

OFFSET IMPLEMENTATION PLAN

OFFSET 5 – PROVISION OF AN INVASIVE
PREDATOR-FREE
CONSERVATION RESERVE FOR
THE WOYLIE

SOUTH32 WORSLEY ALUMINA

DATE: JANUARY 2022
VERSION: 1.0

Offset Implementation Plan

Business Blueprint



Worsley Alumina

Table of Contents	Topic	Page
	1 Introduction	3
	1.1 Purpose of this Offset Implementation Plan	3
	1.2 Scope	3
	1.3 Offset Value	3
	2 Description of the offset	3
	2.1 Objective of the Offset	3
	2.2 Offset Site Summary	4
	3 Description of the Offset Area	5
	3.1 General Description	5
	3.2 Assessment of the land	8
	3.3 Method for Calculating Offset Site Benefit	9
	3.4 Constraints and Variables	10
	4 Methodology	10
	4.1 Action Plan	11
	4.2 Key Performance Indicators (KPIs) & Completion Criteria	13
	4.3 Contingency measures and adaptive Management	13
	4.4 Risk Assessment	13
	5 Reporting	13
	5.1 Annual Biodiversity Offset Report (ABOR)	13
	6 Offset Acquittal	14
	7 Definitions, Terms and Abbreviations	14
	8 References	14
	9 Document Control	15

Table of Figures	Figure	Page
	Figure 1 Proposed Woylie Conservation Reserve Offset Land Parcels 'Lot 102' and 'Lot 100'	6
	Figure 2 Site Vegetation Types of Lot 102 and Lot 100	7

Table of Table	Table	Page
	Table 1 Summary Results of Woylie Conservation Projects in Western Australia and the Proposed Offset	3
	Table 2 Offset Site Summary	4
	Table 4 Offset Property Details	5
	Table 5 Summary Results of Woylie Conservation Projects in Western Australia	9
	Table 6 Inputs and preliminary net present value for the establishment of a conservation reserve for woylie	10

1 INTRODUCTION

1.1 PURPOSE OF THIS OFFSET IMPLEMENTATION PLAN

This Offset Implementation Plan (OIP) has been prepared to support the Biodiversity Offset Plan (BOP) prepared by South32 Worsley Alumina Pty Ltd (Worsley Alumina) for the Worsley Bauxite-Alumina Project (the Project). The BOP and Environmental Review Document (ERD) proposed included provision of offsets to benefit the Woylie. This OIP will describe the offset and outline the plan to deliver the conservation benefit required to address the significant residual impact (SRI) of the activities on impacted woylie individuals. By extrapolating known density estimates within the Northern Jarrah subregion to the proposed impact area, the lowest estimated number of woylies impacted by the proposal is six individuals, and the highest is 107 individuals (South32, 2022). The total number of woylie estimated to be impacted by the Proposal is assumed to be a maximum of 107 individuals.

1.2 SCOPE

This document has been developed to outline the details of the offset including the specific detail of the proposed exclosure conservation reserve as well as tasks, timing and responsibilities for the offset.

1.3 OFFSET VALUE

In accordance with the EPBC Act calculation, this offset provides a benefit to the woylie as outlined below in Table 1 and also offers a comparison to other sanctuaries to demonstrate the extrapolated value. Worsley Alumina will report clearing against this value to ensure total clearing does not exceed the benefit provided by this offset.

Table 1 Summary Results of Woylie Conservation Projects in Western Australia and the Proposed Offset

Reserve	IBRA subregion	Fence reserve size (ha)	Founder population size	Abundance three years post introduction	% increase three years post introduction	Net woylie gain after three years
Perup Sanctuary	Southern Jarrah Forest	423	41	400	976%	318
Mount Gibson	Merredin	7,838	162	758	468%	596
Proposed woylie conservation reserve	Northern Jarrah Forest	500	~ 50	~ 200	400%	~ 150

2 DESCRIPTION OF THE OFFSET

This offset refers to the establishment of an invasive predator-free conservation reserve for the woylie (woylie exclosure), of greater than 500 ha with a founder population of approximately 50 individuals. The offset also identifies suitable land 'Lot 102' and 'Lot 100' for the placement of the woylie exclosure located in the Shire of Collie. This offset also provides benefits for chuditch, quokka and western-ring tailed possum.

Upon establishment of the conservation exclosure and once the offset requirements are met, there is the potential for , surplus individuals to be removed from the reserve and used to supplement and reinforce other populations located in the Collie and Boddington areas which could be undertaken in conjunction with the DBCA and Woylie Recovery Team re-introduction programs. Delivery of this offset will provide a conservation gain for the woylie and potentially other conservation significant species highlighted above.

The placement of the woylie exclosure on lands proposed under Direct Offset 1 will ensure that the woylie exclosure will be afforded the same or similar habitat protection tenure security while ensuring that the woylie exclosure can be appropriately managed.

