YALYALUP
Mineral Sands Project

LAND ACQUISITION OFFSET STRATEGY

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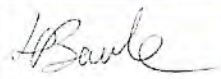
Damon Bourke	ABEC Environmental Consulting Pty Ltd Principal Environmental Scientist	Author		13/9/21
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DECLARATION OF ACCURACY

I declare that:

1. To the best of my knowledge, all the information contained in, or accompanying this Land Acquisition Offset Strategy is complete, current and correct.
2. I am duly authorised to sign this declaration on behalf of the approval holder.
3. I am aware that:
    a. Section 490 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) makes it an offence for an approval holder to provide information in response to an approval condition where the person is reckless as to whether the information is false or misleading.
    b. Section 491 of the EPBC Act makes it an offence for a person to provide information or documents to specified persons who are known by the person to be performing a duty of carrying out a function under the EPBC Act or the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth) where the person knows the information or document is false or misleading.
    c. The above offences are punishable on conviction by imprisonment, a fine or both.

Signed: 

Full Name: Craig Bovell

Organisation: Doral Mineral Sands Pty Ltd

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1. INTRODUCTION

1.1. BACKGROUND

Doral Mineral Sands Pty Ltd (Doral) proposes to extract ore from the Yalyalup Mineral Sands Deposit (i.e. the Proposal), located ~11km southeast of Busselton, WA (Figure 1). This includes dunal heavy mineral accumulation and two heavy mineral bearing strands.

Approximately 12-16 million tonnes (t) of ore will be extracted from the deposit to produce ~600,000t of Heavy Mineral Concentrate (HMC). Ore from the deposit will be mined progressively via a series of open-cut pits using dry mining techniques to a maximum depth of ~10.5m. Dewatering of groundwater inflows into the pit will be required to enable dry mining to occur. Mining will be staged in order to minimise the area of disturbance (at any one time) with the aim of achieving focused and effective management of the environmental factors at each pit location, prior to moving onto the next pit location. The disturbed areas will be progressively rehabilitated in accordance with Doral's Mine Closure Plan. It is anticipated the Mine Closure phase will take up to 5 years, post mining.

The Proposal requires disturbance of ~451.33ha, comprising predominantly cleared pasture (~448.61ha) and degraded native vegetation (~2.72ha) within a Development Envelope of 924.84ha. The Proposal has an anticipated life of mine of 4 to 5years.

This Offset Strategy has been prepared to meet Ministerial Statement No. 1168 Condition 11, and to support environmental assessment of the Proposal impacts by the Commonwealth Department of Agriculture, Water and Environment (DAWE) assessment, in respect to the impact mitigation measures implemented and proposed offset measures for significant residual impacts.

1.2. ENVIRONMENTAL APPROVALS

The Proposal was referred to the EPA under section 38 of the EP Act on 26 October 2017. On 3 January 2018 the EPA published its decision to formally assess the Proposal (Assessment No. 2141) under Part IV of the EP Act as a Public Environmental Review, with a four-week public review period for the Environmental Review Document (ERD) (Assessment No: 2141). The Proposal was submitted to EPA and subject to public review from 22 June 2020 to 20 July 2020.

The Proposal was also referred to the Commonwealth DAWE (then DoEE) on 1 November 2017 for consideration under the EPBC Act. On 8 February 2018, DAWE determined that the Proposal is a Controlled Action and requires assessment and decision on approval under the EPBC Act (EPBC Reference: 2017/8094). The Proposal was assessed by accredited assessment under Part IV of the EP Act. The report and recommendations of the Environmental Protection Authority (Report 1695) was published in January 2021. No appeals were received by the Appeals Convenor during the 14-day appeal period. Ministerial Statement No. 1168 was issued on 17 May 2021.

1.3. PURPOSE AND SCOPE

The Offset Strategy has been prepared to meet Ministerial Statement No. 1168, Condition 11 and to further support environmental assessment of the Proposal impacts by DAWE. Condition 11 requires Doral to undertake offsets set out in conditions 11-2 to 11-9 to achieve the objective of counterbalancing the significant residual impact on the following environmental values:

- 0.34ha indirect impact of SCP10b - *Shrublands on southern Swan Coastal Plain Ironstones (Busselton area),* listed as a TEC with threat status of "Critically Endangered" under the BC Act and "Endangered" under the EPBC Act.
- Indirect impact of nine individuals of *Banksia squarrosa* subsp. *Argillacea*, listed as Threatened under the BC Act and Endangered under the EPBC Act.
- 1.78ha direct impact of potential breeding and foraging habitat for the following three species of Black Cockatoos:
    - Carnaby`s Black-Cockatoo *Zanda latirostris* – listed as Endangered under the *BC Act* and *EPBC Act*.
    - Baudin's Black-Cockatoo *Zanda baudinii* – listed as Endangered under the *BC Act* and *EPBC Act.*
    - Forest Red-tailed Black-Cockatoo *Calyptorhynchus banksii naso* – listed as Vulnerable under the *BC Act* and *EPBC Act.*

1.4. CONDITION REQUIREMENTS

This Land Acquisition Offset Strategy has been prepared to satisfy Ministerial Statement No. 1168 Condition 11 and support the assessment of the Proposal by DAWE in relation to the MNES being impacted. All Conditions relating to the Ministerial Statement are provided in Table 1.

TABLE1: CONDITION REQUIREMENTS

NO	CONDITION	OUTCOME/OBJECTIVE	RELEVANT SECTION
11-1	The proposal shall limit proposal impacts to no more than: (1) 0.34 ha indirect impact of Shrublands on southern Swan Coastal Plain ironstones (Busselton area) Threatened Ecological Community; (2) indirect impact of nine individuals of *Banksia squarrosa* subsp. *argillacea*; and (3) 1.78 ha direct impact of potential breeding and foraging habitat for forest red-tailed black cockatoo (Calyptorhynchus banksii naso), Baudin's cockatoo (*Zanda baudinii*) and Carnaby's cockatoo (*Zanda latirostris*) as a result of the implementation of the proposal, and undertake offsets set out in conditions 11-2 to 11-9 to achieve the objective of counterbalancing the significant residual impact on the abovementioned environmental values.	Avoid where possible or otherwise minimise impacts to conservation significant flora and fauna. Land acquisition and protection of 2.58ha excellent quality Shrublands on southern Swan Coastal Plain ironstones (Busselton area) (SCP10b) Threatened Ecological Community including 15 individual plants of *Banksia squarrosa* subsp. *argillacea* within total offset of ~8.3ha. Land Acquisition, enhancement and protection of 4.15ha of potential breeding and foraging habitat for forest	Section 4 environmental offset strategy Section 5 proposed environmental offset packages

NO	CONDITION	OUTCOME/OBJECTIVE	RELEVANT SECTION
		red-tailed black cockatoo (Calyptorhynchus banksii naso), Baudin's cockatoo (*Zanda baudinii*) and Carnaby's cockatoo (*Zanda latirostris*)	
11-2	Prior to ground disturbing activities or clearing of vegetation and within six (6) months of the publication of this Statement, the proponent shall prepare and submit the Yalyalup Mineral Sands Project Land Acquisition Offset Strategy to the requirements of the CEO.	Prepare and submit a Land Acquisition Offset strategy to the requirements of the CEO prior to ground disturbing activities or clearing of vegetation and within 6 months of the publication of Ministerial Statement 1168 (17 November 2021).	Section 5.1.3 Table 5 Section 5.2.3 Table 7
11-3	The Yalyalup Mineral Sands Project Land Acquisition Offset Strategy shall: (1) demonstrate that the outcome in condition 11-1 will be met; (2) be prepared on advice of the Department of Agriculture, Water and the Environment and the Department of Biodiversity, Conservation and Attractions; (3) identify an area, or areas, to be acquired which contains the environmental value/s identified in condition 11-1, or similar values of equivalent conservation significance agreed by the CEO; (4) demonstrate how the environmental values within the Proposed Offset Conservation Area counterbalances the significant residual impact to the environmental values identified in condition 11-1 through application of the principles of the WA Environmental Offsets Policy (2011) and completion of the WA Offsets Template, as described in the WA Environmental Offsets Guidelines (2014), and the Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy Assessment Guide (2012), or any subsequent revisions of these documents; (5) identify how the Proposed Offset Conservation Area will be acquired and specify:	Prepare a Land Acquisition and Offsets Strategy and achieve the objective of Condition 11-1	Section 5 Appendix 1-6

NO	CONDITION	OUTCOME/OBJECTIVE	RELEVANT SECTION
	(a) a timeframe and works associated with establishing the Proposed Offset Conservation Area, including a contribution for maintaining the offset for at least twenty (20) years after completion of purchase; and (b) each relevant management body for the on-going management of the Proposed Offset Conservation Area, including its role, and confirmation in writing that the relevant management body accepts responsibility for its role.		
11-4	The proponent: (1) may review and revise the Yalyalup Mineral Sands Project Land Acquisition Offset Strategy; or (2) shall review and revise the Yalyalup Mineral Sands Project Land Acquisition Offset Strategy as and when directed by the CEO by a notice in writing.	Review or revise the Land Acquisition Offsets Strategy as required or as directed.	Section 4
11-5	The proponent shall implement the latest revision of the Yalyalup Mineral Sands Project Land Acquisition Offset Strategy approved by the CEO.	Implement the latest revision of the Land Acquisition Offsets Strategy as approved by the CEO.	Section 4
11-6	The proponent shall report to the CEO on the outcomes of the actions, objectives, and targets in the Yalyalup Mineral Sands Project Land Acquisition Offset Strategy within sixty (60) days of completion of those outcomes.	Report on the outcomes of actions, objectives, and targets in the Land Acquisition Offsets Strategy to the CEO within 60 days of completion.	Section 6
11-7	The proponent shall continue to implement the Yalyalup Mineral Sands Project Land Acquisition Offset Strategy until the CEO has confirmed by notice in writing that the proponent has demonstrated that the outcome in condition 11-1 has been met.	Land Acquisition Offsets Strategy to be implemented until notified by the CEO that the outcome of Condition 11-1 has been met	Section 4
11-8	Should the actions, objectives, or targets in Yalyalup Mineral Sands Project Land Acquisition Offset Strategy be unable to be met, the proponent shall notify the CEO within seven (7) days of it being identified and provide details	Notify the CEO within 7 days of identifying the inability to meet actions, objectives or targets of the Land Acquisition Offsets strategy and include details and timing of	Section 6

NO	CONDITION	OUTCOME/OBJECTIVE	RELEVANT SECTION
	and timing of contingency actions to be undertaken, to the satisfaction of the CEO.	contingency actions to be undertaken	
11-9	The proponent shall report to the CEO on the outcomes of the contingency actions as required by condition 11-8 within sixty (60) days of completion.	Report to the CEO on the contingency actions of the inability to meet actions, objectives or targets of the Land Acquisition Offsets strategy within 60 days	Section 6

2. OFFSET FRAMEWORK

2.1. REGULATORY FRAMEWORK

Consideration of environmental offsets is required by both the WA State Government and Australian Government to ensure a Proposal results in net environmental benefit. Where a Proposal is being assessed in parallel under the EP Act and the EPBC Act, agencies will endeavour to align offset requirements

2.2. POLICY FRAMEWORK

Where a significant residual environmental impact has been identified, both the WA Government and the Australian Government have policies regarding offsets. These are:

- *WA Environmental Offsets Policy, September 2011* (Government of Western Australia, 2011)*;*
- *WA Environmental Offsets Guidelines* (Government of Western Australia, 2014)*;*
- *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy Oct 2012* (DSEWPaC, 2012a).

2.2.1. EPA OFFSETS POLICY

Offsets are used to compensate for residual environmental impacts and are designed to achieve long-term outcomes, building on existing conservation programs and initiatives. Where a significant residual environmental impact has been identified, the WA Environmental Offsets Policy (Government of Western Australia, 2011) (Offsets Policy) seeks to ensure that environmental offsets are applied in a transparent manner to engender certainty and predictability, while acknowledging that there are some environmental values that are not readily replaceable (Government of Western Australia, 2011).

When considering proposed environmental offsets, the EPA is guided by the following principles as outlined in the Offsets Policy (Government of Western Australia, 2011):

- Environmental offsets will only be considered after avoidance and mitigation options have been pursued;
- Environmental offsets are not appropriate for all projects;
- Environmental offsets will be cost-effective, as well as relevant and proportionate to the significance of the environmental value being impacted;
- Environmental offsets will be based on sound environmental information and knowledge
- Environmental offsets will be applied within a framework of adaptive management
- Environmental offsets will be focussed on longer term strategic outcomes.

2.2.2. WA ENVIRONMENTAL OFFSETS GUIDELINES

The WA Government Environmental Offsets Guidelines (Government of Western Australia, 2014) (Offset Guidelines) are intended to complement the Offsets Policy by clarifying the determination and application of environmental offsets in Western Australia (Government of Western Australia, 2014). The Offsets Guidelines outline the methodology for determining an appropriate offset by identifying the key elements that should be considered to ensure that decisions made on environmental offsets are consistent and accountable under the EP Act.

The Offset Guidelines outline the framework for consideration of offsets required under the environmental approvals process, including demonstrated application of the mitigation measures and assessment of the residual impacts in relation to relevant EPA environmental factors (Government of Western Australia, 2014). The provision of offsets is the final mitigation option available to help manage significant adverse impacts.

2.2.3. AUSTRALIAN GOVERNMENT POLICY

The Environmental Offsets Policy (EPBC Act Policy) (DSEWPaC, 2012a) defines two types of offsets:

- Direct offsets: measures that have on-ground, tangible benefits that improve the viability of the protected matter.
- Other compensatory measures: any other measure that contributes to the overall conservation outcome of the protected matter.

Principles guiding the EPBC Act Policy are that offsets:

1. Deliver and overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed action.
2. Be built around direct offsets but may include other compensatory measures
3. Be in proportion to the level of statutory protection that applies to the protected matter
4. Be of a size and scale proportionate to the impacts being offset.
5. Effectively account for and manage the risks of the offset not succeeding
6. Be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs (this does not preclude the recognition of state or territory offsets that may be suitable as offsets under the EPBC Act for the same action).
7. Be efficient, effective, timely, transparent, scientifically robust and reasonable.
8. Have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.

Australian Government policy specifies direct offsets should make up at least 90% of the required offset package (DSEWPaC, 2012a). However, deviation from this 90% will be considered where it can be demonstrated that there will likely be a greater benefit to the protected matter through increasing the proportion of indirect offsets or where scientific uncertainty is so high that it is not possible to determine a direct offset likely to benefit the protected matter.

3. RESIDUAL IMPACTS

This section summarises the impact assessment and mitigation measures relevant to the assessment of offsets (additional detail has been provided in the ERD). Significant residual impacts on environmental values require the implementation of an environmental offset to compensate for those impacts and to achieve a net environmental benefit. The following section summarises the significant residual environmental impacts of the Proposal resulting from unavoidable requirements of the Proposal.

3.1. DIRECT IMPACTS

3.1.1. FLORA AND VEGETATION

No direct impacts to conservation significant flora and/or vegetation will occur as a result of implementing the Proposal

3.1.2. FAUNA HABITAT

The Proposal will require clearing of 1.78ha (102 trees) of Black Cockatoo potential breeding (i.e. DBH ≥50cm and DBH ≥30cm for wandoo) and foraging habitat present as isolated scattered paddock trees, from a total of 1,053 present within the 924.84ha Development Envelope. Of these 102 trees, only 5 contain one or more hollows possibly suitable for use by a Black Cockatoo. These 5 trees were subject to an additional assessment by (Harewood, 2020b) to determine suitability and to aid in identifying any signs of current or previous use by Black Cockatoos. None of the hollows showed any conclusive evidence of actual use by nesting Black Cockatoos. Black Cockatoo trees to be cleared are shown in Figures 2 and 2A-2D.

3.2. INDIRECT IMPACTS

3.2.1. FLORA AND VEGETATION

An assessment of groundwater drawdown impacts on groundwater dependent vegetation within the Proposal area was conducted by (Ecoedge, 2020c). This assessment indicated it is likely that predicted water drawdowns for the central and northern part of GDE Area B (see Figure 3) will be moderate to severe (Ecoedge, 2020c). However, following implementation of the GDE Management Plan, indirect impacts to this area are anticipated to be limited to the following flora and vegetation community:

- SCP10b - *Shrublands on southern Swan Coastal Plain Ironstones (Busselton area) (Gibson, et al., 2000);* (Meissner & English, 2005). This vegetation unit (B1) was described by (Ecoedge, 2020a) as Tall shrubland of *Acacia saligna*, *Banksia squarrosa* subsp. *argillacea*, *Calothamnus quadrifidus* subsp. *teretifolius*, *Hakea oldfieldii* and *Kunzea micrantha* (with scattered emergent *Eucalyptus rudis*) over scattered native herbs including *Drosera glanduligera* and *Sowerbaea laxiflora*, the sedge *Loxocarya magna*, and weeds on shallow red sandy clay on massive ironstone.

Indirect impacts from groundwater drawdowns to SCP10b *Shrublands on southern Swan Coastal Plain Ironstones (Busselton area) (Gibson, et al., 2000);* (Meissner & English, 2005) (B1), is predicted to be low-moderate, with the impact likely to be higher at the northern end. Maximum predicted drawdowns in the ironstone shrubland are predicted to be 1-1.5m in Q3 and Q4, 2024 (Figures 4 and 5). Most of the shrubs growing in this ironstone community are relatively large and old, including nine Threatened *Banksia squarrosa* subsp. *argillacea*. As such they are likely to have roots that have found their way through fractures in the ironstone to access groundwater as it retreats in late summer and autumn. There is a moderate

probability that stress within shrubs growing in the ironstone vegetation will increase, and potentially some deaths will occur if drawdowns are greater than 1m.

The area of this vegetation unit likely to be moderately impacted is 0.34ha and includes nine Threatened *Banksia squarrosa* subsp. *argillacea*.

3.2.2. FAUNA HABITAT

SCP02 – Southern Wet Shrublands, an identified GDE (Ecoedge, 2020c) within the northern portion of McGibbon Track (vegetation unit A2), is known to contain conservation significant WRP habitat and 30 co-located Black Cockatoo potential breeding habitat trees (i.e. DBH $\geq$50cm or DBH $\geq$30cm for wandoo). As such groundwater drawdowns of this vegetation will potentially indirectly impact 1.81ha of WRP habitat and 30 co-located Black Cockatoo potential breeding habitat trees. WRP habitat (and co-located Black Cockatoo trees) are shown in Figure 6.

3.3. MITIGATION MEASURES

In accordance with the hierarchy of on-site mitigation measures presented in the Offset Guidelines, the Proposal includes mitigation measures to avoid, minimise and rectify impacts prior to the application of environmental offsets. The mitigation measures for each residual impact are described in Table 2.

TABLE 2: SUMMARY OF MITIGATION MEASURES AND RESIDUAL IMPACTS

ENVIRONMENTAL VALUE	APPLICABLE LEGISLATION	IMPACT MITIGATION			SIGNIFICANT RESIDUAL IMPACT
		AVOID	MINIMISE	REHABILITATE	
Black Cockatoo potential breeding and foraging habitat	*Biodiversity Conservation Act 2016* *EPBC listed species and communities (s18 and 18A)*	Doral has avoided clearing 951 of the 1,053 Black Cockatoo potential breeding habitat trees present within the Development Envelope, (~90%).	Pre-clearing survey using the "Great Cocky Count" methods (Peck, et al., 2018) will be undertaken prior to clearing any Black Cockatoo potential breeding habitat tree containing a possibly suitable hollow. This will be conducted in accordance with the Fauna Environmental Management Plan.	Revegetation of 4.7ha of native vegetation along and adjacent to McGibbon Track, with local native species including species suitable for WRP and Black Cockatoos as per *DMS-YAL-6.1 Yalyalup Mineral Sands Project Revegetation Management Plan* (Cape Life, 2021).	102 trees (1.78ha) (direct impact)
WRP Habitat	*Biodiversity Conservation Act 2016* EPBC listed species and communities (s18 and 18A)	The Proposal has been designed to avoid clearing of WRP habitat, present as SCP02 along McGibbon Track as far as practicable by maximising the use of existing cleared areas and refinements of the mine pit boundary. This has resulted in the avoidance of all direct impacts to WRP habitat (SCP02) being directly	Primary mitigation measure will be implementation of the GDE Management Plan (AQ2, 2020d), which comprises a combination of hydrological parameters and quantitative and qualitative vegetation measurements, ecophysiological measurements and health	Revegetation of 4.7ha of native vegetation along and adjacent to McGibbon Track, with local native species including species suitable for WRP and Black Cockatoos as per *DMS-YAL-6.1 Yalyalup Mineral Sands Project Revegetation Management Plan* (Cape Life, 2021).	No significant residual impacts are predicted after application of mitigation hierarchy.

