

OFFSET IMPLEMENTATION PLAN

**OFFSET 4 – BLACK COCKATOO ARTIFICIAL
HOLLOWS INSTALLATION**

SOUTH32 WORSLEY ALUMINA

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Offset Implementation Plan

Business Blueprint



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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 Mine Expansion Revised Proposal (the Project). The BOP and Environmental Review Document (ERD) include provision of offsets to address the significant residual impact (SRI) to the three black cockatoo species, Carnaby's, Baudin's and forest red-tailed black cockatoo associated with the implementation of the Revised Proposal.

1.2 SCOPE

This document has been developed to outline the details of the proposed Direct Offset 4 as outlined in the BOP. It includes detail of the number, selection of locations and installation of artificial nesting hollows as well as tasks, timing and responsibilities for the offset.

1.3 OFFSET VALUE

Ecological restoration is expected to provide habitat suitable for black cockatoo foraging and roosting within six to eight years following vegetation establishment. However, restoration of black cockatoo breeding habitat (i.e. hollows) will take significantly longer (i.e. >100 - 200 years). To account for this delay, artificial hollows will be installed to offset impacts in relation to the clearing of breeding habitat, known nesting trees and trees with suitable hollows. Previous offsets in the region, have successfully implemented the installation of artificial hollows to provide nesting structures for black cockatoo species (Newmont 2014; Talison 2018).

An estimated 654 actively used (confirmed) and high potential Black Cockatoo breeding hollows are located within the PAA. Activities described within the Revised Proposal will potentially disturb up to 65 'confirmed black cockatoo breeding habitat trees'; i.e. trees with hollows and evidence to suggest breeding activity, and trees with suitable hollows but no evidence of breeding activity (henceforth 'breeding trees'; Phoenix 2021). Hollows large enough for utilization by black cockatoos are estimated to take 100–200 years to develop in trees impacted by fire, fungi, invertebrates or those that are decaying or dead (DPaW 2013). Worsley Alumina commits to avoid >90% of confirmed black cockatoo breeding trees within the PAA. Worsley Alumina will provide artificial hollows as compensation for the residual loss (65 hollows) associated with the removal of black cockatoo breeding trees at a ratio of at least 3:1 and propose to install a minimum of 200 artificial breeding hollows.

Should further hollows be identified in the clearing path during implementation of the Revised Proposal, additional artificial hollows will be installed at the 3:1 ratio.

Studies have shown that Carnaby's black cockatoo will readily nest in artificial hollows, accept the presence of artificial hollows and may use these for breeding if placed in suitable locations (Groom 2010; BirdLife Australia 2017, Phoenix 2021). The placement of artificial hollows in proximity to cleared nesting trees or in locations where hollow availability is limited can maintain or increase the number of hollows available for nesting and potentially achieve breeding success (Groom 2010; Phoenix 2021). There is a paucity of knowledge around the use of artificial hollows by forest red-tailed and Baudin's black cockatoos, however, it is expected that these species may utilise artificial hollows for breeding if these are in priority breeding locations and appropriately maintained.

2 DESCRIPTION OF THE OFFSET

This offset identifies the number of artificial hollows required to offset hollows potentially cleared through the implementation of the Revised Proposal and is specific to addressing the SRI for the black cockatoo species.

Further ecological restoration is proposed in other OIPs which addresses the SRI associated with loss of roosting and foraging habitat for the black Cockatoo species. Delivery of this offset will re-establish breeding hollows and enhance the remnant vegetation and locations in which they are placed.

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2.1 OBJECTIVE OF THE OFFSET

The objective of the offset is to:

- maintain or enhance reproductive success of populations of the Carnaby's black cockatoo, forest red-tailed black cockatoo and Baudin's black cockatoo through the establishment of artificial hollows in priority locations within the range of the impacted species.

The offset will:

- identify high priority locations within the range of the impacted black cockatoos (i.e. Carnaby's black cockatoo, and forest red-tailed black cockatoo; Baudin's black cockatoo will also be considered despite no evidence of impact to breeding trees) where the timely and effective establishment of artificial hollows would maximise likelihood of use and benefit to their reproductive success;
- secure land access to enable installation of artificial hollows (via an appropriate legal mechanism that ensures longevity) and permits access for ongoing management and monitoring;
- install artificial hollows (a ratio of at least 3:1) to replace impacted breeding trees, with the hollows to be positioned within priority locations identified in collaboration with subject matter experts prior to breeding season and the commencement of mining activity under the Revised Proposal to encourage uptake of hollows prior to breeding and to deliver pre-impact offset benefit;
- implement maintenance, management and engineering controls to ensure the endurance of artificial hollows and to minimise the use by other pest species (e.g. feral bees) for at least 30 years.; and
- establish an endowment for a third party to ensure that monitoring and management of artificial hollows continues to an appropriate standard following this period.

