak – Weeping Grass Grassy Riparian Forest of the Hunter Valley	12	<i>Species Credits</i>		Brush-tailed Phascogale	177	
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Condition 29C. Mod 5 Biodiversity Offset Strategy	Within 12 months of the determination of Mod 5, unless otherwise agreed by the Secretary, the Applicant must retire the biodiversity credits specified in Table 9B below. The retirement of the biodiversity credits specified in Table 9B must be carried out in accordance with the Biodiversity Offsets Scheme of the BC Act, to the satisfaction of the BCT.	Section 1.10																												

Mount Owen Continued Operations (SSD 5850)	Condition	Relevant Section of Plan																												
	<p>Table 9B: Biodiversity credit requirements (Mod 5)</p> <table><tr><th>Biodiversity Credit Type</th><th>Credits Required</th></tr><tr><td colspan="2">Ecosystem Credits</td></tr><tr><td>PCT 1601 Spotted Gum - Narrow-leaved Ironbark shrub – Red Ironbark shrub - grass open forest of the central and lower Hunter Moderate</td><td>193</td></tr><tr><td>PCT 1601 Spotted Gum - Narrow-leaved Ironbark shrub – Red Ironbark shrub - grass open forest of the central and lower Hunter Regenerating</td><td>2</td></tr><tr><td>PCT 1598 Forest Red Gum grassy open forest on floodplains of the lower Hunter Moderate</td><td>2</td></tr><tr><td colspan="2">Species Credits</td></tr><tr><td>Squirrel Glider (Petaurus norfolcensis)</td><td>197</td></tr></table> <p>Table 9B: Biodiversity credit requirements (Mod 5)</p> <table><tr><th>Biodiversity Credit Type</th><th>Credits Required</th></tr><tr><td colspan="2">Ecosystem Credits</td></tr><tr><td>PCT 1601 Spotted Gum - Narrow-leaved Ironbark shrub – Red Ironbark shrub - grass open forest of the central and lower Hunter Moderate</td><td>193</td></tr><tr><td>PCT 1601 Spotted Gum - Narrow-leaved Ironbark shrub – Red Ironbark shrub - grass open forest of the central and lower Hunter Regenerating</td><td>2</td></tr><tr><td>PCT 1598 Forest Red Gum grassy open forest on floodplains of the lower Hunter Moderate</td><td>2</td></tr><tr><td colspan="2">Species Credits</td></tr><tr><td>Squirrel Glider (Petaurus norfolcensis)</td><td>197</td></tr></table>	Biodiversity Credit Type	Credits Required	Ecosystem Credits		PCT 1601 Spotted Gum - Narrow-leaved Ironbark shrub – Red Ironbark shrub - grass open forest of the central and lower Hunter Moderate	193	PCT 1601 Spotted Gum - Narrow-leaved Ironbark shrub – Red Ironbark shrub - grass open forest of the central and lower Hunter Regenerating	2	PCT 1598 Forest Red Gum grassy open forest on floodplains of the lower Hunter Moderate	2	Species Credits		Squirrel Glider (Petaurus norfolcensis)	197	Biodiversity Credit Type	Credits Required	Ecosystem Credits		PCT 1601 Spotted Gum - Narrow-leaved Ironbark shrub – Red Ironbark shrub - grass open forest of the central and lower Hunter Moderate	193	PCT 1601 Spotted Gum - Narrow-leaved Ironbark shrub – Red Ironbark shrub - grass open forest of the central and lower Hunter Regenerating	2	PCT 1598 Forest Red Gum grassy open forest on floodplains of the lower Hunter Moderate	2	Species Credits		Squirrel Glider (Petaurus norfolcensis)	197	
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Condition 29D. Mod 6 Biodiversity Offset Strategy	<p>Within 12 months of the determination of Mod 6, unless otherwise agreed by the Secretary, the Applicant must retire the biodiversity credits specified in Table 9C below. The retirement of the biodiversity credits specified in Table 9C must be carried out in accordance with the Biodiversity Offsets Scheme of the BC Act, to the satisfaction of the BCT.</p> <p>Table 9C: Biodiversity credit requirements (Mod 6)</p> <table><tr><th>Biodiversity Credit Type</th><th>Credits Required</th></tr><tr><td colspan="2">Ecosystem Credits</td></tr><tr><td>PCT 1604 Narrow-leaved Ironbark – Grey Box – Spotted Gum shrub-grass woodland of the central and lower Hunter</td><td>23</td></tr><tr><td>PCT 1603 Narrow- leaved Ironbark – Bull Oak – Grey Box shrub-grass woodland of the central and lower Hunter Derived Native Grassland Variant</td><td>7</td></tr><tr><td colspan="2">Species Credits</td></tr><tr><td>Eastern Cave Bat (Vespadelus troughtoni)</td><td>34</td></tr></table>	Biodiversity Credit Type	Credits Required	Ecosystem Credits		PCT 1604 Narrow-leaved Ironbark – Grey Box – Spotted Gum shrub-grass woodland of the central and lower Hunter	23	PCT 1603 Narrow- leaved Ironbark – Bull Oak – Grey Box shrub-grass woodland of the central and lower Hunter Derived Native Grassland Variant	7	Species Credits		Eastern Cave Bat (Vespadelus troughtoni)	34	Section 1.11																
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Condition 30. Compensatory Planting	<p>The Applicant must plant and maintain, until established, 10 River Oak trees for every established River Oak tree removed during construction of the Greater Ravensworth tailings management infrastructure.</p> <p>Notes:</p> <ul style="list-style-type: none">An established River Oak tree is considered to be two metres or greater in height.	Section 3.2.2																												

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Mount Owen Continued Operations (SSD 5850)	Condition	Relevant Section of Plan
	<ul style="list-style-type: none"> The Greater Ravensworth tailings management infrastructure is shown in Appendix 2. 	
Condition 30A. Water Pipeline Infrastructure	30A. During construction of the water pipeline infrastructure, the Applicant must implement the mitigation and management measures specified in EA (Mod 1) (including avoiding disturbance of stags, hollow bearing trees and the Bettys Creek Habitat Management Area) and SEE (Mod 6) (including the measures to avoid and minimise impacts to items of Aboriginal and historic heritage).	Section 3.1 Section 3.2.2
Condition 31. Biodiversity Management Plan	The Applicant must prepare a Biodiversity Management Plan for the development to the satisfaction of the Secretary. This plan must:	Section 1.6
	(a) be prepared in consultation with BCD, and submitted to the Secretary for approval prior to the commencement of development under this consent, unless the Secretary agrees otherwise;	
	(b) describe the short, medium, and long term measures that would be undertaken to:	Section 3 Section 4
	<ul style="list-style-type: none"> manage the remnant vegetation and fauna habitat on the site and in the offset areas (see Table 9); implement the Biodiversity Offset Strategies; minimise the impacts of the development on threatened species, in particular those listed in condition 28 above, and where appropriate, enhance available habitat for and support the recovery of these species on the site; and integrate the implementation of the Biodiversity Offset Strategies to the greatest extent practicable with the rehabilitation of the Mount Owen Complex and any conservation activities being undertaken in the Ravensworth State Forest and New Forest Area; 	Section 1.7 Section 3.1 Section 1.7
	(c) include detailed performance and completion criteria for evaluating the performance of the Biodiversity Offset Strategies and include triggers for remedial action, where these performance or completion criteria are not met;	Section 6 Appendix D
	(d) include a final location for the Rehabilitated Woodland offset area (see Table 9) within 5 years (or such other period as agreed by the Secretary) of the commencement of development under this consent;	TBD
	(e) include a detailed description of the measures that would be implemented to:	Section 3.2.4 Section 4.1 Section 4.8.4
	<ul style="list-style-type: none"> enhance the quality of existing vegetation, connectivity and fauna habitat on the site, within the East-West Corridor Management Area (see Figure 7B in Appendix 7) and in the biodiversity offset areas, including through the assisted revegetation and/or targeted revegetation of appropriate canopy, sub-canopy, understorey and ground strata; introduce naturally scarce fauna habitat features such as den structures, nest boxes and salvaged tree hollows, where appropriate and with a particular focus on the regenerated and rehabilitated 	Section 3.2 Section 4.1

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Mount Owen Continued Operations (SSD 5850)	Condition	Relevant Section of Plan
	woodland areas, and use all reasonable and feasible efforts to promote the use of these introduced habitat features by threatened fauna species;	
	<ul style="list-style-type: none"> maximise the salvage of resources within the approved disturbance area – including tree hollows, vegetative and soil resources – for beneficial reuse in the enhancement of the rehabilitation woodland areas and, where practicable, the biodiversity offset areas; 	Section 3.1.2 Section 4.1
	<ul style="list-style-type: none"> manage any potential conflicts between regeneration and restoration works in the biodiversity offset areas and the East-West Corridor Management Area, and any Aboriginal heritage values (both cultural and archaeological) in these areas; 	Section 3.2.4 Section 4.8.5
	<ul style="list-style-type: none"> manage the collection and propagation of seed; 	Section 3.4
	<ul style="list-style-type: none"> protect vegetation and fauna habitat outside the approved disturbance area on-site; 	Section 3.1
	<ul style="list-style-type: none"> minimise the impacts on fauna on site, including undertaking pre-clearance surveys; 	Section 3.1.1
	<ul style="list-style-type: none"> provide for the salvage, transplanting and/or propagation of any threatened flora (including, but not limited to, threatened orchid species) found during pre-clearance surveys, in accordance with the Guidelines for the Translocation of Threatened Plants in Australia (Vallee <i>et al.</i> 2004); 	Section 3.1.2
	<ul style="list-style-type: none"> avoid and mitigate the spread of noxious weeds; 	Section 3.1.4
	<ul style="list-style-type: none"> control weeds and feral pests, including but not limited to goats, rabbits, red fox, cats and pigs, with consideration of actions identified in relevant threat abatement plans; 	Section 3.1.5 Section 4.3
	<ul style="list-style-type: none"> control erosion on the site and in the biodiversity offset areas; 	Section 3.1.6 Section 4.6
	<ul style="list-style-type: none"> manage any grazing and agriculture on the site or in the biodiversity offset areas; 	Section 4.4
	<ul style="list-style-type: none"> control access to the site and the biodiversity offset areas; 	Section 3.1.3 Section 4.5
	<ul style="list-style-type: none"> manage bushfire hazards on the site and in the biodiversity offset areas; and 	Section 3.3 Section 4.7
	<ul style="list-style-type: none"> rehabilitate any sections or parts of creeks and drainage lines that are impacted by the development (both inside and outside the approved disturbance area); 	Section 3.5
	(e1) include a detailed description of the measures and procedures to be implemented to:	Section 3.1 Section 3.2.2

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Mount Owen Continued Operations (SSD 5850)	Condition	Relevant Section of Plan
	<ul style="list-style-type: none"> minimise, to the greatest extent practicable, the disturbance of threatened species and EECs, and rehabilitate any areas of disturbed land associated with the construction of the water pipeline infrastructure [described in the MOCO MOD 1 EA]; and satisfy the requirements of conditions 30 and 30A of Schedule 3 	
	(f) include details of the proactive measures and completion criteria proposed to manage the impacts of the development on habitat connectivity, with particular reference to the resilience, width and function of woodland corridors and specific measures to prioritise supplementary planting activities in the Southeastern Corridor Offset during Year 1 of the development;	Section 4.1.2 Appendix D – Table D.3
	(g) include a strategy for the regeneration of woodland areas within the offset areas (see Table 9), including details of: <ul style="list-style-type: none"> the level of direct management required to achieve the target woodland community at each offset area; periodic targets for the regeneration of woodland communities; trigger levels where additional management activities (such as weed management and direct seeding or planting of underrepresented species) would be required; and any specific controls or management activities required to ensure this regeneration is trending towards the target communities. 	Section 4.8.3 Appendix E – Table E.3 Section 7 Section 7 Appendix E – Table E.3
	(h) include a seasonally-based program to monitor and report on the effectiveness of the above measures (including the use of anthropogenic habitat features by native and threatened fauna), the progress against the detailed performance and completion criteria, and any progressive improvements that could be implemented to improve biodiversity outcomes	Section 5 Appendix C
	(i) include measures to report on the results of the monitoring activities required under paragraph (h) above, to facilitate shared learnings and research into the application of regeneration and rehabilitation techniques and methods for EECs and native vegetation in the Hunter Valley;	Section 8
	(j) monitor and report on the impacts of the development on groundwater dependent ecosystems and riparian vegetation (having regard to the requirements of the Groundwater Management Plan and focusing on areas that are likely to experience a greater than negligible impact as a result of the development) and identify trigger levels for the remediation of material impacts to these ecosystems;	Section 0
	(k) report on the effectiveness of the above measures against the periodic performance and completion criteria, as part of the annual review referred to in condition 5 of Schedule 5;	Section 8.3 Appendix D
	(l) identify the potential risks to the successful implementation of the Biodiversity Offset Strategies, and include a description of the contingency measures that would be implemented to mitigate against these risks, including provision for alternative direct and/or supplementary offset measures where regeneration of EECs and/or	Section 7

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Mount Owen Continued Operations (SSD 5850)	Condition	Relevant Section of Plan
	the propagation/translocation of threatened flora do not meet the performance and completion criteria; and	
	(m) include details of who would be responsible for monitoring, reviewing, and implementing the plan.	Section 10
	The Applicant must implement the approved Biodiversity Management Plan as approved from time to time by the Secretary.	Section 8
Project Commitments Register	Mount Owen will incorporate the relevant strategies from the existing Mount Owen Complex Flora and Fauna Management Plan in the revised and consolidated Landscape Management Plan within 12 months of Project approval. These strategies will include: <ul style="list-style-type: none"> feral animal and weed control; rehabilitation of disturbed areas with species characteristic of extant vegetation communities; use of native species in revegetation, and the linkage and integration of rehabilitation areas with existing vegetated areas to improve ecological function and provide appropriate fauna habitat, except in areas identified for improved pasture; management of erosion and sedimentation to minimise impacts on adjoining vegetation communities and aquatic systems; adaptive management, as required, if a previously unrecorded or assessed threatened species is identified in the Proposed Disturbance Area during operations; ongoing monitoring and maintenance of revegetation works and habitat enhancement activities; and an adaptive approach to ongoing monitoring of native flora and fauna. 	Section 3.1 Section 3.6 and 4.8 Section 3.6 and 4.8 Section 3.1.6 and 4.6 Section 8.4 Section 5 Section 8.4
	The following fauna re-instatement strategies will be implemented: <ul style="list-style-type: none"> the re-establishment of ground fauna habitat through the relocation of cleared vegetation and rocks in targeted rehabilitation areas, where practicable; installation of supplementary arboreal habitat, such as nest boxes, once rehabilitated vegetation communities are of sufficient maturity; and the retention or augmentation of dams in the post-mining landform to facilitate the re-colonisation of woodland fauna communities, subject to licencing requirements. 	Section 3.1.3, 3.2, 4.1 Section 3.2.1 and 4.1.1 Section 3.6
	In the event that any threatened flora species or populations are identified within the proposed disturbance footprint, the suitability of salvage, translocation, or propagation to minimise the impacts on these species would be implemented, where feasible.	Section 3.1.2
	The Biodiversity Management Plan will be updated to include the management plan revisions identified in Table 3.6 of the Response to Submissions Report B.	Throughout
	Mount Owen will implement a comprehensive Biodiversity Offset Strategy for the Project which includes the long-term conservation of the following land-based offset areas: <ul style="list-style-type: none"> Cross Creek Biodiversity Offset Area approximately 367 hectares (located adjacent to the existing Mount Owen Biodiversity Offset Areas); Stringybark Creek Habitat Corridor (approximately 97.5 hectares); 	Section 2.2

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Mount Owen Continued Operations (SSD 5850)	Condition	Relevant Section of Plan
	<ul style="list-style-type: none"> Mitchell Hills Offset Area (approximately 144 hectares) and Esparanga Biodiversity Offset Area approximately 303 hectares (located in a priority conservation area within the Great Eastern Ranges in the Manobalai Region). 	
	<p>To assist with the persistence of the Spotted-tailed quoll, Mount Owen will implement the following habitat enhancement measures within the Stringybark Creek Habitat Corridor:</p> <ul style="list-style-type: none"> salvage of trees felled during construction works and emplacement within the Stringybark Creek Habitat Corridor as log piles for potential denning habitat; and salvage and placement of large rocks and boulders into piles as further potential denning habitat. 	Section 4.1
	<p>The management actions to be undertaken at each Biodiversity Offset Site (including Stringybark Creek Habitat Corridor) include:</p> <ul style="list-style-type: none"> targeted weed removal using techniques including both spraying and/or manual removal – initiated in year 1, then continued on an as needs basis; targeted pest control program on an annual basis; a mix of passive and active regeneration and assisted revegetation works, including preparation of soil and re-planting areas of DNG with locally sourced tube stock where regeneration activities show poor results or are considered unlikely to deliver effective results without intervention; erection and upkeep of fencing and appropriate signage and maintaining fire trails around the perimeter of the property. 	Section 4
	Mount Owen will implement mine rehabilitation which will provide native vegetation communities and fauna habitat augmentation.	Section 3.6
	Mount Owen will establish the East-West Corridor Management Area (refer to Figure 4.3 of the Response to PAC Review Report) to maintain habitat connectivity.	Section 3.2.4
	Mount Owen will undertake additional revegetation works in the Additional Active Revegetation Area located in the South East Corridor Offset (refer to Figure 4.3 of the Response to PAC Review Report) commencing within 12 months of Project.	Section 4.1.2
	Results of the ecological monitoring program will be reported in the Annual Review and be made available on the Glencore Australia website.	Section 8

Table 1.3 – Relevant Development Consent Conditions for Glendell Mine DA 80/952

Glendell Mine (DA 80/952)	Condition	Relevant Section of Plan
Condition 36. Offset Strategy	The Applicant must:	Section 1.7 Section 4.8.3

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Glendell Mine (DA 80/952)	Condition	Relevant Section of Plan																
	<p>(a) (a) implement the Offset Strategy described in the EA (Mod 2), EA (Mod 3) and summarised in Table 14 (shown conceptually in Appendix 5); and</p> <p>(b) (b) make suitable arrangements to provide appropriate long term security for the offset area to the satisfaction of the Secretary.</p> <div><p>Table 14: Offset Strategy</p><table><tr><th>Offset Area</th><th>Minimum Size</th></tr><tr><td>Bettys Creek Habitat Management Area</td><td>174 ha</td></tr></table></div> <p>The Offset Strategy must contain specific measures to adequately offset the development’s net impact on significant plant communities, including:</p> <ul style="list-style-type: none">• Bulloak Forest;• Swamp Oak Forest; and• Box-Ironbark Woodland.	Offset Area	Minimum Size	Bettys Creek Habitat Management Area	174 ha													
Offset Area	Minimum Size																	
Bettys Creek Habitat Management Area	174 ha																	
Condition 36A Biodiversity Credits Required	<p>Within 6 months of the approval of Modification 4, or other timeframe agreed by the Secretary, the Applicant must retire the biodiversity credits specified in Table 12 below.</p> <div><p>Table 12: Biodiversity credit requirements</p><table><tr><th>Credit Type</th><th>Credits Required</th></tr><tr><td>Ecosystem Credits</td><td></td></tr><tr><td>PCT1692 Bull Oak grassy woodland of the central Hunter Valley - <i>Regeneration</i></td><td>21</td></tr><tr><td>PCT1691 Narrow-leaved Ironbark – Grey Box grassy woodland of the central and upper Hunter-Derived Native Grassland</td><td>88</td></tr></table></div> <div><p>Table 12: Biodiversity credit requirements</p><table><tr><th>Credit Type</th><th>Credits Required</th></tr><tr><td>Ecosystem Credits</td><td></td></tr><tr><td>PCT1692 Bull Oak grassy woodland of the central Hunter Valley - <i>Regeneration</i></td><td>21</td></tr><tr><td>PCT1691 Narrow-leaved Ironbark – Grey Box grassy woodland of the central and upper Hunter-Derived Native Grassland</td><td>88</td></tr></table></div>	Credit Type	Credits Required	Ecosystem Credits		PCT1692 Bull Oak grassy woodland of the central Hunter Valley - <i>Regeneration</i>	21	PCT1691 Narrow-leaved Ironbark – Grey Box grassy woodland of the central and upper Hunter-Derived Native Grassland	88	Credit Type	Credits Required	Ecosystem Credits		PCT1692 Bull Oak grassy woodland of the central Hunter Valley - <i>Regeneration</i>	21	PCT1691 Narrow-leaved Ironbark – Grey Box grassy woodland of the central and upper Hunter-Derived Native Grassland	88	Section 1.9
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Condition 36A Biodiversity Credits Required	<p>The retirement of the biodiversity credits specified in Table 12 must be carried out in accordance with the Biodiversity Offsets Scheme of the BC Act, to the satisfaction of the BCT.</p>																	
Condition 37B. Pre-clearance Survey	<p>Prior to commencing any surface disturbance related to construction or maintenance of the realigned transmission line, including for service roads, the Applicant must ensure that a pre-clearance threatened species survey is undertaken by a suitably qualified expert.</p> <p>If any additional threatened species, which may be adversely affected by the realigned transmission line, are identified during the pre-clearance survey, the Applicant must not undertake any associated surface disturbance until suitable offsets have been provided in accordance with OEH’s NSW Biodiversity Offsets Policy for Major Projects (2016), to the satisfaction of the Secretary.</p>	Section 3.1.2																
Condition 37C. Revegetation and Compensatory Planting	<p>The Applicant must:</p> <p>(a) plant and maintain, until established, 10 River Oak trees for every established River Oak tree that is removed or severely damaged</p>	Section 3.2 Section 3.5																

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Glendell Mine (DA 80/952)	Condition	Relevant Section of Plan
	<p>during construction and maintenance of the realigned transmission line;</p> <p>(b) erect 2 nesting boxes for every identified tree hollow that is removed or severely damaged during the construction and maintenance of the realigned transmission line; and</p> <p>(c) replant or naturally regenerate, with a suitable mix of canopy, mid-storey and groundcover species, any temporarily cleared vegetation for the realigned transmission line that is classified as Swamp Oak Forest or River Oak Forest,</p> <p>to the satisfaction of the Secretary.</p> <p><i>Notes:</i></p> <ul style="list-style-type: none"> <i>An established River Oak tree is considered to be two metres or greater in height.</i> <i>A severely damaged tree is considered to be one that is lopped to the extent that half or more of the crown biomass is lost.</i> 	
Condition 39. Landscape Management Plan	<p>The Applicant must prepare a detailed Landscape Management Plan for all land disturbed by the development to the satisfaction of the Resources Regulator and Secretary. This plan must:</p> <p>a) be prepared in consultation with EPA, DPIE Water, DRG, BCD and Council by suitably qualified expert/s whose appointment/s have been approved by the Secretary;</p>	Section 1.6
Condition 40. Rehabilitation and Offset Management Plan	<p>The Rehabilitation and Offset Management Plan must include:</p> <p>(a) the objectives for rehabilitation of the site and offset area;</p>	<p>RMP</p> <p>Section 3.6</p> <p>Section 4.6</p>
	<p>(b) a detailed description of how the rehabilitation of the site and implementation of the Offset Strategy would be integrated with the rehabilitation and offset strategies of the Mt Owen, Ravensworth East and Ashton mines to ensure there is a comprehensive strategic framework for the restoration and enhancement of the landscape over time;</p>	<p>RMP</p> <p>Section 3.2.4</p> <p>Section 3.6</p> <p>Section 4.8</p>
	<p>(c) a description of the short, medium, and long term measures that would be implemented to:</p> <ul style="list-style-type: none"> rehabilitate the site; implement the Offset Strategy; manage the remnant vegetation and habitat on the site and in the offset areas; maximise effective linkages to the offset areas at Mt Owen, Ravensworth East and Ashton mines; and implement the New England Highway tree screens; <p>(d) detailed performance and completion criteria for the rehabilitation of the site and implementation of the Offset Strategy and New England Highway tree screens;</p> <p>(e) a detailed description of how the performance of the rehabilitation of the mine, the offset areas and the New England Highway tree</p>	<p>Section 3.6</p> <p>Section 1.7</p> <p>Section 3 and 4</p> <p>Section 4.8 and 3.2.4</p> <p>Section 6 Appendix E</p> <p>Section 5</p>

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Glendell Mine (DA 80/952)	Condition	Relevant Section of Plan
	screens would be monitored over time to achieve the stated objectives;	
	<p>(f) a detailed description of what measures would be implemented over the next 3 years to rehabilitate the site, and implement both the Offset Strategy and tree screens along the New England Highway including the procedures to be implemented for:</p> <ul style="list-style-type: none"> progressively rehabilitating areas disturbed by mining; implementing revegetation and regeneration within the disturbance areas and offset areas, including establishment of canopy, sub-canopy (if relevant), understorey and ground strata; reducing the visual impacts of the development; protecting areas outside the disturbance areas; rehabilitating creeks and drainage lines on the site, to ensure no net loss of stream length and aquatic habitat; undertaking pre-clearance surveys; managing impacts on fauna; landscaping the site to minimise visual impacts; conserving and reusing topsoil; collecting and propagating seed for rehabilitation works; salvaging and reusing material from the site for habitat enhancement; controlling weeds and feral pests; controlling access; bushfire management; and managing any potential conflicts between the offset strategy and Aboriginal cultural heritage 	Section 3
	(g) a description of the potential risks to successful rehabilitation and/or revegetation, and a description of the contingency measures that would be implemented to mitigate these risks;	Section 7
	(h) details of who is responsible for monitoring, reviewing, and implementing the plan;	Section 10
	(i) a description of riparian revegetation and maintenance works associated with EA (Mod 3), that have been prepared generally in accordance with DPI Water's Guidelines for Controlled Activities on Waterfront Land; and	Section 3.5
	(j) a description of revegetation and rehabilitation measures that would be implemented during the construction and maintenance of the realigned transmission line.	Section 3.6
Appendix 3: Statement of Commitments	1.11.3. The Applicant will establish a Habitat Management Area in the south-eastern extent of Glendell Mine site. Existing vegetation within the Habitat Management Area will be augmented through protection, regeneration and revegetation practices. Specific vegetation augmentation techniques will be	Section 2.2 and 4.8

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Glendell Mine (DA 80/952)	Condition	Relevant Section of Plan
	outlined in a Biodiversity and Land Management Plan developed for the Glendell Mine site.	
	1.11.4. The Applicant will develop and implement a Biodiversity and Land Management Plan for Glendell Mine specifying ecological management and monitoring measures consistent with the principles of the Mt Owen Complex Flora and Fauna Management Plan, where relevant.	Section 3
	2.1.1. The Applicant will undertake a threatened species survey by a relevantly qualified person prior to commencing any disturbance related construction works for the realigned transmission line. Any additional threatened species identified during the pre-clearance survey will be suitably offset in accordance with OEH's NSW Biodiversity Offsets Policy for Major Projects (2016).	Section 3.1.2
	2.1.2. Field identification of the <i>Acacia pendula</i> and <i>Eucalyptus camaldulensis</i> adjacent to the southern existing track will be undertaken by an appropriately qualified person prior to any transmission line relocation works, if any works are to be undertaken in the immediate vicinity of this area.	Section 3.1.2
	2.1.3. The Applicant will conduct a due diligence assessment of each mature River Oak tree to be lopped, prior to disturbance. For any mature River Oak tree that is lopped, ten (10) trees will be planted; and two (2) nesting boxes will be erected for any tree hollow identified.	Section 3.1.2
	2.1.4. Any tree lopping required along Bowmans Creek and Swamp Creek in the riparian zone will be undertaken manually with chainsaws to allow the root structures to remain in situ.	Section 3.1.2
	2.1.6. The Applicant will update the Biodiversity Management Plan to include appropriate riparian revegetation works and the incorporation of the 4 ha area to be managed by the Applicant, consistent with the commitments of the adjacent Habitat Management Area.	Section 3.5

1.5 GCAA Requirements

Glencore Coal Assets Australia (GCAA) Operations requires that all sites meet the requirements of Glencore HSEC Policies and Standards, State and Commonwealth Approval conditions, legal and statutory obligations and relevant industry guidelines relating to the establishment of biodiversity objectives, conservation outcomes and monitoring programs.

1.6 Consultation with External Stakeholders

A copy of this document was submitted to the NSW Office of Environment and Heritage (OEH) for review on 13th January 2017. Comments from OEH were incorporated into the final document and resubmitted to OEH for information.

The final draft of the current revision of the BOMPS (previous BOMP) was submitted to the Department of Planning and Environment (DP&E) in January 2017. Comments were received from DP&E on 11th April 2017.

As specifically required for the Glendell Mine consent condition 39 (DA 80/952), copies of the BOMP have also been sent to the NSW Environment Protection Authority (EPA), NSW Office of Water and NSW Department of Primary Industries (DPI).

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Following approval of MOCO MOD 2, the BOMPS was updated and submitted to DPIE on 4 December 2019. The approval of the plan by DPIE, however was put on hold in anticipation of impending approvals for MOCO MOD 3 (approved 30 January 2020), and Glendell MOD 4 (approved 4 March 2020). Following these approvals an updated version of the BOMPS was submitted to DPIE in September 2020 for review. This version was subsequently placed on hold until MOCO MOD5 was determined. MOCO Mod 5 was approved 15 January 2021 respectively, see Error! Reference source not found. for consultation with DPIE regarding this. Following the receipt of these approvals, the BOMPs has been reviewed and updated where required, in consultation with BCD. A copy of the correspondence received from BCD is attached in Error! Reference source not found. and **Table 1.4** includes a summary of the recommendations received from BCD and where these have been addressed in this Plan.

Table 1.4 – BCD Consultation - DOC20/429018-2 - SSD 5850 PA-18

BCD Recommendations	MGO Response	Reference
1- BCD recommends that the Table of Contents is revised to include the titles and page numbers of figures and tables in the BOMPS.	List of figures and tables were included in the table of contents.	List of Figures and Tables.
2- BCD recommends that a 'Site Biodiversity Offset Map' is added to the BOMPS.	'MGO Offset Map' and 'Site Biodiversity Map' were included on Figure 1.1 and Figure 1.2 respectively.	Figure 1 Figure 1.2
3 - BCD recommends that changes are made to the colour ramp in the vegetation communities map, Figure 2.1, to make it easier for the reader to identify each vegetation community shown.	'Vegetation communities map' Figure 2.1 , were updated to identify each vegetation community shown.	Figure 2.1
4 - BCD recommends that actions to manage biodiversity at the mine site are measured and quantified and reported in the Annual Review to show their effectiveness.	Section 6.4 Biodiversity and Land Management of the Annual Review contains information regarding how the management of biodiversity at the mine site are measured and quantified and reported in the Annual Review.	Refer to Section 6.4 Biodiversity and Land Management in the Annual Review (external document) approved by DPIE
5 - BCD recommends that plant species abundance is also measured in the monitoring plots and quadrats to obtain an indication of plant recruitment, establishment, or decline in the offset lands and analogue sites.	MGO updated Section 5.1.1.2 to include abundance rating. MGO notes that plant abundance is already measured as part of BAM monitoring.	Section 5.1.1.2
6 - BCD recommends that all BAM field data collected from the rehabilitation areas is provided on the Mount Owen Mine website.	Rehabilitation results are included in Section 8 of the Annual Review publicly available on the Glencore Australia website.	Refer to Section 8 Rehabilitation Monitoring included in Annual Review (external document) approved by DPIE
7- BCD recommends that Appendices C and D of the BOMPS includes tables that provide the site name, site type, eastings and northings and fauna box type to help demonstrate where these sites are located.	A tables providing the site name, site type, eastings and northings and fauna box type where included on Appendix C .	Appendix C -

The BOMPS was further reviewed following the approval of MOCO MOD 6, in consultation with BCD.

The revised BOMPS (including amendments for MOCO MOD6) was submitted and approved by DPIE on (TBD). A copy of the correspondence with external stakeholders is provided in **Appendix A**.

A copy of the DPIE approval of the BOMPS is provided in **Appendix B**.

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1.7 Implementation of the BOMPS

The implementation of the BOMPS will be undertaken in accordance with development consent conditions. It will be integrated with the rehabilitation of MGO and any conservation activities being undertaken in the adjoining Ravensworth State Forest (RSF) and New Forest Area.

The execution of this BOMPS will include the implementation of short, medium and long term measures for management of flora and fauna and the management of MGO and the BOAs as part of the continued operations at MGO. The management of existing BOAs at MGO is broadly guided by the conservation and enhancement strategy described in the MOCO EIS (refer to Section 5.7.8 of the EIS) (Umwelt, 2014). These are summarised in **Table 1.5**.

Table 1.5 - Short, Medium and Long-term Measures to Implement the BOMPS

Action	Short Tern	Medium Term	Long Term
	2019-2020	2020-2025	2025-2030
Implement the BOMPS	Prepare and gain approval of BOMPS prior to commencement of disturbance works.	Ongoing BOMPS implementation across MGO and BOAs. Ongoing review and improvement.	Ongoing review and improvement.
Integrate the BOMPS with the rehabilitation and conservation activities being undertaken in the adjoining Ravensworth State Forest and New Forest Area	Prepare and gain approval of BOMPS prior to commencement of disturbance works. Review approved BOMPS with other rehabilitation and conservation activities.	Improve and update rehabilitation and conservation activities in accordance with approved BOMPS.	Ongoing review and improvement.

1.8 MOCO MOD 2 Biodiversity Offset Strategy

In accordance with Schedule 3 Condition 29 of SSD-5850 and to address relevant legislative requirements as detailed within the *NSW Biodiversity Offsets Policy for Major Projects* (OEH, 2014) the required credits need to be converted to reasonably equivalent 'biodiversity credits', within the meaning of the *NSW Biodiversity Conservation Act 2016* (BC Act) so that the credits can be retired in accordance with the Biodiversity Offsets Scheme of the BC Act. An application for the assessment of reasonable equivalence of biodiversity credits was made to the DPIE on 30th of January 2020 in accordance with the *Biodiversity Conservation (Savings and Transitional) Regulation 2017* within 12 months of commencing mining operations in the MOD 2 disturbance area.

To address the relevant requirements of the *NSW Biodiversity Offsets Policy for Major Projects*, a combined MGO Biodiversity Offset Strategy (BOS) is being developed and will be submitted to DPIE for approval by 4th September 2021 (see **Section 1.12**). The MOD 2 BOS will be incorporated into the MGO BOS, which will include provisions to utilise one or a combination of the following offsetting options:

- Retirement of credits via the establishment of managed stewardship site established in accordance with Part 5 of the *Biodiversity Conservation Act 2016*;
- Purchase of credits through the open credit market; and/or

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- Payment to the Biodiversity Conservation Fund.

The total number of credits required to be retired is identified in **Table 1.2**. However, during the preparation of the MOD 2 BOS, MGO will review and recalculate, if necessary, the total number of credits required to be retired subject to the preferred offsetting options identified above.

The retirement of all biodiversity credits will be carried out in accordance with the Biodiversity Offsets Scheme of the BCT Act and **Section 1.12**, to the satisfaction of the BCT. Further detail, including a description of how credits will be retired, or recalculated will also be provided within the MOD 2 BOS, which will be implemented following approval by DPIE.

1.9 Glendell MOD 4 Biodiversity Offset Credits

In accordance with Schedule 3 Condition 36A of DA 80/952, within 6 months of the approval of Modification 4, or other timeframe agreed by the Secretary, MGO will retire the biodiversity credits specified in **Table 1.3** (Table 12 of DA 80/952). The retirement of the biodiversity credits will be carried out in accordance with the Biodiversity Offset Scheme of the BC Act and **Section 1.12**, to the satisfaction of the BCT.

This will involve utilising one or a combination of the following offsetting options:

- Retirement of credits via the establishment of a managed stewardship site established in accordance with Part 5 of the BC Act;
- Securing the required credits through the open credit market;
- Payment into the Biodiversity Conservation Fund; and/or
- Funding a Biodiversity Conservation Action (if applicable).

Management of the offsetting arrangements will be undertaken in accordance with the strategies and measures outlined in this Plan, and in consultation with the BCT.

1.10 MOCO MOD 5 Biodiversity Offset Credits

In accordance with Schedule 3 Condition 29C of SSD-5850, within 12 months of the approval of Modification 5, or other timeframe agreed by the Secretary, MGO will retire the biodiversity credits specified in Table 1.2 (Table 9B of SSD-5850). The retirement will be carried out in accordance with the Biodiversity Offsets Scheme of the BC Act and **Section 1.12**, to the satisfaction of the BCT.

This will involve utilising one or a combination of the following offsetting options:

- Retirement of credits via the establishment of a managed stewardship site established in accordance with Part 5 of the BC Act;
- Securing the required credits through the open credit market;
- Payment into the Biodiversity Conservation Fund; and/or
- Funding a Biodiversity Conservation Action (if applicable).

Management of the offsetting arrangements will be undertaken in accordance with the strategies and measures outlined in this Plan, and in consultation with the BCT.

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1.11 MOCO MOD6 Biodiversity Offset Credits

In accordance with Schedule 3 Condition 29D of SSD-5850, within 12 months of the determination of Mod 6, unless agreed by the Secretary, MGO will retire the biodiversity credits specified in **Table 1.2** (Table 9C of SSD-5850). The retirement will be carried out in accordance with the Biodiversity Offsets Scheme of the BC Act and **Section 1.12**, to the satisfaction of the BCT.

1.12 Combined Biodiversity Offset Credit Strategy

The retirement of the Mt Owen and Glendell development consent credits is being completed conjointly following the approval of Mt Owen Continued Operations Project MOD 2, Glendell MOD 4, MOCO MOD 5 and MOCO MOD 6. A MGO complex strategy to retire the credits is in the process of being compiled for the Biodiversity Conservation Trust (BCT) to cover the following:

- Glendell DA80/952 MOD 4 - 109 credits by 4th March 2022;
- Mt Owen SSD-5850 MOD 2 - 741 credits by 4th September 2021;
- Mt Owen SSD-5850 MOD 5 – 394 credits by 15th January 2022; and
- Mt Owen SSD-5850 MOD 6 – 64 credits by 4th June 2022.

Please note that the dates listed above may not align to DA80/952 and SSD-5850 due to extensions granted by DPIE for the retirement of required credits.

2. Environmental Context

2.1 Mount Owen Glendell Operations

The following sections draws on information from the MOCO EIS (Umwelt, 2014), MOCO MOD 2 SEE (Umwelt, 2018a), Glendell SEE (Umwelt, 2018b), MOCO MOD 5 SEE (Umwelt 2020a) and MOCO MOD 6 SEE (Umwelt 2020b).

2.1.1 Local and Regional Ecological Context

MGO is located in the central Hunter Valley in the Hunter Coalfields of the Upper Hunter of NSW. The central Hunter Valley has been largely cleared of native vegetation, primarily for agriculture and other land uses, including mining and urban development. Similar land use patterns occur in the vicinity of MGO and the Development Footprint, which is surrounded by agricultural land and coal mining operations, with scattered patches of native vegetation, the most significant of which is Ravensworth State Forest. Ravensworth State Forest and adjoining areas represents a significant link and refuge area between remnant patches of vegetation in the central Hunter Valley. Ravensworth State Forest is located in the north-east of the Mount Owen Complex and to the north of the Development Footprint.

The central location of the vegetation in Ravensworth State Forest and the surrounds is important for its functionality as a fauna refuge and 'stepping stone' in a highly fragmented landscape. The remnant includes Ravensworth State Forest, including the New Forest Area, the existing Mount Owen Biodiversity Offset Areas, and other native woodland and forest vegetation that are connected to these conservation areas. The remnant provides an important link in the generally north/south movement of highly mobile species, from other sizeable remnants in the north-west, to large remnants to the south-east and south-west of the Development Footprint.

2.1.2 Landform, Geology and Soils

MGO is located on the eastern extremity of the Hunter Coal Fields with part of the land holding encompassing the steep escarpments of the Hunter Thrust. The topography of the area is characterised by an undulating and hilly landscape extending to lower areas associated with the waterways that traverses MGO area. Elevations ranges between 80 metres AHD in the south and 400 meters AHD in the northern extent of MGO.

The central Hunter Valley is primarily underlain by four major geological strata: Carboniferous; Permian; Triassic and Quaternary. Carboniferous rocks mostly underlie areas in the north-east of the region and are a combination of erosion resistant marine, volcanic, conglomerate and limestones. Permian rocks make up the majority of the region and mostly consist of the moderately erosion resistant Singleton Coal Measures, conglomerates, sandstone, shale, tuff and some lava beds. Triassic rocks are mostly located in areas in the north-west, west and south of teg upper Hunter Valley and consist of highly erosion resist sandstone. Quaternary sediments are mostly identified along and in proximity to major rivers and creeks of the central lower Hunter Valley.

MGO has three main soil types: Bayswater Soil Landscape, Hunter Soil Landscape and Lambs Valley Soil Landscape. Bayswater Soil Landscape is the predominate type with yellow solodic and yellow and brown padzolic soils occurring on slopes and alluvial soils in drainage lines.

2.1.3 Long Term Security

A Conservation Bond for the MGO BOAs is required by DPIE in accordance with Schedule 3 Condition 32 of SSD- 5850 and Schedule 3 Condition 43 of DA 80/952.

The Mt Owen Glendell (SSD-5850 and DA 80/952) Conservation Bond was revised and approved by DPIE on 28th of May 2019. The conservation bond will be revised within six months of approval of the Biodiversity Management Plan (the BOMPS). The purpose of this bond is to cover the cost of the management of land required to be set aside as an offset area, should the mine consent holder be unable or unwilling to continue management of the land. The Conservation Bond value is based on all the activities identified in the approved BOMPS, for the life of the plan (three years).

Northwest, Northeast, Southeast, Southeast Corridor, Forest East, Southern Remnant and Habitat Management Agreement (HMA) offsets areas were secured on 16th of January 2020 under Conservation Agreements (CAs) in consultation with BCD and as administered by the Minister administering the National Parks and Wildlife Act 1974 (NPW Act). A CA is a legal agreement under section 69 of the NPW Act for an area of land with significant conservation value. These CAs are legally binding on both current and future landholders and is registered on the land title. The CAs document:

- a) Conservation values present;
- b) Management arrangements and costings; and
- c) Monitoring arrangements.

Stringybark Creek, Cross Creek, Mitchell Hills and Esparanga offsets areas are currently in the process of being secured under the Biodiversity Stewardship Agreements (BSAs) in consultation with the BCD and administering by the Minister for the Environment administering the *Biodiversity Conservation Act 2016*. A BSA is a legal agreement under Division 2, Part 5 of the BC Act an area of land with significant conservation value. These SAs are legally binding on both current and future landholders and is registered on the land title. The BSAs:

- a) Assess the biodiversity values of the proposed site in accordance with the biodiversity assessment method;
- b) Sets out the management actions proposed to be carried out; and
- c) Specifies in accordance with the biodiversity assessment method the number and class of biodiversity credits that may be created in respect of those management actions.

In accordance with DA 80/952, within 3 months of the approval of the Landscape Management Plan, MGO must lodge a conservation and biodiversity bond with the Department to ensure that the Offset Strategy is implemented in accordance with the performance and completion criteria of the Landscape Management Plan. The sum of the bond must be determined by:

- a) Calculating the full cost of implementing the Offset Strategy (Bettys Creek Habitat Management Area); and
- b) Employing a suitably qualified rehabilitation expert or quantity surveyor to verify the calculated costs, to the satisfaction of the Secretary.

The calculation of the conservation and biodiversity bond must be submitted to the Department for approval at least 1 month prior to the lodgement of the bond. The conservation and biodiversity bond

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must be reviewed and, if required, an updated bond must be lodged with the Department within 3 months of any of the following:

- a) An approved revision of the Landscape Management Plan;
- b) The completion of an Independent Environmental Audit in which recommendations relating to the implementation of the Landscape Management Plan have been made; or
- c) In response to a request by the Secretary.

If the Offset Strategy is completed generally in accordance with the performance and completion criteria of the Landscape Management Plan to the satisfaction of the Secretary, the Department will release the conservation and biodiversity bond.

If the Offset Strategy is not completed generally in accordance with the performance and completion criteria of the Landscape Management Plan to the satisfaction of the Secretary, all or part of the conservation and biodiversity bond will be used to ensure the satisfactory completion of the relevant works.