ENVIRONMENTAL VALUE	APPLICABLE LEGISLATION	IMPACT MITIGATION			SIGNIFICANT RESIDUAL IMPACT
		AVOID	MINIMISE	REHABILITATE	
		impacted from the Proposal.	assessments using qualitative criteria.		
SCP10b - *Shrublands on southern Swan Coastal Plain Ironstones (Busselton area)*	*Biodiversity Conservation Act 2016* *EPBC listed species and communities (s18 and 18A)*	The Proposal has been successfully designed to avoid any clearing of SCP10b.	Primary mitigation measure will be implementation of the GDE Management Plan (AQ2, 2020d), which comprises a combination of hydrological parameters and quantitative and qualitative vegetation measurements, ecophysiological measurements and health assessments using qualitative criteria.	Revegetation of 4.7ha of native vegetation along and adjacent to McGibbon Track, with local native species as per *DMS-YAL-6.1 Yalyalup Mineral Sands Project Revegetation Management Plan* (Cape Life, 2021).	0.34ha (indirect impact)
Banksia squarrosa subsp. *argillacea*	*Biodiversity Conservation Act 2016* *EPBC listed species and communities (s18 and 18A)*	The Proposal has been successfully designed to avoid clearing *Banksia squarrosa* subsp. *argillacea* present within SCP10b.	Primary mitigation measure will be implementation of the GDE Management Plan (AQ2, 2020d), which comprises a combination of hydrological parameters and quantitative and qualitative vegetation measurements,	Revegetation of 4.7ha of native vegetation along and adjacent to McGibbon Track, with local native species as per *DMS-YAL-6.1 Yalyalup Mineral Sands Project Revegetation Management Plan* (Cape Life, 2021).	Nine individuals (indirect impact)

ENVIRONMENTAL VALUE	APPLICABLE LEGISLATION	IMPACT MITIGATION			SIGNIFICANT RESIDUAL IMPACT
		AVOID	MINIMISE	REHABILITATE	
			ecophysiological measurements and health assessments using qualitative criteria.		

3.4. SUMMARY OF SIGNIFICANT RESIDUAL IMPACTS

The significant residual environmental impacts of the Proposal, after consideration of other mitigation measures to be applied, are expected to be:

- Loss of 1.78ha (102) Black Cockatoo potential breeding and foraging habitat, present as isolated scattered paddock trees.
- Potential loss of up to 0.34ha of SWAFCT10b - *Shrublands on southern Swan Coastal Plain Ironstones (Busselton area)* from indirect dewatering*;*
- Potential loss of nine *Banksia squarrosa* subsp. *Argillacea* (present within SCP10b) from indirect dewatering*.*

Doral has successfully designed the Proposal to avoid clearing of native vegetation as far as practicable by maximising the use of existing cleared areas. This has resulted in all but <1% of the disturbance area being located on cleared pasture. All conservation significant flora and vegetation (and associated fauna habitat) along McGibbon Track has been successfully avoided from direct clearing impacts.

Indirect impacts to flora, vegetation and fauna habitat are also expected to be minimised through the implementation of the GDE Management Plan (AQ2, 2020d) and Revegetation Management Plan (Cape Life, 2021). Uncertainty however exists around the actual extent of indirect impacts associated with groundwater drawdowns to 1.81ha of WRP habitat (present within SCP02). However as required by Ministerial Statement No. 1168 Condition 12 Offsets – Western Ringtail Possum Habitat, if after receiving the Groundwater Dependent Ecosystem Performance Report required by Condition 10-4, an additional significant residual impact to WRP habitat on McGibbon Track has occurred as a result of dewatering, the proponent must undertake an additional offset to counterbalance the significant residual impact to WRP habitat.

These key mitigation measures together with the offsets package to be negotiated and secured (as discussed in the following sections), Doral believes that there would be a 'net environmental benefit' resulting from implementation of the Proposal, in accordance with EPA goals.

4. ENVIRONMENTAL OFFSET STRATEGY

This offset strategy has been developed following consultation with EPA, DBCA and DAWE based on the principles set out in the Offset Guidelines (Government of Western Australia, 2014) and EPBC Act Offset Policy (DSEWPaC, 2012a). Consultation has included meetings, telephone conversations and site visits to the Proposal site and proposed offset sites.

Doral intend to use land acquisition as its primary method for providing a direct offset for the Proposal. The offset package (summarised in Table 3 and detailed in Section 5) focuses on the significant residual impacts identified in Section 3.

The quality value of vegetation and fauna habitat to be impacted and the proposed offset has been determined using the DAWE document *How to use the offsets assessment guide* (DSEWPaC, 2012b) and the associated *EPBC Act Environmental Offsets Policy (DSEWPaC, 2012a),* which requires three elements of quality to be assessed and their relative importance for each MNES to be determined.

Doral believes that there will be a 'net environmental benefit' resulting from implementation of the Proposal, in accordance with EPA goals. This is considered sufficient to limit application of a presumption of unacceptability of the Proposal.

Doral will review or revise this Land Acquisition Offsets Strategy as required or as directed and implement the latest revision of the Land Acquisition Offsets Strategy as approved by the CEO.

Doral shall continue to implement the Yalyalup Mineral Sands Project Land Acquisition Offset Strategy until the CEO has confirmed by notice in writing that the proponent has demonstrated that the outcome in condition 11-1 has been met.

TABLE 3: OFFSET ASSESSMENT

Existing environment/ Impact	*Mitigation*			*Significant Residual Impact*	*Offset Calculation Methodology*				
	Avoid and minimise	*Rehabilitation Type*	*Likely Rehab Success*		*Type*	*Risk*	*Likely Offset Success*	*Time Log*	*Offset Quantification*
Direct impact from clearing 102 Black Cockatoo potential habitat trees, present as isolated scattered paddock trees. In consultation with DAWE, the canopy area of Black Cockatoo potential breeding habitat has been calculated as 1.78ha to assist in determining suitable offsets.	**Avoid** - The proposal has been designed as far as practicable to utilise existing cleared pasture rather than clearing native vegetation. This has resulted in the avoidance of 951 of the total 1.053 Black Cockatoo potential breeding habitat trees within the Development Envelope. **Minimise**- The following plans and strategy will be prepared and implemented to minimise impacts to flora and vegetation values: 1. A Flora and Vegetation Management Plan 2. GDE Management Plan 3.Fauna Management Plan 4. Dust Management Plan 5. Fire Management Plan 6.Acid Sulfate Soil Management Plan 7. Groundwater Operating Strategy.	Doral will rehabilitate 4.7ha of native vegetation using local species as per *DMS-YAL-6.1 Yalyalup Mineral Sands Project Revegetation Management Plan* (Cape Life, 2021) to counterbalance direct impacts of the Proposal. Specifically, the revegetation will aim to establish Woodland of *Corymbia calophylla, Eucalyptus marginata* and *Agonis flexuosa* over shrubland.	<u>Can the environmental values be rehabilitated/Evidence?</u> Yes, Black Cockatoo foraging habitat can be established and be self-sustaining within ~10 years). However, potential breeding trees may take up to 60-70 years to be of sufficient diameter. <u>Operator experience in undertaking rehabilitation?</u> Yes, Doral have successfully rehabilitated three Offset areas back to native vegetation in accordance with Department of Agriculture, Water and Environment and DBCA/EPA conditions. <u>What is the type of vegetation being rehabilitated?</u> Woodland of *Corymbia calophylla, Eucalyptus marginata* and *Agonis flexuosa* over shrubland. <u>Time lag?</u> ~10 years for foraging habitat to be established and self-sustaining, however 60-70 years for trees to reach a DBH >50cm <u>Credibility of the rehabilitation proposed (evidence of demonstrated success)</u> Doral have successfully rehabilitated three Offset areas as part of other mine operations. Doral are currently rehabilitating ~9ha of land back to State-Forest.	<u>Extent</u> 102 trees (equivalent to 1.78ha) <u>Quality</u> Isolated scattered paddock trees, with 5 trees containing hollows <u>possibly suitable</u> for a Black Cockatoo to use. No evidence of current or previous use.	Land acquisition	Low – Land to be secured and protected under Conservation Covenant.	High – Black cockatoo potential breeding habitat will be acquired, and protected under Conservation Covenant.	Secures habitat upon agreement - no time delay.	Total Offset area of 4.15ha of land acquisition and protection as outlined in Section 5.2.4. The land acquisition area has been calculated using the DAWE Offset Calculator. Provision of 12 artificial hollows to be erected in offset.
Indirect impacts from dewatering to 0.34ha of SCP10b - Shrublands on	Groundwater drawdown impacts will be avoided and/or minimised by	Rehabilitation back to the same community types is unlikely. Doral will	<u>Can the environmental values be rehabilitated/Evidence?</u>	<u>Extent</u> 0.34ha of SWAFCT10b	Land acquisition	Low – Land to be secured by Doral	High – Values of vegetation communities can be	Secures vegetation community	Total Offset area of ~8.3ha of land

Existing environment/ Impact	*Mitigation*			*Significant Residual Impact*	*Offset Calculation Methodology*				
	Avoid and minimise	*Rehabilitation Type*	*Likely Rehab Success*		*Type*	*Risk*	*Likely Offset Success*	*Time Log*	*Offset Quantification*
southern Swan Coastal Plain Ironstones (Busselton area), including a population of nine *Banksia squarrosa* subsp. *Argillacea.*	implementing the following key actions: -Dewatering will be undertaken in a staged approach; -Passive dewatering with sump pump (i.e. no dewatering spears) will be used to minimise the extent of dewatering cone of depression; -Rapid hydraulic backfill of sand tails which will aid in returning groundwater levels will be conducted; -Provision of reticulation/irrigation to vegetation in accordance with: 1. GDE Management Plan 2. Groundwater Operating Strategy.	however rehabilitate 4.7ha of native vegetation and adjacent to the conservation significant McGibbon Track using local provenance species, including those present in the impacted TECs. Specially, the revegetation will aim to establish Woodland of *Corymbia calophylla,* E*ucalyptus marginata* and *Agonis flexuosa* over shrubland.	Unlikely, given the vegetation to be potentially impacted by dewatering comprises specific substrate requirements. However, the proposed rehabilitation area is adjacent to McGibbon Track and already contains a Degraded form of SCP10b, which if rehabilitated and managed may return environmental values of this SCP10b. <u>Operator experience in undertaking rehabilitation?</u> Doral have successfully rehabilitated three Offsets areas back to native vegetation. <u>What is the type of vegetation being rehabilitated?</u> Woodland of *Corymbia calophylla* and E*ucalyptus marginata* over shrubland. <u>Time lag?</u> 10 years for vegetation to be established and self-sustaining. <u>Credibility of the rehabilitation proposed (evidence of demonstrated success)</u> Doral have successfully rehabilitated three Offset areas as part of other mine operations. Doral are currently rehabilitating ~9ha of land back to State-Forest.	Nine *Banksia squarrosa* subsp. *Argillacea* (Whicher Range banksia) Quality <u>Quality</u> Vegetation has been mapped as Degraded/Good and Good condition.		and granted to DBCA for management by DBCA.	measured.	upon agreement - no time delay	acquisition and protection. The land acquisition area has been calculated using the DAWE Offset Calculator using 2.58ha of the excellent quality portion of the Site. The site contains a total of 4.43ha of vegetation.
Potential indirect impacts from dewatering to 1.81ha of WRP habitat, present as the GDE SWAFCT02. This includes 30 Black cockatoo potential breeding habitat trees.	Groundwater drawdown impacts will be avoided and/or minimised by implementing the following key actions: -Dewatering will be undertaken in a staged approach;	Doral will rehabilitate 4.7ha of native vegetation and WRP habitat using local species to counterbalance the clearing impacts. Specially, the revegetation will aim to establish Woodland of	<u>Can the environmental values be rehabilitated/Evidence?</u> Yes, WRP habitat can be established and be self-sustaining within ~10 years). <u>Operator experience in undertaking rehabilitation?</u>	No significant residual impacts anticipated after implementation of GDE Management Plan and Revegetation Management Plan.	N/A				

Existing environment/ Impact	*Mitigation*			*Significant Residual Impact*	*Offset Calculation Methodology*				
	Avoid and minimise	*Rehabilitation Type*	*Likely Rehab Success*		*Type*	*Risk*	*Likely Offset Success*	*Time Log*	*Offset Quantification*
	-Passive dewatering with sump pump (i.e. no dewatering spears) will be used to minimise the extent of dewatering cone of depression; -Rapid hydraulic backfill of sand tails which will aid in returning groundwater levels will be conducted; -Provision of reticulation/irrigation to vegetation in accordance with: 1. GDE Management Plan 2. Groundwater Operating Strategy. 3.Revegetation Management Plan	*Corymbia calophylla,* E*ucalyptus marginata* and *Agonis flexuosa* over shrubland.	Doral have successfully rehabilitated three Offset areas back to native vegetation in accordance with Department of Agriculture, Water and the Environment and DBCA/EPA conditions. What is the type of vegetation being rehabilitated? Woodland of *Corymbia calophylla,* E*ucalyptus marginata* and *Agonis flexuosa* over shrubland. Time lag? ~10 years for WRP habitat to be established and self-sustaining. Credibility of the rehabilitation proposed (evidence of demonstrated success) Doral have successfully rehabilitated three Offset areas as part of other mine operations. Doral are currently rehabilitating ~9ha of land back to State-Forest.					

5. PROPOSED ENVIRONMENTAL OFFSET PACKAGES

In order to compensate the significant residual impacts of the Proposal, Doral is proposing an Offset which comprises three separate components.

5.1. OFFSET COMPONENT 1 - VEGETATION

Table 4 provides the objectives and description of Offset Component 1 – acquisition of a Site containing conservation significant flora and vegetation within the Southwest of WA to be purchased by Doral and transferred to DBCA for management. The proposed Offset Site is located at Lot 2 Jindong-Treeton Road and includes 4.43ha of SCP10b - *Shrublands on southern Swan Coastal Plain Ironstones (Busselton area)* (Gibson, et al., 2000) and a population of 15 *Banksia squarrosa* subsp. *Argillacea* (Figure 7). The total site area of the offset to be acquired is ~8.3ha.

To demonstrate the offset will meet the required minimum direct offset (90%) for the MNES to impacted (i.e. SCP10b), Doral have calculated the offset quantum based on the flora and vegetation survey of the proposed Offset Site conducted by DBCA (Appendix 1). Specifically, Doral has based the calculations on Remnant Area 4 of the proposed Offset Site, which is mapped as being in Very Good to Excellent condition and includes 15 *Banksia squarrosa* subsp. *Argillacea.* As such, the calculation of the offset is based on 2.58ha, has a start quality of 8, a future quality without offset of 7 and a future quality with the offset of 8. Further justification of the values used are provided in Appendix 2, with the DAWE Offset Calculator provided as Appendix 3.

TABLE 4: PROTECTION AND ENHANCEMENT OF TEC AND THREATENED FLORA

OBJECTIVE	DESCRIPTION
Protection of TEC and Threatened Flora	Acquisition of this land and implementation of rehabilitation measures will: • Protect one of five remaining freehold remnants of SWAFCT10b in the Southwest; • Protect at least 15 Threatened *Banksia squarrosa* subsp. *Argillacea;* • Protect other Threatened and Priority flora species present in the Offset Site; • Improve the linkage, size and condition of the vegetation community through implementation of management programs such as weed control and fencing to remove feral/pest animals.

Conservation of native vegetation containing high biodiversity values is consistent with the definition of a direct offset in accordance with the Offsets Policy (Government of Western Australia, 2011) and the EPBC Environmental Offsets Policy (DSEWPaC, 2012a). The proposed offset is expected to result in the protection, enhancement and management of additional land currently at risk of loss in its current form.

The proposed Offset Site is of high conservation value as it is only one of only five remnants of the Busselton Ironstone (SCP10b) that is not under conservation management. The Offsite Site is currently privately owned land, without any formal mechanism of bushland protection. As such, ceding of the land to the State for conservation purposes will prevent potential clearing activities at the Site, as well as provide active management of current threats from kangaroos grazing and weeds. The long-term security and conservation of the Offset Site will be ensured as the Site is to be vested with DBCA and managed for conservation.

The Site is continuous with other DBCA managed land, that also contains SCP10b. DBCA considers that with conservation purchase, the condition and linkage of remnant areas 1, 2, 3, 4 and 6 is expected to improve and increase in size. Fencing to exclude kangaroos is considered fundamental to maximising the survival of natural regeneration which is occurring at the Site. The pastured extent of the Site combined with kangaroo exclusion would provide additional scope for future ironstone revegetation planting and Threatened flora translocation. The majority of the Site is not seasonally inundated and as such would also allow for all year access which would greatly assist with weed management and revegetation activities. DBCA considers it is likely that this location could be a valuable future translocation Site for ironstone taxa.

Implementation of the land acquisition process will commence immediately following approval of this *Land Acquisition Offset Strategy* by EPA and DAWE, which would provide the Offset prior to ground disturbing activities or clearing of vegetation, as required by MS1168 Condition 11-2.

5.1.1. LAND PURCHASE AND FINANCIAL ARRANGEMENTS

Doral has consulted with DBCA since early 2020 to identify and secure a suitable offset and have entered into a funding agreement in June 2021 with DBCA and the landowner to acquire and transfer to the State, the portion of the Site that contains the conservation significant flora and vegetation. Evidence of the agreement is provided as Appendix 4.

5.1.2. LAND TRANSFER AND MANAGEMENT

Doral, in consultation with DBCA, will arrange for the purchased land parcel/area to be incorporated into the conservation estate, including:

- Transfer of land tenure from freehold to the conservation estate, as required under the *Land Administration Act 1997* and *Conservation and Land Management Act 1984;*
- Updating of Government databases to incorporate the land parcel(s), including the SLIP database;
- Updating of Government management plans to incorporate the land parcels.

5.1.3. TIMEFRAMES AND WORKS TO ESTABLISH OFFSET CONSERVATION AREA

The following table provides a summary of the proposed works and timeframes to establish and maintain the conservation reserve.

TABLE 5: TIMEFRAMES AND WORKS TO ESTABLISH AND MAINTAIN OFFSET CONSERVATION AREA

ITEM/WORKS	DESCRIPTION	TIMING
Formal agreement to secure Site for Offset	Agreement between Doral, DBCA and landowner to formally secure offset site	June/July 2021
Approval of Offset Strategy (MS1168 Condition 11)	Approval of the Yalyalup Mineral Sands Project Land Acquisition	Prior to ground disturbing activities
Transfer of Site to DBCA ownership	Offset parcel area agreed and purchase agreement documented and signed with Landowner Formal subdivision and Land transfer of Site to DBCA for ongoing conservation purposes	August 2021 October 2021

ITEM/WORKS	DESCRIPTION	TIMING
Exclusion fencing	Doral to erect kangaroo proof fencing around offset Site	Oct/Nov 2021
Annual maintenance	Doral to provide ongoing assistance to DBCA to maintain the land for a period of 20 years.	Annually
On-going Offset Management	DBCA to undertake the necessary on-going management of the Offset Site by protecting and continuing to enhance the quality of conservation significant flora and vegetation	As required

5.2. OFFSET COMPONENT 2 – FAUNA HABITAT

Table 6 provides the objectives and description of Offset Component 2 – acquisition of a Site containing Black Cockatoo potential breeding and foraging habitat within the Southwest of WA to be placed under Conservation Covenant for conservation purposes. The proposed Offset Site, owned by Doral, is located at Lot 348 Boyanup Road West, Stratham and includes 8.4ha of Black Cockatoo potential breeding and foraging habitat (Figure 8). The remaining ~32.1ha area of Lot 348 contains grassland of weeds, scattered trees and groves of trees. The entire Lot is currently used for livestock grazing and hay production.

To demonstrate the proposed area of offset will meet the required minimum direct offset (100%) for the MNES to be impacted (i.e. Black Cockatoo foraging and breeding habitat), Doral have calculated the offset quantum based on the findings of the Black Cockatoo Habitat Assessment (Harewood, 2021) conducted for the proposed Offset Site (Appendix 5). As such, the calculation of the offset is based on a total offset area of 4.15ha, has a start quality of 4, a future quality without offset of 3 and a future quality with offset of 5. Further justification of the values used are provided in Appendix 2, with the DAWE Offset Calculator provided as Appendix 3 for each of the three Black Cockatoo species. Of the 4.15ha offset site, approximately 0.67ha is generally void of vegetation. Doral will commit to revegetation of these areas (see Figure 8) with Eucalypt species suitable for Black Cockatoo use at a rate of 100 trees per ha (i.e. 67 trees), with a 75% survival. Doral will also commit to installing a total of 10 artificial hollows, to offset the impact of clearing 5 hollows, considered possibly suitable for use (although no evidence of current use has been identified to date). A description of the revegetation activities and completion criteria is included as Appendix 6.

