Bunbury Outer Ring Road Southern Section – Offset Plan February 2024 Rev 1

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D22#5503
February 2024

Amendments

Revision Number	Revision Date	Description of Key Changes	Section / Page No.
A	June 2022	Review Draft	All
B	September 2022	Revised Draft	All
C	November 2022	Revised draft incorporating DBCA comments	Sections 3.4.4, 4.4.4, 5.4.4, 6.4.4, 7.3, 7-4-4-1, Tables 3-3, 3-6, 4-3, 4-6, 5-3, 5-6, 6-2, 6-4, 6-6, 8-2
0	September 2023	Final for approval incorporating EPA comments and additional DBCA comments	All
1	February 2024	Final for approval incorporating EPA comments and additional DBCA comments	Sections 3.3, 3.4.4, 4.3, 5.3, 6.3, 7.3, 8, 9.1.3, 10.3. Table 8-6

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SUMMARY

Bunbury Outer Ring Road Southern Section Project

The Bunbury Outer Ring Road (BORR) Southern Section Project (BORR Southern Section / the Project) includes the construction and operation of 10.5 km of new freeway standard dual carriageway, associated bridges, interchanges and other road infrastructure including, but not limited to, culverts, lighting, noise barriers, fencing, landscaping, road safety barriers and signs. The Project is located approximately 200 km south of Perth and, at its closest point, approximately six km south-east of Bunbury.

The Project will be constructed within the 200 ha Development Envelope (also referred to as the Project Area) (Figure 1, Appendix A), which is located within the City of Bunbury and Shire of Capel. Approximately 62 per cent of land within the Development Envelope is cleared. The Development Envelope comprises 76 ha of native vegetation and 124 ha of cleared agricultural land.

Construction of the Project commenced in 2022 and is anticipated to continue for a period of 2-3 years. Once the BORR Southern Section is constructed and open for public use, operation of the Project will be ongoing.

Purpose of this Plan

The *Bunbury Outer Ring Road Southern Section Offset Plan* (this Plan) is submitted in accordance with Ministerial Statement No. 1191 conditions 9-1 to 9-14 for the Project by Main Roads Western Australia.

Table E-1 presents a summary of this plan including the residual impacts this plan is required to offset. Table E-2 presents a summary of the proposed offset sites.

Table E-1. Bunbury Outer Ring Road Southern Section Offset Plan summary

Item	Details
Title of Project	Bunbury Outer Ring Road Southern Section
Proponent name	Commissioner for Main Roads Western Australia
Ministerial Statement No.	1191
Purpose of this plan	This plan is submitted to fulfil the requirements of conditions 9-1 to 9-14 of the above Ministerial Statement.
Environmental objective	To counterbalance the significant residual impacts to: (1) 60.9 ha of habitat for western ringtail possum; (2) 60.9 ha of black cockatoo foraging and breeding habitat; (3) 39.2 ha of habitat for south-western brush-tailed phascogale; (4) 23.4 ha of Banksia Woodlands of the Swan Coastal Plain Threatened and Priority Ecological Community (TEC/PEC); (5) 4.4 ha of Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain TEC/PEC; and (6) 4.5 ha of Southern Swan Coastal Plain *Eucalyptus gomphocephala* – *Agonis flexuosa* Woodlands PEC (incorporating the 4.4 ha of Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain TEC/PEC)

This Plan addresses all of the significant residual impacts associated with the project in accordance with Ministerial Statement No. 1191.

In addition to the land acquisition and revegetation offsets outlined in Table E-2, Main Roads is also committed to:

- Provision of a one-hectare Peppermint orchard (monoculture) on Department of Biodiversity, Conservation and Attractions (DBCA) managed land to provide foliage for WRP wildlife carers for use as a WRP food resource (Offset 6, refer Section 8).
- Provision of a $200,000 contribution to DBCA to enhance on-ground feral animal baiting to manage predation of WRP within the Ludlow State Forest (also known as State Forest No. 2) / Tuart Forest National Park (TFNP) to manage predation of WRP (Offset 7, refer Section 9).

Table E-2. Summary of offset sites provided under this Offset Plan

Value	Significant residual impact to be offset	Offset required	Offset provided						
			Lots 29[1], 153, 267 and 268 Queelup[2] Road Gelorup	Lot 301[3] Marchetti Road Gelorup	State Forest No. 2 / Tuart Forest National Park	Lot 104 Willinge Drive Davenport (north)	Lot 12 Bussell Highway – Peppermint Plantation	Lot 27 Tredrea Road, Myalup	TOTAL
Habitat for western ringtail possum (*Pseudocheirus occidentalis*)	60.9 ha	178.7 land acquisition plus 220 ha revegetation	164.5 ha	14.2 ha	185 ha	35 ha	-	-	178.7 land acquisition plus 220 ha revegetation
Habitat for south-western brush-tailed phascogale (*Phascogale tapoatafa wambenger*)	39.2 ha	Included above							
Habitat for Baudin's Cockatoo (*Zanda baudinii*), Carnaby's Cockatoo (*Zanda latirostris*), and Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*)	60.9 ha	171.5 ha land acquisition plus 75.3 ha revegetation	161.8 ha	9.7 ha	75.3 ha	-	-	-	171.5 ha land acquisition plus 75.3 ha revegetation
Banksia woodlands of the Swan Coastal Plain TEC/PEC	23.4 ha	126.9 ha land acquisition	126.9 ha	-	-	-	-	-	126.9 ha land acquisition
Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain TEC/PEC	4.4 ha	19 ha land acquisition plus 7.2 ha revegetation	-	-	7.2 ha	-	-	19 ha	19 ha land acquisition plus 7.2 ha revegetation

[1] Previously known as Lot 1.
[2] Previously known as Ducane Road
[3] Previously known as Lot 156

Value	Significant residual impact to be offset	Offset required	Offset provided						
			Lots 29[1], 153, 267 and 268 Queelup[2] Road Gelorup	Lot 301[3] Marchetti Road Gelorup	State Forest No. 2 / Tuart Forest National Park	Lot 104 Willinge Drive Davenport (north)	Lot 12 Bussell Highway – Peppermint Plantation	Lot 27 Tredrea Road, Myalup	TOTAL
Southern Swan Coastal Plain *Eucalyptus gomphocephala – Agonis flexuosa* Woodlands TEC/PEC	4.5 ha	19 ha land acquisition plus 7.2 ha revegetation	-	-	7.2 ha	-	-	19 ha	19 ha land acquisition plus 7.2 ha revegetation

1 CONTEXT AND SCOPE

This Offset Plan has been prepared to document measures to counterbalance adverse impacts on conservation significant terrestrial fauna and ecological communities that may occur during construction of the Bunbury Outer Ring Road – Southern Section Project (the Project / BORR Southern Section), as required under condition 9 of Ministerial Statement 1191 (MS1191).

The plan addresses impacts that the Project will have on:

- Western ringtail possum (WRP) (*Pseudocheirus occidentalis*), State and Commonwealth listed as critically endangered
- South-western brush-tailed phascogale (BTP) (*Phascogale tapoatafa*), State listed as Conservation Dependent (Schedule 6) under the *Western Australian Biodiversity Conservation Act 2016* (BC Act)
- Black cockatoos
    - Baudin's Cockatoo (*Zanda baudinii*), State and Commonwealth listed as endangered
    - Carnaby's Cockatoo (*Zanda latirostris*), State and Commonwealth listed as endangered
    - Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*), State and Commonwealth listed as vulnerable
- Banksia Woodland of the Swan Coastal Plain Ecological Community, State listed as Priority 3, Commonwealth listed as endangered (Banksia woodlands Threatened Ecological Community (TEC)/Priority Ecological Community (PEC))
- Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain Priority Ecological Community, State listed as Priority 3, Commonwealth listed as critically endangered (Tuart Woodlands TEC/PEC)
- Southern Swan Coastal Plain *Eucalyptus gomphocephala – Agonis flexuosa* Woodlands, State listed as Priority 3, overlapping the Tuart Woodlands TEC/PEC (Tuart-Peppermint Woodlands PEC).

The three cockatoo species are collectively referred to herein as black cockatoos.

The Project was approved by the Western Australian Minister for Environmental under Ministerial Statement 1191 (MS 1191) on 31 May 2022.

1.1 Project

The BORR Southern Section Project (Figure 1, Appendix A) includes the construction and operation of 10.5 km of new freeway standard dual carriageway, associated bridges, interchanges and other road infrastructure including, but not limited to, culverts, lighting, noise barriers, fencing, landscaping, road safety barriers and signs. The Project is located approximately 200 km south of Perth and, at its closest point, approximately six km south-east of Bunbury.

The 200 ha Development Envelope is within the City of Bunbury and Shire of Capel. Approximately 62 per cent of land within the Development Envelope is cleared. The Development Envelope comprises 76 ha of native vegetation and 124 ha of cleared agricultural land.

Construction of the Project commenced in July 2022 and is anticipated to continue for a period of 2-3 years. Once the BORR Southern Section Project is constructed and open for public use,

operation of the Project will be ongoing. The measures and monitoring identified in this plan will continue into operation, as required under condition 9 of MS 1191.

1.2 Summary of residual impacts

Residual impacts for which Main Roads proposes environmental offsets are detailed in Table 1-1.

Table 1-1. Residual environmental impacts requiring offset

Environmental Attribute	Condition	Residual Impact
WRP habitat (incorporating 39.2 ha of BTP habitat)	Habitat mapped within the Project Area comprises Shedley and Williams (2014) habitat classes as follows: • 11 % of Habitat Quality Class B (High) (7.0 ha) • 52 % of Habitat Quality Class C (Medium) (31.9 ha) • < 1 % of Habitat Quality Class D (Low) (0.3 ha) • 35.5 % not rated (21.6 ha).	60.9 ha
Black cockatoo habitat	Approximately two thirds of the Black Cockatoo habitat within the Development Envelope was mapped as high quality foraging habitat ('Marri / *Eucalyptus* woodland'), with the remaining amount mapped as moderate quality ('Marri / Eucalyptus in paddocks and road reserves').	60.9 ha
	The Development Envelope contains 1088 suitable DBH trees, with 11 containing potentially suitable hollows. At the time of preparation of this Plan, 95% of clearing has been completed, and three trees with hollows assessed as being potentially suitable for black cockatoo nesting have been cleared. No further clearing of trees with potentially suitable hollows is expected.	
Banksia Woodlands TEC/PEC	• Excellent: 0.49 ha • Excellent – Very Good: 4.0 ha • Very Good: 2.28 ha • Very Good - Good: 2.38 ha • Good: 1.47 ha • Good – Degraded: 11.58 ha • Degraded: 0.71 ha • Degraded - Completely Degraded: 0.46 ha • Completely Degraded: 0.07 ha.	23.4 ha
Tuart Woodlands TEC/PEC	• Very Good: 0.80 ha • Good-Degraded: 2.91 ha • Degraded-Completely Degraded: 0.01 ha • Completely Degraded: 0.68 ha.	4.4 ha
Tuart-Peppermint Woodlands PEC (overlapping Tuart Woodlands TEC/PEC)	• Very Good: 0.80 ha • Good-Degraded: 2.91 ha • Degraded-Completely Degraded: 0.11 ha • Completely Degraded: 0.68 ha.	4.5 ha

1.3 Requirements of the conditions

This plan is submitted in accordance with conditions 9-1 to 9-14 of (MS 1191).

MS 1191 condition requirements and in-plan section references are provided in Table 1-2.

The following documents have guided the preparation of this plan:

- *WA Environmental Offsets Policy* (GoWA, 2011)
- *WA Environmental Offsets Guidelines* (GoWA, 2014)
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) *Environmental Offsets Policy Assessment Guide* (DSEWPaC, 2012)
- *Guidance Statement No. 6 Rehabilitation of Terrestrial Ecosystems* (EPA, 2006)
- *A Guide to Preparing Revegetation Plans for Clearing Permits: under Part V of the Environmental Protection Act 1986* (DER, 2016).

Table 1-2. Requirements of Ministerial Statement No. 1191

Condition No.	Condition	Section of this plan
9-1	The proponent shall implement offset measures to counterbalance the significant residual impacts to the following environmental values: (1) 60.9 ha of habitat for western ringtail possum; (2) 60.9 ha of black cockatoo foraging and breeding habitat; (3) 39.2 ha of habitat for south-western brush-tailed phascogale; (4) 23.4 ha of Banksia Woodlands of the Swan Coastal Plain PEC (Banksia Woodlands); (5) 4.4 ha of Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain PEC (Tuart Woodlands); and (6) 4.5 ha of Southern Swan Coastal Plain *Eucalyptus gomphocephala – Agonis flexuosa* Woodlands PEC (Tuart-Peppermint Woodlands), overlapping the Tuart Woodlands PEC.	N/A

<table>
<tr>
<td>9-2</td>
<td>To meet the requirement of condition 9-1 the proponent shall undertake offset measures to the extents and at the locations as set out and described in Table 1:
Table 1: Type, locations and extent of offset measures required to meet the requirement of condition 9-1
<table>
<tr><th>Environmental value</th><th>Offset site & locations</th><th>Minimum extent of area to receive offset measures (hectares)</th><th>Type of offset measures</th></tr>
<tr><td rowspan="4">Western ringtail possum habitat and south-western brush-tailed phascogale habitat</td><td>Offset 1 and 2: Lots 1[4], 153, 267, and 268 Ducane[5] Road, Gelorup</td><td>164.5</td><td>– land acquisition
– on-ground management</td></tr>
<tr><td>Offset 3: Lot 156[6] Marchetti Road, Gelorup</td><td>14.2</td><td>– land acquisition
– on-ground management</td></tr>
<tr><td>Offset 4: Lot 104 Willinge Drive, Davenport</td><td>35</td><td>– land acquisition
– revegetation
– on-ground management</td></tr>
<tr><td>Offset 5 (Site 2, 4 and 12): Ludlow- Tuart State Forest No.2 and Tuart Forest National Park</td><td>185</td><td>– revegetation
– on-ground management</td></tr>
<tr><td rowspan="3">Black cockatoo foraging and breeding habitat</td><td>Offset 1 and 2: Lots 1, 153, 267, and 268 Ducane Road, Gelorup</td><td>161.8</td><td>– land acquisition
– on-ground management</td></tr>
<tr><td>Offset 3: Lot 156 Marchetti Road, Gelorup</td><td>9.7</td><td>– land acquisition
– on-ground management</td></tr>
<tr><td>Offset 5 (Site 12): Ludlow-Tuart State Forest No.2 and Tuart Forest National Park</td><td>75.3</td><td>– revegetation
– on-ground management</td></tr>
<tr><td>Banksia Woodlands PEC</td><td>Offset 1 and 2: Lots 1, 153, 267, 268 Ducane Road, Gelorup</td><td>126.9</td><td>– land acquisition
– on-ground management</td></tr>
<tr><td rowspan="2">Tuart Woodlands PEC and Tuart-Peppermint Woodlands PEC</td><td>Offset 8: Lot 27 Tredrea Road, Myalup</td><td>19</td><td>– land acquisition
– revegetation
– on-ground management</td></tr>
<tr><td>Offset 5 (Site 12): Ludlow-Tuart State Forest No.2 and Tuart Forest National Park</td><td>7.2</td><td>– revegetation
– on-ground management</td></tr>
</table>
</td>
<td>N/A</td>
</tr>
</table>

Condition No.	Condition	Section of this plan
9-3	Within twelve months of the commencement of **ground-disturbing activities**, the proponent shall revise the existing Bunbury Outer Ring Road (BORR) Southern Section Offset Management Plan to the requirements of the CEO, and to meet the following **objectives**:	This Plan
	(1) counterbalance the significant residual impacts listed in condition 9-1;	
	(2) improve connectivity of western ringtail possum habitats;	
	(3) ensure a **net-gain in western ringtail possum populations** in secure conservation tenure within fifteen (15) years from the commencement of construction; and	
	(4) demonstrate a strategic conservation benefit for the western ringtail possum species.	
9-4	The BORR Southern Section Offset Management Plan shall:	
	(1) demonstrate that the **objectives** in condition 9-3 will be met;	This Plan 3.4.2, 4.4.2, 5.4.2, 6.4.2, 7.4.2, 8.4.2, 9.1.1, 10.4.2
	(2) describe how the offset measures will be implemented consistent with condition 9-2;	3.4.13.4.4, 4.4.4, 5.4.4, 6.4.4, 7.4.4, 8.4.4, 10.4.4
	(3) be prepared in consultation with **DBCA**, the Shire of Capel and the Shire of Dardanup;	13
	(4) consistent with condition 9-2, spatially identify the areas (**Proposed Offset Conservation Areas**) of: (a) **acquired** lands offset areas to receive **on-ground management** and/or revegetation offset measures; (b) **DBCA** lands to receive **on-ground management** and revegetation offset measures.	Figures 1-11
	(5) demonstrate how the environmental values within the **Proposed Offset Conservation Areas** will be maintained and improved in order to counterbalance the significant residual impact to the environmental values in condition 9-1 through application of the principles of the WA Environmental Offsets Policy and completion of the WA Offsets Template, as described in the *WA Environmental Offsets Guidelines,* and *the Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy Assessment Guide*, or any subsequent revisions of these documents.	1.4.1 (Appendix C, Appendix D)
	(6) for the land acquisition offsets identified in condition 9-2: (a) demonstrate that the **Proposed Offset Conservation Areas** contain the minimum extents of the environmental values identified in condition 9-2: (b) identify how the **Proposed Offset Conservation Areas** will be protected, being either the sites are ceded to the Crown for the purpose of management for conservation, or the sites are managed	6a) 3.2, 4.2, 5.2, 6.2, 10.2 6b) 3.3, 4.3, 5.3, 6.3, 10.3

[4] Now Lot 29 Queelup Road
[5] Now Queelup Road
[6] Now Lot 301 Marchetti Road

Condition No.	Condition	Section of this plan
	under other suitable mechanism for the purpose of conservation as agreed by the CEO by notice in writing; (c) specify the quantum of works associated with establishing the **Proposed Offset Conservation Areas**, including a contribution for maintaining the offset for at least twenty (20) years after completion of purchase; and (d) identify the **relevant management body** for the on-going management of the **Proposed Offset Conservation Areas**, including its role, and the role of the proponent, and confirmation in writing that the **relevant management body** accepts responsibility for its role.	6c) 3.4, 4.4, 5.4, 6.4, 10.4 6d) 3.3, 4.3, 5.3, 6.3, 10.3
	(7) For revegetation and/or **on-ground management** offsets identified in condition 9-2: (a) state the completion criteria for revegetation and/or **on-ground management** for each offset site, which will demonstrate attainment of the 'future quality with offset' score in Schedule 3. For revegetation offsets relating to western ringtail possum environmental values, this shall include, but not be limited to: (i) western ringtail possum target densities; (ii) completion criteria to measure (at a minimum) ringtail possum abundance/distribution, habitat structure and vegetation condition; and (iii) adaptive management to inform successful habitat revegetation for western ringtail possum. (b) demonstrate the consistency of the targets with the objectives of any relevant guidance, including but not limited to, recovery plans or area management plans; (c) detail the **on-ground management** actions, with associated timeframes for implementation and completion, to achieve the targets identified in condition 9-4(7)(a); and (d) detail the monitoring, reporting and evaluation mechanisms for the targets and actions identified under conditions 9-4(7)(a) and 9-4(7)(c).	7a) 6.4, 7.4 7b) 6.4, 7.4 7c) 6.4, 7.4 7d) 6.4, 7.4
	(8) For the predator control program within the Ludlow Tuart State Forest/Tuart Forest National Park (consistent with the proponent's Offset Strategy Revision 3 August 2021): (a) state the targets to be achieved by the predator control program which will result in a **tangible improvement** to the environmental values being offset; (b) demonstrate the consistency of the targets with the objectives of any relevant guidance, including but not limited to, recovery plans or area management plans; (c) detail the **on-ground management** actions, with associated timeframes for implementation and completion to achieve the targets identified in condition 9-4(8)(a), and how the implementation of the predator control program will facilitate the achievement of the objectives in conditions 9-3(3) and 9-3(4); and (d) detail the monitoring, reporting and evaluation mechanisms for the targets and actions, including but not limited to, a review of the program's effectiveness to demonstrate that the objective of conditions 9-3(3) and 9-3(4) will be met.	8a) 9.1.1 8b) 9.1.2

Condition No.	Condition	Section of this plan
	(9) For the establishment of a Wildlife Carer's Peppermint Orchard: (a) identify the location of the Wildlife Carer's Peppermint Orchard and state the completion criteria for this offset measure in accordance with **DBCA** requirements; and (b) detail the monitoring, reporting and evaluation mechanisms to demonstrate the completion criteria identified under condition 9-4(9)(a) will be met.	9a) 8.1 9b) 8.4.5
9-5	The proponent: (1) may review and revise the BORR Southern Section Offset Management Plan; or	12
	(2) shall review and revise the BORR Southern Section Offset Management Plan as and when directed by the CEO by a notice in writing.	12
9-6	The proponent shall not commence **ground-disturbing activities** until the CEO has confirmed in writing that the BORR Southern Section Offset Management Plan satisfies the requirements of conditions 9-3 and 9-4.	N/A
9-7	The proponent shall implement the latest revision of the BORR Southern Section Offset Management Plan approved by the CEO.	12
9-8	The proponent shall continue to implement the BORR Southern Section Offset Management Plan until the CEO has confirmed by notice in writing that the proponent has demonstrated that the objectives in condition 9-3 are being met.	N/A
9-9	When a notification to the CEO occurs in accordance with condition 12-5, the proponent shall provide a report to the CEO within sixty (60) days if the actions, objectives, or targets in the BORR Southern Section Offset Management Plan are unable to be met, and provide details and timing of **contingency actions** to be undertaken, to the satisfaction of the CEO.	N/A
9-10	The proponent shall report to the CEO on the outcomes of the **contingency actions** as required by condition 9-9 within sixty (60) days of completion.	N/A
9-11	The proponent shall continue to implement **contingency actions** as required by condition 9-9 until the CEO has confirmed by notice in writing that the proponent has demonstrated that the **objectives** in condition 9-3 are being met.	N/A
Contingency offsets		
9-12	If, after receiving the Environmental Performance Report required by condition 6-5 the CEO determines that the proposal has not met the environmental **outcome** in condition 6-2 and has resulted in an additional significant residual impact to western ringtail possum, and after notifying the proponent in writing, the proponent must undertake an additional offset to counterbalance the significant residual impact from the additional impact to western ringtail possum in habitats adjoining the development envelope.	N/A
9-13	Within twelve (12) months of receiving notice in writing from the CEO that an additional offset is required under condition 9-12, the proponent shall update the BORR Southern Section Offset Management Plan required by condition 9-3 to include additional offsets to counterbalance the significant residual impacts to western ringtail possums.	N/A
9-14	The proponent shall implement the latest version of the BORR Southern Section Offset Management Plan, which the CEO has confirmed in writing satisfies the requirements of condition 9-4.	N/A

1.4 Offset determination

1.4.1 WA Environmental Offset Policy (GoWA, 2011)

In developing the proposed offset package, Main Road has taken into account to Principles of the *WA Environmental Offsets Policy* (GoWA, 2011), as summarised in Table 1-3.

Table 1-3. Assessment of offsets against the principles of the WA Environmental Offsets Policy

Principle	Assessment
Environmental offsets will only be considered after avoidance and mitigation options have been pursued	Potential impacts from the BORR Southern Section project have been significantly reduced as a result of the efforts applied during the detailed design phase and during environmental assessment. This reduction has been largely achieved through the additional avoidance and mitigation measures that have been developed for the Project. Where appropriate, local technical expertise for key species and habitats has been sought to ensure the effectiveness of proposed management measures.
Environmental offsets are not appropriate for all projects	Main Roads operates on a hierarchy of avoid, minimise, reduce, rehabilitate and offset environmental impacts. This hierarchy is achieved primarily through changes in scope and design, development and implementation of the EMP and finally, an offset proposal. Application of the management hierarchy is detailed in the Project Offset Strategy BORR IPT (BORR IPT, 2021).
Environmental offsets will be cost-effective, as well as relevant and proportionate to the significance of the environmental value being impacted	Main Roads has pursued a number of options in developing a package of offsets to counterbalance residual impacts that are relevant and appropriate for the locality and quantum of impact for each environmental value impacted. The options investigated have comprised acquisition of land providing fauna habitat and creation of fauna habitat by on ground rehabilitation. Several of the offset sites will address the requirement for more than one offset attribute i.e. provision / creation of habitat for WRP, black cockatoos and BTP at a single site.
Environmental offsets will be based on sound environmental information and knowledge	The offset values for Offset 1-5 and 8 are based on information confirmed through field survey for each of the proposed offset properties.
Environmental offsets will be applied within a framework of adaptive management	The proposed offsets will be subject to long term monitoring and ongoing adaptive management, as required, to ensure the anticipated values and effectiveness criteria for each offset is achieved. Where at variance to the objectives of the offset strategy, advice and management consultation with DBCA and other relevant key stakeholders will be undertaken.
Environmental offsets will be focussed on longer term strategic outcomes	In addition to direct conservation offsets, Main Roads has pursued rehabilitation of lands as offsets that will over the longer term increase the areas of habitat provided by the proposed offsets. In particular, extensive recreation and / or enhancement of habitat in State Forest No. 2 and the Tuart Forest National Park will provide a strategic conservation benefit for the WRP.

1.4.2 Commonwealth offset guide inputs and justification

During the assessment of the Proposal, Main Roads developed an offset strategy (BORR IPT, 2021), which, after assessment via the Commonwealth *Environmental Offsets Policy Assessment Guide* (DSEWPaC, 2012), presented recommendations for offsets considered to counterbalance residual impacts of the Proposal. Additional considerations resulted from the EPA assessment, which resulted the offset package being amended to include additional offsets for WRPs. Under appeal, the Appeals Convenor made additional determinations around the materiality of the proposed offsets, specifically for black cockatoos, Banksia Woodlands (TEC/)PEC and Tuart Woodlands (TEC/)PEC.

In culmination, these factors have led to the offsets currently required and conditioned under MS 1191 condition 9-2.

Except where the values were updated during the state appeals process, the values presented below are consistent with the values that have been presented during the public and agency consultation and state and commonwealth impact assessment processes.

Schedule 3 of MS 1191, which indicates the future value of the proposed Offset Areas to be achieved through implementation of this Plan, is presented in Appendix C (as calculated using the EPBC Act Environmental Offsets Policy Assessment Guide), revised to include the Offset Area 'Start quality' values.