2.1.4 Key Biodiversity Features

2.1.4.1 Vegetation Communities and Threatened Ecological Communities

The areas surrounding and within MGO are predominately composed of valley floor woodlands, forests and native and exotic pastures derived from the clearing of woodlands. As outlined in the Ecological Assessment for the MOCO Project (Umwelt 2014) a total of 355 flora species were recorded during flora surveys, of which 26 per cent were not native to the area. Twelve native vegetation communities have been identified in MGO (**Figure 2.1**), being:

- Barrington Foothills Dry Spotted Gum Forest;
- Central Hunter Bullock Forest regeneration;
- Central Hunter Grey Box- Ironbark Woodland;
- Central Hunter Ironbark – Spotted Gum – Grey Box Forest (including planted variant);
- Central Hunter Swamp Oak Forest;
- Derived Native Grassland;
- Dry Rainforest;
- Hunter Foothills Sheltered Forest;
- Hunter Lowland Red Gum Forest;
- Hunter Valley River Oak Forest;
- Kunzea Closed Shrubland; and
- Mine Rehabilitation.

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A range of threatened ecological communities (TECs) listed under the Threatened Species Conservation (TSC) or EPBC Acts have been previously recorded within MGO. These include:

- Central Hunter Valley Eucalypt Forest and Woodland CEEC under the EPBC Act;
- Central Hunter Ironbark – Spotted Gum – Grey Box Forest in the NSW North Coast and Sydney Basin Bioregions EEC under the TSC Act;
- Central Hunter Grey Box – Ironbark Woodland in the NSW North Coast and Sydney Basin Bioregions EEC under the TSC Act; and
- Hunter Lowland Redgum Forest in the Sydney Basin and NSW North Coast Bioregions EEC under the TSC Act.

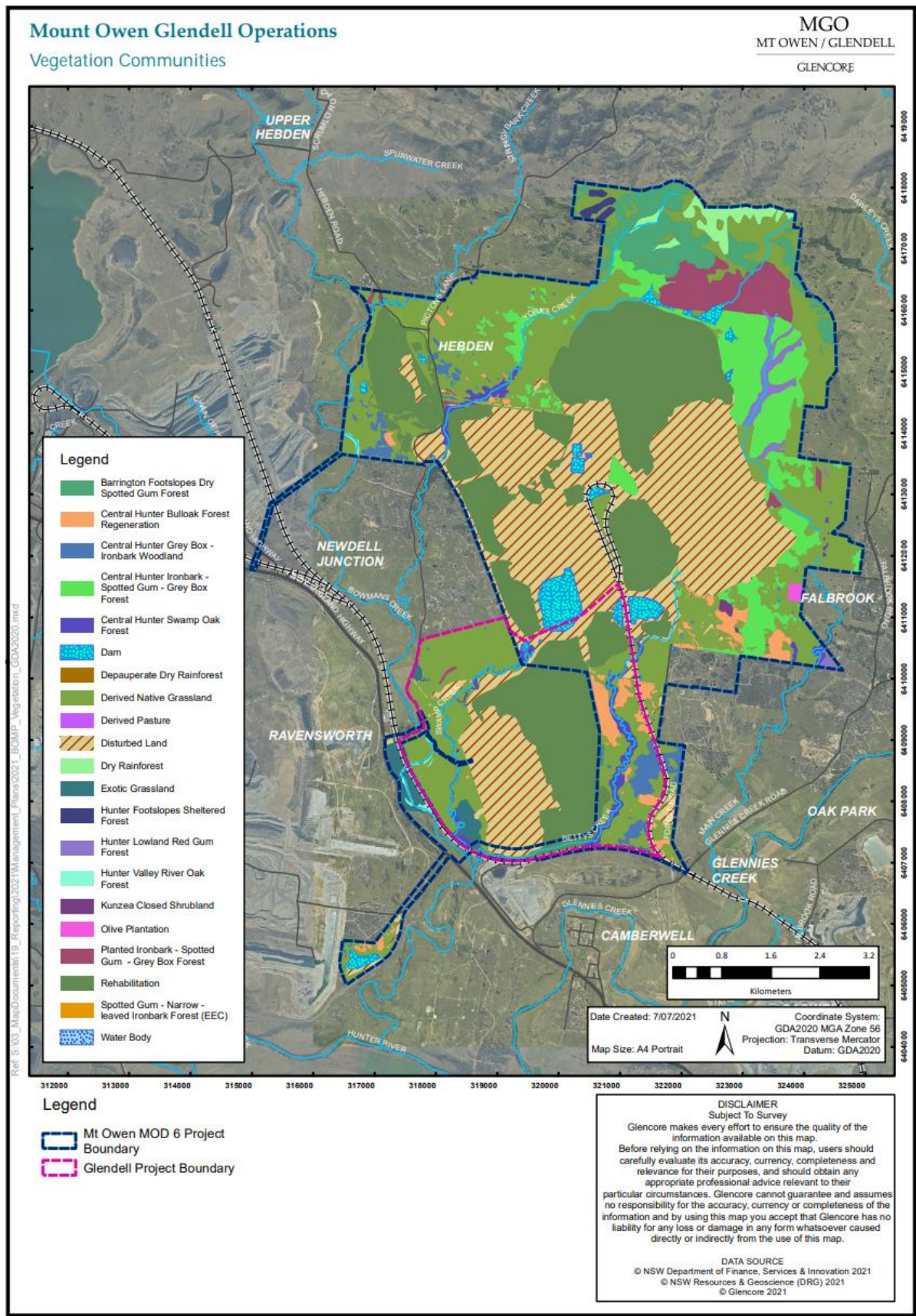


Figure 2.1 Vegetation Communities

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2.1.4.2 Threatened Species and Populations

Table 2.1 below lists the threatened species and populations recorded within MGO.

Table 2.1 – Threatened Species and Populations Recorded in MGO

Species Name	BC Act	EPBC Act
Flora Species/Population		
Slaty Red Gum <i>Eucalyptus glaucina</i>	Vulnerable	Vulnerable
<i>Ozothamnus tessellatus</i>	Vulnerable	Vulnerable
<i>Cymbidium canaliculatum</i> population in the Hunter Catchment	Endangered Population	-
<i>Acacia pendula</i> population in the Hunter Catchment	Endangered Population	-
<i>Eucalyptus camaldulensis</i> in the Hunter Catchment	Endangered Population	-
Fauna Species		
Green and Golden Bell Frog <i>Litoria aurea</i>	Endangered	Vulnerable
Swift Parrot <i>Lathamus discolor</i>	Endangered	Critically Endangered
Dusky Woodswallow <i>Artamus cyanopterus</i>	Vulnerable	-
Little Eagle <i>Heiraaetus morphnoides</i>	Vulnerable	-
White-Bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	Vulnerable	-
Spotted Harrier <i>Circus Assimilis</i>	Vulnerable	-
Little Lorikeet <i>Glossopsitta pusillapusilla</i>	Vulnerable	-
Powerful Owl <i>Ninox strenua</i>	Vulnerable	-
Masked Owl	Vulnerable	-

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Species Name	BC Act	EPBC Act
<i>Tyto novaehollandiae</i>		
Brown Treecreeper <i>Climacteris picumnus victoriae</i>	Vulnerable	-
Speckled Warbler <i>Chthonicola saggitata</i>	Vulnerable	-
Black-Chinned Honeyeater <i>Melithreptus gularis</i>	Vulnerable	-
Grey-Crowned Babbler <i>Pomatostomus temporalis</i>	Vulnerable	-
Varied Sittella <i>Daphoenositta chrysoptera</i>	Vulnerable	-
Hooded Robin <i>Melanodryas cucullata</i>	Vulnerable	-
Scarlet Robin <i>Petroica boodang</i>	Vulnerable	-
Flame Robin <i>Petroica phoenicea</i>	Vulnerable	-
Diamond Firetail <i>Stagonopleura guttata</i>	Vulnerable	-
New Holland Mouse <i>Pseudomys novaehollandiae</i>	-	Vulnerable
Spotted-Tail Quoll <i>Dasyurus maculatus</i>	Endangered	Vulnerable
Brush-Tailed Phascogale <i>Phascogale tapoatafa</i>	Vulnerable	-
Squirrel Glider <i>Petaurus norfolcensis</i>	Vulnerable	-
Koala <i>Phascolarctos cinereus</i>	Vulnerable	Vulnerable
Grey-Headed Flying-Fox <i>Pteropus poliocephalus</i>	Vulnerable	Vulnerable

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Species Name	BC Act	EPBC Act
Large-Eared Pied Bat <i>Chalinolobus dwyeri</i>	Vulnerable	Vulnerable
Yellow-Bellied Sheath-tail Bat <i>Saccolaimus flaviventris</i>	Vulnerable	-
East Coast Freetail-Bat <i>Mormopterus norfolkensis</i>	Vulnerable	-
Little Bentwing-Bat <i>Miniopterus australis</i>	Vulnerable	-
Eastern Bentwing-Bat <i>Miniopterus schreibersii oceanensi</i>	Vulnerable	-
Southern Myotis <i>Myotis macropus</i>	Vulnerable	-
Greater Broad-Nosed Bat <i>Scoteanax rueppellii</i>	Vulnerable	-

2.1.4.3 Habitat Connectivity

The remnant vegetation occurring in MGO occurs in the central portion of the Hunter Valley floor, approximately 87 kilometres from the coast and 150 kilometres from the western extremity of the Hunter catchment. The central location of the vegetation in this locality (including RSF and Mt Owen BOAs) increases its importance due to its functionality as a fauna refuge and 'stepping stone' in a highly fragmented landscape. The remnant includes RSF, including the New Forest Area; Mt Owen BOAs; and other native woodland and forest vegetation that are connected to these conservation areas.

This remnant provides an important link in the generally north/south movement of highly mobile species, from other sizeable remnants in the north-west such as those of Antiene, to large remnants to the south-east and south-west of MGO (**Figure 2.1**). The large size of the remnant provides an important area of habitat for a wide range of flora and fauna species. Of particular importance is the ability of the remnant to support a range of species whose occurrence is limited by the need for a large area of contiguous habitat, such as woodland dependent bird species. Due to the widespread historic clearing and fragmentation of the valley floor vegetation there are few large remnants greater than 100 hectares remaining in the central Hunter Valley increasing the significance of those remaining large remnants (Umwelt 2014).

2.1.5 Rehabilitation

MGO is committed to the ongoing rehabilitation of disturbed areas to native woodland and forest to expand on existing local vegetation communities and provide habitat for endangered and threatened fauna known to occur in the area. At a very early stage in the mine's life, MGO identified a need to develop specialised rehabilitation techniques if it were to achieve its rehabilitation objectives.

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The assessment of the ecological values of rehabilitated formerly mined land and those areas that have been subject to vegetation community and fauna habitat reconstruction programs (Umwelt 2013) demonstrates that rehabilitated land can create quality vegetation communities and fauna habitats that includes threatened fauna species and EEC habitat.

MGO will identify an area of 518 hectares of mine rehabilitation to commit as BOA. This area is to be restored to *Central Hunter Ironbark – Spotted Gum – Grey Box Forest in the NSW North Coast and Sydney Basin Bioregions EEC* under the TSC Act.

2.2 Biodiversity Offset Areas

Twelve BOAs have been established to offset the impacts of MGO projects over the years. These are listed in **Table 2.2** and illustrated in **Figure 1.2**.

The location of the 518 hectares of Rehabilitation Woodland to contain ecological mine rehabilitation will be identified within 5 years of the commencement of development. This is required by 31st December 2021.

2.2.1 Locations

The Mt Owen BOAs protect approximately 2,000 hectares of lands strategically located surrounding MGO, and in the wider Hunter region. The Mt Owen BOAs are strategically positioned in the landscape near to a number of existing conservation reserves including Manobalai Nature Reserve and other Glencore offset sites (**Figure 1.2**).

These BOAs were selected due to their proximity to MGO and their combined valuable corridor function within a fragmented and primarily agricultural landscape.

Table 2.2 – Biodiversity Offset Areas

Name	Area (ha)	Legal Status (2019)	Status
South East Offset	58.3	Approved Conservation Agreement offset, NPW Act	Agreed Offset DA 14-01-2004 (now incorporated into SSD-5850)
Forest East Offset	110.9		
South East Corridor Offset	74.1		
North East Offset	83.6		
North West Offset	71.4		
Southern Remnant Offset	4.0		
Bettys Creek Habitat Management Area (HMA)	174.0	Existing application for Biodiversity Stewardship	Agreed Offset DA 80/952 (4 hectares added in DA 80/952 MOD 3)
Cross Creek Offset Site	367.0		Agreed Offset SSD-5850
Stringybark Creek Habitat Corridor Offset Site	97.5		

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Name	Area (ha)	Legal Status (2019)	Status
Esparanga Offset Site	303.0	Agreement offset, <i>Biodiversity Conservation Act 2016</i> (NSW)	EPBC 2013/6978
Mitchell Hills Offset Site	143.7		
Rehabilitation Woodland	518.0	Process of conversion to Stewardship Agreement within 12 months of location being finalised	
Total Area	2,005.5		

2.2.2 Key Ecological Values

The following section provides information on the vegetation communities, threatened and migratory species, endangered populations and TECs (as listed under the NSW BC Act or EPBC Act) recorded within the BOAs.

2.2.2.1 Vegetation Communities and Threatened Ecological Communities

Table 2.3 below lists the vegetation communities and corresponding TECs recorded within the BOAs.

Table 2.3 – Vegetation Communities and TECs in the BOAs

Vegetation Community	Corresponding Threatened Ecological Community
South East Offset	
Central Hunter Ironbark – Spotted Gum – Grey Box Forest (including planted variant)	<i>Central Hunter Ironbark – Spotted Gum – Grey Box Forest in the NSW North Coast and Sydney Basin Bioregions EEC</i> under the TSC Act
Derived Native Grassland	-
Forest East Offset	
Central Hunter Ironbark – Spotted Gum – Grey Box Forest (including planted variant)	<i>Central Hunter Ironbark – Spotted Gum – Grey Box Forest in the NSW North Coast and Sydney Basin Bioregions EEC</i> under the TSC Act

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Vegetation Community	Corresponding Threatened Ecological Community
Derived Native Grassland	-
Barrington Foothills Dry Spotted Gum Forest	<i>Central Hunter Ironbark – Spotted Gum – Grey Box Forest in the NSW North Coast and Sydney Basin Bioregions EEC</i> under the TSC Act
South East Corridor Offset	
Central Hunter Ironbark – Spotted Gum – Grey Box Forest (including planted variant)	<i>Central Hunter Ironbark – Spotted Gum – Grey Box Forest in the NSW North Coast and Sydney Basin Bioregions EEC</i> under the TSC Act
Derived Native Grassland	-
Central Hunter Swamp Oak Forest	-
North East Offset	
Barrington Foothills Dry Spotted Gum Forest	<i>Central Hunter Ironbark – Spotted Gum – Grey Box Forest in the NSW North Coast and Sydney Basin Bioregions EEC</i> under the TSC Act
Dry Rainforest	-
Derived Native Grassland	-
North West Offset	
Central Hunter Ironbark – Spotted Gum – Grey Box Forest	<i>Central Hunter Ironbark – Spotted Gum – Grey Box Forest in the NSW North Coast and Sydney Basin Bioregions EEC</i> under the TSC Act
Barrington Foothills Dry Spotted Gum Forest	<i>Central Hunter Ironbark – Spotted Gum – Grey Box Forest in the NSW North Coast and Sydney Basin Bioregions EEC</i> under the TSC Act
Derived Native Grassland	-
Southern Remnant Offset	
Central Hunter Ironbark – Spotted Gum – Grey Box Forest (including planted variant)	<i>Central Hunter Ironbark – Spotted Gum – Grey Box Forest in the NSW North Coast and</i>

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Vegetation Community	Corresponding Threatened Ecological Community
	<i>Sydney Basin Bioregions EEC</i> under the TSC Act
Bettys Creek Habitat Management Area (HMA)	
Central Hunter Grey Box – Ironbark Woodland	<i>Central Hunter Grey Box – Ironbark Woodland in the NSW North Coast and Sydney Basin Bioregions EEC</i> under the TSC Act
Central Hunter Bullock Regeneration	-
Central Hunter Swamp Oak Forest	-
Derived Native Grassland	-
Cross Creek Offset Site	
Central Hunter Ironbark – Spotted Gum – Grey Box Forest (including red gum variant)	<i>Central Hunter Ironbark – Spotted Gum – Grey Box Forest in the NSW North Coast and Sydney Basin Bioregions EEC</i> under the TSC Act
Derived Native Grassland	-
Stringybark Creek Habitat Corridor	
Central Hunter Ironbark – Spotted Gum – Grey Box Forest	<i>Central Hunter Ironbark – Spotted Gum – Grey Box Forest in the NSW North Coast and Sydney Basin Bioregions EEC</i> under the TSC Act
Drainage Flat Red Gum Woodland	<i>River-flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions EEC</i> under the TSC Act
Dry Rainforest	-
Central Hunter Swamp Oak Forest	-
Derived Native Grassland	-
Esparanga Offset Site	

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Vegetation Community	Corresponding Threatened Ecological Community
Upper Hunter White Box - Ironbark Grassy Woodland	<i>White Box – Yellow Box – Blakely's Red Gum Woodland</i> EEC under the TSC Act <i>White Box – Yellow Box – Blakely's Red Gum Woodland and Derived Native Grassland</i> CEEC under the EPBC Act
Spotted Gum Open Forest Complex on Sandstone	-
Shrubby White Box Woodland	-
Red Gum Open Forest on Alluvium/Colluvium	-
Narrabeen Sheltered Dry Forest	-
Narrabeen Ironbark Woodland	-
Derived Native Grassland	<i>White Box – Yellow Box – Blakely's Red Gum Woodland</i> EEC under the TSC Act (where derived from Upper Hunter White Box - Ironbark Grassy Woodland) <i>White Box – Yellow Box – Blakely's Red Gum Woodland and Derived Native Grassland</i> CEEC under the EPBC Act (where derived from Upper Hunter White Box - Ironbark Grassy Woodland)
Mitchell Hills Offset Site	
Barrington Foothills Dry Spotted Gum Forest	-
Lower Hunter Dry Rainforest	<i>Lower Hunter Dry Rainforest in the Sydney Basin and NSW North Coast Bioregions</i> VE C under the TSC Act
Upper Hunter Hills Sheltered Moist Forest	-
Derived Native Grassland	-
Rehabilitation Woodland	
Target Community: Central Hunter Ironbark – Spotted Gum – Grey Box Forest	Target TEC: <i>Central Hunter Ironbark – Spotted Gum – Grey Box Forest in the NSW North Coast and</i>

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Vegetation Community	Corresponding Threatened Ecological Community
	Sydney Basin Bioregions EEC under the TSC Act

2.2.2.2 Threatened Fauna Species

Table 2.4 below lists the threatened species and populations recorded within the BOAs.

Table 2.4 – Threatened Species and Populations Recorded in the BOAs

Species Name	BC Act	EPBC Act	BOA
Flora Species/Population			
<i>Cymbidium canaliculatum</i> population in the Hunter Catchment	Endangered Population	-	Esparanga
Fauna Species			
Green and Golden Bell Frog <i>Litoria Aurea</i>	Endangered	Vulnerable	Southeast Offset
White-bellied Sea-eagle <i>Haliaeetus leucogaster</i>	Vulnerable	-	North West Offset
Little Eagle <i>Heiraaetus morphnoides</i>	Vulnerable	-	Forest East Offset
Spotted Harrier <i>Circus assimilis</i>	Vulnerable	-	Stringybark Creek
Little Lorikeet <i>Glossopsitta Pusilla</i>	Vulnerable	-	Esparanga Mitchell Hills
Powerful Owl <i>Ninox Strenua</i>	Vulnerable	-	North West
Brown Treecreeper <i>Climacteris Picumnus Victoriae</i>	Vulnerable	-	Esparanga
Speckled Warbler <i>Chthonicola Saggitata</i>	Vulnerable	-	Esparanga Mitchell Hills Forest East South East Stringybark Creek North East
Grey-Crowned Babbler	Vulnerable	-	Forest East Offset

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Species Name	BC Act	EPBC Act	BOA
<i>Pomatostomus Temporalis</i>			Southeast Offset Southeast Corridor Offset Cross Creek Stringybark Creek Mitchell Hills Esparanga
Varied Sittella <i>Daphoenositta Chrysoptera</i>	Vulnerable	-	Esparanga
Dusky Woodswallow <i>Artamus Cyanopterus</i>	Vulnerable	-	Esparanga Mitchell Hills Stringybark Creek North West North East Forest East
Scarlet Robin <i>Petroica Boodang</i>	Vulnerable	-	Esparanga
New Holland Mouse <i>Pseudomys Novaehollandiae</i>	-	Vulnerable	Forest East Offset
Spotted-Tail Quoll <i>Dasyurus maculatus</i>	Endangered	Vulnerable	Forest East Offset Southeast Offset Southeast Corridor Offset Cross Creek Stringybark Habitat Corridor Esparanga
Brush-Tailed Phascogale <i>Phascogale tapoatafa tapoatafa</i>	Vulnerable	-	Cross Creek Southeast Offset
Squirrel Glider <i>Petaurus norfolcensis</i>	Vulnerable	-	Forest East Southeast Offset Southeast Corridor Offset Esparanga

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Species Name	BC Act	EPBC Act	BOA
Koala <i>Phascolarctos cinereus</i>	Vulnerable	Vulnerable	Southeast Corridor Offset
Grey-Headed Flying-Fox <i>Pteropus poliocephalus</i>	Vulnerable	Vulnerable	All offsets
Large-Eared Pied Bat <i>Chalinolobus dwyeri</i>	Vulnerable	Vulnerable	Esparanga
Yellow-Bellied Sheath-tail Bat <i>Saccolaimus flaviventris</i>	Vulnerable	-	Forest East Offset Esparanga
East Coast Freetail-Bat <i>Mormopterus norfolkensis</i>	Vulnerable	-	Northwest Offset Forest East Offset Southeast Offset Cross Creek
Eastern Bentwing-Bat <i>Miniopterus schreibersii oceanensis</i>	Vulnerable	-	Forest East Offset Southeast Offset Cross Creek Esparanga
Greater Broad-Nosed Bat <i>Scoteanax rueppellii</i>	Vulnerable	-	Forest East Offset
Eastern Cave Bat <i>Vespadelus troughtoni</i>	Vulnerable	-	Esparanga

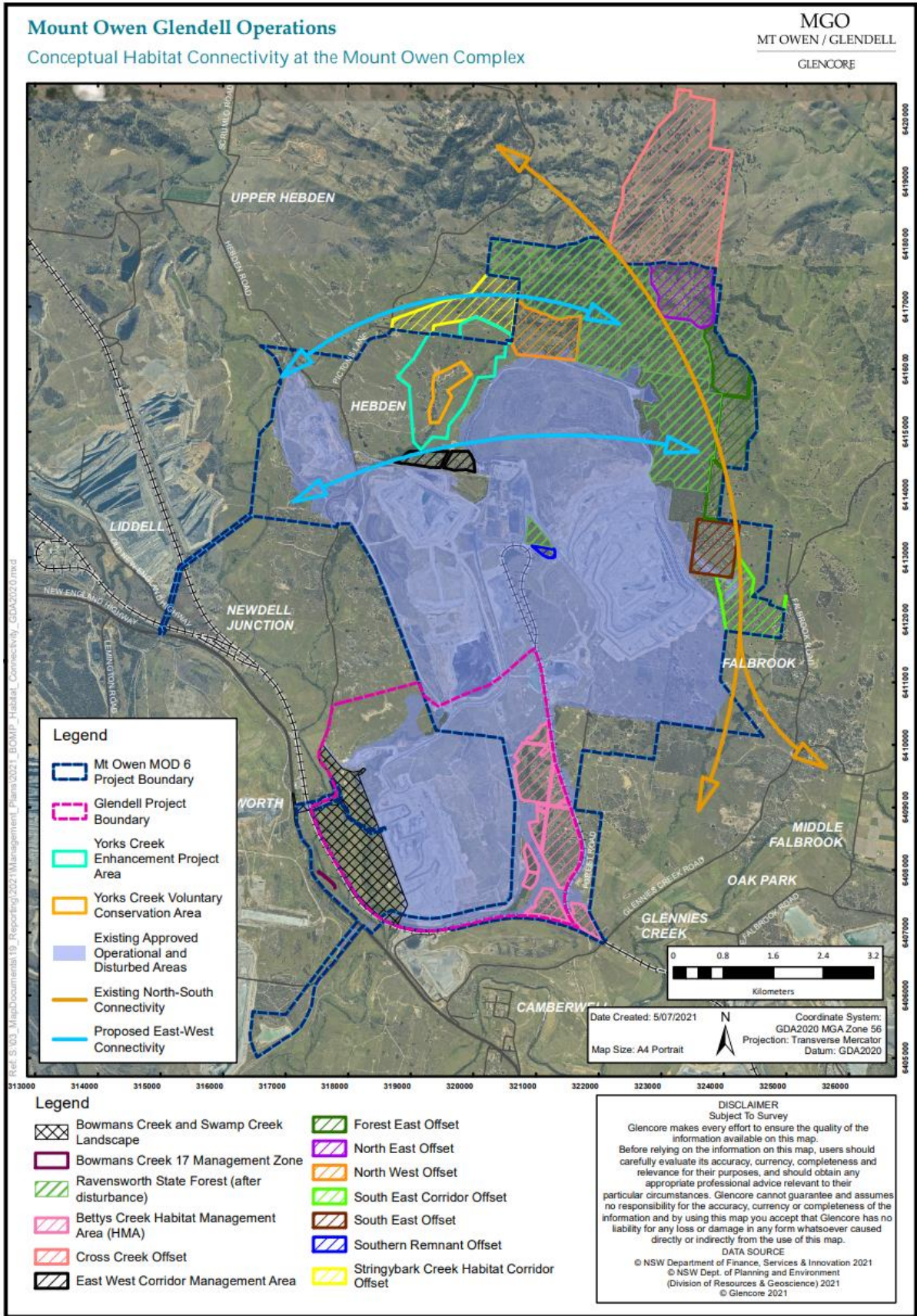


Figure 2.2 Habitat Connectivity

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3. Management of Biodiversity at the Mine Site

The execution of this BOMPS will include the implementation of short, medium and long-term measures for management of flora and fauna as part of the continued operations at MGO. These are summarised in the sections below.

Table 3.1 below outlines the short, medium and long-term measures to manage the biodiversity at the mine site.

Table 3.1 - Short, Medium and Long-term Measures to Manage Biodiversity at MGO

Action	Short-term	Medium-term	Long-term 2025-2030
Minimise the impacts of the development on biodiversity	<p>Pre-clearance surveys and tree-felling supervision during disturbance activities.</p> <p>Habitat augmentation in surrounding habitats using salvaged resources and nest boxes where required.</p> <p>Ongoing weed and pest management</p> <p>Salvage of biodiversity features (where practicable).</p> <p>Progressive rehabilitation in line with approved Mine Operations Plan – MOP (available on Glencore Australia website).</p> <p>Weed and pest management.</p> <p>Monitoring and improvement.</p>	<p>Habitat augmentation in surrounding habitats using salvaged resources and nest boxes where required.</p> <p>Ongoing weed and pest management.</p> <p>Progressive rehabilitation in line with approved Mine Operations Plan – MOP (available on Glencore Australia website).</p> <p>Monitoring and improvement.</p>	<p>Monitoring and improvement.</p> <p>Progressive rehabilitation in line with approved Mine Operations Plan – MOP (available on Glencore Australia website).</p>
Manage the remnant vegetation and fauna habitat at the site	<p>Clear delineation of disturbance footprints to avoid accidental clearance.</p> <p>Habitat augmentation in surrounding habitats using salvaged resources and nest boxes where required.</p> <p>Ongoing weed and pest management.</p>	<p>Habitat augmentation in surrounding habitats using salvaged resources and nest boxes where required.</p> <p>Ongoing weed and pest management.</p> <p>Seed collection and propagation.</p> <p>Rehabilitation and compensatory planting from propagated local seed stock.</p>	<p>Monitoring and improvement.</p>

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Action	Short-term	Medium-term	Long-term 2025-2030
	Seed collection and propagation. Monitoring and improvement.	Monitoring and improvement.	

3.1 Measures to Minimise Impacts on Biodiversity

MGO implements reasonable minimisation measures to achieve ongoing mitigation of potential impacts on remnant vegetation and habitat disturbance as a result of works in MGO. Specific management controls are detailed in the sections below.

The following measures are generally undertaken within MGO to minimise the impacts on threatened species, populations and habitats as a result of the disturbance activities on the site:

- Pre-clearance surveys and tree-felling supervision to minimise impacts on arboreal fauna species such as squirrel glider (*Petaurus norfolcensis*) and threatened micro-bat species (**Section 3.1.1**);
- Salvage of biodiversity features (**Section 3.1.2**);
- Boundaries of disturbance and clearance activities will be demarcated to prevent unnecessary disturbance and accidental clearance (refer to **Section 3.1.3**);
- Weed management (refer to **Section 3.1.4**);
- Pest animal control (refer to **Section 3.1.5**);
- Erosion and sediment control works (refer to **Section 3.1.6**);
- Employee education and training (refer to **Section 8.4**); and
- Utilise existing access tracks, where practicable.

Additional measures were implemented to manage and mitigate the impacts associated with the construction of the Water Transfer Pipeline from MGO to Integra Underground and the Narama Pipeline South Connection. These are available below in **Section 3.1.7** and **Section 3.1.8**, respectively.

3.1.1 Pre-clearance Surveys and Tree Felling Supervision

Tree felling processes are implemented at MGO to minimise the potential for impacts on native fauna species (including threatened species) as a result of the clearing of hollow-bearing trees.

3.1.1.1 Pre-clearance Surveys and Due Diligence Inspections

Pre-clearance surveys are to be undertaken prior to tree felling works. Surveys are undertaken by suitably qualified and experienced persons, and include:

- The demarcation of areas approved for clearing to reduce risk of accidental clearing;
- The identification and marking of habitat resources and habitat trees (note: habitat trees are those containing hollows, cracks or fissures and spouts, active nests, dreys or other signs of

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recent fauna usage. Other habitat features to be identified include fallen timber/hollow logs, burrows and boulder piles);

- The identification of the potential presence of threatened flora and fauna species, endangered populations and TECs (as listed under the BC Act or EPBC Act) recorded within the BOAs;
- The identification of threatened species or habitat features that are suitable for translocation or salvage. This includes native plant species containing seed for collection and propagation purposes and habitat features to be used in habitat augmentation (refer to **Section 3.2**); and
- Where practicable, disturbance activities are targeted to specific times of the year to minimise impacts to threatened species usage of habitat features for breeding and roosting.

For works related to the relocation of the transmission line, targeted due diligence assessments were undertaken recording all mature river oak (*Casuarina cunninghamiana*) individuals which were removed or severely damaged as a result of the works. Ten river oak trees for every one mature tree removed were planted as part of a compensatory planting program as outlined in **Section 3.2**. Pre-clearance surveys of this area targeted potentially occurring threatened flora populations including weeping myall (*Acacia pendula*) and river red gum (*Eucalyptus camaldulensis*).

3.1.1.2 Tree-felling Supervision

Tree felling will be completed as close to the completion of pre-clearance surveys as practicable to limit the potential for new issues to arise (such as new active nests being built). Tree felling supervision is undertaken by appropriately qualified and experienced persons after pre-clearance surveys have identified potential threatened species habitat.

The tree-felling process includes the following:

Prior to Felling Habitat Trees

- Completion of actions recommended from the pre-clearing surveys, including (but not limited to) salvage of identified habitat features, additional surveys to determine threatened fauna usage of the area (if required), identification of active dens or burrows, any actions required to discourage fauna occupation and weed or feral fauna management requirements;
- Removal of non-habitat trees/vegetation as close to the habitat tree felling date as possible in order to create disturbance to discourage fauna usage of the habitat trees; and
- Shaking of habitat trees (with heavy machinery) as appropriate to encourage fauna to abandon trees.

Options for salvage, translocation and propagation will be reviewed following the identification of any threatened flora species (including threatened orchid species) found within a clearing zone in accordance with the Guidelines for the Translocation of Threatened Plants in Australia (Vallee et al. 2004).

On the Day of Felling Habitat Trees

- All habitat trees will be subject to a visual inspection to survey for threatened species;
- Trees previously identified as containing fauna will be shaken and then felled, providing no threatened species are identified; and

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- The lowering of hollow-bearing trees will be done as gently as possible with heavy machinery
- If a threatened species is identified in a habitat tree on the day of felling, the supervising person is to advise the most appropriate method to minimise potential harm. This may include:
 - leaving the tree overnight;
 - further shaking to encourage the animal to vacate the tree;
 - gradual removal of branches to discourage ongoing use;
 - soft-felling of the tree with the animal in the tree; and
 - measures to capture and relocate the animal to secure habitats.
- Uninjured animals should be released on the day of capture into nearby suitable secure habitat and should not be held for extended periods of time;
- Injured animals will be taken to the nearest veterinary clinic or wildlife carer as soon as possible for assessment and treatment;
- Felled trees are to be rolled where appropriate so that the number of hollows blocked against the ground is minimised;
- Felled habitat trees should remain in place for a least one night to allow any remaining fauna to escape;
- Habitat features identified for translocation or salvage operations should be extracted and stored appropriately; and
- Any tree lopping required along Bowmans Creek and Swamp Creek in the riparian zone will be undertaken manually with chainsaws to allow the root structures to remain in situ.

3.1.2 Salvage of Biodiversity Features

3.1.2.1 Salvage of Habitat Resources

Where practical, a selection of habitat features will be salvaged for reuse in rehabilitation areas and nearby offset areas. This will include suitable:

- Tree hollows;
- Hollow logs;
- Fallen timber and woody debris; and
- Rocks and boulders.

Hollow logs, fallen timber and boulders provide shelter and foraging habitat which may be used by the spotted-tailed quoll for denning and latrines. Fallen timber and stumps to provide perch sites which may be used by a variety of threatened fauna species.

Salvageable habitat features (i.e. with good structural integrity and suitability for relocation and fauna use) will be identified during pre-clearing surveys, and collected as part of the clearing process, where

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suitable and feasible to do so. Salvaged features will then be stockpiled for use in rehabilitation and offset areas to increase the habitat diversity and availability of rehabilitation areas, thus making them more suitable for native fauna colonisation (particularly threatened species) (refer to **Section 3.2**).

3.1.2.2 Salvage of Threatened Flora Species

If threatened flora species are recorded in the disturbance footprint during pre-clearance surveys (refer to **Section 3.1**) options for salvage, translocation and/or propagation will be investigated and recommendations sought from a suitably qualified person with reference to the Guidelines for the Translocation of Threatened Plants in Australia (Vallee et al. 2004) and the Florabank Guidelines for Seed Collection and Propagation (Florabank 2013). Threatened flora species that occur in the wider locality and potential salvage options are outlined in **Table 3.2** below.

Table 3.2 – Threatened Flora Species and Salvage Options

Name	Conservation Status	Potential Salvage Options
Slaty Red Gum <i>Eucalyptus glaucina</i>	Vulnerable (BC and EPBC Acts)	Seed collection and propagation, if viable seed available.
<i>Ozothamnus tessellatus</i>	Vulnerable (BC and EPBC Acts)	Unknown. Likely limited seeding potential.
Tiger Orchid (<i>Cymbidium canaliculatum</i>) in the Hunter Catchment	Endangered Population (BC Act)	Salvage and translocation
Weeping Myall (<i>Acacia pendula</i>) in the Hunter Catchment	Endangered Population (BC Act)	Unknown. Hunter valley occurrences have not been recorded setting seed.
River Red Gum (<i>Eucalyptus camaldulensis</i>) in the Hunter Catchment	Endangered Population (BC Act)	Seed collection and propagation, if viable seed available.
Threatened orchid species	Threatened under the BC and/or EPBC Acts	Translocation

3.1.2.3 Salvage for Rehabilitation

Where there are opportunities to salvage topsoil-type material or native seed for rehabilitation purposes, the following measures will be adopted to protect its quality and enhance rehabilitation outcomes:

- Where possible, topsoil will be stripped when moist to help maintain soil structure and to reduce dust generation;
- Level or gently sloping areas will be selected as stockpile sites to minimise erosion and potential soil loss;
- Appropriate sediment controls will be installed at the base of stockpiles to prevent soil loss; and
- Weed growth on stockpiled soils will be monitored and subsequently controlled if necessary.

Seed collection for canopy, mid storey and groundcover species is to be undertaken prior to clearance for propagation and use in rehabilitation areas to maintain the genetic integrity of the vegetation in MGO (refer to **Section 3.4**).

3.1.3 Access Control

Access control is an important feature in protecting and demarcating areas outside disturbance footprints from vehicle access, human access and accidental disturbance. Measures include:

- Appropriate fencing and signposting of areas to prevent the uncontrolled entry of people, accidental disturbance and to minimise vehicular and human traffic. Where possible, fencing will not include barbed wire on the top line of the fence;
- Clear and visible signage is to be appropriately located to inform employees and others of the restricted access or otherwise of areas of outside the disturbance footprint; and
- Locking of gates to prevent unwanted vehicle, person access and disturbance.

3.1.4 Weed Management

Noxious weeds, declared in the local control authority area of Upper Hunter County, that have been recorded within the BOAs are outlined in **Table 3.3** below.

Table 3.3 – Noxious Weeds Recorded in the BOAs

Name	Legislative Listing	Suitable Control Methods
bridal creeper <i>Asparagus asparagoides</i>	Class 5 noxious weed	Physical removal, selective herbicide application.
African boxthorn <i>Lycium ferocissimum</i>	Class 4 noxious weed	Direct cut and paint stems, herbicide application, physical removal.
fireweed <i>Senecio madagascariensis</i>	Class 4 noxious weed	Foliar spray
green cestrum <i>Cestrum parqui</i>	Class 3 regionally controlled weed	Foliar spray
giant reed <i>Arundo donax</i>	Class 4 noxious weed	Selective herbicide application.
pampas grass <i>Cortaderia sp.</i>	Class 3 regionally controlled weed	Foliar spray
Paterson's curse <i>Echium plantagineum</i>	Class 4 noxious weed	Foliar spray
mother of millions <i>Bryophyllum delagoense</i>	Class 3 noxious weed	Selective herbicide application.

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Name	Legislative Listing	Suitable Control Methods
prickly pear <i>Opuntia stricta</i> var. <i>stricta</i>	Class 4 noxious weed	Selective herbicide application, biological control.
tiger pear <i>Opuntia aurantiaca</i>	Class 4 noxious weed	Physical removal, burning, selective herbicide application.
St. John's wort <i>Hypericum perforatum</i>	Class 4 noxious weed	Foliar spray
sweet briar <i>Rosa rubiginosa</i>	Class 4 noxious weed	Foliar spray
willows <i>Salix</i> sp.	Class 4 noxious weed	Mechanical removal

The key objective of the weed control program at MGO is to encourage the regeneration of native species by controlling, or where practicable, eliminating noxious weeds. Assessment for the presence of noxious weeds is to be undertaken as part of MGO ongoing flora and fauna monitoring program and routine inspections. Opportunistic sightings are also recorded.

The MGO weed control program will be implemented to limit the spread and colonisation of noxious and environmental weeds at MGO and will include:

- Regular inspections of MGO to clarify any potential weed infestations;
- The implementation of weed management measures as required including hand removal, mechanical removal and application of approved herbicides (in accordance with the *Pesticides Act 1999*) in authorised areas when favourable conditions prevail;
- Control of noxious weeds in accordance with the relevant legislation and considering the New South Wales Weed Control Handbook (7th Edition) (DPI 2018) and resources on the NSW WeedWise website (<http://weeds.dpi.nsw.gov.au/>);
- Monitoring and inspections of areas to assess the effectiveness of the weed control program and to understand any requirement for further work; and
- Ongoing consultation with the relevant authorities, as required, regarding weed listings, weed occurrence and management technologies, as required.

Chemicals to be used on site for the purposes of weed control will be evaluated by review of their Safety Data Sheet (SDS) and chemical label to determine their registration for control of target species, as well as the safety and environmental requirements during their use. Chemical information will be stored onsite within Chem-Alert. Chemical spraying will be undertaken in accordance with the *Pesticides Act 1999* with records of use maintained for a period of three years. A summary of the weed management activities undertaken on site will be reported in the Annual Review (AR) (refer to **Section 8.3**).

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3.1.5 Pest Animal Control

The objective of pest animal control at MGO is to reduce, and where possible eliminate declared vertebrate pest species, through an integrated approach involving a combination of chemical and physical control methods. Assessment for the presence of vertebrate pests is to be undertaken as part of MGOs ongoing flora and fauna monitoring program and routine inspections. Opportunistic sightings by any personnel are also recorded.

Pest animals that are known to potentially occur within MGO through fauna monitoring and opportunistic sightings include:

- European rabbit;
- Brown hare;
- Wild dog;
- Deer;
- Feral cat;
- Red fox; and
- Feral pig.

These species can potentially impact on native fauna species within MGO through predation and by competing with native fauna for resources such as shelter, breeding sites and food. Pest animals can also degrade soil quality and hence reduce the productivity of the land. Feral goats have not been recorded at MGO.

Pest animal control will be undertaken in consideration of the control recommendations outlined in the Department of Primary Industries Vertebrate Pest Control Manual (DPI 2014), the NSW Codes of Practices (COPs) and Standard Operating Procedures (SOPs) (<http://www.dpi.nsw.gov.au/agriculture/pests-weeds/vertebrate-pests/publications/model-codes-of-practice>) and recommendations in relevant Threat Abatement Plans (TAP).

Pest animals relevant to this BOMPS are outlined in **Table 3.4** below.

The effectiveness of the pest animal control program will be reported in the Annual Review.

Table 3.4 – Pests Animals and Suitable Management Measures at MGO

Pest Species	Threat Abatement Plan	Suitable Control Methods
Wild dog	No TAP available for wild dogs	1080 poisoning Soft-jaw trapping Opportunistic shooting
Red fox	Threat Abatement Plan for Predation by the Red Fox (DEWHA 2008)	1080 poisoning Canid Pest Ejectors Cage trapping

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Pest Species	Threat Abatement Plan	Suitable Control Methods
Pigs	Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (DEH 2005 – currently under review)	1080 poisoning Trapping Opportunistic shooting
Feral cat	Threat Abatement Plan for Predation by Feral Cats (DoE 2015)	Baiting Trapping Opportunistic shooting
Rabbit	Threat abatement plan for competition and land degradation by rabbits (draft) (DoE 2015)	1080 or Pindone poisoning Burrow fumigation and destruction Trapping
Deer	No TAP available for deer	Shooting

3.1.6 Erosion and Sedimentation Control

Erosion and sediment control is critical to the long-term stability of the land surface and downstream water quality. MGO has developed an **Erosion and Sediment Control Plan (ESCP)** with the main objective being to protect soil resources and maintain local water course quality. The MGO **Erosion and Sediment Control Plan** outlines the requirements for erosion and sediment control across MGO and includes the BOA.

Activities associated with the construction of the Integra Underground water pipeline are available below in **Section** Integra Underground Water Pipeline Construction**3.1.7**.

Additional measures that will be implemented to manage potential impacts to biodiversity from the construction of the Narama Pipeline South Connection are discussed in **Section 3.1.8**.

Measures outlined in the Erosion and Sediment Control Plan include:

- Minimising the area of disturbance
- Diverting run-off water around disturbed areas
- Maintaining flow velocity at less than the erosive velocity
- Avoiding disturbance in areas of concentrated flows
- Maximising ground cover.

Work around riparian zones requires focused attention to rehabilitate these areas. This is further detailed in the **Surface Water Management and Monitoring Plan (SWMP)**. Approved ESCP and SWMP documents are available on the Glencore Australia website.

3.1.7 Integra Underground Water Pipeline Construction

During the construction of the MGO and Integra Underground Water Transfer Pipeline, ecological pre-clearance surveys were undertaken prior tree felling works. Identified hollow-bearing trees, proximate

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stags and trees with a trunk diameter of greater than 10cm, were avoided wherever practicable. Betty's Creek Habitat Management Area remained a no-go zone for activities associated with the construction of the water pipeline.

Where trees associated with the pipeline construction are required to be cleared within the Mount Owen Complex Project Boundary, compensatory planting will be undertaken (refer to **Section 3.2.2** for further details).

In the event topsoil is required to be disturbed during the pipeline construction process, topsoil will be re-instated and revegetated as soon as practicable after construction.