The offset aims to compensate for the loss of potential breeding habitat trees and foraging habitat for Black Cockatoo species. The Offset Site is ~40km from the Proposal (disturbance area).

TABLE 6: PROTECTION OF NATIVE VEGETATION COMPRISING BLACK COCKATOO HABITAT IN SURROUNDING LAND

OBJECTIVE	DESCRIPTION
Protection and enhancement of potential breeding and foraging habitat for Black Cockatoo species.	Acquisition of this land and implementation of rehabilitation measures will: • Protect habitat known to be used for foraging by all three species of Black Cockatoos; • Protect habitat potentially used for breeding by all three species of Black Cockatoos;

OBJECTIVE	DESCRIPTION
	• Improve condition of habitat through infill planting of black cockatoo species and management activities such as feral and pest animal management, weed control and infill planting. • Provide 10 artificial Black Cockatoo hollows, to encourage use as breeding habitat.

Conservation of habitat is consistent with the definition of a direct offset in accordance with the Offsets Policy (Government of Western Australia, 2011) and the EPBC Environmental Offsets Policy (DSEWPaC, 2012a). The proposed offset is expected to result in the protection, enhancement and management of additional land currently at risk of loss in its current form. Protection of habitat is also consistent with the principles of the following Recovery Plans:

- *Forest Black Cockatoo (Baudin's Cockatoo Calyptorhynchus baudinii and Forest Red-tailed Black Cockatoo Calyptorhynchus banksii naso) Recovery Plan. Department of Environment and Conservation, Western Australia* (Chapman, 2008).
- *Carnaby's Cockatoo (Calyptorhynchus latirostris) Recovery Plan. Department of Parks and Wildlife, Perth, Western Australia* (DPaW, 2013).

The proposed offset site is currently used for agricultural purposes (grazing and hay production), and is at risk of future clearing and continued degradation through ongoing agricultural activities, if formal protection is not in place. Placement of the land under conservation covenant will provide long term security and prevent further degradation to the offset site, as well as provide for active management of threats including introduced animals, pests (such as kangaroos, which are currently impacting vegetation condition) and weeds, as well as enhancing the current quality of the Site through infill planting in available bare areas and provision of 10 artificial hollows.

Implementation of management actions and placement of the land under Conservation Covenant will commence immediately upon approval of this Land Acquisition Offset Strategy by EPA and DAWE, which would provide the Offset prior to ground disturbing activities or clearing of vegetation, as required by MS1168 Condition 11-2.

5.2.1. LAND PURCHASE AND FINANCIAL ARRANGEMENTS

Doral is the current owner of the proposed offset site and will assume all financial responsibilities to implement the offset detailed in this Plan.

5.2.2. LAND TRANSFER AND MANAGEMENT

Doral will seek to provide long-term protection of the offset site by entering into a conservation covenant with DBCA within one year of approval of this Plan and to be finalised within 4 years.

5.2.3. TIMEFRAMES AND WORKS TO ESTABLISH OFFSET CONSERVATION AREA

The following table provides a summary of the proposed works and timeframes to establish and maintain the conservation reserve.

TABLE 7: TIMEFRAMES AND WORKS TO ESTABLISH AND MAINTAIN OFFSET CONSERVATION AREA

ITEM/WORKS	DESCRIPTION	TIMING
Approval of Offset Strategy (MS1168 Condition 11)	Approval of the Yalyalup Mineral Sands Project Land Acquisition	Prior to ground disturbing activities
Conservation covenant	Register Conservation Covenant for Site with DBCA	December 2021
Exclusion fencing	Doral to erect kangaroo resistant fencing around offset Site	October/November 2021
Weed Control	Bi-annual weed spraying for 3 years	Autumn/Spring
Infill planting	Conduct infill planting in bare areas using species to enhance foraging habitat at the rate of 100 trees per ha at 75% survival.	Autumn 2022/2023
Artificial Hollows	Artificial hollows will be sourced from the Serpentine-Jarrahdale SJ Landcare group (Cockatubes) and installed in the offset site	Autumn 2022/2023
Monitoring	Revegetation monitoring (4 x 5m x 5m quadrats) Visual monitoring (drone) to determine use of artificial hollows and any required maintenance	Annually in Spring Annually
Annual maintenance	Doral to provide ongoing assistance to the land owner to maintain the land for a period of 20 years.	Annually

5.3. EVIDENCE OF CONSULTATION WITH STAKEHOLDERS

Doral has consulted with EPA, DBCA and DAWE to assist with development of the Offset Strategy.

TABLE 6: EVIDENCE OF CONSULTATION

STAKEHOLDER	DATE	DESCRIPTION
DBCA	22/05/20	Discussion and information provided regarding area of impact and offset requirement for Yalyalup project
	09/06/20	Email sent from Doral with first prospective offset site
	09/07/20	Email from DBCA with alternate prospective site with possible Ironstone
	27/07/20	Discussion between Doral and DBCA on known history of land

STAKEHOLDER	DATE	DESCRIPTION
	05/08/20	Following site visit, request from Doral for DBCA assistance to arrange floristic assessment of prospective offset
	05/08/20	DBCA confirmation of contact with land agent
	07/08/20	DBCA conducted site floristic survey of prospective offset
	11/08/20	Floristic survey distributed to DBCA, Doral (Offset Component 1)
	31/08/20	List of 'understandings' provided to DBCA from land agent
	June 2020-June 2021	Ongoing regular (at least monthly) consultation regarding land acquisition process
EPA/DWER	05/08/20	Meeting with Doral to discuss advice received during public comment period that an offset Strategy is required to support Doral's Response to Submissions
	24/08/20	Meeting with EPA, DBCA, Doral to discuss values of potential land and acquisition of Offset Component 1
DAWE	01/09/20	Meeting with DAWE, EPA and Doral to discuss potential land acquisition Offsets and DAWE calculator
	11/09/20	Initial meeting with DAWE and EPA to discuss proposed Yalyalup Offset Management Plan
	30/09/20	Follow up Offsets Management Plan meeting with DAWE and EPA
	18/11/20	Follow up meeting with DAWE to discuss progress on Offsets Management Plan
	16/12/20	Meeting with DAWE to discuss possibility of Stop the clock notice
	26/02/21	Meeting with DAWE, submission of Yalyalup Revegetation management plan, Ironstone offsets progress with DBCA speaking to owner about fence location
	11/03/21	Meeting with DAWE regarding general Yalyalup project, revegetation plan, fencing and ok to send to

STAKEHOLDER	DATE	DESCRIPTION
		DBCA for comment, offsets update, Alex Errington DBCA officer pending retirement
	25/03/21	Meeting with DAWE revegetation plan, Ironstone offsets update presentation of prospective Stratham Black cockatoo site. Discussion of approaching DBCA regarding supply of artificial hollows for more likely DBCA BC breeding projects
	27/04/21	Notification to DAWE that Ironstone block settlement had gone through and discussions with landowner remained positive
	25/06/21	Meeting with DAWE handover from Matt Flux to Karim due to restructure. Offsets Management Plan was submitted following several back and forth sessions of working the DAWE calculator for Stratham Black Cockatoo offset to being satisfactory for submission

5.4. RISK AND CONTINGENCY MEASURES

As stated throughout this document, it is the intention of Doral to provide an offset in a direct manner as far as is reasonably possible and is willing to collaborate with relevant regulatory agencies to enable this.

In the event that, following a process of land identification, evaluation and negotiation, a suitable land parcel(s) comprising Offset Components 1 and 2 has not been acquired within a timeframe of three months prior to commencement of clearing Black Cockatoo trees and/or dewatering of SCP10b, Doral will negotiate with the EPA and DAWE for an alternate offsets package to satisfy the required State and Federal policies and conditions. This will be in the form of a revised *Yalyalup Mineral Sands Project Land Acquisition Offset Strategy* as required under MS1168 Condition 11.

Should the actions, objectives, or targets in Yalyalup Mineral Sands Project Land Acquisition Offset Strategy be unable to be met, the proponent shall notify the CEO within seven (7) days of it being identified and provide details and timing of contingency actions to be undertaken, to the satisfaction of the CEO.

The proponent shall report to the CEO on the outcomes of the contingency actions as required by condition 11-8 within sixty (60) days of completion.

6. REPORTING

All environmental offsets required as part of approvals under WA legislation are now made public via the WA Environmental Offsets Register. Progress of environmental offsets are tracked via the register as actions listed as 'complete' or 'not complete'. For projects approved under Part IV of the EP Act, the Offsets Register is administered by DWER. Once a Statement is issued, the EPA/DWER will upload the relevant details into the register. The offsets 'condition milestones' are based on the conditions in the Ministerial Statement. The 'implementation milestones' are generally based on actions in the Offsets Strategy (Tables 5 and 6).

Doral currently submits an Annual Environmental Report (AER) to the EPA, DWER, DMIRS and DAWE that reports on progress in operating their mines and implementing progressive rehabilitation. Doral will be required to provide an annual report (or as required in accordance with the Ministerial Statement) to EPA/DWER and DAWE detailing the progress of the offset strategy or as a result of an action arising from a Ministerial Statement condition.

In addition, Doral shall report to the CEO on the outcomes of the actions, objectives, and targets in the Yalyalup Mineral Sands Project Land Acquisition Offset Strategy within sixty (60) days of completion of those outcomes.

Should the actions, objectives, or targets in Yalyalup Mineral Sands Project Land Acquisition Offset Strategy be unable to be met, Doral shall notify the CEO within seven (7) days of it being identified and provide details and timing of contingency actions to be undertaken, to the satisfaction of the CEO.

7. REFERENCES

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FIGURE 1: SITE LOCATION

345000 347500 350000 352500 355000 357500 360000 362500 365000 367500 370000

6280000 6277500 6275000 6272500 6270000 6267500 6265000 6262500

GEOGRAPHE BAY

MALBUP RIVER

LUDLOW RIVER

BUSSELL HIGHWAY

WONNERUP SIDING

Vasse-Wonnerup System

VASSE RIVER

RUABON

Wonnerup North (Cristal)

BUSSELTON

Wonnerup (Cristal)

SUES ROAD

4.6km

4.5km

3.5km

YOGANUP

TUTUNUP

CARTIS

LUDLOW RIVER

BUSSELTON

Vasse River Diversion Drain

BUSSELTON BYPASS

Wonnerup South (Cristal)

10.7km

SABINA RIVER

2.6km

2.7km

2.4km

5.1km

YALYALUP

Sabina River Diversion Drain

AMBERGATE

YOONGARILLUP

VASSE HIGHWAY

3.7km

3km

Tutunup South (Iluka)

WHICHER SCARP

HAPPY VALLEY

6.6km

SABINA RIVER

ABBA RIVER

WALSALL

Yoongarillup (Doral)

ACTON PARK

N

0 0.5 1 2 3

Kilometers

Map Location

Legend

Yalyalup Development Envelope

Points of Interest

Avocado Farm

Busselton Airport

Turf Farm

Operational Minesite

Distances

Ramsar Sites (DPAW)

Vasse-Wonnerup System

Doral

Yalyalup Mineral Sands Project

Regional Location

Scale	Datum: GDA94	Sheet Size A3
1:75,000	Projection: MGA Zone 50	
Figure: 1		17/11/2019

FIGURE 2: BLACK COCKATOO HABITAT

355000 356000 357000 358000 359000 360000 361000

6272000 6271000 6270000 6269000

PRINCEFIELD RD
REILLY RD
WONNERUP EAST RD
YALYALUP RD
OATES RD
ABBA RIVER
COOPERS RD
MCGIBBON TK
WONNERUP SOUTH RD
GILES RD
SABINA RIVER
Sabina River Diversion Drain
HITHERGREEN RD

For Detail See Map A
For Detail See Map B
For Detail See Map C
For Detail See Map D

Legend

Yalyalup Development Envelope

Mine Layout

Disturbance
Disturbance Boundary

Habitat Trees

Habitat Tree - No hollows seen
Habitat Tree - No hollows seen (To Be Removed)
Habitat Tree - One or more possible small/medium hollows
Habitat Tree - One or more possible small/medium hollows (To Be Removed)
Habitat Tree - One or more large hollows possibly suitable for black cockatoos
Habitat Tree - One or more large hollows possibly suitable for black cockatoos (To Be Removed)

N

0 125 250 500 750
Meters

Doral

Yalyalup Mineral Sands Project

Locations of Black Cockatoo Habitat

Scale 1:17,500	Datum: GDA94 Projection: MGA Zone 50	Sheet Size A3
Figure: 2		15/05/2020

FIGURE 2A: BLACK COCKATOO HABITAT – MAP A

Doral

Locations of Black Cockatoo Habitat - Map A

Yalyalup Mineral Sands Project

Scale	Datum: GDA94 Projection: MGA Zone 50	Sheet Size A3
1:7,500	Figure: 2A	15/05/2020

Legend

- Yalyalup Development Envelope
- **Mine Layout**
  - Infrastructure
  - Disturbance Boundary
  - Water Dams / Drainage
  - HMC Pad
  - Ore Stockpile
  - Orebody
  - Orebody Deep Strand
  - Other Supporting Infrastructure
  - Roads
  - SEP/Tails Storage Dams
  - Topsoil Stockpile
- **Habitat Trees**
  - Habitat Tree - No hollows seen
  - Habitat Tree - No hollows seen (To Be Removed)
  - Habitat Tree - One or more possible small/medium hollows
  - Habitat Tree - One or more possible small/medium hollows (To Be Removed)
  - Habitat Tree - One or more large hollows possibly suitable for black cockatoos
  - Habitat Tree - One or more large hollows possibly suitable for black cockatoos (To Be Removed)

PRINCEFIELD RD

WONNERUP SOUTH RD

REILLY RD

N

0 25 50 100 150 200 250

Meters

355500 356000 356500 357000 357500 358000

6272000 6271500 6271000 6270500

FIGURE 2B: BLACK COCKATOO HABITAT – MAP B

Doral

Locations of Black Cockatoo Habitat - Map B

Yalyalup Mineral Sands Project

Scale	Datum: GDA94	Sheet Size A3
1:7,500	Projection: MGA Zone 50	
Figure: 2B		15/05/2020

Legend

- Yalyalup Development Envelope
- **Mine Layout**
  - Infrastructure
  - Disturbance Boundary
  - Water Dams / Drainage
  - HMC Pad
  - Ore Stockpile
  - Orebody
  - Orebody Deep Strand
  - Other Supporting Infrastructure
  - Roads
  - SEP/Tails Storage Dams
  - Topsoil Stockpile
- **Habitat Trees**
  - Habitat Tree - No hollows seen
  - Habitat Tree - No hollows seen (To Be Removed)
  - Habitat Tree - One or more possible small/medium hollows
  - Habitat Tree - One or more possible small/medium hollows (To Be Removed)
  - Habitat Tree - One or more large hollows possibly suitable for black cockatoos
  - Habitat Tree - One or more large hollows possibly suitable for black cockatoos (To Be Removed)

PRINCEFIELD RD

COOPERS RD

MCGIBBON TK

358500 359000 359500 360000 360500 361000

6272000 6271500 6271000 6270500

N

0 25 50 100 150 200 250

Meters

FIGURE 2C: BLACK COCKATOO HABITAT – MAP C

355500 356000 356500 357000 357500 358000

6270000 6269500 6269000 6268500

N

0 25 50 100 150 200 250
Meters

WONNERUP EAST RD

WONNERUP SOUTH RD

YALYALUP RD

Sabina River Diversion Drain

SABINA RIVER

Legend

Yalyalup Development Envelope

Mine Layout

- Infrastructure
- Disturbance Boundary
- Water Dams / Drainage
- HMC Pad
- Ore Stockpile
- Orebody
- Orebody Deep Strand
- Other Supporting Infrastructure
- Roads
- SEP/Tails Storage Dams
- Topsoil Stockpile

Habitat Trees

- Habitat Tree - No hollows seen
- Habitat Tree - No hollows seen (To Be Removed)
- Habitat Tree - One or more possible small/medium hollows
- Habitat Tree - One or more possible small/medium hollows (To Be Removed)
- Habitat Tree - One or more large hollows possibly suitable for black cockatoos
- Habitat Tree - One or more large hollows possibly suitable for black cockatoos (To Be Removed)

Doral

Yalyalup Mineral Sands Project

Locations of Black Cockatoo Habitat - Map C

Scale 1:7,500	Datum: GDA94 Projection: MGA Zone 50	Sheet Size A3
Figure: 2C		15/05/2020

FIGURE 2D: BLACK COCKATOO HABITAT – MAP D

358500 359000 359500 360000 360500 361000

6270000

6269500

6269000

6268500

YALYALUP RD

MCGIBBON TK

N

0 25 50 100 150 200 250
Meters

Legend

Yalyalup Development Envelope

Mine Layout

- Infrastructure
- Disturbance Boundary
- Water Dams / Drainage
- HMC Pad
- Ore Stockpile
- Orebody
- Orebody Deep Strand
- Other Supporting Infrastructure
- Roads
- SEP/Tails Storage Dams
- Topsoil Stockpile

Habitat Trees

- Habitat Tree - No hollows seen
- Habitat Tree - No hollows seen (To Be Removed)
- Habitat Tree - One or more possible small/medium hollows
- Habitat Tree - One or more possible small/medium hollows (To Be Removed)
- Habitat Tree - One or more large hollows possibly suitable for black cockatoos
- Habitat Tree - One or more large hollows possibly suitable for black cockatoos (To Be Removed)

Doral

Yalyalup Mineral Sands Project

Locations of Black Cockatoo Habitat - Map D

Scale 1:7,500	Datum: GDA94 Projection: MGA Zone 50	Sheet Size A3
Figure: 2D		15/05/2020

FIGURE 3: GDE TO BE INDIRECTLY IMPACTED

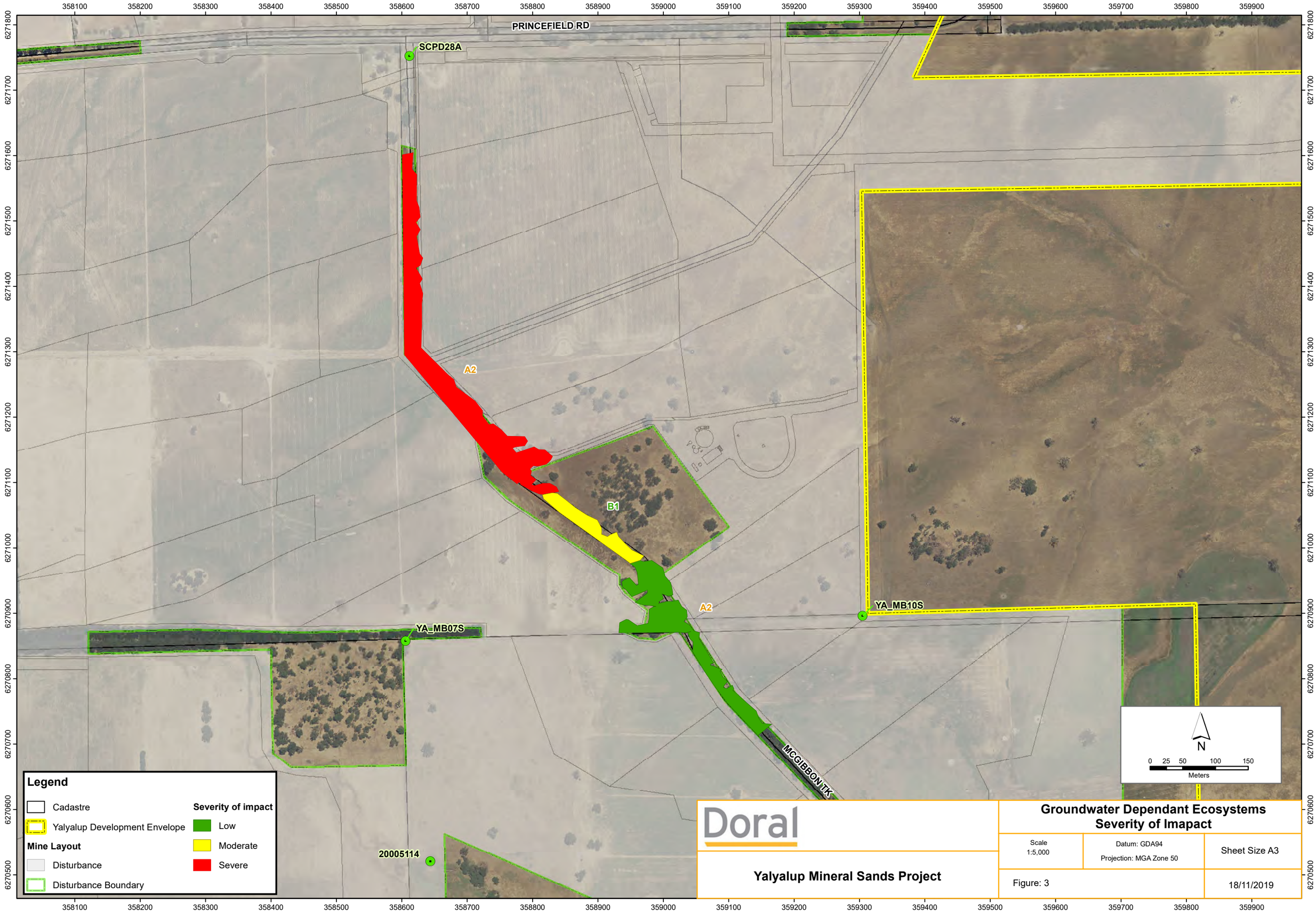

PRINCEFIELD RD
SCPD28A
A2
B1
A2
YA_MB07S
YA_MB10S
20005114
MCGIBBON TK
Legend
Cadastre
Yalyalup Development Envelope
Mine Layout
Disturbance
Disturbance Boundary
Severity of impact
Low
Moderate
Severe
N
0 25 50 100 150
Meters
Doral
Yalyalup Mineral Sands Project
Groundwater Dependant Ecosystems
Severity of Imapact
Scale
1:5,000
Datum: GDA94
Projection: MGA Zone 50
Sheet Size A3
Figure: 3
18/11/2019