2 TABLE OF COMMITMENTS

Table 2-1 presents a table of commitments made in this Plan to achieve the ecological benefits for environmental values impacted by the Project (as outlined in Section 1.2), and a reference to where the commitments are detailed in this Plan.

Table 2-1. Table of commitments

Relevant MNES	Commitment	Section of this plan
WRP	Offset 1 (Ducane Offset Area): Protection and conservation of 126 ha of WRP habitat	1
	Offset 2 (Lot 29 Offset Area): Protection and conservation of 38.5 ha of WRP habitat	4
	Offset 3 (Lot 301 Offset Area): Protection and conservation of 14.2 ha of WRP habitat	5
	Offset 4 (Lot 104 (North) Offset Area): Rehabilitation and management of 35 ha of WRP habitat	6
	Offset 5 (Ludlow Offset Area): Manage 15 ha and rehabilitate 170 ha of habitat suitable for WRP	7
	Offset 6 (Ludlow Peppermint Orchard Offset Area): Creation of a one-hectare peppermint (*Agonis flexuosa*) orchard containing at least 1,800 trees	8
	Offset 7 (Financial Contribution Offset): Provision of $200,000 contribution to DBCA to enhance on-ground feral animal baiting to manage predation of WRP within SF No. 2 and the TFNP	9
Black cockatoos	Offset 1 (Ducane Offset Area): Protection and conservation of 124.1 ha of black cockatoo foraging and potential nesting habitat, installation of artificial nesting hollows	1
	Offset 2 (Lot 29 Offset Area): Protection and conservation of 37.7 ha of black cockatoo foraging and potential nesting habitat, installation of artificial nesting hollows	4
	Offset 3 (Lot 301 Offset Area): Protection and conservation of 9.7 ha of black cockatoo foraging and potential nesting habitat, installation of artificial nesting hollows	5
	Offset 5 (Ludlow Offset Area): Rehabilitation and management of 75.3 ha of black cockatoo foraging and potential nesting habitat	7
Banksia Woodlands TEC	Offset 1 (Ducane Offset Area): Protection and conservation of 124.1 ha of Banksia Woodlands TEC vegetation	1
	Offset 2 (Lot 29 Offset Area): Protection and conservation of 2.8 ha of Banksia Woodlands TEC vegetation	4
Tuart Woodlands TEC	Offset 5 (Ludlow Offset Area): Re-establishment of 7.2 ha of Tuart Woodlands TEC vegetation	7
	Offset 8 (Tredrea Offset Area): Protection and conservation of 19 ha of Tuart Woodlands TEC vegetation	10

3 OFFSET 1 – LOTS 153, 267 AND 268 QUEELUP ROAD GELORUP

This chapter describes the 'Lots 153, 267 and 268 Queelup Road Gelorup' offset (Ducane Offset Area). The following sections identify:

- The offset being proposed (Section 3.1)
- The environmental attributes of the offset (Section 3.2)
- The protection mechanism for the offset (Section 3.3)
- Management and / or rehabilitation actions, including objectives, targets and completion criteria, monitoring and risk management (Section 3.4).

3.1 Identification of offset

Offset 1 comprises three adjoining land parcels, being Lots 153, 267 and 268 Queelup Road, Gelorup ('Ducane Offset Area'), which have a total area of 162.6 ha (Figure 2, Appendix A). The previous owner set aside 22.5 ha of the property under a Conservation Covenant through Section 30B of the *Soil and Land Conservation Act 1945*. The remaining 140.1 ha is proposed as Offset 1. The Ducane Offset Area contains approximately 140.1 ha of remnant native vegetation, 124.1 ha of which comprises Banksia woodland. Wetland and dampland areas, representing Conservation and Resource Enhancement category wetlands, feature in the eastern third of the site. Lots 153, 267 and 268 are separated by fences from the surrounding agricultural land.

3.2 nvironmental attributes of offset area

The vegetation within the Ducane Offset Area was surveyed as part of the environmental assessment for this project. The studies conducted are listed in Table 3-1.

Table 3-1. Relevant baseline studies for the Ducane Offset Area

Study	Description
Lots 153, 267 and 268 Ducane Road Banksia Woodlands TEC Assessment (Biota, 2021)	Survey objective was to determine the extent and condition of vegetation within the survey area that may be consistent with the "Banksia Woodlands of the Swan Coastal Plain" Threatened and Priority Ecological Community.
Targeted Fauna Survey: Lots 267, 268 and 153 Ducane Road, Gelorup (Biota, 2019)	Identifies fauna habitats present on site and reports the findings of a targeted on-ground search for conservation significant fauna species.

The Ducane Offset Area has been confirmed to contain the following values:

- 124.1 ha of Banksia Woodlands TEC/PEC comprising floristic community type 21a
- 124.1 ha of black cockatoo foraging and potential nesting habitat
- 126 ha of WRP and BTP habitat.

The Ducane Offset Area comprises the following vegetation units:

- *Banksia attenuata* woodland with emergent *Eucalyptus marginata*
- *Banksia attenuata* woodland with *Banksia ilicifolia*
- *Banksia attenuata* woodland with *Agonis flexuosa*.

These vegetation units comprise Banksia Woodland TEC/PEC, as well as habitat for black cockatoos, WRP and BTP (Figure 3, Figure 4, Appendix A).

Vegetation on Lots 153, 267 and 268 was mapped as 'Very Good' (67 %) or 'Good' (33 %) condition (Biota, 2021), with most of the Banksia Woodland PEC occurrence rated as Very Good condition.

Evidence of black cockatoo foraging was recorded within the Ducane Offset Area during the field survey. A total of 1,243 suitable DBH trees were recorded within Lots 153, 267 and 268 (Biota, 2019). Of these, 133 trees featured one or more hollows (154 hollows were recorded described as potentially suitable for breeding (as far as could be determined from ground level).

Evidence of WRP was recorded within the Ducane Offset Area during field surveys, including sightings, dreys and scat records. At Lots 153, 267 and 268, a total of 41 individual WRPs were recorded from 34 observations (Biota, 2019).

3.3 Protection mechanism and management contribution

Main Roads agreed with DBCA to assist with the purchase the privately owned properties that make up the Ducane Offset Area, with the intention of utilising the site vegetation as an environmental offset for the BORR Southern Section project. DBCA supported the purchase of the land for addition to the conservation estate. Main Roads then funded the purchase by DBCA and the properties are now owned by the State of Western Australia. The Ducane Offset Area is currently zoned as rural under the Greater Bunbury Region Scheme (GBRS). DBCA has indicated that the properties will be rezoned to Regional Open Space or Conservation under the scheme in the future and managed as part of the Conservation Estate. Main Roads supports the rezoning of the properties and will assist with the rezoning, as required.

Main Roads intends to manage the site for a number of years before handing management over to DBCA and is in the process of formalising this agreement and process with DBCA. DBCA are supportive of this approach, as evidenced by correspondence included in Appendix B . DBCA agrees to undertake specific, agreed ongoing management activities that will be subject to a third-party delivery agreement, which is yet to be finalised and will include the minimum criteria for management handover. Main Roads acknowledges its responsibility to ensure that completion criteria are achieved irrespective of ongoing management arrangements.

Prior to handover of the site to DBCA for ongoing management, Main Roads will undertake the following actions to establish the offset area, in accordance with specific requests from DBCA (refer to Appendix B) and the completion criteria set out in Table 3-3:

- Installation of gates and barriers to restrict unauthorised vehicle access
- Removal of significant collections of accumulated illegally dumped rubbish
- Initial control of WONS and Declared weeds
- If possible, de-gazettal and incorporation into the lots of unformed, redundant road reserves that bisect or adjoin the properties
- Maintain an open line of communications between the two agencies (Main Roads and DBCA) with regard to other but as yet unforeseen matters that may arise during the purchasing process.

In accordance with the Offset Strategy (BORR IPT, 2021) and MS1191 condition 9-4(6)(c), Main Roads will contribute management fees to DBCA to facilitate ongoing management of the site for at least twenty (20) years.. As this offset site has been purchased, with on ground works now commenced, the 20-year management timeframe will begin from when these works commenced.

Ongoing management of the site includes such actions as weed control, pest animal control, fire management and any other actions required to attain and / or maintain achievement of the completion criteria set out in Table 3-3. Management fees to facilitate ongoing management activities will be negotiated with DBCA.

3.4 Offset management

3.4.1 Management approach

Management of the Ducane Offset Area is based on the approach outlined in Table 3-2.

Table 3-2. Ducane Offset Area management approach

Management aspect	Description	Defined in
Objective	Aim of the Offset Area	Table 3-3
Target	Specific goal identified for the Offset Area	
Completion criteria	Measurable outcomes identified for the Offset Area	
Management actions	Actions to be taken to achieve stated objective, targets and completion criteria, including timing	Table 3-5
Monitoring program	Assessment of progress towards achievement of objective, targets or completion criteria	Table 3-6
Performance indicator	Variable that allows for measurable assessment of progress towards achievement of objective, targets or completion criteria	
Trigger value	Measurable event in any assessed parameter that indicates achievement of the objective, targets or completion criteria may be at risk	
Corrective actions	Action(s) to be taken in response to a trigger value being reached	
Reporting	Documentation of progress towards achievement of the objective, targets or completion criteria and any non-compliances that may have occurred	
Risk assessment	Consideration and appraisal of risks that may impede achievement of the objective, targets or completion criteria	Table 3-7
Risk management strategies	Actions to be taken to manage and/or mitigate identified risks	

3.4.2 Objectives, targets and completion criteria

Table 3-3 sets out the objectives, targets and completion criteria for the Ducane Offset Area. The conservation and management of 126 ha of existing WRP habitat, provided within a very large intact remnant that supports a known population of WRPs, provides a strategic conservation benefit for the species.

Site management for long term conservation (20 years) will include access management, weed

control, firebreaks and feral and pest animal control (including kangaroo control) to maintain / improve habitat quality. The proposed completion criteria are consistent with existing management criteria for other offset properties in the local area undertaken for the Bunbury Port Access Road and BORR Central since 2015. The completion criteria will be assessed annually during compliance reporting and must be achieved by, or maintained until, 20 years from the commencement of works.

While the objective of the offset is specifically tied to condition 9-3 of Ministerial Statement 1191, overarching management objectives have previously been defined for Main Roads conservation properties in the vicinity of the BORR (Strategen, 2015) that are consistent with the objectives of condition 9-3. Specific objectives identified for the management of local conservation properties include:

- Enhance vegetation health within the conservation area
- Ensure the ongoing protection of the conservation area through ensuring an infrequent fire regime where possible
- Encourage the natural regeneration of an ecologically diverse and stable vegetation community
- Maintain self-sustaining ecosystems capable of supporting native biota, focussing on significant fauna including WRP, BTP and black cockatoos.

These objectives will be achieved through the implementation of the active management practices detailed in Section 3.4.4.

Table 3-3. Objective, targets and completion criteria for the Ducane Offset Area

Objective	Target	Completion criteria
Counterbalance significant residual impacts to habitat supporting WRP and BTP	Conserve and manage 126 ha of existing WRP and BTP habitat	The offset site will meet the following completion criteria: • Unauthorised vehicle access is restricted • Firebreaks are in place and well maintained • WONS and Declared weeds are absent • High (at least 70 %) canopy continuity for WRP movement (combined across upper and mid storey layers) including a high level of canopy connectivity to adjacent habitat[7] • Vegetation condition is 'Good' or better according to the scale of EPA (2016) • In accordance with the 'Future quality with offset' values presented in Appendix C, WRP habitat value is at least equal to that recorded in baseline surveys • WRP offset site abundance trends, as measured through density (WRP/ha), are commensurate with those at reference sites[8].
Counterbalance significant residual impacts to habitat supporting black cockatoos	Conserve and manage 124.1 ha of existing black cockatoo habitat Install artificial nesting hollows for black cockatoos	The offset site will meet the following completion criteria: • Access is restricted • Firebreaks are in place and well maintained • WONS and Declared weeds are absent • Banksia and eucalypt woodlands providing black cockatoo habitat to have at least 40 % projected foliage cover and contain suitable foraging tree species for each of the three species of black cockatoos • In accordance with the 'Future quality with offset' values presented in Appendix C, black cockatoo habitat value is at least equal to that recorded in baseline surveys • Installation and maintenance of a portion of the up to 11 artificial nesting hollows for black cockatoos required under MS1191 condition 4-4[9].
Counterbalance significant residual impacts to Banksia Woodlands TEC/ PEC	Conserve and manage 124.1 ha of existing Banksia woodlands of the Swan Coastal Plain TEC/PEC	The offset site will meet the following completion criteria: • Access is restricted • Firebreaks are in place and well maintained • WONS and Declared weeds are absent • In accordance with the 'Future quality with offset' values presented in Appendix C, vegetation condition is at least equal to that recorded in baseline surveys[10].

[7] Noting the requirement for firebreaks.

[8] Noting that WRP population densities change seasonally and year to year.

[9] Baseline studies indicated 11 suitable DBH trees with hollows potentially suitable for nesting by black cockatoos are present within the clearing area. MS1191 condition 4-4 requires installation of one artificial hollow for every suitable nest hollows cleared. It is anticipated that clearing will be conducted in three stages, between 2022 and 2024. Therefore, the number of potentially suitable nest hollows cleared cannot be confirmed until clearing has been conducted.

[10] 'Very Good' (67 %) or 'Good' (33 %) condition (Biota, 2021), with most of the Banksia Woodland PEC occurrence rated as Very Good condition (Biota, 2021).

3.4.3 Consistency with recovery plans

Condition 9-4(7)(b) requires the objectives and targets in Table 3-3 to be consistent with the objectives of relevant guidance, including but not limited to recovery plans or area management plans. Of the values being offset by the Ducane Offset Area, WRP and black cockatoos have associated recovery plans or guidances. Although there is no guidance available for the Banksia Woodlands PEC, the Commonwealth has issued a conservation advice for the Banksia Woodlands TEC (TSSC, 2016) which is synonymous with the Banksia Woodlands PEC (hence referred to herein as the TEC/PEC). This plan is consistent with the Commonwealth conservation advice.

WRP
The activities within this plan are consistent with the objectives of the *Western Ringtail Possum (*Pseudocheirus occidentalis*) Recovery Plan* (DBCA, 2017) to protect habitat critical for survival for WRPs and mitigate threatening processes that are constraining the recovery of WRPs (Table 3-4).

Carnaby's Cockatoo
The activities within this plan are consistent with the objectives of the *Carnaby's Cockatoo (*Calyptorhynchus latirostris*) Recovery Plan* (DPAW, 2013) to stop further decline in the distribution and abundance of Carnaby's Cockatoo by protecting the birds and enhancing their habitat critical for survival (Table 3-4).

Baudin's Cockatoo
The activities within this plan are consistent with the objectives of the *Baudin's Cockatoo (*Calyptorhynchus baudinii*) Recovery Plan* (DEC, 2008) to stop further decline in the distribution and abundance of Baudin's Cockatoo by protecting the birds and enhancing their habitat critical for survival (Table 3-4).

Forest Red-tailed Black Cockatoo
The activities within this plan are consistent with the objective of the *Forest Red-tailed Black Cockatoo Recovery Plan* (DEC, 2008), to stop further decline in the breeding populations of the black cockatoo and to ensure their persistence throughout their range in the southwest of Western Australia (Table 3-4).

Banksia Woodlands TEC/PEC
The activities within this plan are consistent with both the 'protect' and 'restore' conservation actions listed in the *Approved Conservation Advice (incorporating listing advice) for the Banksia Woodlands of the Swan Coastal Plain ecological community* (TSSC, 2016) as described in Table 3-4.

Table 3-4. Consistency of activities at the Ducane Offset Area with relevant recovery plans

Objective and action themes from recovery plan / conservation advice	Activities undertaken within this plan
WRP	
Habitat critical for survival for WRPs is protected	• Protecting and placing 126 ha of WRP habitat into the conservation estate to be managed for conservation.
Threatening processes that are constraining the recovery of WRPs are mitigated	• Fencing, weed control, feral animal control and rubbish removal.
Carnaby's Cockatoo	
Protect and manage important habitat	• Protecting and placing 124.1 ha of foraging habitat into the conservation estate to be managed for conservation • Installation of artificial nesting hollows.
Manage other impacts	• Fencing, weed control, feral animal control and rubbish removal.
Baudin's Cockatoo	
Stop further decline in the breeding populations of the black cockatoo and to ensure their persistence throughout their range in the southwest of Western Australia	• Protecting and placing 124.1 ha of foraging habitat into the conservation estate to be managed for conservation • Installation of artificial nesting hollows • Fencing, weed control, feral animal control and rubbish removal.
Forest Red-tailed Black Cockatoo	
Stop further decline in the breeding populations of the black cockatoo and to ensure their persistence throughout their range in the southwest of Western Australia	• Protecting and placing 124.1 ha of foraging habitat into the conservation estate to be managed for conservation • Installation of artificial nesting hollows • Fencing, weed control, feral animal control and rubbish removal.
Banksia Woodlands TEC/PEC	
Protect the ecological community to prevent further loss of extent and condition	• Protecting and placing 124.1 ha of Banksia Woodlands TEC/PEC vegetation into the conservation estate to be managed for conservation.
Restore the ecological community within its original range by active abatement of threats, re-vegetation and other conservation initiatives	• Fencing, weed control, feral animal control and rubbish removal.

3.4.4 Management actions and timeframes

The following on-ground and ongoing management actions will be undertaken for the Ducane Offset Area. Table 3-5 details management actions required to achieve management outcomes supporting habitat for targeted species.

Table 3-5. Ducane Offset Area management actions and timeframes

Activity	Actions	Timeframe and Frequency	Status
Vehicle access	Install gates and other barriers such as boulders, steel roadside barriers to restrict unauthorised vehicle access	Installation late 2023 Ongoing twice-yearly inspections	Commencing late 2023
Artificial hollows	Install artificial nesting hollows	Installation winter 2023 Ongoing annual inspections	Commencing winter 2023
Weed control	Conduct baseline weed survey	Spring 2023	Commencing spring 2023
	Ongoing weed control program (WONS and Declared weeds) with a particular focus around wetland areas	Twice-yearly in spring and autumn or as required for years 1 and 2, annually thereafter based on site observations	Commencing 2024
Pest control	Kangaroo control using shooting	Twice-yearly at six-month intervals for years 1-5 with additional culling if required, annually thereafter based on site observations of grazing impact	Commencing spring 2024
Pest control	Fox control using 1080 baiting	Annually in late winter to autumn based on site observation of fox presence	Commencing late winter 2024
	Rabbit control using Rabbit Haemorrhagic Disease Virus (RHDV) and Pindone	Annually in spring to autumn based on site observation of rabbit presence	Commencing spring 2024
	Feral cat control using trapping	Annually in spring to autumn based on site observation of cat presence	Commencing autumn 2024
Fire management	Maintain 3 m wide firebreak around the offset area boundary	Firebreaks were re-instated in 2020. Ongoing annual inspections.	Maintenance ongoing

Vehicle access management. To restrict unauthorised vehicle access to the site, in consultation with DBCA, reinforced fencing, heavy duty gates and additional barriers such as boulders or steel roadside barriers will be installed along key boundaries and at potential access points.

Kangaroo overgrazing management. The dominant threatening process identified at the Ducane Offset Area by both DBCA (DBCA, 2010, 2018) and Biota (2021) in the Banksia vegetation was overgrazing by kangaroos. The second of the two key threatening process identified by DBCA in their 2018 assessment and also by Biota in their 2021 report, was invasion by annual weeds. This threat was noted as being linked to kangaroo overgrazing impacts, meaning that where overgrazing impacts were more prevalent, invasion by exotic species was also more prevalent and that in these areas, exotics were present at higher densities. An assessment of these reports shows that during the period 2010 to 2021, the Banksia vegetation within the Ducane Offset Area decreased in condition from 'Pristine to Excellent' across its entirety to a combination of 'Very good' and 'Good with some Degraded' condition. This is a significant loss of vegetation quality and habitat value in a relatively short period of time.

Due to potential negative outcomes on the wider kangaroo population as a result of the exclusion fencing and / or on individual kangaroos contained within an exclusion fence, DBCA's preferred management approach for the Ducane Offset Area in relation to overgrazing impacts is not fencing

but kangaroo culling. Kangaroo culling via the engagement of professional shooters is currently occurring in the local area in response to grazing impacts on adjacent agricultural lands, however considering the decline in vegetation condition observed at the offset area, the current level of kangaroo control is not adequate to mitigate the overgrazing impact.

To address kangaroo overgrazing impacts within the Ducane Offset Area, a culling program comprising two shooting rounds throughout the year at approximately six month intervals will be undertaken in coordination with the activities of local landholders. The emphasis of the culling program will be on reducing population size by culling both males and females, rather than just heavy weight large males. Additional culling will be conducted if the vegetation monitoring results are showing a decline or failure to attain the desired vegetation condition, or if the annual kangaroo count does not show a decline in population size despite the culling effort.

If after five years of adaptive management of the expanded shooting program (as outlined above), vegetation condition is not trending towards achievement of the completion criteria set out in Table 3-3, fencing to exclude kangaroos may be considered in order to ensure the ecological benefit is achieved.

Artificial nesting hollows. To satisfy the requirements of condition 4-6(1), artificial nesting hollows for black cockatoos will be installed in consultation with DBCA and according to DBCA's Fauna Note *Artificial Nest Hollows for All Black Cockatoos* (DBCA, 2023)[11]. At least three artificial nesting hollows for black cockatoos required under MS1191 condition 4-4 will be installed within the black cockatoo habitat at the Ducane Offset Area.

Fire management. Firebreaks have been installed and will be maintained as required to ensure effective functioning.

Pest control. As required based on site observations (i.e. observation of evidence of recent (~<2 months old) presence via scats, tracks, diggings or the taking of baits (as relevant)):

- Commencing in autumn 2024, rabbit baiting using a combination of Rabbit Haemorrhagic Disease Virus (RHDV) and Pindone will be undertaken annually from spring through to late autumn where rabbit impacts are noted as having a detrimental impact to native vegetation
- Commencing in autumn 2024, fox baiting using 1080 (sodium fluoroacetate) and / or trapping will be undertaken annually during late winter through to autumn
- Commencing in autumn 2024, feral cats will be targeted using cage traps set in areas where cat activity has been identified during monitoring.

Weed control. Commencing 2024, weed control comprising spot spraying of WONS and Declared weed species will be undertaken twice-yearly (spring, autumn) for years 1 and 2 and annually thereafter (as required based on site observations) for up to 20 years to control weeds.

Rubbish removal. Rubbish will be removed from the site opportunistically to improve vegetation condition and limit the attraction of pest animals.

[11] Revised version of DPaW guidance *How to design and place artificial hollows for Carnaby's Cockatoo* (DPaW, 2015).

3.4.5 Monitoring

Monitoring will be conducted at the Ducane Offset Area to enable early detection of changes that may lead to trigger values being reached and the measurement of progress towards completion criteria.

To enable determination of whether any changes in WRP abundance are locally site specific or regional, WRP density and distribution monitoring will also be conducted at two reference sites, being Lot 2 Boyanup Picton Road and Reserve 23000. WRP monitoring at both offset sites and reference sites involving nocturnal field surveys will utilise distance sampling methods to provide consistency with the baseline dataset.

Monitoring will be undertaken as outlined in Table 3-6, which also specifies trigger values and corrective actions to be taken should these values be reached.

Table 3-6. Ducane Offset Area monitoring program

Parameter	Performance indicator	Methodology	Frequency and timing	Trigger value	Corrective action	Reporting
Access						
Fencing	Presence and condition of fencing	Visual inspection of fence	Annually commencing spring 2023	Fence not intact or to specifications	• Investigate cause and raise incident report • Implement corrective actions which may include: - Review practicality of fencing design and structure - Undertake repair/modification of fence as required - Improve personnel training and education - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting
Firebreaks						
Firebreaks	Condition of firebreaks	Visual inspection of firebreaks	Annually commencing 2021	Firebreaks not to specified standard	• Investigate cause and raise incident report • Implement corrective actions which may include: - Review practicality of firebreak network - Undertake firebreak modification and maintenance as required - Improve personnel training and education - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting
Pest control						
Fox, feral cat and rabbit control	Evidence of recent (<2 months old) fox, feral cat or rabbit presence	Field survey for visual evidence of fox, feral cat or rabbit presence	Annually in autumn commencing 2024	Visual evidence of recent fox, feral cat or rabbit activity detected (e.g. scats, diggings)	• Investigate cause and raise incident report • Implement corrective actions which may include: - Undertake baiting monthly until no fresh visual evidence is observed for two consecutive months - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting

Parameter	Performance indicator	Methodology	Frequency and timing	Trigger value	Corrective action	
WRP						
WRP distribution	WRP observations	Nocturnal field survey (including in Reference Sites)	Every three years in October / November commencing in 2023/2024 (baseline)	WRP absent for more than 3 years from areas where they were present at baseline	• Investigate cause and raise incident report • Implement corrective actions which may include: - Assess WRP reference site data to determine whether trends are local to the site or regional - Assess canopy cover / structure (remote sensing) data - If a decline in WRP abundance is detected, conduct predator survey, review and modify as required practicality of the predator control program - Review practicality of weed control program, modify as required - Conduct *Phytophthora* dieback assessment - Review and modify *Phytophthora* dieback management measures as required - Undertake targeted revegetation as required - Improve personnel training and education - Review monitoring frequency and method. Monitoring frequency will be increased to annually if a decline in WRP abundance is detected until such time that the reason for the decline is understood, and if appropriate continued, should corrective actions to stabilise or recover the population be implemented. • Monitor outcomes.	Report annually as part of annual compliance reporting
WRP density	Number of WRP / ha			WRP offset site abundance trends lower than those at reference sites for 3 consecutive years (measured through annual average density)		
Black Cockatoo						
Black cockatoo habitat	Black cockatoo habitat quality	Field survey of black cockatoo foraging and potential nesting habitat and artificial hollows	Every two years in spring commencing 2023/24 (baseline), 2024 for artificial hollows	Decline in habitat quality over baseline for two consecutive monitoring periods (i.e. four years)	• Investigate cause and raise incident report • Implement corrective actions which may include: - Review practicality of pest animal control program, modify as required - Review practicality of weed control program, modify as required - Review and modify *Phytophthora* dieback management measures as required - Improve personnel training and education - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting

Parameter	Performance indicator	Methodology	Frequency and timing	Trigger value	Corrective action	
Vegetation / Habitat						
Condition	Condition of vegetation assessed against EPA (2016)	Field survey	Annually in spring commencing 2023 (baseline)	At year four or later, condition is Degraded or worse	• Investigate cause and raise incident report • Implement corrective actions which may include: - Review and modify as required weed control program - Review and modify as required *Phytophthora* dieback management measures - Review and modify as required fire management measures - Revegetation actions (and any other actions, e.g. management of grazing pressures) will be considered where these actions are appropriate and are considered likely to produce an outcome whereby the vegetation condition improves or the decline is halted - Improve personnel training and education - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting
WONS and Declared weed species distribution and diversity	Presence and distribution (location) of WONS and Declared weed species present	Field survey (meander with opportunistic recording)	Annually in spring for five years commencing 2023, every two years thereafter	WONS or Declared weed species present		
Vegetation cover and structure	Cover and structure of vegetation	Drone footage (3D imagery)	Three-yearly in autumn or spring commencing 2023 (baseline)	At year six or later, combined average canopy cover across upper and / or mid storey layer is less than 60 %		

3.4.6 Risk management

Potential risks to the successful implementation of this offset and achievement of the objectives in Section 3.4.2 are set out in Table 3-7 along with potential strategies for mitigating risks.