2.1 OBJECTIVE OF THE OFFSET

The objective of Direct Offset 5 – Woylie Conservation Reserve is to:

Offset Implementation Plan

Business Blueprint



Worsley Alumina

- provide a safe haven from predation (namely, a fenced, predator enclosure), containing foraging/refuge habitat for the woylie;
- establish a woylie 'insurance' population to supplement existing extant Indigenous populations within south-west WA (i.e. Dryandra, Perup) and complement reintroduced populations elsewhere within Australia; and
- provide a safe haven from predation for translocated woylie from areas cleared for mining development to reside.

Additionally, the offset will aim to develop, in conjunction with DBCA and relevant experts, a process to effectively manage the genetic diversity of the woylie population.

Further the offset aims to:

- secure land for habitat protection as per Direct Offset 1;
- establish and maintain an invasive predator-free conservation reserve (enclosure) for the woylie;
- establish a managed population of woylie commencing with a founder population size of 50 individuals of suitable genetic diversity supplementing the local population;
- increase the number of individuals in the reserve from the founder 50 individuals to greater than 200 individuals within a 3 year period post introduction;
- commence reserve establishment activities prior to the commencement of mining, including:
 - stakeholder consultation within the Collie region and Shire in support of the reserve;
 - consultation with experts in Threatened and invasive species ecology and land management requirements to support the establishment, management and operation of the reserve;
 - locating an appropriate area within 'Lot 102' and 'Lot 100' to support >500 ha of suitable habitat for the reserve while minimising any clearing requirements for enclosure fence requirements;
 - enhancement of remnant vegetation within the proposed reserve, where required, to support woylie ecological requirements;
 - undertake a monitoring program to establish densities of Threatened species and invasive predators for management
 - engage Western Shield and an appropriate invasive predator management contractor to provide reserve eradication (95 – 99%) within the reserve
 - undertake dieback mapping within the proposed reserve;
- commence establishment of the invasive predator-free fenceline immediately (<12 months) once the siting of the enclosure is confirmed;
- establish a partnership for the design, management, source of founder population and operation of the invasive predator-free conservation reserve immediately (<12 months);
- commence monitoring and management activities for life of impact immediately (<12 months) following agreement on the location of the reserve including:
 - invasive predator eradication (95 – 99%) within the reserve
 - woylie, quokka, chuditch, western ring-tail possum and other conservation significant species occurrence and densities within the reserve;
 - removal or reduction of threatening processes surrounding the reserve (e.g. fire, feral predators, weeds);
 - monitoring invasive predator densities within and external (within 1km) of the reserve
- following establishment and confirmation of an invasive predator-free reserve (<24 months), introduction of supplementary individuals
- delivery of ecological benefit within appropriate timescales (using conservative estimates) for conservation significant species:
 - 3 years for woylie

2.2 OFFSET SITE SUMMARY

The offset site is located on Worsley Alumina Joint Venture owned land in the Shire of Collie described by the Revised Proposal.

Table 2 Offset Site Summary

Address	Mornington Road, Shire of Collie
Lot/Plan	Lot 102 on Deposited Plan 23201 - ex Worsley Timber (Darling Forest) Lot 100 on Deposited Plan 402144 - ex Worsley Timber
Area	500 ha
Tenure	Freehold (Worsley Joint Venture)
Local Government Area	Shire of Collie
Action Commencement Date	Following acceptance of the Biodiversity Offset Plan in accordance with EPBC Assessment 2019/8437 – planning and initial actions to commence FY23

3 DESCRIPTION OF THE OFFSET AREA

3.1 GENERAL DESCRIPTION

The properties proposed to accommodate the >500 ha Woylie conservation reserve, Lot 102 and Lot 100 are currently owned by the Worsley Alumina Joint Venture and are primarily vegetated by 'Excellent' quality vegetation (Keighery scale of vegetation quality). The land parcels are a mixture of vegetation and derived fauna habitat types offering suitable habitat for woylie, quokka, western ring-tail possum, chuditch and black cockatoos with records in close proximity to the locations (including recent significant breeding records of the Baudin's black cockatoo and breeding forest red-tailed black cockatoo). The Brunswick River is located to the northern boundary of 'Lot 102' and the Lunenbrough River is located at the southern boundary of 'Lot 102', other lower order drainage lines through the properties connect to both rivers supporting riparian habitat and small dams through the valley systems.

Historically the area has been impacted by timber harvesting activity and some mineral resource exploration. An existing limestone quarry (Fernbrook Quarry) is located at the northern section of 'Lot 100'. All Fernbrook quarry licenced lands including the access road and easements have been excised from the proposed offset properties. Fire breaks and general access tracks are located throughout the properties. An opportunity to utilize existing tracks for the installation of fencing for the establishment of the enclosure is possible.

The proposed parcels of land are contiguous with State Forest areas. The Wellington National Park links to the south with linear barriers including the Lunenbrough River, rail and infrastructure easements.

3.1.1 Location, parcel and ownership

The location of the offset properties proposed for the establishment of the woylie conservation reserve are shown in Figure 2 with the details provided below in Table 4. Subdivision may be required to formally excise licenced lands associated with Fernbrook Quarry.