FIGURE 4: GROUNDWATER DRAWDOWN OF GDE – Q3 2024

355000 356000 357000 358000 359000 360000 361000

6272000 6271000 6270000 6269000 6268000

PRINCEFIELD RD
REILLY RD
YALYALUP RD
WONNERUP EAST RD
WONNERUP SOUTH RD
AVERY RD
OATES RD
COOPERS RD
LUDLOW HITHERGREEN RD
MCGIBBON TK
ABBA RIVER
SABINA RIVER
Sabina River Diversion Drain

0.25
0.5
0.1
0.1
2
2
5
5
4
3
1

N

0 125 250 500
Meters

Legend

- Q3 2024 Drawdown
- Yalyalup Development Envelope

Mine Layout

- Disturbance
- Disturbance Boundary

Doral

Yalyalup Mineral Sands Project

Water Drawdown Mining Q3 2024 Dry Scenario

Scale	Datum: GDA94	Sheet Size A3
1:17,500	Projection: MGA Zone 50	
Figure: 4		19/11/2019

FIGURE 5: GROUNDWATER DRAWDOWN OF GDE – Q4 2024

355000 356000 357000 358000 359000 360000 361000

6272000 6271000 6270000 6269000 6268000

PRINCEFIELD RD
REILLY RD
WONNERUP EAST RD
YALYALUP RD
AVERY RD
WONNERUP SOUTH RD
MCGIBBON TK
COOPERS RD
ABBA RIVER
OATES RD
LUDLOW/HITHERGREEN RD
SABINA RIVER
Sabina River Diversion Drain

0.25 0.5 1 2 3 4 5 6 0.1 0.5

N

0 125 250 500
Meters

Legend

- Q4 2024 Drawdown
- Yalyalup Development Envelope

Mine Layout

- Disturbance
- Disturbance Boundary

Doral

Yalyalup Mineral Sands Project

Water Drawdown Mining Q4 2024 Dry Scenario

Scale 1:17,500	Datum: GDA94 Projection: MGA Zone 50	Sheet Size A3
Figure: 5		19/11/2019

FIGURE 6: WRP HABITAT

358600 358700 358800 358900 359000 359100 359200 359300

6271500 6271400 6271300 6271200 6271100 6271000 6270900 6270800 6270700 6270600 6270500

Legend

Yalyalup Development Envelope

Mine Layout

Disturbance

Disturbance Boundary

Possum Observations 2019

Common Brushtail Possum (2)

Western Ringtail Possum (1)

Possum Observations 2017

Common Brushtail Possum (6)

Western Ringtail Possum (5)

Dreys 2019

WRP Drey (4)

Dreys 2017

WRP Drey (6)

N

0 25 50 75 100 125

Meters

Doral

Yalyalup Mineral Sands Project

Locations of Western Ringtail Possums and Habitat (Inset)

Scale	Datum: GDA94	Sheet Size A3
1:3,000	Projection: MGA Zone 50	
Figure: 6		18/11/2020

FIGURE 7: PROPOSED IRONSTONE VEGETATION (SCP10B) OFFSET SITE

334100 334200 334300 334400 334500

6259100 6259000 6258900 6258800 6258700 6258600

Legend

- Fence
- Remnant Vegetation
- Lot 2 - 540 Jindong-Treeton Road, KALOORUP 6280
- Indicative Offset Area (8.37 ha)
- Indicative Private Property (2.03 ha)

GALE RD

JINDONG - TREETON RD

Block 1
0.16ha

Block 2
0.64ha

Block 3
0.39ha

Block 4
2.58ha

Block 5
0.65ha

Block 6
0.01ha

N

0 12.5 25 50
Meters

Doral

Yalyalup Mineral Sands Project

Lot 2 - 540 Jindong-Treeton Road

Scale	Datum: GDA94 Projection: MGA Zone 50	Sheet Size A3
1:1,750		
Figure: 7		Date: 28/06/2021

FIGURE 8: PROPOSED BLACK COCKATOO HABITAT OFFSET SITE

371900 372000 372100 372200 372300

6295600 6295500 6295400 6295300

0.15ha

3.48ha

0.3ha

0.22ha

Legend

Habitat Trees

Habitat Tree - No hollows seen (No. 121)

Habitat Tree - One or more possible/actual hollows assessed as unsuitable for Black Cockatoo (No. 9)

Potential Offset Area

Marri Woodland

Revegetation Areas

N

0 12.5 25 50

Meters

Doral

Yalyalup Mineral Sands Project

Black Cockatoo Offset Site

Scale 1:1,420	Datum: GDA94 Projection: MGA Zone 50	Sheet Size A3
Figure: 8		23/06/2021

APPENDIX 1: FLORA AND VEGETATION SURVEY – PROPOSED OFFSET COMPONENT 1

APPENDIX 2: HABITAT QUALITY

A process of assessment was conducted to quantify fauna habitat and ecological community values within the vegetation to be impacted by the Proposal considering the factors of site condition, site context and species stocking rates. The results of this assessment are provided below.

Fauna habitat/Ecological Community Values

Fauna habitat and ecological community quality has been informed by the following aspects:

1. Site condition. This is the condition of a site in relation to the ecological requirements of a threatened species or ecological community. This includes considerations such as vegetation condition and structure, the diversity of habitat species present, and the number of relevant habitat features.
2. Site context. This is the relative importance of a site in terms of its position in the landscape, taking into account the connectivity needs of a threatened species or ecological community. This includes considerations such as movement patterns of the species, the proximity of the site in relation to other areas of suitable habitat, and the role of the site in relation to the overall population or extent of a species or community.
3. Species stocking rate. This is the usage and/or density of a species at a particular site. The principle acknowledges that a particular site may have a high value for a particular threatened species, despite appearing to have poor condition and/or context. It includes considerations such as survey data for a site in regards to a particular species population or, in the case of a threatened ecological community this may be a number of different populations. It also includes consideration of the role of the site population in regards to the overall species population viability or community extent.

Quantification of value

Consideration of fauna habitat and ecological community values for vegetation to be impacted by the Proposal has been derived from an assessment of vegetation condition, structure and extent of disturbance, as described in Table 1. It is noted that the 102 Black Cockatoo potential breeding habitat trees are present as isolated scattered paddock trees, within cleared pasture and have not been included in Table 1. Condition ratings for vegetation rely upon the information provided in the Flora and Vegetation surveys (Ecoedge, 2020a).

TABLE 1: VEGETATION CONDITION WITHIN THE PROPOSAL AREA

CONDITION RATING	AREA (ha)	DESCRIPTION	INTERPRETED VALUE (PROPOSED HABITAT QUALITY SCORE)
Pristine	-	Pristine or nearly so; No obvious signs of disturbance	10
Excellent	-	>80% native flora composition; Vegetation structure intact or nearly so; Minor signs of disturbance; Non-aggressive weed species (cover <5%)	8-9
Very Good	-	60–80% native flora composition; vegetation structure altered in places; Obvious signs of disturbance; Weed cover/abundance 5–20%.	6-7
Good/Fair	2.15ha	40–60% native flora composition; Vegetation structure significantly altered yet retains basic structure or ability to regenerate to it; Very obvious signs of multiple disturbance; Weed cover/abundance 20–50%.	4-5
Degraded	-	Basic vegetation structure severely impacted by disturbance; Scope for regeneration but not to a state approaching good condition without intensive management.	2-3
Completely Degraded	-	<20% native flora composition; Vegetation structure no longer intact; Extensive disturbance/modification present; Weeds are highly invasive (cover/abundance >80%).	1

VALUE AS ECOLOGICAL COMMUNITY

SCP10b - *Shrublands on southern Swan Coastal Plain Ironstones (Busselton area)*

Condition results from the Flora and Vegetation Surveys of the Proposal area (Ecoedge, 2020a) show that Vegetation Unit B1 is recognised as the TEC SCP10b - *Shrublands on southern Swan Coastal Plain Ironstones (Busselton area)* (Gibson, et al., 2000); (Meissner & English, 2005). The occurrence on McGibbonTrack (0.34ha) is in Good condition but unaccountably is yet to be added to the DBCA threatened communities' database (A, Webb, DBCA Bunbury, pers. Comm. 22/02/2016, cited in Ecoedge, 2020a). This community includes a population of nine *Banksia squarrosa* subsp. *Argillacea,* also listed as MNES under the *EPBC Act.*

The vegetation unit was mapped as comprising:

> Tall shrubland of *Acacia saligna*, *Banksia squarrosa* subsp. *argillacea*, *Calothamnus quadrifidus* subsp. *teretifolius*, *Hakea oldfieldii* and *Kunzea micrantha* (with scattered emergent *Eucalyptus rudis*) over scattered native herbs including *Drosera glanduligera* and *Sowerbaea laxiflora*, the sedge *Loxocarya magna*, and weeds on shallow red sandy clay on massive ironstone.

TABLE 2: SITE ASSESSMENT FOR SCP10b - *SHRUBLANDS ON SOUTHERN SWAN COASTAL PLAIN IRONSTONES (BUSSELTON AREA)*

ELEMENT	CRITERIA	ASSESSMENT	SCORE
Site Condition	Vegetation condition and structure	Vegetation condition was rated Good by Ecoedge (2020a). The community is considered to be intact or nearly so, given it is recognised as a TEC.	5
	Diversity of species	The vegetation is present as a TEC and includes the presence of Priority and Threatened flora species. This includes a population of nine EPBC listed flora, *Banksia squarrosa* subsp. *Argillacea*	
	Relevant features	The vegetation is present as a TEC, restricted to ironstone soils and includes the presence of Priority and Threatened flora species.	
Site Context	Connectivity	This community is restricted to a small thin area within the McGibbon Track road reserve due to the presence of ironstone. The community connects to other WA State listed TECs.	5
	Regional importance of occurrence	This community typically occurs on a soil type that is restricted to the eastern side of the Swan Coastal Plain along the base of the Whicher Scarp near Busselton. It is known from 15 locations in the southwest totaling ~139ha, which is a 90% decline from the original ironstone soils mapped by Tille and Lantzke (1990).	
	Threats	The key threats to the community are fire, weed invasion, track maintenance, accidental clearing and possibly salinization and waterlogging. In addition,	

ELEMENT	CRITERIA	ASSESSMENT	SCORE
		many of the endemic, endangered and priority species of plants are dieback susceptible.	
Species Stocking Rate	Presence and density of species	SCP10b contains Threatened and Priority flora species.	5
	Regional role of the site in overall species viability or community extent	The community has significant risk of loss from track maintenance and accidental clearing activities as well as cattle grazing due to stock movement from adjacent landowner. The area is considered extremely small (0.34ha) and given there is ~139ha of this TEC elsewhere, the impacts to this community are localised	

In summary, this community is highly restricted in distribution, known to support Threatened and Priority flora and is one of only a few remaining areas of SCP10b in the southwest. As such, the community is considered to be of regional importance particularly given 97% of the historical area has been cleared for agriculture. This portion of SCP10b however is very small (0.34ha) and restricted to a thin portion of the single lane McGibbon Track road reserve due to the presence of ironstone soils. It is subject to significant threatening process in its current form, such as track maintenance, cattle grazing and cattle movement and is considered to be in declining condition, as evidenced by the adjacent vegetation (formerly considered to be SCP10b) which is now Completely Degraded with only overstorey species present. Overall, the quality of this community has been rated as medium (quality score of 5).

VALUE AS FAUNA HABITAT

VALUE AS BLACK-COCKATOO HABITAT

Native vegetation within the Proposal area generally comprises fragmented isolated patches of vegetation in completely degraded condition, likely due to past and current farming activity. The only continuous patches of vegetation occur either along the McGibbon Track or Woddidup Drain. As such, the overall value to fauna can be regarded as low when compared to other nearby areas such as the Whicher Range and Ludlow Tuart Forest.

The extent of quality foraging habitat within the Proposal area can be regarded as those areas containing marri, jarrah, banksia and to a lesser extent flooded gum. This area totals ~38ha. Most of this vegetation does not fall within the disturbance area and will not be affected by the Proposal. Evidence of foraging for three species of Black Cockatoos was observed in the form of chewed marri fruits and pine cones.

Larger trees present within the Development Envelope (1,053) are considered to represent potential breeding habitat due to DBH>50cm and >30cm for Wandoo, with 54 of these trees containing hollows considered possibly suitable for nesting. A total of 102 trees, including 5 with possibly suitable hollows will be cleared for the Proposal. No evidence of use by Black Cockatoos have been observed at the Site. These trees to be directly impacted by the Proposal are present as isolated scattered paddock trees. Based on the total area of ground disturbance for the proposal (451.33ha), clearing of 102 trees equates to approximately 1 tree per 4.4ha.

TABLE 3: SITE ASSESSMENT FOR BLACK COCKATOO HABITAT

ELEMENT	CRITERIA	ASSESSMENT	SCORE
Site Condition	Vegetation condition and structure	The 102 Black Cockatoo potential breeding habitat trees are present as isolated scattered paddock trees and are not part of a vegetation community. Impacts to these trees equate to approximately 1 tree per 4.4ha. A total of 951 potential breeding trees remain after implementation of the Proposal. A total of 37.81ha of native vegetation is present within the Proposal area, of which 93% will remain after the implementation of the Proposal. Almost all of this native vegetation is in Degraded or Completely Degraded condition.	4
	Diversity of species	The trees to be impacted meet the EPBC definition of potential breeding habitat due to DBH>50cm and >30cm for Wandoo. As such these trees have the potential to develop hollows suitable for three species of Black Cockatoos. These trees are present as isolated scattered paddock trees.	
	Relevant features	A total of 1,053 potential breeding habitat trees are present in the Development Envelope. These comprise: • 893 with no hollows; • 106 with unsuitable hollows for Black Cockatoo use; • 54 trees with possibly suitable hollows. Of the 102 trees to be impacted (i.e. <10%), by the Proposal (i.e. <10%) only 5 contain hollows possibly suitable for a Black Cockatoo. These trees were subject to a separate Habitat Tree Assessment which identified no evidence of use by a Black Cockatoo.	
Site Context	Connectivity	The 102 trees to be impacted by the Proposal are present as isolated scattered paddock trees. Based on the disturbance area this equates to 1 tree per 4ha. A total of 951 trees will remain after implementation of the Proposal, with majority present within vegetation being avoided. The species are highly mobile and displays a seasonal migratory pattern that is linked to breeding (Saunders 1980, 1990, Berry 2008 in DEC & Australian Government 2012). Breeding takes places between late July and December and most breeding occurs in the inland	3

ELEMENT	CRITERIA	ASSESSMENT	SCORE
		parts of its distribution, in areas receiving between 300–750 mm of average rainfall (Saunders 1974 in DEC & Australian Government 2012). During the non-breeding season (January to July), the majority of the birds move to the higher rainfall coastal regions of their range including the Midwest coast, Swan Coastal Plain and south coast (Saunders 1980, 1990; Berry 2008; Saunders et al. 2011; Johnstone et al 2011 in DEC & Australian Government 2012).	
	Regional importance of occurrence	Overall fauna habitat values within the Proposal have been severely compromised by the almost total removal of native vegetation. Most areas lack any natural attributes and are now only likely to be utilised by generally common and widespread fauna species with non-specific requirements which allow them to persist in highly disturbed habitats. As a consequence, the fauna biodiversity of the Proposal area is well below levels present prior to historical disturbance having occurred and can therefore be regarded as highly depauperate (Harewood, 2020a). Given these trees are isolated scattered paddock trees, the overall fauna assemblage can therefore be regarded as highly unlikely to be of local or regional significance (Harewood, 2020a). A review of the 2018 Great Cocky Count database shows no documented, active roost sites within 10km of the Proposal area (Peck, et al., 2018). Based on available vegetation mapping it is estimated that there is approximately 13,300ha of native vegetation within 12km of the Proposal area and therefore there is significant potential for roosting habitat to be present in the wider area (assuming the presence of suitable trees).	
	Threats	The key threats to the Black Cockatoos include habitat loss through habitat degradation, fragmentation and clearing.	
Species Stocking Rate	Presence and density of species	Evidence of foraging for three species of Black Cockatoos was observed in the form of chewed marri fruits and pine cones during the fauna survey (Harewood, 2020a). No evidence of use by a Black Cockatoo within the 5 hollows to be impacted by the Proposal was observed during a tree hollow	3

ELEMENT	CRITERIA	ASSESSMENT	SCORE
		assessment. Density of trees to be cleared is 1 per 4.4ha.	
	Regional role of the site in overall species viability or community extent	Rather than hosting a discrete population of Black-Cockatoos, the Proposal area is expected to play a role in contributing foraging habitat within the wider South West region for visiting groups of the species during the autumn and winter months.	

In summary, the Proposal area may be used as foraging and contains potential breeding habitat for three species of Black Cockatoos, although no evidence of use of any of the 5 hollows have been observed. The Proposal will only impact a total of 102 trees, which is less than 10% of the potential breeding habitat trees present with the Proposal area. These 102 trees are present as isolated scattered paddock trees, equating to 1 tree per 4.4ha. The trees are not part of a vegetation community.

As such, the Proposal area is not considered of regional importance for nesting or roosting, based on the absence of direct evidence of the utilisation of the habitat trees for these purposes (Harewood 2020b). An abundance of similar vegetation occurs in close proximity (<12km) to the Proposal and therefore there is significant potential for foraging, breeding and roosting habitat to be present in the wider area (assuming the presence of suitable trees).

Rather than hosting a discrete population of Black-Cockatoos, the Proposal area is expected to play a role in contributing foraging habitat within the wider South West region for visiting groups of the species during the autumn and winter months.

Habitat quality of the 102 Black-Cockatoo potential breeding habitat trees to be impacted has been rated as low (i.e. habitat quality score of 4).