Table 3-7. Ducane Offset Area offset implementation risk and mitigation strategies

Potential risk	Risk mitigation strategy
Long term security of tenure	• The Ducane Offset Area is owned by the State of Western Australia and is therefore in secure tenure • The properties are currently zoned rural under the Greater Bunbury Region Scheme (GBRS). DBCA has indicated that the properties will be rezoned to Regional Open Space or Conservation under the scheme in the future and managed as part of the Conservation Estate • Funding provided for management actions.
Management actions not implemented	• Annual audit conducted to ensure management actions have been implemented • Main Roads required to comply with requirements of MS 1191, including implementation of actions within this plan • Main Roads required to report annually to CEO on compliance with this plan, including implementation of management actions.
Failure to achieve completion criteria	• Re-assess completion criteria 12 months after failure and continue to assess until completion criteria are met • Monitor progress toward achieving completion criteria over time through annual audits • Review management actions and / or completion criteria in accordance with the review provisions for this plan if management actions are no longer feasible, completion criteria are no longer attainable or other extenuating circumstances arise.

4 OFFSET 2 – LOT 29 QUEELUP ROAD, GELORUP

This chapter describes the 'Lot 29 Queelup Road Gelorup' offset (Lot 29 Offset Area). The following sections identify:

- The offset being proposed (Section 4.1)
- The environmental attributes of the offset (Section 4.2)
- The protection mechanism for the offset (Section 4.3)
- Management and / or rehabilitation actions, including objectives, targets, completion criteria, monitoring and risk management (Section 4.4).

4.1 Identification of offset

The Lot 29 Offset Area (Figure 2, Appendix A) is located immediately adjacent to the BORR Southern Section project Development Envelope, approximately 1.2 km northwest of the Ducane Offset Area. The Lot 29 Offset Area was identified during the BORR project planning phase as a potential offset to address impacts to WRP, BTP, black cockatoos and Banksia Woodlands TEC/PEC. The Lot 29 Offset Area contains approximately 38.9 ha of remnant native vegetation, all of which is upland Banksia woodland. Existing fences separate the Lot 29 Offset Area from the surrounding land.

4.2 Environmental attributes of offset area

The vegetation within the Lot 29 Offset Area was surveyed as part of the environmental assessment for this project. The studies conducted are listed in Table 4-1.

Prior to finalisation of Main Roads acquisition of the property in 2022, Lot 29 Ducane (now Queelup) Road was known as Lot 1 Ducane Road. Surveys conducted for the Project therefore refer to Lot 1, not Lot 29.

Table 4-1. Relevant baseline studies for the Lot 29 Offset Area

Study	Description
Targeted Fauna Survey: Lot 1 Ducane Rd, Lot 156 Marchetti Rd, & Lot 167 Jilley Rd (Biota, 2021)	Identifies fauna habitats present on site and reports the findings of a targeted on-ground search for conservation significant fauna species
Bunbury Outer Ring Road Southern Section Flora and Vegetation Survey (BORR IPT, 2020)	Provides information on the vegetation types present within the Lot 29 Offset Area and immediate surrounds, and their condition determined from a flora and vegetation survey
Lot 1 Ducane Road Environmental Values Assessment (GHD, 2014)	Provides information on the vegetation units (structure and composition) present within the Lot 29 Offset Area and their condition as determined from a flora and vegetation survey. Identifies fauna habitats present on site and reports the findings of an on-ground search for significant fauna species.

The site has been confirmed to contain the following values:

- 37.7 ha of black cockatoo foraging and potential nesting habitat
- 38.5 ha of WRP and BTP habitat
- 2.8 ha of Banksia Woodlands TEC/PEC.

The Lot 29 Offset Area comprises three vegetation units. The first vegetation unit listed covers the great majority of the site and includes 2.8 ha of vegetation representing Banksia Woodlands TEC/PEC (Figure 5, Appendix A) and comprises habitat for black cockatoos, WRP and BTP (Figure 6, Appendix A):

- Open forest of *Eucalyptus marginata, Corymbia calophylla, Banksia attenuata and Agonis flexuosa* on Bassendean dunes (37.7 ha)
- Melaleuca woodland comprising 'Closed tall scrub of *Melaleuca preissiana, Astartea scoparia* and *Kunzea glabrescens* over sedgeland' and 'Low open forest of *Eucalyptus rudis* and *Melaleuca preissiana* over sedgeland' (1.9 ha).

The large majority of the vegetation on the Lot 29 Offset Area was mapped as Good-Degraded condition, with some small areas mapped as Very Good (BORR IPT, 2020).

Biota (2021) recorded 553 suitable DBH trees (i.e., trees with diameter at breast height (DBH) of >500 mm) within the Lot 29 Offset Area, and evidence of black cockatoo foraging was recorded during the field survey. Of the suitable DBH trees recorded, two contained hollows with evidence of potential black cockatoo use (chewing), but use could not be confirmed. A further 43 trees were identified as containing potentially suitable hollows with no signs of use, 22 of which were only assessed from ground level (Biota, 2021).

Based on the results of Biota's desktop assessment (Biota, 2021), all three black cockatoo species have previously been recorded within 5 km of the Lot 29 Offset Area, and a black cockatoo roost site has been recorded 4 km north of the Lot 29 Offset Area, but the black cockatoo species was not identified. A confirmed Carnaby's Cockatoo breeding hollow has also been recorded approximately 200 m south-west of the Lot 29 Offset Area (Biota, 2021).

Evidence of WRP was recorded within the Lot 29 Offset Area during field surveys, including sightings, dreys and scat records. A total of 37 individual WRPs were recorded from 33 observations (Biota, 2021), representing a density of 0.93 individuals / ha, similar to the Gelorup corridor.

4.3 Protection mechanism and management contribution

Main Roads acquired the Lot 29 Offset Area in 2022 from the WA Planning Commission (WAPC). Main Roads will request WAPC to rezone the Lot 29 Offset Area from rural to Regional Open Space or Conservation under the GBRS.

Main Roads will discuss long term management options with DBCA and the Shire of Capel. Until an alternative management structure is in place, Main Roads will maintain ownership and fund and manage the property for the purposes of conservation.

Should the land tenure or on-going management responsibilities change, Main Roads will develop a maintenance funding agreement with DBCA and / or the Shire of Capel to address on-going management costs of the offset site for at least twenty (20) years. As this offset site has been purchased, with on ground works now commenced, the 20-year management timeframe will begin from when these works commenced.

Management fees will be negotiated with DBCA and / or the Shire of Capel. Should no alternative management structure be secured, Main Roads will fund and manage the site for at least 20 years,

as above.

4.4 Offset management

4.4.1 Management approach

Management of the Lot 29 Offset Area is based on the approach outlined in Table 3-2.

Table 4-2. Lot 29 Offset Area management approach

Management aspect	Description	Defined in
Objective	Aim of the Offset Area	Table 4-3
Target	Specific goal identified for the Offset Area	
Completion criteria	Measurable outcomes identified for the Offset Area	
Management actions	Actions to be taken to achieve stated objective, targets and completion criteria, including timing	Table 4-5
Monitoring program	Assessment of progress towards achievement of objective, targets or completion criteria	Table 4-6
Performance indicator	Variable that allows for measurable assessment of progress towards achievement of objective, targets or completion criteria	
Trigger value	Measurable event in any assessed parameter that indicates achievement of the objective, targets or completion criteria may be at risk	
Corrective actions	Action(s) to be taken in response to a trigger value being reached	
Reporting	Documentation of progress towards achievement of the objective, targets or completion criteria and any non-compliances that may have occurred	
Risk assessment	Consideration and appraisal of risks that may impede achievement of the objective, targets or completion criteria	Table 4-7
Risk management strategies	Actions to be taken to manage and/or mitigate identified risks	

4.4.2 Objectives, targets and completion criteria

Table 4-3 sets out the objectives, targets and completion criteria for the Lot 29 Offset Area. The conservation and management of 38.5 ha of existing WRP habitat, provided within a large intact remnant that supports a known population of WRPs, provides a strategic conservation benefit for the species.

Site management for long term conservation (20 years) will include fencing and access management, weed control, firebreaks and feral and pest animal control to maintain / improve habitat quality. The proposed completion criteria are consistent with existing management criteria for other offset properties in the local area undertaken for the Bunbury Port Access Road and BORR Central since 2015.

Table 4-3. Objective, targets and completion criteria for the Lot 29 Offset Area

Objective	Target	Completion criteria
Counterbalance significant residual impacts to habitat supporting WRP and BTP	Conserve and manage 38.5 ha of existing WRP and BTP habitat	The offset site will meet the following completion criteria: • Access is restricted • Firebreaks are in place and well maintained • WONS and Declared weeds are absent • High (at least 70 %) canopy continuity for WRP movement (combined across upper and mid storey layers) including a high level of canopy connectivity to adjacent habitat[12] • Vegetation condition is 'Good' or better according to the scale of EPA (2016) • In accordance with 'Future quality with offset' values presented in Appendix C, WRP habitat value is at least equal to that recorded in baseline surveys • WRP offset site abundance trends, as measured through density (WRP/ha), are commensurate with those at reference sites[13].
Counterbalance significant residual impacts to habitat supporting black cockatoos	Conserve and manage 37.7 ha of existing black cockatoo habitat Install artificial nesting hollows for black cockatoos	The offset site will meet the following completion criteria: • Access is restricted • Firebreaks are in place and well maintained • WONS and Declared weeds are absent • Banksia and eucalypt woodlands providing black cockatoo habitat to have at least 40 % projected foliage cover and contain suitable foraging tree species for each of the three species of black cockatoos • In accordance with the 'Future quality with offset' values presented in Appendix C, black cockatoo habitat value is at least equal to that recorded in baseline surveys • Installation and maintenance of a portion of the up to 11 artificial nesting hollows for black cockatoos required under MS1191 condition 4-4[14].
Counterbalance significant residual impacts to Banksia Woodlands TEC/PEC	Conserve and manage 2.8 ha of existing Banksia Woodlands TEC/PEC	The offset site will meet the following completion criteria: • Access is restricted • Firebreaks are in place and well maintained • WONS and Declared weeds are absent • In accordance with the 'Future quality with offset' values presented in Appendix C, Banksia Woodland vegetation condition is at least equal to that recorded in baseline surveys[15].

[12] Noting the requirement for firebreaks.

[13] Noting that WRP population densities change seasonally and year to year.

[14] Baseline studies indicated 11 suitable DBH trees with hollows potentially suitable for nesting by black cockatoos are present within the clearing area. MS1191 condition 4-4 requires installation of one artificial hollow for every suitable nest hollows cleared. It is anticipated that clearing will be conducted in three stages, between 2022 and 2024. Therefore, the number of potentially suitable nest hollows cleared cannot be confirmed until clearing has been conducted.

[15] Good-Degraded condition, with some small areas mapped as Very Good (BORR IPT, 2020).

While the objective of the offset is specifically tied to condition 9-3 of Ministerial Statement 1191, overarching management objectives have previously been defined for Main Roads conservation properties in the vicinity of the BORR (Strategen, 2015) that are consistent with the objectives of condition 9-3. Specific objectives identified for the management of local conservation properties include:

- Enhance vegetation health within the conservation area
- Ensure the ongoing protection of the conservation area through ensuring an infrequent fire regime where possible
- Encourage the natural regeneration of an ecologically diverse and stable vegetation community
- Maintain self-sustaining ecosystems capable of supporting native biota, focussing on significant fauna including WRP, BTP and black cockatoos.

These objectives will be achieved through the implementation of the active management practices detailed in Section 4.4.4.

4.4.3 Consistency with recovery plans

Condition 9-4(7)(b) requires the objectives and targets in Table 4-3 to be consistent with the objectives of relevant guidance, including but not limited to recovery plans or area management plans. Of the values being offset by the Lot 29 Offset Area, WRP and black cockatoos have associated recovery plans or guidances. No such document exists for the Banksia Woodlands PEC, however, the Commonwealth has issued a conservation advice for the Banksia Woodlands TEC (TSSC, 2016) which is synonymous with the Banksia Woodlands PEC. This plan is consistent with the Commonwealth conservation advice.

WRP
The activities within this plan are consistent with the objectives of the *Western Ringtail Possum (*Pseudocheirus occidentalis*) Recovery Plan* (DBCA, 2017) to protect habitat critical for survival for WRPs and mitigate threatening processes that are constraining the recovery of WRPs (Table 4-4).

Carnaby's Cockatoo
The activities within this plan are consistent with the objectives of the *Carnaby's Cockatoo (*Calyptorhynchus latirostris*) Recovery Plan* (DPAW, 2013) to stop further decline in the distribution and abundance of Carnaby's Cockatoo by protecting the birds and enhancing their habitat critical for survival (Table 4-4).

Baudin's Cockatoo
The activities within this plan are consistent with the objectives of the *Baudin's Cockatoo (*Calyptorhynchus baudinii*) Recovery Plan* (DEC, 2008) to stop further decline in the distribution and abundance of Baudin's Cockatoo by protecting the birds and enhancing their habitat critical for survival (Table 4-4).

Forest Red-tailed Black Cockatoo
The activities within this plan are consistent with the objective of the *Forest Red-tailed Black Cockatoo Recovery Plan* (DEC, 2008), to stop further decline in the breeding populations of the black cockatoo and to ensure their persistence throughout their range in the southwest of Western Australia (Table 4-4).

Banksia Woodlands TEC/PEC

The activities within this plan are consistent with both the 'protect' and 'restore' conservation actions listed in the *Approved Conservation Advice (incorporating listing advice) for the Banksia Woodlands of the Swan Coastal Plain ecological community* (TSSC, 2016) as described in Table 4-4.

Table 4-4. Consistency of activities at the Lot 29 Offset Area with relevant recovery plans

Objective and action themes from recovery plan / conservation advice	Activities undertaken within this plan
WRP	
Habitat critical for survival for WRPs is protected	• Protecting 38.5 ha of WRP habitat.
Threatening processes that are constraining the recovery of WRPs are mitigated	• Firebreaks, fencing, weed control, feral animal control and rubbish removal.
Carnaby's Cockatoo	
Protect and manage important habitat	• Protecting 37.7 ha of foraging habitat • Installation of artificial nesting hollows.
Manage other impacts	• Firebreaks, fencing, weed control, feral animal control and rubbish removal.
Baudin's Cockatoo	
Stop further decline in the breeding populations of the black cockatoo and to ensure their persistence throughout their range in the southwest of Western Australia	• Protecting 37.7 ha of foraging habitat • Installation of artificial nesting hollows • Firebreaks, fencing, weed control, feral animal control and rubbish removal.
Forest Red-tailed Black Cockatoo	
Stop further decline in the breeding populations of the black cockatoo and to ensure their persistence throughout their range in the southwest of Western Australia	• Protecting 37.7 ha of foraging habitat • Installation of artificial nesting hollows • Fencing, weed control, feral animal control and rubbish removal.
Banksia Woodlands TEC/PEC	
Protect the ecological community to prevent further loss of extent and condition	• Protecting 2.8 ha of Banksia Woodland TEC/PEC vegetation.
Restore the ecological community within its original range by active abatement of threats, re-vegetation and other conservation initiatives	• Firebreaks, fencing, weed control, feral animal control and rubbish removal.

4.4.4 Management actions and timeframes

The following on-ground and ongoing management actions will be undertaken for the Lot 29 Offset Area. Table 4-5 details management actions required to achieve management outcomes supporting the in situ habitat for targeted species and TEC/PEC vegetation.

Table 4-5. Lot 29 Offset Area management actions and timeframes

Activity	Actions	Timeframe and Frequency	Status
Fencing	Install boundary fence to rural fence specifications	Installation 2023. Ongoing quarterly inspections.	Commencing 2023
Artificial hollows	Install artificial nesting hollows	Installation 2024. Ongoing annual inspections.	Commencing 2024
Weed control	Conduct baseline weed survey	Spring 2023	Commencing 2023
	Ongoing weed control program (WONS and Declared weeds) with a particular focus in the area of the south eastern boundary	Twice-yearly in spring and autumn or as required for years 1 and 2, annually thereafter based on site observations	Commencing 2024
Pest control	Fox control using 1080 baiting	Annually in late winter to autumn based on site observation of fox presence	Commencing autumn 2024
	Rabbit control using RHDV and Pindone	Annually in spring to autumn based on site observation of rabbit presence	Commencing autumn 2024
Fire management	Establish and maintain 3 m wide firebreak around the offset area boundary	Autumn 2023	Commencing autumn 2023, maintenance ongoing

Fencing requirements. Access to the site will be restricted through the installation of fencing. The existing rural style property boundary fence will be replaced with a 1.5 m fauna fence on all boundaries to exclude macropods and feral pest species (foxes / rabbits). Fence design will include fauna escape gates to enable kangaroos to leave the site. The aim of the fauna fence is to minimise further degradation of native vegetation by limiting macropod (and rabbit) grazing pressure. As macropod grazing is currently the most significant cause of degradation factor, this will enable favourable conditions for natural regeneration.

The Lot 29 Offset Area forms a component of the 'Dalyellup/Gelorup/Crooked Brook Ecological Linkage' identified by the EPA in their assessment of the GBRS (EPA, 2003). The South West Regional Ecological Linkage (SWREL) project further refined the ecological linkages identified by the EPA (Molloy, S., Wood, J., Wallrodt, S., & Whisson, G., 2009). The Lot 29 Offset Area is traversed by an axis line and buffer of a SWREL mapped ecological linkage. In spite of the above, apart from scattered vegetation to the east, the Lot 29 Offset Area is isolated from nearby vegetation remnants and does not provide significant ecological linkages to nearby remnant vegetation. The construction of the BORR Southern Section project to the west of the property will sever any ecological linkage to the west. The northern boundary adjoins a quarry and the southern boundary directly adjoins Ducane Road. Therefore, it is not expected that the fauna fence will impact substantially in a negative way on any ecological linkage values. Rather, by enhancing the quality of the vegetation through encouraging natural regeneration, is likely to improve the value of this linkage.

Access control is an effective tool for preventing a range of detrimental impacts to bushland caused by unauthorised vehicle access, such as land degradation, trampling of vegetation, illegal dumping of rubbish and spread of weeds and disease. unauthorised and unwanted access to the site. Controlling access prevents people (including vehicles) from causing land degradation,

interference with revegetation works and the spread of weeds and diseases.

Artificial nesting hollows. To satisfy the requirements of condition 4-6(1), artificial nesting hollows for black cockatoos will be installed in consultation with DBCA and according to DBCA's Fauna Note *Artificial Nest Hollows for All Black Cockatoos* (DBCA, 2023). A portion of the up to 11 artificial nesting hollows for black cockatoos required under MS1191 condition 4-4 will be installed within the black cockatoo habitat at the Lot 29 Offset Area.

Fire management. Firebreaks will be installed and maintained as required to ensure effective functioning.

Pest control. As required based on site observations (i.e. observation of evidence of recent (~<2 months old) presence via scats, tracks, diggings or the taking of baits (as relevant)):

- Commencing in autumn 2024, rabbit baiting using a combination of Rabbit Haemorrhagic Disease Virus (RHDV) and Pindone will be undertaken annually from spring through to late autumn where rabbit impacts are noted as having a detrimental impact to native vegetation
- Commencing in autumn 2024, fox baiting using 1080 (sodium fluoroacetate) and / or trapping will be undertaken annually during late winter through to autumn.

Weed control. Commencing 2024, weed control comprising spot spraying of WONS and Declared weed species will be undertaken twice-yearly (spring, autumn) for years 1 and 2 and annually thereafter (as required based on site observations) for up to 20 years to control weeds.

Rubbish removal. Once fencing has been installed and access restricted, rubbish will be removed from the site to improve vegetation condition and limit the attraction of pest animals.

4.4.5 Monitoring

Monitoring will be conducted at the Lot 29 Offset Area to enable early detection of changes that may lead to trigger values being reached and the measurement of progress towards completion criteria.

To enable determination of whether any changes in WRP abundance are locally site specific or regional, WRP density and distribution monitoring will also be conducted at two reference sites, being Lot 2 Boyanup Picton Road and Reserve 23000. WRP monitoring at both offset sites and reference sites involving nocturnal field surveys will utilise distance sampling methods to provide consistency with the baseline dataset.

Monitoring will be undertaken as outlined in Table 4-6, which also specifies trigger values and corrective actions to be taken should these values be reached.

Table 4-6. Lot 29 Offset Area monitoring program

Parameter	Performance indicator	Methodology	Frequency and timing	Trigger value	Corrective action	Reporting
Access						
Fencing	Presence and condition of fencing	Visual inspection of fence	Annually commencing spring 2023	Fence not intact or to specifications	• Investigate cause and raise incident report • Implement corrective actions which may include: - Review practicality of fencing design and structure - Undertake repair/modification of fence as required - Improve personnel training and education - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting
Firebreaks						
Firebreaks	Condition of firebreaks	Visual inspection of firebreaks	Annually commencing spring 2023	Firebreaks not to specified standard	• Investigate cause and raise incident report • Implement corrective actions which may include: - Review practicality of firebreak network - Undertake firebreak modification and maintenance as required - Improve personnel training and education - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting
Pest control						
Fox and rabbit control	Evidence of recent (<2 months old) fox or rabbit presence	Field survey for visual evidence of fox or rabbit presence	Annually in autumn commencing 2023	Visual evidence of recent fox or rabbit activity detected (e.g. scats, diggings)	• Investigate cause and raise incident report • Implement corrective actions which may include: - Undertake baiting monthly until no fresh visual evidence is observed for two consecutive months - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting

Parameter	Performance indicator	Methodology	Frequency and timing	Trigger value	Corrective action	Reporting
WRP						
WRP distribution	WRP observations	Nocturnal field survey	Every three years in October / November commencing in 2023/2024	WRP absent for more than 3 years from areas where they were present at baseline	• Investigate cause and raise incident report • Implement corrective actions which may include: - Assess WRP reference site data to determine whether trends are local to the site or regional - Assess canopy cover / structure (remote sensing) data - If a decline in WRP abundance is detected, conduct predator survey, review and modify as required practicality of the predator control program - Review practicality of weed control program, modify as required - Conduct *Phytophthora* dieback assessment - Review and modify *Phytophthora* dieback management measures as required - Undertake targeted revegetation as required - Improve personnel training and education - Review monitoring frequency and method. Monitoring frequency will be increased to annually if a decline in WRP abundance is detected until such time that the reason for the decline is understood, and if appropriate continued, should corrective actions to stabilise or recover the population be implemented. • Monitor outcomes.	Report annually as part of annual compliance reporting
WRP density	Number of WRP / ha			WRP offset site abundance trends lower than those at reference sites for 3 consecutive years (measured through annual average density)		
Black Cockatoo						
Black cockatoo habitat	Black cockatoo habitat quality	Field survey of black cockatoo foraging and potential nesting habitat and artificial hollows	Every two years in spring commencing 2023 (baseline), 2023 for artificial hollows	Decline in habitat quality over baseline for two consecutive monitoring periods (i.e. four years)	• Investigate cause and raise incident report • Implement corrective actions which may include: - Review practicality of pest animal control program, modify as required - Review practicality of weed control program, modify as required - Review and modify *Phytophthora* dieback management measures as required - Improve personnel training and education - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting

Parameter	Performance indicator	Methodology	Frequency and timing	Trigger value	Corrective action	Reporting
Vegetation / Habitat						
Condition	Condition of vegetation assessed against EPA (2016)	Field survey	Annually in spring commencing 2023 (baseline)	At year four or later, condition is Degraded or worse	• Investigate cause and raise incident report • Implement corrective actions which may include: - Review and modify as required weed control program - Review and modify as required *Phytophthora* dieback management measures - Review and modify as required fire management measures - Revegetation actions (and any other actions, e.g. management of grazing pressures) will be considered where these actions are appropriate and are considered likely to produce an outcome whereby the vegetation condition improves or the decline is halted - Improve personnel training and education - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting
WONS and Declared weed species distribution and diversity	Presence and distribution (location) of WONS and Declared weed species present	Field survey (meander with opportunistic recording)	Twice-yearly for two years commencing 2023 (baseline), annually thereafter	WONS or Declared weed species present		
Vegetation cover and structure	Cover and structure of vegetation	Drone footage (3D imagery)	Three-yearly in autumn or spring commencing 2023 (baseline)	At year four or later, cover across all strata is less than 75 % of baseline		

4.4.6 Risk management

Potential risks to the successful implementation of this offset and achievement of the objectives in Section 4.4.2 are set out in Table 4-7 along with potential strategies for mitigating risks.

Table 4-7. Lot 29 Offset Area offset implementation risk and mitigation strategies

Potential risk	Risk mitigation strategy
Long term security of tenure	• Main Roads has acquired the Lot 29 Offset Area. Owned by the Commissioner of Main Roads, the property is in secure tenure. • The property is currently zoned rural and primary regional road under the GBRS. Main Roads will request WAPC to rezone the Lot 29 Offset Area to Regional Open Space or Conservation under the scheme. • Funding provided for management actions • Investigate potentially appointing an appropriate management authority.
Management actions not implemented	• Annual audit conducted to ensure management actions have been implemented • Main Roads required to comply with requirements of MS 1191, including implementation of actions within this plan • Main Roads required to report annually to CEO on compliance with this plan, including implementation of management actions.
Failure to achieve completion criteria	• Re-assess completion criteria 12 months after failure and continue to assess until completion criteria are met • Monitor progress toward achieving completion criteria over time through annual audits • Review management actions and / or completion criteria in accordance with the review provisions for this plan if management actions are no longer feasible, completion criteria are no longer attainable or other extenuating circumstances arise.