3.1.8 Narama Pipeline South Connection Construction

Potential impacts to biodiversity from the construction of the Narama Pipeline South connection will be managed in accordance with the measures outlined in this BOMPS. This will include avoiding disturbance of stags, hollow bearing trees and the Bettys Creek Habitat Management Area.

Further to this, any newly constructed sections of the pipeline that are located above ground will include short sections (approximately 300 mm) which are raised above ground level by placing timber or concrete beams under the pipeline. These will be located approximately every 50 to 100m to allow the movement of small ground fauna beneath the pipeline.

3.2 Habitat Enhancement

The loss of fauna habitat from the disturbance footprints will result in increased pressure on surrounding vegetation for displaced fauna competing for foraging resources, shelter and nesting/roosting habitats. The following section describes mitigation of habitat loss through habitat enhancement of remnant vegetation, revegetation and areas of rehabilitation within MGO.

Habitat enhancement will generally be undertaken within the rehabilitation and revegetation of the BOAs and will focus on:

- Habitat augmentation with salvaged habitat resources and nest boxes (refer to Section 3.2.1);
- Compensatory planting, where required; and
- Enhancement of the East-West Corridor Management Area (refer to Figure 2.2).

The aim of habitat enhancement is to increase the quality or abundance of specific habitat features for key threatened species, to increase the carrying capacity of rehabilitation and areas within MGO to support displaced species, and to augment with specific habitat features to encourage use by target species earlier than may naturally occur.

The following section outlines the recommended methods for tree hollow augmentation, and for augmentation of other habitat features.

3.2.1 Habitat Augmentation

3.2.1.1 Salvaged Resources

Salvaged habitat resources including:

- Tree hollows;

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- Fallen timber; and
- Rocks/boulders.

Salvaged resources provide foraging and refuge habitat for a number of key threatened species, particularly insectivorous woodland birds and terrestrial mammal species. The microclimates provided around fallen timber and rocks/boulders can assist in the establishment of flora species and the decomposing woody material from fallen timber can assist in soil conditioning.

The relocation of salvaged habitat resources will focus on areas with low natural hollow and habitat resource densities within rehabilitation areas. This will increase habitat complexity for fauna species sooner than when they would naturally develop.

Where salvaged resources are to be installed:

- They are to be of structurally good condition for habitat use;
- Sizes should be variable to capture for the range of threatened species known to occur in MGO such as woodland birds, arboreal mammals and micro-bats;
- Hollow resource density should be consistent with densities in unaffected vegetation on the site (i.e. reference sites); and
- Fallen timber resource density should be consistent with densities in unaffected vegetation on the site (i.e. reference sites).

When re-instating habitat features, care must be taken not to damage existing native vegetation and where possible should take place prior to rehabilitation work commencing. Habitat features can be stockpiled in unused areas, if necessary, in a manner that minimises damage and deterioration, until able to be reinstated.

3.2.1.2 Nest Boxes

Erecting nest boxes has been undertaken at MGO since 1995. New nest box installation locations will focus on areas with low natural hollow and nest box densities within rehabilitation areas. Nest boxes will be maintained within rehabilitation areas for the life of the mine to ensure that hollow roosting and nesting species are able to inhabit rehabilitated areas to supplement arboreal habitat. An assessment of the suitability of rehabilitated areas will be undertaken as part of annual rehabilitation monitoring to determine when the rehabilitation is sufficiently mature enough to support populations of hollow dependent fauna species, as well as the size and type of nest boxes/tree hollows that are suitable.

Where nest boxes are to be installed:

- They are to be made from high quality and durable materials that, ideally, provide for a long lifespan;
- Designs are to be targeted to the hollow-dependent threatened species known to occur in MGO such as woodland birds, arboreal mammals and micro-bats;
- Hollow resource density should be consistent with densities in unaffected vegetation on the site (i.e. reference sites); and

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- The number, type and size of nest boxes to be installed should be reflective of those disturbed in impacted areas.

For works associated with the Glendell transmission line relocation, for every tree hollow removed, two nest boxes will be installed in a secure location near the impact area.

Installed nest boxes will be monitored for condition and content as outlined in **Section 5.1.2**. Any nest boxes that have deteriorated or been damaged to the point they no longer function as intended will be replaced during the life of the mine.

3.2.2 Compensatory Planting

For works relating to the construction of the Greater Ravensworth tailings management infrastructure and the realignment of the transmission line, 10 river oak trees were direct seeded for every established (2 metre or greater in height) river oak tree removed or severely damaged (lopped to the extent that half or more of the crown biomass is lost) as a result of the works.

These trees planted in areas likely to once contained Hunter Valley River Oak Forest near the impact area and along Bowmans Creek. These measures also aim to mitigate the visual impacts of the mine. MGO will assess the germination progress annually and undertake supplementary planting if required until plant establishment.

For works relating to the construction of the Integra Underground water pipeline infrastructure, 10 swamp oak trees will be planted and maintained, until established for every established swamp oak removed or severely damaged as a result of the works. These trees are to be planted in areas which will continue to enhance the vegetation and habitat connectivity of the swamp oak community.

3.2.3 Tree Screens

As required by Schedule 3, Condition 40, approximately 1,000 advanced native tube stock were planted adjacent to the New England Highway. Additional tube stock were planted during 2009 to improve density and width in some areas. These measures also aim to mitigate the visual impacts of the mine.

The tree screen is assessed annually for health and effectiveness and maintained with watering, weed control and mulch.

3.2.4 East-West Corridor Management Area

The East-West Corridor Management Area (refer to **Figure 2.2**), occurs north of the Mt Owen access road. It joins existing scattered woodland habitats from the Mt Owen site office and Yorks Creek. This area will be maintained to retain the native vegetation and connectivity in an east to west direction between RSF, established rehabilitated areas in the northern area of the North Pit overburden emplacement area, and riparian vegetation along Yorks Creek and Bowmans Creek to the west toward Liddell Operations.

Measures will include:

- Cattle exclusion;
- Weed and pest animal control;
- Access control including fencing; and

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- Revegetation.

Supplementary planting will include passive and active revegetation targeting species characteristic of Central Hunter Ironbark – Spotted Gum - Grey Box Forest including:

- *Corymbia maculata*;
- *Eucalyptus moluccana*; and
- *Eucalyptus crebra*;

where natural regeneration following cattle exclusion and access control is not adequate.

3.2.4.1 Cultural Heritage Management

The East-West Corridor Management Area is located south of the Yorks Creek Voluntary Conservation Area (VCA). The VCA is conserved for Aboriginal cultural heritage purposes.

Management strategies relating to Aboriginal cultural heritage sites and values are provided in the approved *MGO Aboriginal Cultural Heritage Management Plan (ACHMP)*. The strategies identified in this BOMPS have been developed in accordance with the ACHMP. Approved ACHMP document is available on the Glencore Australia website (www.mtowencomplex.com.au).

The proposed regeneration/revegetation activities documented above are designed to provide adaptive measures for restricted areas. While natural regeneration will be encouraged wherever possible, regeneration /revegetation may require some mechanical activity (and ground disturbance) in order to re-establish naturally occurring vegetation communities. Proposed revegetation works will be managed in accordance with ACHMP.

A Ground Disturbance Permit (GDP) is required for all activities on previously undisturbed land and includes a review of cultural heritage impacts. If the proposed works are outside the previously assessed cultural heritage VCA, further investigation into cultural heritage impacts must be completed for due diligence.

3.3 Bushfire Management

There are two aspects to bushfire management in MGO; prevention and control. Bushfire management will be guided by the *NSW Rural Fire Service Bushfire Environmental Assessment Code, 2006* (BEAC) (RFS 2006) as well as *Planning for Bushfire Protection 2019* (RFS 2019).

Many flora and fauna species, young trees and shrubs are susceptible to the effects of inappropriate fire regimes such as too frequent and/or too intense fires. The development and effective implementation of bushfire management strategies is essential to the long-term success of revegetation programs and viability of fauna populations.

These objectives will be achieved through the implementation of a range of measures, including;

- Maintaining a suitably equipped response to any fires on site and assisting the Rural Fire Service and emergency services on site in the event of a fire at MGO
- Appropriate grazing management regimes to reduce ground fuel loads whilst minimising impacts on biodiversity
- Maintaining strategically positioned fire breaks and access roads.

Any bushfire to occur on MGO owned land will be reported as an incident and a review of MGO's bushfire mitigation and management procedures will be undertaken.

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3.4 Seed Collection and Propagation

The key objectives for seed collection, handling and propagation are to provide a resource to:

- Enhance the regeneration of native indigenous vegetation within designated rehabilitation and biodiversity conservation areas
- Facilitate active reforestation of equivalent land types adjoining the RSF
- Facilitate revegetation of mine disturbed areas using native indigenous species as part of mine site rehabilitation.
- Maintain representation of local provenance genetic diversity at species and community levels through the collection of diverse local genetic stock.

The seed collection program will focus on:

- Seed collection of species from target vegetation communities adhering to best practice principles for seed collection and storage (Florabank 2013).
- Meeting the required volumes of local provenance seed in order to; propagate the required numbers of tubestock and undertake direct seeding activities to meet annual targets
- Detailed recording of the collection and propagation process, including seed collection methods, timing, seed storage, seed quantity, propagation/seeding methods and successes. Such records will be fed back into the process to allow for continual improvement and increased success rates.

3.5 Riparian Zone Management

Areas of Bowmans Creek and Bettys Creek have the potential to be impacted as a result of the MOCO Project and works associated with the relocation of the transmission line for the Glendell Mine may impact areas of Swamp Creek and Bowmans Creek. Furthermore, changes are expected to the final landform catchment areas of Yorks Creek, Swamp Creek, Bettys Creek and Main Creek.

The key objectives for riparian zone management and rehabilitation are to:

- Enhance bank stability and mitigate erosion issues
- Provide vegetated riparian corridors for fauna movements including habitat enhancement features (i.e. woody debris)
- Develop self-sustaining native vegetation communities that restore impacted native vegetation communities.

Management of riparian zones during and following disturbances will be focused on improving the resilience of existing riparian vegetation, habitat connectivity and providing habitat features for threatened flora and fauna species. Management actions will consider the recommendations in the *Guidelines for Controlled Activities on Waterfront Land* (DPI 2012) and include the following measures, where deemed required:

- Planting of tree species (direct seeding and planting of native tubestock) characteristic of the riparian vegetation (**Table 3.5**) to enhance bank stability and restore areas temporarily cleared that are associated with Central Hunter Swamp Oak Forest and Hunter Valley River Oak Forest
- Additional vegetation planting adjacent to riparian zones to reduce reliance on riparian vegetation for connectivity

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- Fencing of riparian vegetation to remove grazing pressures and access control on ground and understorey species during dry periods. use of geo-matting, hay bales or straw wattles to secure diversion banks and support deposition of soil
- Hydro mulching, using native species, to stabilise the soil surface and promote organic matter build up
- Installation of logs and other natural course debris along the banks to promote sediment build up and habitat features for local fauna species and
- Re-shaping, where required, using top-soil and other material.

Management area extents for riparian zone actions will be determined based on the Strahler system of ordering watercourses and recommended riparian corridor widths in DPI (2012). **Table 3.5** below outlines these stream orders and recommended corridor management areas for the creeks and drainage lines in and around MGO.

Table 3.5 – Strahler Stream Orders and Recommended Corridor Management Areas

Creek	Watercourse Type	Recommended Riparian Corridor Width	Dominant Vegetation Community
Bowmans Creek	6 th order	40m either side of channel	Hunter Valley River Oak Forest
Bettys Creek	4 th order	40m either side of channel	Central Hunter Swamp Oak Forest
Main Creek	4 th order	40m either side of channel	Central Hunter Swamp Oak Forest
Swamp Creek	3 rd order	30m either side of channel	Central Hunter Swamp Oak Forest
Yorks Creek	3 rd order	30m either side of channel	Central Hunter Swamp Oak Forest

Management in relation to groundwater dependent ecosystems (GDEs) will be undertaken as required where GDE monitoring (**Section 5.1.3**) indicates changes in alluvial groundwater levels as a result of mining impacts.

Refer to the Surface Water Management and Monitoring Plan (SWMP) and Creek Diversion Management Plan for further details.

3.6 Mine Rehabilitation

MGO is committed to rehabilitate areas disturbed by mining activities back to woodland and grassland communities and with a specific focus on the re-establishment of Central Hunter Ironbark – Spotted Gum – Grey Box Forest and, in selected areas, grassland for grazing. The rehabilitation strategy will also include the establishment of other communities in appropriate parts of the terrain such as Hunter Lowland Red Gum Forest, primarily along drainage lines and potentially areas of dry rainforest or wetter variants of Central Hunter Ironbark – Spotted Gum – Grey Box Forest with dry rainforest species in more sheltered areas of the final landform. Areas temporarily cleared in association with the Glendell Mine are required to be replanted or naturally regenerated. The rehabilitation strategy will

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be integrated, where appropriate, with the rehabilitation strategies of the Ravensworth East and Ashton mines (**Figure 1.2**) to maximise habitat linkages.

The rehabilitation areas previously surveyed (Umwelt 2013) found these areas are trending very strongly towards the *Central Hunter Ironbark – Spotted Gum – Grey Box Forest in the NSW North Coast and Sydney Basin Bioregions EEC*, and ongoing management of these sites will continue to improve their condition and function and to ensure long-term self-sustainability.

Where suitable, the retention or augmentation of dams in the post-mining landform will be undertaken to facilitate the re-colonisation of native woodland fauna communities.

Details of the mine rehabilitation within MGO are included in the *Mining Operations Plan / Rehabilitation Management Plan (MOP)*. Approved MOP document is available on the Glencore Australia website.

4. Management of Biodiversity at the Offset Sites

Table 4.1 outlines the short, medium and long-term measures to manage the biodiversity at the BOAs.

Table 4.1 – Short, Medium and Long-term Measures to Manage Biodiversity at the BOAs

Action	Short-term 2019-2020	Medium-term 2020-2025	Long-term 2025-2030
Manage the remnant vegetation and fauna habitat at the BOAs	Habitat augmentation using salvaged resources and nest boxes. Ongoing weed and pest management. Grazing management. Supplementary planting for corridor function and required BOAs. Access control. Monitoring and improvement.	Ongoing weed and pest management. Habitat monitoring and enhancement. Access control. Regeneration and revegetation activities. Monitoring and improvement.	Monitoring and improvement.

4.1 Habitat Enhancement

The loss of fauna habitat from the disturbance footprints will result in increased pressure on surrounding vegetation for displaced fauna competing for foraging resources, shelter and nesting/roosting habitats. The following section describes the habitat enhancement of remnant vegetation and regeneration/revegetation areas of the BOAs.

Habitat enhancement will be undertaken within the BOAs and will focus on:

- Habitat augmentation with salvaged habitat resources and nest boxes (refer to **Section 4.1.1**);

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- Corridor function of the South East Corridor Offset (refer to **Section 4.1.2**);
- Targeted African olive control at the Stringybark Creek Habitat Corridor (refer to **Section 4.2.1**); and
- Regeneration and revegetation (discussed in detail in **Section 4.8**).

The aim of habitat enhancement is to increase the quality or abundance of specific habitat features for key threatened species, to increase the carrying capacity of the BOAs to support displaced species, and to augment with specific habitat features to encourage use by target species earlier than may naturally occur.

4.1.1 Habitat Augmentation

Habitat augmentation is the process of installing habitat features for a range of fauna species in previously disturbed or depauperate areas. Habitat augmentation can greatly contribute to the quality of habitat for key threatened species in an area and provide valuable refuge for fauna species as they move across the landscape. Specific habitat features are those that can be a limiting factor to population thresholds, and may include nest boxes, salvaged tree hollows, fallen timber, hollow logs and / or rocks and boulders.

Once regenerated communities are structurally mature, salvaged tree hollows and/or nest boxes will be installed in similar densities to those in unaffected vegetation on the site (i.e. reference sites). Nest box design will consider the full range of hollow-dependent species known or expected to occur in the BOAs, in particular hollow-dependent threatened fauna species such as the squirrel glider (*Petaurus norfolcensis*) and threatened tree-roosting woodland birds and micro-bats.

4.1.1.1 Augmented Denning Habitat for the Spotted-tailed Quoll in the Stringybark Creek Habitat Corridor

Given the known presence of a spotted-tailed quoll (*Dasyurus maculatus maculatus*) population in MGO and surrounds, the following habitat enhancement measures will be undertaken within the Stringybark Creek Habitat Corridor to assist the persistence of this species at the site and the broader local area:

- Salvage of trees felled during mining operations and emplacement within the Stringybark Creek Habitat Corridor as log piles. This will increase the amount of potential foraging and denning habitat for this species in the local area; and
- Salvage and placement of large rocks and boulders into piles as further potential denning habitat.

4.1.2 Corridor Function and the South East Corridor Offset

Continuation of mining in the North Pit will result in a temporary reduction in the width of the Southeast Corridor Offset during active mining operations and prior to completion of rehabilitation of this area. MGO have undertaken strategic active revegetation in the Additional Active Revegetation Area (**Figure 1.2**) located in the Southeast Corridor Offset to minimise the impacts of corridor width reduction in this area.

A schedule of actions in this area is provided in **Table 4.2** below.

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Table 4.2 – Southeast Corridor Offset Active Regeneration Plan

Action	Detail	Status
Year 1 – 2017		
Supplementary planting of canopy and shrub species characteristic of surrounding areas of established Spotted Gum - Narrow-leaved Ironbark shrub - grass open forest of the central and lower Hunter (HU816)	<i>Corymbia maculata</i> <i>Eucalyptus crebra</i> <i>Eucalyptus moluccana</i> <i>Eucalyptus fibrosa</i> <i>Allocasuarina luehmannii</i> <i>Daviesia ulicifolia</i> <i>Daviesia genistifolia</i> <i>Lissanthe strigosa</i> <i>Acacia amblygona</i> And other species consistent with this community as observed at MGO.	Completed
Supplementary planting of canopy and shrub species characteristic of surrounding areas of established Swamp Oak - Weeping Grass grassy riparian forest of the Hunter Valley (HU945) along the minor riparian zone associated with the upper reaches of Main Creek.	<i>Casuarina glauca</i> <i>Angophora floribunda</i>	Completed
Year 2 – 2018		
Habitat augmentation following salvage works associated with clearance activities.	Fallen timber Hollow logs Rock/boulders Nest box installation	Ongoing
Year 3 – 2019		
Further supplementary planting of canopy and shrub species if monitoring shows planting failure from Year 1 or inadequate growth.	As per species list above	Supplementary Planting not required at this stage.
Year 4 – 2020		
Growth and weed control monitoring	Ongoing weed control Nest box installation	-

The proposed planting density, spacing and tree to shrub ratio was determined following consideration of the planting regime and patch and density experiments previously undertaken in the Southeast Corridor Offset.

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Table 4.3 below outlines the completed planting densities and tree to scrub ratios for the targeted planting of the Southeast Corridor Offset. While **Table 4.3** provided proposed planting ratios, the variability in the canopy to shrub ratio in the Southeast Corridor Offset will be adaptively managed to account for any changes required to maximise the success of the planting and to provide connectivity in the north-south corridor.

Table 4.3 – Completed Planting Densities and Ratios

Area Nominated for Planting (ha)	Canopy Plants		Midstorey Plants		Canopy/ Midstorey Ratio
	Per Hectare	Total	Per Hectare	Total	
16	400	4960	500	8,240	1:1.25

4.2 Weed Management

The introduced flora species provided in **Table 4.4** have been identified within the BOAs and have legislative status as listed noxious, environmental weeds, Weeds of National Significance or as key threatening processes (KTPs). Other significant weeds that may be present at the BOAs recorded during monitoring or inspections should be included in future revisions of this Plan.

Table 4.4 - Introduced Flora Species Recorded in BOAs

Common Name	Suitable Control Methods
Bridal Creeper <i>Asparagus asparagoides</i>	Physical removal, selective herbicide application.
African Boxthorn <i>Lycium ferocissimum</i>	Direct cut and paint stems, herbicide application, physical removal.
Fireweed <i>Senecio madagascariensis</i>	Foliar spray
Galenia <i>Galenia pubescens</i>	Selective herbicide application
Prickly Pear <i>Opuntia stricta</i> var. <i>stricta</i>	Selective herbicide application, biological control.
Tiger Pear <i>Opuntia aurantiaca</i>	Physical removal, burning, selective herbicide application.
African Olive <i>Olea europaea</i> subsp. <i>cuspidata</i>	Refer to Section 4.2.1 .

The key objective of weed control for the BOAs is to encourage the regeneration of native species by controlling, or where practicable, eliminating noxious weeds.

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Refer to **Section 3.1.4** for information regarding the weed control program and chemicals to be used for the purposes of weed control within the BOAs.

4.2.1 African Olive Control at the Stringybark Habitat Corridor

A total of 8 hectares of African olive-dominated land occurs in the Stringybark Creek Habitat Corridor. The community occurs on the upper, south to south-east facing slopes and is characterised by dense stands (to 70 per cent cover) of African olive (*Olea europaea subsp. cuspidata*) up to approximately 3 metres in height. Emergent narrow-leaved ironbark (*Eucalyptus crebra*) and spotted gum (*Corymbia maculata*) were scattered throughout the area, occurring to approximately 15 metres in height.

The invasion and establishment of African olive can result in the suppression of native species growth and regeneration which limits biodiversity and resources for target threatened fauna species. Active management of this species is a key management factor in maintaining and improving the habitat at the Stringybark Creek Habitat Corridor. The improvement of the habitat quality at the site requires active regeneration of eucalypt-dominated woodland vegetation, which will substantially increase the area of suitable habitat available for threatened species as well as improving connectivity between the offset sites and surrounding habitat.

Control measures can include:

- Herbicide treatment;
- Cutting the tree and applying herbicide to the cut stump;
- Foliar spray for control of seedlings;
- Tree injection to frill 3cm deep holes into the trunk and applying herbicide;
- Controlled fire for young (<1metre) plants; and
- Physical removal where applicable, however due to steep slope herbicide treatment will be prioritised.

4.3 Pest Animal Control

Pest control will be consistent across MGO's Rehabilitation and Biodiversity Offsets areas, objectives in their control, are outlined in **Section 3.1.5** and **Table 3.4**.

4.4 Grazing Management

Controlled, sustainable grazing practices may be required throughout the life of the offset areas to allow for weed and fuel load control. Where this is undertaken, grazing will be temporary and monitoring for any adverse impacts to biodiversity will be undertaken.

4.5 Fencing, Signage and Access Control

Fencing will be installed (where it does not currently occur) along the boundaries of the BOAs to demarcate the sites and protect the BOAs from unauthorised access and disturbance.

Access control measures for the BOAs include:

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- Appropriate fencing and signposting of areas of biodiversity value where appropriate to prevent the uncontrolled entry of people and to minimise vehicular and human traffic;
- Alternatives to barbed-wire fencing are to be considered when new fencing is required including the use of plain wire fencing to avoid the obstruction of flight paths of birds, bats and gliders;
- Clear and visible signage is to be appropriately located to inform employees and others of the restricted access or otherwise of areas of biodiversity value; and
- Locking of gates to prevent unwanted vehicle, person access and disturbance.

Continued monitoring and maintenance of fences, signage and access will occur as part of ongoing management of the BOAs.

4.6 Erosion and Sediment Control

Inspections of areas of erosion concern will be included in routine inspection surveys, targeting riparian areas and sites with limited vegetation cover. If an area of significant erosion concern is identified, appropriate short term erosion and sediment controls will be implemented and longer term stabilisation actions such as vegetation establishment will be investigated.

The revegetation process has the potential to create erosion issues through the removal of ground covering vegetation and disturbing the soil profile. Minimising the area of exposed soil and ripping along contours will limit the amount of erosion in revegetation areas. All revegetation areas and watercourses will be monitored for evidence of erosion and corrective actions (e.g. remedial earthworks, groundcover planting, and soil amelioration) will be implemented where required.

4.7 Bushfire Management

As per **Section 3.3**, the development and effective implementation of bushfire management strategies is essential to the long-term success of revegetation programs and viability of fauna populations.

4.8 Regeneration and Revegetation of the BOAs

The aim of revegetation/regeneration works within the BOAs is to restore areas of existing grassland and degraded vegetation to a condition that is representative of the target benchmark communities, thus improving habitat quality and connectivity throughout these areas. Works will be undertaken in consideration of *Establishing Native Vegetation – Principles and Interim Guidelines for Spoil Placements Areas and Restoration Lands* (Nussbaumer *et al.* 2012). Where suitable, the revegetation/regeneration works within the BOAs will be integrated with the rehabilitation strategies of MGO and Ashton Mine to maximise habitat linkages.

4.8.1 Management Domains

4.8.1.1 Regeneration of Derived Native Grasslands

Passive Regeneration

The process of allowing woodland communities to naturally develop from seed bank material present through the removal of grazing and management of weeds and other predation factors.

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Active Regeneration

The process of supplementing passive regeneration with direct seeding or planting of woodland species is used where there is a requirement to establish a woodland community earlier, or with greater long-term confidence, than might be achieved through passive regeneration alone or where monitoring of passive regeneration indicates that species recovery may not be optimal due to seed dormancy issues or the seeds of key species are not present in the soil seed bank.

Regeneration is reliant upon seedlings germinating from seed naturally distributed at the offset sites from existing remnant vegetation. This approach will be utilised where there is potential for increased density and extension of existing remnant vegetation or where after a short time period it is obvious that there is a viable seed bank present in cleared areas not proximate to remnant vegetation. Some areas of the offset areas are currently exhibiting evidence of natural regeneration (emerging seedlings from parent trees) that only requires protection from stock (or managed rotational grazing), feral animal control and weed management in order for existing seedlings to reach maturity.

Each proposed regeneration area is to be assessed for the presence of healthy seed within the existing remnant vegetation. Where a healthy seed stock is not evident, direct seeding methods may need to be employed. In most domains, the erection of fencing to exclude cattle or implement a program of managed rotational grazing is required in order to facilitate natural regeneration of the remnant bushland.

4.8.1.2 Revegetation of Disturbed Areas

Revegetation is the process of actively planting or seeding species into a previously cleared environment. A range of methods are proposed for domains that require medium to high intensity revegetation including direct seeding, tubestock planting, targeted weed management strategies, feral animal control, grazing management and fencing/access control.

Planting of tube-stock and/or seeding may be required in target areas; however natural regeneration will also be encouraged where possible. Ongoing management actions will be required to increase survival of tubestock or direct seeded areas. It is considered that protection of existing vegetation (either through exclusion of grazing or managed rotational grazing), combined with additional fencing, weed management, feral animal and bushfire control and supplementary planting via direct seeding and/or tubestock will lead to the development of a self-sustaining natural ecosystem.

4.8.2 Regeneration and Revegetation Method

4.8.2.1 Direct Seeding

Direct seeding will involve either hand broadcasting or machinery application of a local provenance native seed mix directly onto prepared ground. Preparation of the seed bed will be the key to the success of this method. Depending on the location and the condition of the existing vegetation, ground preparation will involve weed management, contour ripping, scarification, or a combination of these. Reducing competition from existing groundcover species (including native grasses in some areas), may be required in order to provide the best opportunities for success when employing direct seeding method. This may involve the use of herbicides, crash grazing, slashing or a combination of these methods.

Weed management will be a particularly important aspect of site preparation for direct seeding sites as application of herbicides after seeding is to be minimised as mortality of non-target species such as very young seedlings is likely to occur. Minimising competition for nutrients, water and light via weed reduction prior to seeding of a site will be critical for the success of the revegetation program.

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Herbicide applications may need to be applied to planned revegetation sites for an extended period prior to sowing of the native seed mix. These herbicide applications are likely to take place in autumn and spring and may be conducted after grazing or slashing of the proposed planting area in order to achieve a more effective kill of weed species.

The benefits of direct seeding are that the seedlings produced are generally more resilient than tubestock and should require less ongoing maintenance. Direct seeding allows a mixture of trees, shrubs and groundcovers to be sown at the same time with the different rates of germination reflecting that of assisted natural regeneration.

The seed mix will contain a mixture of groundcover, canopy and understorey species; however in order to increase survival rates, species that are known to have low germination rates will not be included in the seed mix and will instead be grown as tubestock then planted. Seeding mixtures and rates will be determined by the desired revegetation community, seed viability and planting site conditions. Seed treatments such as smoke, water or heat application will be conducted on species where seed dormancy is considered to be an issue (e.g. *Asteraceae* and *Acacia* spp.).

4.8.2.2 Tubestock Planting

It is recommended that tubestock planting be utilised on sites where assisted natural regeneration is unlikely to occur. Species composition and stems per hectare rates will be reflective of the adjacent communities and pre-clearing vegetation community type.

It is proposed that tubestock be propagated in a Hunter Valley nursery using local provenance seed. It is recommended that the use of 'Hiko' cells (or similar) tubestock be implemented across the majority of the site, as this method results in good root structure, is cost effective, and allows for large numbers of seedlings to be planted in short time periods. Good soil preparation is essential when using this method and an extensive weed management program, followed by ripping of the soil will be required prior to planting.

Depending on the soil structure it may be necessary to pass a rotary hoe over the rip line prior to planting of tubestock. This will break up any large clumps of soil and reduce the potential for air gaps to be left around the seedling's root structure.

4.8.3 Target Vegetation Communities

The target regenerated and revegetated vegetation communities within the BOAs are outlined in **Table 4.5** below.

Table 4.5 - Target Regenerated and Revegetated Vegetation Communities

Biodiversity Offset Area	Target Vegetation Communities from Derived Native Grassland or Disturbed Land	Re-establishment Methods	Methods

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Biodiversity Offset Area	Target Vegetation Communities from Derived Native Grassland or Disturbed Land	Re-establishment Methods	Methods
South East Offset	1602 - HU816 Spotted Gum - Narrow-leaved Ironbark shrub - grass open forest of the central and lower Hunter	Passive Regeneration as described in the Conservation Agreements	Weed and Pest management Grazing management Access management Habitat augmentation
Forest East Offset	1602 - HU816 Spotted Gum - Narrow-leaved Ironbark shrub - grass open forest of the central and lower Hunter	Combination of passive regeneration and active regeneration as described in the Conservation Agreements	Direct seeding Weed and Pest management Grazing management Access management Habitat augmentation
South East Corridor Offset	1602 - HU816 Spotted Gum - Narrow-leaved Ironbark shrub - grass open forest of the central and lower Hunter	Combination of passive regeneration and active regeneration as described in the Conservation Agreements	Tube stake planting Direct seeding Weed and Pest management Grazing management Access management Habitat augmentation
North East Offset	1602 - HU816 Spotted Gum - Narrow-leaved Ironbark shrub - grass open forest of the central and lower Hunter	Passive Regeneration as described in the Conservation Agreements	Weed and Pest management Grazing management Access management Habitat augmentation
	HU828 Grey Gum - Grey Myrtle - Narrow-leaved Stringybark - Rusty Fig open forest on ranges of the Upper Hunter	Passive Regeneration as described in the Conservation Agreements	Weed and Pest management Grazing management Access management Habitat augmentation
North West Offset	1602 - HU816 Spotted Gum - Narrow-leaved Ironbark shrub - grass open forest of the central and lower Hunter	Passive Regeneration as described in the Conservation Agreements	Weed and Pest management Grazing management Access management Habitat augmentation

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Biodiversity Offset Area	Target Vegetation Communities from Derived Native Grassland or Disturbed Land	Re-establishment Methods	Methods
Southern Remnant Offset	1607 - HU816 Spotted Gum - Narrow-leaved Ironbark shrub - grass open forest of the central and lower Hunter	Combination of passive regeneration and active regeneration as described in the Conservation Agreements	Direct seeding Weed and Pest management Grazing management Access management Habitat augmentation
Bettys Creek Habitat Management Area (HMA)	HU905 Narrow-leaved Ironbark - Grey Box grassy woodland of the central and upper Hunter Conforming to Central Hunter Grey Box – Ironbark Woodland EEC	Combination of passive regeneration and active regeneration as described in the Conservation Agreements	Direct seeding Weed and Pest management Grazing management Access management Habitat augmentation
	HU906 Bull Oak grassy woodland of the central Hunter Valley	Passive Regeneration	Weed and Pest management Grazing management Access management Habitat augmentation
	HU945 Swamp Oak - Weeping Grass grassy riparian forest of the Hunter Valley	Combination of passive regeneration and active regeneration as described in the Conservation Agreements	Direct seeding Weed and Pest management Grazing management Access management Habitat augmentation
Cross Creek Offset Area	1602 - HU816 Spotted Gum - Narrow-leaved Ironbark shrub - grass open forest of the central and lower Hunter Conforming to Central Hunter Ironbark – Spotted Gum – Grey Box Forest EEC	Combination of passive regeneration and active regeneration as described in the Stewardship Agreements	Direct seeding Weed and Pest management Grazing management Access management Habitat augmentation

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Biodiversity Offset Area	Target Vegetation Communities from Derived Native Grassland or Disturbed Land	Re-establishment Methods	Methods
Esparanga Offset Area	281 - HU714 Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Passive Regeneration as described in the Stewardship Agreements	Weed and Pest management Grazing management Access management Habitat augmentation
	618 - HU730 White Box x Grey Box - red gum - Rough-barked Apple grassy woodland on rich soils on hills in the upper Hunter Valley Conforming to White Box – Yellow Box – Blakely's Red Gum Woodland EEC	Passive Regeneration as described in the Stewardship Agreements	Weed and Pest management Grazing management Access management Habitat augmentation
Stringybark Creek Habitat Corridor Offset Area	1598 - HU812 Forest Red Gum grassy open forest on floodplains of the lower Hunter Conforming to River-flat Eucalypt Forest EEC	Combination of passive regeneration and active regeneration as described in the Stewardship Agreements African olive weed management	Direct seeding Weed and Pest management Grazing management Access management Habitat augmentation
	1602 - HU816 Spotted Gum - Narrow-leaved Ironbark shrub - grass open forest of the central and lower Hunter Conforming to Central Hunter Ironbark – Spotted Gum – Grey Box Forest EEC	Combination of passive regeneration and active regeneration as described in the Stewardship Agreements African olive weed management	Direct seeding Weed and Pest management Grazing management Access management Habitat augmentation
Mitchell Hills Offset Area	1590 - HU630 Spotted Gum - Grey Ironbark forest dry open forest of the lower foothills of the Barrington Tops, NSW North Coast Bioregion	Passive Regeneration as described in the Stewardship Agreements	Weed and Pest management Grazing management Access management Habitat augmentation

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Biodiversity Offset Area	Target Vegetation Communities from Derived Native Grassland or Disturbed Land	Re-establishment Methods	Methods
Rehabilitation Woodland Offset Area	1602 - HU816 Spotted Gum - Narrow-leaved Ironbark shrub - grass open forest of the central and lower Hunter	Rehabilitation	Rehabilitation methods are described in the MOP.

4.8.4 Target Habitat for Threatened Species

The target habitat types for threatened species to be established at the BOAs are outlined in **Table 4.6**.

Table 4.6 – Target Habitat for Threatened Species

Biodiversity Offset Area	Target Habitat Types from Derived Native Grassland or Disturbed Land	Threatened Species
South East Offset	Passive regeneration of box-gum forests	<ul style="list-style-type: none"> • Arboreal mammals (squirrel glider, brush-tailed phascogale, koala) • Ground-dwelling mammals (spotted-tailed quoll) • Woodland birds (swift parrot, speckled warbler, little lorikeet, grey-crowned babbler, diamond firetail) • Micro-bats (eastern bentwing-bat, east coast freetail-bat, great broad-nosed bat) • Forest owls (masked owl, powerful owl)
Forest East Offset	Passive regeneration of box-gum forests	<ul style="list-style-type: none"> • Arboreal mammals (squirrel glider, brush-tailed phascogale, koala) • Ground-dwelling mammals (spotted-tailed quoll) • Woodland birds (swift parrot, speckled warbler, little lorikeet, grey-crowned babbler, diamond firetail) • Micro-bats (eastern bentwing-bat, east coast freetail-bat, great broad-nosed bat) • Forest owls (masked owl, powerful owl)
South East Corridor Offset	Passive and active regeneration of box-gum forests	<ul style="list-style-type: none"> • Arboreal mammals (squirrel glider, brush-tailed phascogale, koala) • Ground-dwelling mammals (spotted-tailed quoll) • Woodland birds (swift parrot, regent honeyeater, speckled warbler, little lorikeet, grey-crowned babbler, diamond firetail) • Micro-bats (eastern bentwing-bat, east coast freetail-bat, great broad-nosed bat) • Forest owls (masked owl, powerful owl)
North East Offset	Passive regeneration of box-gum forests.	<ul style="list-style-type: none"> • Arboreal mammals (squirrel glider, brush-tailed phascogale, koala) • Ground-dwelling mammals (spotted-tailed quoll)

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Biodiversity Offset Area	Target Habitat Types from Derived Native Grassland or Disturbed Land	Threatened Species
	Passive regeneration of dry rainforest habitat.	<ul style="list-style-type: none"> Woodland birds (swift parrot, regent honeyeater, speckled warbler, little lorikeet, grey-crowned babbler, diamond firetail) Micro-bats (eastern bentwing-bat, east coast freetail-bat, great broad-nosed bat) Forest owls (masked owl, powerful owl)
Southern Remnant Offset	Passive regeneration of box-gum forests.	<ul style="list-style-type: none"> Arboreal mammals (squirrel glider) Woodland birds (swift parrot, regent honeyeater, speckled warbler, little lorikeet, grey-crowned babbler, diamond firetail) Micro-bats (eastern bentwing-bat, east coast freetail-bat, great broad-nosed bat)
Bettys Creek Habitat Management Area (HMA)	Active regeneration of box-gum forests and riparian forests Passive regeneration of bullock forests	<ul style="list-style-type: none"> Amphibians (green and golden bell frog) Arboreal mammals (squirrel glider, brush-tailed phascogale) Ground-dwelling mammals (spotted-tailed quoll) Woodland birds (swift parrot, regent honeyeater, speckled warbler, little lorikeet, grey-crowned babbler, diamond firetail) Micro-bats (eastern bentwing-bat, east coast freetail-bat, great broad-nosed bat) Forest owls (masked owl, powerful owl)
Cross Creek Offset Site	Active regeneration of box-gum forests	<ul style="list-style-type: none"> Arboreal mammals (squirrel glider, brush-tailed phascogale) Ground-dwelling mammals (spotted-tailed quoll) Woodland birds (swift parrot, regent honeyeater, speckled warbler, little lorikeet, grey-crowned babbler, diamond firetail) Micro-bats (eastern bentwing-bat, east coast freetail-bat)
Stringybark Creek Habitat Corridor Offset Site	Revegetation of riparian forest and box-gum forests	<ul style="list-style-type: none"> Arboreal mammals (squirrel glider, brush-tailed phascogale) Ground-dwelling mammals (spotted-tailed quoll) Woodland birds (swift parrot, regent honeyeater, speckled warbler, little lorikeet, grey-crowned babbler, diamond firetail) Micro-bats (eastern bentwing-bat, east coast freetail-bat) Forest owls (masked owl, powerful owl)
	Clearance of African olive infestation	<ul style="list-style-type: none"> Ground-dwelling mammals (spotted-tailed quoll)
Esperanga Offset Site	Passive regeneration of box-gum woodlands	<ul style="list-style-type: none"> Flora (tiger orchid) Arboreal mammals (squirrel glider, brush-tailed phascogale, koala) Ground-dwelling mammals (spotted-tailed quoll)

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Biodiversity Offset Area	Target Habitat Types from Derived Native Grassland or Disturbed Land	Threatened Species
		<ul style="list-style-type: none"> Woodland birds (swift parrot, regent honeyeater, scarlet robin, speckled warbler, little lorikeet, brown treecreeper, varied sittella) Micro-bats (eastern bentwing-bat, yellow-bellied sheath-tail bat) Forest owls (masked owl, powerful owl)
Mitchell Hills Offset Site	Passive regeneration of box-gum forests	<ul style="list-style-type: none"> Arboreal mammals (squirrel glider, brush-tailed phascogale) Ground-dwelling mammals (spotted-tailed quoll) Woodland birds (swift parrot, regent honeyeater, scarlet robin, speckled warbler, little lorikeet, brown treecreeper, varied sittella) Micro-bats (eastern bentwing-bat, large-eared pied bat) Forest owls (masked owl, powerful owl)
Rehabilitation Woodland	Rehabilitation of box-gum forest	<ul style="list-style-type: none"> Arboreal mammals (brush-tailed phascogale) Ground-dwelling mammals (spotted-tailed quoll) Micro-bats (eastern bentwing-bat, east coast freetail-bat, great broad-nosed bat) Woodland birds (speckled warbler, little lorikeet, grey-crowned babbler, Diamond firetail) Forest owls (masked owl, powerful owl)

4.8.5 Cultural Heritage Management

Management strategies relating to aboriginal and cultural heritage values are undertaken in accordance with the MGO's approved ACHMP.

4.9 Rehabilitation Woodland Offset

Mt Owen will identify an area of 518 hectares of mine rehabilitation to commit as BOA within 5 years of commencement of operations. This area is to be restored to *Central Hunter Ironbark – Spotted Gum – Grey Box Forest in the NSW North Coast and Sydney Basin Bioregions EEC* under the TSC Act. As outlined in Section 1.7.1, the long-term conservation of this offset will be determined in accordance with Condition 29, Schedule 3 of SSD 5850.

Details of the rehabilitation to be undertaken in the Rehabilitation Woodland Offset Area are included in the MGO's approved MOP.

5. Monitoring and Inspections

5.1 Rehabilitation Monitoring Program

The rehabilitation monitoring program is undertaken across MGO and targets areas of mine rehabilitation, revegetation and habitat creation. This monitoring includes assessments of rehabilitation establishment success and progress, seasonal fauna monitoring and assessments of GDEs.

The monitoring program will identify management measures required to address issues with the potential to hinder successful rehabilitation establishment and progress towards the objectives and completion criteria defined in the approved MOP and, as such, will contribute significantly towards the identification of signals of sustainability. Once the sustainability signals are achieved for any section of rehabilitation, a scientifically based statement can be prepared of sustainable soil function; sustainable plant life cycling and diversity of functional groups; and evidence of recolonization of rehabilitation areas by native fauna. Such statement can then assist MGO with relinquishment of that part of the mining lease.

The types of surveys conducted across MGO relating to rehabilitation condition are outlined in the sections below. All Rehabilitation monitoring methods are described in more detail within the Rehabilitation Management Plan also referred as MOP.

5.1.1 Annual Rehabilitation Monitoring

Every year, rehabilitation monitoring efforts will concentrate on rehabilitation areas aged 1, 2, 5 and 10 years old (and every 5 years thereafter). A number of discrete monitoring areas/zones are defined and delineated based on rehabilitation age and specific final land use type: Open Grassland, Corridors/Shelter Belts or Open Woodland. Different monitoring zones can later be merged/grouped as one larger zone where it has been determined that adjacent areas of different ages (but similar land use) are comparable in state and condition.

Monitoring of younger areas (Years 1 and 2) is primarily concerned with species germination and establishment of a protective ground cover, the emergence of weed species that may hinder further development of the site, and landform stability including early signs of erosion. Monitoring of intermediate rehabilitation (Year 5) focusses on the survival and growth of seedlings and the adequacy of establishing species against the targeted vegetation communities; whilst also confirming whether slopes and landforms have stabilised. Finally, monitoring of mature rehabilitation (Years 10+) assesses the structure, resilience and self-sustainability of the established ecosystems, and demonstrates the productivity of pastures (where relevant).

In each of the rehabilitation areas selected for monitoring, performance condition is assessed by means of a walkover inspection combined with scientific transect/plot-based monitoring.

5.1.1.1 Walkover Inspection

The walkover inspection is intended to provide a high-level assessment of rehabilitation condition across the entire area being assessed. Whilst walking each monitoring area/zone, opportunistic sightings and assessments are made of the following, where relevant:

- Germination rates, species abundance and diversity in recently established rehabilitation;

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- Ground protection, vegetative cover, vegetation health and growth rates;
- Constructed artificial habitat features (rock piles, logs, stags, nest boxes, etc.);
- Stability of slopes and landforms including active erosion areas (e.g. rill, gully and tunnel erosion);
- Function and condition of sediment control and water management structures (e.g. rock-lined drains, contour banks, sediment dams, etc.);
- Areas of significant weed incursion;
- Evidence of presence of / impact from vertebrate pest species; and
- Any other disturbance factors or features which may impact on site safety, such as presence of mine waste, track disturbance, damaged fences, etc.

All key observations are documented by recording GPS coordinates and collecting geo-referenced photographs so that specific areas/issues can be revisited in the future to demonstrate the evolution of the site condition over time.