PROPOSED OFFSET VALUES

TABLE 4: PROPOSED OFFSET SCP10b: *SHRUBLANDS ON SOUTHERN SWAN COASTAL PLAIN IRONSTONES (BUSSELTON AREA)* – REMNANT 4 OF PROPOSED OFFSET SITE

OFFSET PARAMETER	ELEMENT	CRITERIA	ASSESSMENT	SCORE
START QUALITY (out of 10)	Site Condition	Vegetation condition and structure	Vegetation condition was rated Very Good to Excellent by DBCA site survey (Appendix 1). The community is considered to be intact or nearly so, given it is recognised as a TEC. Remnant 4 was historically fenced for ~20 years to exclude stock access until impacted by fire ~2 years ago.	8
		Diversity of species	The vegetation is present as a TEC and includes the presence of Priority and Threatened flora species. This includes the presence of four listed species including a population of 15 individual *Banksia squarrosa* subsp. *Argillacea* (T), 4 individual	

OFFSET PARAMETER	ELEMENT	CRITERIA	ASSESSMENT	SCORE
			Banksia nivea spp. u*liginosa* (T) *Hakea oldfieldii* (P3) and *Loxocarya magna* (P3). This remnant has both seasonally inundated and non-inundated ironstone vegetation types.	
		Relevant features	The vegetation is present as a TEC, restricted to ironstone soils and includes the presence of Priority and Threatened flora species. DBCA indicate that there is a highly likelihood of additional conservation significant flora species occurring on the Site with more detailed surveys (i.e. spring). The entire location supports ironstone geology, predominantly ironstone sheet rock with is exposed in some areas or with a shallow covering of loam soil.	
	Site Context	Connectivity	This community is continuous with the DBCA managed Gale Road Ironstone Nature Reserve (R.45533) and an area of Shire road reserve that also supports SCP10b. With conservation purchase the condition and linkage of other remnants of SCP10b on the site (remnants 1, 2, 3, 5 and 6) is expected to improve and increase in size.	8
		Regional importance of occurrence	This Site is one of 5 remnants that is not under conservation management. With conservation management it is expected that this Site could be used as a translocation site for ironstone taxa.	
		Threats	Keys threats include, no current mechanism of bushland protection, cattle grazing, fire and weed invasion.	
	Species Stocking Rate	Presence and density of species	SCP10b contains Threatened and Priority flora species.	8
		Regional role of the site in overall species viability or community extent	This Site is of high conservation value and is one of 5 remnants that is not under conservation management. With conservation management it is expected that this Site would be further improved and could be used as a translocation site for ironstone taxa.	
Future quality without offset (out of 10)			Without conservation management and formal bushland protection, it is likely that this TEC could	7

OFFSET PARAMETER	ELEMENT	CRITERIA	ASSESSMENT	SCORE
			be lost or further degraded to be of similar condition to Remnants 1, 2, 3, 5 and 6, if not cleared or grazed by land owner.	
Future quality with offset (out of 10)			With conservation management this community would be formally protected from incidental clearing, enhanced in condition and diversity and offer opportunities for translocation of ironstone taxa.	8
Time over which loss is averted (max. 20 years)			Maximum of 20 years	20
Time until ecological benefit			Offset would be in place prior to dewatering impacts of SCP10b. A time of 1 year has been included in the calculator.	1
Risk of loss (%) without offset			No formal bushland protection. Risk of clearing and grazing by cattle. Risk of loss for Busselton area is listed as 4.74% in Appendix 1 of *Guidance for deriving Risk of Loss estimates when evaluating biodiversity offset proposals under the EPBC Act 2017*.	5%
Risk of loss (%) with offset			The Offset site contains two Threatened flora species and one TEC (SCP10b), listed under the EPBC Act. The site would be formally managed and protected by DBCA. As such in accordance with Table 2 of *Guidance for deriving Risk of Loss estimates when evaluating biodiversity offset proposals under the EPBC Act 2017,* the risk of loss with offset would be 0%. However, as discussed with DAWE, Doral have used a figure of 1%.	0%
Confidence in results			High confidence in results based on flora survey of offset site	80
% of impact offset			**DAWE Calculator using the above information.**	**157.01%**

TABLE 5: PROPOSED OFFSET LOT 348 - BLACK COCKATOO HABITAT (FORAGING AND BREEDING COMPONENTS)

OFFSET PARAMETER	ELEMENT	CRITERIA	ASSESSMENT	SCORE
FORAGING HABITAT				
START QUALITY (out of 10)	Site Condition	Vegetation condition and structure	Vegetation present within the proposed offset within Lot 348 consists almost entirely of a Marri (*Corymbia calophylla*) woodland/open woodland with very occasional jarrah (*Eucalylptus* marginate). The proposed offset will be 4.15ha, which includes 3.48ha of existing Black Cockatoo habitat and 0.67ha to be revegetated and enhanced with suitable Black Cockatoo species.	4
		Diversity of species	Low diversity of species present within Lot 348 offset site. The Site is almost entirely Marri woodland with virtually no midstory or native groundcover vegetation. The trees present (total of 130) meet the EPBC definition of potential breeding habitat due to DBH>50cm. Of the 130 trees, 9 contained one or more possible/actual hollows although assessed as being unsuitable.	
		Relevant features	The proposed offset contains a total of 130 Black Cockatoo potential breeding habitat trees.	
	Site Context	Connectivity	The proposed offset site is immediately adjacent to large areas of native vegetation mapped as Banksia Woodland (Lots 187, 1348 and 154). This vegetation contains a large amount of potential breeding habitat (trees with DBH>50cm) and has been assigned the highest ecological proximity rating of '1a'as it is continuous with vegetation through which the ecological linkage line passes (Molloy, Wood, Hall, Wallrodt, & Whisson, 2009). A review of the 2018 Great Cocky Count database shows the closest active roost site is ~4.5-5km north, as being used by five white-tailed Black Cockatoos (exact species not identified) (Peck et al. 2018). Another seven documented roost sites (but not necessarily in current use) occur within 12km of the Site.	5
		Regional importance of occurrence	The offset site is expected to play a role in contributing foraging and breeding habitat within	

OFFSET PARAMETER	ELEMENT	CRITERIA	ASSESSMENT	SCORE
			the wider South West region for visiting groups of the species during the autumn and winter months.	
		Threats	The key threats to the Black Cockatoo habitat at the proposed offset site includes habitat loss through habitat degradation, fragmentation and clearing.	
	Species Stocking Rate	Presence and density of species	The proposed offset site contains flora species known to be used as a direct food source (e.g. seeds, flowers, nectar, bark or grubs) by one or more species of Black Cockatoos (Harewood, 2021). Evidence of Black Cockatoo foraging (chewed fruits from marri trees) was observed during the field survey at a small number of locations. This activity was mainly attributed to the Red-Tailed Forest Black Cockatoo.	5
		Regional role of the site in overall species viability or community extent	The offset site is expected to play a role in contributing foraging and breeding habitat within the wider South West region for visiting groups of the species during the autumn and winter months.	
Future quality without offset (out of 10)			Area is at risk of incidental clearing and significant impact from kangaroos and grazing cattle without formal protection mechanisms.	3
Future quality with offset (out of 10)			With conservation management this community would be formally protected from incidental clearing, revegetated with species suitable for Black Cockatoos, and enhanced in condition by excluding kangaroos, grazing cattle, weed management and provision of 12 artificial hollows for encourage breeding activity.	5
Time over which loss is averted (max. 20 years)			Maximum of 20 years	20
Time until ecological benefit			85% of offset to be provided prior to clearing of Black Cockatoo habitat, with the remaining 15% (0.67ha) to be revegetated in accordance with Appendix 5. 10 years has been used in the calculator as the Time Until Ecological Benefit to enable the revegetation of 0.67ha to meet the completion criteria as foraging habitat.	10
Risk of loss (%) without offset			Risk of loss for Busselton area is 4.74% (*Guidance for deriving Risk of Loss estimates when evaluating biodiversity offset proposals under the EPBC Act*	0%

OFFSET PARAMETER	ELEMENT	CRITERIA	ASSESSMENT	SCORE
			2017), however as Doral own the Offset Site, risk of loss is considered 0%.	
Risk of loss (%) with offset			The Offset site would contain habitat suitable for Black Cockatoos, which is protected under the EPBC Act. The site would be formally managed and protected by Conservation Covenant. As such in accordance with Table 2 of *Guidance for deriving Risk of Loss estimates when evaluating biodiversity offset proposals under the EPBC Act 2017,* the risk of loss with offset would be 0%.	0%
Confidence in results			High confidence in result. Evidence provided to DAWE as part of AER obligations for EPBC 2013/6879.	80
% of impact offset (foraging component)			DAWE Calculator (foraging component) using the above information. For the following: • Carnaby`s Black-Cockatoo • Baudin's Black-Cockatoo • Forest Red-tailed Black-Cockatoo	 82.77% 82.77% 91.41%
POTENTIAL BREEDING HABITAT (ATTRIBUTE)				
Quantum of Impact			5 hollows have been identified as being possibly suitable for use at the impact Site	5
Proposed Offset			10 artificial hollows (cockatubes) sourced from Serpentine-Jarrahdale SJ Landcare Group https://landcaresj.com.au/cockatubes-saving-black-cockatoos/	10
Time horizon			Maximum of 20 years	20
Start value			10 hollows to be installed	10
Future value without offset			Without the offset, no hollows would be present within the offset site, however a value of 5 has been used based on the hollows to be impacted (if the proposal were not to proceed).	5
Future value with offset			With conservation management this community would be formally protected from incidental clearing, revegetated with species suitable for Black Cockatoos, and enhanced in condition by excluding kangaroos, grazing cattle, weed	10

OFFSET PARAMETER	ELEMENT	CRITERIA	ASSESSMENT	SCORE
			management and provision of 10 artificial hollows for encourage breeding activity.	
Confidence in results			High confidence in result, as Doral has successfully installed artificial hollows as part of other Black Cockatoo offset projects	70
% of impact offset (potential breeding component)			DAWE Calculator (potential breeding component) using the above information. For the following: • Carnaby`s Black-Cockatoo • Baudin's Black-Cockatoo • Forest Red-tailed Black-Cockatoo	 55.14% 55.14% 67.26%
% of impact offset (TOTAL COMBINED OFFSET FOR FORAGING AND BREEDING)			DAWE Calculator (total combined) using the above information. For the following: • Carnaby`s Black-Cockatoo • Baudin's Black-Cockatoo • Forest Red-tailed Black-Cockatoo	 137.91% 137.91% 158.67%

APPENDIX 3: DAWE OFFSET CALCULATOR

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Shrublands on SCP Ironstones
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	**1.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	Yes		**Area**	0.34	Hectares	
			Quality	**5**	Scale 0-10	
			Total quantum of impact	0.17	Adjusted hectares	
Threatened species habitat						
Area of habitat	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	Yes	0.17	Adjusted hectares	2.58	**Risk-related time horizon (max. 20 years)**	20	**Start area (hectares)**	2.58	**Risk of loss (%) without offset**	5%	**Risk of loss (%) with offset**	0%	0.13	90%	0.12	0.09	157.01%	Yes		
									Future area without offset (adjusted hectares)	2.5	**Future area with offset (adjusted hectares)**	2.6				0.27				
					Time until ecological benefit	1	**Start quality (scale of 0-10)**	**8**	**Future quality without offset (scale of 0-10)**	**7**	**Future quality with offset (scale of 0-10)**	**8**	1.00	80%	0.80	0.79				
Threatened species habitat																				
Area of habitat	No				**Time over which loss is averted (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	0				$0.00		$0.00
Area of community	0.17	0.27	157.01%	**Yes**	$0.00	N/A	$0.00
					$0.00	**$0.00**	**$0.00**

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Carnaby's black cockatoo
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	**1.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes		**Area**	1.78	Hectares	
			Quality	**4**	Scale 0-10	
			Total quantum of impact	0.71	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	Yes	5 hollows	5		Count	
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset** **Future area without offset (adjusted hectares)**	0.0	**Risk of loss (%) with offset** **Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	0.71	Adjusted hectares		**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	4.15	**Risk of loss (%) without offset** **Future area without offset (adjusted hectares)**	0% 4.2	**Risk of loss (%) with offset** **Future area with offset (adjusted hectares)**	0% 4.2	0.00	90%	0.00	0.00	0.59	82.77%	No	
					Time until ecological benefit	10	**Start quality (scale of 0-10)**	**4**	**Future quality without offset (scale of 0-10)**	**3**	**Future quality with offset (scale of 0-10)**	**5**	2.00	80%	1.60	1.42				
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	Yes	5	Count	10	20		10		5		10		5	70%	3.50	2.76	55.14%	No		
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	5	2.76	55.14%	**No**	$0.00	#DIV/0!	#DIV/0!
Condition of habitat	0				$0.00		$0.00
Area of habitat	0.712	0.59	82.77%	**No**	$0.00	#DIV/0!	#DIV/0!
Area of community	0				$0.00		$0.00
					$0.00	**#DIV/0!**	**#DIV/0!**

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Baudin's black cockatoo
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	**1.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes		**Area**	1.78	Hectares	
			Quality	**4**	Scale 0-10	
			Total quantum of impact	0.71	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	Yes	5 hollows	5		Count	
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset** **Future area without offset (adjusted hectares)**	0.0	**Risk of loss (%) with offset** **Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	0.71	Adjusted hectares		**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	4.15	**Risk of loss (%) without offset** **Future area without offset (adjusted hectares)**	0% 4.2	**Risk of loss (%) with offset** **Future area with offset (adjusted hectares)**	0% 4.2	0.00	90%	0.00	0.00	0.59	82.77%	No	
					Time until ecological benefit	10	**Start quality (scale of 0-10)**	**4**	**Future quality without offset (scale of 0-10)**	**3**	**Future quality with offset (scale of 0-10)**	**5**	2.00	80%	1.60	1.42				
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	Yes	5	Count	10	20		10		5		10		5	70%	3.50	2.76	55.14%	No		
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	5	2.76	55.14%	**No**	$0.00	#DIV/0!	#DIV/0!
Condition of habitat	0				$0.00		$0.00
Area of habitat	0.712	0.59	82.77%	**No**	$0.00	#DIV/0!	#DIV/0!
Area of community	0				$0.00		$0.00
					$0.00	**#DIV/0!**	**#DIV/0!**

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Forest Red Tailed black cockatoo
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	**0.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes		**Area**	1.78	Hectares	
			Quality	**4**	Scale 0-10	
			Total quantum of impact	0.71	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	Yes	5 hollows	5		Count	
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)		% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																					
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**										
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0									
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**										
Threatened species habitat																					
Area of habitat	Yes	0.71	Adjusted hectares		**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	4.15	**Risk of loss (%) without offset**	0%	**Risk of loss (%) with offset**	0%	0.00	90%	0.00	0.00		91.41%	Yes		
									Future area without offset (adjusted hectares)	4.2	**Future area with offset (adjusted hectares)**	4.2					0.65				
					Time until ecological benefit	10	**Start quality (scale of 0-10)**	**4**	**Future quality without offset (scale of 0-10)**	**3**	**Future quality with offset (scale of 0-10)**	**5**	2.00	80%	1.60	1.57					
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**		**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	Yes	5	Count	10	20		10		5		10		5	70%	3.50	3.36		67.26%	No		
Condition of habitat Change in habitat condition, but no change in extent	No																				
Threatened species																					
Birth rate e.g. Change in nest success	No																				
Mortality rate e.g Change in number of road kills per year	No																				
Number of individuals e.g. Individual plants/animals	No																				

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	5	3.36	67.26%	**No**	$0.00	#DIV/0!	#DIV/0!
Condition of habitat	0				$0.00		$0.00
Area of habitat	0.712	0.65	91.41%	**Yes**	$0.00	#DIV/0!	#DIV/0!
Area of community	0				$0.00		$0.00
					$0.00	**#DIV/0!**	**#DIV/0!**

APPENDIX 4: EVIDENCE OF AGREEMENT WITH DBCA

Your ref: EPBC 2017/8094
Our ref: 2021/001251-1
Enquiries: Ben Nickchen-Long
Phone: 9219 8919
Email: ben.nickchen-long@dbca.wa.gov.au

Craig Bovell
OSH&E Superintendent
Doral Mineral Sands Pty Ltd
25 Harris Road
PICTON WA 6229

By email: Craig.Bovell@doral.com.au

Dear Mr Bovell

CONFIRMATION OF AGREEMENT TO PURCHASE AND FUTURE MANAGEMENT OF PART LOT 2 (540) JINDONG-TREETON ROAD, KARLOORUP FOR PROPOSED CREATION AS A NATURE RESERVE

I refer to previous communications between the Department of Biodiversity, Conservation and Attractions (**the Department**) and Doral Mineral Sands Pty Ltd (**Doral**) relating to the identification and purchase of a suitable parcel of land required to satisfy Doral's offset requirements under EPBC 2017/8094.

The Department confirms it has entered into a contract of sale for the purchase of an 8.38ha portion (subject to survey) of Lot 2 (540) Jindong-Treeton Road, Karloorup (**the Property**) (see Attachment 1). The Department will invoice Doral to recoup costs associated with the acquisition of the Property.

The Property was identified and assessed by the Department in collaboration with Doral and recommended as a suitable addition to the State of Western Australia's (**the State**) conservation estate. Surveys assessing the site revealed the presence of SCP10b – *Shrublands on southern Swan Coastal Plain Ironstones* (Busselton area). The Department acknowledges Doral's previous advice that purchase of the Property for inclusion in the conservation estate would be suitable to satisfy its offset obligations under the Western Australian *Environmental Protection Act 1986* and the Commonwealth *Environmental Protection and Biodiversity Act 1999*.

The Department confirms that the Property, following subdivision and subsequent transfer to the State in freehold, will be added to the conservation estate. I confirm the Department is currently obtaining subdivision approval for the creation of a new lot for the purchased portion of the Property to facilitate settlement. The Department proposes the reserve creation under the *Conservation and Land Management Act 1984* following necessary consultation with relevant stakeholders.

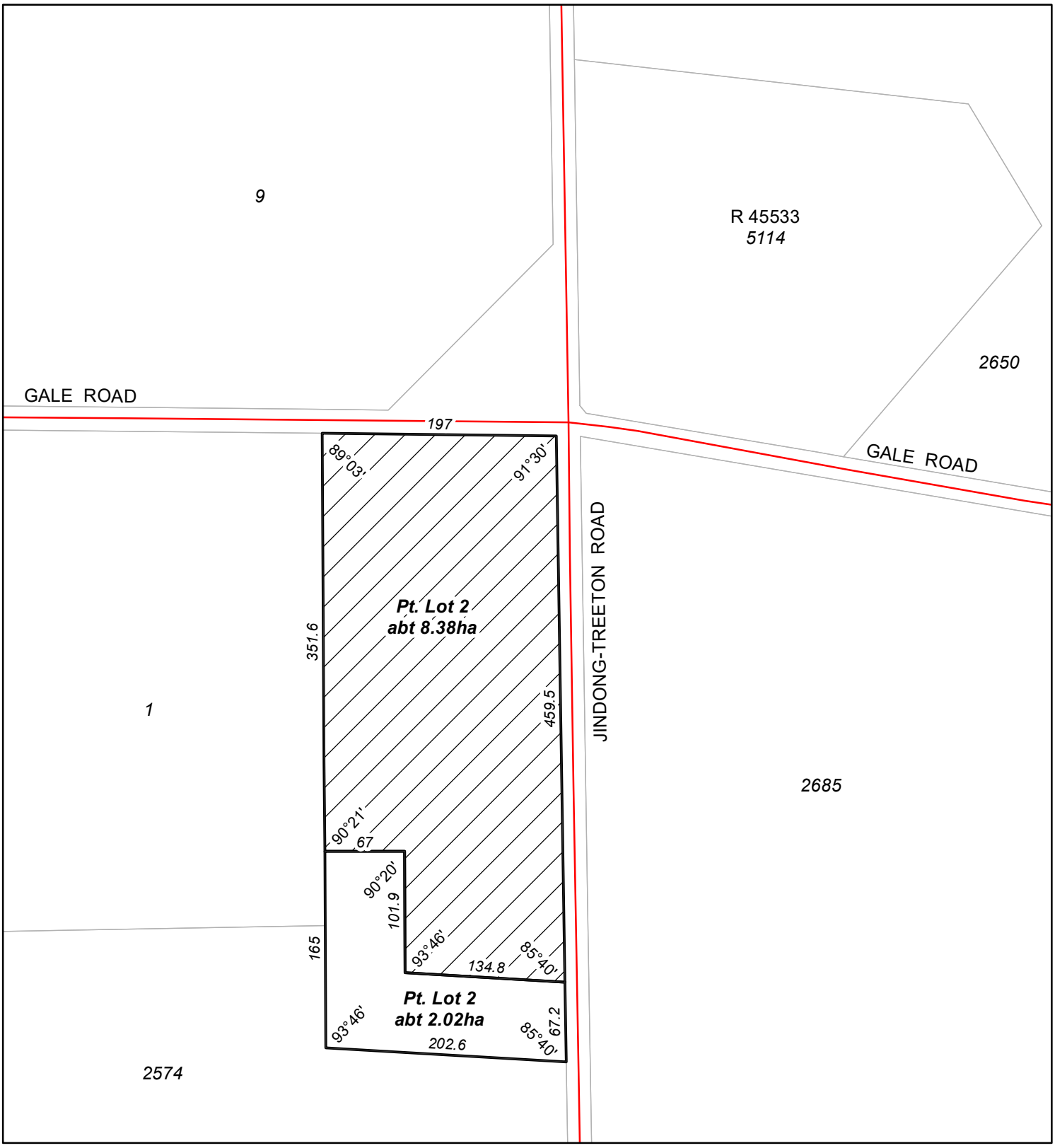
The Department confirms that the purchase the Property is a welcome and acceptable addition to the conservation estate.