5 OFFSET 3 – LOT 301 MARCHETTI ROAD GELORUP

This chapter describes the 'Lot 301 Marchetti Road Gelorup[16]' offset (Lot 301 Offset Area). The following sections identify:

- The offset being proposed (Section 5.1)
- The environmental attributes of the offset (Section 5.2)
- The protection mechanism for the offset (Section 5.3)
- Management and / or rehabilitation actions, including objectives, targets, completion criteria, monitoring and risk management (Section 5.4).

5.1 Identification of offset

The Lot 301 Offset Area comprises the 16 ha western vegetated portion of Lot 301 Marchetti Road, Gelorup (Figure 2, Appendix A). Lot 301 is located approximately 150 m north of the BORR Southern Section Development Envelope, approximately 1.4 km west-southwest of the Lot 29 Offset Area and 2.2 km northwest of the Ducane Offset Area. Lot 301 was identified during the BORR project planning phase as a potential offset to address impacts to WRP, BTP and black cockatoos. Lot 301 contains approximately 14.2 ha of remnant native vegetation, most of which is upland Banksia woodland.

5.2 Environmental attributes of offset area

Vegetation within the Lot 301 Offset Area was surveyed as part of the environmental assessment for this project. Studies conducted are listed in Table 5-1.

Table 5-1. Relevant baseline studies for the Lot 301 Offset Area

Study	Description
Targeted Fauna Survey: Lot 1 Ducane Rd, Lot 156 Marchetti Rd, & Lot 167 Jilley Rd (Biota, 2021)	Identifies fauna habitats present on site and reports the findings of a targeted on-ground search for conservation significant fauna species
Flora and Vegetation Survey of Lot 156 Marchetti Road (Stream Environment and Water, 2021)	Provides information on the vegetation units (structure and composition) present and their condition as determined from a flora and vegetation survey

The Lot 301 Offset Area has been confirmed to contain the following values:

- Approximately 9.7 ha of black cockatoo foraging and potential nesting habitat
- Approximately 14.2 ha of WRP and BTP habitat
- A conservation category wetland associated with the Five Mile Brook (UFI 931) dissects the offset area.

[16] Previously Lot 156 Marchetti Road (hence surveys refer to Lot 156).

The Lot 301 Offset Area comprises three vegetation units comprising intact native vegetation, the first two of which comprise black cockatoo habitat (Figure 7, Appendix A). The third is associated with the Five Mile Brook:

- Marri / Eucalyptus woodland. Dominated by Marri and Jarrah, these habitats also contained Peppermint and Banksia (9.7 ha)
- Melaleuca woodland. Seasonally inundated, these areas are characterised by Melaleuca over heath and sedges, with varying densities of Flooded Gum (4.5 ha).

All of the Lot 301 Offset Area vegetation was in 'Very Good' or 'Good' condition (Stream Environment and Water, 2021). There are small areas of weed infestations, primarily associated with the Five Mile Brook.

Evidence of black cockatoo foraging was recorded within the Lot 301 Offset Area, and Forest Red-tailed Black Cockatoo were observed foraging in both Jarrah and Marri during the field survey (Biota, 2021). 205 suitable DBH trees were recorded, of which two have a suitably sized hollow with no signs of use, eight have a potential suitably sized hollow with no signs of use and ten have hollows unsuitable for use by black cockatoos. The remaining trees had no hollows.

Five individual Forest Red-tailed Black Cockatoos were recorded roosting in a single Marri tree in the north-west corner of Lot 301. The roost site tree, which had no hollows, had a DBH of 57 cm and was 10-15 m high. It is located on the edge of the Jarrah / Marri habitat, ~100 m north of the ephemeral Five Mile Brook, which was dry during the survey.

Biota (2021) recorded evidence of WRP within the Lot 301 Offset Area during the fauna survey including sightings, dreys and scat records. A total of 15 individuals were recorded from 12 observations, representing a density of 1.06 individuals / ha.

5.3 Protection mechanism and management contribution

The Lot 301 Offset Area has been purchased by the Commissioner of Main Roads and was acquired with the intention of utilising the site vegetation as an offset for the BORR Project. Main Roads will request WAPC rezone the property from rural to Regional Open Space or Conservation under the GBRS.

Main Roads will discuss long term management options with DBCA and the Shire of Capel. Until an alternative management structure is in place, Main Roads will maintain ownership and fund and manage the property for the purposes of conservation. Should the land tenure or on-going management responsibilities change, Main Roads will develop a maintenance funding agreement with DBCA and / or the Shire of Capel to address on-going management costs of the offset site for at least twenty (20) years. As this offset site has been purchased, with on ground works to establish the offset now commenced, the 20-year management timeframe will begin from when these works commenced.

Management fees will be negotiated with DBCA and / or the Shire of Capel. Should no alternative management structure be secured, Main Roads will fund and manage the site for at least 20 years, as above.

5.4 Offset management

5.4.1 Management approach

Management of the Lot 301 Offset Area is based on the approach outlined in Table 5-2.

Table 5-2. Lot 301 Offset Area management approach

Management aspect	Description	Defined in
Objective	Aim of the Offset Area	Table 5-3
Target	Specific goal identified for the Offset Area	
Completion criteria	Measurable outcomes identified for the Offset Area	
Management actions	Actions to be taken to achieve stated objective, targets and completion criteria, including timing	Table 5-5
Monitoring program	Assessment of progress towards achievement of objective, targets or completion criteria	Table 5-6
Performance indicator	Variable that allows for measurable assessment of progress towards achievement of objective, targets or completion criteria	
Trigger value	Measurable event in any assessed parameter that indicates achievement of the objective, targets or completion criteria may be at risk	
Corrective actions	Action(s) to be taken in response to a trigger value being reached	
Reporting	Documentation of progress towards achievement of the objective, targets or completion criteria and any non-compliances that may have occurred	
Risk assessment	Consideration and appraisal of risks that may impede achievement of the objective, targets or completion criteria	Table 5-7
Risk management strategies	Actions to be taken to manage and/or mitigate identified risks	

5.4.2 Objectives, targets and completion criteria

Table 5-3 sets out the objectives, targets and completion criteria for the Lot 301 Offset Area. The conservation and management of 14.2 ha of existing intact WRP habitat that is situated along a riparian corridor and within an area that supports a known population of WRPs provides a strategic conservation benefit for the species.

Site management for long term conservation (20 years) will include fencing and access management, weed control, firebreaks and feral and pest animal control to maintain / improve habitat quality. The proposed completion criteria are consistent with existing management criteria for other offset properties in the local area undertaken for the Bunbury Port Access Road and BORR Central since 2015.

Table 5-3. Objective, targets and completion criteria for the Lot 301 Offset Area

Objective	Target	Completion criteria
Counterbalance significant residual impacts to habitat supporting WRP and BTP	Conserve and manage 14.2 ha of existing WRP and BTP habitat	The offset site will meet the following completion criteria: • Access is restricted • Firebreaks are in place and well maintained • WONS and Declared weeds are absent • High (at least 70 %) canopy continuity for WRP movement (combined across upper and mid storey layers) including a high level of canopy connectivity to adjacent habitat[17] • Vegetation condition is 'Good' or better according to the scale of EPA (2016) • In accordance with 'Future quality with offset' values presented in Appendix C, WRP habitat value is at least equal to that recorded in baseline surveys • WRP offset site abundance trends, as measured through density (WRP/ha), are commensurate with those at reference sites[18].
Counterbalance significant residual impacts to habitat supporting black cockatoos	Conserve and manage: 9.7 ha of black cockatoo habitat Install artificial nesting hollows for black cockatoos.	The offset site will meet the following completion criteria: • Access is restricted • Firebreaks are in place and well maintained • WONS and Declared weeds are absent • Banksia and eucalypt woodlands providing black cockatoo habitat to have at least 40 % projected foliage cover and contain suitable foraging tree species for each of the three species of black cockatoos • In accordance with the 'Future quality with offset' values presented in Appendix C, black cockatoo habitat value is at least equal to that recorded in baseline surveys • Installation and maintenance of a portion of the up to 33 artificial nesting hollows for black cockatoos required under EPBC Act approval for EPBC 2019/8543 condition 18(c)(i)[19].

While the objective of the offset is specifically tied to condition 9-3 of Ministerial Statement 1191, overarching management objectives have previously been defined for Main Roads conservation properties in the vicinity of the BORR (Strategen, 2015) that are consistent with the objectives of condition 9-3. Specific objectives identified for the management of local conservation properties include:

- Enhance vegetation health within the conservation area
- Ensure the ongoing protection of the conservation area through ensuring an infrequent fire regime where possible
- Encourage the natural regeneration of an ecologically diverse and stable vegetation

[17] Noting the requirement for firebreaks.
[18] Noting that WRP population densities change seasonally and year to year.
[19] Baseline studies indicated 11 suitable DBH trees with hollows potentially suitable for nesting by black cockatoos are present within the clearing area. EPBC Act approval for EPBC 2019/8543 condition 18(c)(i) requires installation of artificial hollows totalling at least three times the number of suitable nest hollows cleared. It is anticipated that clearing will be conducted in two stages, between 2022 and 2023. Therefore, the number of potentially suitable nest hollows cleared cannot be confirmed until clearing has been conducted.

community
- Maintain self-sustaining ecosystems capable of supporting native biota, focussing on significant fauna including WRP, BTP and black cockatoos.

These objectives will be achieved through the implementation of the active management practices detailed in Section 5.4.4.

5.4.3 Consistency with recovery plans

Condition 9-4(7)(b) requires the objectives and targets in

Table 5-3 to be consistent with the objectives of relevant guidance, including but not limited to recovery plans or area management plans. Of the values being offset by the Lot 301 Offset Area, WRP and black cockatoos have associated recovery plans or guidances.

WRP

The activities within this plan are consistent with the objectives of the *Western Ringtail Possum (*Pseudocheirus occidentalis*) Recovery Plan* (DBCA, 2017) to protect habitat critical for survival for WRPs and mitigate threatening processes that are constraining the recovery of WRPs (

Table 5-4).

Carnaby's Cockatoo

The activities within this plan are consistent with the objectives of the *Carnaby's Cockatoo (*Calyptorhynchus latirostris*) Recovery Plan* (DPAW, 2013) to stop further decline in the distribution and abundance of Carnaby's Cockatoo by protecting the birds and enhancing their habitat critical for survival (

Table 5-4).

Baudin's Cockatoo

The activities within this plan are consistent with the objectives of the *Baudin's Cockatoo (*Calyptorhynchus baudinii*) Recovery Plan* (DEC, 2008) to stop further decline in the distribution and abundance of Baudin's Cockatoo by protecting the birds and enhancing their habitat critical for survival (

Table 5-4).

Forest Red-tailed Black Cockatoo

The activities within this plan are consistent with the objective of the *Forest Red-tailed Black Cockatoo Recovery Plan* (DEC, 2008), to stop further decline in the breeding populations of the black cockatoo and to ensure their persistence throughout their range in the southwest of Western Australia (

Table 5-4).

Table 5-4. Consistency of activities at the Lot 301 Offset Area with relevant recovery plans

Objective and action themes from recovery plan / conservation advice	Activities undertaken within this plan
WRP	
Habitat critical for survival for WRPs is protected	• Protecting 14.2 ha of WRP habitat
Threatening processes that are constraining the recovery of WRPs are mitigated	• Firebreaks, fencing, weed control, feral animal control and rubbish removal.
Carnaby's Cockatoo	
Protect and manage important habitat	• Protecting 9.7 ha of foraging habitat • Installation of artificial nesting hollows
Manage other impacts	• Firebreaks, fencing, weed control, feral animal control and rubbish removal.
Baudin's Cockatoo	
Stop further decline in the breeding populations of the black cockatoo and to ensure their persistence throughout their range in the southwest of Western Australia	• Protecting 9.7 ha of foraging habitat • Installation of artificial nesting hollows • Firebreaks, fencing, weed control, feral animal control and rubbish removal.
Forest Red-tailed Black Cockatoo	
Stop further decline in the breeding populations of the black cockatoo and to ensure their persistence throughout their range in the southwest of Western Australia	• Protecting 9.7 ha of foraging habitat • Installation of artificial nesting hollows • Fencing, weed control, feral animal control and rubbish removal.

5.4.4 Management actions and timeframes

The following on-ground and ongoing management actions will be undertaken for the Lot 301 Offset Area. Table 5-5 details management actions required to achieve management outcomes supporting the in-situ habitat for targeted species.

Table 5-5. The Lot 301 Offset Area management actions and timeframes

Activity	Actions	Timeframe	Status
Fencing	Replace existing rural boundary	Installation autumn 2022. Ongoing quarterly inspections	Commencing autumn 2022
Artificial hollows	Install artificial nesting hollows	Installation autumn 2024. Ongoing annual inspections	Commencing autumn 2024
Signage	Install signage to exclude dog-walking from this offset area	Installation Q1/Q2 2024, signage to remain in place for 20 years from the date of approval	Q1/Q2 2024
Weed control	Conduct baseline weed survey	Spring 2023	Commencing spring 2023
	Ongoing weed control program (WONS and Declared weeds) with a particular focus around Five Mile Brook	Twice-yearly in spring and autumn or as required for years 1 and 2, annually thereafter based on site observations	Ongoing
Pest control	Fox control using 1080 baiting	Annually in late winter to autumn based on site observation of fox presence	Commencing autumn 2024
	Rabbit control using RHDV and Pindone	Annually in spring to autumn based on site observation of rabbit presence	Commencing autumn 2024
Fire management	Establish and maintain 3 m wide firebreak around the offset area boundary	Autumn 2023	Commencing autumn 2023

Fencing requirements. Redundant existing fencing on the western boundary will be removed. A new rural style fence will be installed on all boundaries where the fence is deemed to be inadequate. The aim of the fencing is to restore adequate site security and limit illegal or unauthorised access. Fencing will be replaced as like-for-like to match existing fence styles. New fencing will be constructed with straight wires (no-barbed wire or netting) to enable the continues continued passage for of reptiles and other fauna. Should off-road vehicle access restriction not be effective and damage to offset values occurs as a result, modification to the fence design may be required, such as installation of reinforced gates and other barriers and fortification of key access points.

Access to the site will be restricted through the installation of fencing. Access control is an effective tool for preventing a range of detrimental impacts to bushland caused by unauthorised vehicle access, such as land degradation, trampling of vegetation, illegal dumping of rubbish and spread of weeds and disease. unauthorised and unwanted access to the site. Controlling access prevents people (including vehicles) from causing land degradation, interference with revegetation works and the spread of weeds and diseases.

Signage. To further protect resident WRP within the Lot 301 Offset Area, signage to exclude dog-walking will be installed at access points on the property boundary.

Artificial nesting hollows. To satisfy the requirements of condition 4-6(1), artificial nesting hollows for black cockatoos will be installed in consultation with DBCA and according to DBCA's Fauna Note *Artificial Nest Hollows for All Black Cockatoos* (DBCA, 2023). A portion of the up to 11 artificial nesting hollows for black cockatoos required under MS1191 condition 4-4 will be installed within the black cockatoo habitat at the Lot 301 Offset Area.

Fire management. Firebreaks will be installed and maintained as required to ensure effective functioning.

Pest control. As required based on site observations (i.e. observation of evidence of recent (~<2 months old) presence via scats, tracks, diggings or the taking of baits (as relevant)):

- Commencing in autumn 2024, rabbit baiting using a combination of Rabbit Haemorrhagic Disease Virus (RHDV) and Pindone will be undertaken annually from spring through to late autumn where rabbit impacts are noted as having a detrimental impact to native vegetation
- Commencing in autumn 2024, fox baiting using 1080 (sodium fluoroacetate) and / or trapping will be undertaken annually during late winter through to autumn.

Weed control. Weed control comprising spot spraying of WONS and Declared weed species will be undertaken twice-yearly (spring, autumn) for years 1 and 2 and annually thereafter (as required based on site observations) for up to 20 years to control weeds.

Rubbish removal. Once fencing has been installed and access restricted, rubbish will be removed from the site to improve vegetation condition and limit the attraction of pest animals.

5.4.5 Monitoring

Monitoring will be conducted at the Lot 301 Offset Area to enable early detection of changes that may lead to trigger values being reached and the measurement of progress towards completion criteria.

To enable determination of whether any changes in WRP abundance are locally site specific or regional, WRP density and distribution monitoring will also be conducted at two reference sites, being Lot 2 Boyanup Picton Road and Reserve 23000. WRP monitoring at both offset sites and reference sites involving nocturnal field surveys will utilise distance sampling methods to provide consistency with the baseline dataset.

Monitoring will be undertaken as outlined in Table 5-6, which also specifies trigger values and corrective actions to be taken should these values be reached.

Table 5-6. Lot 301 Offset Area monitoring program

Parameter	Performance indicator	Methodology	Frequency and timing	Trigger value	Corrective action	Reporting
Access						
Fencing	Presence and condition of fencing	Visual inspection of fence	Annually commencing 2023	Fence not intact or to specifications	• Investigate cause and raise incident report • Implement corrective actions which may include: - Review practicality of fencing design and structure - Undertake repair/modification of fence as required - Improve personnel training and education - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting
Firebreaks						
Firebreaks	Condition of firebreaks	Visual inspection of firebreaks	Annually commencing 2023	Firebreaks not to specified standard	• Investigate cause and raise incident report • Implement corrective actions which may include: - Review practicality of firebreak network - Undertake firebreak modification and maintenance as required - Improve personnel training and education - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting
Pest control						
Fox and rabbit control	Evidence of recent (<2 months old) fox or rabbit presence	Field survey for visual evidence of fox or rabbit presence	Annually commencing 2024	Visual evidence of recent fox or rabbit activity detected (e.g. scats, diggings)	• Investigate cause and raise incident report • Implement corrective actions which may include: - Undertake baiting monthly until no fresh visual evidence is observed for two consecutive months - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting

Parameter	Performance indicator	Methodology	Frequency and timing	Trigger value	Corrective action	Reporting
WRP						
WRP distribution	WRP observations	Nocturnal field survey	Every three years in October / November commencing in 2023/2024	WRP absent for more than 3 years from areas where they were present at baseline	• Investigate cause and raise incident report • Implement corrective actions which may include: - Assess WRP reference site data to determine whether trends are local to the site or regional - Assess canopy cover / structure (remote sensing) data - If a decline in WRP abundance is detected, conduct predator survey, review and modify as required practicality of the predator control program - Review practicality of weed control program, modify as required - Conduct *Phytophthora* dieback assessment - Review and modify *Phytophthora* dieback management measures as required - Undertake targeted revegetation as required - Improve personnel training and education - Review monitoring frequency and method. Monitoring frequency will be increased to annually if a decline in WRP abundance is detected until such time that the reason for the decline is understood, and if appropriate continued, should corrective actions to stabilise or recover the population be implemented. • Monitor outcomes.	Report annually as part of annual compliance reporting
WRP density	Number of WRP / ha			WRP offset site abundance trends lower than those at reference sites for 3 consecutive years (measured through annual average density)		
Black cockatoo						
Black cockatoo habitat	Black cockatoo habitat quality	Field survey of black cockatoo foraging and potential nesting habitat and artificial hollows	Every two years in spring commencing 2023, 2024 for artificial hollows	Decline in habitat quality for two consecutive monitoring periods (i.e., four years)	• Investigate cause and raise incident report • Implement corrective actions which may include: - Review practicality of pest animal control program, modify as required - Review practicality of weed control program, modify as required - Review and modify *Phytophthora* dieback management measures as required - Improve personnel training and education - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting

Parameter	Performance indicator	Methodology	Frequency and timing	Trigger value	Corrective action	Reporting
Vegetation / Habitat						
Condition	Condition of vegetation assessed against EPA (2016)	Field survey	Annually in spring commencing 2023 (baseline)	At year four or later, condition is Degraded or worse	• Investigate cause and raise incident report • Implement corrective actions which may include: - Review and modify as required weed control program - Review and modify as required *Phytophthora* dieback management measures - Review and modify as required fire management measures - Revegetation actions (and any other actions, e.g. management of grazing pressures) will be considered where these actions are appropriate and are considered likely to produce an outcome whereby the vegetation condition improves or the decline is halted - Improve personnel training and education - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting
WONS and Declared weed species distribution and diversity	Presence and distribution (location) of WONS and Declared weed species present	Field survey (meander with opportunistic recording)	Twice-yearly for two years commencing 2023 (baseline), annually thereafter	WONS or Declared weed species present		
Vegetation cover and structure	Cover and structure of vegetation	Drone footage (3D imagery)	Every three years in autumn or spring commencing 2023 (baseline)	At year four or later, cover across all strata is less than 75 % of baseline		

5.4.6 Risk management

Potential risks to the successful implementation of this offset and achievement of the objectives in Section 5.4.2 are set out in Table 5-7 along with potential strategies for mitigating risks.

Table 5-7. Lot 301 Offset Area implementation risk and mitigation strategies

Potential risk	Risk mitigation strategy
Long term security of tenure	• Main Roads has acquired Lot 301. As it is owned by the Commissioner of Main Roads, the property is in secure tenure. • The property is currently zoned rural and primary regional road under the GBRS. Main Roads will request WAPC to rezone Lot 301 to Regional Open Space or Conservation under the scheme. • Funding provided for management actions • Investigate potentially appointing an appropriate management authority.
Management actions not implemented	• Annual audit conducted to ensure management actions have been implemented • Main Roads required to comply with requirements of MS 1191, including implementation of actions within this plan • Main Roads required to report annually to CEO on compliance with this plan, including implementation of management actions.
Failure to achieve completion criteria	• Re-assess completion criteria 12 months after failure and continue to assess until completion criteria are met • Monitor progress toward achieving completion criteria over time through annual audits • Review management actions and / or completion criteria in accordance with the review provisions for this plan if management actions are no longer feasible, completion criteria are no longer attainable or other extenuating circumstances arise.

6 OFFSET SITE 4 – LOT 104 (NORTH) WILLINGE DRIVE DAVENPORT

This chapter describes the Lot 104 (North) Willinge Drive, Davenport offset. The following sections identify:

- The offset being proposed (Section 6.1)
- The environmental attributes of the offset (Section 6.2)
- The protection mechanism for the offset (Section 6.3)
- Management and / or rehabilitation actions, including objectives, targets, completion criteria, monitoring and risk management (Section 6.4).

6.1 Identification of offset

Lot 104 (North) Willinge Drive, Davenport, (Lot 104 North Offset Area) is owned freehold by the Commissioner of Main Roads and was purchased as a potential sand source and environmental offset site. The Lot 104 North Offset Area comprises a portion of the 48.3 ha northern portion of the property, bound to the west by the Preston River, to the south by the BORR Central section and to the east by Willinge Drive (Figure 8, Appendix A). Lot 104 is zoned rural under the GBRS.

6.2 Environmental attributes of offset area

Historic farming practices has resulted in the removal of the majority of native vegetation. The majority of the property was previously the used as a commercial Blue Gum plantation, with the timber harvested in 2017 and the land is currently cleared apart from some vegetated sections of an ephemeral watercourse that crosses the property from east to west.

The Lot 104 North Offset Area abuts the Preston River to the west. The riparian woodland of the Preston River represents a habitat linkage for fauna. The riverine woodland provides a corridor to a number of widely separated reserve areas occurring outside the vicinity of the Offset Area (e.g. Manea Park and Franklandia Nature Reserve) (Biota, 2019).

Main Roads proposes to rehabilitate and revegetate a 35 ha portion of the property to provide habitat for WRP and BTP. Revegetation flora species will be selected to provide habitat and foraging vegetation suitable for these fauna species and will be based on site parameters and selected in consultation with DBCA. This reflects the approach for similar offset revegetation works by Main Roads in the region. Ongoing site management for long term conservation (20 years) will include fencing and access management, weed control, firebreaks and feral animal control to maintain / improve habitat quality.

6.3 Protection mechanism and management contribution

Lot 104 Willinge Drive was acquired by Main Roads in 2014 as a potential sand source and environmental offset site. Lot 104 is currently zoned as rural under the GBRS. Main Roads will request WAPC to rezone the entirety of Lot 104 to Regional Open Space or Conservation under the GBRS.

Main Roads will fund the rehabilitation of the Lot 104 North Offset Area. Main Roads will discuss long term management options with DBCA and the City of Bunbury. Until an alternative management structure is in place, Main Roads will maintain ownership and fund and manage the

property for the purposes of conservation.

Should the land tenure or on-going management responsibilities change, Main Roads will develop a maintenance funding agreement with DBCA and / or the City of Bunbury to address on-going management costs of the offset site for at least twenty (20) years. As this offset site has been purchased, with on ground works to establish the offset now commenced, the 20-year management timeframe will begin from when these works commenced.

Should no alternative management structure be secured, Main Roads will fund and manage the site for at least 20 years, as above.

6.4 Offset management

6.4.1 Management approach

Management of the the Lot 104 North Offset Area is based on the approach outlined in Table 6-1.

Table 6-1. Lot 104 North Offset Area management approach

Management aspect	Description	Defined in
Objective	Aim of the Offset Area	Table 6-2
Target	Specific goal identified for the Offset Area	
Completion criteria	Measurable outcomes identified for the Offset Area	
Management actions	Actions to be taken to achieve stated objective, targets and completion criteria, including timing	Table 6-5
Monitoring program	Assessment of progress towards achievement of objective, targets or completion criteria	Table 6-6
Performance indicator	Variable that allows for measurable assessment of progress towards achievement of objective, targets or completion criteria	
Trigger value	Measurable event in any assessed parameter that indicates achievement of the objective, targets or completion criteria may be at risk	
Corrective actions	Action(s) to be taken in response to a trigger value being reached	
Reporting	Documentation of progress towards achievement of the objective, targets or completion criteria and any non-compliances that may have occurred	
Risk assessment	Consideration and appraisal of risks that may impede achievement of the objective, targets or completion criteria	Table 6-7
Risk management strategies	Actions to be taken to manage and/or mitigate identified risks	

6.4.2 Objectives, targets and completion criteria

Table 6-2 sets out the objectives, targets and completion criteria for the Lot 104 North Offset Area. The creation of 35 ha of new WRP habitat adjoining a riparian corridor that is known to support an existing population of WRPs provides a strategic conservation benefit for the species.