5.1.1.2 Transect/Plot-based Monitoring

This monitoring collects more detailed data on vegetation community establishment and development, from which an accurate assessment can be made on the status of rehabilitation against associated completion criteria. The monitoring is designed to be scientifically robust and repeatable, so that data collected in successive monitoring campaigns can be compared and trend analyses undertaken of rehabilitation progress over time; so that it can be demonstrated that the rehabilitation is tracking towards the target communities and defined objectives and completion criteria.

Within each defined monitoring area/zone, monitoring transects/plots are established at densities defined in **Table 5.1** and using the configuration shown in **Plate 1**.

At each monitoring transect/plot, the metrics and attributes listed in **Table 5.2** are assessed and collected. For areas of Open Woodland rehabilitation, monitoring methods incorporate the requirements of the NSW Biodiversity Assessment Method (BAM) (NSW OEH, 2017). Flora monitoring locations within MGO BOAs are shown on **Figure 5.1** and **Figure 5.2**.

Table 5.1 – Recommended monitoring plot density per monitoring area/zone

Open Grassland / Pasture rehabilitation		Open Woodland / Shelter Belts rehabilitation	
Zone area (ha)	No. of transects/plots	Zone area (ha)	No. of transects/plots
< 5	1 site	< 2	1 site
> 5 – 10	2 sites	> 2 – 5	2 sites
> 10 – 25	3 sites	> 5 – 20	3 sites
> 25 – 50	4 sites	>20 – 50	4 sites
> 50 – 100	5 sites	> 50 – 100	5 sites

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Open Grassland / Pasture rehabilitation		Open Woodland / Shelter Belts rehabilitation	
Zone area (ha)	No. of transects/plots	Zone area (ha)	No. of transects/plots
> 100 – 250	6 sites	> 100 – 250	6 sites

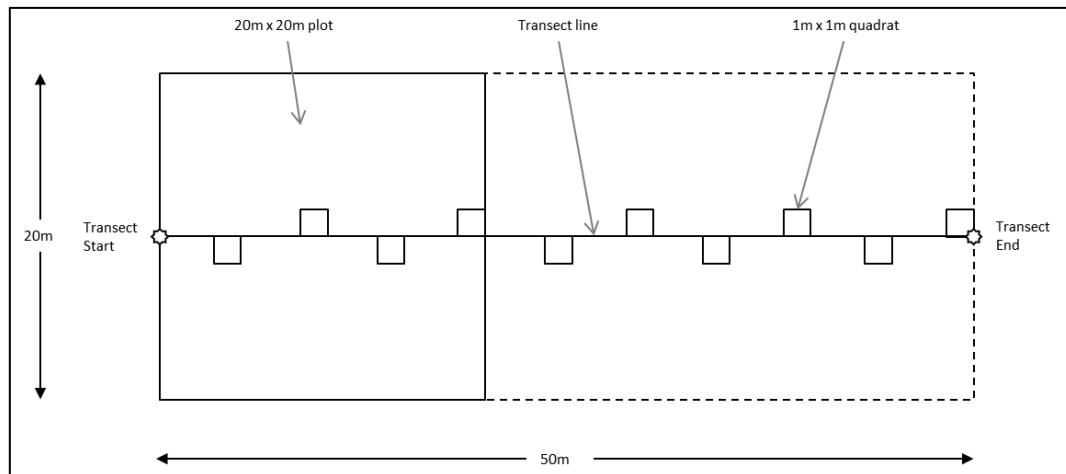


Plate 1 – Monitoring transect/plot configuration

Table 5.2 – Monitoring metrics and attributes

Metric / attribute	Timing (years)	Sampling unit	Notes
All land use types			
Ground cover protection	1, 2, 5, 10, 15, etc.	10 x 1m ² quadrats	Percent cover of live vegetation, litter, cryptograms, rocks, bare ground.
Soil Profile	1	Localised	Depth, type and texture of applied topsoil/growing medium.
Soil properties	5, 10, 15, etc	20 x 50m plot	Laboratory analyses.
Photographic monitoring	1, 2, 5, 10, 15, etc.	Start and end of 50m transect line	Digital photographs with transect line in centre background.
Open Grassland rehabilitation			
Species composition	1, 2, 5, 10, 15, etc.	10 x 1m ² quadrats	List of all vascular ground cover species and associated percent cover score
Pasture productivity	5, 10, 15, etc	5 x 1m ² quadrats	Harvest and dry to determine pasture biomass and yields.
Open Woodland / Corridors/Shelter Belts rehabilitation			

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Metric / attribute	Timing (years)	Sampling unit	Notes
Vegetation composition	1, 2, 5, 10, 15, etc.	20m x20m plot	Percent cover score and abundance rating of each recorded vascular species (as per BAM number series)
	1, 2, 5, 10, 15, etc.	20m x20m plot	Percent cover score of each recorded vascular species (as per BM number series).
Tree stem densities	1, 2, 5, 10, 15, etc.	20m x 50m plot	Count of all tree stems per diameter at breast height classes (as per BAM DBH classes).
Vegetation function	10, 15, 20, etc.	20m x 50m plot	Presence of second generation tree seedlings and /or presence of reproductive material on tree species. Length of logs (m).
Vegetation health	5, 10, 15, etc.	20m x 50m plot	Vegetation health condition and growth rates

Use of Analogue Sites

Analogue sites form an integral part of the rehabilitation monitoring program at MGO and are used to establish performance benchmarks for a range of completion criteria defined in the MOP, particularly pertaining to species richness, species assemblages, vegetation structure, weed presence and soil characteristics.

Three native woodland analogue sites have been established and are monitored every 3 to 5 years using methods fully consistent with those applied at the rehabilitation sites (**Table 5.2**). All analogue sites were established within MGO's offset lands adjacent to the operation (i.e. to be representative of local communities' condition), and selected with particular consideration of vegetation community types (i.e. consistent with what is being re-established across the rehabilitation), vegetation condition and landform aspect/gradient.

Additional analogue sites may be established in the future to be representative of different vegetation community types as relevant to future rehabilitation works.

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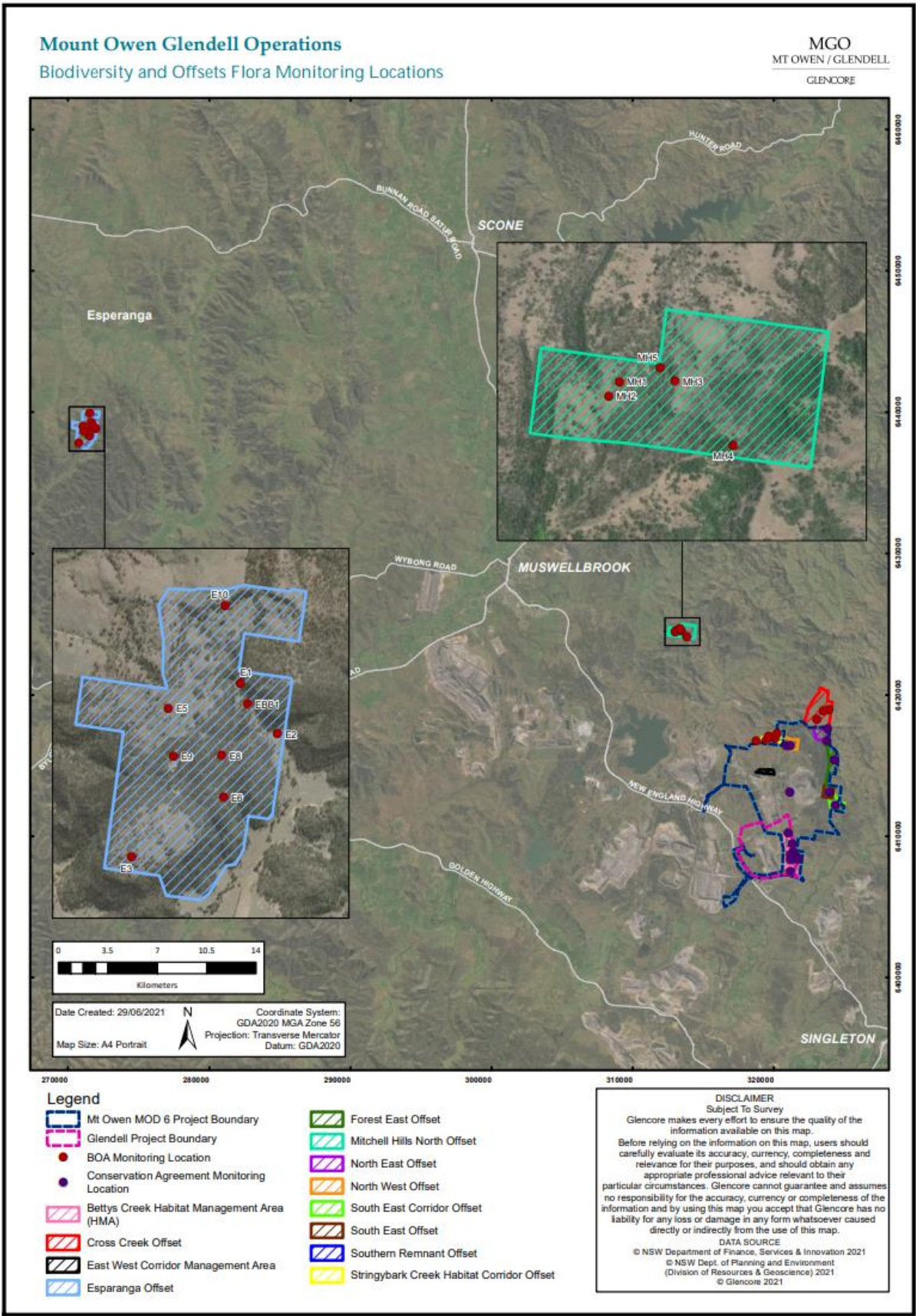


Figure 5.1 BOA Flora Monitoring Locations Overview

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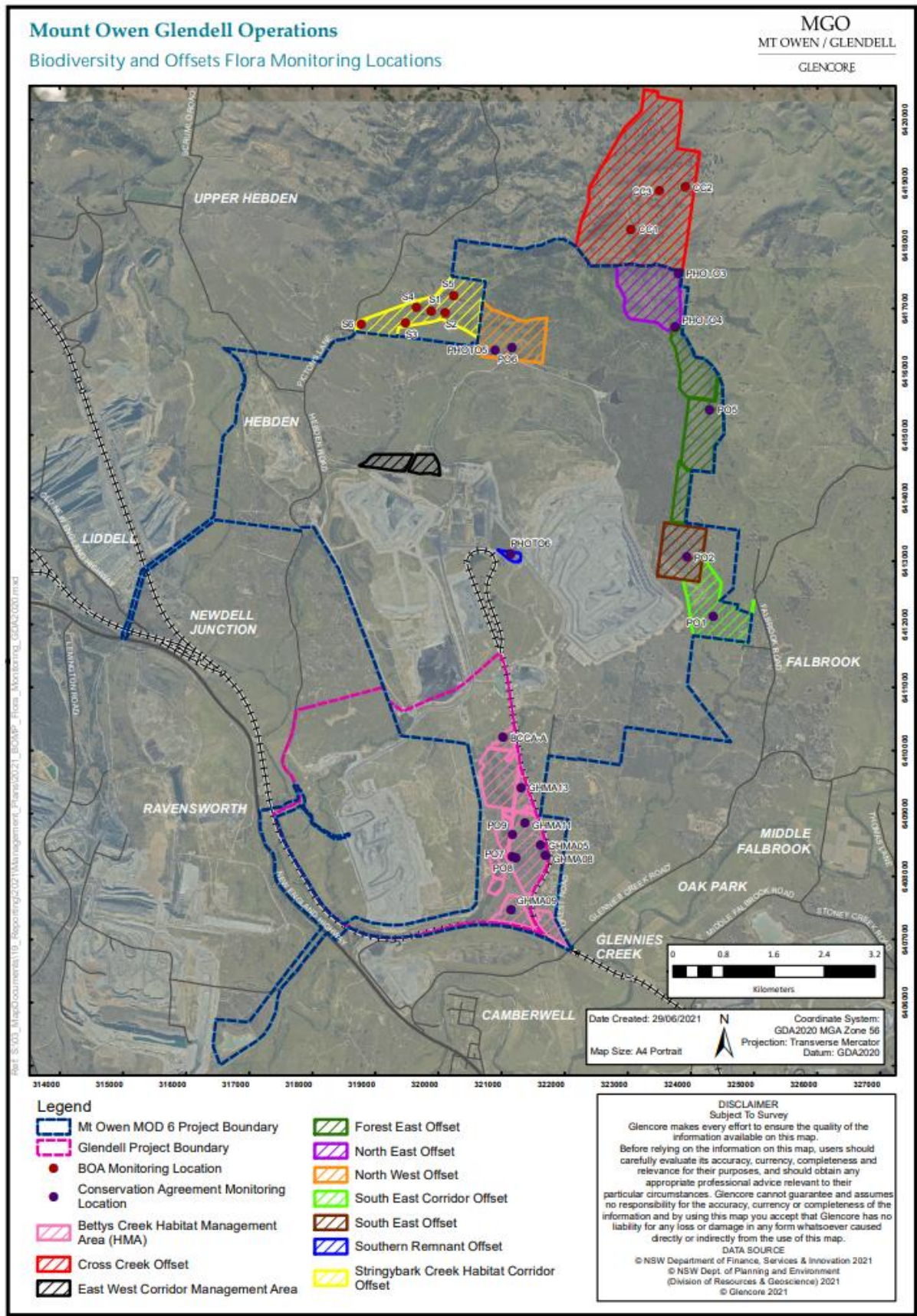


Figure 5.2 BOA Flora Monitoring Locations MGO

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5.1.2 Fauna Monitoring

Mt Owen Glendell Operations conducts fauna monitoring across the MGO. The primary aim of the monitoring program is to provide information that is useful in ensuring the continued survival and management of the native fauna of the study area. The key objectives of the program are to:

- Provide information on species present;
- Provide information on the distribution and habitat use of species in the management areas;
- Provide information on the success of fauna management and conservation program; and
- To enable informed decisions about future monitoring and management practices.

MGO operates a fauna monitoring program for a variety of species including:

- Birds;
- Small and arboreal mammals;
- Micro-bats;
- Reptiles; and
- Amphibians.

Fauna monitoring of the MGO and Rehabilitation areas is conducted annually. The sampling methodology is consistent with Offset fauna monitoring schedule, sampling diurnal (winter and spring), microbats by echolocation detection, herpetofauna surveys, nocturnal spotlight and remote cameras. In addition, a more comprehensive survey conducted every five years targets additional fauna groups such as small terrestrial mammals, trapping surveys for microbats. Fauna monitoring locations include Ravensworth State Forest (1 site) and rehabilitation areas (3 sites). Survey locations are detailed in **Appendix C**. Detailed methods are outlined in the fauna monitoring reports.

The seasonal fauna monitoring schedule is outlined in **Table 5.3** below. Monitoring will also be undertaken in the year 2020, 2025 and 2030 to compare against the results of habitat creation following previous revegetation and rehabilitation activities.

Table 5.3 – Fauna monitoring schedule

Offset	Size (ha)	Site Name(s)	Fauna Monitoring Method								Five Yr Monitoring		
			Diurnal Birds	Winter Birds	Micro-bats (Anabat)	Herpetofauna	Nocturnal Spotlight Call playback	Remote Camera	Nest box	Nest Box Installation	Microbats (Harp Trap)	Pitfall Trapping	Elliott Trapping
MGO Rehabilitation	518	Reh1, Reh2, Reh3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Ravensworth State Forest	597	MGO For1	Y	Y	Y	Y	Y	Y	Y	N/A	Y	Y	Y
			Autumn		Winter		Spring		Summer				

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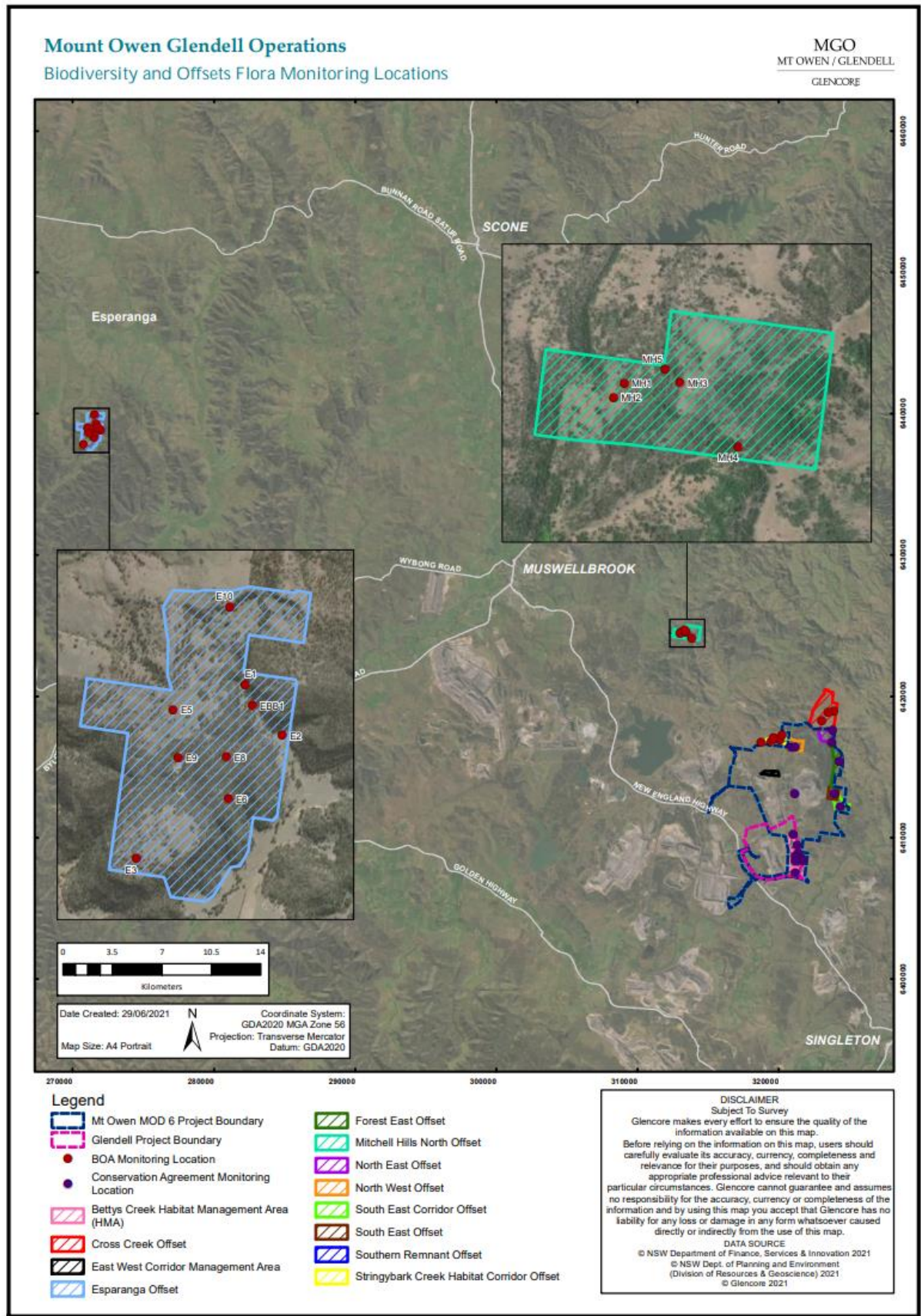


Figure 5.3 BOA Fauna Monitoring Locations Overview

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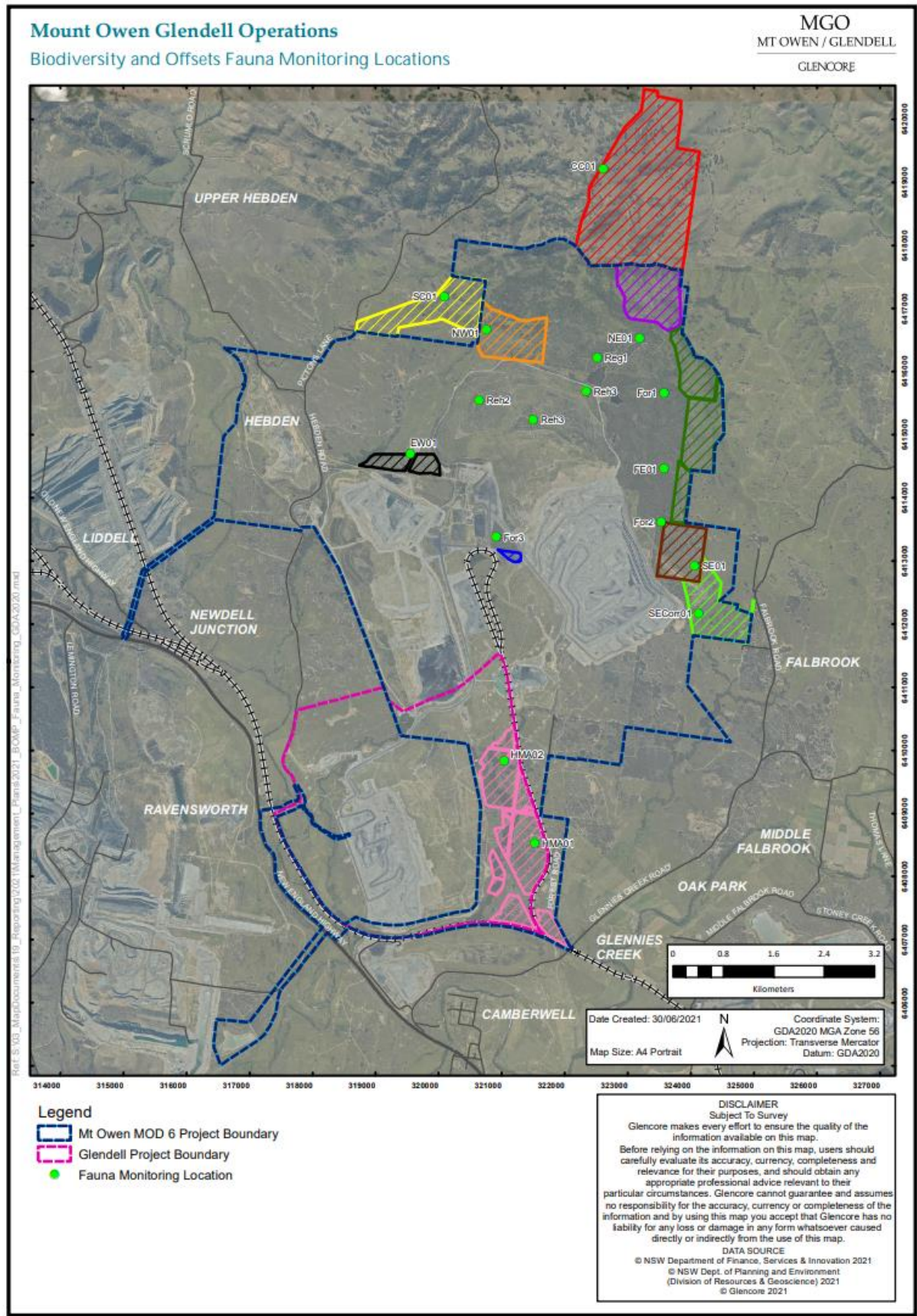


Figure 5.4 BOA Fauna Monitoring Locations MGO

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5.1.3 Groundwater Dependant Ecosystems

The monitoring of GDEs will include the measurement of the following parameters:

- Alluvial groundwater levels
- Stream level
- Water quality
- Rapid appraisal of riparian condition (RARC) – this comprises assessing five sub-indices of:
 - habitat extent and continuity;
 - cover of vegetation and structural complexity;
 - native vegetation dominance versus exotics (weeds);
 - debris such as standing dead trees, hollow bearing trees, leaf litter, fallen logs; and
 - features indicative to the site;
- Visual inspection and photographic recording; and
- Cross sections at selected monitoring points.

Monitoring will be located along:

- Main Creek and Bettys Creek where GDEs may be potentially impacted by the Project;
- Analogue sites where the alluvium are not predicted to be impacted; and
- Upstream locations where vegetation communities occur above minimal alluvium.

This monitoring will also provide information on the outcomes of riparian zone management actions (if applicable) as outlined in **Section 3.5** including:

- Soil conditions and erosion (i.e. stability);
- Drainage and sediment control structures;
- Plant health;
- Natural regeneration; and
- Weed infestation.

5.2 BOAs Ecological Monitoring

These BOAs will be subject to ongoing monitoring and maintenance actions to ensure that the areas progress towards meeting the objectives and targets in a timely manner. The monitoring program will monitor the success of the management actions, in addition to compliance with the approval conditions and against performance indicators outlined in **Appendix E**.

The monitoring requirements for the Rehabilitation Woodland Offset Area will be developed and implemented in accordance with the MOP.

The BOAs are be subject to specific ecological monitoring methods and subject to BCD agreements approval.

5.2.1 Stewardship Agreements Offsets (SAOs)

- Cross Creek Offset Area;
- Stringybark Creek Habitat Corridor;
- Esparanga Offset Area; and
- Mitchell Hills Offset Area.

5.2.1.1 Flora Monitoring

MGO will undertake flora monitoring at the SAOs in accordance with the *Biodiversity Assessment Methodology, 2017* (BAM) (OEH 2017) to analyse floristic composition and vegetation attribute trends against benchmark data.

Flora monitoring will involve the following:

- **Vegetation survey plots** – full floristic plot-based surveys using in a 20 x 20 metre quadrat (or 400m² or equivalent area) nested within a 20 x 50 metre plot (or equivalent 1,000m² area).
- **Photographic monitoring** – undertaken at permanent monitoring points using a consistent methodology across the BOAs.
- **Opportunistic observations** – sightings of high threat weeds and other invasive species, threatened species and/or notes on management related issue (broken fences, track maintenance etc.).

5.2.1.2 Vegetation Survey Plots

Vegetation survey plots (BAM plots) will consist of a 20m x 20m quadrat nested within a 20m x 50m plot with a 50m transect line and associated 1m x 1m subquadrats, as shown in **Plate 2** below.

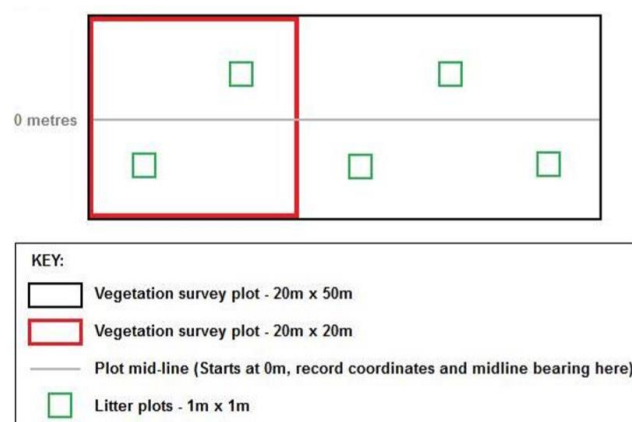


Plate 2 – BAM Plot layout

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Plots are to be established permanently using star pickets at the four corners of the 20 x 20 metre quadrat. At least one plot will be established in each vegetation zone (plant community type and condition class) to allow paired-site comparisons in each of the BOAs. Vegetation attributes to be collected is provided in **Table 5.4** below.

Table 5.4 - Vegetation attribute data to be collected in BAM Plots

Attribute	Sampling Area	Assessment methods
Vegetation composition	20m x 20m quadrat	<ul style="list-style-type: none"> Total number of native plant species (richness) observed and recorded; Full species names (to the lowest taxonomic order) of above ground vascular plant species recorded where sufficient plant material is available for identification using nomenclature consistent with PlantNet NSW; At least the three dominant native plants identified to species level; Stratum and layer-in which each species occurs; Growth form -for each recorded species; Exotic and High Threat Exotic (HTE) plant species recorded; The composition of each allocated growth form assessed by counting the number of different native plant species within each growth form group (i.e. tree, shrub, grass and grass like, forb, fern and other); Abundance rating –A relative measure of the number of individuals or shoots of a species within the plot. Use the following intervals; numbers above about 20 are estimates only: 1,2,3,4,5,6,7,8,9,10,20,50,100,500,1000. Numbers between 20 and 1000 individuals estimated only as it is not possible to accurately count large numbers of some species in the plot.
Vegetation structure	20m x 20m quadrat	<ul style="list-style-type: none"> Each recorded species is to be assigned an estimate percent foliage cover, drawn from the following number series: 0.1, 0.2, 0.3,.....1, 2, 3,.....10, 15, 20, 25,.....100% The structure of each growth form group will be calculated as the summation of individual foliage cover estimates of all species recorded within the growth form group.
Vegetation function	20m x 50m plot	<ul style="list-style-type: none"> Number of large trees -count of all living stems with a DBH equal to or greater than the large tree benchmark DBH size for that PCT or vegetation class. Stem size class -record presence or absence of living tree stems that fall between regenerating stems (<5cm DBH) and the large tree benchmark DBH size(s) (i.e. <5, 5–9, 10–19, 20–29, 30–49, 50–79, and 80+ cm DBH) and include all species in the tree growth form group; Total length of fallen logs -total length in metres of all woody material greater than 10cm in diameter that is dead and entirely or in part on the ground in each plot; Hollow bearing trees –number of hollow-bearing trees (living or dead) were counted with at least one hollow with an opening

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Attribute	Sampling Area	Assessment methods
		width greater than or equal to five centimetres and the hollow at least one metre above the ground. Hollows in the shrub growth form group were also counted if met requirements
	1m x 1m subquadrat	<ul style="list-style-type: none"> Litter cover -percentage litter cover was measured in five 1 m x 1 m subquadrats located five metres out from 50 metre mid-line marked at 5m, 15m, 25m, 35m and 45m. Litter is taken as plant material detached from a plant including leaves, seeds, twigs, branchlets and branches with diameter of <10 cm. Litter not in contact with the ground is not recorded. The estimated litter cover from each five sub-plots were averaged to generate the average percentage litter cover for the entire plot;

5.2.1.3 Photo Monitoring

Photographic monitoring is to be undertaken at each BAM Plot from the northeast corner of the 20m x 20m quadrat. Four digital photographs will be taken facing north, east, south and west.

5.2.1.4 Opportunistic Observations

Whilst traversing the BOAs and travelling between the monitoring locations, any relevant opportunistic sightings and observations will be recorded and documented. This may include (though not necessarily limited to):

- Any risks to the implementation of the biodiversity offset strategy arising as a function of the TARP defined in Section 7.0 of the BOMP;
- Fire events or impacts of fire management;
- Significant and active erosion/sedimentation features or processes which may compromise land capability;
- Weeds (including compiling a list of high threat exotic species and recording new weed infestations including location and extent);
- Pest animals (species and location, including evidence of pest animals such as burrows, scats or disturbance);
- Visitor impact and vehicle access (including evidence of any recent usage, and the presence of any new access tracks);
- Rubbish dumping;
- Presence of domesticated livestock;
- Damaged fences which may require maintenance;
- Natural regeneration of previously disturbed areas; and

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- Success of revegetation works or other implemented management actions.

5.2.1.5 Timing

Monitoring is to be carried out at the same time of year across BOAs. It is recommended that the time period occur in spring to maximise species richness through increased detectability of flowering forbs and annual species.

Monitoring within the SAOs should be undertaken annually as per SA requirements.

Monitoring within the SAOs should be undertaken annually as per SA requirements.

Table 5.5 – Flora Monitoring Requirements

BOA	Vegetation Zones	Minimum Plots and Transects Required
Cross Creek Offset Area	1602 Moderate to Good 1602 Moderate to Good (Riparian Variant) 1602 Moderate to Good (DNG)	3
Stringybark Creek Habitat Corridor	1598 Moderate to Good 1602 Moderate to Good 1602 Moderate to Good (DNG) 1602 Moderate to Good (African Olive) 1614 Moderate to Good 1731 Moderate to Good	6
Esparanga Offset Area	281 Moderate to Good 281 Moderate to Good (DNG) 618 Moderate to Good 618 Moderate to Good (Shrubby Variant) 618 Moderate to Good (DNG) 1602 Moderate to Good 1607 Moderate to Good 1654 Moderate to Good 1654 Moderate to Good (DNG)	9

BOA	Vegetation Zones	Minimum Plots and Transects Required
Mitchell Hills Offset Area	1590 Moderate to Good 1590 Moderate to Good (DNG) 1590 Moderate to Good (Regrowth) 1543 Moderate to Good 624 Moderate to Good	5

5.2.2 Conservation Agreements Offsets (CAOs)

- Bettys Creek HMA;
- South East Offset;
- Forest East Offset;
- South East Corridor Offset;
- North East Offset;
- North West Offset; and
- Southern Remnant Offset.

5.2.2.1 Flora Monitoring

MGO will undertake flora monitoring at the CAOs in accordance with the Biometric methodology (DECCW 2011) to analyse floristic composition and vegetation attribute trends against benchmark data.

Flora monitoring will involve the following:

- **Plot monitoring** – floristic data was collected from each quadrat monitoring site and followed the Biometric methodology (DECCW 2011);
- **Photo-point monitoring** – four photographs were taken from each monitoring point at specific bearings to allow annual comparisons; and
- **Walkthrough assessment** – opportunistic sightings of management related issues.

5.2.2.2 Biometric Vegetation Plots

Plot monitoring will follow the NSW Biometric Methodology (Biometric) (DECCW 2011). This consists of a 20m x 50m plot with a nested 20m x 20m quadrat and 50m transect line.

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Plots are to be established permanently using star pickets at the four corners of the 20 x 20 metre quadrat. Plot stratification will follow that described in Table 5.5 below, and should facilitate paired-site comparisons in each of the CAOs.

Vegetation attributes to be collected is provided in **Table 5.6** below.

Table 5.6 – Biometric plot monitoring components

Sampling Area	Assessment methods
20m x 20m quadrat	<ul style="list-style-type: none"> • Full floristic diversity for all vascular flora. • Percentage projective foliage cover of each plant species within the quadrat (less than 5% cover estimated to the nearest percent up to 5%, then in 5% increments). • Estimated counts of abundance of each plant species within the quadrat. • Occurrence and abundance of weeds.
20m x 50m plot	<ul style="list-style-type: none"> • Hollow-bearing tree count. • Fallen log length count. • General health of vegetation. • Evidence of natural recruitment. • Signs of disturbance by stock or humans. • Evidence of feral animals. • Impacts from mining.
50m transect line	<ul style="list-style-type: none"> • 50-point intercept of groundcover lifeforms (native grasses, native herbs, native sedges and monocots, native shrubs less than 1 m and exotics) every 1 metre. • Estimated projective foliage cover of native overstorey species at 10 points (every 5 metres) • Estimated projective foliage cover of native mid-storey (above 1m) cover at 10 points (every 5 metres). • Estimated projective foliage cover of exotic canopy and mid-storey at 10 points (every 5 metres)

5.2.2.3 Photo Monitoring

Photographic monitoring is to be undertaken at each Biometric Plot from the northeast corner of the 20m x 20m quadrat. Four digital photographs respectively facing north, east, south and west.

5.2.2.4 Walkthrough Assessment

Whilst traversing the CAOs and travelling between the monitoring locations, any relevant opportunistic sightings and observations will be recorded and documented. This may include (though not necessarily limited to):

- Any risks to the implementation of the BOS arising as a function of the TARP defined in Section 7.0 of the BOMP;
- Fire events or impacts of fire management;
- Significant and active erosion/sedimentation features or processes which may compromise land capability;

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- Weeds (including compiling a list of high threat exotic species and recording new weed infestations including location and extent);
- Pest animals (species and location, including evidence of pest animals such as burrows, scats or disturbance);
- Visitor impact and vehicle access (including evidence of any recent usage, and the presence of any new access tracks);
- Rubbish dumping;
- Presence of domesticated livestock;
- Damaged fences which may require maintenance;
- Sightings of threatened species;
- Natural regeneration of previously disturbed areas; and
- Success of revegetation works or other implemented management actions.

5.2.2.5 Timing

Monitoring is to be carried out at the same time of year across CAOs. It is recommended that the time period occur in spring to maximise species richness through increased detectability of flowering forbs and annual species.

Monitoring within the CAOs should be undertaken annually as per CA requirements as also shown in **Table 5.7**.

Table 5.7 – CAOs Flora Monitoring Requirements

CAO	Vegetation	Minimum Plots and Transects Requirements
Bettys Creek (Enex Foydell) Conservation Area	HU906 - Derived Native Grassland (proposed for 1692 - Bull Oak Grassy Woodland of the Central Hunter Valley) HU905 - 1691 - Narrow-leaved Ironbark – Grey Box Grassy Woodland of the Central and Upper Hunter HU945 - 1731 - Swamp Oak – Weeping Grass Grassy Riparian Forest of the Hunter Valley	8
Bettys Creek (Glendell) Conservation Area	HU906 - Derived Native Grassland (proposed for 1692 - Bull Oak Grassy Woodland of the Central Hunter Valley)	1

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CAO	Vegetation	Minimum Plots and Transects Requirements
Mount Owen Offsets Conservation Area, represented by a cluster of four smaller offset areas, being; <ul style="list-style-type: none"> • North East Offset; • Forest East Offset; • South East Offset; • South East Corridor Offset; 	HU945 - 1731 - Swamp Oak – Weeping Grass Grassy Riparian Forest of the Hunter Valley HU816 - Derived Native Grassland (proposed for PCT 1602 - Spotted Gum - Narrow-leaved Ironbark Shrub - Grass Open Forest of the Central and Lower Hunter) HU828 - 1614 - Grey Gum - Grey Myrtle - Narrow-leaved Stringybark - Rusty Fig Open Forest on ranges of the Upper Hunter HU816 - 1602 - Spotted Gum - Narrow - leaved Ironbark Shrub - Grass Open Forest of the Central and Lower Hunter 20m x 50m plot	5
Southern Remnant Offset Conservation Area	HU816 - 1602 - Spotted Gum - Narrow - leaved Ironbark Shrub - Grass Open Forest of the Central and Lower Hunter	1
North West Offset Conservation Area	HU816 - 1602 - Spotted Gum - Narrow - leaved Ironbark Shrub - Grass Open Forest of the Central and Lower Hunter	2

5.2.3 Fauna Monitoring

Fauna monitoring will be undertaken at each BOA listed in **Section 5.2** and will consist of:

- Diurnal woodland bird surveys;
- Targeted winter bird surveys;
- Micro-bat echolocation surveys;
- Diurnal herpetofauna surveys;
- Spotlighting surveys;
- Call playback surveys; and
- Remote camera surveys.

Table 5.8 below outlines the number of fauna survey locations required at each BOA. The number of monitoring sites nominated will be reviewed periodically as monitoring progresses to enable adjustment to these as appropriate.

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Table 5.8 – BOAs Fauna Monitoring Schedule

Offset	Size (ha)	Site Name(s)	Number of Annual Fauna Monitoring Sites							
			Diurnal Birds	Winter Birds	Micro-bats (Anabat)	Herpetofauna	Nocturnal Spotlight Call playback	Remote Camera	Nest box Inspections	Nest Box Installation
Cross Creek Offset	367.0	CC01	1	1	1	1	1	2	N	N
Stringybark Creek Offset	97.5	SC01	1	1	1	1	1	2	Y	Y
Esparanga Offset	303.0	ESP01, ESP02, ESP03	3	3	3	3	3	3	N	N
Mitchell Hills Offset	143.7	MH01, MH02, MH03	3	3	3	3	3	3	Y	Y
Bettys Creek HMA Offset*	170	BC01, BC02	2	2	2	2	2	3	Y	Y
Southeast Corridor Offset*	74.1	SE Corr01	1	1	1	1	1	1	Y	Y
Southeast Offset*	58.3	MGO Reg3	1	1	1	1	1	1	Y	Y
Forest East Offset*	110.9	MGO Reg2	1	1	1	1	1	1	Y	Y
Southern Remnant Offset*	4.0	MGO For3	1	1	1	1	1	1	Y	N
Northeast Offset	83.6	NE01	1	1	1	1	1	1	Y	Y
Northwest Offset*	71.4	Close to SC01	1	1	1	1	1	1	Y	Y

*As per conservation agreements requirements.

Autumn	Winter	Spring	Summer
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5.2.3.1 Nest Box Installation and Monitoring

All nest boxes installed in the BOAs are subject to monitoring for condition and content. Details recorded for nest box monitoring is as follows:

- Content, including:
 - Whether they are being used by target species;
 - Signs of presence such as nesting material or feathers;
 - Predator use;
 - Presence of native fauna; and
 - Presence of non-target species such as bees, wasps and introduced birds.
- Condition, including:
 - Collapsing joints;
 - Missing lids;
 - Bowing timber;
 - Perishing timber; and
 - Tree attachment.

Additional nest-box monitoring surveys will be undertaken where new nest boxes are installed as habitat enhancement measures. These will be undertaken annually commencing the year after installation. MGO nest box monitoring locations are shown in **Figure 5.5**.

5.2.3.2 Diurnal Birds (including Winter Surveys)

Two survey methodologies are utilised to census for diurnal bird species:

- **Opportunistic Sightings** - Opportunistic sightings of bird species are recorded whilst undertaking other field duties. This includes direct observations of bird species and identification of their characteristic calls; and
- **Diurnal Census** - Sample plot counts employ a standard 20 minute search within a 1 hectare area (i.e. 100m x 100m, 50m x 200m, etc.) at each fauna monitoring site. Seasonal counts are conducted in both winter and spring. All bird species and individuals seen or heard are recorded, being scored as on-site if detected within plot, or off-site if recorded in adjacent vegetation types or flying overhead.

5.2.3.3 Nocturnal Birds

Spotlight surveys for nocturnal birds and other fauna comprise 30 minute search within minimum of 1 ha area. Playback calls of threatened large forest owls are to be conducted at completion of spotlight search.

5.2.3.4 Microbats (Recordings)

Anabat recordings for microbat species are to be conducted at each fauna monitoring site for one night in Spring. Detectors are to sample between dusk and dawn at locations likely to yield high microbat activity, such as flyways and dams.

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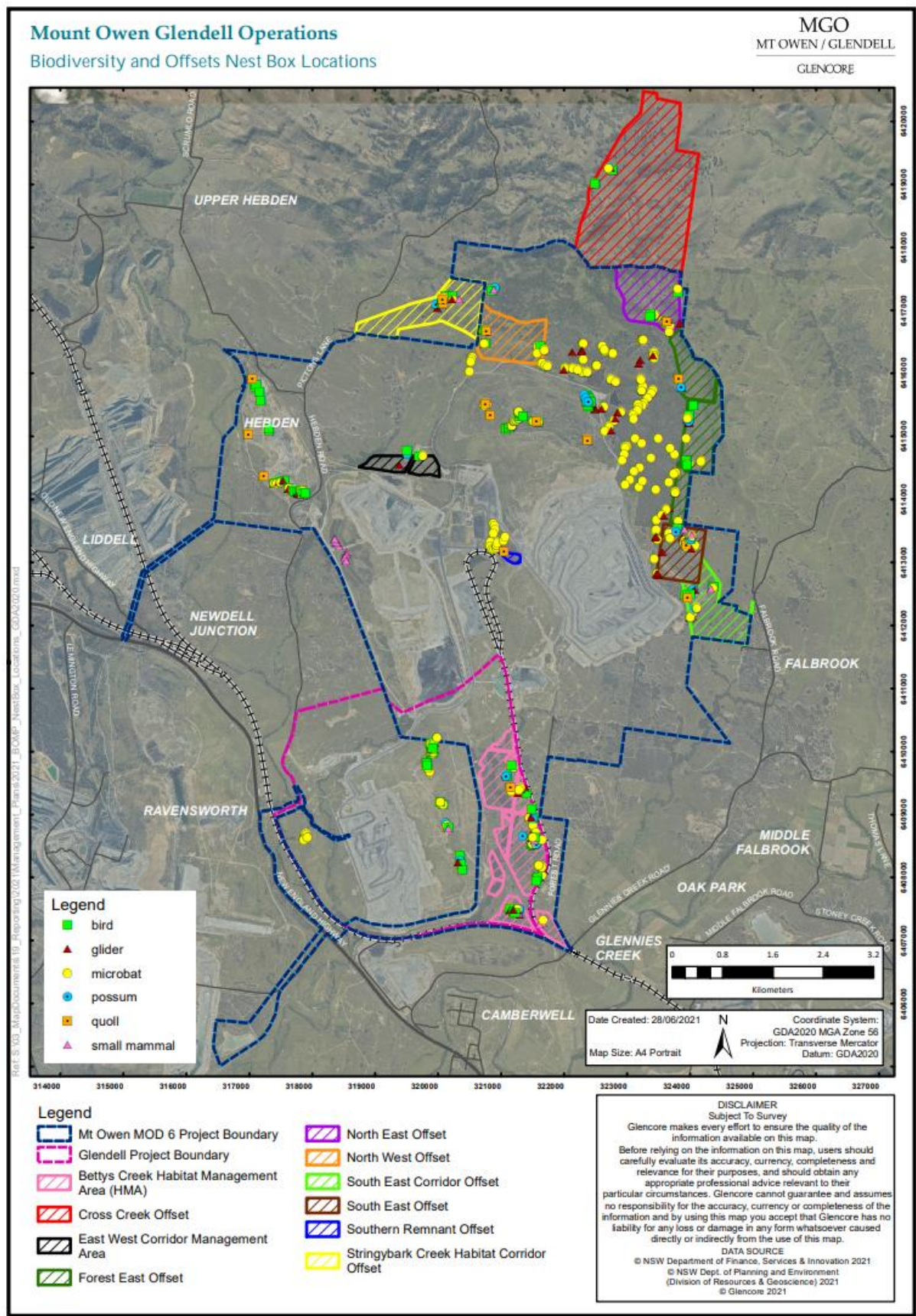


Figure 5.5 Nest Box Monitoring Locations

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5.2.3.5 Herptofauna

Diurnal searches for herpetofauna comprise a 60 search in areas of higher quality habitat for active or basking reptiles. Such areas should include rock piles, ground logs and other ground cover such as discarded building materials. Nocturnal searches for reptiles are covered during spotlight searches for other fauna.