If you have any queries, please myself at 9219 8919 or ben.nickchen-long@dbca.wa.gov.au.

Yours sincerely,

Ben Nickchen-Long
Senior Land Acquisition Officer
Land Services Unit
Parks and Wildlife Services

13 August 2021



NOTE:
- All dimensions are approximate and are subject to survey.
- Dwelling to be retained
- Total area of Lot 2 is 10.4ha

PROPOSED SUBDIVISION

Legend

Land subject to SUBDIVISION - abt 10.4ha

Location(s): Portion of Lot 2 on Diagram 79019 as shown on Certificate of Title 1907/879

Owner(s): Brett John Robinson

N

0 50 100 200 300 400

Metres

SCALE: 1:4,500

Department of Biodiversity, Conservation and Attractions

PARKS AND WILDLIFE

APPENDIX 5: LOT 348 FAUNA HABITAT ASSESSMENT

Greg Harewood
Zoologist
PO Box 755
BUNBURY WA 6231
5 February 2021

Doral Mineral Sands Pty Ltd
25 Harris Road
PICTON WA 6229

Attention: Craig Bovell

Dear Craig

RE: Habitat Assessment Lot 348 Boyanup Road West – Stratham

1. INTRODUCTION

Doral Mineral Sands Pty Ltd (Doral) is investigating the purchase of Lot 348 Boyanup Road West, Stratham (or part thereof) to offset the clearing of black cockatoo habitat and vegetation in general from within various mine site projects located in south west Western Australia.

The following report details an assessment of Lot 348 primarily carried out to inform Doral of its black cockatoo habitat values.

Lot 348 has a total area of 40.5 hectares (ha). The lot contains 8.4 ha of remnant native woodland which is the subject of this assessment (survey area). The balance of the lot contains a grassland of weeds, scattered trees and groves of trees. The entire lot is currently used for livestock grazing and hay production.

2. SCOPE OF WORKS

Doral defined the scope of the fauna assessment as:

- A targeted black cockatoo habitat survey;
- A preliminary assessment of the likelihood of the area representing significant habitat for other species of conservation significance (e.g. western ringtail possum);
- Provide report detailing methods and results

Note: For the purposes of this proposal the term Black Cockatoo is in reference to Baudin's Black Cockatoo *Calyptorhynchus baudinii*, Carnaby's Black Cockatoo *Calyptorhynchus latirostris* and the Forest Red-tailed Black Cockatoo *Calyptorhynchus banksii naso.*

3. METHODS

The survey of Lot 348 was undertaken on the 2 February 2021 by Greg Harewood (Zoologist) and Kurtis Harewood (field assistant).

3.1 GENERAL HABITAT ASSESSMENT

The vegetation communities, landforms and soils observed have been be used to classify the survey area into broad habitat types.

3.2 BLACK COCKATOO HABITAT ASSESSMENT

3.2.1 Breeding Habitat Assessment

The black cockatoo breeding habitat assessment ha involved the identification of all suitable breeding tree species within the survey area that have a diameter at breast height (DBH) equal to or greater than 50 centimetres (cm). The DBH of each tree was estimated using a pre-made 50 cm “caliper”.

3.2.2 Foraging Habitat Assessment

The location and nature of black cockatoo foraging evidence (e.g. chewed fruits around base of trees) observed during the field survey was recorded. The nature and extent of potential foraging habitat present was also documented irrespective of the presence of any actual foraging evidence.

3.2.3 Night Roosting Habitat Assessment

Direct and indirect evidence of black cockatoos roosting within trees on site was noted where observed (e.g. branch clippings, droppings or moulted feathers).

3.3 OTHER FAUNA SPECIES OF CONSERVATION SIGNIFICANCE

Concurrent with the black cockatoo habitat assessment, evidence (e.g. tracks, scats, individuals) of the presence of other species of conservation significance and their habitat were made and recorded.

4. RESULTS

4.1 GENERAL HABITAT ASSESSMENT

The survey area consists almost entirely of a marri (*Corymbia calophylla*) dominated woodland/open woodland with very occasional jarrah (*Eucalyptus marginata*) specimens over a grassland. The woodland contains virtually no midstory or native groundcover vegetation. A small, presumably, seasonally waterlogged area is present in the north west section of the survey area. This contains a very sparce low open woodland of “tea tree” (*Melaleuca* spp.) bordered in some parts by a small number of flooded gum (*Eucalyptus rudis*).

The location and extent o each of the defined fauna habitats are shown in Figure 1. Example images are provided in the Table below.

Table 1: Example images of the fauna habitats within the survey area

Fauna Habitat Description	Example Image
Woodland/open marri woodland over grassland on grey sandy clay.	
Very open tea tree low woodland with bordering flooded gum on grey sandy clay (seasonally waterlogged)	

The fauna values of the survey area have been severely compromised given its degraded state, lack of overall habitat quality and diversity. The original fauna assemblage is therefore likely to be depauperate. Most of the terrestrial vertebrate fauna species present are likely to be birds able to persist in degraded remnants of this type.

4.2 BLACK COCKATOO HABITAT ASSESSMENT

4.2.1 Breeding Habitat Assessment

Trees considered potentially suitable for black cockatoos to use as nesting habitat (subject to a suitable hollow being present and other factors) found within the survey area comprised the following species:

- Marri – *Corymbia calophylla*;
- Jarrah – *Eucalyptus marginata*;

- Flooded Gum - *Eucalyptus rudis*; and
- Dead unknown species; and

A summary of the habitat trees observed is provided in Table 1. The locations of habitat trees are shown in Figure 1.

Table 1: Summary of Potential Habitat Trees (DBH ≥50cm) within the Survey area

Total Number of Habitat Trees (DBH > 50cm)	Number of Habitat Trees with No Hollows Observed	Number of Habitat Trees with Possible Hollows considered Unsuitable for Black Cockatoos	Number of Habitat Trees with Possible Hollows considered Potentially suitable for Black Cockatoos	Tree Species			
				Marri	Jarrah	Flooded Gum	Dead Unidentified
262	243	19	0	221	10	1	30

The assessment identified 262 trees within the survey area with a DBH of ≥50cm. The vast majority of these trees (243) appeared to not contain hollows of any size. Nineteen (19) trees contained apparent or obvious hollows, all of which were assessed as being unlikely to be suitable for black cockatoos to currently use for nesting purposes, either because the hollow entrance appeared to be too small, or if the hollow entrance was large enough but the accommodating branch/trunk was too small. Several larger hollows were examined using a drone and found to be too shallow or to have unsuitable floor space (i.e. obstructed).

Additional details on each habitat trees observed can be found in the attached spreadsheet table attached to the end of this document.

4.2.2 Foraging Habitat Assessment

Table 2 lists flora species that are known to be used as a direct food source (e.g. seeds, flowers, nectar, bark or grubs) by one or more species of black cockatoo which were recorded within the survey area:

Table 2: Cockatoo Food Plants recorded within the Survey Area

Cockatoo Food Plants				Cockatoo Species		
Species	**Common Name**	**Status**	**Part Eaten**	**FRTBC**	**CBC**	**BBC**
Corymbia calophylla	Marri	Native	flowers, seeds, nectar	F,N,R	F,n,R	F,n,R
Eucalyptus marginata	Jarrah	Native	seeds	F,N,R	F,n,R	F,n,R
Eucalyptus rudis	Flooded Gum	Native	flowers		R	F

F, f = foraging, R, r = roosting, N, n = nesting (main and less commonly used species, respectively).

Evidence of black cockatoos foraging was observed during the field survey at a small number of locations. The evidence was all in the form of chewed fruits from marri trees. This activity was attributed to the forest red-tailed black cockatoo nature of marks left on the fruits. Several small

groups of forest red-tailed black cockatoos were also observed foraging within the survey area during the course of the survey.

Table 3: Foraging Evidence Examples

Foraging Evidence Description	Example Image
Marri fruits – foraging activity attributed to the Forest Red-tailed Black Cockatoo.	

The marri woodland/open woodland which makes up about 7 ha of the total survey area represents a quality foraging resource for all three black cockatoo species known to frequent the general area.

This resource is supplemented by the presence of the other two tree species, however they are represented by only a small number of specimens and therefore do not contribute to the total resource to a significant degree.

4.2.3 Night Roosting Habitat Assessment

No conclusive evidence of black cockatoos roosting within trees located within Lot 348 was observed during the survey period, though a small number of individuals were observed foraging during the day survey, and some feathers were found in one location.

It is difficult to determine if trees or groves of trees within the survey area represent potential roosting habitat as a range of factors, not all of which can be observed, determine suitability. Some of the larger trees may be suitable for roosting but as indicated no actual evidence of use was seen.

4.3 OTHER FAUNA SPECIES OF CONSERVATION SIGNIFICANCE

No evidence of any other fauna species of conservation significance was observed during the survey period.

With respect to western ringtail possums, the remnant vegetation onsite (i.e. woodland/open woodland with no midstorey component and a lack of favoured foraging species) represents unsuitable/very marginal habitat for the species. The area is therefore considered unlikely to support individuals of the species except on rare occasions (assuming some connectivity to nearby habitat that does support the species).

The only other fauna species of conservation significance that could possibly occur in the area are the Masked Owl (*Tyto novaehollandiae novaehollandiae*) (Priority 3), the South-western Brush-tailed Phascogale (*Phascogale tapoatafa wambenger*) (Schedule 6) and the Western False Pipistrelle (*Falsistrellus mackenziei*) (Priority 4). The survey area lacks hollow bearing trees so represents marginal refuge/breeding habitat for all three species but the Masked owl and the Western False Pipistrelle may forage in the woodland/open woodland habitat, nonetheless.

5. SUMMARY

Lot 348 contains 8.4 ha of remnant native woodland which was the subject of an assessment to determine the sites black cockatoo habitat values.

The survey area consists almost entirely of a marri (*Corymbia calophylla*) dominated woodland/open woodland with very occasional jarrah (*Eucalyptus marginata*) specimens over a grassland. The woodland contains virtually no midstory or native groundcover vegetation. A small, presumably, seasonally waterlogged area is present in the north west section of the survey area. This contains a very sparce low open woodland of “tea tree” (*Melaleuca* spp.) bordered in some parts by a small number of flooded gum (*Eucalyptus rudis*).

The black cockatoo habitat tree assessment identified 262 trees within the survey area with a DBH of >50cm. None of these trees contain hollows that can be considered suitable for black cockatoos to use for nesting purposes.

The marri woodland/open woodland which makes up about 7 ha of the total survey area represents a quality foraging resource for all three black cockatoo species known to frequent the general area.

No evidence of black cockatoos roosting within trees located within Lot 348 was observed during the survey period

No evidence of any other fauna species of conservation significance was observed during the survey period.

With respect to western ringtail possums, the remnant vegetation onsite (i.e. woodland/open woodland with no midstorey component and a lack of favoured foraging species) represents unsuitable/very marginal habitat for the species. The area is therefore considered unlikely to support individuals of the species except on rare occasions (assuming some connectivity to nearby habitat that does support the species).

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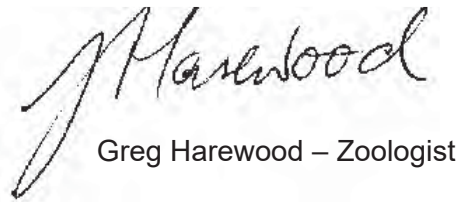
If you have any questions regarding this matter please do not hesitate to contact me on 0402 141 197.



Greg Harewood – Zoologist

Legend

- Survey Area
- Marri Woodland/Open Woodland
- Tea Tree Very OpenLow Woodland
- Habitat Tree - One or more possible/actual hollows assessed as unsuitable for black cockatoos
- Habitat Tree - No hollows seen

N

0 25 50 75 100

Metres

Fauna Survey

Lot 348 Boyanup Road West
Doral Mineral Sands P/L

Habitat & Habitat Trees (DBH >50cm)

Drawn: G Harewood
Date: Feb 2021
Scale: 1:2,250
Projection/Coordinate System: UTM/MGA Zone 50

Figure: 1

Habitat Trees
DBH >50cm
Datum - GDA94
Entrance Size Ranges - Small = >5cm, Medium = 5 to 10cm, Large = >10cm

Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	DBH (cm)	Number of Hollows	Hollow Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt001	50H	371838	6295260	Marri	15-20	>50	0					
wpt002	50H	371838	6295264	Marri	15-20	>50	0					
wpt003	50H	371837	6295271	Marri	15-20	>50	0					
wpt004	50H	371846	6295272	Dead Unknown	15-20	>50	0					
wpt005	50H	371848	6295276	Marri	15-20	>50	0					
wpt006	50H	371852	6295274	Marri	15-20	>50	0					
wpt007	50H	371853	6295286	Marri	15-20	>50	0					
wpt008	50H	371859	6295282	Marri	15-20	>50	0					
wpt009	50H	371857	6295263	Marri	15-20	>50	0					
wpt010	50H	371868	6295255	Marri	15-20	>50	0					
wpt011	50H	371871	6295257	Dead Marri	15-20	>50	0					
wpt012	50H	371875	6295271	Dead Unknown	10-15	>50	0					
wpt013	50H	371897	6295253	Marri	15-20	>50	0					
wpt014	50H	371904	6295255	Marri	15-20	>50	0					
wpt015	50H	371912	6295250	Marri	15-20	>50	0					
wpt016	50H	371917	6295247	Dead Unknown	15-20	>50	0					
wpt017	50H	371937	6295256	Marri	15-20	>50	0					
wpt018	50H	371944	6295254	Marri	15-20	>50	0					
wpt019	50H	371956	6295277	Marri	15-20	>50	0					
wpt020	50H	371959	6295292	Marri	15-20	>50	0					
wpt021	50H	371963	6295308	Marri	15-20	>50	0					
wpt022	50H	371958	6295315	Dead Unknown	15-20	>50	0					
wpt023	50H	371963	6295312	Marri	15-20	>50	0					
wpt024	50H	371962	6295331	Marri	15-20	>50	1	Medium	No Signs	No Signs	No	
wpt025	50H	371972	6295324	Marri	20+	>50	0					
wpt026	50H	371970	6295334	Marri	15-20	>50	0					
wpt027	50H	371968	6295347	Marri	15-20	>50	0					
wpt028	50H	371958	6295349	Marri	15-20	>50	0					
wpt029	50H	371965	6295362	Dead Unknown	15-20	>50	0					
wpt030	50H	371957	6295361	Marri	15-20	>50	0					
wpt031	50H	371950	6295364	Marri	20+	>50	0					
wpt032	50H	371947	6295366	Marri	20+	>50	0					
wpt033	50H	371949	6295384	Marri	15-20	>50	0					

Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	DBH (cm)	Number of Hollows	Hollow Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt034	50H	371940	6295381	Dead Unknown	10-15	>50	0					
wpt035	50H	371916	6295375	Marri	15-20	>50	0					
wpt036	50H	371914	6295377	Marri	15-20	>50	0					
wpt037	50H	371902	6295399	Marri	15-20	>50	0					
wpt038	50H	371886	6295385	Marri	15-20	>50	0					
wpt039	50H	371866	6295384	Marri	15-20	>50	0					
wpt040	50H	371850	6295398	Marri	15-20	>50	0					
wpt041	50H	371845	6295389	Marri	15-20	>50	0					
wpt042	50H	371837	6295391	Marri	15-20	>50	0					
wpt043	50H	371827	6295378	Marri	15-20	>50	0					
wpt044	50H	371821	6295375	Marri	15-20	>50	0					
wpt045	50H	371809	6295362	Marri	15-20	>50	0					
wpt046	50H	371809	6295360	Marri	15-20	>50	0					
wpt047	50H	371809	6295358	Marri	15-20	>50	0					
wpt048	50H	371806	6295359	Marri	15-20	>50	0					
wpt049	50H	371827	6295362	Marri	15-20	>50	0					
wpt050	50H	371832	6295367	Marri	20+	>50	0					
wpt051	50H	371837	6295358	Marri	15-20	>50	0					
wpt052	50H	371851	6295358	Marri	15-20	>50	0					
wpt053	50H	371851	6295347	Marri	15-20	>50	0					
wpt054	50H	371854	6295341	Marri	15-20	>50	0					
wpt055	50H	371866	6295352	Marri	15-20	>50	0					
wpt056	50H	371875	6295353	Dead Jarrah	10-15	>50	2+	Small & Medium	No Signs	No Signs	No	
wpt057	50H	371881	6295338	Marri	15-20	>50	0					
wpt058	50H	371877	6295331	Marri	15-20	>50	0					
wpt059	50H	371881	6295326	Dead Unknown	15-20	>50	0					
wpt060	50H	371870	6295318	Marri	15-20	>50	0					
wpt061	50H	371874	6295309	Marri	15-20	>50	0					
wpt062	50H	371895	6295298	Marri	15-20	>50	0					
wpt063	50H	371897	6295300	Marri	15-20	>50	0					
wpt064	50H	371903	6295293	Dead Jarrah	15-20	>50	2+	Small, Medium & Large	No Signs	No Signs	No	Examined with drone - Hollows appear unsuitable
wpt065	50H	371915	6295299	Marri	15-20	>50	0					
wpt066	50H	371916	6295311	Marri	20+	>50	0					
wpt067	50H	371924	6295314	Dead Unknown	15-20	>50	0					
wpt068	50H	371916	6295322	Marri	15-20	>50	0					
wpt069	50H	371940	6295316	Marri	15-20	>50	0					
wpt070	50H	371923	6295328	Dead Unknown	15-20	>50	2+	Small	No Signs	No Signs	No	

Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	DBH (cm)	Number of Hollows	Hollow Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt071	50H	371926	6295343	Marri	15-20	>50	0					
wpt072	50H	371933	6295357	Dead Jarrah	10-15	>50	0					
wpt073	50H	371898	6295362	Marri	15-20	>50	0					
wpt074	50H	371889	6295355	Jarrah	15-20	>50	2+	Small & Medium	No Signs	No Signs	No	
wpt075	50H	371883	6295348	Marri	15-20	>50	0					
wpt076	50H	371891	6295351	Marri	15-20	>50	0					
wpt077	50H	371908	6295344	Marri	15-20	>50	0					
wpt078	50H	371903	6295345	Marri	15-20	>50	0					
wpt079	50H	372000	6295344	Marri	15-20	>50	0					
wpt080	50H	372002	6295343	Marri	15-20	>50	0					
wpt081	50H	372004	6295336	Marri	15-20	>50	0					
wpt082	50H	372016	6295342	Marri	15-20	>50	0					
wpt083	50H	372025	6295336	Marri	20+	>50	0					
wpt084	50H	372023	6295330	Marri	15-20	>50	0					
wpt085	50H	372034	6295328	Marri	15-20	>50	0					
wpt086	50H	372035	6295331	Marri	15-20	>50	0					
wpt087	50H	372044	6295335	Marri	15-20	>50	0					
wpt088	50H	372052	6295328	Marri	15-20	>50	0					
wpt089	50H	372047	6295334	Marri	15-20	>50	0					
wpt090	50H	372059	6295325	Marri	20+	>50	0					
wpt091	50H	372077	6295324	Marri	20+	>50	0					
wpt092	50H	372089	6295321	Marri	15-20	>50	0					
wpt093	50H	372104	6295323	Marri	15-20	>50	0					
wpt094	50H	372116	6295322	Marri	15-20	>50	0					
wpt095	50H	372118	6295325	Marri	15-20	>50	0					
wpt096	50H	372128	6295321	Marri	15-20	>50	0					
wpt097	50H	372128	6295325	Marri	15-20	>50	0					
wpt098	50H	372136	6295323	Dead Unknown	15-20	>50	0					
wpt099	50H	372140	6295325	Marri	15-20	>50	0					
wpt100	50H	372148	6295325	Marri	15-20	>50	0					
wpt101	50H	372181	6295324	Marri	15-20	>50	0					
wpt102	50H	372179	6295320	Marri	15-20	>50	0					
wpt103	50H	372186	6295324	Marri	15-20	>50	0					
wpt104	50H	372187	6295348	Marri	20+	>50	0					
wpt105	50H	372185	6295342	Marri	15-20	>50	0					
wpt106	50H	372185	6295354	Marri	15-20	>50	0					
wpt107	50H	372181	6295366	Marri	15-20	>50	0					

Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	DBH (cm)	Number of Hollows	Hollow Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt108	50H	372181	6295366	Dead Unknown	15-20	>50	2+	Small	No Signs	No Signs	No	
wpt109	50H	372187	6295373	Marri	20+	>50	0					
wpt110	50H	372185	6295381	Marri	15-20	>50	0					
wpt111	50H	372185	6295383	Marri	15-20	>50	0					
wpt112	50H	372167	6295391	Dead Unknown	10-15	>50	0					
wpt113	50H	372168	6295380	Marri	15-20	>50	0					
wpt114	50H	372168	6295377	Marri	20+	>50	0					
wpt115	50H	372152	6295389	Marri	15-20	>50	0					
wpt116	50H	372140	6295403	Marri	20+	>50	0					
wpt117	50H	372130	6295394	Dead Unknown	15-20	>50	2+	Small	No Signs	No Signs	No	
wpt118	50H	372121	6295404	Dead Unknown	15-20	>50	2+	Small	No Signs	No Signs	No	
wpt119	50H	372118	6295414	Marri	15-20	>50	0					
wpt120	50H	372091	6295415	Marri	15-20	>50	0					
wpt121	50H	372055	6295420	Marri	15-20	>50	0					
wpt122	50H	372032	6295400	Marri	15-20	>50	0					
wpt123	50H	372013	6295381	Marri	15-20	>50	0					
wpt124	50H	371993	6295383	Marri	15-20	>50	0					
wpt125	50H	371975	6295387	Marri	15-20	>50	0					
wpt126	50H	371973	6295379	Marri	15-20	>50	0					
wpt127	50H	371969	6295374	Marri	15-20	>50	0					
wpt128	50H	371980	6295365	Marri	15-20	>50	0					
wpt129	50H	371991	6295359	Marri	15-20	>50	0					
wpt130	50H	371995	6295350	Marri	15-20	>50	0					
wpt131	50H	372013	6295364	Marri	15-20	>50	0					
wpt132	50H	372024	6295353	Marri	15-20	>50	0					
wpt133	50H	372040	6295343	Marri	15-20	>50	0					
wpt134	50H	372049	6295357	Dead Unknown	15-20	>50	2+	Small	No Signs	No Signs	No	
wpt135	50H	372061	6295346	Marri	15-20	>50	0					
wpt136	50H	372079	6295345	Dead Unknown	15-20	>50	0					
wpt137	50H	372086	6295333	Marri	15-20	>50	0					
wpt138	50H	372090	6295328	Marri	15-20	>50	0					
wpt139	50H	372089	6295340	Marri	15-20	>50	0					
wpt140	50H	372094	6295341	Marri	15-20	>50	0					
wpt141	50H	372098	6295336	Marri	15-20	>50	0					
wpt142	50H	372109	6295336	Marri	15-20	>50	0					
wpt143	50H	372116	6295333	Jarrah	15-20	>50	0					
wpt144	50H	372128	6295339	Jarrah	10-15	>50	2+	Small	No Signs	No Signs	No	

Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	DBH (cm)	Number of Hollows	Hollow Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt145	50H	372122	6295345	Marri	15-20	>50	0					
wpt146	50H	372140	6295335	Marri	15-20	>50	0					
wpt147	50H	372147	6295335	Marri	15-20	>50	0					
wpt148	50H	372155	6295329	Marri	15-20	>50	0					
wpt149	50H	372157	6295337	Marri	15-20	>50	0					
wpt150	50H	372156	6295343	Marri	15-20	>50	0					
wpt151	50H	372167	6295347	Marri	15-20	>50	0					
wpt152	50H	372159	6295356	Marri	15-20	>50	0					
wpt153	50H	372142	6295366	Marri	15-20	>50	0					
wpt154	50H	372139	6295371	Marri	15-20	>50	0					
wpt155	50H	372138	6295382	Dead Unknown	15-20	>50	0					
wpt156	50H	372099	6295389	Marri	15-20	>50	0					
wpt157	50H	372093	6295396	Marri	15-20	>50	0					
wpt158	50H	372097	6295374	Marri	15-20	>50	0					
wpt159	50H	372114	6295368	Marri	15-20	>50	0					
wpt160	50H	372125	6295360	Jarrah	10-15	>50	0					
wpt161	50H	372098	6295349	Jarrah	15-20	>50	2+	Small, Medium & Large	No Signs	No Signs	No	Examined with drone - Hollows unsuitable
wpt162	50H	372087	6295349	Marri	15-20	>50	0					
wpt163	50H	372080	6295366	Marri	15-20	>50	0					
wpt164	50H	372079	6295374	Jarrah	10-15	>50	0					
wpt165	50H	372073	6295377	Marri	15-20	>50	0					
wpt166	50H	372070	6295373	Jarrah	15-20	>50	1	Small	No Signs	No Signs	No	
wpt167	50H	372058	6295379	Marri	15-20	>50	0					
wpt168	50H	372047	6295374	Dead Unknown	15-20	>50	0					
wpt169	50H	372038	6295379	Dead Unknown	15-20	>50	0					
wpt170	50H	372023	6295364	Marri	15-20	>50	0					
wpt171	50H	372190	6295420	Marri	20+	>50	0					
wpt172	50H	372188	6295427	Marri	15-20	>50	0					
wpt173	50H	372185	6295450	Marri	15-20	>50	0					
wpt174	50H	372180	6295462	Marri	15-20	>50	0					
wpt175	50H	372182	6295470	Marri	15-20	>50	0					
wpt176	50H	372184	6295488	Marri	15-20	>50	0					
wpt177	50H	372183	6295495	Marri	15-20	>50	0					
wpt178	50H	372173	6295498	Marri	15-20	>50	0					
wpt179	50H	372170	6295487	Marri	15-20	>50	0					
wpt180	50H	372180	6295507	Marri	15-20	>50	0					
wpt181	50H	372177	6295511	Marri	15-20	>50	0					

Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	DBH (cm)	Number of Hollows	Hollow Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt182	50H	372182	6295518	Marri	15-20	>50	0					
wpt183	50H	372179	6295520	Marri	15-20	>50	0					
wpt184	50H	372192	6295536	Marri	15-20	>50	0					
wpt185	50H	372169	6295535	Marri	15-20	>50	0					
wpt186	50H	372157	6295524	Marri	15-20	>50	0					
wpt187	50H	372144	6295527	Marri	15-20	>50	0					
wpt188	50H	372132	6295529	Dead Unknown	20+	>50	0					
wpt189	50H	372131	6295516	Marri	15-20	>50	0					
wpt190	50H	372105	6295535	Marri	15-20	>50	0					
wpt191	50H	372098	6295507	Marri	15-20	>50	0					
wpt192	50H	372089	6295498	Marri	15-20	>50	0					
wpt193	50H	372105	6295486	Marri	15-20	>50	0					
wpt194	50H	372101	6295469	Marri	15-20	>50	0					
wpt195	50H	372105	6295459	Marri	15-20	>50	0					
wpt196	50H	372093	6295448	Marri	15-20	>50	0					
wpt197	50H	372095	6295442	Marri	15-20	>50	0					
wpt198	50H	372098	6295434	Marri	15-20	>50	0					
wpt199	50H	372129	6295431	Marri	15-20	>50	0					
wpt200	50H	372134	6295444	Dead Unknown	20+	>50	0					
wpt201	50H	372133	6295449	Marri	15-20	>50	0					
wpt202	50H	372152	6295445	Marri	15-20	>50	0					
wpt203	50H	372151	6295436	Marri	15-20	>50	0					
wpt204	50H	372152	6295416	Dead Unknown	20+	>50	0					
wpt205	50H	372152	6295414	Marri	15-20	>50	0					
wpt206	50H	372164	6295455	Marri	15-20	>50	0					
wpt207	50H	372121	6295475	Marri	15-20	>50	0					
wpt208	50H	372132	6295463	Marri	15-20	>50	0					
wpt209	50H	372130	6295460	Marri	15-20	>50	0					
wpt210	50H	372074	6295529	Marri	20+	>50	0					
wpt211	50H	372055	6295529	Marri	15-20	>50	0					
wpt212	50H	372048	6295523	Marri	15-20	>50	0					
wpt213	50H	372042	6295521	Marri	15-20	>50	0					
wpt214	50H	372020	6295514	Dead Unknown	20+	>50	0					
wpt215	50H	372005	6295523	Marri	15-20	>50	0					
wpt216	50H	372002	6295526	Marri	15-20	>50	0					
wpt217	50H	371993	6295524	Marri	15-20	>50	0					
wpt218	50H	371984	6295524	Marri	15-20	>50	0					

Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	DBH (cm)	Number of Hollows	Hollow Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt219	50H	371924	6295536	Dead Unknown	20+	>50	0					
wpt220	50H	371920	6295534	Marri	15-20	>50	0					
wpt221	50H	371919	6295524	Marri	15-20	>50	0					
wpt222	50H	371911	6295514	Marri	15-20	>50	2+	Small	No Signs	No Signs	No	
wpt223	50H	371900	6295514	Marri	15-20	>50	0					
wpt224	50H	371893	6295508	Marri	15-20	>50	0					
wpt225	50H	371889	6295502	Marri	15-20	>50	0					
wpt226	50H	371887	6295497	Marri	15-20	>50	0					
wpt227	50H	371885	6295495	Marri	15-20	>50	0					
wpt228	50H	371883	6295485	Marri	15-20	>50	0					
wpt229	50H	371880	6295485	Marri	15-20	>50	0					
wpt230	50H	371879	6295479	Marri	15-20	>50	0					
wpt231	50H	371876	6295472	Marri	15-20	>50	0					
wpt232	50H	371876	6295468	Flooded Gum	15-20	>50	0					
wpt233	50H	371855	6295434	Marri	15-20	>50	0					
wpt234	50H	371855	6295433	Marri	15-20	>50	0					
wpt235	50H	371854	6295429	Marri	15-20	>50	0					
wpt236	50H	371854	6295431	Marri	15-20	>50	0					
wpt237	50H	371848	6295420	Marri	15-20	>50	0					
wpt238	50H	371858	6295416	Marri	15-20	>50	0					
wpt239	50H	371859	6295420	Marri	15-20	>50	0					
wpt240	50H	371864	6295431	Marri	15-20	>50	0					
wpt241	50H	371878	6295427	Marri	15-20	>50	0					
wpt242	50H	371906	6295473	Dead Unknown	10-15	>50	1	Medium	No Signs	No Signs	No	
wpt243	50H	371941	6295481	Dead Unknown	15-20	>50	2+	Small	No Signs	No Signs	No	
wpt244	50H	371949	6295466	Marri	15-20	>50	0					
wpt245	50H	371966	6295453	Marri	15-20	>50	0					
wpt246	50H	371975	6295433	Marri	20+	>50	2+	Small & Medium	No Signs	No Signs	No	
wpt247	50H	371997	6295409	Marri	15-20	>50	0					
wpt248	50H	371971	6295404	Marri	15-20	>50	0					
wpt249	50H	372004	6295435	Marri	15-20	>50	0					
wpt250	50H	372014	6295431	Marri	15-20	>50	0					
wpt251	50H	372013	6295435	Marri	15-20	>50	0					
wpt252	50H	372027	6295460	Marri	15-20	>50	0					
wpt253	50H	372046	6295460	Dead Unknown	15-20	>50	2+	Small	No Signs	No Signs	No	
wpt254	50H	372049	6295462	Marri	15-20	>50	0					
wpt255	50H	372065	6295456	Marri	20+	>50	2+	Small & Medium	Bees	No Signs	No	

Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	DBH (cm)	Number of Hollows	Hollow Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt256	50H	372074	6295458	Marri	15-20	>50	0					
wpt257	50H	372070	6295515	Marri	15-20	>50	0					
wpt258	50H	372075	6295520	Marri	15-20	>50	0					
wpt259	50H	372037	6295497	Dead Unknown	15-20	>50	0					
wpt260	50H	372015	6295481	Dead Unknown	15-20	>50	2+	Small, Medium & Large	No Signs	No Signs	No	Examined with drone - appears too shallow
wpt261	50H	372004	6295481	Dead Unknown	15-20	>50	0					
wpt262	50H	371983	6295484	Marri	15-20	>50	0					

Web: barkenviro.com M: 0400 308 582 ABN: 18643939360

DORAL Mineral Sands Pty Ltd
PO Box PO Box 9155
PICTON WA 6229
ATT: Craig Bovell

07.09.2021
Our ref: BARK66.2021

RE: Phytophthora Dieback Assessment in vegetated block within Lot 348 Boyanup Road West

Dear Craig,
Thank you for engaging BARK Environmental to assess Phytophthora Dieback within Lot 348, namely the vegetated area we understand is a potential future environmental offset site.
Please refer below to the results and Dieback Management recommendations below.

On 6th September 2021, Bruno Rikli a Registered Dieback Interpreter with the Department off Biodiversity, Conservation and Attractions (DBCA, W.A.) assessed Lot 348 for Phytophthora disease. Lot 348 comprises approximately 40.5 hectares (ha) largely cleared degraded land with no intact native vegetation community remaining, except for one treed block of approximately 8.4 ha. The broader cleared area warrants no further assessment or specific Dieback management as no susceptible vegetation remains and it has been subjected to open grazing and obvious soil disturbance without hygiene for many years. The 8.4 ha treed area was the subject of this Phytophthora occurrence assessment.

METHOD OF ASSESSMENT and VEGETATION DESCRIPTION:
Field interpretation followed the comprehensive assessment methodology described in the "*Forest and Ecosystem Management Division 2015 (047), Phytophthora Dieback Interpreter's manual for lands managed by the department, Department of Parks and Wildlife, Perth, Western Australia*." (DPaW, 2015). Presence or absence of *Phytophthora cinnamomi* ('the pathogen') was determined through field observations and the relevant Dieback occurrence mapping category was applied (see Table 1). Sampling of dead and dying plants was not undertaken due to a complete absence of understorey indicator plants due to clearing and grazing. Demarcation and mapping was not required.

Table 1: Phytophthora Occurrence Categories (DBCA, 2015).

Phytophthora occurrence category	Description
Infested	Determined by a registered interpreter to have plant disease symptoms consistent with the presence of Phytophthora cinnamomi.
Uninfested	Determined by a registered interpreter to be free of plant disease symptoms which indicates the presence of Phytophthora cinnamomi
Uninterpretable	Where susceptible plants are absent or too few to enable the interpretation of Phytophthora cinnamomi presence or absence
Temporarily Uninterpretable	Areas of temporary disturbance where natural vegetation is likely to recover
Not Yet Resolved	Areas where Phytophthora cinnamomi occurrence diagnosis cannot be easily made within the required timeframe because of inconsistent evidence
Excluded (not coloured on figures)	Areas of long-term high disturbance where natural vegetation has been cleared and is unlikely to recover.

RESULTS:

Site Vegetation:
The understorey has been replaced by grasses and paddock weeds. The vegetation remaining can be described as park land cleared or open Marri (*Corymbia calophylla*) woodland. There are very few Jarrah (*E. marginata*), a tree susceptible to *Phytophthora* disease within this area and none displayed symptoms of the disease, but they were too few to enable interpretation. One small degraded damp-land area exists within the treed lock towards its western part that was comprised of an open degraded mid-storey of what appears to be a *Melaleuca spp.* and *E. rudis*. Evidence of cattle movements, grazing and trampling throughout this area and the greater Lot is obvious and kangaroos are abundant in this locality and significantly add to grazing pressure on native vegetation.

The entire treed block of 8.4 ha within Lot 348 falls was allocated the "Excluded" Dieback occurrence category assigned to Degraded and Completely Degraded vegetation condition areas (See Figure 1).

As such Dieback Occurrence Assessment is not currently possible within any part of Lot 348 due to its absence of indicator plant species to enable Dieback Interpretation.

RECOMMENDATIONS:

If the long-term goal is to retain the treed area for conservation and revegetate it with native seedlings the following precautionary Dieback Hygiene measures are recommended. Employing these measures will support the success of revegetation by minimising the risk of introducing or spreading the pathogen accidentally during any revegetation and/or internal disturbance activities. In addition, a basic biosecurity hygiene measure is given for the greater surrounds to minimise the risk of potential off-site spread of pathogens should any be present in the open paddock areas.

1. Recommendations for the treed block within Lot 348:

The aim here should be: To minimise the risk of introducing Phytophthora disease in retained vegetation areas.
Management Measures:

- Inform all personnel / contractors who need to enter the area – to ensure a Clean-on-Entry protocol is applied at all relevant access points along the fenced boundary of the treed block. i.e. within Inductions and EMP.
- Source seedlings from a NIASA accredited nursery to ensure they do not contain pathogens or weeds.
- Maintain a form of record of the above such as emails/advice given/EMP.

2. Recommendations for the remainder of Lot 348:

The aim here should be: To minimise the risk of vehicles, equipment and footwear from carrying potentially infected paddock soil/organic material to within off-site susceptible native vegetation areas.

- Inform all personnel / contractors who need to arrive to site Clean and Exit Clean at relevant access points. i.e. within Inductions and EMP.
- There are no further Dieback Hygiene requirements necessary for this area because it is Completely Degraded from past agricultural history and parts are subjected to waterlogging in high rainfall years.
- Maintain a form of record of the above such as emails/advice given/EMP.

If you have any further queries on this aspect, please contact me.

Sincerely,

Bruno Rikli
DIRECTOR – BARK ENVIRONMENTAL PTY LTD
BSc Environmental Management, Certificate CALM/Dieback Interpreter 25 years
Registered Dieback Interpreter – DBCA
Pesticide Business Registration #2308 – WA Dept. of Health
Pest Management Technician Licence (WA) No. 8198 - WA Dept. of Health
Registered Green Card Trainer – Dieback Working Group Inc.

Figure 1. Dieback assessment transects, white evidence waypoints confirming "Excluded" category applies and area subject to seasonal waterlogging shown in blue polygon.

APPENDIX 6: REVEGETATION PLAN FOR BLACK COCKATOO FORAGING HABITAT

YALYALUP
Mineral Sands Project

STRATHAM OFFSETS REVEGETATION MANAGEMENT PLAN

Date: 13 September 2021

Document Ref: DMS-YAL-7.2 Stratham Offsets Revegetation Management Plan

Ministerial Statement NO: 1168

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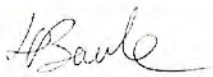
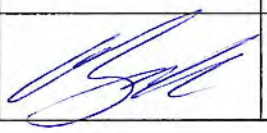
DOCUMENT DETAILS

DOCUMENT ID	REPORT TITLE	VERSION	DATE	PREPARED FOR
DMS-YAL-7.2 Stratham Offsets Revegetation Management Plan	Yalyalup Mineral Sands Project, Mining Proposal, Stratham Offsets Revegetation Management Plan	Version 1	13/9/21	DAWE/EPA

PREPARED BY

NAME	TITLE	ROLE	SIGNATURE	DATE
Damon Bourke	ABEC Environmental Consulting Pty Ltd Principal Environmental Scientist	Author		13/9/21
Craig Bovell	Doral Mineral Sands Pty Ltd OHS&E Superintendent	Reviewer		13/9/21

Prepared by:

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Table of Contents

1. Introduction

This Revegetation Management Plan has been prepared in accordance with the Department of Water and Environmental Regulation publication, *A Guide to Preparing Revegetation Plans for Clearing Permits* (DWER, 2018) to counterbalance direct impacts from clearing 102 Black Cockatoo potential habitat trees (1.78ha) in association with the Yalyalup Mineral Sands Project Land Acquisition Strategy (Doral 2021) as submitted to the Commonwealth Department for Agriculture, Water and the Environment (DAWE).

This Revegetation Management Plan forms part of Doral's proposed Offset Strategy for significant impacts to Black Cockatoo foraging and potential breeding habitat as a result of the Yalyalup Project and details the activities associated with the preparation, revegetation, maintenance and monitoring associated with the securing and enhancement of 4.15 ha of Black Cockatoo foraging and potential breeding habitat located at Lot 348 Stratham in the Shire of Capel, WA as suitable habitat for *the following three species of Balck cockatoos:*

- *Carnaby`s Black-Cockatoo Zanda latirostris – listed as Endangered under the BC Act and EPBC Act.*
- *Baudin's Black-Cockatoo Zanda baudinii – listed as Endangered under the BC Act and EPBC Act.*
- *Forest Red-tailed Black-Cockatoo Calyptorhynchus banksii naso – listed as Vulnerable under the BC Act and EPBC Act.*

1.1 Objectives

The aim of this Revegetation Management Plan is to provide clear definition as to the methodology and expectations associated with the revegetation component of the Yalyalup Mineral Sands Project to provide foraging and potential breeding habitat as an offset for the direct clearing of 1.78ha (102 trees) of Black Cockatoo foraging and potential breeding habitat.

The following specific objectives for the offset is as follows:

- Planting of species suitable as habitat for *Zanda latirostris* (Carnaby's Black Cockatoo), *Zanda baudinii* (Baudin's Black Cockatoo) and *Calyptorhychus banksia naso (*Forest Red-tailed Black Cockatoo).
- Planting of species suitable for the establishment of woodland comprised of *Corymbia calophylla* (Marri), *Eucalyptus marginata* (Jarrah) and *Agonis flexuosa* (Peppermint tree).
- Planting of understorey species with local provenance at optimal time,
- The capacity of the site to become sustainable with minimal management whilst working towards becoming self-sustaining once established.