The overall strategy to revegetate the Lot 104 North Offset Area will require a staged approach to the rehabilitation. Initial works, which commenced in 2019, included the mechanical removal of remaining stumps in conjunction with initial herbicide treatments to minimise weeds prior to revegetation. Rehabilitation works proposed for the Lot 104 North Offset Area will improve the connectivity of existing WRP habitat present along the riparian zone of the Preston River, further

south, to the Lot 104 central land parcel which comprises a revegetation offset for the Project under the EPBC approval, and further south still to the Lot 104 south land parcel, which is a revegetation offset for the BORR Northern and Central Sections project. All three Lot 104 land parcels comprising these offsets directly adjoin the Preston River, significantly improving the connectivity of WRP habitat within this local landscape.

Site management for long term conservation (20 years) will include fencing and access management, weed control, firebreaks, feral animal control and rehabilitation to establish and maintain fauna habitat. The completion criteria set for WRP target densities is reflective of the Lot 104 North Offset Area's habitat 'start quality' value of zero, and noting that there are limited opportunities for WRP to move into the site from adjacent areas. Once the rehabilitated habitat is established, WRP within the offset area are expected to thrive, particularly in light of the boundary fauna fence that will be installed and predator control that will be conducted.

Table 6-2. Objective, targets and completion criteria for the Lot 104 North Offset Area

Objective	Target	Completion criteria
Counterbalance significant residual impacts to habitat supporting WRP (and BTP)	• Rehabilitate and manage 35 ha of WRP habitat (including BTP habitat) • Improve connectivity of WRP habitat • Within 15 years of commencement of construction, within the Lot 104 North Offset Area, WRP are present in greater density than baseline levels (achieving a net-gain in WRP populations within the Lot 104 North Offset Area secure conservation area).	Rehabilitation and management of 35 ha of habitat suitable for WRP (and BTP) completed. The offset site will meet the following completion criteria: • Declared weed species and WONS are absent • Revegetation areas have a minimum of two structural layers (canopy/midstorey/ground layer) and must include a canopy layer • Understorey species richness in revegetated areas averages a minimum of eight species per monitoring quadrat • Revegetated habitat provides high (at least 70 %) canopy continuity for WRP movement (combined across upper and mid storey layers) within the site and a high degree of connectivity to adjacent habitat along the Preston River[20] • Revegetated habitat includes species known to be utilised by WRPs (refer to the proposed species list in Table 6-4) • Vegetation condition is 'Good' or better according to the scale of Keighery as presented in EPA (2016) • In accordance with 'Future quality with offset' values presented in Appendix C, WRP habitat quality (vegetation condition and structure) achieves a value of at least 6 • Within 15 years of commencement of construction, WRP density (WRP/ha) is greater than at baseline.

[20] Noting the requirement for firebreaks.

6.4.3 Consistency with recovery plans

Condition 9-4(7)(b) requires the objectives and targets in Table 6-2 to be consistent with the objectives of relevant guidance, including but not limited to recovery plans or area management plans. Of the values being offset by the Lot 104 North Offset Area, only WRP has an associated recovery plan or guidance.

WRP
The activities within this plan are consistent with the objectives of the *Western Ringtail Possum (*Pseudocheirus occidentalis*) Recovery Plan* (DBCA, 2017) to mitigate threatening processes that are constraining the recovery of WRPs (Table 6-3).

Table 6-3. Consistency of activities at the Lot 104 North Offset Area with relevant recovery plans

Objective and action themes from recovery plan / conservation advice	Activities undertaken within this plan
WRP	
Threatening processes that are constraining the recovery of WRPs are mitigated	• Creation of 35 ha of WRP habitat • Firebreaks, fencing, weed control, feral animal control and rubbish removal.

6.4.4 Management actions and timeframes

6.4.4.1 Management actions

The following management actions will be undertaken as part of the Lot 104 North Offset Area.

Fencing requirements. Access to the site will be restricted through the installation of a boundary fence to fauna fence specifications (1500 mm high with 300 mm vermin skirt). The fence will incorporate two access gates to enable implementation of site maintenance and monitoring activities. Two fauna escape gates will also be installed in strategic locations to enable kangaroos and other fauna to leave the site.

Access control is an effective tool for preventing a range of detrimental impacts to bushland caused by unauthorised vehicle access, such as land degradation, trampling of vegetation, illegal dumping of rubbish and spread of weeds and disease. unauthorised and unwanted access to the site. Controlling access prevents people (including vehicles) from causing land degradation, interference with revegetation works and the spread of weeds and diseases.

Pest control. Fox and rabbit controls are already in place and will continue to be used within the Lot 104 North Offset Area. As required based on site observations (i.e. observation of evidence of recent (~<2 months old) presence via scats, tracks, diggings or the taking of baits (as relevant)):

- Commencing in autumn 2024, rabbit baiting using a combination of Rabbit Haemorrhagic Disease Virus (RHDV) and Pindone will be undertaken annually from spring through to late autumn where rabbit impacts are noted as having a detrimental impact to native vegetation
- Commencing in autumn 2024, fox baiting using 1080 (sodium fluoroacetate) and / or trapping will be undertaken annually during late winter through to autumn

Weed control. A weed management strategy will be prepared for the Lot 104 North Offset Area based on the results of a baseline weed survey, and a weed resister will be prepared. Weed control

comprising spot spraying of WONS and Declared weed species will be undertaken twice-yearly for years 1-3 post planting / seeding and annually thereafter (as required based on site observations) for up to 20 years to control weeds.

Fire management. Firebreaks have been installed and will be maintained as required to ensure effective functioning.

***Phytophthora* dieback management.** Historical land use and ground disturbing activities may have exposed the site to a variety of soil-borne plant pathogens such as *Phytophthora* spp. In order to manage the potential risk of spreading soil pathogens during rehabilitation, controls will be implemented with two main aims:

1. Minimise the potential for soil pathogens to be introduced to the offset area
2. Minimise the potential for soil pathogens to spread from the offset area.

Guiding principles to reduce the risk of spreading soil pathogens will include:

- Imported soil amendments to be dieback free (certified)
- Seedlings to be sourced only from nurseries that hold appropriate certification
- Rehabilitation to be undertaken over several years to enable isolation and definition of specific areas of ground disturbing activities
- Fencing of the project site to limit vehicle access.

Planted vegetation will be monitored for disease. Where appropriate, seedlings will be provided with the appropriate treatments to give the best chance of survival. Treatments applied will be recorded and their efficacy monitored and reported.

Main Roads standard management practices for dieback will be implemented during all management, maintenance and monitoring activities conducted onsite.

6.4.4.2 Rehabilitation actions

Activities associated with the on-ground management for rehabilitating the Lot 104 North Offset Area are set out below and in Table 6-5. These are directly linked to the stated completion criteria (see Table 6-2) to ensure that the offset's completion criteria will be achieved.

Rubbish removal. Rubbish will be removed from the site as required to improve vegetation condition and limit the attraction of pest animals. This will commence when control over access has been established via the installation of fencing. This includes significant tyre removal.

Access tracks. A network of internal access tracks will be established throughout the Offset Area to enable ongoing maintenance of revegetation.

Drainage. Site drainage is required within the Lot 104 North Offset Area to manage runoff quality and quantity to the Preston River. Constructed wetlands will also be placed within the Offset Area where required to manage water quality and limit nutrient inputs into the Preston River.

Remediation. A portion of the Lot 104 North Offset Area has a historic land use that included horticulture practices which used organochlorides including Dieldren. Testing on the site showed contamination levels are below reportable parameters. A contingency plan will be required to address remediation of contaminated soils should elevated levels be identified.

Earthworks (site preparation). Due to compaction and other effects of the previous land use, rip / furrow site preparation is required to enable establishment of seedlings. In areas where remnant native vegetation limits machinery access or where the use of mechanical ground disturbing activities poses an unacceptable risk to the health of remnant vegetation (such as disturbance of the structural root zone), alternative site preparation methodologies will be used. This may include manual planting using hand-held equipment such as powered augers.

Planting. Planting requirements will be specified with the completion criteria listed in Table 6-2 assumed as a minimum standard. Native species typical of the Southern River and Swan vegetation complexes (within which the Lot 104 North Offset Area is situated) will form the basis of the revegetation species list. Native species from other flora and vegetation survey sites in the local area may be included to supplement the Swan and Southern River species and provide additional fauna habitat value. The indicative project species list, including indications of species suitability as habitat for target species, is presented in Table 6-4.

Local provenance seed will be collected or sourced for revegetation, and provided to registered nurseries for propagation.

Planting density will be managed to ensure at the completion of the project, the completion criteria are met. The vegetation coverage will include variety of species within vegetation structural groups that will provide a cover of native vegetation for the target fauna species, with a focus on the upper and mid-storey layers. Plant density will vary across the site in response to local soil types, existing (remnant) vegetation density.

Completion of rehabilitation. The completion of rehabilitation will be evaluated against the completion criteria for the offset, which will be evaluated after ten years. Rehabilitation activities will continue until the rehabilitation criteria are achieved.

Table 6-4. Revegetation species list for the Lot 104 North Offset Area

Species	Dryland	Wetland - transition	Form	WRP forage
Acacia extensa	X	X	Shrub	
Acacia huegelii	X		Shrub	
Acacia pulchella	X	X	Shrub	
Acacia saligna	X	X	Shrub/Tree	X
Acacia urophylla		X	Shrub	
Adenanthos meisneri		X	Shrub	
Agonis flexuosa	X		Tree	X
Allocasuarina humilis	X		Shrub	
Anigozanthos manglesii	X	X	Grass/Herb	
Astartea scoparia		X	Shrub	
Babingtonia camphorosmae		X	Shrub	
Banksia attenuata	X		Shrub	
Banksia grandis	X		Tree	
Banksia littoralis		X	Tree	
Baumea juncea		X	Rush	
Billardiera fusiformis	X		Shrub	
Bossiaea eriocarpa	X		Shrub	

Species	Dryland	Wetland - transition	Form	WRP forage
Bossiaea linophylla		X	Shrub	
Brachysema praemorsum		X	Groundcover	
Callistachys lanceolata		X	Small tree	
Clematis linearifolia	X		Climber	
Conostylis aculeata	X	X	Grass/Herb	
Corymbia calophylla	X	X	Tree	X
Cyathochaeta avenacea		X	Grass	
Daviesia physodes	X	X	Shrub	
Eucalyptus marginata	X		Tree	X
Eucalyptus patens		X	Tree	X
Eucalyptus rudis		X	Tree	X
Ficinia nodosa	X		Rush	
Gahnia trifida		X	Rush	
Gastrolobium bilobum		X	Shrub	
Gastrolobium praemorsum		X	Shrub	
Grevillea diversifolia		X	Shrub	
Hakea amplexicaulis	X		Shrub	
Hakea lissocarpha	X		Shrub	
Hakea prostrata	X	X	Shrub	
Hakea ruscifolia	X		Shrub	
Hakea varia		X	Shrub	
Hardenbergia comptoniana	X	X	Climber	X
Hemiandra pungens	X		Shrub	
Hibbertia cuneiformis	X	X	Shrub	
Hypocalymma angustifolium		X	Shrub	
Jacksonia furcellata	X	X	Shrub	
Juncus pallidus		X	Rush	
Kennedia prostrata	X		Groundcover	
Kunzea glabrescens	X	X	Shrub	X
Lepidosperma effusum		X	Sedge	
Lepidosperma gladiatum	X		Sedge	
Lepidosperma longitudinale		X	Sedge	
Lepidosperma tetraquetrum		X	Sedge	
Leucopogon australis		X	Shrub	
Macrozamia riedlei	X	X	Shrub	
Melaleuca preissiana		X	Tree	X
Melaleuca rhaphiophylla		X	Tree	
Melaleuca thymoides	X		Shrub	
Melaleuca viminea		X	Shrub	X
Mesomelaena tetragona		X	Sedge	
Mirbelia dilatata		X	Shrub	
Nuytsia floribunda	X	X	Tree	
Orthrosanthus laxus	X	X	Grass/Herb	

Species	Dryland	Wetland - transition	Form	WRP forage
Paraserianthes lophantha		X	Small tree	
Patersonia occidentalis	X	X	Grass/Herb	
Persoonia longifolia		X	Small tree	
Phyllanthus calycinus	X	X	Shrub	
Taxandria linearifolia		X	Shrub	
Trymalium floribundum		X	Shrub	
Xanthorrhoea brunonis	X	X	Grass	
Xanthorrhoea preissii		X	Grass	
Xylomelum occidentale	X		Tree	

Table 6-5. Lot 104 North Offset Area management actions and timeframes

Activity	Actions	Timeframe
Clearing / stockpiling stumps	• Clearing of regrowth bluegums as required, vegetative material to be mulched	Completed
Fencing	• Survey fence location to obtain accurate calculation of Offset Area • Removal of dilapidated fence • Installation of new fence (fauna fence specification) (noting that seasonal inundation limits site access, fence can be installed during summer only).	Completed
Earthworks / drainage	• Installation of constructed wetlands / nutrient basins • Contouring the revegetation area to reduce areas of standing water • Installation of maintenance access / fire tracks • Rip / furrowing of unvegetated areas in preparation for planting.	Commencing autumn 2023
Weed control	• Baseline weed survey • Initial herbicide application prior to planting including treatment of woody weeds (Blue gums) • Revegetation areas treated with pre-emergent herbicide where required prior to planting • Ongoing management of WONS and Declared weeds.	• Preliminary weed control commenced 2015 / 2016 • Baseline weed survey to be conducted spring 2023 • Estimated two treatments in Years 1-3 post rehabilitation and annually thereafter as required based on site observations.
Pest animal control	• Rabbit baiting using a combination of RHDV and Pindone • Fox baiting using 1080 (sodium fluoroacetate).	Commencing autumn 2023 or prior • Rabbit baiting conducted annually from spring through to late autumn as required based on site observations • Fox baiting conducted annually during late winter through to autumn as required based on site observations.
Remediation / rubbish removal	• Dieldrin assessment – testing is due November 2021. Remediate if required. • Disposal of tyres / waste • Rubbish removal opportunistically and as required.	Completed
Firebreak maintenance	• Maintenance of fire breaks to remove flammable material.	Annually and opportunistically
Rehabilitation	Seed Collection / Propagation • Seed collections to be ordered annually as required.	Seed collection and propagation commencing 2023.

Activity	Actions	Timeframe
	• Seedling propagation / cuttings taken annually as required Revegetation – Commencing 2023 • Site is to be fully planted (no direct seeding) • Rip / mound, plant out in 2022 and annually thereafter as required.	The remaining tasks will commence within 12 months of the completion of construction. Revegetation works are expected to continue for five years.

6.4.5 Monitoring

Monitoring will be conducted at the Lot 104 North Offset Area to enable early detection of changes that may lead to trigger values being reached and the measurement of progress towards completion criteria. Monitoring will be undertaken as outlined in Table 6-6, which also specifies trigger values and corrective actions to be taken should these values be reached.

To enable determination of whether any changes in WRP abundance are locally site specific or regional, WRP density and distribution monitoring will also be conducted at two reference sites, being Lot 2 Boyanup Picton Road and Reserve 23000. WRP monitoring at both offset sites and reference sites involving nocturnal field surveys will utilise distance sampling methods to provide consistency with the baseline dataset.

Monitoring will be conducted using three primary methodologies, as follows:

- Visual inspection (used for fencing maintenance and firebreak maintenance, WONS and Declared weeds, evidence of pest animal presence, vegetation condition)
- Targeted surveys (used for detecting presence of WRP in recreated habitat)
- Aerial drone surveys (vegetation cover and structure).

Table 6-6. Lot 104 North Offset Area monitoring program

Parameter	Performance indicator	Methodology	Frequency and timing	Trigger value	Corrective action	Reporting
Access						
Fencing	Presence and condition of fencing	Visual inspection of fence	Annually commencing spring 2023	Fence not intact or to specifications	• Investigate cause and raise incident report • Implement corrective actions which may include: - Review practicality of fencing design and structure - Undertake repair/modification of fence as required - Improve personnel training and education - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting
Firebreaks						
Firebreaks	Condition of firebreaks	Visual inspection of firebreaks	Annually commencing spring 2023	Firebreaks not to specified standard	• Investigate cause and raise incident report • Implement corrective actions which may include: - Review practicality of firebreak network - Undertake firebreak modification and maintenance as required - Improve personnel training and education - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting
Pest control						
Fox and rabbit control	Evidence of recent (<2 months old) fox or rabbit presence	Field survey for visual evidence of fox or rabbit presence	Annually in autumn commencing 2023	Visual evidence of recent fox or rabbit activity detected (e.g. scats, diggings)	• Investigate cause and raise incident report • Implement corrective actions which may include: - Undertake baiting monthly until no fresh visual evidence is observed for two consecutive months - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting

Parameter	Performance indicator	Methodology	Frequency and timing	Trigger value	Corrective action	Reporting
WRP						
WRP distribution	WRP observations	Nocturnal field survey	Baseline assessment in 2023/2024 then every three years in October / November commencing 2030 (six years post-rehabilitation)	Annual average WRP density no higher than baseline twelve years post-rehabilitation	• Investigate cause and raise incident report • Assess revegetation adequacy as WRP habitat • Implement corrective actions which may include: - Assess canopy cover / structure (remote sensing) data - Undertake targeted revegetation as required - If a decline in WRP abundance is detected, conduct predator survey, review and modify as required practicality of the predator control program - Review practicality of pest animal control program, modify as required - Review practicality of weed control program, modify as required - Review and modify *Phytophthora* dieback management measures as required - Improve personnel training and education - Review monitoring frequency and method. Monitoring frequency will be increased to annually if a decline in WRP abundance is detected until such time that the reason for the decline is understood, and if appropriate continued, should corrective actions to stabilise or recover the population be implemented. • Monitor outcomes.	Report annually as part of annual compliance reporting
WRP density	Number of WRP / ha					

Parameter	Performance indicator	Methodology	Frequency and timing	Trigger value	Corrective action	Reporting
Revegetation						
Condition	Condition of vegetation assessed against EPA (2016)	Field survey (meander)	Baseline assessment 2023 then annually in spring from 2028 onwards (five years post-rehabilitation)	At year six or later, condition is Degraded or worse	• Investigate cause and raise incident report • Implement corrective actions which may include: - Review and modify as required weed control program - Undertake targeted infill planting as required - Review and modify as required *Phytophthora* dieback management measures - Review and modify as required fire management measures - Improve personnel training and education - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting
WONS and Declared weed species distribution and diversity	Presence and distribution (location) of WONS and Declared weed species present	Field survey (meander with opportunistic recording)	Annually for five years commencing 2023, every two years thereafter	WONS or Declared weed species present		
Vegetation cover and structure	Cover and structure of native vegetation	Drone footage (3D imagery)	Every three years in autumn or spring commencing 2023 (baseline)	At year ten or later, combined average canopy cover across upper and / or mid storey layer is less than 60 %		

6.4.6 Risk management

Potential risks to the successful implementation of this offset and achievement of the objectives in Section 6.4.2 are set out in Table 6-7 along with potential strategies for mitigating risks.

Table 6-7. Lot 104 North Offset Area implementation risk and mitigation strategies

Potential risk	Risk mitigation strategy
Long term security of tenure	• As it is owned freehold by the Commissioner of Main Roads, the property is in secure tenure • Lot 104 is currently zoned as rural under the GBRS. Main Roads will request WAPC to rezone the entire Lot 104 to Regional Open Space or Conservation under the scheme. • Funding provided for management actions • Investigate potentially appointing an appropriate management authority.
Management actions not implemented	• Annual audit to ensure management actions have been implemented • Main Roads required to comply with requirements of MS 1191, including implementation of actions within this plan • Main Roads required to report annually to CEO on compliance with this plan, including implementation of management actions.
Failure to achieve completion criteria	• Assess completion criteria 12 months after failure and continue to assess until completion criteria are met • Monitor progress toward achieving completion criteria over time through annual audits • Review management actions and / or completion criteria in accordance with the review provisions for this plan if management actions are no longer feasible, completion criteria are no longer attainable or other extenuating circumstances arise.

7 OFFSET SITE 5 – LUDLOW STATE FOREST / TUART FOREST NATIONAL PARK

This chapter describes the 'Ludlow State Forest / Tuart Forest National Park' offset (Ludlow Offset Area). The following sections identify:

- The offset being proposed (Section 7.1)
- The environmental attributes of the offset (Section 7.2)
- The protection mechanism for the offset (Section 7.3)
- Management and / or rehabilitation actions, including objectives, targets, completion criteria, monitoring and risk management (Section 7.4).

7.1 Identification of offset

The Ludlow Offset Area comprises the proposed revegetation of 185 ha across three degraded land parcels within the Ludlow State Forest (also known as State Forest No. 2 (SF No.2)) and Tuart Forest National Park (TFNP). The TFNP and Ludlow State Forest are located approximately 10-15 km east of the Busselton town centre and are the focus of an on-going revegetation program. The sites, which are 12-25 km from the southern end of the Project Area, are described in

Table 7-1 below and are shown in Figure 9 (Appendix A).

The Ludlow Offset Area rehabilitation will provide 185 ha of habitat for WRP and BTP and 75.3 ha of habitat for black cockatoos, as well as 7.2 ha of re-created Tuart Woodlands TEC/PEC also incorporating Tuart-Peppermint Woodland PEC vegetation. In particular, the creation and / or enhancement of 185 ha of habitat for WRP within SF No.2 / TFNP, areas of which are recognised strongholds for the species (Shedley, E. and Williams, K., 2014; Jones, B.A., How, R.A. and Kitchener, D.J., 1994), provides a strategic conservation benefit for the WRP.

7.2 Environmental attributes of offset area

The condition and environmental attributes (where relevant) of each of the three sites comprising the Ludlow Offset Area are described in

Table 7-1.

Table 7-1. Ludlow Offset Area description and environmental attributes

Site no.	Description	Size
2 (Vasse)	Site 2 comprises 5 ha of five-year-old revegetation undertaken by Main Roads. Species used comprise those naturally found in the Tuart forest vegetation and provide habitat for both WRP (and BTP) and black cockatoos.	5 ha
4 (BORR SF2)	Site 4 comprises 10 ha of revegetation established in winter 2021 by Main Roads. Species used comprise those naturally found in the Tuart forest vegetation and provide habitat for both WRP (and BTP) and black cockatoos.	10 ha
12 (DBCA Site 12)	Site 12 contains areas of mid 1980s Tuart ashbed regeneration over grass. Native vegetation cover is very sparse over large parts of the site. Revegetation comprising canopy, mid-storey and understorey species is required across the site. The primary degrading factors are weed infestation (primarily Arum lily and Bridal creeper under existing canopy and pasture grasses in bare areas) and grazing pressure (from rabbits and macropods) which together impede natural regeneration. While vegetation and habitat cover at Site 12 is discontinuous, the site is known to support an existing WRP population, with WRP density varying across the site (Biota, 2020). Main Roads intends to revegetate 170 ha at Site 12 to increase WRP (and BTP) habitat extent and connectivity with an aim to homogenise WRP density across the site. This revegetation will incorporate 75.3 ha of restored black cockatoo habitat and 7.2 ha of restored Tuart Woodlands TEC/PEC also comprising Tuart-Peppermint Woodland PEC.	170 ha

7.3 Protection mechanism and management contribution

The three sites comprising the Ludlow Offset Area are located on Crown land that is managed by DBCA under the *Conservation and Land Management Act 1984*. Accordingly, the offset areas have long term tenure protection. DBCA has advised that the three sites are available to Main Roads for use as an offset towards the BORR Southern Section Project. Main Roads will be responsible for the implementation of revegetation works, ongoing monitoring and maintenance, and reporting against the requirements of MS1191. Main Roads will establish a Memorandum of Understanding (or similar) with DBCA that details the agreed revegetation and ongoing management parameters, as well as the terms for handover of the site to DBCA once the completion criteria are met.

Main Roads will fund and manage the Ludlow Offset Area for the purposes of conservation for at least twenty (20) years. As these offset sites have been secured, with on ground works to establish the offset now commenced, the 20-year management timeframe will begin from when these works commenced.

7.4 Offset management

7.4.1 Management approach

Management of the the Ludlow Offset Area is based on the approach outlined in

Table 7-2.

Table 7-2. The Ludlow Offset Area management approach

Management aspect	Description	Defined in
Objective	Aim of the Offset Area	Table 7-3
Target	Specific goal identified for the Offset Area	
Completion criteria	Measurable outcomes identified for the Offset Area	
Management actions	Actions to be taken to achieve stated objective, targets and completion criteria, including timing	Table 7-5
Monitoring program	Assessment of progress towards achievement of objective, targets or completion criteria	Table 7-6
Performance indicator	Variable that allows for measurable assessment of progress towards achievement of objective, targets or completion criteria	
Trigger value	Measurable event in any assessed parameter that indicates achievement of the objective, targets or completion criteria may be at risk	
Corrective actions	Action(s) to be taken in response to a trigger value being reached	
Reporting	Documentation of progress towards achievement of the objective, targets or completion criteria and any non-compliances that may have occurred	
Risk assessment	Consideration and appraisal of risks that may impede achievement of the objective, targets or completion criteria	Table 7-7
Risk management strategies	Actions to be taken to manage and/or mitigate identified risks	

7.4.2 Objectives, targets and completion criteria

Main Roads proposes to rehabilitate, revegetate and / or manage a total of 185 ha at this site to provide habitat for WRP and BTP, incorporating 75.3 ha of black cockatoo habitat and 7.2 ha of Tuart Woodlands TEC/PEC also comprising Tuart-Peppermint Woodland PEC. Each of the three revegetation sites at the Ludlow Offset Area will be fenced to fauna fence standards to ensure protection of revegetation and emerging habitat. Ongoing site management for long term conservation (20 years) will include fencing and firebreak maintenance, weed control and feral animal control to maintain / improve habitat quality. This approach aligns with that used by Main Roads for similar offset revegetation works in SF No. 2 and the region.

The proposed rehabilitation works are congruent with the objectives of the Tuart Forest National Park Management Plan (TFNPMP) (DPaW, 2014), which are to:

- Protect and enhance the eastern wetland / tall Tuart community transition zone
- Protect and increase habitat for fauna that are highly represented in zones 5 and 6 (for example, WRP and Common Brushtail Possum)
- Enhance the resilience of this zone to disturbance and threatening processes.