Searches for frogs are to be conducted in areas of suitable habitat, such as farm dams or other waterbodies, and along any suitable creeklines. Ideally, searches should corresponded with recent rainfall events.

5.2.3.6 Remote Cameras

One motion detection camera is to be installed at each monitoring site for a minimum period of 30 consecutive nights, targeting a range of diurnal and nocturnal fauna.

5.2.4 Biannual Inspections of BOAs

Biannual (every six months) inspections will be undertaken within the BOAs over the life of the Project. These will comprise walkover inspections in strategic areas with a focus on revegetation/regeneration areas, weed control success, general offset access and overall pest control results. These will assess:

- The condition of site features such as fences and access tracks;
- Evidence of erosion;
- Fuel loads for bushfire risk;
- Weed infestations; and
- Evidence of pest fauna.

Outcomes of biannual inspections will be recorded and reported in the AR. Any required management actions that are identified as part of the inspection will be implemented as soon as practical. Where necessary, management strategies will be amended accordingly with the aim of continually improving the success of the management strategies.

6. Performance and Completion Criteria

The performance indicators and completion criteria are detailed in **Appendix E** relate to the:

- a) Management strategies for MGO as outlined in **Section 3**;
- b) Management strategies for the BOAs as outlined in **Section 4**; and
- c) Regeneration and revegetation areas of the BOAs as outlined in **Section 4.8**.

The performance and completion criteria for the Rehabilitation Woodland Offset Area will be detailed in the MOP.

7. Risks to Implementation of Biodiversity Offset Strategy

A risk assessment workshop was undertaken in October 2016 and included attendance of MGO personnel and a ecologist. The risk assessment was conducted to identify the potential risk to the successful implementation of the Biodiversity Offset Strategy and identify appropriate contingency measures where required. This process identified a number of low to medium risks which are summarised in **Table 7.1**.

Table 7.1 – Risk Assessment and Contingency Measures for the Implementation of the BOMPS

No.	Risk	Cause	Rating (1-25)	Contingency Measures	Timing/Frequency
1	Failure to implement Biodiversity Offset Strategy (BOS)	Less than adequate resourcing	5 - Low	Internal review of BOS. Further consultation with government authorities.	Consultation to be undertaken as soon as possible to resolve.
2	Failure to establish long term security of offsets by end June 2018	Failure to reach agreement on security mechanism with all tiers of government	5 - Low	Further consultation with government authorities.	Consultation to be undertaken as soon as possible to resolve.
3	Unapproved clearing/disturbance of BOAs or MGO	Non-adherence to GDP process	8 - Medium	Identify access points and repair as required Rehabilitate any damaged areas Review site security.	Within one week of identification during site operations or monitoring
4	Deterioration of vegetation/habitat within BOAs or MGO	Weed and feral pest infestation	12 - Medium	Adapt weed management strategy and modify accordingly Identify access points and repair as required	Strategy to be developed within two weeks of identification
		Unauthorised / uncontrolled access to biodiversity offset areas	12 - Medium		Control works to be undertaken within one month of identification
		Key habitat augmentation features absence or lacking in BOAs	8 - Medium	Review site security	Monitoring to be undertaken three months

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No.	Risk	Cause	Rating (1-25)	Contingency Measures	Timing/Frequency
		Erosion of biodiversity offset areas (including Upper Bettys Creek diversion)	5 - Low	Assess whether thinning is necessary	following identification.
		Colonising tree or shrub species dominate regeneration areas within BOAs	5 - Low	Adapt feral animal control strategy and modify accordingly	
		Less than adequate management of State Forest land	8 - Medium	Actively monitor the results of modifying strategy.	
5	Low flora and fauna species diversity in regeneration areas	Less than adequate natural regeneration and/or weed competition and/or habitat augmentation	12 - Medium	<p>Targeted weed control</p> <p>Consider the need for active revegetation techniques including direct seeding or tubestock planting, following appropriate ground preparation such as weed control, ripping and augering.</p> <p>Additional habitat resources to be installed.</p>	<p>Undertake weed control within one month of issue identification</p> <p>Implement active revegetation within one month of identifying requirement</p>

No.	Risk	Cause	Rating (1-25)	Contingency Measures	Timing/Frequency
6	Regeneration/revegetation areas do not conform to target vegetation communities	Less than adequate implementation of biodiversity offset strategy	12 - Medium	<p>Review the reasons for success in other naturally regenerating areas within the offset sites and the potential cause of each plant species failure.</p> <p>Targeted removal of non-characteristic species and weeds.</p> <p>Consider additional monitoring to examine the establishment of tubestock and seed.</p> <p>Investigate alternative direct and/or supplementary offset measures.</p>	<p>Strategy to be developed within one month of identification</p> <p>Revegetation works to be undertaken within two months of identification</p> <p>Monitoring to be undertaken three months following revegetation works.</p>
7	Unable to implement biodiversity offset strategy (especially in East-West Corridor Management Area)	Conflicting management practices for Aboriginal heritage values (cultural and archaeological)	5 - Low	<p>Consultation with relevant authorities and stakeholders.</p> <p>Investigate alternative direct and/or supplementary offset measures.</p>	Consultation to be undertaken as soon as possible to resolve.
8	Unable to achieve completion criteria associated with the Rehabilitation Woodland Offset within appropriate timeframe	Less than adequate rehabilitation of woodland areas	8 - Medium	<p>Consider active revegetation works to accelerate rehabilitation.</p> <p>Further consultation with government authorities.</p>	Consultation to be undertaken as soon as possible to resolve.

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No.	Risk	Cause	Rating (1-25)	Contingency Measures	Timing/Frequency
9	Failure to undertake required monitoring	Inability to undertake the monitoring due to inadequate equipment, access, resources or finances.	8 - Medium	Implement adaptive management approach to monitoring requirements	Strategy to be developed within six months of identification Revised monitoring schedule to be available for following year of monitoring.
10	Damage/loss of rehabilitation and revegetation/regeneration areas	Excessive fuel loads and failure to maintain fire trails	8 - Medium	Undertake controlled burning as required and in consultation with the RFS. Consider the implementation of strategic grazing in appropriate management zones where control burning is not considered suitable.	Consultation to be undertaken with RFS within one month of identification
11	Lack of local plant stock/seeds for regeneration and rehabilitation activities	Less than adequate local provenance seed availability	8 - Medium	Review seed inventory and propagated plants and investigate the need to collect seed in other areas.	Review to be undertaken within two weeks of identification.
12	Direct impacts to threatened flora species	Failure to undertake adequate pre-clearance surveys in order to identify and relocate threatened species	5 - Low	Ensure targeted pre-clearance surveys are undertaken in future. Advise government authorities.	Advising government to be undertaken as soon as possible following impact.

No.	Risk	Cause	Rating (1-25)	Contingency Measures	Timing/Frequency
13	Direct impacts to regeneration/revegetation	Poor grazing management	5 - Low	Review grazing schedule and amend where necessary. Rehabilitate any damaged areas.	Strategy to be developed within one month of identification.
14	Lack of knowledge of biodiversity considerations and outcomes in MGO	Poor on-site communication or training on biodiversity issues.	5 - Low	Review training materials. Include more consideration in tool-box talks, etc.	Strategy to be developed within one month of identification.
		Lack of research published on programs undertaken at MGO	5 - Low	Review products that can be published.	Strategy to be developed within one year of identification.
15	Observable impacts to GDEs	Changes in alluvial groundwater levels as a result of mining and disturbance impacts	5 - Low	Planting of tree species less reliant on groundwater. Additional vegetation planting adjacent to creek lines to reduce reliance on riparian vegetation for connectivity. Fencing of riparian vegetation to remove grazing pressures on ground and understorey species during dry periods.	Strategy to be developed within one month of identification.

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8. Review and Improvement

8.1 Monitoring Reporting

Flora and fauna monitoring results, details of the effectiveness of management measures and research outcomes will be presented in the annual Flora and Fauna Monitoring Reports. Copies of the reports are and will be made available on the Glencore Australia website ([Glencore Australia](#)).

Where necessary, this BOMPS will be updated following the findings and recommendations from the report.

8.2 Publication of Research

Where possible, the outcomes of research, particularly in relation to the establishment of threatened ecological communities, will be made publically available, either through the publishing in scientific journals or on the Glencore Australia website.

This commitment to shared knowledge aims help in the wider application of regeneration and rehabilitation techniques and methods for TECs and native vegetation in the Hunter Valley.

8.3 Annual Review

In accordance with Schedule 5, Condition 5 of the development consents, by the end of March each year, MGO will submit an AR to the satisfaction of the Secretary. The review must:

- Describe the development (including rehabilitation) that was carried out in the previous calendar year, and the development that is proposed to be carried out over the current calendar year;
- Include a comprehensive review of the monitoring results and complaints recorded of the development over the previous calendar year, which includes a comparison of these results against:
 - The relevant statutory requirements, limits or performance measures/criteria
 - The monitoring results of previous years; and
 - The relevant predictions in the previous approvals, the EIS and Development Layout Plans.
- Identify any non-compliance over the last year, and describe what actions were (or are being) taken to rectify the non-compliance and avoid reoccurrence;
- Identify any trends in the monitoring data over the life of the development;
- Identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and
- Describe what measures will be implemented over the next year to improve the environmental performance and development.

Specifically, as required by Schedule 3, Condition 31(k) of SSD 5850, the AR will report on the effectiveness of biodiversity management measures against performance and completion criteria, including those related to GDE and riparian vegetation monitoring.

Furthermore, as noted in **Section 3.1.4**, a summary of the weed management activities undertaken at MGO will be reported in the Annual Review.

8.4 Training and Communication

Generic biodiversity training is provided to all employees and contractors through the GCAA Generic Surface Induction and the Site Familiarisation to inform personnel of the biodiversity issues present at the site and to ensure they know their role and responsibilities in relation to the protection and/or minimisation of impacts to all native biodiversity during construction.

From time to time, workforce communication days and toolbox talks allow for discussion of the objectives and requirements of this and any other relevant Plans.

Site personnel whose duties directly involve the implementation of strategies, plans and programs under this BOMPS will undertake training according to their specific accountabilities outlined in **Section 10**. Specific training materials have been prepared to address the BOMPS to highlight the biodiversity features of MGO and inform employees and contractors of their environmental responsibilities while working on the site.

8.5 Adaptive Management

In accordance with Condition 1 of Schedule 5 of SSD 5850 and DA 80/952, MGO will assess and manage biodiversity and rehabilitation related risks to ensure compliance with the criteria outlined in **Appendix E**.

Where a non-compliance relating to biodiversity or rehabilitation has occurred, MGO will, to the satisfaction of the Secretary:

- Take all reasonable and feasible measures to ensure the impact ceases and does not recur;
- Consider all reasonable and feasible options for remediation (where relevant) and submit a report to the DPE describing those options and any preferred remediation measures or other course of action; and
- Implement remediation measures as directed by the Secretary.

A strong feedback loop between monitoring and management will be established. Adaptive management of the BOA and mine site will be responsive to any new ecological data that may arise through the monitoring described in **Section 5**, legislative change or any other studies completed at the site. This will enable a flexible approach to management requirements, allowing ongoing feedback and refinement of the management strategy.

8.6 Plan Review

This BOMPS will be reviewed in accordance with the MGO **Environmental Management Strategy (EMS)**, that is, within three months of:

- The submission of the Annual Review;

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- The submission of an Incident Report to DPIE;
- The submission of an Independent Environmental Audit; and
- Modification to the conditions of development consent.

If the review leads to revisions to the BOMPS, the revised document will be submitted to DPIE for approval within four weeks of the review.

8.7 Complaint Resolution

All complaints received by MGO are managed in accordance with the GCAA Community Complaint Management standard and the MGO **Environmental Management Strategy (EMS)** that details the process so that complaints are properly documented and handled in accordance with licence requirements and company policy.

Following the complaint investigation, the complainant will be provided with the details of the investigation report including what actions were taken to mitigate any further biodiversity risks.

MGO maintains a dedicated free-call community response line (1800 730 883) that is advertised at least quarterly in the local newspapers, provided in each edition of the Greater Ravensworth Community Newsletter and displayed on the Glencore Australia website (www.glencore.com.au).

A summary of complaints received and actions taken is presented in the Annual Review and to the MGO CCC as part of the operational performance review. A complaints register is to be updated monthly on the Glencore Australia website located at (www.glencore.com.au).

8.8 BOMPS Publication

As per the requirements of Schedule 5 Condition 13 of SSD 5850 and DA 80/952 as well as Condition 4 of the EPBC 2013/6978 approval, the BOMPS will be made available on the Glencore Australia website (www.glencore.com.au) within one month of being approved by the Secretary.

9. Commitments

Commitments outlined within this management plan are detailed in **Table 9.1** below. Management commitments will be entered into the MGO Compliance Management system (CMO) and actioned where necessary. Records of documentation associated with the management commitments will also be maintained within CMO.

Table 9.1 – Management Plan Commitments

No.	Commitment	Where in Management Plan
1	Confirm the final location of the Rehabilitation Woodland Offset Area (518 hectares) within 5 years of the commencement of operations.	Section 2.2 and Section 4.9 SSD-5850 Schedule 3 Condition 27A

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No.	Commitment	Where in Management Plan
2	Undertake manual tree lopping (with chainsaws) for any lopping required along Bowmans Creek and Swamp Creek in the riparian zone.	Section 3.1
3	Undertake seed collection and propagation to provide local seed resources for rehabilitation and revegetation works.	Section 3.4
4	Establish the East-West Corridor Management Area and manage for biodiversity and habitat connectivity outcomes.	Section 3.2.4 SSD-5850 Schedule 3 Condition 27 (e)
5	Manage the habitats of the BOAs through: <ul style="list-style-type: none"> Fencing, signage and access control Weed management Pest animal control Grazing management Erosion and sedimentation control Bushfire management 	Section 3 Section 4 SSD 5850 Schedule 3 Condition 27 (e) DA 80/952 Schedule 3 Condition 40 (f)
6	Enhance the fauna habitats in the BOAs by undertaking habitat augmentation including the installation of: <ul style="list-style-type: none"> Nest boxes Salvaged tree hollows, fallen timber, hollow logs, rock/boulders Undertake habitat enhancement measures for the spotted-tailed quoll at the Stringybark Habitat Corridor Offset by placing salvaged trees as log piles and large rocks and boulders for potential denning habitat. Undertake targeted African olive management and control at the Stringybark Habitat Corridor Offset 	Section 4.1.1 Section 4.1.2
7	Undertake the MGO Ecological Monitoring Program (including annual walkovers, scientific plots and transects and annual seasonal fauna monitoring) to monitor against performance and completion criteria. Undertake annual biodiversity monitoring of the BOAs, nest box monitoring and fauna surveys.	Section 5
8	Undertake biannual (every six months) inspections within the BOAs over the life of the Project.	Section 5.2.4 SSD 5850 Schedule 3 Condition 27 (h)
9	Provide suitable training and communicate biodiversity objectives and requirements to employees and contractors through inductions, workforce communication days and toolbox talks.	Section 8.4
10	Undertake routine erosion and sedimentation inspections of areas of erosion concern.	Section 4.6

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10. Accountabilities

Responsibility for the implementation of the BOMPS lies with MGO, with input from external specialists and contractors as required. The list in **Table 10.1** identifies the key roles and responsibilities of specific MGO positions concerning the implementation of the BOMPS.

Table 10.1 – Accountabilities

Role	Accountabilities for this document
Operations Manager	<ul style="list-style-type: none"> • Provide sufficient resources for the implementation of this BOMPS
Environment and Community Manager	<ul style="list-style-type: none"> • Provide sufficient time and resources to allow for the implementation of long term ecological management and enhancement strategies for the BOAs; • Allocate sufficient resources and time for the implementation of the BOMPS monitoring programs; • Utilise the results of the BOMPS monitoring programs and research trials to refine closure criteria as well as to evaluate the effectiveness of regeneration/rehabilitation practices so as to facilitate continual improvement; • Periodically review progress against performance indicators and completion criteria; • Report internally and externally as per the requirements are met, including necessary revisions of the BOMPS; • Maintain all relevant records maintained on site; and • Authorisation of essential clearing activities in accordance with the BOMPS through the Ground Disturbance Permit process.
Environment and Community Coordinator / Officer	<ul style="list-style-type: none"> • Coordinate the day to day implementation of this BOMPS, including the design and implementation of ecological management activities and as delegated by the Environment and Community Manager; • Coordinate monitoring requirements as per the BOMPS and Glencore standards; • Coordinate reporting requirements relating to rehabilitation in the Annual Review (AR) and Environmental Management Strategy (EMS); and • Ensure that personnel involved in the carrying out and monitoring of the BOMPS activities are appropriately qualified, licensed and experienced to undertake the task.
Mining and Land Management Contractors	<ul style="list-style-type: none"> • Undertake all activities directly in accordance with the requirements of the BOMPS, as directed by the Environment and Community Manager and Land Management Officer.

11. Document Information

11.1 Relevant Legislation

The following legislation is relevant to this Plan:

- *Environmental Planning and Assessment Act 1979*;
- *Environmental Protection and Biodiversity Conservation Act 1999*;
- *Pesticides Act 1999*;
- *Biosecurity Act 2015*; and
- *Biodiversity Conservation Act 2016*.

11.2 Related Documents

Related documents, listed in **Table 11.1** below, are internal documents directly related to or referenced from this document.

Table 11.1 – Related documents

Reference	Title
GCAA	
GCAA-625378177-10336	11.16 Completion Criteria and Rehabilitation Monitoring
GCAA-625378177-10326	11.18 Biodiversity Offset Management
Mount Owen	
MGOOC-1779562647-11191	Environmental Management Strategy
MGOOC-1779562647-11565	Mining Operations Plan (Rehabilitation Management Plan)
MGOOC-1779562647-11186	Groundwater Management and Monitoring Plan
MGOOC-1779562647-10974	Erosion and Sediment Control Plan
MGOOC-1779562647-4159	Aboriginal Cultural Heritage Management Plan
MGOOC-1779562647-11190	Surface Water Management and Monitoring Plan

11.3 Reference Information

Reference information, listed in **Table 11.2** below, is information that is directly related to the development of this document or referenced from within this document.

Table 11.2 – Reference information

Reference	Title
OEH 2010	<i>Threat Abatement Plan for Predation by the Red Fox</i>
DOE 2015	<i>Threat Abatement Plan for Predation by Feral Cats</i>

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Reference	Title
DOE 2016	<i>Threat abatement plan for competition and land degradation by rabbits</i>
DP&I 2014	<i>Best Practice Guidelines for the Preparation of BOMPs in the Hunter Valley</i>
DPI 2014	<i>Vertebrate Pest Control Manual</i>
DPI 2018	<i>NSW Weed Control Handbook (7th Edition)</i>
Florabank 2017	<i>Florabank Guidelines for Native Seed Collection Methods</i>
Hansen Bailey 2017	<i>Integra to Mount Owen Complex. Water pipeline Modification Environmental Assessment</i>
Nussbaumer <i>et al.</i> 2012	<i>Establishing Native Vegetation – Principles and Interim Guidelines for Spoil Placements Areas and Restoration Lands</i>
OEH 2014	<i>BioBanking Assessment Methodology</i>
DAWE 2017	<i>Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs</i>
OEH 2017	<i>Biodiversity Assessment Methodology</i>
OzArk 2016	<i>Aboriginal Cultural Heritage Management Plan</i>
RFS 2019	<i>Planning for Bushfire Protection</i>
RFS 2006	<i>NSW Rural Fire Service Bushfire Environmental Assessment Code</i>
Umwelt 2013	<i>Assessment of the Ecological Outcomes of Mine Rehabilitation, Regeneration and Revegetation at the Mount Owen Mine</i>
Umwelt 2014	<i>Mount Owen Continued Operations Project Ecological Assessment</i>
Umwelt 2015	<i>Mount Owen Continued Operations Project Response to Department of the Environment Submission (Report B)</i>
Umwelt 2015	<i>Mount Owen Continued Operations Project Environmental Impact Statement</i>
Umwelt 2018a	<i>Mount Owen Continued Operations Project Modification 2 Statement of Environmental Effects</i>
Umwelt 2018b	<i>Glendell Modification 4 Statement of Environmental Effects</i>
Umwelt 2019	<i>Glendell Mine Modification 4 Response to Submissions</i>
Umwelt 2020a	<i>Mount Owen Continued Operations Project Modification Report Modification 5</i>
Umwelt 2020b	<i>Mount Owen Continued Operations Project Modification 6 Modification Report</i>
Vallee <i>et al.</i> 2004	<i>Guidelines for the Translocation of Threatened Plants in Australia</i>

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11.4 Change Information

A summary of the document history is provided below in **Table 11.3**.

Table 11.3 – Change information

Version Old SharePoint	Date	Review team (consultation)	Change Summary	DPIE Approval
1	February 2006	MGO	Flora and Fauna Management Plan	N/A
2	December 2014	MGO	Biodiversity Management Plan	17/12/2014
3	16 December 2016	Umwelt, MGO EMS Steering Committee	Updated to address the Mount Owen Continued Operations development consent (SSD-5850) conditions and revised development consent for Glendell Mine (DA 80/952 MOD 3)	N/A
4	July 2017	OEH	Revised, taking into account correspondence received from OEH 25 January 2017 (Refer to Appendix A)	11/7/2017
New SharePoint				
1	October 2017	MGO	Revised to incorporate requirements of SSD 5850 MOD 1 (Integra Water Pipeline)	17/10/2017
2	November 2018	MGO	Revise commitments	6/12/2018
3	December 2019	MGO	Revised to incorporate requirements of SSD 5850 MOD 2	N/A
4	May 2020	MGO	Revised to incorporate requirements of DA 80/852	N/A
5	July 2020	MGO	Revised following BCD consultation	Draft Approval Date TBC
6	April 2021	MGO	Revised to incorporate requirements of SSD-5850 MOD 5, removal of TSR Offset and updated template	Draft Approval Date TBC
7	June 2021	MGO	Revised to incorporate SSD-5850 MOD6	Draft Approval Date TBC

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Appendix A - Regulatory Consultation

A.1 Biodiversity and Conservation Division Consultation



Our ref: DOC20/429018-2
Your ref: SSD 5850 PA-18

Mr Mike Pereira

Environment and Community Officer
Mount Owen Complex
Glencore
mike.pereira@glencore.com.au

Dear Mr Pereira

Mount Owen Glendell Mining Operations – Biodiversity and Offset Management Plan and Strategy (SSD-5850-PA-18)

I refer to your e-mail dated 29 May 2020 requesting that Biodiversity and Conservation Division (BCD) review the Mt Owen Glendell Mining Operations Biodiversity and Offset Management Plan and Strategy (BOMPS). The BOMPS has been prepared to meet Schedule 3, Condition 31 of the Project Approval for the Mt Owen Continued Operations Project (SSD 5850). BCD has reviewed the draft document and apologises for the delay in getting our response to you.

Biodiversity and Conservation Division's (BCD) recommendations are provided in **Attachment A** and detailed comments are provided in **Attachment B**. If you require any further information regarding this matter, please contact Robert Gibson, Regional Biodiversity Conservation Officer, on 4927 3154 or via email at rog.hcc@environment.nsw.gov.au

Yours sincerely

STEVE LEWER
Acting Senior Team Leader Planning
Hunter Central Coast Branch
Biodiversity and Conservation Division

Date: 23 June 2020

Enclosure: Attachments A and B

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Attachment A

BCD's recommendations

Mount Owen Glendell Operations Biodiversity and Offset Management Plan and Strategy

1. BCD recommends that the Table of Contents is revised to include the titles and page numbers of figures and tables in the BOMPS.
2. BCD recommends that a 'Site Biodiversity Offset Map' is added to the BOMPS.
3. BCD recommends that changes are made to the colour ramp in the vegetation communities map, Figure 2.1, to make it easier for the reader to identify each vegetation community shown.
4. BCD recommends that actions to manage biodiversity at the mine site are measured and quantified and reported in the Annual Review to show their effectiveness.
5. BCD recommends that plant species abundance is also measured in the monitoring plots and quadrats to obtain an indication of plant recruitment, establishment, or decline in the offset lands and analogue sites.
6. BCD recommends that all BAM field data collected from the rehabilitation areas is provided on the Mount Owen Mine website.
7. BCD recommends that Appendices C and D of the BOMPS includes tables that provide the site name, site type, eastings and northings and fauna box type to help demonstrate where these sites are located.

Attachment B

BCD's detailed comments

Mount Owen Glendell Operations Biodiversity and Offset Management Plan and Strategy

1. Add a list of figures and tables to the Table of Contents

The Table of Contents of the Biodiversity and Offset Management Plan and Strategy (BOMPS) does not include any details of the figures and tables in the document; particularly their titles and on what page they occur. This makes it difficult to find some information. BCD recommends that the revised Table of Contents in the BOMPS includes details about figures and tables.

Recommendation 1

BCD recommends that the Table of Contents is revised to include the titles and page numbers of figures and tables in the BOMPS.

2. A 'Site Biodiversity Offset Map' is required

Figure 1.1 'Biodiversity Offset Areas' contains a reference to a 'Site Biodiversity Offset Map' that presents a clearer picture of the different offsets at the Mt Owen Complex. However, that map is not provided. BCD recommends that a 'Site Biodiversity Offset Map' is added to the BOMPS.

Recommendation 2

BCD recommends that a 'Site Biodiversity Offset Map' is added to the BOMPS.

3. The colour ramp for the vegetation map includes colours that are difficult to distinguish

Figure 2.1 'Vegetation Communities in the Mount Owen Complex' of the BOMPS has a colour ramp with some colours that are difficult to distinguish on the map. This is so for the two pale brown shades in the current map (Central Hunter Bullock Forest Regeneration and Kunzea Closed Shrubland), and the two grey shades (Disturbed Land and Hunter Footslopes Sheltered Forest).

Recommendation 3

BCD recommends that changes are made to the colour ramp in the vegetation communities map, Figure 2.1, to make it easier for the reader to identify each vegetation community shown.

4. Report on actions done where they are not possible to predict in advance

Chapter 3 'Management of Biodiversity at the Mine Site' of the BOMPS proposes management actions that may not be used. For example, the salvage of hollow logs, installation of nest boxes, targeted timing of clearing, and treatment of any injured wildlife, have qualifiers like 'where practical', 'if required' and 'as soon as possible'. Such actions are impossible to predict. However, to document the effectiveness of such management actions BCD recommends that the results are measured and reported in the Annual Review; such as the type and number of biodiversity features that were salvaged and how they were re-used, how many nest boxes were installed, and the timing of disturbance activities in relation to potential impacts to threatened species use of habitat features for breeding and roosting.

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Recommendation 4

BCD recommends that actions to manage biodiversity at the mine site are measured and quantified and reported in the Annual Review to show their effectiveness.

5. BCD recommends that plant abundance is also measured in BAM plots

Section 5.1.2.2 of the BOMPS describes the transect/ plot monitoring process planned to be undertaken on the offset lands, and how it will follow the Biodiversity Assessment Method 2017 (BAM). This includes measuring foliage cover by species. However, BCD recommends that a measure of plant abundance is also included, as described in Tables 2 and 25 of the BAM, as this will provide useful information on recruitment, establishment, or decline of native species in the offset lands and analogue sites.

Recommendation 5

BCD recommends that plant species abundance is also measured in the monitoring plots and quadrats to obtain an indication of plant recruitment, establishment, or decline in the offset lands and analogue sites.

6. Background data behind monitoring provides more meaning to monitoring results

Chapter 5 of the BOMPS describes proposed monitoring of areas of rehabilitation, revegetation and habitat creation on the Mount Owen Glendell Operations area. It includes the collection of data using the BAM, which are summarised in Table 5.4 in the BOMPS. The BAM summarises site data as a Vegetation Integrity Score across a vegetation zone. The presentation of the background data for the BAM method, such as the flora species found and their cover and abundance, enables the BAM results to be better understood. This in turn helps identify if rehabilitation issues may be present, and whether rehabilitation outcomes are likely to be met. BCD recommends that the full data set from the monitoring program is provided on the Mt Owen website (as described in Section 8.1).

Recommendation 6

BCD recommends that all BAM field data collected from the rehabilitation areas is provided on the Mount Owen Mine website.

7. Provide a table of coordinates of monitoring locations and fauna boxes

Details of the flora and fauna monitoring sites, and fauna boxes, shown in Appendices C and D are not clear on the maps. Therefore, BCD recommends that Appendixes C and D of the BOMPS includes tables that provides the site name, site type, eastings and northings and fauna box type to help demonstrate where these sites are.

Recommendation 7

BCD recommends that Appendixes C and D of the BOMPS includes tables that provide the site name, site type, eastings and northings and fauna box type to help demonstrate where these sites are located..

A.2 Department of Planning, Industry & Environment Consultation

From: Sarah Clibborn <Sarah.Clibborn@planning.nsw.gov.au>
Sent: Friday, 27 November 2020 9:52 AM
To: Desmond, Jason (Mount Owen - AU) <Jason.Desmond@glencore.com.au>
Cc: Joe Fittell <Joe.Fittell@planning.nsw.gov.au>
Subject: Management Plan update

External sender
Hi Jason,

Joe and I have spoken with Lauren, and the plan moving forward is as follows:

- Joe will review the AQGGMP in the near future, followed by the NMP
- Once these are approved you can submit the EMS (with any updates that come out of the other plans)
- I will hold off on the BOMP review until after Mod 5 is determined
- Once Mod 6 is determined, and we are unsure of how far away that may be, any affected plans will need to be reviewed and resubmitted if there are changes as a result

Please don't hesitate to call myself or Joe if you have any questions/issues.

Thanks,

Sarah Clibborn
Senior Environmental Assessment Officer
Department of Planning, Industry & Environment
P (02) 8837 6095 E sarah.clibborn@planning.nsw.gov.au
www.dpie.nsw.gov.au

Please note that I work part time, and that my usual days are Thursday and Friday.



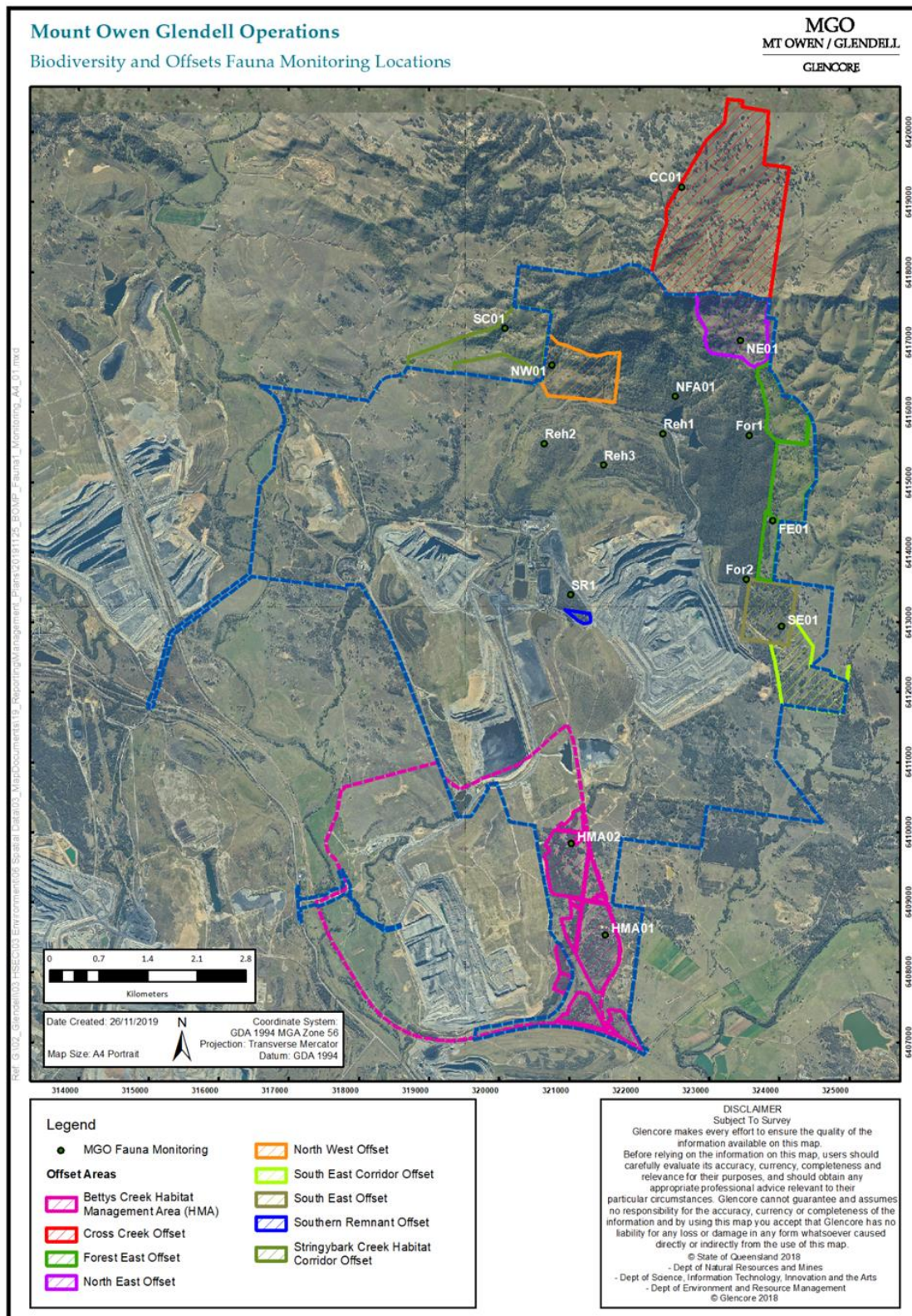
We work flexibly. I'm sending this message now because it's a good time for me. I don't expect that you will read, respond to, or action this message outside of your own regular hours.

The Department of Planning, Industry and Environment acknowledges that it stands on Aboriginal land. We acknowledge the traditional custodians of the land and we show our respect for elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.

Appendix B - Biodiversity and Offset Management Plan Approval

To be inserted once approved by the Department.

Appendix C - Fauna Monitoring Locations



Number: MGOOC-899305957-16

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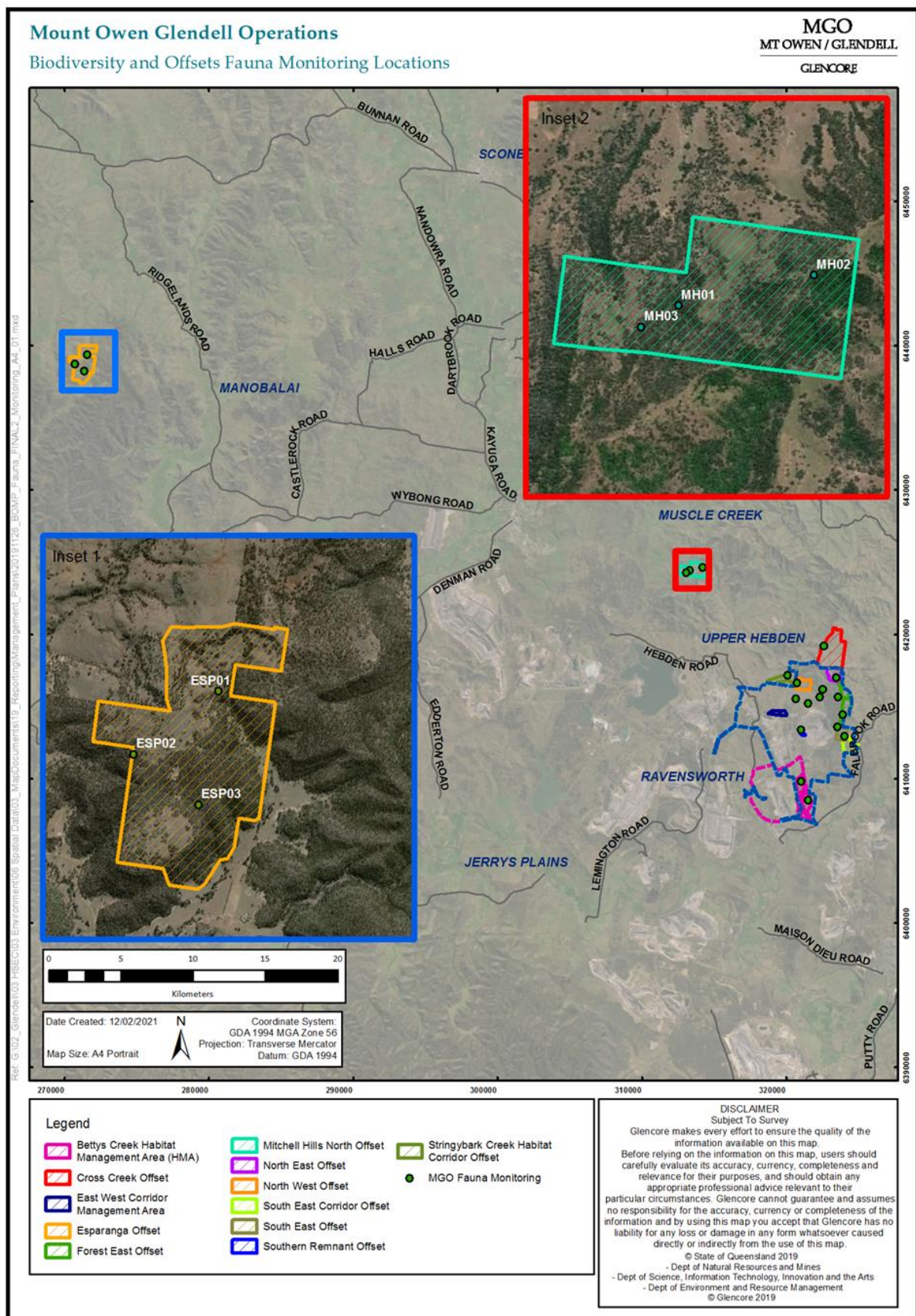
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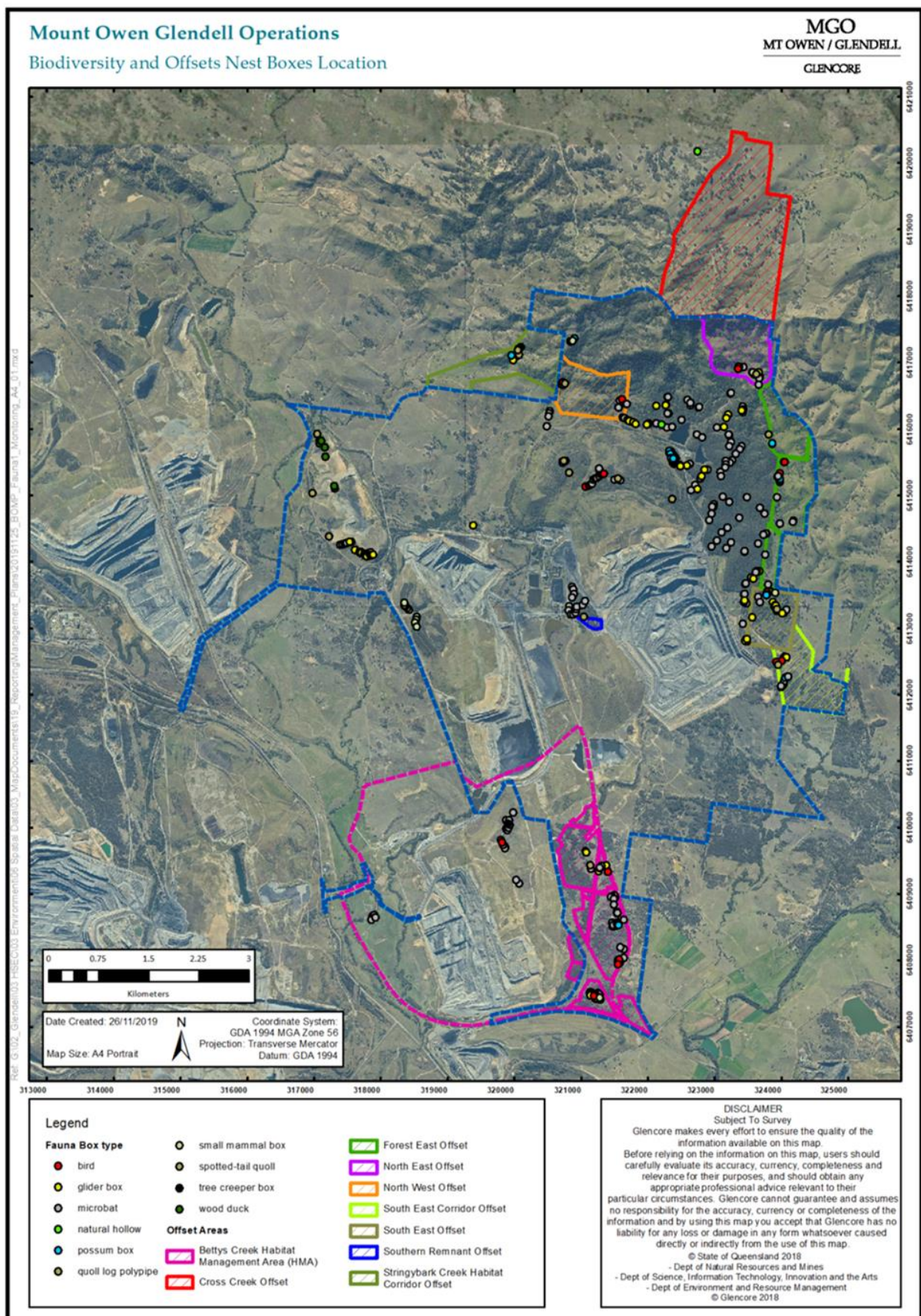
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Table 4 – Mt Owen Glendell Operations Nest Boxes - Date of Last Revision – 20 April 2020