Table 3 Offset Property Details

Lot Number	Total Area (ha)	Vegetation Type		Current Land Use
		Cleared	Native Vegetation	
2862/255 Lot 100 on Deposited Plan 402144	832.2	0.0	832.2	Agricultural (Leased) Remnant Veg
2153/260 Lot 102 on Deposited Plan 23201	2,241.8	0.0	2,241.8	Remnant Veg
TOTAL	3,074.1	0.0	3,074.1	

Offset Implementation Plan

Business Blueprint



Worsley Alumina

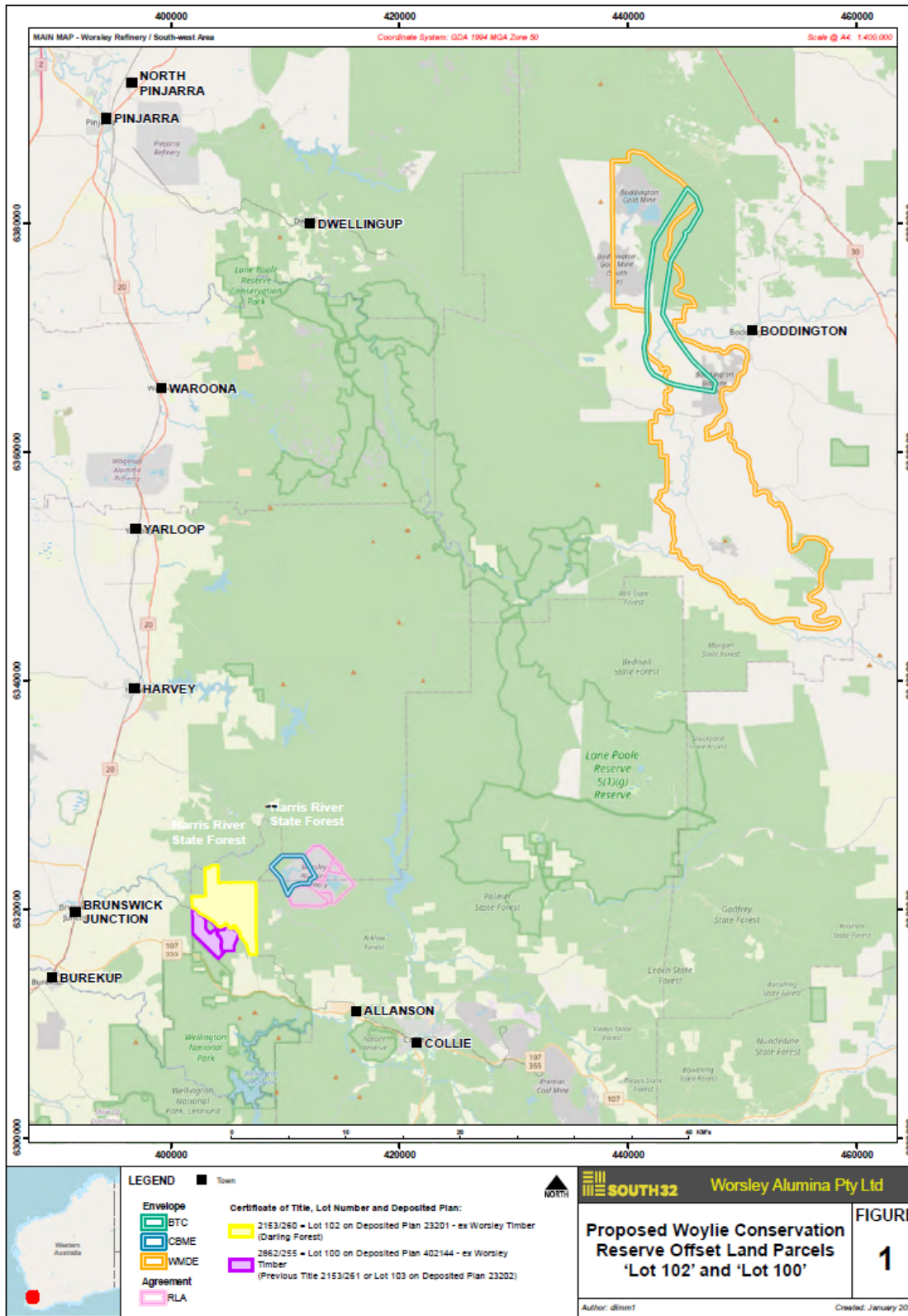


Figure 1 Proposed Woylie Conservation Reserve Offset Land Parcels 'Lot 102' and 'Lot 100'

Deployed XX XXX XXXX
Revalidate XX XXX XXXX
Author Type your name here

Owner Superintendent of Function or Area
WAPL Business Blueprint
UNCONTROLLED ONCE PRINTED