Rehabilitation works proposed for the Ludlow Offset Area will improve the connectivity of WRP habitats within and between areas of SF No. 2 and the TFNP, through the establishment of a high degree of consistency in habitat cover and quality across the three sites, as well as a high degree of

canopy connectivity within the sites and to adjacent habitat[21].

Table 7-3 sets out the objectives, targets and completion criteria for the Ludlow Offset Area. The proposed completion criteria detailed in the table are consistent with existing criteria for other revegetation offset sites in the local area undertaken for Main Roads other projects. The completion criteria set for WRP target densities will achieve a net-gain in WRP populations within the SF No. 2 / TFNP secure conservation area, and are reflective of Sites 2, 4 and 12 habitat 'start quality' values of zero, zero and three, respectively (Appendix C), and noting that there are good opportunities for WRP to move into the sites from adjacent areas.

Table 7-3. Objective, targets and completion criteria for the Ludlow Offset Area

Objective	Target	Completion criteria
Counterbalance significant residual impacts to habitat supporting WRP and BTP	• Restore and / or manage 185 ha of WRP and BTP habitat[22] • Improve connectivity of WRP habitat • Within 15 years of commencement of construction, within the Ludlow Offset Area, WRP are present in greater density than baseline levels (achieving a net-gain in WRP populations within the SF No. 2 / TFNP secure conservation area)	The offset site will meet the following completion criteria: • Access to revegetation areas is restricted • Firebreaks are in place as required and well maintained • Declared weed species and WONS are absent • Revegetation areas have a minimum of two structural layers (canopy/midstorey/ground layer) and must include a canopy layer • Revegetated habitat at Ludlow Offset Area Sites 2, 4 and 12 provides a high degree (at least 70 %) of canopy connectivity within and throughout the sites and a high degree of connectivity to adjacent habitat areas[23] • Vegetation condition is 'Good' or better according to the scale of Keighery as presented in EPA (2016) • In accordance with the 'future quality with offset' values presented in Appendix C, habitat quality (vegetation condition and structure) achieves a value of at least 6 • Within 15 years of commencement of construction, within Ludlow Offset Area Sites 2, 4 and 12, WRP density (WRP/ha) is greater than at baseline (achieving a net-gain in WRP populations within the SF No. 2 / TFNP secure conservation area).
Counterbalance significant residual impacts to habitat supporting black cockatoos	Restore and / or manage 75.3 ha of black cockatoo habitat	The offset site will meet the following completion criteria: • Access to revegetation areas is restricted • Firebreaks are in place as required and well maintained • Declared weed species and WONS are absent • Banksia and eucalypt woodlands providing black cockatoo habitat to have at least 40 % projected foliage cover and contain suitable foraging tree species for each of the three species of black cockatoos (refer to the proposed species list in

[21] Noting the requirement for firebreaks.
[22] As is detailed in Table 7-1, 15 ha of the 185 ha of WRP habitat to be created and managed at the Ludlow Offset Area has already been established, and therefore management of this revegetation only is required, in order to ensure the completion criteria are achieved.
[23] Noting the requirement for firebreaks.

Objective	Target	Completion criteria
		• Table 7-5) • In accordance with the 'future quality with offset' values presented in Appendix C, black cockatoo habitat quality (vegetation condition and structure) achieves a value of at least 6.
Counterbalance significant residual impacts to Tuart Woodlands TEC/PEC incorporating Tuart-Peppermint Woodland PEC	Restore and / or manage 7.2 ha of Tuart Woodland TEC/PEC incorporating Tuart-Peppermint Woodland PEC	The offset site will meet the following completion criteria: • Access to revegetation areas is restricted • Firebreaks are in place as required and well maintained • Declared weed species and WONS are absent • In 10 m x 10 m monitoring quadrats, understorey species richness in revegetated Tuart Woodlands TEC/PEC incorporating Tuart-Peppermint Woodland PEC areas averages a minimum of eight species OR ≥60 % of all understorey vegetation cover is native i.e. achieves a condition of at least 'High' according to the scale of TSSC (2019) • In accordance with the 'Future quality with offset' values presented in Appendix C, re-created Tuart Woodland TEC/PEC incorporating Tuart-Peppermint Woodland PEC achieves a value of at least 7.

7.4.3 Consistency with recovery plans

Condition 9-4(7)(b) requires the objectives and targets in Table 7-3 to be consistent with the objectives of relevant guidance, including but not limited to recovery plans or area management plans. Of the values being offset by the Ludlow Offset Area, WRP and black cockatoos have associated recovery plans or guidances. The Commonwealth has also issued a conservation advice for the Tuart Woodlands TEC which is synonymous with the Tuart Woodlands PEC (and incorporates the Tuart-Peppermint Woodlands PEC) (TSSC, 2019).

WRP

The activities within this plan are consistent with the objectives of the *Western Ringtail Possum (*Pseudocheirus occidentalis*) Recovery Plan* (DBCA, 2017) to mitigate threatening processes that are constraining the recovery of WRPs (Table 7-4).

Carnaby's Cockatoo

The activities within this plan are consistent with the objectives of the *Carnaby's Cockatoo (*Calyptorhynchus latirostris*) Recovery Plan* (DPAW, 2013) to stop further decline in the distribution and abundance of Carnaby's Cockatoo by protecting the birds and enhancing their habitat critical for survival. The recovery plan also recommends the maintaining or increasing the area of non-breeding feeding habitat and night roosts by planting areas of native vegetation (Table 7-4).

Baudin's Cockatoo

The activities within this plan are consistent with the objectives of the *Baudin's Cockatoo (*Calyptorhynchus baudinii*) Recovery Plan* (DEC, 2008) to stop further decline in the distribution and abundance of Baudin's Cockatoo by protecting the birds and enhancing their habitat critical for survival. The Commonwealth conservation advice (TSSC, 2018) also lists habitat restoration as a key objective (Table 7-4).

Forest Red-tailed Black Cockatoo
The activities within this plan are consistent with the objective of the *Forest Red-tailed Black Cockatoo Recovery Plan* (DEC, 2008) to stop further decline in the breeding populations of the black cockatoo and to ensure their persistence throughout their range in the southwest of Western Australia (Table 7-4).

Tuart Woodlands TEC/PEC and Tuart-Peppermint Woodland PEC
The activities in this plan are consistent with the 'restore' priority conservation action listed in the *Approved Conservation Advice (incorporating listing advice) for the Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain ecological community* (TSSC, 2019).

Table 7-4. Consistency of activities at the Ludlow Offset Area with relevant recovery plans

Objective and action themes from recovery plan / conservation advice	Activities undertaken within this plan
WRP	
Threatening processes that are constraining the recovery of WRPs are mitigated	• Creation of 185 ha of WRP habitat • Weed control and feral animal control
Carnaby's Cockatoo	
Implement management to protect and improve the condition of breeding habitat and associated feeding habitat, including activities that promote regeneration and revegetate areas within and adjacent to breeding habitat and associated feeding habitat	• Creation of 75.3 ha of foraging habitat • Weed control and feral animal control
Baudin's Cockatoo	
Undertake habitat restoration by revegetating suitable areas with key tree species	• Creation of 75.3 ha of foraging habitat
Stop further decline in the breeding populations of the black cockatoo and to ensure their persistence throughout their range in the southwest of Western Australia	• Weed control and feral animal control
Forest Red-tailed Black Cockatoo	
Stop further decline in the breeding populations of the black cockatoo and to ensure their persistence throughout their range in the southwest of Western Australia	• Creation of 75.3 ha of foraging habitat • Weed control and feral animal control
Tuart Woodlands TEC/PEC and Tuart-Peppermint Woodlands PEC	
Re-vegetation and regeneration Control invasive species and diseases	• Creation of 7.2 ha of TEC/PEC vegetation • Weed control

7.4.4 Management actions and timeframes

7.4.4.1 Management actions

The following specific management actions will be undertaken as part of the Ludlow Offset. Table 7-6 details management actions required to achieve the proposed revegetation outcomes.

Fencing requirements. Access to the offset area revegetation sites will be restricted through the installation of fencing. The fence will be constructed to fauna fence standards, and will be 1.5 m

high with a 300 mm rabbit wire apron to reduce burrowing animals from entering the sites. A minimum of two fauna escape gates will be installed at each site. The aim of the fauna fence is to minimise further degradation of native vegetation and maximise success of revegetation efforts by limiting macropod (and rabbit) grazing pressure. The minimisation of grazing pressure will create favourable conditions for both revegetation and natural regeneration.

Access control is an effective tool for preventing a range of detrimental impacts to bushland caused by unauthorised vehicle access, such as land degradation, trampling of vegetation, illegal dumping of rubbish and spread of weeds and disease. unauthorised and unwanted access to the site. Controlling access prevents people (including vehicles) from causing land degradation, interference with revegetation works and the spread of weeds and diseases.

DBCA have requested that an appropriate level of public access to all three sites is maintained, and specified that access for recreational horse riding must be maintained around the perimeter of (i.e. outside of) Site 12, with horse riding being excluded from Site 12 itself.

Site preparation. Rip / furrow preparation works to occur when seasonal conditions are optimal and soil moisture is suitable for planting. Some thinning of Tuarts may be required in some areas. Manual auger planting to occur is areas where access is reduced or where lower impact site works is deemed appropriate.

All planting areas will require routine maintenance access. Informal tracks are to be established at 30 m to 50 m intervals to enable efficient access (where possible). Some sites may require more permanent internal tracks including suitable materials at gateways to enable fire access.
All sites to have vehicle access tracks that may serve as firebreaks on the internal boundary fences.

Pest control. As required based on site observations (i.e. observation of evidence of recent (~<2 months old) presence via scats, tracks, diggings or the taking of baits (as relevant)):

- Commencing in autumn 2025, rabbit baiting using a combination of Rabbit Haemorrhagic Disease Virus (RHDV) and Pindone will be undertaken annually from spring through to late autumn where rabbit impacts are noted as having a detrimental impact to native vegetation
- Commencing in autumn 2025, fox baiting using 1080 (sodium fluoroacetate) and / or trapping will be undertaken annually during late winter through to autumn
- Commencing in autumn 2025, feral cats will be targeted using cage traps set in areas where cat activity has been identified during monitoring.

The proposed pest control approach detailed for the Ludlow Offset Area will be conducted in consultation with DBCA to ensure management actions being undertaken do not interfere with the monitoring design administered by DBCA through Offset 7 (refer to Section 9).

Weed control. Weed control comprising spot spraying of WONS and Declared weed species is ongoing in Sites 2 and 4 and will be undertaken at Site 12 prior to planting commencing in 2024. Weed control will continue to be undertaken twice-yearly for years 1-3 post planting / seeding and annually thereafter (as required based on site observations) for up to 20 years to control weeds.

Rubbish removal. Rubbish will be removed from the Sites to improve vegetation condition and limit the attraction of pest animals when control over access has been established via the installation of fencing.

7.4.4.2 Rehabilitation actions

Activities associated with the on-ground management for rehabilitating the Ludlow Offset Area are set out below and in Table 7-6. These are directly linked to the stated completion criteria (see Table 7-3) to ensure that the offset's completion criteria will be achieved.

Rehabilitation works will consist of site preparation (fencing, weed control, ripping/furrow-lining and pest control), seeding/planting and ongoing management.

Approach. The site preparation and revegetation methodology applied at Site 12 will be the same as that used at Sites 2 and 4, and all other Main Roads revegetation sites in the Ludlow State Forest with minor variation as required dependant on site conditions. Aspects comprising this approach are outlined below. As Sites 2 and 4 have already been revegetated, different, less intensive management actions are required for these sites.

Staging. To minimise risk of losses and maximise resource availability, the overall strategy to revegetate Site 12 requires a staged approach. Initial weed control treatments commenced at all sites in 2022. Subsequent fencing, ripping / furrow-lining and revegetation works will be staged between the sites as outlined in Table 7-6.

Species selection. Species used in the revegetation have been selected in consultation with DBCA based on their value as habitat and foraging vegetation for these fauna species, their presence in Tuart Woodlands TEC/PEC (as per the conservation advice (TSSC, 2019)) and the general site parameters. The revegetation will include a variety of species within each structural layer to provide native vegetation cover. The indicative revegetation species list, based on species generally expected to be commercially available, is presented in

Table 7-5. It includes both upland and wetland species to be used as appropriate. The range of species used in the rehabilitation will be taken from this list. Additional species from the broader DBCA-approved list may also be used in seed form where site conditions are conducive to direct seeding.

Seed and material sourcing. Licenced seed collectors will be engaged to collect provenance seed over several years until sufficient seed is collected. Collected seed will be used for both propagation of seedings and for direct seeding in select areas. Vegetative material such as cuttings and material obtained by division may also be collected.

Seedling propagation. Collected seed and vegetative material will be provided to nurseries that meet the Nursery and Garden Industry Western Australia certification to ensure appropriate hygiene protocols are observed. Alternative nurseries may be considered as potential suppliers if the plants can be supplied to the required standards and conditions.

Seeding / seedlings. Site 12 contains a significant weed burden. The presence of weeds may limit the option to undertake direct seeding in some areas. Direct seeding and / or seedling planting will occur once project sites are prepared (weed control, pest control, fencing). Seedlings will be planted with slow release native fertiliser tablets and systemic insecticide tablets to offer suitable nutrients and protection from insects in the establishment phase.

Planting density. Planting densities will be managed to maximise canopy connectivity and resource availability for WRP and foraging species for black cockatoos (where required). Planting density will also aim to minimise bare ground and maximise the structural integrity (in accordance with the completion criteria presented in Table 7-3) and long-term viability of the established vegetation. Tuart canopy cover will established to align with requirements for Tuart Woodlands TEC/PEC as per the conservation advice (TSSC, 2019).

Monitoring. As detailed in Section 7.4.5, regular monitoring will be undertaken to assess plant health and monitor for disease, insect damage and nutrient deficiencies. Where plant health is below standard or pests are detected, appropriate treatments will be applied. Any applied treatments will be recorded and reported.

Table 7-5. Revegetation species list for the Ludlow Offset Area

Species	Dryland	Wetland - transition	Form	WRP forage	Black cockatoo forage
Acacia cyclops	X		Shrub	X	
Acacia extensa	X		Shrub		
Acacia pulchella	X	X	Shrub		
Acacia saligna	X		Shrub / Tree	X	X
Adenanthos meisneri			Shrub		
Agonis flexuosa	X	X	Tree	X	
Allocasuarina humilis	X	X	Shrub		
Alyxia buxifolia	X		Shrub		
Anigozanthos manglesii	X	X	Grass / herb		
Anthocercis littorea	X		Shrub		
Banksia attenuata	X		Tree		X
Banksia grandis	X		Tree		X
Banksia littoralis		X	Tree		X
Baumea juncea		X	Rush		
Billardiera fusiformis	X		Shrub		
Bossiaea eriocarpa	X		Shrub		
Clematis linearifolia	X		Climber		
Conostylis aculeata	X		Grass		
Corymbia calophylla	X		Tree	X	X
Cyathochaeta avenacea			Grass		
Daviesia physodes	X	X	Shrub		
Dianella brevicaulis	X	X	Herb		
Diplolaena dampieri	X		Shrub		
Eucalyptus gomphocephala	X		Tree		X
Eucalyptus marginata	X		Tree	X	X
Eucalyptus rudis			Tree	X	X
Ficinia nodosa	X		Rush		
Gahnia trifida			Rush		
Gastrolobium praemorsum			Shrub		
Gompholobium tomentosum	X		Shrub		
Haemodorum spicatum			Herb		
Hakea amplexicaulis	X		Shrub		X
Hakea lissocarpha	X	X	Shrub		X
Hakea prostrata	X		Shrub		X
Hakea ruscifolia	X		Shrub		X
Hakea varia		X	Shrub		X
Hardenbergia comptoniana	X		Climber	X	
Hemiandra pungens	X		Shrub		
Hibbertia cuneiformis	X	X	Shrub		
Hypocalymma angustifolium			Shrub		
Juncus pallidus			Rush		
Kennedia prostrata	X		Groundcover		

Species	Dryland	Wetland - transition	Form	WRP forage	Black cockatoo forage
Kunzea glabrescens	X		Shrub	X	
Kunzea micrantha		X	Shrub		
Lepidosperma gladiatum	X		Sedge		
Lepidosperma longitudinale			Sedge		
Lepidosperma pubisquameum			Sedge		
Logania vaginalis			Herb		
Melaleuca incana		X	Shrub		
Melaleuca preissiana		X	Tree	X	
Melaleuca rhaphiophylla		X	Tree		
Melaleuca thymoides	X	X	Shrub		
Melaleuca viminea		X	Shrub	X	
Orthrosanthus laxus	X	X	Grass / Herb		
Patersonia occidentalis	X		Grass / Herb		
Phyllanthus calycinus	X	X	Shrub		
Regelia ciliata		X	Shrub		
Rhagodia baccata	X		Shrub		
Solanum symonii	X		Shrub		
Spyridium globulosum	X		Shrub		
Trymalium ledifolium		X	Shrub		
Xanthorrhoea brunonis	X		Grass		
Xanthorrhoea preissii			Grass		X
Xylomelum occidentale	X	X	Tree		

Table 7-6. Ludlow Offset Area management actions and timeframes

Activity	Offset Area	Action	Timeframe
Weed control	Site 2	Post revegetation – ongoing weed control targeting Arum lily, Bridal creeper and other WONS and Declared weeds as required	• Up to two treatments annually in late winter/early spring and summer/autumn in years 1-3 post revegetation and annually thereafter
	Site 4	Post revegetation – ongoing weed control targeting Arum lily, Bridal creeper and other WONS and Declared weeds as required	• Up to two treatments annually in late winter/early spring and summer/autumn in years 1-3 post revegetation and annually thereafter
	Site 12	Herbicide application targeting Arum lily, Bridal creeper WONS and Declared weeds as required	• Up to two treatments annually in late winter/early spring and summer/autumn in years 1-3 post revegetation and annually thereafter
Pest control	Site 2	Pest animal control	• Rabbit baiting ongoing annually as required based on site observations • Fox baiting not currently required (requirement monitored annually) • Cat trapping to commence spring 2025 and continue annually as required based on site observations.
	Site 4		
	Site 12	Pest animal control	• Rabbit baiting to commence spring 2025 and continue annually as required based on site observations • Fox baiting to commence in spring 2025 and continue annually or biannually as required based on site observations • Cat trapping to commence spring 2025 and continue annually as required based on site observations.
Fencing	Site 2	Ongoing maintenance of existing fence as required	Fence installed in 2017
	Site 4		Fence installed in 2021

Activity	Offset Area	Action	Timeframe
	Site 12	• Construction of revegetation area fences to fauna fence specification • Fauna gates to be installed • Fence locations surveyed to obtain accurate calculation of Offset Area • Ensure fence position maintains fire and fauna access.	Fence to be installed 2024
Rubbish removal	All sites	Rubbish removal as required	Q1 2024 and ongoing
Revegetation - seed collection / propagation	Sites 2, 4, 12	• Order seed collections • Order seedlings • Seedling propagation.	Sites 2 and 4 - Seedlings for infill planting ordered annually as required based on monitoring results to enable achievement of completion criteria Site 12 - Seed and seedlings to be ordered in 2024
Revegetation - site preparation	Sites 2 and 4	N/A	N/A
	Site 12	Rip and furrow-line throughout open areas, hand-augur in amongst existing vegetation in preparation for planting	Site preparation works to commence in 2025
Revegetation – planting and seeding	Sites 2 and 4	• Infill planting as required	Infill planting will be undertaken annually as required
	Site 12	• Direct seedling of areas with low weed burden • Rip / furrow planting with seedlings • Targeted planting required for areas of remnant vegetation • Infill planting as required.	• Planting to commence in winter 2025 and be completed in winter 2029 (5-year revegetation program) • Post-2029, infill planting will be undertaken annually as required.
Rehabilitation completion	All sites	Rehabilitation meets completion criteria (excluding WRP density criteria, which will be completed within 15 years of revegetation commencing)	10 years from commencement of rehabilitation

7.4.5 Monitoring

Monitoring will be conducted at the Ludlow Offset Area to enable early detection of changes that may lead to trigger values being reached and the measurement of progress towards completion criteria. Monitoring will be undertaken as outlined in Table 7-7, which also specifies trigger values and corrective actions to be taken should these values be reached.

To enable determination of whether any changes in WRP abundance are locally site specific or regional, WRP density and distribution monitoring will also be conducted at two reference sites, being Lot 2 Boyanup Picton Road and Reserve 23000. WRP monitoring at both offset sites and reference sites involving nocturnal field surveys will utilise distance sampling methods to provide consistency with the baseline dataset.

Monitoring will be conducted using four primary methodologies, as follows:

- Visual inspection (used for fencing maintenance and firebreak maintenance, WONS and Declared weeds, vegetation condition and evidence of pest animal presence)
- Floristic quadrats (10 x 10 m) (used for native species cover and native species diversity)
- Targeted surveys (used for detecting presence of WRP in recreated habitat and evidence of foraging by black cockatoos)
- Aerial drone survey (vegetation cover and structure).

Table 7-7. Ludlow Offset Area monitoring program

Parameter	Performance indicator	Methodology	Frequency and timing	Trigger value	Corrective action	Reporting
Access						
Fencing	Presence and condition of fencing	Visual inspection of fence	Annually commencing spring 2024	Fence not intact or to specifications	• Investigate cause and raise incident report • Implement corrective actions which may include: - Review practicality of fencing design and structure - Undertake repair/modification of fence as required - Improve personnel training and education - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting
Firebreaks						
Firebreaks	Condition of firebreaks	Visual inspection of firebreaks	Annually commencing spring 2023	Firebreaks not to specified standard	• Investigate cause and raise incident report • Implement corrective actions which may include: - Review practicality of firebreak network - Undertake firebreak modification and maintenance as required - Improve personnel training and education - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting
Pest control						
Fox, feral cat and rabbit control	Evidence of recent (<2 months old) fox, feral cat or rabbit presence	Field survey for visual evidence of fox, feral cat or rabbit presence	Annually in autumn commencing 2024 (baseline)	Visual evidence of recent fox, feral cat or rabbit activity detected (e.g. scats, diggings)	• Investigate cause and raise incident report • Implement corrective actions which may include: - Undertake baiting monthly until no fresh visual evidence is observed for two consecutive months - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting

Parameter	Performance indicator	Methodology	Frequency and timing	Trigger value	Corrective action	Reporting
WRP						
WRP distribution WRP density	WRP observations Number of WRP / ha	Nocturnal field survey	Baseline assessment in 2023/2024 then every three years in October/ November commencing 2030 (six years post-commencement of rehabilitation)	Annual average WRP density less than baseline twelve years post-rehabilitation	• Investigate cause and raise incident report • Assess revegetation adequacy as WRP habitat • Implement corrective actions which may include: - Assess canopy cover / structure (remote sensing) data - Undertake targeted revegetation as required - If a decline in WRP abundance is detected, conduct predator survey, review and modify as required practicality of the predator control program - Review practicality of weed control program, modify as required - Review and modify *Phytophthora* dieback management measures as required - Improve personnel training and education - Review monitoring frequency and method. If a decline in WRP abundance is detected, monitoring frequency will be increased to annually until such time that the reason for the decline is understood, and if appropriate continued, should corrective actions to stabilise or recover the population be implemented. • Monitor outcomes.	Report annually as part of annual compliance reporting
Black cockatoos						
Black cockatoo habitat utilisation	Black cockatoo presence and/or foraging evidence	Field survey	Annually in spring commencing 2030	No evidence of black cockatoo foraging recorded by 2033 (nine years post-rehabilitation)	• Investigate cause and raise incident report • Assess revegetation adequacy as black cockatoo habitat • Implement corrective actions which may include: - Undertake targeted revegetation as required - Review practicality of pest animal control program, modify as required - Review practicality of weed control program, modify as required - Review and modify *Phytophthora* dieback management measures as required - Improve personnel training and education - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting

Parameter	Performance indicator	Methodology	Frequency and timing	Trigger value	Corrective action	Reporting
Revegetation						
Species richness	Number of species per 100m^2	Field survey using 10 x 10 m floristic quadrats	Annually in spring commencing year 2023 (baseline)	Species richness 33 % below planted	• Investigate cause and raise incident report • Implement corrective actions which may include: - Review and modify as required weed control program - Undertake targeted infill planting as required - Review and modify as required *Phytophthora* dieback management measures - Review and modify as required fire management measures - Improve personnel training and education - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting
Native foliage cover	Native foliage cover as a percentage of area			At year four or later, native foliage cover <50 %		
Condition	Condition of vegetation assessed against EPA (2016)	Field survey		At year four or later, condition is Degraded or worse		
WONS and Declared weed species distribution and diversity	Presence and distribution (location) of WONS and Declared weed species present	Field survey (meander with opportunistic recording)	Annually in spring for five years commencing 2023, every two years thereafter	WONS or Declared weed species present		
Vegetation cover and structure	Cover and structure of vegetation	Drone footage (3D imagery)	Every three years in autumn or spring commencing 2023 (baseline)	At year four or later, cover across all strata is less than 70%		

7.4.6 Risk management

Potential risks to the successful implementation of this offset and achievement of the objectives in Section 7.4.2 are set out in Table 7-8 along with potential strategies for mitigating risks.

Table 7-8. Ludlow Offset Area implementation risk and mitigation strategies

Potential risk	Risk mitigation strategy
Long term security of tenure	• Memorandum of Understanding established with DBCA • Funding provided for management actions.
Management actions not implemented	• Annual audit to ensure management actions have been implemented • Main Roads required to comply with requirements of MS 1191, including implementation of actions within this plan • Main Roads required to report annually to CEO on compliance with this plan, including implementation of management actions.
Failure to achieve completion criteria	• Assess completion criteria 12 months after failure and continue to assess until completion criteria are met • Monitor progress toward achieving completion criteria over time through annual audits • Review management actions and / or completion criteria in accordance with the review provisions for this plan if management actions are no longer feasible, completion criteria are no longer attainable or other extenuating circumstances arise.

8 OFFSET SITE 6 – LUDLOW PEPPERMINT ORCHARD

This chapter describes the 'Ludlow Peppermint Orchard' offset. The following sections identify:

- The offset being proposed (Section 8.1)
- The environmental attributes of the offset (Section 8.2)
- The protection mechanism for the offset (Section 8.3)
- Management and / or rehabilitation actions, including objectives, targets, completion criteria, monitoring and risk management (Section 8.4).