ID2	Location	BoxID	Box style	Fauna species	x	y	Latitude	Longitude	Altitude	Date Installed
2	Forest East Offset	ER01	bat box	microbat	324186	6414608	-32.3917	151.1308	0	1/01/1996
3	Forest East Offset	ER02	bat box	microbat	324177	6414591	-32.3919	151.1307	0	1/01/1996
4	Forest East Offset	ER03	bat box	microbat	323987	6414570	-32.392	151.1287	0	1/01/1996
6	Ravensworth State Forest	ER05	bat box	microbat	323780	6414418	-32.3934	151.1265	187	11/09/2008
7	Ravensworth State Forest	ER06	bat box	microbat	323770	6414417	-32.3934	151.1264	173	11/09/2008
8	Forest East Offset	ER07	bat box	microbat	323765	6414103	-32.3962	151.1262	165	1/01/1996
9	Forest East Offset	ER08	bat box	microbat	323765	6414103	-32.3962	151.1262	165	11/09/2008
10	Ravensworth State Forest	ER09	bat box	microbat	323780	6414418	-32.3934	151.1265	174	11/09/2008
11	Ravensworth State Forest	ER010	bat box	microbat	323770	6414417	-32.3934	151.1264	174	1/01/1996
12	Forest East Offset	ER011	bat box	microbat	323939.4	6414964.6	-32.3885	151.1283	194	1/01/1996
15	Forest East Offset	FE01	Glider	glider	323986.1	6415195.1	-32.3864	151.1288	203	12/11/2018
16	Forest East Offset	FE02	Glider	glider	323984.6	6415214.3	-32.3862	151.1288	201	12/11/2018
17	Forest East Offset	FE03	Glider	glider	323984	6415224.4	-32.3861	151.1288	203	12/11/2018
18	Forest East Offset	FE04	Possum	possum	323984.3	6415238.6	-32.386	151.1288	203	12/11/2018
19	Forest East Offset	FE05	Parrot	bird	323982.5	6415328.2	-32.3852	151.1288	206	12/11/2018
20	Forest East Offset	FE06	Glider	glider	323871.8	6415769.4	-32.3812	151.1277	213	7/08/2019
21	Forest East Offset	FE07	Possum	possum	323867.6	6415773.1	-32.3812	151.1276	212	7/08/2019
22	Forest East Offset	FE08	Glider	glider	324048.7	6415496.5	-32.3837	151.1295	198	7/08/2019
23	Forest East Offset	FE09	Parrot	bird	324058	6415488	-32.3838	151.1296	201	7/08/2019
24	Forest East Offset	FE10	antechinus	small mammal	323947.8	6415272.5	-32.3857	151.1284	195	7/08/2019
25	Forest East Offset	FE11	bat box	microbat	323959.5	6415283.5	-32.3856	151.1285	199	7/08/2019
26	North East Offset	NE02	bat box	microbat	323385.4	6416908.7	-32.3708	151.1227	213	12/11/2018
27	North East Offset	NE01	bat box	microbat	323441.6	6416922.9	-32.3707	151.1233	216	12/11/2018
28	North East Offset	NE03	bat box	microbat	323380.3	6416921.5	-32.3707	151.1227	214	12/11/2018
29	North East Offset	NE04	Parrot	bird	323372	6416931.7	-32.3706	151.1226	217	12/11/2018
30	North East Offset	NE05	Parrot	bird	323362.9	6416896.3	-32.371	151.1225	215	12/11/2018

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ID2	Location	BoxID	Box style	Fauna species	x	y	Latitude	Longitude	Altitude	Date Installed
31	North East Offset	NE06	bat box	microbat	323571.3	6416840.7	-32.3715	151.1247	203	7/08/2019
32	North East Offset	NE07	Possum	possum	323595	6416824.4	-32.3716	151.1249	207	7/08/2019
33	North East Offset	NE08	Glider	glider	323597.9	6416815	-32.3717	151.125	207	7/08/2019
34	North East Offset	NE09	Parrot	bird	323611.9	6416803.1	-32.3718	151.1251	212	7/08/2019
35	North East Offset	NE10	Possum	possum	323682	6416783.4	-32.372	151.1259	217	7/08/2019
36	North East Offset	NE11	bat box	microbat	323677.5	6416755.9	-32.3723	151.1258	225	7/08/2019
37	North East Offset	NE12	Glider	glider	323670.1	6416840.5	-32.3715	151.1257	214	7/08/2019
38	North East Offset	NE13	antechinus	small mammal	323577.8	6416839.5	-32.3715	151.1248	208	7/08/2019
39	New Forest Area	NFA01	bat box	microbat	321632.7	6416167.2	-32.3772	151.104	166	12/11/2018
40	North West Offset	NW02	bat box	microbat	321618.4	6416405	-32.3751	151.1039	185	12/11/2018
41	North West Offset	NW03	bat box	microbat	321584.4	6416422.5	-32.3749	151.1035	182	12/11/2018
42	North West Offset	NW04	Parrot	bird	321629.4	6416406.1	-32.3751	151.104	190	12/11/2018
43	North West Offset	NW05	Parrot	bird	321623	6416434.6	-32.3748	151.1039	185	12/11/2018
44	North West Offset	NW06	Glider	glider	320743.6	6416653.9	-32.3727	151.0946	170	6/08/2019
45	North West Offset	NW07	bat box	microbat	320715.1	6416668	-32.3726	151.0943	176	6/08/2019
46	North West Offset	NW08	Parrot	bird	320729.6	6416689.4	-32.3724	151.0945	179	6/08/2019
47	New Forest Area	NFA02	Possum	possum	320910.5	6417351.7	-32.3665	151.0965	249	6/08/2019
48	New Forest Area	NFA03	bird	bird	320849.1	6417310.1	-32.3668	151.0959	244	6/08/2019
49	New Forest Area	NFA04	antechinus	small mammal	320879.3	6417322.6	-32.3667	151.0962	246	6/08/2019
52	Ravensworth State Forest		bat box	microbat	323452	6413498	-32.4016	151.1228	149	1/01/1996
53	South East Offset	ER015	bat box	microbat	323664	6413460	-32.402	151.125	160	1/01/1996
54	Ravensworth State Forest	ER016	bat box	microbat	323460.6	6413511	-32.4015	151.1229	155	1/01/1996
55	Ravensworth State Forest	ER017	bat box	microbat	323433	6413061	-32.4055	151.1225	146	1/01/1996
59	Forest East Offset	ER025	bat box	microbat	323810.1	6413647.3	-32.4003	151.1266	145	1/01/1996
61	South East Offset	ER026	bat box	microbat	323474.6	6412816.3	-32.4078	151.1229	0	6/06/2018
64	South East Offset	ER033	bat box	microbat	323682.4	6413387.4	-32.4026	151.1252	164	11/09/2008
65	South East Offset	ER034	bat box	microbat	323682.4	6413387.4	-32.4026	151.1252	164	11/09/2008

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67	South East Offset	ER036	bat box	microbat	323938.6	6413254.6	-32.4039	151.1279	140	11/09/2008
69	South East Offset	ER038	bat box	microbat	324047.3	6413224.6	-32.4042	151.1291	162	11/09/2008
70	South East Offset	ER039	bat box	microbat	324083.4	6413267	-32.4038	151.1295	153	11/09/2008
71	South East Offset	ER040	bat box	microbat	324083.4	6413267	-32.4038	151.1295	153	11/09/2008
73	South East Corridor Offset	ER044	bat box	microbat	324054.4	6412208.6	-32.4133	151.129	124	11/09/2008
74	Ravensworth State Forest	ER048	bat box	microbat	323485.2	6413362.8	-32.4028	151.1231	129	1/01/1996
75	Ravensworth State Forest	GB28	Glider	glider	323451	6413385	-32.4026	151.1228	0	19/09/2000
76	Ravensworth State Forest	GB29	Glider	glider	323461	6413412	-32.4024	151.1229	0	1/06/1999
80	South East Offset	SE016	Glider	glider	323480	6412804	-32.4079	151.123	0	1/06/1999
81	South East Offset	SE017	Glider	glider	323570	6413157	-32.4047	151.124	0	12/10/2011
82	South East Offset	SE018	Glider	glider	323487.7	6412794	-32.408	151.123	157	6/06/2018
83	South East Offset	SE019	Glider	glider	323461.2	6412804.7	-32.4079	151.1228	162	6/06/2018
84	South East Offset	SE020	Glider	glider	323494.8	6412825.5	-32.4077	151.1231	160	6/06/2018
85	South East Offset	SE021	Glider	glider	324025.4	6413212.4	-32.4043	151.1288	150	14/08/2019
86	South East Offset	SE01	Glider	glider	323878.5	6413380.9	-32.4027	151.1273	159	12/11/2018
87	South East Offset	SE02	bat box	microbat	323912.7	6413339.1	-32.4031	151.1277	156	12/11/2018
88	South East Offset	SE03	bat box	microbat	323909.2	6413309.4	-32.4034	151.1276	153	12/11/2018
89	South East Offset	SE04	Possum	possum	323933.3	6413305.9	-32.4034	151.1279	154	12/11/2018
90	South East Offset	SE05	Glider	glider	323926.4	6413335.2	-32.4031	151.1278	155	12/11/2018
91	South East Corridor Offset	SEC01	Glider	glider	324004.7	6412106.2	-32.4142	151.1284	128	12/11/2018
92	South East Corridor Offset	SEC02	Glider	glider	324037.5	6412143	-32.4139	151.1288	129	12/11/2018
93	South East Corridor Offset	SEC03	bat box	microbat	324047.5	6412192.5	-32.4135	151.1289	130	12/11/2018
94	South East Corridor Offset	SEC04	bat box	microbat	324014.4	6412117.6	-32.4141	151.1285	129	12/11/2018
95	South East Corridor Offset	SEC05	bat box	microbat	324002.3	6412121.1	-32.4141	151.1284	130	12/11/2018
96	South East Offset	SE06	Possum	possum	323840.6	6413540.4	-32.4013	151.1269	152	7/08/2019
97	South East Offset	SE08	Glider	glider	323824.2	6413541.7	-32.4013	151.1268	154	7/08/2019
98	South East Offset	SE09	bird	bird	323794.7	6413532.8	-32.4013	151.1264	160	7/08/2019
99	South East Offset	SE010	bat box	microbat	323779	6413495.8	-32.4017	151.1263	161	7/08/2019

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ID2	Location	BoxID	Box style	Fauna species	x	y	Latitude	Longitude	Altitude	Date Installed
100	South East Offset	SE07	Possum	possum	323781.4	6413486.9	-32.4018	151.1263	163	7/08/2019
101	South East Offset	SE011	antechinus	small mammal	323913	6413524.9	-32.4014	151.1277	174	7/08/2019
107	South East Corridor Offset	SEC06	Possum	possum	324056.9	6412567.1	-32.4101	151.1291	146	7/08/2019
108	South East Corridor Offset	SEC07	Glider	glider	324083.8	6412551.3	-32.4102	151.1293	142	7/08/2019
109	South East Corridor Offset	SEC08	Parrot	bird	324010.3	6412499	-32.4107	151.1285	151	7/08/2019
110	South East Corridor Offset	SEC09	Parrot	bird	323929.1	6412483.1	-32.4108	151.1277	150	7/08/2019
111	South East Corridor Offset	SEC010	Possum	possum	324068.2	6412249.1	-32.413	151.1291	151	7/08/2019
112	South East Corridor Offset	SEC011	bat box	microbat	324108.1	6412267.1	-32.4128	151.1295	149	7/08/2019
113	Ravensworth State Forest	NF01	bat box	microbat	323226	6415892	-32.379983	151.120844	222	1/01/1996
114	Ravensworth State Forest	NF02	bat box	microbat	322738	6415903	-32.379807	151.115661	168	1/01/1996
115	Ravensworth State Forest	NF03	bat box	microbat	322824	6415866	-32.380154	151.116568	178	1/01/1996
117	Ravensworth State Forest	NF05	bat box	microbat	323413	6415730	-32.381473	151.122801	187	1/01/1996
119	Ravensworth State Forest	NF07	bat box	microbat	323256.4	6415795.5	-32.380858	151.121149	223	11/09/2008
120	Ravensworth State Forest	NF08	bat box	microbat	323215.4	6415904.8	-32.379866	151.120734	218	11/09/2008
121	Ravensworth State Forest	NF09	bat box	microbat	323382	6415684	-32.381883	151.122463	246	1/01/1996
122	Ravensworth State Forest	NF010	bat box	microbat	323325	6415615	-32.382496	151.121845	191	1/01/1996
123	Ravensworth State Forest	NF011	bat box	microbat	323229.3	6415730.7	-32.381438	151.120849	182	1/01/1996
124	Ravensworth State Forest	NF012	bat box	microbat	323268	6415520	-32.383344	151.121221	196	1/01/1996
125	Ravensworth State Forest	NF013	bat box	microbat	323239	6415482	-32.383682	151.120906	208	1/01/1996
126	Ravensworth State Forest	NF014	bat box	microbat	323229.3	6415730.7	-32.381438	151.120849	207	1/01/1996
127	Ravensworth State Forest	NF015	bat box	microbat	323176	6415510	-32.383419	151.120242	191	1/01/1996
128	Ravensworth State Forest	NF016	bat box	microbat	323178	6415457	-32.383898	151.120253	192	1/01/1996
129	Ravensworth State Forest	NF017	bat box	microbat	323169	6415417	-32.384257	151.12015	193	1/01/1996
130	Ravensworth State Forest	NF018	bat box	microbat	323098	6415340	-32.38494	151.119381	177	1/01/1996
131	Ravensworth State Forest	NF019	bat box	microbat	323104	6415279	-32.385491	151.119433	200	1/01/1996
132	Ravensworth State Forest	NF020	bat box	microbat	322899	6415378	-32.384566	151.117274	177	1/01/1996
133	Ravensworth State Forest	NF021	bat box	microbat	322636	6415464	-32.383749	151.114495	180	1/01/1996

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134	Ravensworth State Forest	NF022	bat box	microbat	322796	6415248	-32.385721	151.116155	174	1/01/1996
136	Ravensworth State Forest	NF024	bat box	microbat	322717	6415146	-32.386629	151.115296	173	1/01/1996
137	Ravensworth State Forest	NF026	bat box	microbat	323132	6414969	-32.38829	151.119673	178	1/01/1996
139	Ravensworth State Forest	NF028	bat box	microbat	323002	6414853	-32.389316	151.11827	180	1/01/1996
140	Ravensworth State Forest	NF029	bat box	microbat	322993	6414825	-32.389567	151.118169	175	1/01/1996
141	Ravensworth State Forest	NF030	bat box	microbat	322968	6414818	-32.389626	151.117902	167	1/01/1996
142	Ravensworth State Forest	NF031	bat box	microbat	322959	6414713	-32.390571	151.117787	173	1/01/1996
143	Ravensworth State Forest	NF032	bat box	microbat	322926	6414622	-32.391386	151.117419	176	1/01/1996
144	Ravensworth State Forest	NF033	bat box	microbat	323228	6414889	-32.389027	151.120678	168	1/01/1996
145	Ravensworth State Forest	NF034	bat box	microbat	323379	6414653	-32.391179	151.122239	152	1/01/1996
147	Ravensworth State Forest	NF036	bat box	microbat	323198	6414503	-32.392502	151.120287	151	1/01/1996
148	Ravensworth State Forest	NF037	bat box	microbat	323110	6414436	-32.393093	151.11934	153	1/01/1996
149	Ravensworth State Forest	NF038	bat box	microbat	323041	6414308	-32.394236	151.118582	144	1/01/1996
151	Ravensworth State Forest	NF040	bat box	microbat	322967	6414225	-32.394972	151.117781	142	1/01/1996
152	Ravensworth State Forest	NF041	bat box	microbat	323185	6414192	-32.395305	151.120091	153	1/01/1996
153	Ravensworth State Forest	NF042	bat box	microbat	323250	6414285	-32.394476	151.120799	148	1/01/1996
155	Ravensworth State Forest	NF044	bat box	microbat	323458	6414146	-32.395763	151.122984	169	1/01/1996
156	Ravensworth State Forest	NF045	bat box	microbat	323460	6414152	-32.395709	151.123006	161	1/01/1996
157	Ravensworth State Forest	NF046	bat box	microbat	323664	6414268	-32.394695	151.125196	173	1/01/1996
158	Ravensworth State Forest	NF047	bat box	microbat	323740	6414399	-32.393526	151.126028	182	1/01/1996
159	Ravensworth State Forest	NF048	bat box	microbat	323757	6414717	-32.390661	151.126268	169	1/01/1996
160	Ravensworth State Forest	NF049	bat box	microbat	323682	6414808	-32.389829	151.125488	172	1/01/1996
161	Ravensworth State Forest	NF050	bat box	microbat	323493	6414966	-32.388375	151.123509	177	1/01/1996
163	Ravensworth State Forest	NF052	bat box	microbat	322651	6415072	-32.387285	151.114581	170	1/01/1996
164	Yorks Creek	NR001	bat box	microbat	320539	6416257	-32.376263	151.092363	162	1/01/1996
166	Yorks Creek	NR003	bat box	microbat	320531	6416226	-32.376542	151.092273	164	1/01/1996
168	Yorks Creek	NR005	bat box	microbat	320519	6416181	-32.376945	151.092137	161	1/01/1996
170	Yorks Creek	NR007	bat box	microbat	320495	6416033	-32.378276	151.091854	157	1/01/1996

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171	New Forest Area	NR008	bat box	microbat	321705	6416126	-32.377631	151.104727	190	1/01/1996
172	North West Offset	NR009	bat box	microbat	321573	6416317	-32.375888	151.103361	185	1/01/1996
175	New Forest Area	NR012	bat box	microbat	321688	6416370	-32.375429	151.104593	189	1/01/2008
176	New Forest Area	NR013	bat box	microbat	321688	6416370	-32.375429	151.104593	189	1/01/2008
178	New Forest Area	NR015	bat box	microbat	321692	6416368	-32.375447	151.104635	190	1/01/1996
180	New Forest Area	NR017	bat box	microbat	321654	6416154	-32.377371	151.104191	163	1/01/1996
182	New Forest Area	NR019	bat box	microbat	321704	6416126	-32.377631	151.104717	166	1/01/1996
184	New Forest Area	NR021	bat box	microbat	321739	6416114	-32.377745	151.105086	163	1/01/1996
187	New Forest Area	NR024	bat box	microbat	322020	6416074	-32.37815	151.108064	178	1/01/1996
188	New Forest Area	NR026	bat box	microbat	322133	6416073	-32.378177	151.109265	176	1/01/1996
190	New Forest Area	NR027	bat box	microbat	322290	6416017	-32.378707	151.110922	174	1/01/1996
191	New Forest Area	NR028	bat box	microbat	322373	6416020	-32.378694	151.111805	200	1/01/1996
193	New Forest Area	NR030	bat box	microbat	322301	6416470	-32.374625	151.111124	199	1/01/1996
194	New Forest Area	NR031	bat box	microbat	322301	6416470	-32.374625	151.111124	199	1/01/1996
195	New Forest Area	NR032	bat box	microbat	322307	6416469	-32.374635	151.111188	201	1/10/2010
196	New Forest Area	NR033	bat box	microbat	322307	6416469	-32.374635	151.111188	201	1/10/2010
197	New Forest Area	NR034	bat box	microbat	322516	6416125	-32.37777	151.113344	175	1/01/1996
198	New Forest Area	NR035	bat box	microbat	322516	6416125	-32.37777	151.113344	175	1/01/1996
199	New Forest Area	NR036	bat box	microbat	322516	6416125	-32.37777	151.113344	175	1/01/1996
200	New Forest Area	NR037	bat box	microbat	322516	6416125	-32.37777	151.113344	175	1/01/1996
202	New Forest Area	NR039	bat box	microbat	323243	6416528	-32.374251	151.121144	197	1/10/2010
203	New Forest Area	NR040	bat box	microbat	323243	6416528	-32.374251	151.121144	197	1/10/2010
204	New Forest Area	NR041	bat box	microbat	323251	6416529	-32.374244	151.121229	198	1/10/2010
205	New Forest Area	NR042	bat box	microbat	323251	6416529	-32.374244	151.121229	198	1/10/2010
206	New Forest Area	NR043	bat box	microbat	323258	6416530	-32.374236	151.121303	197	1/01/1996
207	New Forest Area	NR044	bat box	microbat	323258	6416530	-32.374236	151.121303	197	1/01/1996
210	New Forest Area	NR047	bat box	microbat	323429	6416328	-32.376084	151.123083	227	1/01/1996
211	New Forest Area	NR048	bat box	microbat	323440	6416287	-32.376456	151.123192	227	1/01/1996

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214	New Forest Area	NR051	bat box	microbat	323421	6416277	-32.376543	151.122988	225	1/01/1996
216	New Forest Area	NR053	bat box	microbat	323433	6416238	-32.376896	151.123108	0	1/01/1996
220	New Forest Area	NR057	bat box	microbat	322772.6	6416309.4	-32.376148	151.116105	181	1/01/1996
221	New Forest Area	NR058	bat box	microbat	322772.6	6416309.4	-32.376148	151.116105	181	1/01/1996
222	New Forest Area	NR059	bat box	microbat	322772.6	6416309.4	-32.376148	151.116105	181	1/10/2010
223	MGO Rehabilitation	Reh01	bat box	microbat	320749	6415509	-32.383041	151.094453	0	1/01/1996
224	MGO Rehabilitation	Reh02	bat box	microbat	320774	6415506	-32.383072	151.094718	0	1/01/1996
225	New Forest Area	NR060	bat box	microbat	322772.6	6416309.4	-32.376148	151.116105	181	1/10/2010
226	New Forest Area	NR061	bat box	microbat	322775.2	6416319.1	-32.376061	151.116134	188	1/10/2010
227	New Forest Area	NR062	bat box	microbat	322775.2	6416319.1	-32.376061	151.116134	188	1/10/2010
229	New Forest Area	NR064	bat box	microbat	322316	6416223.7	-32.376848	151.111238	191	1/01/1996
230	New Forest Area	NR065	bat box	microbat	322305.4	6416222.5	-32.376857	151.111125	196	1/10/2010
231	New Forest Area	NR066	bat box	microbat	322305.4	6416222.5	-32.376857	151.111125	196	1/10/2010
234	MGO Rehabilitation	Reh03	bat box	microbat	320774	6415506	-32.383072	151.094718	0	1/01/1996
235	MGO Rehabilitation	Reh04	bat box	microbat	320732	6415500	-32.38312	151.094271	0	1/01/1996
236	MGO Rehabilitation	Reh05	bat box	microbat	320732	6415500	-32.38312	151.094271	0	1/01/1996
237	MGO Rehabilitation	Reh06	bat box	microbat	320728	6415488	-32.383227	151.094226	0	1/01/1996
238	New Forest Area	NR073	bat box	microbat	322604.1	6416426.7	-32.375063	151.114337	0	14/08/2019
239	New Forest Area	NR074	bat box	microbat	322646.5	6416352.1	-32.375743	151.114773	0	14/08/2019
240	New Forest Area	NR075	bat box	microbat	322642.2	6416380.9	-32.375482	151.114733	0	14/08/2019
241	North East Offset	NR077	bat box	microbat	323669.5	6416658.9	-32.373139	151.125699	0	1/01/1996
249	New Forest Area	NFA09	Glider	glider	321990	6416056	-32.378308	151.107742	0	18/09/2000
250	New Forest Area	NFA10	bat box	microbat	322215	6416060	-32.378308	151.110134	0	17/09/2000
254	New Forest Area	NFA11	Glider	glider	322132	6416338	-32.375788	151.109304	0	1/06/2005
258	New Forest Area	NFA12	Glider	glider	322286.2	6416358.3	-32.37563	151.110946	0	12/10/2011
259	New Forest Area	NFA13	Glider	glider	322271.2	6416350	-32.375702	151.110785	0	12/10/2011
260	New Forest Area	NFA14	Glider	glider	323210	6416210	-32.377113	151.120734	0	2/11/1996
261	New Forest Area	NFA15	Glider	glider	323185	6416157	-32.377587	151.120458	0	2/11/1996

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263	Ravensthorpe State Forest	GB22	Glider	glider	322853	6415377	-32.384567	151.116785	0	1/11/1996
264	Ravensthorpe State Forest	GB23	Glider	glider	322748	6415090	-32.387138	151.115615	0	2/11/1996
265	Ravensthorpe State Forest	GB24	Glider	glider	322816	6415280	-32.385436	151.116373	0	1/06/1999
267	Ravensthorpe State Forest	GB25a	Glider	glider	322590.359	6415438.36	-32.383972	151.114005	186	14/08/2019
268	MGO Rehabilitation	Reh07	Glider	glider	322482.697	6415451.91	-32.383833	151.112864	0	14/08/2019
269	MGO Rehabilitation	Reh08	Glider	glider	322493.598	6415429.11	-32.38404	151.112976	0	14/08/2019
270	New Forest Area	NFA16	Glider	glider	323414.254	6416271.66	-32.37659	151.122915	230	14/08/2019
271	Southern Remnant	SF001	bat box	microbat	320874	6413615	-32.400138	151.095423	128	1/01/1996
272	Southern Remnant	SF002	bat box	microbat	320894	6413575	-32.400502	151.095628	133	1/01/1996
273	Southern Remnant	SF003	bat box	microbat	320899	6413509	-32.401098	151.095668	129	1/01/1996
274	Southern Remnant	SF004	bat box	microbat	320875.1	6413453.5	-32.401594	151.095404	134	1/01/1996
275	Southern Remnant	SF005	bat box	microbat	320831	6413323	-32.402764	151.09491	144	1/01/1996
276	Southern Remnant	SF006	bat box	microbat	320823	6413258	-32.403349	151.094813	126	1/01/1996
277	Southern Remnant	SF007	bat box	microbat	320856	6413202	-32.403859	151.095153	122	1/01/1996
278	Southern Remnant	SF008	bat box	microbat	320888	6413202	-32.403864	151.095493	122	1/01/1996
279	Southern Remnant	SF009	bat box	microbat	320923	6413224	-32.403671	151.095869	137	1/01/1996
280	Southern Remnant	SF010	bat box	microbat	320923	6413224	-32.403671	151.095869	137	1/01/1996
282	Southern Remnant	SF012	bat box	microbat	320930	6413277	-32.403195	151.095954	139	1/01/1996
283	Southern Remnant	SF013	bat box	microbat	320930	6413277	-32.403195	151.095954	139	1/01/1996
284	Southern Remnant	SF014	bat box	microbat	320945	6413312	-32.402881	151.09612	141	1/01/1996
285	Southern Remnant	SF015	bat box	microbat	321035	6413342	-32.402625	151.097082	136	1/01/1996
286	Southern Remnant	SF016	bat box	microbat	321065	6413406	-32.402053	151.097413	123	1/01/1996
287	Southern Remnant	SF017	bat box	microbat	321035	6413342	-32.402625	151.097082	123	1/01/1996
288	Southern Remnant	SF018	bat box	microbat	321065	6413406	-32.402053	151.097413	123	1/01/1996
289	MGO Rehabilitation	Reh09	Glider	glider	322482.7	6415451.9	-32.383833	151.112864	181	12/10/2011
290	MGO Rehabilitation	Reh010	Glider	glider	322493.6	6415429.1	-32.384041	151.112976	179	12/10/2011
291	MGO Rehabilitation	Reh011	bird	bird	322357.3	6415648	-32.382045	151.111568	189	1/10/2015
292	MGO Rehabilitation	Reh012	bird	bird	322332.2	6415624	-32.382258	151.111297	196	1/10/2015

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293	MGO Rehabilitation	Reh013	bird	bird	322357	6415604.1	-32.382441	151.111557	193	1/10/2015
294	MGO Rehabilitation	Reh014	bird	bird	322380.4	6415607.7	-32.382412	151.111806	189	1/10/2015
295	MGO Rehabilitation	Reh015	bird	bird	322398.6	6415576.8	-32.382694	151.111994	186	1/10/2015
296	MGO Rehabilitation	Reh016	bird	bird	322423.6	6415544.7	-32.382987	151.112253	186	1/10/2015
297	MGO Rehabilitation	Reh017	bird	bird	322394.8	6415464.5	-32.383706	151.111932	196	1/10/2015
298	MGO Rehabilitation	Reh018	bird	bird	322384.9	6415485.6	-32.383514	151.111831	198	1/10/2015
299	MGO Rehabilitation	Reh019	bird	bird	322369.1	6415520.4	-32.383198	151.11167	199	1/10/2015
300	MGO Rehabilitation	Reh020	bird	bird	322358.5	6415558.6	-32.382851	151.111564	200	1/10/2015
301	MGO Rehabilitation	Reh021	Possum	possum	322329.775	6415631.03	-32.382194	151.111273	193	7/09/2016
302	MGO Rehabilitation	Reh022	Possum	possum	322324.259	6415655.67	-32.381971	151.111219	192	7/09/2016
303	MGO Rehabilitation	Reh023	Possum	possum	322346.123	6415611.62	-32.382371	151.111443	197	7/09/2016
304	MGO Rehabilitation	Reh024	Possum	possum	322355.372	6415556.91	-32.382866	151.111531	201	7/09/2016
305	MGO Rehabilitation	Reh025	Possum	possum	322387.92	6415546.16	-32.382968	151.111875	195	7/09/2016
306	MGO Rehabilitation	Reh026	Bird	bird	321076.806	6415121.79	-32.386585	151.097863	297	12/12/2018
307	MGO Rehabilitation	Reh027	Bird	bird	321076.806	6415121.79	-32.386585	151.097863	297	12/12/2018
308	MGO Rehabilitation	Reh028	Bird	bird	321126.603	6415142.2	-32.386409	151.098396	296	12/12/2018
309	MGO Rehabilitation	Reh029	Bird	bird	321126.603	6415142.2	-32.386409	151.098396	296	12/12/2018
310	MGO Rehabilitation	Reh030	Possum	possum	321154.141	6415154.78	-32.3863	151.098691	297	12/12/2018
311	MGO Rehabilitation	Reh031	bat box	microbat	321154.141	6415154.78	-32.3863	151.098691	297	12/12/2018
312	MGO Rehabilitation	Reh032	Possum	possum	321169.685	6415164.48	-32.386215	151.098858	297	12/12/2018
313	MGO Rehabilitation	Reh033	bat box	microbat	321169.685	6415164.48	-32.386215	151.098858	297	12/12/2018
314	MGO Rehabilitation	Reh034	Possum	possum	321193.244	6415226.23	-32.385662	151.09912	298	12/12/2018
315	MGO Rehabilitation	Reh035	bat box	microbat	321193.244	6415226.23	-32.385662	151.09912	298	12/12/2018
316	MGO Rehabilitation	Reh036	Possum	possum	321217.293	6415244.52	-32.385501	151.099379	298	12/12/2018
317	MGO Rehabilitation	Reh037	bat box	microbat	321217.293	6415244.52	-32.385501	151.099379	298	12/12/2018
318	MGO Rehabilitation	Reh038	Possum	possum	321244.693	6415254.32	-32.385417	151.099672	298	12/12/2018
319	MGO Rehabilitation	Reh039	bat box	microbat	321244.693	6415254.32	-32.385417	151.099672	298	12/12/2018
320	MGO Rehabilitation	Reh040	Possum	possum	321275.128	6415284.03	-32.385154	151.100001	297	12/12/2018

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321	MGO Rehabilitation	Reh041	bat box	microbat	321275.128	6415284.03	-32.385154	151.100001	297	12/12/2018
322	MGO Rehabilitation	Reh042	Possum	possum	321291.985	6415315.16	-32.384876	151.100186	298	12/12/2018
323	MGO Rehabilitation	Reh043	Bird	bird	321291.985	6415315.16	-32.384876	151.100186	298	12/12/2018
324	MGO Rehabilitation	Reh044	Possum	possum	321285.923	6415354.43	-32.384521	151.100129	299	12/12/2018
325	MGO Rehabilitation	Reh045	Bird	bird	321285.923	6415354.43	-32.384521	151.100129	299	12/12/2018
326	MGO Rehabilitation	Reh046	Possum	possum	321279.392	6415377.72	-32.38431	151.100064	299	12/12/2018
327	MGO Rehabilitation	Reh047	bat box	microbat	321279.392	6415377.72	-32.38431	151.100064	299	12/12/2018
328	MGO Rehabilitation	Reh048	Possum	possum	321275.327	6415394.61	-32.384157	151.100024	296	12/12/2018
329	MGO Rehabilitation	Reh049	bat box	microbat	321275.327	6415394.61	-32.384157	151.100024	296	12/12/2018
330	MGO Rehabilitation	Reh050	Bird	bird	321345.311	6415317.11	-32.384867	151.100753	298	12/12/2018
331	MGO Rehabilitation	Reh051	Bird	bird	321345.311	6415317.11	-32.384867	151.100753	298	12/12/2018
332	MGO Rehabilitation	Reh052	Bird	bird	321510.488	6415231.54	-32.385665	151.102492	300	12/12/2018
333	MGO Rehabilitation	Reh053	bat box	microbat	321510.488	6415231.54	-32.385665	151.102492	300	12/12/2018
334	MGO Rehabilitation	Reh054	Bird	bird	321592.936	6415220.47	-32.385778	151.103366	301	12/12/2018
335	MGO Rehabilitation	Reh055	bat box	microbat	321592.936	6415220.47	-32.385778	151.103366	301	12/12/2018
336	Habitat Management Area	GL001	bat box	microbat	321245.4	6407453.6	-32.4558	151.0982	79	10/10/2008
337	Habitat Management Area	GL002	bat box	microbat	321220.9	6407419	-32.4561	151.0979	80	10/10/2008
338	Habitat Management Area	GL003	bat box	microbat	321195.3	6407452.3	-32.4558	151.0977	80	10/10/2008
339	Habitat Management Area	GL004	bat box	microbat	321166.7	6407475.2	-32.4555	151.0974	86	10/10/2008
340	Habitat Management Area	GL005	bat box	microbat	321164.7	6407478.9	-32.4555	151.0974	83	10/10/2008
341	Habitat Management Area	GL006	bat box	microbat	321157.9	6407495.2	-32.4554	151.0973	80	10/10/2008
342	Habitat Management Area	GL007	bat box	microbat	321163.5	6407504.7	-32.4553	151.0973	79	10/10/2008
343	Habitat Management Area	GL008	bat box	microbat	321135.1	6407508.4	-32.4552	151.097	82	10/10/2008
344	Habitat Management Area	GL009	bat box	microbat	321136.5	6407496	-32.4554	151.0971	77	10/10/2008
345	Habitat Management Area	GL010	bat box	microbat	321235.2	6407418.1	-32.4561	151.0981	71	26/03/2009
346	Habitat Management Area	GL011	Glider	glider	321238.6	6407419.6	-32.4561	151.0981	82	26/03/2009
347	Habitat Management Area	GL012	Glider	glider	321263.2	6407496.7	-32.4554	151.0984	83	26/03/2009
348	Habitat Management Area	GL013	bat box	microbat	321645	6408032.8	-32.4506	151.1026	93	10/10/2008

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349	Habitat Management Area	GL014	bat box	microbat	321647.4	6408031.8	-32.4506	151.1026	94	10/10/2008
350	Habitat Management Area	GL015	bat box	microbat	321645.4	6408161.2	-32.4494	151.1026	99	10/10/2008
351	Habitat Management Area	GL016	bat box	microbat	321645.4	6408161.2	-32.4494	151.1026	99	10/10/2008
352	Habitat Management Area	GL017	bat box	microbat	321598.8	6408184.5	-32.4492	151.1021	99	10/10/2008
353	Habitat Management Area	GL018	bat box	microbat	321598.8	6408184.5	-32.4492	151.1021	99	10/10/2008
354	Habitat Management Area	GL019	bat box	microbat	321537.4	6408516.5	-32.4462	151.1015	86	10/10/2008
355	Habitat Management Area	GL020	bat box	microbat	321526.6	6408515.5	-32.4462	151.1014	93	10/10/2008
356	Habitat Management Area	GL021	bat box	microbat	321507.8	6408511.1	-32.4463	151.1012	89	10/10/2008
357	Habitat Management Area	GL022	bat box	microbat	321503.2	6408516.5	-32.4462	151.1011	86	10/10/2008
358	Habitat Management Area	GL023	bat box	microbat	321505.9	6408531.4	-32.4461	151.1012	97	10/10/2008
359	Habitat Management Area	GL024	Glider	glider	321507.4	6408531.5	-32.4461	151.1012	97	26/03/2009
360	Habitat Management Area	GL025	bat box	microbat	321483.9	6408526.9	-32.4461	151.1009	95	26/03/2009
361	Habitat Management Area	GL026	bat box	microbat	321480	6408508.7	-32.4463	151.1009	91	26/03/2009
362	Habitat Management Area	GL027	bat box	microbat	321472.7	6408558.9	-32.4458	151.1008	92	26/03/2009
363	Habitat Management Area	GL028	Glider	glider	321549.4	6408528.4	-32.4461	151.1016	89	26/03/2009
364	Habitat Management Area	GL029	Glider	glider	321188.2	6407462.8	-32.4557	151.0976	90	27/03/2009
365	Habitat Management Area	GL030	Glider	glider	321552.4	6408700.7	-32.4446	151.1017	96	27/03/2009
366	Habitat Management Area	GL031	Glider	glider	321543.9	6408728.2	-32.4443	151.1016	95	27/03/2009
367	Habitat Management Area	GL032	Glider	glider	321516.1	6408935.7	-32.4424	151.1014	106	27/03/2009
368	Habitat Management Area	GL033	Glider	glider	321499.2	6408951.8	-32.4423	151.1012	97	27/03/2009
369	Habitat Management Area	GL034	Glider	glider	321450	6408947.1	-32.4423	151.1007	98	27/03/2009
370	Habitat Management Area	GL035	bat box	microbat	321552.4	6408700.7	-32.4446	151.1017	96	27/03/2009
371	Habitat Management Area	GL036	bat box	microbat	321543.9	6408728.2	-32.4443	151.1016	95	27/03/2009
372	Habitat Management Area	GL037	bat box	microbat	321516.1	6408935.7	-32.4424	151.1014	106	27/03/2009
373	Habitat Management Area	GL038	bat box	microbat	321513.7	6408935.7	-32.4424	151.1013	99	27/03/2009
374	Habitat Management Area	GL039	bat box	microbat	321499.2	6408951.8	-32.4423	151.1012	97	27/03/2009
375	Habitat Management Area	GL040	bat box	microbat	321506.4	6408970	-32.4421	151.1013	97	27/03/2009
376	Habitat Management Area	GL041	bat box	microbat	321506.4	6408970	-32.4421	151.1013	97	27/03/2009

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377	Habitat Management Area	GL042	bat box	microbat	321475.4	6408954	-32.4423	151.1009	97	27/03/2009
378	Habitat Management Area	GL043	bat box	microbat	321475.4	6408954	-32.4423	151.1009	97	27/03/2009
379	Habitat Management Area	GL044	bat box	microbat	321450	6408947.1	-32.4423	151.1007	98	27/03/2009
380	Habitat Management Area	GL045	bat box	microbat	321450	6408947.1	-32.4423	151.1007	98	27/03/2009
381	Habitat Management Area	GL046	bat box	microbat	321496.5	6408924.7	-32.4425	151.1012	94	27/03/2009
382	Habitat Management Area	GL047	bat box	microbat	321496.5	6408924.7	-32.4425	151.1012	94	27/03/2009
383	Habitat Management Area	GL048	bat box	microbat	321502.2	6408829.1	-32.4434	151.1012	99	27/03/2009
384	Habitat Management Area	GL049	bat box	microbat	321502.2	6408829.1	-32.4434	151.1012	99	27/03/2009
385	Habitat Management Area	GL050	bat box	microbat	321520.1	6408521.7	-32.4462	151.1013	100	9/11/2018
386	Habitat Management Area	GL051	Parrot	bird	321408.1	6409328	-32.4389	151.1003	88	9/11/2018
387	Habitat Management Area	GL052	Glider	glider	321075.5	6409633.6	-32.4361	151.0968	85	9/11/2018
388	Habitat Management Area	GL053	Glider	glider	321084.5	6409616.9	-32.4362	151.0969	86	9/11/2018
389	Habitat Management Area	GL054	bat box	microbat	321494.9	6408508.5	-32.4463	151.1011	97	9/11/2018
390	Habitat Management Area	GL055	Glider	glider	321264.6	6407490.7	-32.4554	151.0984	89	9/11/2018
391	Habitat Management Area	GL056	Possum	possum	321287.4	6407470.8	-32.4556	151.0987	89	9/11/2018
392	Habitat Management Area	GL057	bat box	microbat	321217.5	6407430.7	-32.456	151.0979	86	9/11/2018
393	Habitat Management Area	GL058	bat box	microbat	321280.3	6407485.5	-32.4555	151.0986	87	9/11/2018
394	Habitat Management Area	GL059	bat box	microbat	321587.7	6407959.3	-32.4512	151.1019	95	9/11/2018
395	Habitat Management Area	GL060	bat box	microbat	321559.1	6407993.6	-32.4509	151.1016	95	9/11/2018
396	Habitat Management Area	GL061	Glider	glider	321587	6407983.5	-32.451	151.1019	95	9/11/2018
397	Habitat Management Area	GL062	Parrot	bird	321563.6	6407979.4	-32.4511	151.1017	95	9/11/2018
398	Habitat Management Area	GL063	Possum	possum	321485.6	6408522.1	-32.4462	151.101	95	9/11/2018
399	Habitat Management Area	GL064	Parrot	bird	321487.3	6408511.2	-32.4463	151.101	95	9/11/2018
400	Habitat Management Area	GL065	Parrot	bird	321508.3	6408529.7	-32.4461	151.1012	94	9/11/2018
401	Habitat Management Area	GL066	Glider	glider	321267	6409338.4	-32.4388	151.0988	92	9/11/2018
402	Habitat Management Area	GL067	Glider	glider	321315.1	6409395.3	-32.4383	151.0993	90	9/11/2018
403	Habitat Management Area	GL068	Glider	glider	321385.7	6409421.3	-32.438	151.1001	90	9/11/2018
404	Habitat Management Area	GL069	Possum	possum	321284.4	6409381.9	-32.4384	151.099	90	9/11/2018

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405	Habitat Management Area	GL070	bat box	microbat	321492.2	6408523	-32.4461	151.101	94	9/11/2018
406	Habitat Management Area	GL071	Glider	glider	321245.4	6407453.7	-32.4557	151.0982	28	6/08/2019
407	Habitat Management Area	GL072	Possum	possum	321260.4	6407434.8	-32.4559	151.0984	26	6/08/2019
408	Habitat Management Area	GL073	Glider	glider	321185.7	6407460.7	-32.4557	151.0976	21	6/08/2019
409	Habitat Management Area	GL074	bat box	microbat	321217.3	6407425.1	-32.456	151.0979	24	6/08/2019
410	Habitat Management Area	GL075	bat box	microbat	321238	6407411.7	-32.4561	151.0981	27	6/08/2019
411	Habitat Management Area	GL076	Glider	glider	321238.4	6407417.8	-32.4561	151.0981	21	6/08/2019
412	Habitat Management Area	GL077	Glider	glider	321295.3	6407405.8	-32.4562	151.0987	27	6/08/2019
413	Habitat Management Area	GL078	Glider	glider	321210.7	6407477.9	-32.4555	151.0978	25	6/08/2019
414	Habitat Management Area	GL079	Bird	bird	321203.9	6407475	-32.4556	151.0978	27	6/08/2019
415	Habitat Management Area	GL080	Bird	bird	321141.3	6407493.1	-32.4554	151.0971	22	6/08/2019
416	Habitat Management Area	GL081	Glider	glider	321143.2	6407466.8	-32.4556	151.0971	21	6/08/2019
417	Habitat Management Area	GL082	Bird	bird	321195.8	6407451.9	-32.4558	151.0977	26	6/08/2019
418	Habitat Management Area	GL083	antechinus	small mammal	321283.3	6407426.6	-32.456	151.0986	31	6/08/2019
419	Habitat Management Area	GL084	Bird	bird	321579.8	6408001.2	-32.4509	151.1019	41	6/08/2019
420	Habitat Management Area	GL085	Bird	bird	321558.5	6407929.7	-32.4515	151.1016	39	6/08/2019
421	Habitat Management Area	GL086	bat box	microbat	321557.2	6408566.7	-32.4458	151.1017	53	6/08/2019
422	Habitat Management Area	GL087	bat box	microbat	321544.6	6408550.8	-32.4459	151.1016	54	6/08/2019
423	Habitat Management Area	GL088	bat box	microbat	321555.1	6408525.8	-32.4461	151.1017	52	6/08/2019
424	Habitat Management Area	GL089	Possum	possum	321569.2	6408525.9	-32.4461	151.1019	60	6/08/2019
425	Habitat Management Area	GL090	bat box	microbat	321554	6408706.5	-32.4445	151.1017	54	6/08/2019
426	Habitat Management Area	GL091	bat box	microbat	321649.9	6408600.2	-32.4455	151.1027	61	6/08/2019
427	Habitat Management Area	GL092	bat box	microbat	321157	6409367.7	-32.4385	151.0976	57	6/08/2019
428	Habitat Management Area	GL093	bat box	microbat	321311.8	6409412.5	-32.4381	151.0993	59	6/08/2019
429	Habitat Management Area	GL094	bat box	microbat	321283.6	6409389.2	-32.4383	151.099	57	6/08/2019
430	Bowmans Creek Floodplain	BowCk01	bat box	microbat	317879.802	6408656.27	-32.444361	151.062646	87	24/07/2018
431	Bowmans Creek Floodplain	BowCk02	bat box	microbat	317879.802	6408656.27	-32.444361	151.062646	87	24/07/2018