Version 1.0
WAPL-CD-200000545
Page 6 of 15

Offset Implementation Plan

Business Blueprint



Worsley Alumina

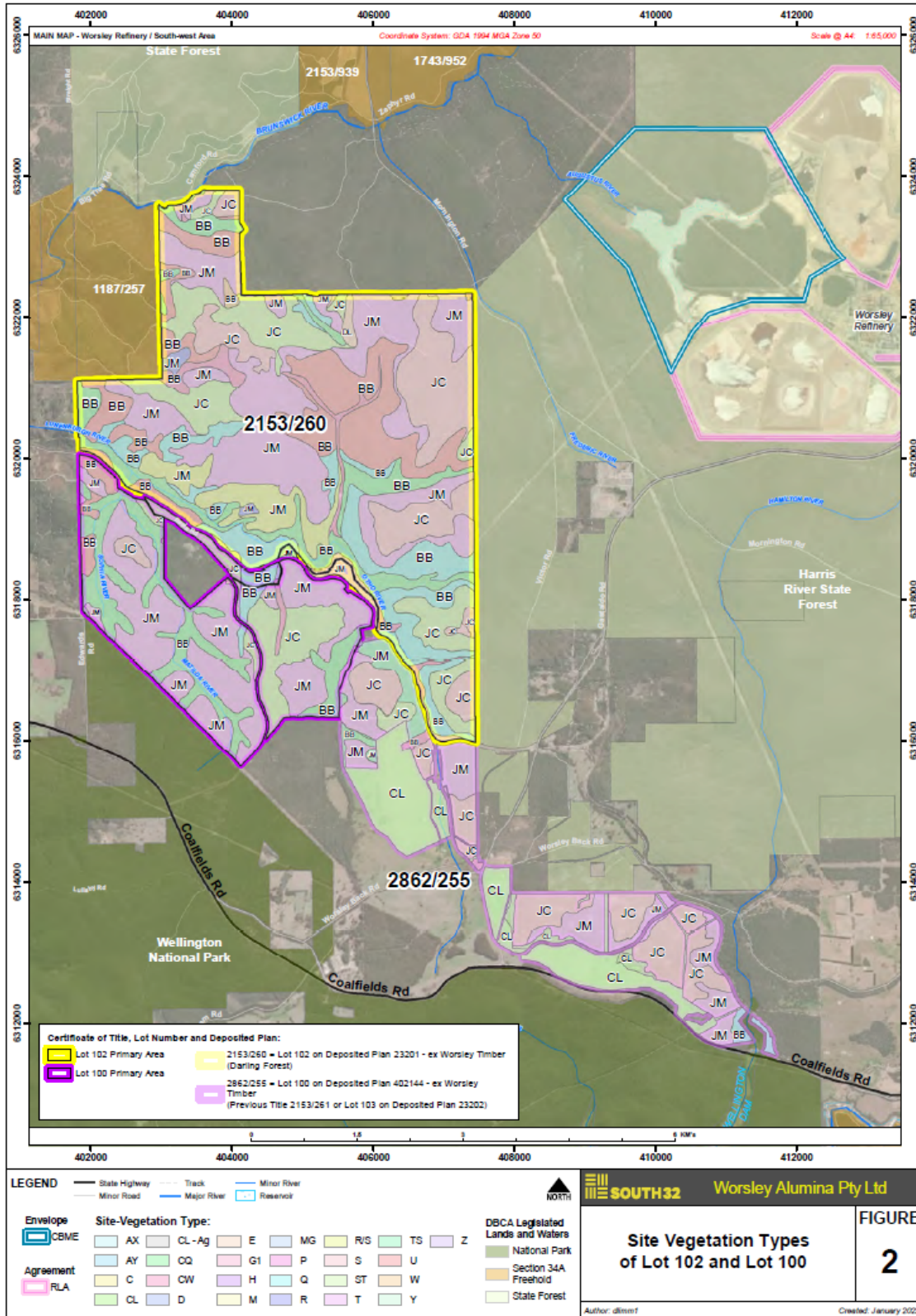


Figure 2 Site Vegetation Types of Lot 102 and Lot 100

Deployed XX XXX XXXX
Revalidate XX XXX XXXX
Author Type your name here

Owner Superintendent of Function or Area
WAPL Business Blueprint
UNCONTROLLED ONCE PRINTED

Version 1.0
WAPL-CD-200000545
Page 7 of 15

3.2 ASSESSMENT OF THE LAND

The proposed offset blocks for the siting of the proposed woylie conservation reserve 'Lot 102' and 'Lot 100' have been assessed for vegetation values primarily from a desktop and aerial imagery assessment by Mattiske Consulting (Mattiske, 2022). Vegetation mapping from this review is outlined in Figure 1. Vegetation quality assessment of these properties has been undertaken by aerial photo analysis, resulting in remnant vegetation being mapped as excellent quality under the Keighery scale. On ground third party confirmation of the vegetation types is to be undertaken, prior to implementation of the offset plan outlined in Section 4.1.

A desktop review of the fauna values within the land parcels was conducted in 2021 (Biostat, 2021). A first season (of two seasons) Matters of National Significance fauna survey was conducted in Spring 2021 (4 October to 11 November 2021). A second season in Autumn 2022 is planned. The interim report from the Spring 2021 survey consisted of:

- site reconnaissance and standardised habitat descriptions
- systematic transect surveys for black cockatoo nesting trees
- motion-sensitive cameras (primarily for mammal species)
- audio-sonic recording devices (bat detection)
- head torching
- opportunistic sightings

The most significant observation from the survey was the high number of nests of Baudin's Black-Cockatoo. Several significant mammals that were targeted were not found, but the abundance of mammals can vary seasonally and annually so they are still likely to be present (albeit in small numbers) (interim report Bamford, 2021). Stantec (2021) recorded the Carter's Freshwater Mussel in a drainage line dam central to the proposed offset property 'Lot 102'. Further baseline surveys to inform the implementation of this offset will occur in accordance with section 4.1. In addition to the second season fauna survey in Autumn, Worsley have contracted Glevan Consulting to undertake targeted dieback assessments of the properties in March/April 2022.