8.1 Identification of offset

Offset 6 (shown in Figure 9, Appendix A) comprises a one-hectare Peppermint orchard (monoculture) on DBCA managed land at Lot 12 Bussell Highway within the Shire of Capel (the Ludlow Peppermint Orchard Offset Area). The orchard was established in consultation with DBCA to provide foliage for WRP wildlife carers for use as a WRP food resource. WRP wildlife carers in the southwest currently collect peppermint foliage from DBCA reserves and road reserves to provide food resources for rescued WRP. This uncontrolled collection may compromise the availability of in-situ food resources for resident WRP. The orchard was established in 2021 by Main Roads and is managed by DBCA with foliage collected as necessary by WRP wildlife carers. Foliage is expected to be available for collection in 2027.

8.2 Environmental attributes of offset area

Lot 12 Bussell Highway forms part of the Tuart Forest National Park. Prior to establishment of the orchard, this area was completely degraded, having been used historically as a plantation.

8.3 Protection mechanism and management contribution

The Ludlow Peppermint Orchard Offset Area is located on Crown land that is managed by DBCA under the *Conservation and Land Management Act 1984*. Accordingly, this offset has long term tenure protection. Main Roads will be responsible for the establishment of the orchard (already achieved), as well as ongoing monitoring and reporting against the requirements of MS 1191. DBCA will be responsible for management of the orchard once the trees have reached a height of at least 2 m. Main Roads will establish a Memorandum of Understanding with DBCA that details the agreed revegetation and ongoing management parameters.

8.4 Offset management

8.4.1 Management approach

Management of the the Ludlow Peppermint Orchard Offset Area is based on the approach outlined in

Table 8-1.

Table 8-1. The Ludlow Peppermint Orchard Offset Area management approach

Management aspect	Description	Defined in
Objective	Aim of the Offset Area	Table 8-2
Target	Specific goal identified for the Offset Area	
Completion criteria	Measurable outcomes identified for the Offset Area	
Management actions	Actions to be taken to achieve stated objective, targets and completion criteria, including timing	Table 8-4
Monitoring program	Assessment of progress towards achievement of objective, targets or completion criteria	Table 8-5
Performance indicator	Variable that allows for measurable assessment of progress towards achievement of objective, targets or completion criteria	
Trigger value	Measurable event in any assessed parameter that indicates achievement of the objective, targets or completion criteria may be at risk	
Corrective actions	Action(s) to be taken in response to a trigger value being reached	
Reporting	Documentation of progress towards achievement of the objective, targets or completion criteria and any non-compliances that may have occurred	
Risk assessment	Consideration and appraisal of risks that may impede achievement of the objective, targets or completion criteria	Table 8-7
Risk management strategies	Actions to be taken to manage and/or mitigate identified risks	

8.4.2 Objectives, targets and completion criteria

Table 8-2 sets out the objectives, targets and completion criteria for the Ludlow Peppermint Orchard Offset Area. The provision of a regional foraging resource for use by WRP wildlife carers reduces the demand for forage from existing WRP habitat areas, and therefore provides a strategic benefit for the species.

Table 8-2. Objective, targets and completion criteria for the Ludlow Peppermint Orchard Offset Area

Objective	Target	Completion criteria
Counterbalance significant residual impacts to habitat supporting WRP	Establish a one-hectare peppermint orchard (monoculture)	The offset site will meet the following completion criteria: • Bare areas within orchard do not exceed 0.05 ha • The orchard covers at least one hectare and contains at least 1,800 Peppermint trees at least 2 m in height • A minimum of 90 % of the orchard contains peppermint trees that are healthy (according to Table 8-6) and biologically productive (i.e. produce flowering material) • Foliage is able to be collected by no later than Q4 2027.

8.4.3 Consistency with recovery plans

Condition 9-4(7)(b) requires the objectives and targets in Table 8-2 to be consistent with the objectives of relevant guidance, including but not limited to recovery plans or area management plans. The value offset by the Ludlow Peppermint Orchard Offset Area is the WRP, for which a

recovery plan exists.

The activities within this plan are consistent with the objectives of the *Western Ringtail Possum (*Pseudocheirus occidentalis*) Recovery Plan* (DBCA, 2017) to mitigate threatening processes that are constraining the recovery of WRPs (Table 8-3).

Table 8-3. Consistency of activities at the Ludlow Peppermint Orchard Offset Area with relevant recovery plans

Objective and action themes from recovery plan / conservation advice	Activities undertaken within this plan
WRP	
Threatening processes that are constraining the recovery of WRPs are mitigated	Creation of 1 ha WRP forage orchard

8.4.4 Management actions and timeframes

The following management actions will be undertaken as part of the Ludlow Peppermint Orchard Offset Area. Table 8-4 details management actions required to achieve management outcomes for the targeted species.

Fencing requirements. Boundary fencing is required around the peppermint orchard to minimise herbivore damage to the growing trees. The fence design will be finalised in consultation with DBCA.

Fire management. Firebreaks will be installed and maintained as required to ensure effective functioning.

Weed control. Targeted weed control will be undertaken by Main Roads as required to control weeds until the Peppermint trees reach a height of at least 2 m, at which time it is anticipated that management of the orchard will be taken over by DBCA.

Table 8-4. Ludlow Peppermint Orchard Offset Area management actions and timeframes

Activity	Actions	Timeframe
Fencing	Installation of boundary fence	Commencing 2022
Weed Control	Ongoing weed management conducted as needed until completion criteria are met	Commencing 2021 prior to establishment and ongoing bi-annually until handover
Completion of orchard establishment	The Peppermint orchard meets completion criteria	Seven years or earlier after establishment

8.4.5 Monitoring

Monitoring will be conducted at the Ludlow Peppermint Orchard Offset Area to enable early detection of changes that may lead to trigger values being reached and the measurement of progress towards completion criteria. Monitoring will be undertaken as outlined in Table 8-5, which also specifies trigger values and corrective actions to be taken should these values be reached.

Monitoring will be conducted via a field survey (meander).

Table 8-5. Ludlow Peppermint Orchard Offset Area monitoring program

Parameter	Performance indicator	Methodology	Frequency and timing	Trigger value	Corrective action	Reporting
Access						
Fencing	Presence and condition of fencing	Visual inspection of fence	Annually commencing 2022	Fence not intact or to specifications	• Investigate cause and raise incident report • Implement corrective actions which may include: - Review practicality of fencing design and structure - Undertake repair/modification of fence as required - Improve personnel training and education - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting
Firebreaks						
Firebreaks	Condition of firebreaks	Visual inspection of firebreaks	Annually commencing 2022	Firebreaks not to specified standard	• Investigate cause and raise incident report • Implement corrective actions which may include: - Review practicality of firebreak network - Undertake firebreak modification and maintenance as required - Improve personnel training and education - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting
Orchard development						
Plant height	Average height of Peppermint trees	Field survey	Annually commencing spring 2021	At year five, Peppermint trees are <2 m in height	• Investigate cause and raise incident report • Implement corrective actions which may include: - Undertake targeted infill planting as required - Consider application of watering and / or fertiliser - Review and modify as required weed control program - Review and modify as required fire management measures - Improve personnel training and education - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting
Plant health and flowering	Average health of Peppermint trees and evidence of flowering	Field survey	Annually commencing spring 2024	In any monitoring period, average plant stress is <3 or flowering material is absent for more than three years		
Orchard area	Size of Peppermint orchard	Field survey	Annually commencing spring 2021	Orchard area is less than one hectare in any monitoring period		

Table 8-6 Plant stress scale

Plant stress level	Description
5	Plant with >81 % of the original canopy present; healthy overall; little or no leaf yellowing. No evidence of wilting of foliage. Plants not stressed.
4	Plant with 61-80% of the original canopy present; occasional dead branches (< 20 % of canopy); small patches of leaf yellowing. Plant leaves may show signs of wilting at periphery. Plants potentially stressed.
3	Plant with 41-60 % of the original canopy present; some smaller dead branches evident (21-40 % of canopy); moderate amount of leaf yellowing (21-40 % of canopy). Plant leaves may show signs of wilting with noticeable curling of leaf periphery. Plants exhibiting symptoms of stress.
2	Plant with 21-40 % of original canopy present; some main branches dead (50 – 80 % of canopy; abundant leaf yellowing (> 41 % of canopy). Plant leaves may show signs of wilting with noticeable curling of leaf. Plants exhibiting signs of stress.
1	Plant with <20 % of original canopy; most main branches dead; remaining leaves mostly dying off. Plant leaves may show signs of wilting with noticeable curling of leaf (approaching closure). Plants clearly stressed.

8.4.6 Risk management

Potential risks to the successful implementation of this offset and achievement of the objectives in Section 8.4.2 are set out in Table 8-7 along with potential strategies for mitigating risks.

Table 8-7. Ludlow Peppermint Orchard Offset Area implementation risk and mitigation strategies

Potential risk	Risk mitigation strategy
Long term security of tenure	• Memorandum of Understanding established with DBCA • Funding provided for management actions.
Management actions not implemented	• Annual audit to ensure management actions have been implemented • Main Roads required to comply with requirements of MS 1191, including implementation of actions within this plan • Main Roads required to report annually to CEO on compliance with this plan, including implementation of management actions.
Failure to achieve completion criteria	• Assess completion criteria 12 months after failure and continue to assess until completion criteria are met • Monitor of progress toward achieving completion criteria over time through annual audits • Review and revise Offset Plan if required • Review management actions and / or completion criteria in accordance with the review provisions for this plan if management actions are no longer feasible, completion criteria are no longer attainable or other extenuating circumstances arise.

9 OFFSET 7 – FINANCIAL CONTRIBUTION: SUPPLEMENTATION OF DBCA'S TFNP FOX BAITING PROGRAM

9.1 Identification of offset

Offset 7 pertains to MS 1191 condition 9-4(8a-d). In accordance with the Offset Strategy (BORR IPT, 2021), this offset (Financial Contribution Offset) comprises a $200,000 contribution to DBCA to enhance DBCA's existing on-ground fox control program to manage predation of WRP within SF No. 2 and the TFNP.

DBCA currently conducts fox baiting within the Ludlow Tuart State Forest / Tuart Forest National Park, primarily around the perimeter of the forest blocks and along selected strip transects within blocks. Consistent with the *Offset Strategy Revision 3 August 2021* (BORR IPT, 2021), Main Roads will contribute $200,000 to DBCA to enhance on-ground fox baiting to manage fox predation on WRPs. Supplementation of DBCA's existing initiative provides a cost-effective indirect offset for Project impacts to WRP (and BTP). Funding for the additional ground-based fox control has been provided to DBCA.

Under condition 9-4(8)(c), Offset 7 is required to facilitate the achievement of the objectives set out in Condition 9-3(3) and 9-3(4).

Condition 9-3(3) requires the extent of the environmental benefit associated with the offset to exceed the extent of the significant residual impact, allowing for natural background variation, seasonal changes or other factors outside the control of the proponent, in secure conservation tenure within fifteen (15) years from the commencement of construction, noting that the significant residual impact to be offset is as identified in Condition 9-1 as the clearing of 60.9 ha of habitat for western ringtail possum.

Condition 9-1 also identifies the environmental value relevant for condition 9-4(8) as "60.9 ha of habitat for western ringtail possum" that will be lost for the Project. However, it is understood that the intent of this condition relates to habitat for western ringtail possum being the environmental value.

To complement the on-ground management and revegetation offset measures that will occur on acquired lands offset areas[24] that will exceed the extent of the significant residual impact, the fox baiting program (that will occur outside acquired lands offset areas) will tangibly improve the quality of the habitat available in existing SF No. 2 / TFNP WRP habitat by removing and / or reducing predatory threats.

Condition 9-3(4) sets out the objective to demonstrate a strategic conservation benefit for the western ringtail possum species. The expansion of DBCA's existing fox baiting program in SF No.2 / TFNP, which is known to be one of the species' strongholds (Shedley, E. and Williams, K., 2014; Jones, B.A., How, R.A. and Kitchener, D.J., 1994), to include more land area and involve more refined baiting practices, provides a clear strategic conservation benefit for WRPs.

[24] Offsets 1, 2, 3, 4, 5 and 8.

It should be noted that the predator control program to be implemented as part of Offset 5 (Ludlow Offset Area) is to occur separate to, and has no overlap with, the physical land areas covered by the predator control program associated with Offset 7.

Table 9-1. Financial Contribution Offset management approach

Management aspect	Description	Defined in
Objective	Aim of the Offset Area	Table 9-2
Target	Specific goal identified for the Offset Area	
Completion criteria	Measurable outcomes identified for the Offset Area	
Monitoring program	Assessment of progress towards achievement of objective, targets or completion criteria	Table 9-3
Performance indicator	Variable that allows for measurable assessment of progress towards achievement of objective, targets or completion criteria	
Trigger value	Measurable event in any assessed parameter that indicates achievement of the objective, targets or completion criteria may be at risk	
Corrective actions	Action(s) to be taken in response to a trigger value being reached	
Reporting	Documentation of progress towards achievement of the objective, targets or completion criteria and any non-compliances that may have occurred	
Risk assessment	Consideration and appraisal of risks that may impede achievement of the objective, targets or completion criteria	Table 9-4

9.1.1 Objectives, targets and completion criteria

Table 9-2 sets out the objectives, targets and completion criteria for the Financial Contribution Offset.

Main Roads acknowledges and understands that the legal responsibility of meeting condition 9-4(8)(a-d), remains the responsibility of Main Roads as the proponent of the Project. Main Roads will continue to work closely with DBCA to ensure the objectives and targets of condition 9-4(8)(a-d) are met.

Table 9-2. Objective, targets and completion criteria for the Financial Contribution Offset

Objective	Target	Completion criteria
Counterbalance significant residual impacts to WRP (and BTP) habitat	Increase predation threat mitigation efforts for WRP in SF No. 2 / TFNP	Fox relative abundance trends are less than baseline levels (as measured through camera detection rates and trapping / shooting results) and / or Bait uptake rate by foxes increases compared with baseline levels (as measured through camera uptake data).

9.1.2 Consistency with recovery plans

Condition 9-4(7)(b) requires the objectives and targets in Table 9-2 to be consistent with the objectives of relevant guidance, including but not limited to recovery plans or area management plans. The value offset by the Financial Contribution Offset is the WRP, for which a recovery plan exists (DBCA, 2017).

Predation by foxes is listed as a key threat to WRP in the species' recovery plan, and relates to

Objective 2, which states "Threatening processes that are constraining the recovery of western ringtail possums are mitigated in each key management zone" (DBCA, 2017).

The proposed supplementation of DBCA's SF No. 2 and TFNP fox baiting program directly addresses this threat and contributes to achievement of Objective 2. It will also address Objective 4 of the Threat Abatement Plan (DEWHA, 2008), which is to "Improve the effectiveness, target specificity, integration and humaneness of control options for foxes", specifically Action 4.6, which is to "Ensure that habitat rehabilitation and management of potential prey, competitors and predators of foxes are considered in fox control programs" (DBCA, 2017).

The Financial Contribution Offset is also consistent with the Recovery Plan Action theme 2.3, to 'Implement effective, integrated introduced predator control programs on DPaW managed land and seek to have a coordinated approach to control of introduced predators across different land tenures to maximise effectiveness'.

9.1.3 Monitoring

Monitoring of the Financial Contribution Offset is outlined in

Table 9-3 which also specifies trigger values and corrective actions to be taken should these values be reached.

DBCA will monitor specific areas within SF No.2 / TFNP to identify where additional fox baiting actions can be undertaken and a subset of remote cameras will be deployed in these areas to evaluate fox activity levels, bait uptake and effectiveness. It should be noted that in relation to effectiveness, in their draft *Tuart Forest National Park Predator Control Offset Proposal* (DBCA, 2023, in prep.), DBCA has advised that it is preferable to increase the rate at which a target species (i.e. fox) chooses to actually take a bait as evaluated by the number of occasions a bait is intercepted and how many of those occasions result in a "take".

As per the draft *Tuart Forest National Park Predator Control Offset Proposal* (DBCA, 2023, in prep.), DBCA will monitor the success of baiting for Offset 7 through bait uptake counts and lured cameras. Given fox predation is recognised as a threatening process, any take up of baits by foxes within the additional areas associated with Offset 7 will result in a tangible improvement for the WRP within the additional areas, i.e. the environmental values being offset.

In addition to the core components of the project centred around predator control, spotlighting transect(s) for WRP will be undertaken within the active management area to provide additional data on WRP population trends and complement the existing DBCA WRP monitoring in the area.

An annual report will be submitted to DWER as part of the CAR.

Table 9-3. Financial Contribution Offset monitoring program

Parameter	Performance indicator	Methodology	Frequency and timing	Trigger value	Corrective action	Reporting
Financial contribution						
Fox bait uptake	Number of baits taken	Visual inspection, camera detection rates	Monthly commencing winter 2023 (baseline) for years 1-5 then three-monthly for years 6-8[25]	No baits taken up for two consecutive baiting periods despite lured cameras showing evidence of fox presence	• Investigate cause and raise incident report • Implement corrective actions which may include: - Review lured camera footage, bait type, baiting method, and frequency of baiting program. Modify as required • Monitor outcomes.	Report annually as part of annual compliance reporting
AND / OR						
Fox relative abundance trends	Fox relative abundance	Camera detection rates and trapping / shooting results	Monthly commencing winter 2023 (baseline) for years 1-5 then three-monthly for years 6-8[26]	Fox relative abundance no lower than at baseline	• Investigate cause and raise incident report • Implement corrective actions which may include: - Review lured camera footage, bait type, baiting method, and frequency of baiting program. Modify as required • Monitor outcomes.	Report annually as part of annual compliance reporting

[25] According to DBCA's draft *Tuart Forest National Park Predator Control Offset Proposal* (DBCA, 2023, in prep.), the $200,000 financial contribution will fund eight years' worth of predator control activities.

[26] According to DBCA's draft *Tuart Forest National Park Predator Control Offset Proposal* (DBCA, 2023, in prep.), the $200,000 financial contribution will fund eight years' worth of predator control activities.

9.1.4 Risk management

Potential risks to the successful implementation of this offset and achievement of the objectives in Section 9.1.1 are set out in Table 9-4 along with potential strategies for mitigating risks.

Table 9-4. Financial Contribution Offset implementation risk and mitigation strategies

Potential risk	Risk mitigation strategy
Management actions not implemented	• Provide funding for financial contribution • Annual audit conducted to ensure financial contribution has been paid • Main Roads is required to comply with requirements of MS 1191, including implementation of actions within this plan • Main Roads is required to report annually to CEO on compliance with this plan, including implementation of management actions.
Failure to achieve completion criteria	• Re-assess completion criteria 12 months after failure and continue to assess until completion criteria are met • Monitor progress toward achieving completion criteria over time through annual audits • Review completion criteria in accordance with the review provisions for this plan if completion criteria are no longer attainable or other extenuating circumstances arise.

10 OFFSET 8 – LOT 27 TREDREA ROAD MYALUP

This chapter describes the 'Lot 27 Tredrea Place, Myalup' offset (Lot 27). The following sections identify:

- The offset being proposed (Section 10.1)
- The environmental attributes of the offset (Section 10.2)
- The protection mechanism for the offset (Section 10.3)
- Management and / or rehabilitation actions, including objectives, targets, completion criteria, monitoring and risk management (Section 10.4).

10.1 Identification of offset

This offset comprises a 19 ha portion of Lot 27 Tredrea Place, Myalup (Tredrea Offset Area) (Figure 10, Appendix A). Lot 27, which covers approximately 40 ha, is zoned a rural under the GBRS and was previously purchased by Main Roads for the purposes of developing a limestone and sand pit. It is adjoined to the south and east by mostly cleared farmland, and to the north and west by remnant vegetation. In the west, it is situated on the Quindalup dunes and in the east, on the Spearwood dunes. Lot 27 contains at least 31.6 ha of vegetation representative of the Tuart Woodlands TEC/PEC also comprising Tuart-Peppermint Woodlands PEC.

10.2 Environmental attributes of offset area

The vegetation within the Tredrea Offset Area was surveyed as part of the environmental assessment for this project. Studies conducted are listed in Table 10-1.

Table 10-1. Relevant baseline studies for the Tredrea Offset Area

Study	Description
Environmental Site Inspection Report - Indicative targeted Vegetation Assessment, Lot 27 Tredrea Road (Main Roads, 2021)	Provides information on the vegetation (structure and composition) present within Lot 27, its condition and alignment with Tuart Woodlands TEC/PEC and Tuart-Peppermint Woodlands PEC as determined from a site inspection

The Tredrea Offset Area contains both upland and wetland landforms and associated vegetation, with the majority of the site being upland. It has been confirmed to contain the following values:

- Approximately 19 ha of Tuart Woodlands TEC/PEC also comprising Tuart-Peppermint Woodlands PEC

The Tuart Woodlands TEC/PEC within the Tredrea Offset Area comprises five vegetation units in which tuart is dominant in the canopy. The first four listed comprise both Tuart Woodlands TEC/PEC and Tuart-Peppermint Woodlands PEC:

- Tuart-Jarrah-Peppermint-Banksia woodland
- Upland Tuart-Peppermint woodland
- Lowland Tuart-Peppermint woodland
- Very open Tuart-Peppermint woodland
- Upland Tuart woodland.

Vegetation condition varied across of the Offset Area. The Tuart-Jarrah-Peppermint-Banksia woodland rated as High-Very High according to the scale defined by the TSSC (2019) while the upland Tuart-Peppermint woodland rated as Moderate-High. The lowland Tuart-Peppermint woodland was rated as Very High, the very open Tuart-Peppermint woodland rated as Poor and the upland Tuart woodland was not formally assessed but based on visual inspection is likely to be considered Moderate-High condition.

At least 31.6 ha of vegetation on Lot 27 meets the TSSC (2019) criteria to be considered representative of the Tuart Woodlands TEC/PEC and Tuart-Peppermint Woodlands PEC. The TEC/PECs are present onsite in three patches, noting that patches 2 and 3 were not able to be mapped in detail due to time constraints and availability and therefore areas for these patches have been conservatively provided and would increase if mapped in detail (Figure 11, Appendix A).

10.3 Protection mechanism and management contribution

Lot 27 is owned by the Commissioner of Main Roads. Main Roads will request WAPC to rezone the property from General Farming to Regional Open Space or Conservation under the GBRS. Main Roads will discuss long term management options with DBCA and the Shire of Harvey. Until an alternative management structure is in place, Main Roads will maintain ownership and fund and manage the property for the purposes of conservation.

Should the land tenure or on-going management responsibilities change, Main Roads will develop a maintenance funding agreement with DBCA and / or the Shire of Harvey to address on-going management costs of the offset site for at least twenty (20) years. As this offset site is already owned by the Commissioner of Main Roads, with on ground works to establish the offset now commenced, the 20-year management timeframe will begin from when these works commenced.

Management fees will be negotiated with DBCA and / or the Shire of Harvey. Should no alternative management structure be secured, Main Roads will fund and manage the site for at least 20 years, as above.

10.4 Offset management

10.4.1 Management approach

Management of the the Tredrea Offset Area is based on the approach outlined in

Table 10-2.

Table 10-2. The Tredrea Offset Area management approach

Management aspect	Description	Defined in
Objective	Aim of the Offset Area	Table 10-3
Target	Specific goal identified for the Offset Area	
Completion criteria	Measurable outcomes identified for the Offset Area	
Management actions	Actions to be taken to achieve stated objective, targets and completion criteria, including timing	Table 10-5
Monitoring program	Assessment of progress towards achievement of objective, targets or completion criteria	Table 10-6
Performance indicator	Variable that allows for measurable assessment of progress towards achievement of objective, targets or completion criteria	
Trigger value	Measurable event in any assessed parameter that indicates achievement of the objective, targets or completion criteria may be at risk	
Corrective actions	Action(s) to be taken in response to a trigger value being reached	
Reporting	Documentation of progress towards achievement of the objective, targets or completion criteria and any non-compliances that may have occurred	
Risk assessment	Consideration and appraisal of risks that may impede achievement of the objective, targets or completion criteria	Table 10-7
Risk management strategies	Actions to be taken to manage and/or mitigate identified risks	

10.4.2 Objectives, targets and completion criteria

Table 10-3 sets out the objectives, targets and completion criteria for the Tredrea Offset Area. Site management for long term conservation (20 years) will include fencing and access management, weed control, firebreaks and feral and pest animal control to maintain / improve vegetation condition. The proposed completion criteria are consistent with existing management criteria for other offset properties in the local area undertaken for the Bunbury Port Access Road and BORR Central since 2015.

Table 10-3. Objective, targets and completion criteria for the Tredrea Offset Area

Objective	Target	Completion criteria
Counterbalance significant residual impacts to Tuart Woodlands TEC/PEC and Tuart-Peppermint Woodlands PEC	Conserve and manage19 ha of existing Tuart Woodlands TEC/PEC vegetation that also comprises Tuart-Peppermint Woodlands PEC	The offset site will meet the following completion criteria: • Access is restricted • Firebreaks are in place and well maintained • WONS and Declared weeds are absent • Bare / Completely degraded / Degraded areas larger than 25 m^2 are revegetated with appropriate Tuart Woodlands understorey species as per the Approved Conservation Advice (TSSC, 2019) • In accordance with the 'Future quality with offset' values presented in Appendix C, Tuart Woodlands vegetation condition is at least equal to that recorded in baseline surveys (refer to Section 10.2).

While the objective of the offset is specifically tied to condition 9-3 of Ministerial Statement 1191, overarching management objectives have previously been defined for Main Roads conservation properties in the vicinity of the BORR (Strategen, 2015) that are consistent with the objectives of condition 9-3. Specific objectives identified for the management of local conservation properties include:

- Enhance vegetation health within the conservation area
- Ensure the ongoing protection of the conservation area through ensuring an infrequent fire regime where possible
- Encourage the natural regeneration of an ecologically diverse and stable vegetation community
- Maintain self-sustaining ecosystems capable of supporting native biota, focussing on significant fauna including WRP, BTP and black cockatoos.

These objectives will be achieved through the implementation of the active management practices detailed in Section 10.4.4.

10.4.3 Consistency with recovery plans

Condition 9-4(7)(b) requires the objectives and targets in Table 7-3 to be consistent with the objectives of relevant guidance, including but not limited to recovery plans or area management plans. The values being offset by the Tredrea Offset Area are the Tuart Woodlands TEC/PEC and Tuart-Peppermint Woodlands PEC. The Commonwealth has issued a conservation advice for the Tuart Woodlands TEC (TSSC, 2019) which is synonymous with the Tuart Woodlands PEC (and incorporates the Tuart-Peppermint Woodlands PEC). This plan is consistent with the Commonwealth conservation advice.