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432	Bowmans Creek Floodplain	BowCk03	bat box	microbat	317886.732	6408663.16	-32.4443	151.062721	86	24/07/2018
433	Bowmans Creek Floodplain	BowCk04	bat box	microbat	317886.732	6408663.16	-32.4443	151.062721	86	24/07/2018
434	Bowmans Creek Floodplain	BowCk05	bat box	microbat	317904.672	6408677.64	-32.444173	151.062915	86	24/07/2018
435	Bowmans Creek Floodplain	BowCk06	bat box	microbat	317904.672	6408677.64	-32.444173	151.062915	86	24/07/2018
436	Bowmans Creek Floodplain	BowCk07	bat box	microbat	317865.606	6408601.45	-32.444853	151.062485	84	24/07/2018
437	Bowmans Creek Floodplain	BowCk08	bat box	microbat	317865.606	6408601.45	-32.444853	151.062485	84	24/07/2018
438	Bowmans Creek Floodplain	BowCk09	bat box	microbat	317921.948	6408633.99	-32.444569	151.06309	80	24/07/2018
439	Bowmans Creek Floodplain	BowCk10	bat box	microbat	317921.948	6408633.99	-32.444569	151.06309	80	24/07/2018
440	Barrett Pit Rehabilitation	GLRh01	bat box	microbat	319863.018	6409702.57	-32.43525	151.083933	171	10/08/2018
441	Barrett Pit Rehabilitation	GLRh02	bat box	microbat	319863.018	6409702.57	-32.43525	151.083933	171	10/08/2018
442	Barrett Pit Rehabilitation	GLRh03	bat box	microbat	319870.228	6409681.68	-32.43544	151.084006	167	10/08/2018
443	Barrett Pit Rehabilitation	GLRh04	bat box	microbat	319870.228	6409681.68	-32.43544	151.084006	167	10/08/2018
444	Barrett Pit Rehabilitation	GLRh05	bat box	microbat	319843.869	6409735.87	-32.434947	151.083736	173	10/08/2018
445	Barrett Pit Rehabilitation	GLRh06	bat box	microbat	319843.869	6409735.87	-32.434947	151.083736	173	10/08/2018
446	Barrett Pit Rehabilitation	GLRh07	bat box	microbat	319826.385	6409766.02	-32.434672	151.083555	172	10/08/2018
447	Barrett Pit Rehabilitation	GLRh08	Bird	bird	319808.963	6409802.83	-32.434338	151.083377	169	10/08/2018
448	Barrett Pit Rehabilitation	GLRh09	Bird	bird	319808.963	6409802.83	-32.434338	151.083377	169	10/08/2018
449	Barrett Pit Rehabilitation	GLRh10	Bird	bird	319826.45	6409765.9	-32.434673	151.083556	172	10/08/2018
450	Barrett Pit Rehabilitation	GLRh11	Bird	bird	320077.723	6409149.01	-32.440276	151.08611	125	2/08/2019
451	Barrett Pit Rehabilitation	GLRh12	bat box	microbat	320077.723	6409149.01	-32.440276	151.08611	125	2/08/2019
452	Barrett Pit Rehabilitation	GLRh13	Bird	bird	320031.221	6409198.42	-32.439823	151.085625	125	2/08/2019
453	Barrett Pit Rehabilitation	GLRh14	bat box	microbat	320031.221	6409198.42	-32.439823	151.085625	125	2/08/2019
454	Barrett Pit Rehabilitation	GLRh15	Bird	bird	319881.929	6410106.88	-32.431608	151.084211	125	2/08/2019
455	Barrett Pit Rehabilitation	GLRh16	bat box	microbat	319881.929	6410106.88	-32.431608	151.084211	125	2/08/2019
456	Barrett Pit Rehabilitation	GLRh17	Bird	bird	319926.532	6410105.91	-32.431624	151.084685	125	2/08/2019
457	Barrett Pit Rehabilitation	GLRh18	bat box	microbat	319926.532	6410105.91	-32.431624	151.084685	125	2/08/2019
458	Barrett Pit Rehabilitation	GLRh19	Possum	possum	319986.374	6410220.33	-32.430602	151.085343	125	2/08/2019
459	Barrett Pit Rehabilitation	GLRh20	bat box	microbat	319986.374	6410220.33	-32.430602	151.085343	125	2/08/2019

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460	Barrett Pit Rehabilitation	GLRh21	Bird	bird	319886.796	6409966.67	-32.432873	151.084236	59	13/08/2019
461	Barrett Pit Rehabilitation	GLRh22	bat box	microbat	319886.796	6409966.67	-32.432873	151.084236	59	13/08/2019
462	Barrett Pit Rehabilitation	GLRh23	Bird	bird	319902.224	6409956.07	-32.432971	151.084398	72	13/08/2019
463	Barrett Pit Rehabilitation	GLRh24	bat box	microbat	319902.224	6409956.07	-32.432971	151.084398	72	13/08/2019
464	Barrett Pit Rehabilitation	GLRh25	Bird	bird	319922.024	6409990.15	-32.432667	151.084615	72	13/08/2019
465	Barrett Pit Rehabilitation	GLRh26	bat box	microbat	319922.024	6409990.15	-32.432667	151.084615	72	13/08/2019
466	Barrett Pit Rehabilitation	GLRh27	Bird	bird	319935.625	6410028.99	-32.432319	151.084767	77	13/08/2019
467	Barrett Pit Rehabilitation	GLRh28	bat box	microbat	319935.625	6410028.99	-32.432319	151.084767	77	13/08/2019
468	Barrett Pit Rehabilitation	GLRh29	Bird	bird	319910.151	6410049.05	-32.432134	151.0845	73	13/08/2019
469	Barrett Pit Rehabilitation	GLRh30	bird	bird	319910.151	6410049.05	-32.432134	151.0845	73	13/08/2019
470	Bayswater Pit Rehabilitation	GLRh41	antechinus	small mammal	318544.471	6413167.84	-32.403793	151.07058	125	2/08/2019
471	Bayswater Pit Rehabilitation	GLRh42	antechinus	small mammal	318531.587	6413120.59	-32.404217	151.070434	125	2/08/2019
472	Bayswater Pit Rehabilitation	GLRh43	antechinus	small mammal	318538.673	6413118.94	-32.404233	151.070509	125	2/08/2019
473	Bayswater Pit Rehabilitation	GLRh44	antechinus	small mammal	318520.564	6413079.68	-32.404584	151.070309	125	2/08/2019
474	Bayswater Pit Rehabilitation	GLRh45	antechinus	small mammal	318539.292	6413016.91	-32.405153	151.070496	125	2/08/2019
475	Bayswater Pit Rehabilitation	GLRh46	antechinus	small mammal	318429.232	6413265.47	-32.402894	151.069374	125	2/08/2019
476	Bayswater Pit Rehabilitation	GLRh47	antechinus	small mammal	318401.233	6413294.47	-32.402628	151.069082	125	2/08/2019
477	Bayswater Pit Rehabilitation	GLRh48	antechinus	small mammal	318378.267	6413320.9	-32.402386	151.068843	125	2/08/2019
478	Bayswater Pit Rehabilitation	GLRh49	antechinus	small mammal	318358.225	6413341.72	-32.402195	151.068634	125	2/08/2019
479	Bayswater Pit Rehabilitation	GLRh50	antechinus	small mammal	318359.105	6413371.13	-32.40193	151.068649	125	2/08/2019
480	Stringybark Creek Offset	SC01	Glider	glider	319991.594	6417028.29	-32.369221	151.086694	201	7/08/2019
481	Stringybark Creek Offset	SC02	Possum	possum	319967.595	6417101.73	-32.368555	151.086453	209	7/08/2019

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482	Stringybark Creek Offset	SC03	Parrot	bird	320061.439	6417101.85	-32.368569	151.08745	198	7/08/2019
483	Stringybark Creek Offset	SC04	Glider	glider	320058.589	6417177	-32.367891	151.087434	203	7/08/2019
484	Stringybark Creek Offset	SC05	Parrot	bird	320107.479	6417222.35	-32.36749	151.087962	209	7/08/2019
485	Stringybark Creek Offset	SC06	bat box	microbat	320089.276	6417203.28	-32.367659	151.087765	209	7/08/2019
486	Stringybark Creek Offset	SC07	antechinus	small mammal	320071.964	6417192.32	-32.367755	151.087579	204	7/08/2019
487	Stringybark Creek Offset	SC08	quoll polypipe	quoll	320078.047	6417104.81	-32.368545	151.087627	193	31/07/2019
488	Stringybark Creek Offset	SC09	quoll polypipe	quoll	320062.345	6417177.51	-32.367887	151.087474	191	31/07/2019
489	Mitchell Hills Offset	MH01	bat box	microbat	313546.495	6424944.96	-32.296787	151.019779	385	8/08/2019
490	Mitchell Hills Offset	MH02	Parrot	bird	313476.652	6424951.99	-32.296712	151.019039	374	8/08/2019
491	Mitchell Hills Offset	MH03	Glider	glider	313422.013	6424936.67	-32.296841	151.018456	370	8/08/2019
492	Mitchell Hills Offset	MH04	Parrot	bird	313431.63	6424987.2	-32.296387	151.018568	375	8/08/2019
493	Mitchell Hills Offset	MH05	Glider	glider	313415.649	6424888.53	-32.297274	151.018379	367	8/08/2019
494	Mitchell Hills Offset	MH06	antechinus	small mammal	313418.446	6424879.93	-32.297352	151.018407	368	8/08/2019
495	North Void Rehabilitation	NV01	duck	bird	317085.746	6415816.75	-32.379672	151.055589	156	17/10/2019
496	North Void Rehabilitation	NV02	duck	bird	317089.958	6415771.46	-32.380081	151.055625	158	17/10/2019
497	North Void Rehabilitation	NV03	duck	bird	317112.451	6415812.91	-32.379711	151.055872	153	17/10/2019
498	North Void Rehabilitation	NV04	chainsaw hole	bird	317396.348	6414245.43	-32.39389	151.058586	187	17/10/2019
499	North Void Rehabilitation	NV05	Glider	glider	317396.35	6414245.32	-32.393891	151.058586	192	17/10/2019
500	North Void Rehabilitation	NV06	bat box	microbat	317396.462	6414244.32	-32.3939	151.058587	170	17/10/2019
501	North Void Rehabilitation	NV07	chainsaw hole	bird	317436.86	6414258.36	-32.39378	151.059019	184	17/10/2019
502	North Void Rehabilitation	NV08	bat box	microbat	317431.745	6414255.05	-32.393809	151.058964	189	17/10/2019
503	North Void Rehabilitation	NV09	chainsaw hole	bird	317495.055	6414276.94	-32.393622	151.059641	188	17/10/2019
504	North Void Rehabilitation	NV10	glider	glider	317463.154	6414266.6	-32.39371	151.0593	192	17/10/2019
505	North Void Rehabilitation	NV11	bat box	microbat	317491.919	6414273.45	-32.393653	151.059607	192	17/10/2019
506	North Void Rehabilitation	NV12	chainsaw hole	bird	317563.795	6414290.06	-32.393515	151.060374	193	17/10/2019
507	North Void Rehabilitation	NV13	glider	glider	317539.433	6414289.51	-32.393516	151.060115	191	17/10/2019
508	North Void Rehabilitation	NV14	chainsaw hole	bird	317622.875	6414171.68	-32.394592	151.060979	174	17/10/2019

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509	North Void Rehabilitation	NV15	bat box	microbat	317623.436	6414171.91	-32.39459	151.060985	179	17/10/2019
510	North Void Rehabilitation	NV16	glider	glider	317616.725	6414168.35	-32.394621	151.060913	174	17/10/2019
511	North Void Rehabilitation	NV17	glider	glider	317683.466	6414146.38	-32.39483	151.061618	174	17/10/2019
512	North Void Rehabilitation	NV18	bat box	microbat	317701.548	6414140.39	-32.394887	151.061809	172	17/10/2019
513	North Void Rehabilitation	NV19	duck	bird	317699.067	6414126.7	-32.39501	151.06178	172	17/10/2019
514	North Void Rehabilitation	NV20	bat box	microbat	317716.711	6414124.13	-32.395036	151.061967	172	17/10/2019
515	North Void Rehabilitation	NV21	chainsaw hole	bird	317716.711	6414124.13	-32.395036	151.061967	176	17/10/2019
516	North Void Rehabilitation	NV22	duck	bird	317764.892	6414113.69	-32.395138	151.062477	170	17/10/2019
517	North Void Rehabilitation	NV23	glider	glider	317757.967	6414106.36	-32.395203	151.062402	170	17/10/2019
518	North Void Rehabilitation	NV24	duck	bird	317788.475	6414094.93	-32.395311	151.062724	176	17/10/2019
519	North Void Rehabilitation	NV25	glider	glider	317772.806	6414082.01	-32.395425	151.062555	169	17/10/2019
520	North Void Rehabilitation	NV26	glider	glider	317794.745	6414076.08	-32.395482	151.062787	172	17/10/2019
521	North Void Rehabilitation	NV27	chainsaw hole	bird	317826.774	6414126.13	-32.395036	151.063137	175	17/10/2019
522	North Void Rehabilitation	NV28	bat box	microbat	317827.533	6414125.81	-32.395039	151.063145	178	17/10/2019
523	North Void Rehabilitation	NV29	glider	glider	317841.255	6414126.72	-32.395033	151.063291	179	17/10/2019
524	North Void Rehabilitation	NV30	bat box	microbat	317852.369	6414131.36	-32.394993	151.06341	182	17/10/2019
525	North Void Rehabilitation	NV31	chainsaw hole	bird	317863.13	6414093.18	-32.395339	151.063517	176	17/10/2019
526	North Void Rehabilitation	NV32	chainsaw hole	bird	317845.729	6414087.54	-32.395387	151.063331	172	17/10/2019
527	North Void Rehabilitation	NV33	glider	glider	317862.887	6414096.17	-32.395312	151.063515	178	17/10/2019
528	North Void Rehabilitation	NV34	bat box	microbat	317887.848	6414100.06	-32.395281	151.063781	175	17/10/2019
529	North Void Rehabilitation	NV35	chainsaw hole	bird	317887.846	6414100.17	-32.39528	151.063781	175	17/10/2019
530	North Void Rehabilitation	NV36	duck	bird	317163.4	6415710.6	-32.3859	151.0564	0	21/10/2019
531	North Void Rehabilitation	NV37	duck	bird	317179.3	6415570.9	-32.3819	151.0565	0	21/10/2019
532	North Void Rehabilitation	NV38	duck	bird	317317.4	6415091.4	-32.3862	151.0579	0	21/10/2019
533	North Void Rehabilitation	NV39	duck	bird	317311.01	6415129.5	-32.3859	151.0579	0	21/10/2019
534	North West Offset	NWQ1	quoll box	quoll	320762.1	6416671.9	-32.3726	151.0948	185	14/11/2019
535	North East Offset	NEQ1	quoll box	quoll	323631	6416819.8	-32.3717	151.1253	228	14/11/2019
536	Forest East Offset	FEQ1	quoll box	quoll	323815.7	6415909.1	-32.3799	151.1271	193	14/11/2019

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Status: [Document Status
(Office)]

Effective: [Effective Date]

Owner: [Owner (Office)]

Version: [Document Version
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ID2	Location	BoxID	Box style	Fauna species	x	y	Latitude	Longitude	Altitude	Date Installed
537	South East Offset	SEQ1	quoll box	quoll	323940.9	6413277.5	-32.4037	151.128	160	14/11/2019
538	South East Corridor Offset	SECQ1	quoll box	quoll	323957	6412436.9	-32.4113	151.128	135	14/11/2019
539	Southern Remnant	SRQ1	quoll box	quoll	321044.474	6413163.2	-32.404239	151.097149	152	14/11/2019
540	Habitat Management Area	HMAQ1	quoll box	quoll	321147.8	6409419.3	-32.438	151.0975	94	15/11/2019
541	North Void Rehabilitation	NVQ1	quoll box	quoll	317048.727	6415911.57	-32.378811	151.055214	104	15/11/2019
542	North Void Rehabilitation	NVQ2	quoll box	quoll	316979.425	6415028.66	-32.38676	151.054307	120	15/11/2019
543	North Void Rehabilitation	NVQ3	quoll box	quoll	317228.939	6414369.6	-32.392743	151.056831	128	15/11/2019
544	MGO Rehabilitation	RehQ1	quoll box	quoll	320746.262	6415514.41	-32.382992	151.094425	217	15/11/2019
545	MGO Rehabilitation	RehQ2	quoll box	quoll	320828.13	6415330.09	-32.384667	151.09526	214	15/11/2019
546	MGO Rehabilitation	RehQ3	quoll box	quoll	321557.751	6415241.03	-32.385587	151.102996	207	15/11/2019
547	MGO Rehabilitation	RehQ4	quoll box	quoll	322367.788	6414940.49	-32.388426	151.111547	205	15/11/2019
548	Habitat Management Area	GL095	bird	bird	321483.529	6409086.04	-32.44107	151.101045	7	19/03/2020
549	Habitat Management Area	GL096	Parrot	bird	321529.352	6408942.12	-32.442375	151.101505	10	19/03/2020
550	Habitat Management Area	GL097	antechinus	small mammal	321536.011	6408953.77	-32.442271	151.101578	13	19/03/2020
551	Habitat Management Area	GL098	Possum	possum	321513.91	6408932.53	-32.442459	151.101339	9	19/03/2020
552	Habitat Management Area	GL099	Glider	glider	321480.339	6408948.13	-32.442313	151.100985	8	19/03/2020
553	Habitat Management Area	GL100	bat box	microbat	321178.256	6409760.72	-32.434938	151.097927	10	19/03/2020
554	Habitat Management Area	GL101	bat box	microbat	321194.014	6409742.03	-32.435109	151.098091	10	19/03/2020
555	Habitat Management Area	GL102	Parrot	bird	321166.801	6409764.84	-32.434899	151.097806	11	19/03/2020
556	Habitat Management Area	GL103	Parrot	bird	321094.162	6409607.94	-32.436302	151.097004	12	19/03/2020
557	Habitat Management Area	GL104	Possum	possum	321081.804	6409604.72	-32.436329	151.096872	10	19/03/2020
558	Habitat Management Area	GL105	Possum	possum	321528.068	6408601.82	-32.445443	151.101427	20	19/03/2020
559	Habitat Management Area	GL106	antechinus	small mammal	321532.998	6408583.72	-32.445607	151.101476	19	19/03/2020
560	Habitat Management Area	GL107	Parrot	bird	321539.754	6408626.87	-32.445219	151.101556	18	19/03/2020
561	Habitat Management Area	GL108	Glider	glider	321481.993	6408680.64	-32.444725	151.100952	17	19/03/2020
562	Habitat Management Area	GL109	Glider	glider	321481.323	6408617.85	-32.445291	151.100933	15	19/03/2020
563	Habitat Management Area	GL110	bat box	microbat	321499.416	6408631.7	-32.445169	151.101128	16	19/03/2020

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564	Habitat Management Area	GL111	Possum	possum	321345.851	6408657.25	-32.444914	151.0995	12	19/03/2020
565	Habitat Management Area	GL112	Possum	possum	321292.302	6407487.07	-32.455456	151.098709	18	19/03/2020
566	Habitat Management Area	GL113	Glider	glider	321271.503	6407472.17	-32.455587	151.098485	22	19/03/2020
567	Habitat Management Area	GL114	bat box	microbat	321258.011	6407495.77	-32.455372	151.098346	23	19/03/2020
568	Habitat Management Area	GL115	Parrot	bird	321228.336	6407435.46	-32.455911	151.098019	19	19/03/2020
569	Habitat Management Area	GL116	Glider	glider	321193.661	6407471	-32.455585	151.097657	21	19/03/2020
570	Habitat Management Area	GL117	antechinus	small mammal	321657.221	6407261.87	-32.457545	151.102547	28	19/03/2020
571	Habitat Management Area	GL118	antechinus	small mammal	321608.84	6407253.91	-32.457609	151.102031	28	19/03/2020
572	Habitat Management Area	GL119	bat box	microbat	321663.951	6407317	-32.457049	151.102629	24	19/03/2020
573	Stringybark Creek Offset	SC10	Possum	possum	320226.877	6417204.19	-32.367673	151.089227	152	19/03/2020
574	Stringybark Creek Offset	SC11	Parrot	bird	320225.718	6417216.37	-32.367563	151.089217	156	19/03/2020
575	Stringybark Creek Offset	SC12	bat box	microbat	320229.23	6417167.29	-32.368006	151.089245	155	19/03/2020
576	Stringybark Creek Offset	SC13	Glider	glider	320221.474	6417169.37	-32.367986	151.089163	155	19/03/2020
577	Stringybark Creek Offset	SC14	antechinus	small mammal	320334.097	6417172.16	-32.367979	151.09036	158	19/03/2020
578	North West Offset	NW01	antechinus	small mammal	320719.518	6416450.24	-32.37455	151.094318	144	20/03/2020
579	North West Offset	NW02	Possum	possum	320724.093	6416462.86	-32.374437	151.094369	145	20/03/2020
580	North West Offset	NW03	Glider	glider	320739.714	6416468.35	-32.37439	151.094536	147	20/03/2020
581	North West Offset	NW04	Parrot	bird	320749.642	6416471.07	-32.374367	151.094642	150	20/03/2020
582	North West Offset	NW05	bat box	microbat	320723.811	6416473.39	-32.374342	151.094368	146	20/03/2020
583	North East Offset	NE14	Possum	possum	323822.035	6417282.17	-32.367543	151.127436	255	20/03/2020
584	North East Offset	NE15	Parrot	bird	323809.341	6417286.83	-32.367499	151.127302	243	20/03/2020
585	North East Offset	NE16	bat box	microbat	323801.038	6417336.37	-32.367051	151.127223	250	20/03/2020
586	North East Offset	NE17	antechinus	small mammal	323835.052	6416785.86	-32.37202	151.127482	226	20/03/2020
587	North East Offset	NE18	Glider	glider	323839.312	6416795.25	-32.371936	151.127529	228	20/03/2020
588	Forest East Offset	FE12	Possum	possum	323956.591	6414616.96	-32.391595	151.12837	155	20/03/2020

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589	Forest East Offset	FE13	Glider	glider	323956.866	6414644.24	-32.391349	151.128378	158	20/03/2020
590	Forest East Offset	FE14	Parrot	bird	323936.465	6414616.27	-32.391598	151.128156	157	20/03/2020
591	Forest East Offset	FE15	bat box	microbat	323955.363	6414563.48	-32.392077	151.128347	155	20/03/2020
592	Forest East Offset	FE16	bird	bird	323951.25	6414545.77	-32.392236	151.1283	153	20/03/2020
593	South East Offset	SE012	Parrot	bird	324001.352	6413360.92	-32.402927	151.128612	140	20/03/2020
594	South East Offset	SE013	Possum	possum	324019.744	6413358.36	-32.402953	151.128807	139	20/03/2020
595	South East Offset	SE014	bat box	microbat	324033.994	6413415.06	-32.402444	151.128969	139	20/03/2020
596	South East Offset	SE015	antechinus	small mammal	324034.958	6413435.26	-32.402262	151.128983	145	20/03/2020
597	South East Corridor Offset	SEC012	Possum	possum	324342.772	6412603.73	-32.409808	151.1321	105	20/03/2020
598	South East Corridor Offset	SEC013	Parrot	bird	324364.052	6412613.53	-32.409723	151.132328	105	20/03/2020
599	South East Corridor Offset	SEC014	Parrot	bird	324378.67	6412616.89	-32.409695	151.132484	103	20/03/2020
600	South East Corridor Offset	SEC015	bat box	microbat	324364.975	6412582.27	-32.410005	151.132332	102	20/03/2020
601	South East Corridor Offset	SEC016	antechinus	small mammal	324334.273	6412578.63	-32.410033	151.132005	104	20/03/2020
602	Mitchell Hills Offset	MH07	Possum	possum	313846.463	6424882.84	-32.297397	151.022951	337	20/03/2020
603	Mitchell Hills Offset	MH08	Parrot	bird	313854.073	6424894.18	-32.297296	151.023034	335	20/03/2020
604	Mitchell Hills Offset	MH09	Glider	glider	313843.372	6424912.51	-32.297129	151.022924	330	20/03/2020
605	Mitchell Hills Offset	MH010	antechinus	small mammal	313843.202	6424916.61	-32.297092	151.022923	260	20/03/2020
606	Mitchell Hills Offset	MH011	antechinus	small mammal	313843.202	6424916.61	-32.297092	151.022923	260	20/03/2020
607	Barrett Pit Rehabilitation	GLRh31	Possum	possum	320116.086	6408866.2	-32.442832	151.086464	67	23/03/2020
608	Barrett Pit Rehabilitation	GLRh32	bat box	microbat	320139.641	6408827.14	-32.443188	151.086707	63	23/03/2020
609	Barrett Pit Rehabilitation	GLRh33	antechinus	small mammal	320151.842	6408812.83	-32.443319	151.086834	63	23/03/2020
610	Barrett Pit Rehabilitation	GLRh34	Parrot	bird	320161.833	6408790.6	-32.443521	151.086936	64	23/03/2020
611	Barrett Pit Rehabilitation	GLRh35	antechinus	small mammal	320163.12	6408776.54	-32.443648	151.086947	104	23/03/2020
612	Barrett Pit Rehabilitation	GLRh36	bird	bird	320348.122	6408340.2	-32.447612	151.088831	97	23/03/2020

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Status: [Document Status (Office)]

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ID2	Location	BoxID	Box style	Fauna species	x	y	Latitude	Longitude	Altitude	Date Installed
613	Barrett Pit Rehabilitation	GLRh37	Possum	possum	320348.1	6408273.1	-32.448217	151.088818	100	23/03/2020
614	Barrett Pit Rehabilitation	GLRh38	bird	bird	320361.029	6408202.34	-32.448857	151.088942	100	23/03/2020
615	Barrett Pit Rehabilitation	GLRh39	Parrot	bird	320383.607	6408123.11	-32.449575	151.089167	100	23/03/2020
616	Barrett Pit Rehabilitation	GLRh40	Glider	glider	320317.911	6408236.4	-32.448543	151.08849	105	23/03/2020
617	Cross Creek Offset	CC01	bird	bird	322491.967	6419009.5	-32.351758	151.113629	184	9/04/2020
618	Cross Creek Offset	CC02	bird	bird	322768.766	6419222.67	-32.34988	151.116609	182	9/04/2020
619	Cross Creek Offset	CC03	Glider	glider	322739.371	6419255.98	-32.349575	151.116303	178	9/04/2020
620	Cross Creek Offset	CC04	Possum	possum	322707.179	6419260.95	-32.349525	151.115962	175	9/04/2020
621	Cross Creek Offset	CC05	bat box	microbat	322701.506	6419256.97	-32.34956	151.115901	173	9/04/2020
622	East West Corridor Offset	EW01	Glider	glider	319388.039	6414538.49	-32.391572	151.079807	162	8/08/2019
623	East West Corridor Offset	EW02	bird	bird	319694.899	6414686.3	-32.390289	151.083096	36	9/04/2020
624	East West Corridor Offset	EW03	bat box	microbat	319753.858	6414683.58	-32.390323	151.083722	37	9/04/2020
625	East West Corridor Offset	EW04	Possum	possum	319506.489	6414718.3	-32.38997	151.0811	31	9/04/2020
626	East West Corridor Offset	EW05	bird	bird	319501.666	6414766.79	-32.389532	151.081058	34	9/04/2020

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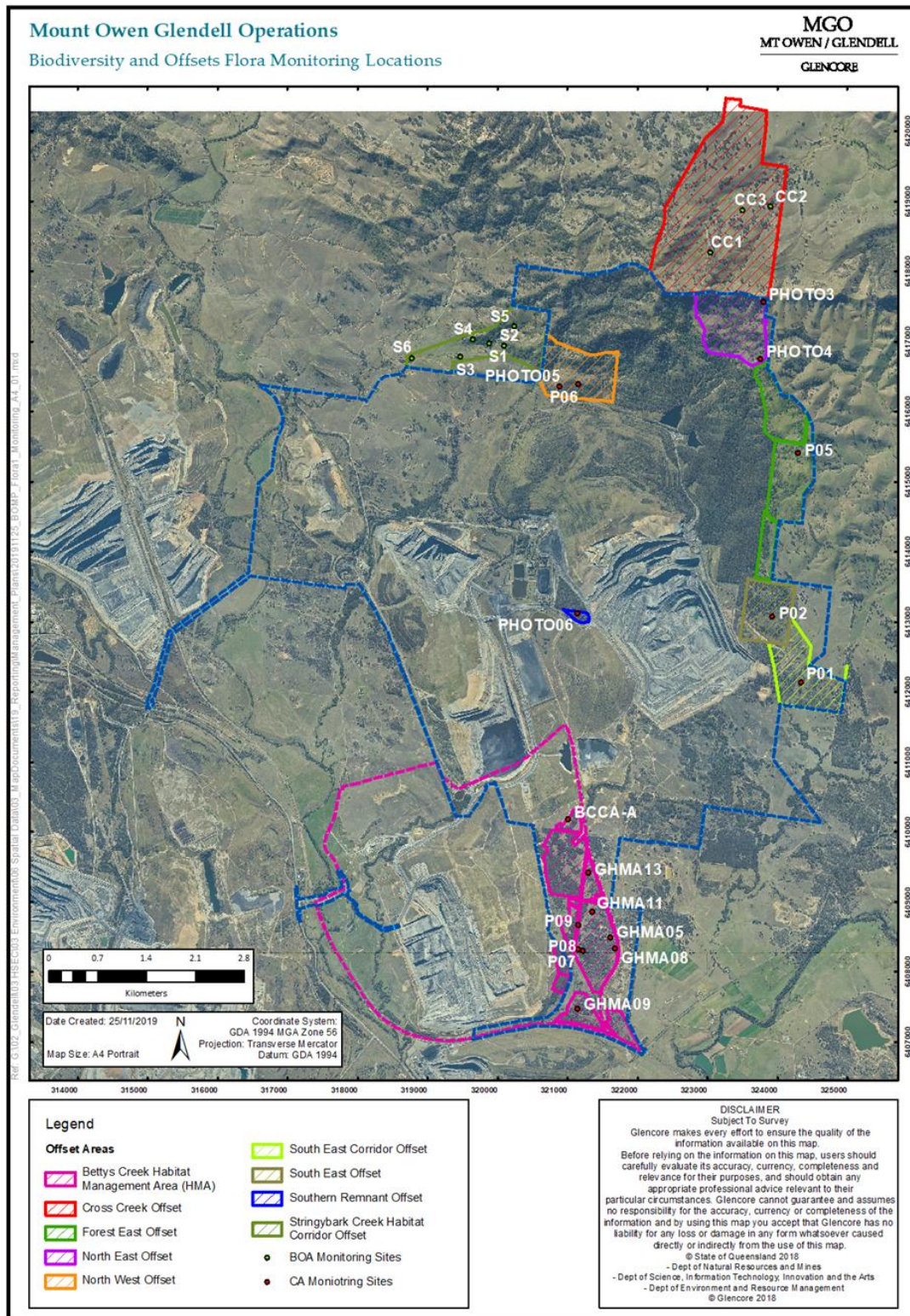
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Appendix D - Flora Monitoring Locations



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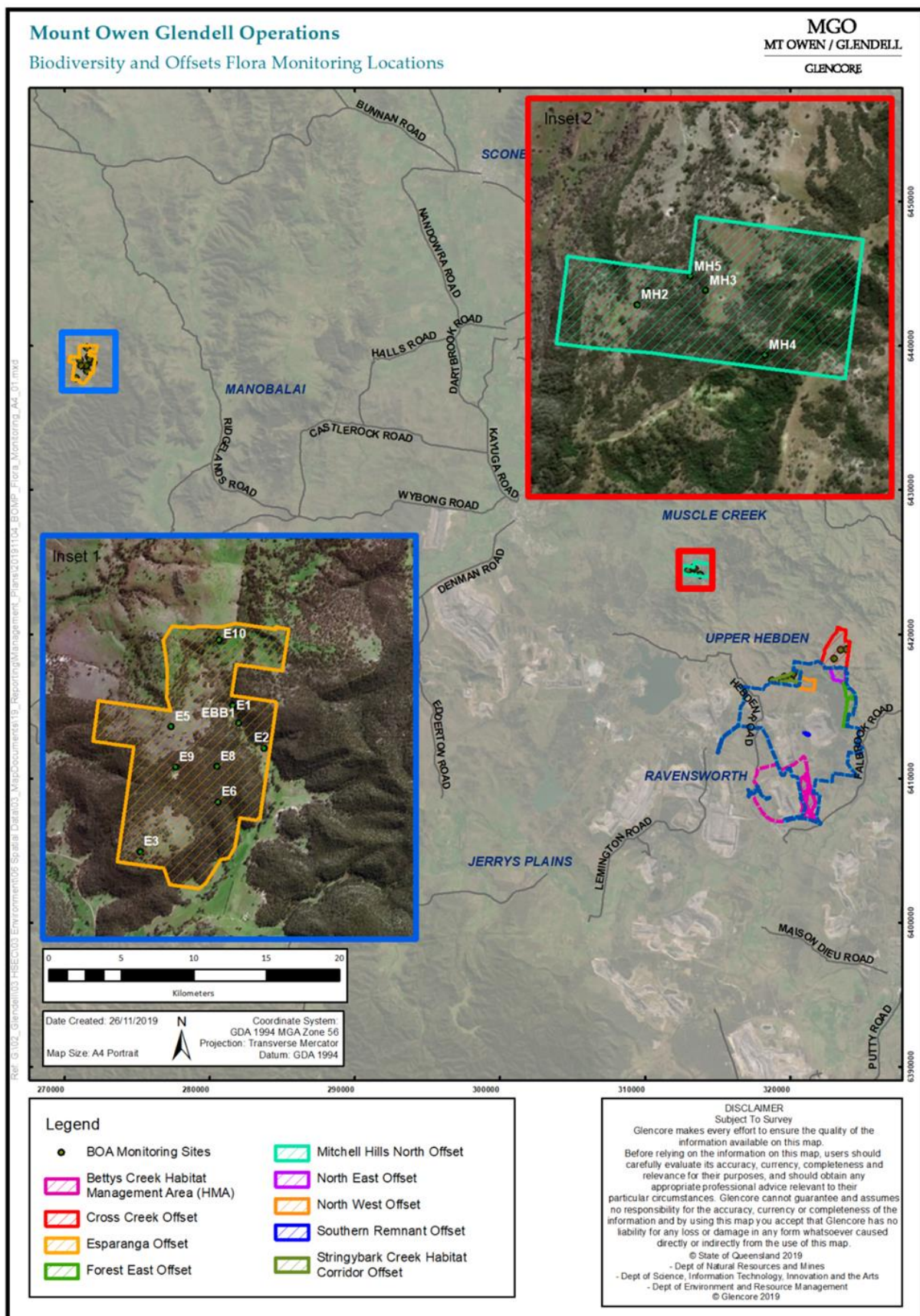
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Appendix E - Performance Indicators and Completion Criteria

The performance indicators are sometimes qualitative rather than quantitative. This is because descriptive long-term trends allow for seasonal variation (e.g. periods of drought), changes in rate of passive germination (e.g. natural seed bank levels), and trends offer a clearer understanding of whether an area is heading towards self-sustainability.

The performance indicators and completion criteria listed in the tables below relate to the:

- a) Management strategies for MGO as outlined in **Section 3**;
- b) Management strategies for the BOAs as outlined in **Section 4**; and
- c) Regeneration and revegetation areas of the BOAs as outlined in **Section 4.8**.

The short-term performance indicators are for the three years of the implementation of this BOMPS (2019 - 2021) and can be used to assist in demonstrating how management actions are progressing towards achieving the completion criteria.

The performance indicators and completion criterion apply the SMART principles:

- **Specific** – specific outcomes relevant to biodiversity matters
- **Measurable** – include quantifiable performance measures that can be compared over time
- **Achievable** – realistic goals that can be compared to baseline information
- **Relevant** – outcomes are directly relevant to the biodiversity matter
- **Timely** – includes specific timeframes for the completion of the outcome.

The completion of and performance against each of these indicators/criterion is assessed and documented in the AR, based on the outcome of ecological monitoring and inspections across MGO and BOAs each year.

The performance and completion criteria for the Rehabilitation Woodland Offset Area will be detailed in the RMP.

Table E.1 Performance Indicators and Completion Criteria for MGO

Action/ Item	Short Term Performance Indicators			Medium Term Performance Indicators	Long Term Performance Indicators	Completion Criteria	Relevant BOMPS Objective (Table 1.1) and Trigger Actions (Table 7.1)	SMART Criteria
	Year 3 2019	Year 4 2020	Year 5 2021	Years 6 - 12 2022-2028	Years 13-18 2029-2034			
Minimise Impacts on Biodiversity								
Undertake pre-clearance surveys and tree-felling supervision	Pre-clearance surveys and tree-felling supervision is undertaken in accordance with procedure.	Pre-clearance surveys and tree-felling supervision is undertaken in accordance with procedure.	Pre-clearance surveys and tree-felling supervision is undertaken in accordance with procedure.	Pre-clearance surveys and tree-felling supervision is undertaken in accordance with procedure.	Pre-clearance surveys and tree-felling supervision is undertaken in accordance with procedure.	Impacts to arboreal fauna species are minimised.	Objective No.4 TARP No.12	<i>Specific</i> – threatened arboreal fauna <i>Measureable</i> – fauna captures and translocations are recorded <i>Achievable</i> – currently undertaken successfully at Mt Owen <i>Relevant</i> – minimises impacts on biodiversity <i>Timely</i> – in accordance with timing in procedure outlined in Section 3.1.1 .
	Outcomes of pre-clearing process are recorded and recommendations are implemented.	Outcomes of pre-clearing process are recorded and recommendations are implemented.	Outcomes of pre-clearing process are recorded and recommendations are implemented.	Outcomes of pre-clearing process are recorded and recommendations are implemented.	Outcomes of pre-clearing process are recorded and recommendations are implemented.			
Salvage of biodiversity features	Suitable habitat features identified during the pre-clearing process are salvaged.	Suitable habitat features identified during the pre-clearing process are salvaged.	Suitable habitat features identified during the pre-clearing process are salvaged.	Suitable habitat features identified during the pre-clearing process are salvaged.	Suitable habitat features identified during the pre-clearing process are salvaged.	Salvaged habitat features are available as habitat resources for local fauna species.	Objective No.3 TARP No.4	<i>Specific</i> – habitat features for threatened fauna <i>Measureable</i> – salvaged habitat features are recorded for use <i>Achievable</i> – currently undertaken successfully at Mt Owen <i>Relevant</i> – minimises habitat resource loss
	Salvaged features are	Salvaged features are	Salvaged features are		Salvaged features are stockpiled			

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Status: [Document Status (Office)]

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Action/ Item	Short Term Performance Indicators			Medium Term Performance Indicators	Long Term Performance Indicators	Completion Criteria	Relevant BOMPS Objective (Table 1.1) and Trigger Actions (Table 7.1)	SMART Criteria
	Year 3 2019	Year 4 2020	Year 5 2021	Years 6 - 12 2022-2028	Years 13-18 2029-2034			
	stockpiled appropriately for later use.	stockpiled appropriately for later use.	stockpiled appropriately for later use.	Salvaged features are stockpiled appropriately for later use.	appropriately for later use.			<i>Timely</i> – in accordance with timing in procedure outlined in Section 3.1.2 .
Habitat Enhancement								
Habitat augmentation with salvaged resources and nest box installation	Salvaged resources and nest boxes are re-instated into surrounding areas with low levels of habitat features. Inspected, maintained and replaced if required.	Salvaged resources and nest boxes are re-instated into surrounding areas with low levels of habitat features. Inspected, maintained and replaced if required.	Salvaged resources and nest boxes are re-instated into surrounding areas with low levels of habitat features. Inspected, maintained and replaced if required.	Nest box or salvaged hollow type and numbers are reflective of those disturbed in impacted areas (i.e. 1:1 for impacted hollows). Inspected, maintained and replaced if required.	Nest box or salvaged hollow type and numbers are reflective of those disturbed in impacted areas (i.e. 1:1 for impacted hollows). Inspected, maintained and replaced if required.	Nest box or salvaged hollow type and numbers are reflective of those disturbed in impacted areas (i.e. 1:1 for impacted hollows).	Objective No.3 TARP No.5	<i>Specific</i> – fauna species <i>Measureable</i> – installation is recorded and monitoring surveys record nest box integrity. Nest boxes replace impacted hollows at 1:1. <i>Achievable</i> – currently undertaken successfully at Mt Owen <i>Relevant</i> – increases habitat resources <i>Timely</i> – in accordance with timing in procedure outlined in Section 3.2.1 .
Nest boxes and habitat features are providing habitat value for native fauna (i.e.	Progressive installation and monitoring of habitat features and nest boxes.	Progressive installation and monitoring of habitat features and nest boxes.	Progressive installation and monitoring of habitat features and nest boxes.	Monitoring shows signs of use, based on time established in	Monitoring shows signs of use, based on time established in the landscape	All nest box and habitat feature are in place and usage consistent with	Objective No.3 TARP No.5	<i>Specific</i> – fauna species <i>Measureable</i> – signs of use is monitored <i>Achievable</i> – currently undertaken successfully at Mt Owen

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Action/ Item	Short Term Performance Indicators			Medium Term Performance Indicators	Long Term Performance Indicators	Completion Criteria	Relevant BOMPS Objective (Table 1.1) and Trigger Actions (Table 7.1)	SMART Criteria
	Year 3 2019	Year 4 2020	Year 5 2021	Years 6 - 12 2022-2028	Years 13-18 2029-2034			
showing signs of use - entrance chew marks, the presence of nesting material, signs of activity inside nest boxes)				the landscape across target faunal groups.	across target faunal groups.	target native faunal assemblages.		<i>Relevant</i> – nest boxes and habitat features are being used by local fauna species <i>Timely</i> – signs of use expected in the medium term (years 6-12).
Compensatory planting of river oak	River oak trees are planted at a 10:1 ratio for the tailings management infrastructure and the realignment of the transmission line within 1 year of disturbance.	River oak trees are planted at a 10:1 ratio for the tailings management infrastructure and the realignment of the transmission line.	River oak trees are planted at a 10:1 ratio for the tailings management infrastructure and the realignment of the transmission line.	Planted river oak trees are found to be establishing and growing at the site of planting.	Planted river oak trees are found to be establishing and growing at the site of planting.	River oak trees are healthy and established at 2m height where compensatory planting has been undertaken.	Objective No.1 TARP No.4	<i>Specific</i> – replacement of removed river oaks <i>Measureable</i> – river oaks are replaced and established at 10:1 ratio <i>Achievable</i> – replanting is achievable at MGO based on previous rehabilitation outcomes <i>Relevant</i> – provides visual mitigation <i>Timely</i> – within one year of disturbance
Tree screens along the New England Highway	Tree screen assessed for heath, density and condition during Annual Walkover Inspections.	Tree screen assessed for heath, density and condition during Annual Walkover Inspections.	Tree screen assessed for heath, density and condition during Annual Walkover Inspections.	Tree screen assessed for heath, density and condition during Annual Walkover Inspections.	Tree screen assessed for heath, density and condition during Annual Walkover Inspections.	Trees are healthy and providing suitable screening density along the New	Objective No.1 TARP No.4	<i>Specific</i> – tree planting <i>Measureable</i> – tree screen is monitored by ecological monitoring outlined in Section 5.1.1.1 . <i>Achievable</i> – replanting is achievable at MGO based on previous rehabilitation outcomes <i>Relevant</i> – provides visual mitigation

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Status: [Document Status (Office)]

Effective: [Effective Date]

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Action/ Item	Short Term Performance Indicators			Medium Term Performance Indicators	Long Term Performance Indicators	Completion Criteria	Relevant BOMPS Objective (Table 1.1) and Trigger Actions (Table 7.1)	SMART Criteria
	Year 3 2019	Year 4 2020	Year 5 2021	Years 6 - 12 2022-2028	Years 13-18 2029-2034			
						England Highway.		<i>Timely</i> – actions already commenced. Established river oaks expected in the medium term (years 6-12).
East-West Corridor Management Area	Cattle are excluded and weed and pest animal control is undertaken in this area.	Cattle are excluded and weed and pest animal control is undertaken in this area.	Passive regeneration is evident by the presence of dominant canopy species saplings.	Passive regeneration is evident by the presence of dominant canopy species saplings.	Passive regeneration is evident by the establishment of dominant canopy species.	East-west connectivity from MGO to the west toward Liddell Operations is retained.	Objective No.3, 8 TARP No.7, 13	<i>Specific</i> – habitat connectivity for threatened species management
	Active regeratation	Active regeratation						<i>Measureable</i> – monitoring of dominant canopy species regeneration following cattle exclusion and weed and pest animal control
	Habitat Argumentation	Habitat Argumentation						<i>Achievable</i> – minimal active actions are required.
								<i>Relevant</i> – aims to retain connectivity between Mt Owen and Liddell Operations.
								<i>Timely</i> – Measures to begin in year 1 (2017)
Access Control								
Fencing, signposting and gates are established	Delineation and signage of disturbance footprints is undertaken.	Delineation and signage of disturbance footprints is undertaken.	Delineation and signage of disturbance footprints is undertaken.	Delineation and signage of disturbance footprints is undertaken.	Delineation and signage of disturbance footprints is undertaken.	Fencing, signposting and gates effectively provide control of access within the mine site and provide protection of	Objective No.3 TARP No.3	<i>Specific</i> – protects flora and fauna habitat
	Gates are locked and in good	Gates are locked and in good	Gates are locked and in good	Gates are locked and in	Gates are locked and in good			<i>Measureable</i> – fencing integrity monitored on an ongoing basis
								<i>Achievable</i> – currently undertaken at MGO
								<i>Relevant</i> – minimises unnecessary disturbance
								<i>Timely</i> – Measures to begin in year 1 (2017)

Number: GCAA-1299732908-12

Status: [Document Status (Office)]

Effective: [Effective Date]

Owner: [Owner]

Version: [Document Version (Office)]

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Action/ Item	Short Term Performance Indicators			Medium Term Performance Indicators	Long Term Performance Indicators	Completion Criteria	Relevant BOMPS Objective (Table 1.1) and Trigger Actions (Table 7.1)	SMART Criteria
	Year 3 2019	Year 4 2020	Year 5 2021	Years 6 - 12 2022-2028	Years 13-18 2029-2034			
	structural condition.	structural condition.	structural condition.	good structural condition.	structural condition.	surrounding remnant vegetation during clearance activities.		