3.2.1 Vegetation Assessment

The location of the >500 ha woylie conservation reserve has not been spatially defined in 'Lot 102' and/or 'Lot 100'. The following assessment is applicable for the properties being proposed:

Disturbance:

- historical logging and grazing;
- recent bushfire
- presence of feral species (i.e. red fox *Vulpes vulpes*; feral cat *Felis catus*; feral pig *Sus scrofa*);
- minor recreational use.

Habitat importance:

- Major habitat types include: Jarrah/Marri forest and woodlands; Jarrah/Marri/Allocasuarina woodlands on slopes and ridges; Wandoo woodlands; Blackbutt woodlands on lower slopes; Flooded Gum woodlands (Mattiske 2021, Biostat 2020);
- All extant native vegetation on the properties represents foraging habitat for Carnaby's black cockatoo, Baudin's black cockatoo and forest red-tailed black-cockatoo (as per DoEE 2018), (Mattiske 2020, Biostat 2020). The offset properties contain mature habitat trees with potential to form hollows, therefore representing potential breeding habitat for black cockatoos (as per DoEE 2018). In addition, the high-quality vegetation provides recruitment of potential habitat trees of key tree species for black cockatoos and other fauna species, for example, western ring-tail possum that utilise hollows for breeding or refuge.

All extant native vegetation on the properties represents potential habitat for the chuditch (Biostat 2020, 2021).

Extant native vegetation on the offset properties within the proximity of CBME is potentially important habitat for the quokka and western ring-tail possum, with an emphasis on riparian habitat, denser vegetation communities within valleys and those supporting hollows and Balga (*Xanthorrhoea preissii*) (Biostat 2020, Craig et al. 2017, Hayward et al. 2005, Wayne et al. 2005).

'Lot 102' and 'Lot 100' contain water sources (i.e. small dams and natural drainage lines).

Offset Implementation Plan

Business Blueprint



Worsley Alumina

Phytophthora dieback status of properties is indeterminate at this stage with survey work commencing in Autumn 2022.

3.3 METHOD FOR CALCULATING OFFSET SITE BENEFIT

The suitability of the site as an offset was assessed from baseline flora and fauna surveys including review of historical records and reconnaissance assessments by ecological consultants. The calculation methodology and approach are described in the BOP using the EPBC Act Offsets Assessments Guide to ensure it meets the requirements of the Department's EPBC Act *Environmental Offsets Policy* (October 2012), species expert stakeholder consultation and benchmarking of woylie conservation programs. A review of existing conservation programs highlight that removing the key threats to the species (primarily invasive predators fox and cat) within suitable habitat will allow a population to thrive and achieve the desired outcome. Examples of Western Australian exclosure conservation reserves for the woylie are provided in Table 4. A minimum size 500 ha is sufficient to achieve the desired density and carrying capacity of the reserve.

In order to calculate the offset value, the inputs have been applied as outlined in Table 5.

Table 4 Summary Results of Woylie Conservation Projects in Western Australia

Reserve	IBRA subregion	Fence reserve size (ha)	Founder population size	Abundance three years post introduction	% increase three years post introduction	Net woylie gain in reserve after three years
Perup Sanctuary	Southern Jarrah Forest	423	41	400	976%	318
Mount Gibson	Merredin	7,838	162	758	468%	596
Proposed woylie conservation reserve	Northern Jarrah Forest	500	~ 50	~ 200	400%	~ 150

Table 5 Inputs and preliminary net present value for the establishment of a conservation reserve for woylie

Attribute	Value	Rationale
Number of Features (Total Quantum of Impact)	110	By extrapolating known density estimates within the Northern Jarrah subregion to the proposed impact area (See section 2.3.1 of the ERD), the lowest estimated number of woylies impacted by the proposal is six individuals, and the highest is 107 individuals. From here after the estimated number of woylies impacted by the proposal is assumed to be the maximum of 107 individuals
Time Horizon (years)	3	As a conservative measure, the increase in woylie population to achieve adequate compensation for impact will occur within three years. However, it is likely that the woylie population may further increase in size beyond this.
Start Value	50	A founding population of 50 individuals has been proposed given this is comparable to previous woylie translocations into similar sized sanctuaries. For example, a founding population of 43 individuals was used to establish a woylie population within Perup Sanctuary (423 ha).
Future Value without Woylie Conservation Reserve	0	Without the implementation of the proposed Woylie Conservation Reserve, it is highly likely the existing population of woylies within the proposed impact area would not persist.
Future Value with Woylie Conservation Reserve	200	The number of woylies introduced into the proposed conservation reserve, and the expected population growth rate have been conservatively estimated based on results from two recent woylie translocations into predator exclosures. The first occurred in 2010 and involved the translocation of 41 individuals into Perup sanctuary (-34.27, 116.63), and the second occurred in 2015 and involved the translocation of 162 individuals into Mount Gibson Wildlife Sanctuary (-29.63, 117.24) in 2015. The two translocations resulted in three-year population increases of 468% and 976%, respectively. Using a founder population size of 50 individuals, we have conservatively estimated a three-year population increase of 400%, resulting in a net gain of ~150 woylie individuals.
Confidence in Result	70%	Woylie are recognised as the most translocated species in Australia, and the success rate for Woylie translocations has historically been high (Short, 2009). This is especially true for Woylie translocations to predator proof fenced reserves, where the impact of predation — a major cause of mammal translocation failures — is removed. In recent years, there have been several successful Woylie translocations to predator proof fenced reserves, including Whiteman Park (Umbrello, 2010), Perup Sanctuary (Wayne et al, 2013), and Mount Gibson Sanctuary (Smith et al, 2020). Given the above information, and the fact that the proposed woylie conservation reserve will be completely removed of predators (feral cats, foxes, dogs) — a major limiting factor in previous mammal translocations (Short, 2009) — a reasonably high level of confidence can be assumed in achieving a successful result.
Net Present Value (No. of features)	114.92	This quantity exceeds the quantum of impact; indicating that a net gain in individuals is expected to be achieved.