2. Background and Site Description

2.1 Location, Ownership, Vesting and Zoning

The Stratham Offset is located approximately 15km south of Bunbury WA at Lot 348 Boyanup West Road, Stratham. Lot 348 is owned by Doral Mineral Sands Pty Ltd and has a total area of 40.5 hectares (ha). The lot contains 8.4 ha of remnant native woodland which is the subject of this assessment (survey area). The balance of the lot contains a grassland of weeds, scattered trees and groves of trees. The entire lot is currently used for livestock grazing and hay production.

2.2 Physical and Biological Features

The survey area consists almost entirely of a marri (Corymbia calophylla) dominated woodland/open woodland with very occasional jarrah (Eucalyptus marginata) specimens over a grassland. The woodland contains virtually no midstory or native groundcover vegetation. A small, presumably, seasonally waterlogged area is present in the north west section of the survey area. This contains a very sparce low open woodland of "tea tree" (Melaleuca spp.) bordered in some parts by a small number of flooded gum (Eucalyptus rudis).

Figure 1. Marri dominated woodland/open woodland

Trees considered potentially suitable for black cockatoos to use as nesting habitat (subject to a suitable hollow being present and other factors) found within the survey area comprised the following species:

- Marri – *Corymbia calophylla*;
- Jarrah – *Eucalyptus marginata*; and
- Flooded Gum - *Eucalyptus rudis*.

2.3 Site History

Consistent grazing by stock appears to be the most commonly undertaken activity across the revegetation site prior to acquisition and proposed revegetation by Doral Mineral Sands Pty Ltd.

2.4 Disturbances, Threats and Other Site Conditions

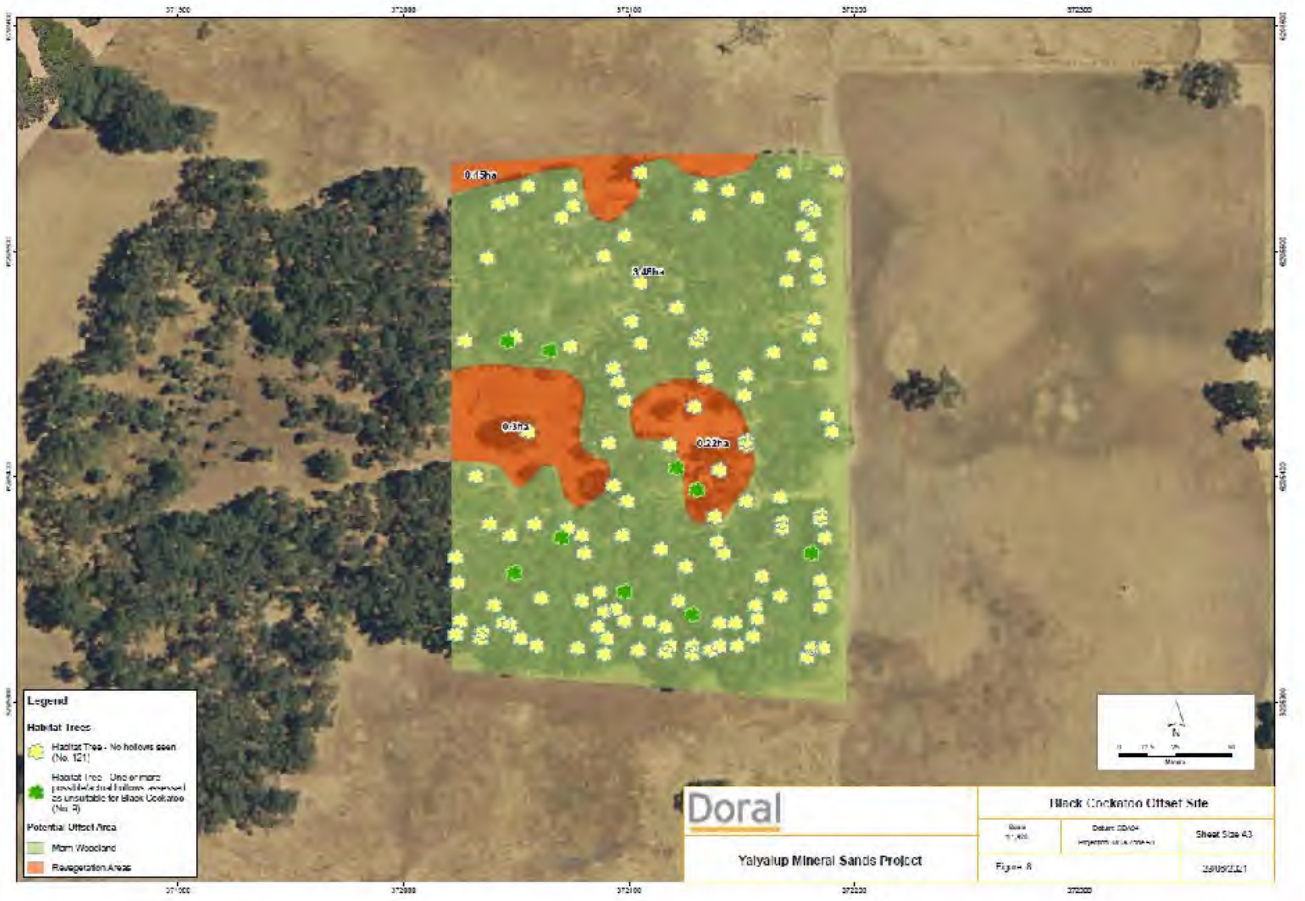
Weed encroachment, feral animal and pest exclusion (or control) as well as alleviating soil compaction will be the main considerations associated with the successful establishment of self-sustaining, native vegetation at the site.

3. Revegetation Methodology

The revegetation site will be completely fenced to exclude feral and grazing animals and weed control spraying will be applied no less than 3 times prior to the preparation of the ground by ripping and furrowing. Plant species will be represented by suitable habitat species for threatened fauna with a focus on establishing a sustainable woodland comprised of *Corymbia calophylla* (Marri), *Agonis flexuosa* (Peppermint Tree), *Banksia attenuata* (Candlestick Banksia*), Banksia grandis* (Bull Banksia) and *Eucalyptus marginata* (Jarrah).

Native vegetation which exists to the west of the proposed Offset area shown in Figure 2 below, will be similarly fenced and revegetated in the likely scenario for use as a future offset.

Figure 2. Approximate site allocation for revegetation zones



3.1 Provenance Native Seed Collection

Provenance native seed collection will be undertaken from stands of remnant vegetation in proximity to the project site to be utilised for nursery propagation and direct seeding. A seeding rate of 2.5kg per hectare is recommended, equating to a total of 10kg of seed required for the direct seeding. Small batches of recalcitrant

species will be targeted during the collections for nursery propagation and subsequent seedling planting where direct seeding is not practical.

With implementation projected for Winter 2022, provenance collections will be undertaken over the 2020/21 and 2021/22 South West seed collection seasons, typically running from November through to April. This will allow for targeted collections and a broad range of species being obtained, with up to 35 different species being targeted. Species selection are based on historical local flora surveys and those considered suitable habitat (feeding and/or nesting) for threatened native fauna. Table 2 (see Appendix) details an indicative species list that will be targeted for collection. It is anticipated that other suitable species observed to be growing in similar vegetation types within the provenance zone may be added once collections are underway. All seed collected will be vacuum sealed and held in temperature-controlled storage until required for use.

3.2 Cutting Material Collection

Species identified as being difficult to secure viable seed from, or that hold significant importance with regard to project objectives, will have cutting material taken from them for propagation at a suitably experienced nursery. This activity will be best undertaken in Spring 2021 to allow appropriate time for seedlings to establish.

3.3 Site Exclusion Fencing and Rabbit Control

Perimeter exclusion fencing is essential in mitigating the risks of predation by kangaroos and other grazing animals. Fencing would need to be of a height and strength adequate in preventing access by pest fauna. Timely rabbit baiting and burrow fumigation will provide a cost-effective rabbit control in addition to a rabbit 'skirt' along the bottom of the perimeter fence line. Initial control would be scheduled for April-May 2022 with follow up treatments as required. Signage educating the general public, mine employees and contractors of the revegetation activities will be installed at access points to the site.

Figure 3. Photo of Doral Offset fencing design

3.4 Pre-vegetation Establishment Weed Control

The success of any revegetation project is dependent on timely and thorough weed control. Applications of broad acre weed control throughout the revegetation site in Spring 2021 and Summer and Autumn 2022 will

be undertaken to reduce the weed burden and deplete the weed seed bank prior to implementation. Follow up pre-planting weed control will be undertaken and then occur each spring and autumn. Summer weed control will also be implemented in case weeds encouraged by soil disturbance need to be managed.

3.5 Site Preparation

To alleviate soil compaction, promote root development and to provide protection for broadcasted seed, ripping and furrowing of the site will be undertaken prior to implementation. Intermittent access tracks throughout the site will be established to enable more efficient post-implementation weed control and monitoring.

Hygiene protocols will be implemented where any machinery, equipment and personnel are accessing the revegetation site to eliminate the introduction of diseases and weed species. This will include the inspection and cleaning of all light vehicles and earth-moving equipment to remove any residual soil and/or vegetation prior to entering and leaving the area. A dieback Clean on Entry point will be installed once fencing is in place.

3.6 Seed Pre-treatment and Batching

Seed pre-treatments and batching will be carried out in the days leading up to direct seeding, anticipated in late July/early August of 2022.

Seed pre-treatments are required to break dormancy of certain species allowing for a higher germination rate across the site utilising a combination of smoke, hot water, heat and acid.

Seed batching will aid in ensuring species and quantities are evenly distributed across the site. An initial site visit identified the requirement for a seeding mix incorporating suitable wetland species and a fringing intermediate species mix including *Corymbia calophylla* (Marri), *Agonis flexuosa* (Peppermint Tree) and *Eucalyptus marginata* (Jarrah). The site will be divided into these two distinct zones with a different species mix attributed to each zone.

3.7 Tubestock Planting and Direct Seed Broadcasting

Once the site is prepared and a final broad acre weed control event has been undertaken, seedling planting and hand seeding will likely occur in late winter of 2022 once water levels have reached capacity and drainage issues can be alleviated if required.

Seedlings used in the project will be propagated, where practicable, from provenance seed collected and forwarded to a trusted, accredited nursery.

Seedling planting will act to enhance the seeding zone and will help with biodiversity and native vegetation cover in areas where direct seeding is not practical. In both the wetland and transitional zone understorey seedlings will be installed at a density of 1/5m2. Tree species will be installed at a rate of 1/20m2 where available and seedlings will be planted with Pottiputkis where surface preparation is possible and with hand augers to break surface compaction in areas where surface preparation is not practical.

For the direct seeding, approximately 8 bags per hectare will be batched up and hand broadcast. Each bag will be mixed with sterile yellow sand to help with hand distribution. A mycorrhizal inoculant will be used to assist with seed germination and development by mixing it with the seed at a rate of 1kg per hectare. The site will be seeded at a rate of 2.5kg per hectare requiring a total of 10kg for the estimated 4 hectares of seeding area. All seed will be sourced from provenance, targeted collections described above.

3.8 Schedule of Works

The Schedule of works will guide activities at the site and will provide a quick reference as works are implemented at the site. The Schedule of Works is provided in Table 3 (see Appendix).

4. Revegetation Monitoring

4.1 Monitoring Methodology

4.1.1 Quadrat

4x 5mx5m quadrats will be established throughout the revegetation area in accordance with the specifications stipulated in *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016). Revegetation monitoring events will be undertaken annually in Spring and continue until the Completion Criteria objectives have been met or otherwise approved to cease monitoring.

4.3 Completion Criteria

With the primary objectives of the revegetation to enhance habitat for threatened native fauna as well as to incorporate species present within the adjacent vegetation community, the completion criteria will reference the framework in Table 1 below.

Table 1. Completion Criteria

CLOSURE OUTCOME	COMPLETION CRITERIA	MEASUREMENT TOOL	CORRECTIVE ACTIONS	TIMING
Exclusion of grazing stock and feral animals to secure revegetation success	Erection of suitable perimeter fence to be installed and provide an effective barrier to prevent or reduce impacts to revegetation area	Observed installation and maintenance of perimeter fence	Maintain fence	Q4 2021
Overstorey vegetation is self-sustaining and suitable for future use by three species of Black Cockatoos and Western Ringtail Possums.	Within 5 years a total surviving tree count of 50 overstorey woodland species (comprising at least 20 Marri, 20 Jarrah and 10 Peppermint trees).	Visual inspection (Tree count)	Additional planting of overstorey woodland species using tube stock following yearly review of number of surviving overstorey species	Q1 2026
Understorey composition is similar to the adjacent vegetation communities	Within 5 years: Species richness is at least 50% of adjacent areas of native vegetation. Species density is at least 800 stems/ha.	Quadrats	Additional planting of tubestock and application of direct seeding to be undertaken following yearly review of species richness and diversity.	Q1 2026
Plants used in rehabilitation to be of local provenance.	The mix of species is comprised of species recruited from direct seeding and species introduced as tube stock grown from seed, cuttings or whole plants salvaged from within 20km of the revegetation site.	Audit of rehabilitation records for sources of plant materials used in rehabilitation.	Purchase or collection of additional local provenance seed of target species	
Reduced weed cover in comparison to the adjacent vegetation community	Within 5 years: Weed cover is no greater than 60% of the current weed cover within offset area No Declared weeds are present within the revegetation area.	Quadrats	Weed control methods such as chemical application will be modified as required to achieve the best practice solution. The use of targeted spray applications and adaptive techniques such as weed wipers or rope wick technology will be implemented where required to selectively treat weeds	Q1 2026

CLOSURE OUTCOME	COMPLETION CRITERIA	MEASUREMENT TOOL	CORRECTIVE ACTIONS	TIMING
Dieback	No dieback is present within the revegetation area at 5 years post establishment.	Dieback survey	Exclusion and signage. Possible phosphite treatment	Q1 2026

5. Maintenance Commitments and Contingency

5.1 Weed Control

Fundamental to the success of establishment throughout the revegetation site, seasonal weed control is scheduled for two years post initial implementation. In both zones, careful spot spraying using a combination of glyphosate and selective herbicides at different rates will be utilised. Maintenance weed control will be undertaken seasonally (at a minimum) and more intensely in the early stages after seeding and planting. Once plants have established (after 24 months) they will be able to out compete emerging weed species. From this time only problematic and declared weeds should need control.

5.2 Remediation Planting

Infill planting has been incorporated into the works schedule as required for Winter 2023 and 2024 to ensure that targets are met towards achieving the closure criteria (see Table 1). These events are designed to enhance stem density whilst increasing species richness and will be dependent on monitoring observations.

5.3 Other Maintenance Actions

Further management actions that will require consideration include the identification and remediation associated with damage caused by pests (e.g. grasshoppers, weevils, rabbits, etc.) and the inspection and maintenance of the revegetation perimeter fencing.

6. References

Environmental Protection Authority of WA (2016). Technical guidance Flora and Vegetation Surveys for Environmental Impact. EPA. Perth, Western Australia

Department of Water and Environmental Regulation (2018). A Guide to Preparing Revegetation Plans for Clearing Permits. DWER. Perth, Western Australia

7. Appendix

Table 2. Indicative Target Species List

Cape Life

Doral Stratham Offset Preliminary Species List

Species	Direct seed or plant	Propagation method	Suggested nursery
Acacia pulchella	Seed	seed/broadcast	Geographe or Boyanup
Acacia saligna	Seed	seed/broadcast	Geographe or Boyanup
Agonis flexuosa	Seed/Plant	seed/broadcast	Geographe or Boyanup
Allocasuarina humilis	Seed	seed/broadcast	Geographe or Boyanup
Allocasuarina fraseriana	Seed	seed/broadcast	Geographe or Boyanup
Banksia attentuata	Seed/Plant	seed	Geographe or Boyanup
Banksia grandis	Seed/Plant	seed	Geographe or Boyanup
Banksia littoralis	Plant	seed	Geographe or Boyanup
Callistachys lanceolata	Plant	seed	Geographe or Boyanup
Corymbia calophylla	Seed/Plant	seed	Geographe or Boyanup
Eucalyptus marginata	Seed/Plant	seed/broadcast	Geographe or Boyanup
Eucalyptus rudis	Seed/Plant	seed/broadcast	Geographe or Boyanup
Hakea ceratophylla	Plant	seed	Nuts about Natives
Hakea lissocarpa	Plant	seed	Nuts about Natives
Hakea prostrata	Plant	seed	Nuts about Natives
Hakea varia	Plant	seed	Nuts about Natives
Hibbertia hypericoides	Plant	cuttings	Nuts about Natives
Hypocalymma angustifolium	Seed/Plant	seed/broadcast	Nuts about Natives
Jacksonia furcellata	Plant	seed	Geographe or Boyanup
Juncus pallidus	Seed	broadcast	n/a
Kunzea glabresens	Plant	seed	Geographe or Boyanup
Kunzea micrantha	Plant	seed	Nuts about Natives
Melaleuca incana	Seed	broadcast	n/a
Melaleuca osullivanii	Seed	broadcast	n/a
Melaleuca preisiana	Seed/Plant	seed/broadcast	Geographe or Boyanup
Melaleuca raphiopylla	Seed/Plant	seed/broadcast	Geographe or Boyanup
Melaleuca viminea	Seed	broadcast	n/a
Patersonia occidentalis	Seed	broadcast	n/a
Persoonia elliptica	Plant	seed	Nuts about Natives
Persoonia longifolia	Plant	seed	Nuts about Natives
Pericalymma ellipticum	Plant	seed	Nuts about Natives
Regelia ciliata	Seed/Plant	seed/broadcast	Geographe or Boyanup
Viminaria juncea	Seed	broadcast	n/a
Xanthorrhoea preissii	Plant	seed	Nuts about Natives
Xylomelum occidentalis	Plant	seed	Geographe or Boyanup

Table 3. Proposed Schedule of Works

Proposed Schedule of Works – Stratham Offset

	Item	Timing	Responsibility	Comments
1.0	**Completion Criteria**			
1.1	Reference site quadrat establishment	Spring 2021	Revegetation Consultant	
1.2	Confirmation of completion criteria	Spring 2021	Revegetation Consultant	
2.0	**Native Seed Collection**			
2.1	Field Collections	Summer 2021/22	Revegetation Consultant	
2.2	Seed Cleaning	Summer 2021/22	Revegetation Consultant	
2.3	Cutting material collections	Spring 2021	Revegetation Consultant	
3.0	**Site Preparation**			
3.1	Fencing	Spring 2021	Fencing contractors	
3.2	Weed Control 2021	Spring	Weed contractors	
3.3	Weed Control 2022	Summer, Autumn, Spring	Weed contractors	Pre- and post ripping
3.4	Site Ripping / Furrowing	Autumn 2022	Doral / Reveg Contractor	
3.5	Rabbit baiting / control	Autumn 2022	Pest Contractor	
4.0	**Vegetation Establishment**			
4.1	Seed prep and nursery order	Spring/Summer 21/22	Revegetation Consultant	
4.2	Seed Prep for direct seeding	Autumn 2022	Revegetation Consultant	
4.3	Plant tubestock and direct seeding	Winter 2022	Revegetation Consultant	
5.0	**Revegetation Monitoring**			
5.1	Site Quadrat establishment	Late Spring 2022	Revegetation Consultant	
5.2	Monitoring 2022	Late Spring 2022	Revegetation Consultant	
5.3	Monitoring 2023	Autumn/Spring	Revegetation Consultant	
5.4	Reporting 2023	Spring	Revegetation Consultant	
5.5	Monitoring 2024	Autumn/Spring	Revegetation Consultant	
5.6	Reporting 2024	Spring	Revegetation Consultant	
5.7	Monitoring and Reporting 2026	Spring	Revegetation Consultant	
5.8	Monitoring and Reporting 2028	Spring	Revegetation Consultant	
6.0	**Maintenance and Contingency**			
6.1	Weed Control 2023	Summer, Autumn, Spring	Weed contractors	
6.2	Remedial infill planting	Late Winter 2023	Revegetation Consultant	As required to achieve closure criteria
6.3	Weed Control 2024	Summer, Autumn, Spring	Weed contractors	
6.4	Remedial infill planting	Late Winter 2024	Revegetation Consultant	As required to achieve closure criteria
6.5	Weed Control 2025	Autumn, Spring	Weed contractors	
6.6	Weed Control 2026	Autumn, Spring	Weed contractors	

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