2.2 OFFSET SITE SUMMARY

The use of artificial hollows by black cockatoos will vary depending on location based on proximity to other known active hollows, preferred habitat types, and landscape context (Groom et al. 2010, Birdlife Australia 2017, Phoenix 2021). Therefore, the identification of priority locations for breeding hollows is key to ensure their success as an offset. Preferred locations for placement of artificial hollows will be determined prior to the installation of artificial hollows for this offset in liaison with DBCA, WA Museum, appropriate stakeholders and relevant subject matter experts.

2.2.1 Species of National Significance

The species of National Environmental Significance that will be addressed by this offset are outlined below in Table 1, which also includes the conservation status for each species as well as the adjusted impact calculated for the entire project area. The offset described by this OIP does not address the entire impact for any of the three listed species but is specific to the loss of breeding hollows.

Table 1 Focus Species of National Significance and the Total Impact from the Project

Conservation significant species (EPBC Act ^a and WA BC Act ^b)	Conservation Status ^c		Adjusted impact ^d (ha)
	EPBC Act	BC Act	
Forest red-tailed black cockatoo (<i>Calyptorhynchus banksii naso</i>)	VU	VU S3	4,795
Baudin's black cockatoo (<i>Calyptorhynchus baudinii</i>)	EN	EN S2	4,795
Carnaby's black cockatoo (<i>Calyptorhynchus latirostris</i>)	EN	EN S2	4,795

a: EPBC Act refers to the Commonwealth Government Environment Protection and Biodiversity Conservation Act 1999

b: BC Act refers to the Western Australian Government Biodiversity Conservation Act 2016

c: Species status as classified as EN – endangered, VU- vulnerable, CR – critically endangered, T- threatened, MI- migratory species, CD – species of special conservation interest, IA – migratory birds protected under an international agreement, S1 – schedule 1 (critically endangered species), S2 – schedule 2 (endangered species), S3- schedule 3 (vulnerable species), S6 – schedule 6 (conservation dependent fauna)

d: Adjusted impact accounts for the remaining impact after avoidance, minimisation and mitigation measures, as well as consideration of habitat quality (condition and importance within the landscape context)

3 DESCRIPTION OF THE OFFSET AREA

3.1 GENERAL DESCRIPTION

Artificial hollows will be installed for the three threatened black cockatoo species enabling breeding in areas where natural hollows are limited (DBCA 2014, 2017). Key criteria need to be met to ensure the maximum chance of usage by black cockatoos (DPAW 2015). These criteria addressed in the Worsley Alumina Threatened Fauna Pre-clearance Survey and Management Procedure (2020a) and the Worsley Alumina Biodiversity and Forest Management Plan (2020) are:

- Site for installation of artificial hollows will be within or adjacent to eucalypt woodland or forest in the known breeding range of the species.
- Worsley Alumina will target sites within 50 kilometres of the PAA where possible. Sites outside this range may be selected dependent on suitability.
- Breeding is known or suspected at the site. There must also be evidence that a lack of available tree hollows is preventing breeding that would otherwise occur in the vicinity of the site.
- The artificial hollows are in close proximity to adequate feeding areas – within a 12 km radius.
- The site is secure in terms of tenure.
- The program represents longevity; security measures, maintenance, adaptation and replacement will be provided for the entire time that the artificial hollow will be in place.
- A suitable artificial hollow design is used.

In alignment with the black cockatoo recovery plans, other conservation actions (DBCA 2014) which will be considered for artificial hollow sites (subject to land access) are:

- protecting habitat by fencing and/or rabbit control to encourage regeneration of native vegetation;
- controlling competitive species such as galahs, corellas and feral bees that may occupy hollows;
- repairing old and damaged natural nesting hollows;
- revegetating with preferred food species and nesting trees; and
- creating linkages of vegetation between nesting and feeding areas.

Prior to placement of artificial hollows, Worsley Alumina will ensure appropriate approvals from landowners/managers are obtained and recorded to ensure appropriate tenure and protection measures can be established.

3.2 METHOD FOR CALCULATING OFFSET SITE BENEFIT

In order to calculate the offset value, the attributes have been applied as outlined in Table 2.