3.4 CONSTRAINTS AND VARIABLES

Further work is required to establish the preferred location for the woylie conservation reserve on the properties, which are intended as outlined in Section 4.1. Also required is confirmation from the Department of Agriculture, Water and the Environment (Commonwealth) and Department of Water and Environmental Regulation (State) that the offset proposal and intent is acceptable. This will be confirmed during the assessment process and final calculations confirmed prior to approval of the Project and associated offsets.

4 METHODOLOGY

This section describes the management actions and measures necessary to meet the identified outcomes of the proposed offset area. The actions and management measures proposed are designed to provide positive conservation outcomes for the woylie,

however they will also bring an overall improvement in the condition and quality of a wide range of native species present within the conservation reserve offset area, including chuditch, quokka, western ring-tail possum and the three black cockatoo species. As discussed in Section 3.2 the location of the conservation reserve within 'Lot 102' and/or 'Lot 100' will require detailed assessment and confirmation.

4.1 ACTION PLAN

4.1.1 Confirmation of suitability of the Land Parcels and location of the Woylie Conservation Reserve

Worsley has proposed the land parcels 'Lot 102' and/or 'Lot 100' as potential locations for the location of the Woylie Conservation Reserve. Confirmation of the suitability and acceptability of the proposed offset will be required through the State and Commonwealth Regulatory Authorities. Further assessment will be required to determine the most appropriate location for the positioning of the enclosure boundary including but not limited to topography, hydrography, dieback, fauna studies (MNES, detailed habitat suitability and introduced predator), access availability and closures, fence line construction limitations, and fire risk management to confirm the environmental offset value.

Worsley commits to undertaking further studies to provide the necessary background information to inform the planning, development and decision makers relevant to this offset.

4.1.2 Provision of Suitable Tenure – Legally securing the Offset Area

The Woylie Conservation Reserve is proposed to be located within offset lands proposed under Direct Offset 1 of the BOP. Application for suitable protection measures to ensure protection of the offset for the life of the impact (eg conservation covenant including appropriate survey and delineation of the area for conservation (registered as an encumbrance against the property) and potentially future subdivision of the Woylie Conservation Reserve and Fernbrook Quarry from 'Lot 102' and/or 'Lot 100'. Methods of protection include:

- *Soil and Land Conservation Act 1945* (WA): a conservation covenant or an agreement to reserve between owner and Commissioner of Soil and Land Conservation (Part IV A)
- *National Trust of Australia (WA) Act 1964* (WA): agreement between the owner/occupier of land and the National Trust of Australia (WA) restricting use of land (s 21A)
- *Biodiversity Conservation Act 2016* (WA): biodiversity conservation agreement between the owner/occupier and the Minister (Part 7) or biodiversity conservation covenant between the owner and DBCA (Part 8)
- *Environmental Protection Act (1986)* (WA): environmental protection covenant between DWER and owner (with consent of all owners/occupiers) as a condition of a clearing permit or Ministerial Statement (new part VB, not yet in force)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth): conservation agreement between the Commonwealth Environment Minister and the landowner or user (can include indigenous groups) (s 305, Part 14)
- *Conservation and Land Management Act 1984* (WA): agreement between DBCA and the person responsible for the area to manage private land (as if it were state forest, timber reserves, national parks, conservation parks or nature reserves) (s 8A)
- *Transfer of Land Act 1893* (WA): absolute caveat (s 137) between caveator and owner and registered on the Certificate of Title or deed of restrictive covenant 'in gross' between owner and local government / public authority

Investigation as to the appropriate tenure and timing for placement against the Woylie Conservation Reserve will be confirmed following confirmation under section 4.1.1. Tenure must enable the activities to establish and operate the Woylie Conservation Reserve.