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Effective: [Effective Date]

Owner: [Owner]

Version: [Document Version (Office)]

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Action/ Item	Short Term Performance Indicators			Medium Term Performance Indicators	Long Term Performance Indicators	Completion Criteria	Relevant BOMPS Objective (Table 1.1) and Trigger Actions (Table 7.1)	SMART Criteria
	Year 3 2019	Year 4 2020	Year 5 2021	Years 6 - 12 2022-2028	Years 13-18 2029-2034			
Weed Management								
Control of noxious weed spread following disturbance works	Weed management actions are undertaken for noxious weed species if present (refer to Table 3.3) within 6 months of disturbance works.	Weed management actions are undertaken for noxious weed species if present (refer to Table 3.3) within 6 months of disturbance works.	Weed management actions are undertaken for noxious weed species if present (refer to Table 3.3) within 6 months of disturbance works.	Weed management actions are undertaken for noxious weed species (refer to Table 3.3) if monitoring determines their presence.	Weed management actions are undertaken for noxious weed species (refer to Table 3.3) if monitoring determines their presence.	Monitoring indicates that noxious weed presence is managed in accordance with the BOMPS and does not present a risk to native habitats.	Objective No.5 TARP No.4	<i>Specific</i> – noxious weeds. <i>Measureable</i> – measured during Annual Walkover Inspections outlined in Section 5.1.1.1 . <i>Achievable</i> – weed management currently undertaken in MGO <i>Relevant</i> – minimises weed spread into adjoining retained habitats. <i>Timely</i> – actions to be undertaken within 6 months of disturbance.
Pest Animal Control								
Reduction in pest animal species and populations following control measures implemented	Pest animal actions are undertaken for targeted pest species (refer to Table 3.4) within 6 months of identification and reporting.	Pest animal actions are undertaken for targeted pest species (refer to Table 3.4) within 6 months of identification and reporting.	Pest animal actions are undertaken for targeted pest species (refer to Table 3.4) within 6 months of identification and reporting.	Pest animal actions are undertaken for targeted pest species (refer to Table 3.4) within 6 months of	Pest animal actions are undertaken for targeted pest species (refer to Table 3.4) within 6 months of identification and reporting.	Records indicate that feral animal pests are controlled in accordance with legislation and the BOMPS.	Objective No.5 TARP No.4	<i>Specific</i> – pest animal species <i>Measureable</i> – measured during Annual Walkover Inspections outlined in Section 5.1.1.1 . <i>Achievable</i> – pest management currently undertaken in MGO <i>Relevant</i> – minimises pest animal species degrading native species habitats. <i>Timely</i> – actions to be undertaken within 6 months of identification and reporting.

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Action/ Item	Short Term Performance Indicators			Medium Term Performance Indicators	Long Term Performance Indicators	Completion Criteria	Relevant BOMPS Objective (Table 1.1) and Trigger Actions (Table 7.1)	SMART Criteria
	Year 3 2019	Year 4 2020	Year 5 2021	Years 6 - 12 2022-2028	Years 13-18 2029-2034			
				identification and reporting.				
Erosion and Sedimentation Control								
Refer to the Surface Water Management Plan-								
Bushfire Management								
Management of fuel loads at MGO	Initial assessment of fuel loads undertaken.	Fire breaks and access roads are maintained. Strategic grazing or controlled burning in consultation with RFS is investigated if required following identification of high fuel loads.	Fire breaks and access roads are maintained. Strategic grazing or controlled burning in consultation with RFS is investigated if required following identification of high fuel loads.	Fire breaks and access roads are maintained. Strategic grazing or controlled burning in consultation with RFS is investigated if required following identification of high fuel loads.	Fire breaks and access roads are maintained. Strategic grazing or controlled burning in consultation with RFS is investigated if required following identification of high fuel loads.	Bushfire mitigation actions have been implemented including managing fuel loads, maintaining fire breaks and access roads.	Objective No.5 TARP No.10	<i>Specific</i> – protects flora and fauna habitat <i>Measureable</i> – fuel loads measured during Annual Walkover Inspections outlined in Section 5.1.1.1 <i>Achievable</i> – ongoing actions already undertaken <i>Relevant</i> – minimises chance of catastrophic fire events in native habitats. <i>Timely</i> – actions undertaken following within one month of identification of high fuel loads (as per Table 7.1).

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Action/ Item	Short Term Performance Indicators			Medium Term Performance Indicators	Long Term Performance Indicators	Completion Criteria	Relevant BOMPS Objective (Table 1.1) and Trigger Actions (Table 7.1)	SMART Criteria
	Year 3 2019	Year 4 2020	Year 5 2021	Years 6 - 12 2022-2028	Years 13-18 2029-2034			
Seed Collection and Propagation								
Implementation of seed collection and handling program for use in revegetation/rehabilitation works.	Pre-clearing surveys identify potential seed sources. Seeds are collected, stored, handled and propagated according to Florabank Guidelines	Seeds are collected, stored, handled and propagated according to Florabank Guidelines.	Seeds are collected, stored, handled and propagated according to Florabank Guidelines.	Locally collected seeds/ saplings have been used in rehabilitation and/or revegetation works.	Locally collected seeds/ saplings have been used in rehabilitation and/or revegetation works.	Rehabilitation/ revegetation works use seeds collected onsite, thus maintaining as much genetic similarity (local provenance) where possible.	Objective No.1, 11 TARP No.11	<i>Specific</i> – seed collection and propagation <i>Measureable</i> – detailed recording of the collection and propagation process as per Section 3.4) <i>Achievable</i> – habitats within MGO are likely to produce suitable seed for collection. <i>Relevant</i> – maintains local genetic vegetated material for community restoration. <i>Timely</i> – identification of seeds to be undertaken prior to clearance (refer to Section3.4) .
Adequate seed collection records are prepared	Data is collected and reported from seed collection programs (including volume of seed collected and species collected from).	Data is collected and reported from seed collection programs (including volume of seed collected and species collected from).	Data is collected and reported from seed propagation programs (including seed germination success rates).	Data is collected and reported from seed propagation programs (including seed germination success rates). Follow up information provided on propagated	Data is collected and reported from seed propagation programs (including seed germination success rates). Follow up information provided on propagated seed establishment	Seed collection and propagation programs are reported on, where appropriate, in literature and research papers.	Objective No.6 TARP No.11	<i>Specific</i> – seed collection and propagation <i>Measureable</i> – data and learnings are reported on <i>Achievable</i> – MGO have committed to sharing research outcomes (refer to Section 8.2) . <i>Relevant</i> – provides propagation and establishment learnings. <i>Timely</i> – to be done as seed collection and propagation is undertaken

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	Year 3 2019	Year 4 2020	Year 5 2021	Years 6 - 12 2022-2028	Years 13-18 2029-2034			
				seed establishment rates in rehabilitation and revegetation.	rates in rehabilitation and revegetation.			
Riparian Zone Management								
Riparian zone habitat rehabilitation	Planting schedule is implemented as soon as practical following riparian zone disturbance.	Seeding and planting of tubestock for characteristic native species is undertaken. Habitat features (i.e. woody debris) are installed where appropriate.	Seeding and planting of tubestock and habitat feature emplacement is ongoing.	Monitoring indicates that planted species are healthy and establishing and fauna species are utilising riparian habitat.	Monitoring indicates that native vegetation communities are trending towards conforming to the target native vegetation community. Monitoring shows riparian zone being used as movement corridor (e.g. birds, microbat fly aways).	Rehabilitated riparian zones provide fauna movement corridors and conform to target native vegetation communities.	Objective No.7, 8 TARP No, 5, 6	<i>Specific</i> – riparian habitats <i>Measureable</i> – habitat condition measured as part of GDE monitoring. <i>Achievable</i> – part of committed monitoring activities at MGO <i>Relevant</i> – provides enhancement of riparian habitat and native vegetation community establishment. <i>Timely</i> – GDE and vegetation condition monitoring undertaken annually per Section 5.1.3 .
Riparian zone stability	Preliminary measures such	Seeding and planting of	Seeding and planting of	Bank is stabilised and	Bank is stabilised and only minimal	Rehabilitated riparian zones	Objective No.1	<i>Specific</i> – riparian zone stability

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Action/ Item	Short Term Performance Indicators			Medium Term Performance Indicators	Long Term Performance Indicators	Completion Criteria	Relevant BOMPS Objective (Table 1.1) and Trigger Actions (Table 7.1)	SMART Criteria
	Year 3 2019	Year 4 2020	Year 5 2021	Years 6 - 12 2022-2028	Years 13-18 2029-2034			
	as fencing, mulching, re-shaping and placement of woody debris is undertaken as soon as possible following disturbance.	tubestock is undertaken.	tubestock and habitat feature emplacement is ongoing, as well as any other required measures for erosion and bank stability.	only minimal erosional issues are	erosional issues are	are stable and have minimal or no erosion issues.	TARP No, 15	<i>Measureable</i> – riparian condition measured as part of GDE monitoring. <i>Achievable</i> – part of committed monitoring activities at MGO <i>Relevant</i> – ensures riparian zones are stable and safe. <i>Timely</i> – GDE and vegetation condition monitoring undertaken annually per Section 5.1.3 .
Mine Rehabilitation								
Refer to the Rehabilitation Management Plan (RMP)								
Cultural Heritage Management								
Balance of cultural heritage and biodiversity objectives	Proposed activities at MGO (such as revegetation and regeneration) are undertaken in accordance with the ACHMP and legislation.	Proposed activities at MGO (such as revegetation and regeneration) are undertaken in accordance with the ACHMP and legislation.	Proposed activities at MGO (such as revegetation and regeneration) are undertaken in accordance with the ACHMP and legislation.	Proposed activities at MGO (such as revegetation and regeneration) are undertaken in accordance with the ACHMP and legislation.	Proposed activities at MGO (such as revegetation and regeneration) are undertaken in accordance with the ACHMP and legislation.	Cultural heritage impacts are managed adequately at MGO.	Objective No.1 TARP No.7	<i>Specific</i> – cultural heritage <i>Measureable</i> – any incidents reported on in AR. <i>Achievable</i> – part of ongoing actions and compliance at MGO <i>Relevant</i> – aims to balance impacts for environmental features <i>Timely</i> – as required by legislation and the ACHMP

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	Year 3 2019	Year 4 2020	Year 5 2021	Years 6 - 12 2022-2028	Years 13-18 2029-2034			
Biodiversity Monitoring								
Undertake flora and fauna monitoring program throughout MGO	Annual monitoring program completed as per Section 5.1.	Annual monitoring program completed as per Section 5.1.	Annual monitoring program completed as per Section 5.1.	Annual monitoring program completed as per Section 5.1.	Annual monitoring program completed as per Section 5.1.	Monitoring program completed and reported on each year undertaken.	Objective No.6 TARP No.9	<i>Specific</i> – biodiversity monitoring <i>Measureable</i> – reported on in annual review <i>Achievable</i> – part of ongoing monitoring activities at MGO <i>Relevant</i> – monitors a range of ecological outcomes at MGO. <i>Timely</i> – walkover inspections and fauna monitoring undertaken annually and floristic surveys undertaken as per schedule in Tables 5.1 and 5.2.

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	Year 3 2019	Year 4 2020	Year 5 2021	Years 6 - 12 2022-2028	Years 13-18 2029-2034			
Groundwater Dependent Ecosystems (GDEs)								
Manage mining impacts to GDEs and associated riparian vegetation	Formal GDE monitoring program developed as per Section 5.1.3.	GDE monitoring program undertaken.	GDE monitoring program undertaken.	No observable impacts to GDEs as a result of mining.	No observable impacts to GDEs as a result of mining.	No observable impacts to GDEs as a result of mining. Or, if impacts occur, management actions are undertaken to maintain vegetation and habitat connectivity.	Objective No.6 TARP No.15	Specific – groundwater dependent ecosystems Measureable – targeted GDE monitoring (Section 5.1.3). Achievable – part of committed monitoring activities at MGO Relevant – monitors both the alluvial groundwater levels as well as corresponding vegetation condition Timely – GDE and vegetation condition monitoring undertaken annually per Section 5.1.3.
Training and Communication								
Staff Training and Communication	Specific BOMPS training package is included in the Site Familiarisation and Generic Surface Induction.	Specific BOMPS training package is included in the Site Familiarisation and Generic Surface Induction.	Specific BOMPS training package is included in the Site Familiarisation and Generic Surface Induction.	Specific BOMPS training package is included in the Site Familiarisation and Generic Surface Induction.	Specific BOMPS training package is included in the Site Familiarisation and Generic Surface Induction.	Staff are aware of key biodiversity features and issues at MGO.	Objective No.9 TARP No.14	Specific – staff training in biodiversity Measureable – staff pass or fail induction test Achievable – currently ongoing at MGO Relevant –more environmentally-aware staff Timely – provided in inductions and training sessions.

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Action/ Item	Short Term Performance Indicators			Medium Term Performance Indicators	Long Term Performance Indicators	Completion Criteria	Relevant BOMPS Objective (Table 1.1) and Trigger Actions (Table 7.1)	SMART Criteria
	Year 3 2019	Year 4 2020	Year 5 2021	Years 6 - 12 2022-2028	Years 13-18 2029-2034			
Reporting								
Collate data on actions implemented and results of inspections and monitoring into the AR.	AR completed as required annually.	AR completed as required annually.	AR completed as required annually.	AR completed as required annually.	AR completed as required annually.	AR completed as required annually.	Objective No.9 TARP No.14	<i>Specific</i> – annual review <i>Measureable</i> – to be undertaken annually <i>Achievable</i> – undertaken currently at MGO <i>Relevant</i> – provides information on biodiversity actions and outcomes from previous year to inform adaptive management process <i>Timely</i> – annually

Table E.2 Performance Indicators and Completion Criteria for BOAs Revegetation and Regeneration Areas

Action/ Item	Short Term Performance Indicators			Medium Term Performance Indicators	Long Term Performance Indicators	Completion Criteria	Relevant BOMPS Objective (Table 1.1) and Trigger Actions (Table 7.1)	SMART Criteria
	Year 3 2019	Year 4 2020	Year 5 2021	Year 6-12 2022-2028	Year 15-18 2031-2034			
Conservation Mechanism								
Establish an appropriate long-term	Conservation Bond revised within 3 months	Conservation Bond for BOAs revised within 6	Conservation Bond remains in place and is	Conservation Bond remains in place and is	Conservation Bond remains in place and is	A conservation mechanism is determined by	Objective No.10 TARP No.1	<i>Specific</i> – conservation mechanisms <i>Measureable</i> – environmental audit

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Action/ Item	Short Term Performance Indicators			Medium Term Performance Indicators	Long Term Performance Indicators	Completion Criteria	Relevant BOMPS Objective (Table 1.1) and Trigger Actions (Table 7.1)	SMART Criteria
	Year 3 2019	Year 4 2020	Year 5 2021	Year 6-12 2022-2028	Year 15-18 2031-2034			
conservation mechanism for the BOAs	of approval of BOMPS.	months of approval of BOMPS. Long-term protection mechanism in place for DA80/952 – Glendell Bettys Creek (Enex) and Bettys Creek SSD5850 – Mt Owen Northwest Southern Remnant Northeast Forest East Southeast Southeast Corridor	revised if necessary.	revised if necessary.	revised if necessary.	2020 and remains in place.		<i>Achievable</i> – conservation mechanisms under review <i>Relevant</i> – provides security for long-term conservation of offset sites <i>Timely</i> – fixed timeframe in consent

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Action/ Item	Short Term Performance Indicators			Medium Term Performance Indicators	Long Term Performance Indicators	Completion Criteria	Relevant BOMPS Objective (Table 1.1) and Trigger Actions (Table 7.1)	SMART Criteria
	Year 3 2019	Year 4 2020	Year 5 2021	Year 6-12 2022-2028	Year 15-18 2031-2034			
		Long-term protection mechanism Stringybark Creek Crosscreek Esparanga Mitchell Hills North is secured by September 2020.						
Habitat Enhancement								
Habitat features such as hollow-bearing trees, logs, stumps, large rocks and boulders from salvage activities	Suitable habitat features re-identified during the pre-clearing process are salvaged.	Salvaged features are re-instated into BOAs with low levels of habitat features.	Salvaged features are re-instated into BOAs with low levels of habitat features.	Biometric monitoring of BOAs indicates presence of salvaged habitat features in areas otherwise lacking in naturally-occurring features.	Biometric monitoring of BOAs indicates presence of salvaged habitat features in areas otherwise lacking in naturally-occurring features.	Salvaged habitat features are available as alternative habitat resources for local fauna species in areas otherwise lacking in naturally-	Objective No.3 TARP No.5	<i>Specific</i> – habitat features for fauna species <i>Measureable</i> – biometric attributes <i>Achievable</i> – considered to be achievable <i>Relevant</i> – increases habitat resources <i>Timely</i> – material salvaged in accordance with timing in procedure outlined in Section 3.2.1.

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Action/ Item	Short Term Performance Indicators			Medium Term Performance Indicators	Long Term Performance Indicators	Completion Criteria	Relevant BOMPS Objective (Table 1.1) and Trigger Actions (Table 7.1)	SMART Criteria
	Year 3 2019	Year 4 2020	Year 5 2021	Year 6-12 2022-2028	Year 15-18 2031-2034			
						occurring features.		
Nest box installation	Number, size and type of hollows removed in MGO disturbance activities recorded.	Number, size and type of hollows removed in MGO disturbance activities recorded.	Progressive installation of nest boxes in the BOAs. Nest boxes inspected, maintained and replaced, if required.	Nest box number and design are reflective of selected reference sites. Nest boxes inspected, maintained and replaced, if required.	Inspected, maintained and replaced if required.	Nest boxes are installed, inspected and maintained as required.	Objective No.3 TARP No.5	<i>Specific</i> – fauna species <i>Measureable</i> – installation is recorded and monitoring surveys record nest box integrity. <i>Achievable</i> – currently undertaken successfully at MGO <i>Relevant</i> – increases habitat resources <i>Timely</i> – installation to be undertaken following analysis of benchmark data at selected reference sites.
Nest boxes are providing habitat value for native fauna (i.e. showing signs of use - entrance chew marks, the presence of nesting material, signs of activity inside nest boxes)	Progressive installation and monitoring of nest boxes.	Progressive installation and monitoring of nest boxes.	Progressive installation and monitoring of nest boxes.	Monitoring shows signs of use, based on time established in the landscape across target faunal groups.	Monitoring shows signs of use, based on time established in the landscape across target faunal groups.	Nest box usage is consistent with target native faunal assemblages.	Objective No.3 TARP No.5	<i>Specific</i> – fauna species <i>Measureable</i> – monitoring signs of use as per Section 5.2.3 . <i>Achievable</i> – currently undertaken successfully at Mt Owen <i>Relevant</i> – nest boxes and habitat features are being used by local fauna species <i>Timely</i> – signs of use expected in the medium term (years 6-12).

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	Year 3 2019	Year 4 2020	Year 5 2021	Year 6-12 2022-2028	Year 15-18 2031-2034			
Weed Management								
Reduction in introduced flora species cover following control measures implemented across the BOAs	Weed management actions are undertaken for weed species if present (refer to Table 4.3) as per annual plan targeting identified high risk infestation.	Weed management actions are undertaken for weed species if present (refer to Table 4.3) as per annual plan targeting identified high risk infestation..	Weed management actions are undertaken for weed species if present (refer to Table 4.3) as per annual plan targeting identified high risk infestation.	Weed management actions are undertaken for weed species if present (refer to Table 4.3) as per annual plan targeting identified high risk infestation.	Weed management actions are undertaken for weed species if present (refer to Table 4.3) as per annual plan targeting identified high risk infestation.	Monitoring indicates that weed presence is managed in accordance with the BOMPS and does not present a risk to native habitats.	Objective No.5 TARP No.4	<i>Specific</i> – target weeds in Table 4.4 <i>Measureable</i> – measured during annual monitoring outlined in Section 5.2 . <i>Achievable</i> – weed management currently undertaken in MGO <i>Relevant</i> – minimises weed spread into adjoining retained habitats. <i>Timely</i> – actions to be undertaken within one month of disturbance identification of high risk infestation.
Pest Animal Control								
Reduction in pest animal species and populations following control measures implemented across the BOAs	Pest animal actions are undertaken for targeted pest species (refer to Table 4.4) as per annual plan targeting	Pest animal actions are undertaken for targeted pest species (refer to Table 4.4) as per annual plan targeting	Pest animal actions are undertaken for targeted pest species (refer to Table 4.4) as per annual plan targeting	Pest animal actions are undertaken for targeted pest species (refer to Table 4.4) as per annual plan targeting	Pest animal actions are undertaken for targeted pest species (refer to Table 4.4) as per annual plan targeting	Records indicate that feral animal pests are controlled in accordance with legislation and the BOMPS.	Objective No.5 TARP No.4	<i>Specific</i> – pest animal species <i>Measureable</i> – measured during Annual Walkover Inspections outlined in Section 5.2 . <i>Achievable</i> – pest management currently undertaken in MGO <i>Relevant</i> – minimises pest animal species degrading native species habitats.

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	Year 3 2019	Year 4 2020	Year 5 2021	Year 6-12 2022-2028	Year 15-18 2031-2034			
	identified high risk population.	identified high risk population.	identified high risk population.	identified high risk population.	identified high risk population.			<i>Timely</i> – actions to be undertaken within one month of identification of high risk population.
Grazing Management								
Grazing management in the BOAs	Controlled sustainable grazing occurs that does not impede natural recruitment. Management practices modified as needed based on monitoring to allow integration of ecological-based management.	Grazing excluded from BOAs (unless required for strategic weed or fuel load management)	Grazing excluded from BOAs (unless required for strategic weed or fuel load management)	Grazing excluded from BOAs (unless required for strategic weed or fuel load management)	Unsustainable grazing excluded from BOAs	Grazing in SO has led to increased abundance and vigour of native pasture species. Introduced weed species levels are minimal..	Objective No.7, 11 TARP No.13	<i>Specific</i> – grazing management <i>Measureable</i> – grazing damage to be identified in monitoring outlined in Section 5.2.2. <i>Achievable</i> – considered to be achievable <i>Relevant</i> – protection of flora and fauna habitats <i>Timely</i> – grazing to be excluded from year 1. Rehabilitation of damaged areas following this to be implemented within one month of identification as per Table 7.1.
Fencing, Signage and Access Control								
Fencing and signage	Inspect existing fencing and signage for need	Supplement/ replace existing fencing and signage as	Inspect and maintain fencing and signage.	Inspect and maintain fencing and signage.	Inspect and maintain fencing and signage.	All required boundary fences and signage are present and	Objective No.3 TARP No.3	<i>Specific</i> – protects flora and fauna habitat <i>Measureable</i> – fencing integrity monitored on an ongoing basis

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	Year 3 2019	Year 4 2020	Year 5 2021	Year 6-12 2022-2028	Year 15-18 2031-2034			
	for replacement or installation.	deemed required.				regularly monitored and maintained in appropriate condition.		<i>Achievable</i> – most fencing and signage in place <i>Relevant</i> – minimises unnecessary disturbance <i>Timely</i> – Measures to begin in year 1 (2017)
Bushfire Management								
Management of fuel loads at BOAs	Initial assessment of fuel loads undertaken.	Fire breaks and access roads are maintained. Strategic grazing or controlled burning in consultation with RFS is investigated if required following identification of high fuel loads.	Fire breaks and access roads are maintained. Strategic grazing or controlled burning in consultation with RFS is investigated if required following identification of high fuel loads.	Fire breaks and access roads are maintained. Strategic grazing or controlled burning in consultation with RFS is investigated if required following identification of high fuel loads.	Fire breaks and access roads are maintained. Strategic grazing or controlled burning in consultation with RFS is investigated if required following identification of high fuel loads.	Bushfire mitigation actions have been implemented including managing fuel loads, maintaining fire breaks and access roads.	Objective No.5 TARP No.10	<i>Specific</i> – protects flora and fauna habitat <i>Measureable</i> – fuel loads measured during annual monitoring outlined in Section 5.2.2 . <i>Achievable</i> – ongoing actions already undertaken <i>Relevant</i> – minimises chance of catastrophic fire events in native habitats. <i>Timely</i> – actions undertaken following within one month of identification of high fuel loads (as per Table 7.1).
Cultural Heritage Management								
Balance of cultural heritage	Proposed activities at the BOAs (such as	Proposed activities at the BOAs (such as	Proposed activities at the BOAs (such as	Proposed activities at the BOAs (such as	Proposed activities at the BOAs (such as	Cultural heritage impacts are managed	Objective No.1 TARP No.7	<i>Specific</i> – cultural heritage

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	Year 3 2019	Year 4 2020	Year 5 2021	Year 6-12 2022-2028	Year 15-18 2031-2034			
and biodiversity objectives	revegetation and regeneration) are undertaken in accordance with the ACHMP and legislation.	revegetation and regeneration) are undertaken in accordance with the ACHMP and legislation.	revegetation and regeneration) are undertaken in accordance with the ACHMP and legislation.	revegetation and regeneration) are undertaken in accordance with the ACHMP and legislation.	revegetation and regeneration) are undertaken in accordance with the ACHMP and legislation.	adequately at the BOAs.		<i>Measureable</i> – any incidents reported on in AR. <i>Achievable</i> – part of ongoing actions and compliance at the BOAs <i>Relevant</i> – aims to balance impacts for environmental features <i>Timely</i> – as required by legislation and the ACHMP
Rehabilitation Woodland Offset Area								
Rehabilitation Woodland Offset Area establishment	Location of Rehabilitation Woodland Offset Area investigated.	Location of Rehabilitation Woodland Offset Area investigated or determined.	Location of Rehabilitation Woodland Offset Area investigated or determined.	Location of Rehabilitation Woodland Offset Area determined by year 6 (2022).	Location of Rehabilitation Woodland Offset Area determined.	Location of Rehabilitation Woodland Offset Area determined.	Objective No.1, 7, 8, 10 TARP No.8	<i>Specific</i> – offset area establishment <i>Measureable</i> – determination of area depends on 518 hectares of suitable rehabilitation available. <i>Achievable</i> – previous mine rehabilitation success at MGO indicates this is achievable <i>Relevant</i> – aims to restore woodland rehabilitation in post-mine areas. <i>Timely</i> – location of Rehabilitation Woodland Offset Area determined by year 5
Rehabilitation Performance and Completion Criteria (refer to Section 6 of Mine Operations Plan (MOP))-								

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	Year 3 2019	Year 4 2020	Year 5 2021	Year 6-12 2022-2028	Year 15-18 2031-2034			
Biodiversity Monitoring								
Undertake ecological monitoring program throughout BOAs	Annual monitoring program completed as per Section 5.2.	Annual monitoring program completed as per Section 5.2.	Annual monitoring program completed as per Section 5.2.	Annual monitoring program completed as per Section 5.2.	Annual monitoring program completed as per Section 5.2.	Monitoring program completed and reported on each year undertaken.	Objective No.6 TARP No.9	<i>Specific</i> – biodiversity monitoring <i>Measureable</i> – reported on in annual review <i>Achievable</i> – part of ongoing monitoring activities at MGO <i>Relevant</i> – monitors a range of ecological outcomes at the BOAs. <i>Timely</i> – flora and fauna monitoring undertaken as per schedule in Section 5.2.
Reporting								
Collate data on actions implemented and results of inspections and monitoring into the AR.	AR completed as required annually	AR completed as required annually	AR completed as required annually	AR completed as required annually	AR completed as required annually	AR completed as required annually	Objective No.9 TARP No.14	<i>Specific</i> – annual review <i>Measureable</i> – to be undertaken annually <i>Achievable</i> – undertaken currently at MGO <i>Relevant</i> – provides information on biodiversity actions and outcomes from previous year to inform adaptive management process <i>Timely</i> – annually

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Table E.3 Performance Indicators and Completion Criteria for BOAs

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	Year 3 2019	Year 4 2020	Year 5 2021	Year 6-12 2022-2028	Year 15-18 2031-2034			
General Revegetation and Regeneration Measures								
Control of weeds in revegetation/ regeneration areas.	Weed control works are completed, as required.	Weed control works are completed, as required.	Weed control works are completed, as required.	There is no significant weed infestation such that weeds do not compromise more than 50% proportion of species in any stratum.	There is no significant weed infestation such that weeds do not compromise more than 40% proportion of species in any stratum.	There is no significant weed infestation such that weeds do not compromise more than 30% proportion of species in any stratum.	Objective No.5 TARP No.4	<i>Specific</i> – weed control and management <i>Measureable</i> – measured during annual monitoring outlined in Section 5.2 . <i>Achievable</i> – weed management currently undertaken in MGO <i>Relevant</i> – measures weed dominance in establishing woodland communities <i>Timely</i> – actions to be undertaken within one month of disturbance identification of high risk infestation.

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Action/ Item	Short Term Performance Indicators			Medium Term Performance Indicators	Long Term Performance Indicators	Completion Criteria	Relevant BOMPS Objective (Table 1.1) and Trigger Actions (Table 7.1)	SMART Criteria
	Year 2019	Year 2020	Year 2021	Year 2022-2028	Year 2031-2034			
Implementation of seed collection and handling program for use in revegetation works	Seeds are collected, stored and handled according to Florabank Guidelines.	Seeds are collected, stored, handled and propagated according to Florabank Guidelines and prior to revegetation works.	Seeds are collected, stored, handled and propagated according to Florabank Guidelines.	Locally collected seeds/ saplings have been used in revegetation works.	Locally collected seeds/ saplings have been used in revegetation works.	Rehabilitation/ revegetation works use seeds collected onsite, thus maintaining as much genetic similarity (local provenance) where possible.	Objective No.1, 11 TARP No.11	<i>Specific</i> – seed collection and propagation <i>Measureable</i> – detailed recording of the collection and propagation process as per Section 3.4) <i>Achievable</i> – habitats within the BOAs are likely to produce suitable seed for collection. <i>Relevant</i> – maintains local genetic vegetated material for community restoration. <i>Timely</i> – seeds to be propagated in time for revegetation schedule.
Species composition in revegetation/ regeneration areas.	Monitoring of regeneration/ revegetation areas to provide baseline data.	Monitoring of regeneration/ revegetation areas to provide comparable data.	Monitoring indicates that planted or regenerating canopy, mid storey and/or ground cover species are healthy and established.	Monitoring indicates that planted or regenerating canopy, mid storey and/or ground cover species are recruiting.	Monitoring indicates that planted or regenerating canopy, mid storey and/or ground cover species are recruiting.	Species composition in the canopy, mid storey and ground cover is comparable to reference sites.	Objective No.2, 11 TARP No.5, 6	<i>Specific</i> – species composition <i>Measureable</i> – plot and transect surveys as part of monitoring outlined in Section 5.2.1. <i>Achievable</i> – considered to be achievable <i>Relevant</i> – species composition important for floristic diversity. <i>Timely</i> – species composition should continue to improve in the medium term.

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	Year 3 2019	Year 4 2020	Year 5 2021	Year 6-12 2022-2028	Year 15-18 2031-2034			
Structural diversity of revegetation/ regeneration areas.	Revegetation/ regeneration works undertaken.	Revegetation/ regeneration works undertaken.	Revegetation/ regeneration works undertaken.	Management domains show emerging canopy, mid storey and/or ground cover stratum.	Management domains show clear canopy, mid storey and/or ground cover stratum and a developing litter and woody debris cover	Management domains show clear canopy, mid storey and/or ground cover stratum as well as litter and woody debris cover.	Objective No.3 TARP No.5	<i>Specific</i> – floristic structural diversity <i>Measurable</i> – plot and transect surveys as part of monitoring outlined in Section 5.2.1 . <i>Achievable</i> – considered to be achievable <i>Relevant</i> – floristic structural diversity important for functional ecosystems. <i>Timely</i> – floristic structural diversity should continue to improve in the long term.
Native fauna diversity in revegetation/ regeneration areas.	Fauna monitoring undertaken to provide baseline data.	Fauna monitoring undertaken to provide comparable data.	Fauna monitoring undertaken to provide comparable data.	Monitoring indicates that number of fauna species (diversity) for management domain is at least 60% of reference sites.	Monitoring indicates that number of fauna species (diversity) for management domain is at least 70% of reference sites.	Monitoring indicates that number of fauna species (diversity) for management domain is at least 80% of reference sites.	Objective No.3 TARP No.5	<i>Specific</i> – fauna composition <i>Measurable</i> – fauna monitoring surveys as per Section 5.2.2 to determine species diversity across management zones. <i>Achievable</i> – considered to be achievable <i>Relevant</i> – fauna diversity important for functional ecosystems. <i>Timely</i> – fauna diversity should continue to improve in the medium term.

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	Year 2019	Year 2020	Year 2021	Year 2022-2028	Year 2031-2034			
Cross Creek Offset Area								
Active regeneration to conform to Central Hunter Ironbark – Spotted Gum – Grey Box Forest EEC	Determination of management domains.	Initial active regeneration (direct seeding or tubestock) using characteristic species.	Ongoing passive and active regeneration (direct seeding or tubestock) using characteristic species, as required.	Regeneration areas are trending to benchmark (or reference site) ranges for overstorey, midstorey and groundcover scores and at least 60% or above for species richness benchmarks.	Regeneration areas are trending to benchmark (or reference site) ranges for overstorey, midstorey and groundcover scores and at least 70% or above for species richness benchmarks.	Regeneration areas are at 80% or above for species richness benchmarks. 80% or more of the regeneration areas conform to Central Hunter Ironbark – Spotted Gum – Grey Box Forest EEC.	Objective No.1 TARP No.6	Specific – restoration of Central Hunter Ironbark – Spotted Gum – Grey Box Forest EEC. Measureable – measured against reference sites or benchmark data. Achievable – MGO have success in re-establishing EECs using active regeneration Relevant – provides suitable offsets and gains of EEC in the Hunter Valley Timely – active regeneration areas should show improvement in the medium term and majority conform to EEC in the long term.

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	Year 2019	Year 2020	Year 2021	Year 2022-2028	Year 2031-2034			
Stringybark Creek Habitat Corridor								
Revegetation areas to conform to Central Hunter Ironbark – Spotted Gum – Grey Box Forest EEC or River-flat Eucalypt Forest EEC	Determination of management domains. Initial baseline flora monitoring undertaken.	Initial revegetation works (direct seeding or tubestock) using characteristic species.	Ongoing passive and active revegetation using characteristic species, as required.	Revegetation areas are trending to benchmark (or reference site) ranges for overstorey, midstorey and groundcover scores and at least 60% or above for species richness benchmarks.	Revegetation areas are trending to benchmark (or reference site) ranges for overstorey, midstorey and groundcover scores and at least 70% or above for species richness benchmarks.	Regeneration areas are at 80% or above for species richness benchmarks. 80% or more of the revegetated areas conform to the applicable EEC.	Objective No.1 TARP No.6	<i>Specific</i> – restoration of EECs. <i>Measureable</i> – measured against reference sites or benchmark data. <i>Achievable</i> – MGO have success in re-establishing EECs using active regeneration <i>Relevant</i> – provides suitable offsets and gains of EEC in the Hunter Valley <i>Timely</i> – active regeneration areas should show improvement in the medium term and majority conform to EEC in the long term.

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	Year 3 2019	Year 4 2020	Year 5 2021	Year 6-12 2022-2028	Year 15-18 2031-2034			
Habitat/denning augmentation for spotted-tailed quoll	Suitable habitat features (logs, timber, rock boulders) identified, process are salvaged. Initial installation of logs.	Salvaged features are placed into BOA as denning habitat. Monitoring and further logs installation	Salvaged features are placed into BOA as denning habitat.	Spotted-tailed quoll recorded in Stringybark Creek Habitat Corridor during this time frame.	Spotted-tailed quoll recorded in Stringybark Creek Habitat Corridor over multiple survey periods during this time frame.	Fauna monitoring has shown use of augmented habitat in BOA by spotted-tailed quoll.	Objective No.2 TARP No.5	<i>Specific</i> – spotted-tailed quoll habitat enhancement <i>Measureable</i> – spotted-tailed quoll presence monitored through surveys outlined in Section 5.2.2. <i>Achievable</i> – previous records of spotted-tailed quoll on site <i>Relevant</i> – provides enhanced habitat for the species locational to known population in MGO <i>Timely</i> – performance indicators provide suitable timeframe for achieving known habitat for the species.

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	Year 3 2019	Year 4 2020	Year 5 2021	Year 6-12 2022-2028	Year 15-18 2031-2034			
African olive management	Action Plan prepared to target weed control and rehabilitation of African olive infested area. Initial African olive control measures undertaken	Action Plan prepared to target weed control and rehabilitation of African olive infested area Ongoing African olive control measures undertaken.	Monitoring of effectiveness of initial control measures. Further control to be undertaken if required.	Rehabilitation of African olive infestation to native vegetation communities. Further control to be undertaken if required.	African olive does not occur above 20% cover in any management domain within the offset site.	African olive does not occur above 10% cover in any management domain within the offset site.	Objective No.5 TARP No.4	<i>Specific</i> – African olive weed control <i>Measureable</i> – floristic monitoring as outlined in Section 5.2.1 . <i>Achievable</i> – may be difficult to eradicate from the site, however reduction of cover of this species should be achievable. <i>Relevant</i> – high threat weed in the Hunter Valley requiring targeted control <i>Timely</i> – performance indicators suggest immediate action to manage this weed.

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	Year 2019	Year 2020	Year 2021	Year 2022-2028	Year 2031-2034			
Esparanga Offset Area								
Passive regeneration in grassland to conform to White Box – Yellow Box – Blakely’s Red Gum Woodland EEC	Determination of management domains.	Passive regeneration commences.	Passive regeneration continues.	Regeneration areas are trending to benchmark (or reference site) ranges for overstorey, midstorey and groundcover scores and at 60% or above for species richness benchmarks.	Regeneration areas are trending to benchmark (or reference site) ranges for overstorey, midstorey and groundcover scores and at 70% or above for species richness benchmarks.	Regeneration areas are at 80% or above for species richness benchmarks. 80% or more of the regeneration areas conform to White Box – Yellow Box – Blakely’s Red Gum Woodland EEC.	Objective No.1 TARP No.6	<i>Specific</i> – restoration of White Box – Yellow Box – Blakely’s Red Gum Woodland EEC. <i>Measureable</i> – measured against reference sites or benchmark data. <i>Achievable</i> – MGO have success in re-establishing EECs using passive regeneration <i>Relevant</i> – provides suitable offsets and gains of EEC in the Hunter Valley <i>Timely</i> – active regeneration areas should show improvement in the medium term and majority conform to EEC in the long term.

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	Year 2019	Year 2020	Year 2021	Year 2022-2028	Year 2031-2034			
Mitchell Hills Offset Area								
Passive regeneration in grassland to regenerate to HU630 Barrington Footslopes Dry Spotted Gum Forest	Determination of management domains. Initial baseline flora monitoring undertaken. Flora monitoring undertaken.	Passive regeneration commences. Flora monitoring undertaken.	Flora monitoring undertaken.	Regeneration areas are trending to benchmark (or reference site) ranges for HU630 Barrington Footslopes Dry Spotted Gum Forest overstorey, midstorey and groundcover scores and at 60% or above for species richness benchmarks.	Regeneration areas are trending to benchmark (or reference site) ranges for HU630 Barrington Footslopes Dry Spotted Gum Forest overstorey, midstorey and groundcover scores and at 70% or above for species richness benchmarks.	Regeneration areas are at 80% or above for species richness benchmarks for HU630 Barrington Footslopes Dry Spotted Gum Forest.	Objective No.1 TARP No.6	<i>Specific</i> – restoration of HU630 Barrington Footslopes Dry Spotted Gum Forest. <i>Measureable</i> – measured against reference sites or benchmark data for HU630. <i>Achievable</i> – MGO have success in re-establishing EECs using active regeneration <i>Relevant</i> – provides suitable offsets and gains of native forest in the Hunter Valley <i>Timely</i> – active regeneration areas should show improvement in the medium term and majority conform to the PCT in the long term.

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	Year 2019	Year 2020	Year 2021	Year 2022-2028	Year 2031-2034			
Southeast Corridor Offset								
Supplementary planting for corridor function	Supplementary planting of canopy and shrub species characteristic of surrounding areas is undertaken. Further supplementary planting of canopy and shrub species.	Habitat augmentation and weed control are undertaken.	Further supplementary planting of canopy and shrub species if monitoring shows planting failure.	Monitoring verifies more than 75% of plantings are healthy and growing.	Area provides a range of structural habitats including eucalypts, shrubs, ground cover, developing litter layer.	Corridor function is maintained in the north south direction.	Objective No.3, 8 TARP No.7, 13	<i>Specific</i> – habitat connectivity <i>Measureable</i> – monitoring of dominant canopy and shrub species regeneration following targeted planting as outlined in Section 3.2.4. <i>Achievable</i> – considered to be achievable following previous regeneration success at MGO. <i>Relevant</i> – aims to retain connectivity to the north-south of MGO. <i>Timely</i> – Measures to begin in year 1 (2017)

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	Year 2019	Year 2020	Year 2021	Year 2022-2028	Year 2031-2034			
Bettys Creek Habitat Management Area								
Selected areas of active regeneration to conform to Central Hunter Grey Box – Ironbark Woodland EEC	Determination of management domains.	Ongoing active regeneration (direct seeding or tubestock) using characteristic species, as required.	Ongoing active regeneration (direct seeding or tubestock) using characteristic species, as required.	Selected regeneration areas are trending to benchmark (or reference site) ranges for overstorey, midstorey and groundcover scores and at 60% or above for species richness benchmarks.	Selected regeneration areas are trending to benchmark (or reference site) ranges for overstorey, midstorey and groundcover scores and at 70% or above for species richness benchmarks.	Selected regeneration areas are at 80% or above for species richness benchmarks. 80% or more of the selected regeneration areas conform to Central Hunter Grey Box – Ironbark Woodland EEC.	Objective No.8 TARP No.7, 13	Specific – restoration of Central Hunter Ironbark – Spotted Gum – Grey Box Forest EEC. Measureable – measured against reference sites or benchmark data. Achievable – MGO have success in re-establishing EECs using passive regeneration Relevant – provides suitable offsets and gains of EEC in the Hunter Valley Timely – active regeneration areas should show improvement in the medium term and majority conform to EEC in the long term.

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