Table 2 Inputs and Preliminary Net Present Value for Artificial Hollow Establishment

Attribute	Value	Rationale
Number of Features (Total Quantum of Impact)	65	A survey of hollows with evidence of potential cockatoo use was conducted across known breeding habitat types within the Indicative Disturbance Footprint (IDF). Based on the results of this survey, the density of hollows with evidence of potential cockatoo use was 0.12285 hollows per ha. The estimated density of hollows with evidence of potential cockatoo use (0.12285/ha) was multiplied by the extent of native vegetation to be cleared (current remaining approved clearing and proposed new clearing – 5381 ha), equating to a total estimated number of 657 within the disturbance footprint. South32 have committed to avoiding clearance of 90% of hollows with evidence of potential cockatoo use (657 hollows) as part of the proposal. This leaves a total of 65 hollows that will be cleared as part of the proposal.
Time Horizon (years)	1	Installation of hollows will commence immediately following approval of the Revised Proposal by both the Western Australian and Australian Commonwealth governments. Artificial hollows will be installed prior to the breeding season and prior to clearing of breeding trees. Recent studies show artificial hollows may be used as soon as the first year following installation (Groom, 2010).
Start Value	0	No hollows will exist in locations where installation is to take place (locations will be chosen where access to tree hollows for breeding are limiting)

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Attribute	Value	Rationale
Future Value without Hollow Establishment	0	No additional artificial hollows installed
Future Value with Offset	200	This proposed quantity results in a Net Present Value that equates to $\geq 100\%$ of the Total Quantum of Impact, thereby effectively offsetting the initial impact (i.e. removal of hollows)
Confidence in Result	35%	Recent studies show that Carnaby's black cockatoo will readily nest in artificial hollows with a strong correlation between the use of artificial hollows and their proximity to currently used natural hollows (Groom, 2010; BirdLife Australia, 2017). Additionally, artificial hollows installed at Muchea North, Coomallo Creek and other sites within fragmented landscapes have been used in previous seasons by Carnaby's black cockatoo (Phoenix 2021). Artificial hollows placed in intact landscapes where hollows are not limiting do not achieve the comparable rates of utilisation (Newmont 2014; GHD 2018; T. Kirkby pers comm. 2020 in Phoenix 2021). Artificial hollows will be installed in proximity to cleared trees, or in proximity to known breeding areas, and adjacent to adequate foraging areas and water sources. While Worsley Alumina is confident that the use of artificial hollows will effectively offset the residual impact from the Revised Proposal, a confidence of 35% has been selected to reflect the difference in lifespan between natural and artificial hollows and the remaining uncertainty within the scientific literature in relation to the use of artificial hollows in all circumstances, particularly for forest red-tailed black cockatoos.
Net Present Value (No. of features)	69.17	This quantity exceeds the quantum of impact; indicating that a net gain in hollows is expected to be achieved.

4 METHODOLOGY

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

4.1 ACTION PLAN

4.1.1 Confirmation of suitability of areas for artificial hollow installation

Within 12 months of the approval of the Revised Proposal and prior to any associated clearing, Worsley will work with appropriate stakeholders including the BOAG and other third parties to determine suitable areas for placement of the artificial hollows. This will be undertaken in accordance with the criteria set out in Section 3.1 above.

4.1.2 Provision of Suitable Tenure – Legally securing the Offset Area

Application for suitable protection measures to ensure protection of the offset for the life of the impact (e.g. conservation covenant including appropriate survey and delineation of the area for conservation (registered as an encumbrance against the property) and potentially future subdivision of 1719/866. 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 will be confirmed following confirmation under section 4.1.1.

4.1.3 Installation

Installation of the expected quantum of artificial hollows will occur prior to the commencement of mining activities. Any further installation of required hollows will be installed one year prior to breeding tree removal.

The artificial hollows will be installed following suitable guidelines (such as DPaW 2015b) by appropriately trained personnel. Suitable locations will be identified, and land tenure secured prior to installation. Installation of the first round of artificial hollows (minimum 50) will occur prior to the first breeding season after approval for the revised Proposal is received.

4.1.4 Monitoring and Reporting

Monitoring and management of artificial hollows will commence immediately (within 12 months of installation) and will persist for a minimum of 30 years.

Monitoring of the installed hollows will be undertaken during the breeding season to determine the use of the hollows and will be conducted in general accordance with Department of Parks and Wildlife (now DBCA) guidelines (DPaW 2015c). Monitoring also allows for review and ongoing improvement or maintenance required to deliver the conservation benefit. Monitoring activities will include:

- Each artificial nesting hollow will be inspected at least twice per year and four weeks apart during the breeding season to determine use.
- Use of camera traps on selected hollows to determine interest from cockatoo species.
- Inspection for pest species (e.g. feral bees),
- Inspection of each hollow to determine any maintenance requirements. Maintenance will be undertaken outside of the breeding season.

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

- Use of artificial hollows
- Breeding success if hollow is being used;
- Presence of pest species (eg feral bees) and removal if required.
- Integrity of artificial hollows and any maintenance required.