4.1.3 Woylie Conservation Reserve Establishment and Land Management Activities

The following establishment and land management activities will be undertaken to ensure the Woylie Conservation Reserve is suitably prepared to ensure the highest likelihood of the intended conservation outcomes and successful implementation of the proposed offset

The following activities will be undertaken within 12 months of approval of this OIP:

- Site Establishment
 - Consultation with experts to define the boundary of the Woylie Conservation Reserve
 - Define boundary of the Woylie Conservation Reserve ensuring a heterogeneous habitat mosaic of excellent quality habitat
 - Define location of primary access
 - Define location of work and service facilities
 - Determine the most appropriate fencing construction materials and methods to establish the enclosure fence

- Site Preparation
 - Exclosure fenceline establishment
 - Fence purchase and install
 - Track widening where required
 - Track removal where required
 - Maintenance of firebreaks
 - Confirmation of any contaminated sites and planning for appropriate removal or restoration
 - Weed management (for land preparation and fire risk minimization) – a weed survey will be undertaken to determine the presence of noxious weeds, resulting, if required, in a weed management plan and appropriate mapping
 - Disease Mapping and subsequent management
 - Feral animal control
 - Feral animal baseline monitoring will be undertaken, and a feral animal control plan completed for the area.
 - Feral eradication plan within the exclosure aiming for 100% eradication (95% - 99% of feral predators eradicated)
 - Fire risk minimization and Fire Management Plan
 - Revegetation of areas to ensure sufficient dense undergrowth in areas with inadequate undergrowth cover.
- Conservation Planning and Design
 - Partnership with appropriate organisations for the design, establishment and management of the Reserve
 - Work and Service Facilities
 - Design and construction of an appropriate facility for the operational management of the Reserve
 - Personnel requirements
 - Machinery and Tools
 - Vehicles, generator, fire fighting equipment, weed management, feral control tools, science equipment (cameras, monitoring equipment etc.)
 - Source population
 - Natural recruitment and/or translocation, monitoring, veterinary, service management
 - Annual Operational Management

Following the initial planning process (within 12 months of approval) implementation of site preparation, conservation planning and design activities will commence. Worsley will develop partnerships with appropriate organisations to support and facilitate the planning and design activities. Eradication of feral predators from within the exclosure is expected to take 12 months. Once eradication is complete, the first woylie to be introduced into the Reserve will be possible. This is expected within two years following the initial planning process and establishment of the fenceline.

4.1.4 Monitoring

Monitoring of the Woylie Conservation Reserve will focus on monitor the health and status of the establishment of the woylie population and maintaining the Reserve invasive predator-free. Other conservation significant species monitoring activities will be performed aligned with requirements of Direct Offset 1 for Habitat Protection (refer to Worsley Biodiversity Offset Plan OIP1). Monitoring also allows for review and ongoing improvement or maintenance required to deliver the conservation benefit.

Results from monitoring activities will be reported in the Annual Biodiversity Offsets Report and will include:

- Threat abatement management including:
 - Management activities to maintain the feral free reserve including fence inspection and maintenance
 - Results of invasive predator and weed monitoring and management activities
 - Disease monitoring and mapping
 - Fire risk management activities

- Woylie population establishment and density to (conservatively) provide a net gain of at least 150 individuals within 3-4 years of sourcing at least 50 individuals of the founder population.
- Track management activities including any habitat re-establishment.

4.2 KEY PERFORMANCE INDICATORS (KPI'S) & COMPLETION CRITERIA

Outline of expectations for development of KPI's will be further discussed with regulators and advisory bodies in accordance with the BOP. It is expected that, as the ultimate goal for this offset the Reserve will:

- provide a safe haven from predation (namely, a fenced, predator enclosure), containing foraging/refuge habitat for the woylie;
- establish a woylie 'insurance' population to achieve the desired density and number of individuals of woylie (150 individual gain) to discharge the offset, supplement existing extant Indigenous populations within south-west WA (i.e. Dryandra, Perup) and complement reintroduced populations elsewhere within Australia; and
- provide a safe haven from predation for translocated woylie from areas cleared for mining development to reside

Examples of appropriate completion criteria are outlined below and will require discussion with the members of the BOAG and other regulatory bodies (including DBCA, DWER and DAWA) to ensure they are consistent with expected outcomes.

Invasive Predator Management:

- Ethical and appropriate level of invasive predator management conducted
- Invasive predator eradication program removing 99% of invasive predators from the Reserve.
- Monitoring to demonstrate maintenance of an invasive free Reserve
- Weekly enclosure fence inspections and maintenance (additional following storm events, high wind velocities and post-fire activity)

Woylie Population:

- Woylie founder population established of at least 50 individuals with genetic variation appropriate to sustain a genetically valuable population.
- Annual monitoring to demonstrate a healthy population is establishing and the population is on trajectory for net gain of at least 150 individuals within 3-4 years of establishment.
- Net gain of 150 individuals achieved within 4 years of founder population establishment.

4.3 CONTINGENCY MEASURES AND ADAPTIVE MANAGEMENT

A review of this OIP will be completed in conjunction with the BOAG, at a minimum of every five years, or earlier if triggered by criteria defined in the Plan. The intent of this review is to facilitate adaptive management and ensure areas of focus are consistent with outcomes for ongoing biodiversity protection and are changing focus areas. This could include (but not be limited to) change in status of conservation significant species, outcomes of different research and realignment/collaborative focus with government and industry. The outcomes of OIP reviews will be reported on within the Annual Biodiversity Offsets Report.

4.4 RISK ASSESSMENT

Following completion of planning and design actions outlined in section 4.1.4 a risk assessment will be undertaken for the offset.

5 REPORTING

5.1 ANNUAL BIODIVERSITY OFFSET REPORT (ABOR)

Progress against this plan will be provided in the Annual Biodiversity Offset Report (ABOR) which will be provided as an appendix to the Annual Environmental Report (AER).

6 OFFSET ACQUITTAL

The offset acquittal process is undertaken using the EPBC Act Offsets assessment guide. The EPBC Act Offsets assessment guide requires the key ecological attributes of the species or ecological community to be quantified.

7 DEFINITIONS, TERMS AND ABBREVIATIONS

Term	Description
ABOR	Annual Biodiversity Offset Report
AER	Annual Environmental Report
BOAG	Biodiversity Offsets Advisory Group
BOP	Biodiversity Offsets Plan
CBME	Contingency Bauxite Mining Envelope
ERD	Environmental Review Document
DAWE	Department of Agriculture, Water and the Environment
DBCA	Department of Biodiversity, Conservation and Attractions (WA)
DWER	Department of Water and Environmental Regulation
EPBC Act	<i>Environmental Protection and Biodiversity Act 1999</i>
JV	Joint Venture
OIP	Offset Implementation Plan
SRI	Significant Residual Impact

8 REFERENCES

	Bamford Consulting Ecologists (2022) <i>Summary Progress Report: Fauna Investigations of Proposed Offset Areas Spring 2021</i> . Unpublished report.
1013619	Biodiversity and Forest Management Plan
	Biostat Pty Ltd (Biostat) (2020). <i>PAA Offset Fauna Habitat Assessment Desktop Study/Ecological Values Field Surveys 2020</i> . Unpublished report prepared for South32 Worsley Alumina.
	Biostat (2021) <i>Worsley Mine Expansion Offset Fauna Habitat Assessment Ecological Values</i> . Unpublished report.
	Craig, M.D., White, D.A., Stokes, V.L., and Prince, J. (2017). Can Postmining Revegetation Create Habitat for a Threatened Mammal? <i>Ecological Management & Restoration</i> 18 (2), pp. 149–55.
	Department of Environment and Energy (DoEE) (2018). <i>Protected Matters Search Tool</i> . Available: https://www.environment.gov.au/epbc/protected-matters-search-tool .
	Hayward, M.W., de Torres, P.J., and Banks, P.B. (2005). Habitat Use of The Quokka, <i>Setonix brachyurus</i> (Macropodidae: Marsupialia), in The Northern Jarrah Forest of Australia. <i>Journal of Mammalogy</i> 86(4), pp. 683–88.
	Mattiske (2022) <i>Desktop Survey of Potential Offset Areas</i> . Unpublished report.
	Mattiske Consulting Pty Ltd (Mattiske) (2021). <i>Desktop Survey of Potential Offset Areas</i> . Unpublished report prepared for South32 Worsley Alumina, 2020.

Offset Implementation Plan

Business Blueprint



Worsley Alumina

	Short, J. (2009). The characteristics and success of vertebrate translocations within Australia. <i>Wildlife Research and Management Pty Ltd</i> , Perth, and <i>Australian Government Department of Agriculture, Fisheries and Forestry</i> , Canberra.
	Smith, M., Volck, G., Palmer, N., Jackson, C., Moir, C., Parker, R., Palmer, B. and Thomasz, A., (2020) <i>Conserving the endangered woylie (Bettongia penicillata ogilbyi): Establishing a semi-arid population within a fenced safe haven</i> . <i>Ecological Management & Restoration</i> , 21(2), pp.108-114.
	South32 (2022) Worsley Alumina Biodiversity Offset Plan
	Umbrello, L. S. (2010). <i>Introducing the Woylie (Bettongia Penicillata) to the Swan Coastal Plain: Resource Availability and the Impact of Digging on Soil Water-Repellency</i> (Doctoral dissertation, Honours thesis, The University of Western Australia, Perth, Western Australia).
	Wayne, A. F., Maxwell, M. A., Ward, C. G., Vellios, C. V., Wilson, I. J., & Dawson, K. E. (2013). Woylie conservation and research project: progress report 2010–2013. <i>Department of Parks and Wildlife</i> , Perth.
	Wayne, A. F., Rooney, J.F., Ward, C.G., Vellios, C.V., and Lindenmayer, D.B. (2005). The Life History of <i>Pseudocheirus occidentalis</i> (Pseudocheiridae) in the Jarrah Forest of South-Western Australia. <i>Australian Journal of Zoology</i> 53(5), pp. 325-337.

9 DOCUMENT CONTROL

Reviewer Circulation

Role	Name	Endorsed	Date
Vice President Operations	Erwin Schaufler		

Approval Circulation

Role	Name	Approved	Date
Manager HSERT	Dale McAtee		
Manager Approvals	Claire Reid	✓	
Manager Planning	Cameron McKean		
Manager Group Planning	Lakhvir Pooni		