Each installed hollow will be individually identified and the following information collected and maintained;

- GPS location of the hollow
- Permanent photographic point set up to observe hollow with GPS location recorded

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

An outline of expectations for development of KPI's and completion criteria will be further discussed with regulators and advisory bodies in accordance with the BOP. It is expected that, as the goal for this offset will be the utilisation of the artificial hollows by breeding pairs of black cockatoos, that this will be the key performance indicator.

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 DAWE) to ensure they are consistent with expected outcomes.

- Artificial breeding hollows are used within nine years of establishment.
- Artificial hollows are maintained to appropriate standard for the life of the proposal.
- Artificial hollows remain pest free for the life of the proposal.

- Secured land tenure is provided for areas containing artificial hollows to prevent further clearing or removal of hollows.

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.

Should monitoring indicate that installed artificial hollows are not being used by black cockatoos, then adaptive management strategies such as relocation of hollows, deploying additional hollows or utilising an alternative design will be instigated in consultation with BOAG. These will be set out in the Worsley Alumina Black Cockatoo Artificial Hollow Plan and the OIP.

Should additional suitable breeding hollows be identified during pre-clearance surveys, additional hollows will be installed at a ratio of at least 3:1 in areas determined appropriate as outlined above.

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). In addition clearing in accordance with the allowance provided by this offset will be reported in the Annual Plan of Bauxite Mining Operations (10 Year Plan).

6 STAGING

6.1 REQUIREMENT FOR STAGING

This offset provides for the loss of up to 65 black cockatoo breeding hollows. Provision of the offset will occur on a staged implementation over five year periods.

The number of hollows installed per stage will be dependent on the number of hollows expected to be cleared in a five year period with the corresponding number of artificial hollows to be installed prior to the clearing commencing.

For example, if 20 hollows were to be cleared in the first five years of implementation of the Revised Proposal then a minimum of 60 artificial hollows will be installed prior to that 5 year period.

If Worsley Alumina is able to secure access for the installation of hollows in advance, then the entire offset will be provided in advance of initial clearing. This will, however, be dependant on securing access to suitable areas and sourcing the artificial hollows.

7 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.

8 DEFINITIONS, TERMS AND ABBREVIATIONS

Term	Description
AER	Annual environmental report
BOAG	Biodiversity Offset Advisory Group
BOP	Biodiversity Offset Plan
DAWE	Department of Agriculture, Water and the Environment
DBCA	Department of Biodiversity, Conservation and Attractions
DPaW	Department of Parks and Wildlife (now DBCA)
DWER	Department of Water and Environmental Regulation
ERD	Environmental Review Document
OIP	Offset Implementation Plan
SRI	Significant Residual Impact

9 REFERENCES

Birdlife Australia 2017	Birdlife Australia (2017). <i>Cocky Notes</i> 24. Issue 24: Summer 2016-2017. Perth, Western Australia. Available: http://birdswa.com.au/Cockatoos/Cocky Notes/Cocky%20Notes%2024%20-%20Jan%202017.pdf .
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DBCA 2017	Department of Biodiversity, Conservation and Attractions (DBCA) (2017). <i>Fauna Profile - Baudin's Cockatoo</i> <i>Calyptorhynchus baudinii</i> . Available: https://www.dpaw.wa.gov.au/images/documents/plants-animals/animals/animal_profiles/audins_cockatoo_fauna_profile.pdf .
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GHD 2018	<i>Talison Greenbushes Mine Expansion Offset Proposal</i> . Report prepared for Talison Lithium Australia Pty Ltd. GHD 2018
Groom 2010	Groom, C. (2010). <i>Artificial Hollows for Carnaby's Black Cockatoo: An Investigation of the Placement, Use, Monitoring and Maintenance Requirements of Artificial Hollows for Carnaby's Black Cockatoo</i> . Western Australia: Department of Environment and Conservation.
Newmont 2014	Newmont Boddington Gold, Black Cockatoo Management Plan, Newmont Boddington gold Pty Ltd 2014, (NBG Black Cockatoo Management Plan (nbgcdn.com))

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Phoenix 2021	Phoenix Environmental Sciences (Phoenix) (2021). <i>Black Cockatoo Breeding Habitat Assessment for the Worsley Mine Expansion Project</i> . Report prepared for South32 Ltd.
Talison 2018	Appendix L - Talison Greenbushes Mine Expansion Offset Proposal, Talison Lithium Pty Ltd Environmental review Document 2018. (Appendix L - Talison Offset Proposal 2018.pdf (epa.wa.gov.au))

10 DOCUMENT CONTROL

Reviewer Circulation

Role	Name	Endorsed	Date
Vice President Operations			

Approval Circulation

Role	Name	Approved	Date
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