Tuart Woodlands TEC/PEC and Tuart-Peppermint Woodland PEC
The activities in this plan are consistent with both the 'protect' and 'restore' priority conservation actions listed in the Tuart Woodlands TEC(PEC) conservation advice (TSSC, 2019), as described in Table 10-4.

Table 10-4. Consistency of activities at the Tredrea Offset Area with relevant recovery plans

Objective and action themes from recovery plan / conservation advice	Activities undertaken within this plan
Tuart Woodlands TEC/PEC and Tuart-Peppermint Woodlands PEC	
Protect the ecological community to prevent further loss of extent and condition	• Protection of 19 ha of PEC vegetation • Firebreaks, fencing, weed control, feral animal control and rubbish removal.
Restore the ecological community within its original range by active abatement of threats, re-vegetation and other conservation initiatives	• Firebreaks, fencing, weed control, feral animal control and rubbish removal.

10.4.4 Management actions and timeframes

The following on-ground and ongoing management actions will be undertaken for the Tredrea Offset Area.

Table 10-5 details management actions required to achieve management outcomes supporting the in-situ habitat for targeted species.

Table 10-5. Tredrea Offset Area management actions and timeframes

Activity	Actions	Timeframe	Status
Fencing	Replace existing rural boundary	Installation 2023/2024. Ongoing annual inspections and maintenance	Commencing 2024
Weed control	Conduct baseline weed survey	Spring 2023	Commencing spring 2023
	Ongoing weed control program (WONS and Declared weeds)	Twice-yearly in spring and autumn or as required for years 1 and 2, annually thereafter based on site observations	Commenced 2018
Pest control	Fox control using 1080 baiting	Annually in late winter to autumn based on site observation of fox presence	Commencing after fence installed
	Rabbit control using RHDV and Pindone	Annually in spring to autumn based on site observation of rabbit presence	Commencing after fence installed
Targeted revegetation	In bare / Completely degraded / Degraded areas ≥25m^2	2025 and 2026. Ongoing annual inspections.	Commencing winter 2025
Fire management	Maintain 3 m wide firebreak around the offset area boundary	Ongoing annual inspections and maintenance	Maintenance ongoing

Fencing requirements. The Tredrea Offset Area will be fenced to fauna fence specifications to reduce grazing pressure from kangaroos. Fencing will also enable effective feral pest control and limit uncontrolled vehicle access. The fence will be a 1.5 m fauna fence with a 300 mm rabbit wire apron to reduce burrowing animals from entering the project site. Access gates will be installed in strategic location to enable access for rehabilitation and site maintenance and to allow for emergency egress. A minimum of two gates will be installed. Fauna escape gates will be installed at the site to allow egress of macropods. Fauna gates will be located in strategic locations where fauna is predicted to congregate.

Access control is an effective tool for preventing a range of detrimental impacts to bushland caused by unauthorised vehicle access, such as land degradation, trampling of vegetation, illegal dumping of rubbish and spread of weeds and disease. unauthorised and unwanted access to the site. Controlling access prevents people (including vehicles) from causing land degradation, interference with revegetation works and the spread of weeds and diseases.

Targeted revegetation. Targeted revegetation will be undertaken in bare / Completely degraded / Degraded areas ≥25m^2 utilising the same methods proposed for the Ludlow Offset Area. Site preparation will be conducted via hand auger or similar small-scale method suitable to the scale of the revegetation areas. Species will comprise those known to be present in the Tuart Woodlands TEC/PEC and Tuart-Peppermint Woodlands PEC vegetation present on the site with seed sourced locally.

Fire management. Firebreaks will be installed and maintained as required to ensure effective functioning.

Pest control. As required based on site observations (i.e. observation of evidence of recent (~<2 months old) presence via scats, tracks, diggings or the taking of baits (as relevant)):

- Commencing in autumn 2024, rabbit baiting using a combination of Rabbit Haemorrhagic Disease Virus (RHDV) and Pindone will be undertaken annually from spring through to late autumn where rabbit impacts are noted as having a detrimental impact to native vegetation
- Commencing in autumn 2024, fox baiting using 1080 (sodium fluoroacetate) and / or trapping will be undertaken annually during late winter through to autumn

Weed control. Weed control comprising spot spraying of WONS and Declared weed species will be undertaken twice-yearly (spring, autumn) for years 1 and 2 and annually thereafter (as required based on site observations) for up to 20 years to control weeds.

Rubbish removal. Once fencing has been installed and access restricted, rubbish will be removed from the site to improve vegetation condition and limit the attraction of pest animals.

10.4.5 Monitoring

Monitoring will be conducted at the Tredrea Offset Area to enable early detection of changes that may lead to trigger values being reached and the measurement of progress towards completion criteria. Monitoring will be undertaken as outlined in Table 10-6, which also specifies trigger values and corrective actions to be taken should these values be reached.

Table 10-6. Tredrea Offset Area monitoring program

Parameter	Performance indicator	Methodology	Frequency and timing	Trigger value	Corrective action	Reporting
Access						
Fencing	Presence and condition of fencing	Visual inspection of fence	Annually commencing 2023	Fence not intact or to specifications	• Investigate cause and raise incident report • Implement corrective actions which may include: - Review practicality of fencing design and structure - Undertake repair/modification of fence as required - Improve personnel training and education - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting
Firebreaks						
Firebreaks	Condition of firebreaks	Visual inspection of firebreaks	Annually commencing 2023	Firebreaks not to specified standard	• Investigate cause and raise incident report • Implement corrective actions which may include: - Review practicality of firebreak network - Undertake firebreak modification and maintenance as required - Improve personnel training and education - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting
Vegetation						
Condition	Condition of vegetation assessed against EPA (2016)	Field survey	Annually in spring commencing year 2023 (baseline)	At year four or later, condition is Degraded or worse At year four, bare / Completely degraded / Degraded areas ≥25m2 are present	• Investigate cause and raise incident report • Implement corrective actions which may include: - Undertake infill planting as required - Review and modify as required weed control program - Review and modify as required *Phytophthora* dieback management measures - Review and modify as required fire management measures - Improve personnel training and education - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting
WONS and Declared weed species distribution and diversity	Presence and distribution (location) of WONS and Declared weed species present	Field survey (meander with opportunistic recording)	Twice-yearly for two years commencing year 2023, annually thereafter	WONS or Declared weed species present		

Parameter	Performance indicator	Methodology	Frequency and timing	Trigger value	Corrective action	Reporting
Pest control						
Fox and rabbit control	Evidence of recent (<2 months old) fox or rabbit presence	Field survey for visual evidence of fox or rabbit presence	Annually in autumn commencing 2024	Visual evidence of recent fox or rabbit activity detected (e.g. scats, diggings)	• Investigate cause and raise incident report • Implement corrective actions which may include: - Undertake baiting monthly until no fresh visual evidence is observed for two consecutive months - Review monitoring frequency and method • Monitor outcomes.	Report annually as part of annual compliance reporting

10.4.6 Risk management

Potential risks to the successful implementation of this offset and achievement of the objectives in Section 10.4.2 are set out in Table 10-7 along with potential strategies for mitigating risks.

Table 10-7. Tredrea Offset Area implementation risk and mitigation strategies

Potential risk	Risk mitigation strategy
Long term security of tenure	• Main Roads has acquired Lot 27. Owned by the Commissioner of Main Roads, the property is in secure tenure. • The property is currently zoned general farming under the GBRS. Main Roads will request WAPC to rezone Lot 27 to Regional Open Space or Conservation under the scheme. • Provide funding for management actions • Investigate potentially appointing an appropriate authority.
Management actions not implemented	• An annual audit will be conducted to ensure management actions have been implemented. • Main Roads is required to comply with requirements of MS No. 1191, including implementation of actions within this plan. • Main Roads is required to report annually to CEO on compliance with this plan, including implementation of management actions.
Failure to achieve completion criteria	• Re-assess completion criteria 12 months after failure and continue to assess until completion criteria are met. • Monitoring of progress toward achieving completion criteria over time through annual audits. • Review management actions and/or completion criteria in accordance with the review provisions for this plan if management actions are no longer feasible, completion criteria are no longer attainable or other extenuating circumstances arise.

11 REPORTING AND ACCOUNTABILITY

11.1 Roles and responsibility

This Offset Plan identifies the environmental management of activities to be undertaken by Main Roads or its delegate in implementation of the offset proposal. Main Roads acknowledges that the environmental management actions contained within this Plan are legal requirements to be met by Main Roads.

The Manager Environment at Main Roads will maintain responsibility for implementation of the management actions specified in this Offset Plan, on behalf of Main Roads Managing Director. Management actions may be undertaken by employees and / or contractors of Main Roads on behalf of Managing Director.

Where management actions are undertaken by employees and / or contractors of Main Roads, these will be communicated and documented to the relevant personnel through relevant environmental training and contractual arrangements (refer to Section 11.3).

11.2 Reporting

Main Roads will report to DWER on the implementation of this Plan as part of the Environmental Performance report and annual compliance reporting, which will both be publicly available, under condition 12-6 of MS 1191.

Where compliance audits undertaken by Main Roads identify that the environmental management actions and / or the environmental objectives are not being achieved (e.g. non-compliance or an environmental incident), Main Roads will notify DWER as soon as practicable and no later than within seven days of the non-compliance being known. When such a notification is made to the DWER, it is noted that follow up reporting may be required under MS 1191.

Consistent with standard document control procedures, Main Roads will maintain copies of all reports submitted to DWER.

The reporting requirements for this Plan are identified in Table 11-1.

Table 11-1. Reporting requirements

Aspect	Report from	Report to	Reporting frequency
Implementation of Offset Plan	Manager Environment	DWER	Annually (as part of annual compliance reporting)
Non-compliance with Offset Plan or Environmental Incident	Manager Environment	DWER	As soon as reasonably practicable but not more than seven days

The format and content of annual reporting will be in accordance with the requirements of conditions 5-3 and 12-6 of MS 1191. The format and content of reporting of a non-compliance event or an environmental incident will be subject to the nature of the non-compliance / incident and will include all requested information from DWER. In consideration of this, specific templates for reporting these are not provided as part of this Plan.

11.3 Environmental training

Main Roads will ensure that all personnel undertaking works for the Project, including visitors, have undertaken a site induction training program, or are escorted to the site. Main Roads will evaluate all personnel undertaking the site induction training program through a written test to ensure that all personnel have an understanding of the environmental requirements for the Project.

Where it is identified that personnel have not undertaken the works in accordance with the environmental requirements for the Project, Main Roads will require such personnel to repeat the site induction training program. The general content of the site induction training program for the Project is outlined in Table 11-2.

Table 11-2. BORR Southern Section project offset areas site induction training program content

Aspect	Site induction training program content
Site induction training program	Awareness of Main Roads Environmental Policy
	Identification of the environmental values in the Offset Area
	Identification of key environmental risks associated with the Offset Area, and the identification of management requirements to control such risks
	Roles and responsibilities of all personnel in the protection and management of the environment, including identification of key personnel that have specific roles or responsibilities
	Awareness of importance of compliance with the environmental requirements (including penalties for non-conformance with the environmental requirements)
	Pegging of the area of works, and other pegging types (for example, monitoring sites/photopoints)
	Hygiene procedures for *Phytophthora* Dieback management and weed management
	Appropriate disposal of wastes
	Environmental incidents, including the requirements for management and reporting

11.4 Emergency contacts and procedures

Emergency contact details will be signposted at appropriate locations within the area of the Project, to enable immediate contact and response in the event of an emergency / environmental incident observed by Main Roads' personnel, contractors or the public. Emergency response procedures will be followed in the event of an emergency / environmental incident. Main Roads' general and emergency contacts for the Project are provided in Table 11-3.

Table 11-3. Emergency contact details

Aspect	Contact details
General contact	• Main Roads Head Office Address: Don Aitken Centre, Waterloo Crescent, EAST PERTH WA 6004 Mail: PO Box 6202, EAST PERTH WA 6002 Email: enquiries@mainroads.wa.gov.au Phone: 138 138 • Main Roads South West Region Address: Robertson Drive, BUNBURY WA 6231 Mail: PO Box 5010, EAST PERTH WA 6231 Email: enquiries@mainroads.wa.gov.au Phone: 138 138 / (08) 9724 5600
Emergency contact	• Manager Environment, Main Roads Email: Martine.Scheltema@mainroads.wa.gov.au Phone: (08) 9323 4614 • Regional Manager, Main Roads South West Region Email: robert.barnsley@mainroads.wa.gov.au Phone: (08) 9724 5600

12 ADAPTIVE MANAGEMENT AND REVIEW

In accordance with MS 1191 condition 9-5(1), Main Roads may review and revise this plan. Main Roads will also review and revise this plan as and when directed by the DWER CEO. The approved version of the plan will continue to be implemented until directed otherwise.

12.1 Adaptive management

This Offset Plan adopts an 'adaptive management' approach which seeks to embed a cycle of monitoring, reporting and implementing change, where required. Accordingly, it is intended that this Offset Plan is intended to be dynamic and may be updated (as required) to reflect changes in the monitoring and management practices, subject to the results of the monitoring to identify that the environmental objectives are being achieved. The Offset Plan may also be revised to address learnings from the implementation of corrective actions, should this occur.

Relevant corrective actions for each Offset Area are detailed in this Plan under the relevant subsections.

Main Roads acknowledges that inherent risks exist associated with external factors of complex ecological systems that are outside its control with regard to implementation of this Plan. Where a target or objectives set out in MS 1191 is unlikely to be met as a result of external factors, the monitoring program will be reviewed to determine if it is possible to measure the impact of the external factor.

12.2 Environmental review

Main Roads proposes to review this Offset Plan annually for the first three years after commencing construction and three-yearly after this point in order to consider:

- The management and monitoring actions, including the ongoing sufficiency and suitability of WRP reference sites
- Opportunities for an improvement in environmental performance (for example, changes to methodologies or timing)
- Identify a need to update this Offset Plan to capture changes to the management and / or monitoring actions
- Identify any general need to update this Offset Plan (for example, to capture new information on WRP knowledge or management, address inherent risks associated with external factors that are outside of Main Roads control).

Main Roads acknowledge that a revision to this Offset Plan may trigger a need for additional approval by DWER prior to implementing any changes to the specified management or monitoring actions.

The proposed Offset Plan review schedule for the Project is identified in Table 12-1.

Table 12-1. Offset Plan review schedule

Timing	Action	Schedule
Construction and Post construction	• Review of Offset Plan management and monitoring actions • Review of opportunities for an improvement in environmental performance • Revise Offset Plan (if appropriate) and seek DWER and DAWE approval of revised plan.	Annually for three years after construction commences then once every three years for 16 years

12.3 Data management

Main Roads will maintain records on the implementation of this Offset Plan in accordance with Main Roads corporate standard document control procedures.

The retention of records held by Main Roads will be maintained and managed in accordance with the Western Australian *State Records Act 2000* (WA).

13 STAKEHOLDER CONSULTATION

Main Roads consulted with stakeholders while developing this plan. This section provides a summary of consultation that occurred. The comments raised during consultations with stakeholders were considered in developing the plan. Table 13-1 presents a summary of consultation and Main Roads response.

Table 13-1. Stakeholders consulted, comments and responses

Date	Organisation	Summary of consultation	Main Roads response to comments / concerns
Ducane Offset Area			
May 2019	DBCA	DBCA Corporate office advised Main Roads of opportunity to purchase these properties as an environmental offset	Main Roads noted interest in purchase and arranged site fauna survey
July 2019	DBCA	DBCA SW region indicated support for Main Roads to fund the purchase of these properties as an environmental offset for BORR	Main Roads advised DBCA it would fund the acquisition of the properties as an environmental offset for BORR. Acquisition was finalised in March 2020.
October 2020 and August 2021	EPA	Properties included in Environmental Offset Strategy submitted to EPA	N/A
November 2020	DAWE, EPA Services and DBCA	Main Roads presented these properties as proposed environmental offsets for BORR Southern Section project during workshop presented to regulators	N/A
December 2020	Shire of Capel	The Shire reviewed the Offset Strategy as part of the public consultation process of both the EPA and DAWE referrals. In regard to offsets, the same concerns were provided in both the EPA and DAWE submissions.	Main Roads addressed the Shire's concerns in both the EPA and DAWE submission response documents, and we have also sought consultation on this Plan subsequent to the Minister releasing his Statement.
July 2022	Shire of Capel	The Shire reviewed the Offset Plan (Rev A) and provided comments to Main Roads.	Main Roads has addressed and will continue to address the Shire's concerns as required.
Lot 29 Offset Area			
August 2019	DBCA SW Region	General discussion of BORR environmental offsets for BORR project	N/A
July 2020	DBCA SW Region	Discussion of Ducane Rd properties as environmental offsets for BORR project	N/A
December 2020	DPLH	DPLH raised this property as a potential environmental offset site for BORR	Main Roads indicated it would investigate environmental

Date	Organisation	Summary of consultation	Main Roads response to comments / concerns
			values of the property
December 2020	Shire of Capel	The Shire reviewed the Offset Strategy as part of the public consultation process of both the EPA and DAWE referrals. In regard to offsets, the same concerns were provided in both the EPA and DAWE submissions.	Main Roads addressed the Shire's concerns in both the EPA and DAWE submission response documents, and we have also sought consultation on this Plan subsequent to the Minister releasing his Statement.
August 2021	EPA	Properties included in environmental Offset Strategy submitted to EPA	N/A
July 2022	Shire of Capel	The Shire reviewed the Offset Plan (Rev A) and provided comments to Main Roads.	The Shire provided preliminary advice indicating that the Shire was not interested in assuming management responsibility for the Lot 29 Offset Area at this point in time. Given the long time frames associated with the offset implementation for this project, Main Roads will continue to consult with all relevant land management authorities until the most appropriate management arrangements is identified.
Lot 301 Offset Area			
February 2020	DBCA	DBCA advised they would not incorporate this property into the conservation estate	Main Roads to manage until alternative management can be resolved
October 2020 and August 2021	EPA	Properties included in environmental Offset Strategy submitted to EPA	N/A
November 2020	DAWE, EPA Services and DBCA	Main Roads presented these properties as proposed environmental offsets for BORR Southern Section project during workshop presented to regulators	N/A
December 2020	Shire of Capel	The Shire reviewed the Offset Strategy as part of the public consultation process of both the EPA and DAWE referrals. In regard to offsets, the same concerns were provided in both the EPA and DAWE submissions.	Main Roads addressed the Shire's concerns in both the EPA and DAWE submission response documents, and we have also sought consultation on this Plan subsequent to the Minister releasing his Statement.

Date	Organisation	Summary of consultation	Main Roads response to comments / concerns
June 2022		The Shire reviewed the Offset Plan (Rev A) and provided comments to Main Roads.	The Shire provided preliminary advice indicating that the Shire was not interested in assuming management responsibility for the Lot 156 (now 301) offset site at this point in time. Given the long time frames associated with the offset implementation for this project, Main Roads will continue to consult with all relevant land management authorities until the most appropriate management arrangements is identified.
Lot 104 North Offset Area			
October 2020 and August 2021	EPA	Properties included in environmental Offset Strategy submitted to EPA	N/A
November 2020	DAWE, EPA Services and DBCA	Main Roads presented these properties as proposed environmental offsets for BORR Southern Section project during workshop presented to regulators	N/A
June 2022	Shire of Dardanup	The Shire reviewed the Offset Plan and confirmed that no offset properties are located within the Shire. Plan	N/A
Ludlow Offset Area			
2014 - present	DBCA SW region	Discussed and agreed on development of environmental offset sites	N/A
October 2020 and August 2021	EPA	Properties included in environmental Offset Strategy submitted to EPA	N/A
November 2020	DBCA SW Region	Meeting to discuss Main Roads options for environmental offset in Ludlow State Forest	N/A
November 2020	DAWE, EPA Services and DBCA	Main Roads presented these properties as proposed environmental offsets for BORR Southern Section project during workshop presented to regulators	N/A
December 2020	Shire of Capel	The Shire reviewed the Offset Strategy as part of the public consultation process of both the EPA and DAWE referrals. In regard to offsets, the same concerns were	Main Roads addressed the Shire's concerns in both the EPA and DAWE submission response documents, and we

Date	Organisation	Summary of consultation	Main Roads response to comments / concerns
		provided in both the EPA and DAWE submissions.	have also sought consultation on this Plan subsequent to the Minister releasing his Statement.
Tredrea Offset Area			
February 2020	DBCA SW Region	DBCA advised via e-mail that the property is to small and isolated to be incorporated into the conservation estate	Main Roads to manage until alternative management can be resolved
October 2020 and August 2021	EPA	Properties included in environmental Offset Strategy submitted to EPA	N/A
November 2020	DAWE, EPA Services and DBCA	Main Roads presented these properties as proposed environmental offsets for BORR Southern Section project during workshop presented to regulators	N/A
December 2020	Shire of Capel	The Shire reviewed the Offset Strategy as part of the public consultation process of both the EPA and DAWE referrals. In regard to offsets, the same concerns were provided in both the EPA and DAWE submissions.	Main Roads addressed the Shire's concerns in both the EPA and DAWE submission response documents, and we have also sought consultation on this Plan subsequent to the Minister releasing his Statement.

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APPENDIX A. Figures

COLLEGE GROVE

DALYELLUP

GELORUP

STRATHAM

HENTY PLAINS

Bussell Highway

n Western Highway

LEGEND

Proposal Area

Retention Vegetation Area

Clearing Exclusion Areas

Major Road

HARVEY

BUNBURY

CAPEL

BUSSELTON

SLIP

Paper Size ISO A3

0 250 500 750 1,000

Meters

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 Perth Coastal Grid 1994

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Bunbury Outer Ring Road Southern Section

Proposal Area

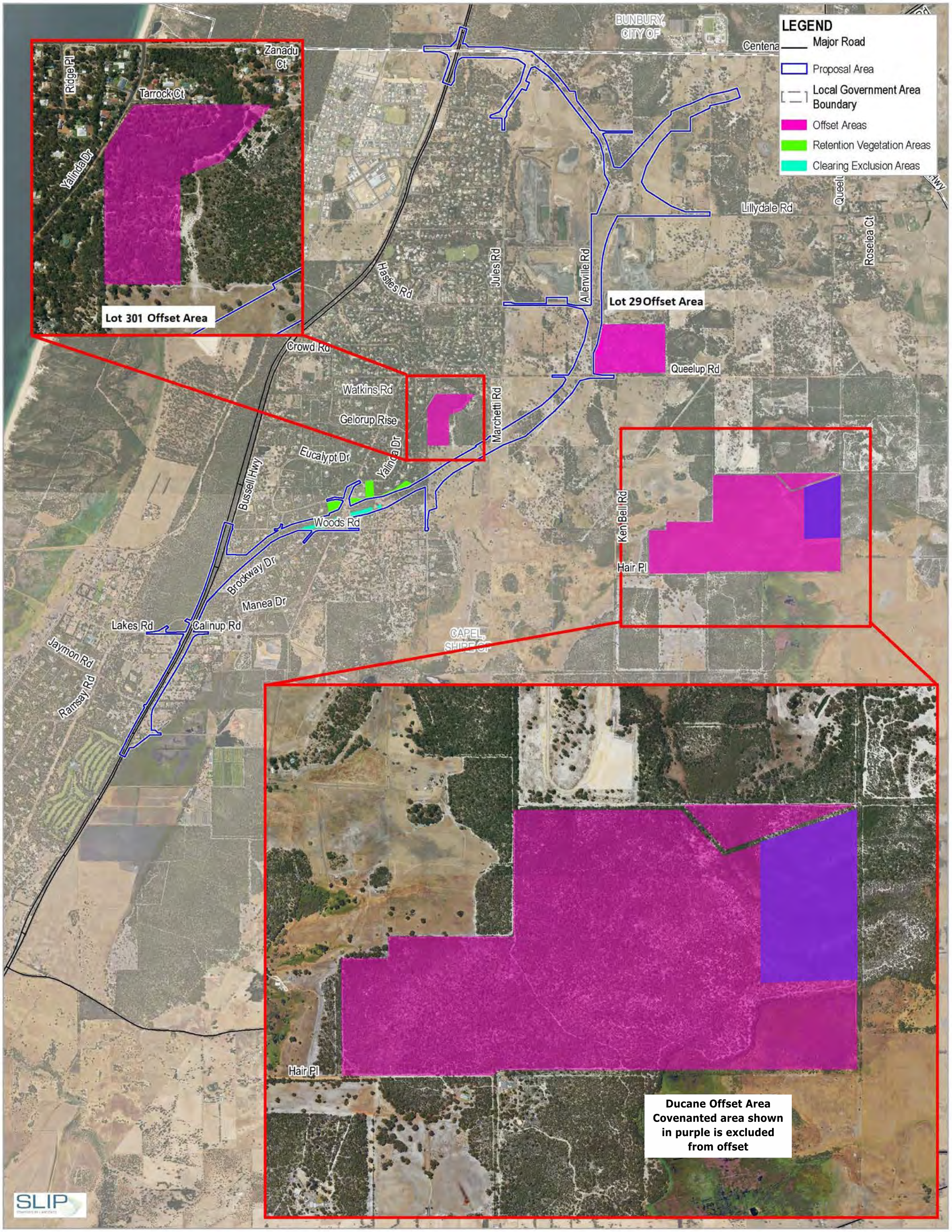
Project No.	61-37041
Revision No.	4
Date	4/08/2021

Overview

FIGURE 1

G:\61\37041\19_0_GIS\Maps\Working\BORR South Referral Update\Offset Strategy Update\6137041_001_BORRSouthProposalArea_Overview_Rev4.mxd
Print date: 04 Aug 2021 - 14:13

Data source: Geoscience Australia: GeoData Topo 250k Series III - 2006; Landgate: Roads - 20180501, Imagery - WA Now accessed 20210804; BORR: Proposal Area - 20191212, Vegetated Exclusion Area - 20210513. Created by: slei



Paper Size ISO A3

0 250 500 750 1,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 Perth Coastal Grid 1994

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Ducane Offset Area, Lot 29 Offset Area and Lot 301 Offset Area

Project No. **61-37041**
Revision No. **1**
Date **4/08/2021**

FIGURE 2

G:\61\37041\19_0_GIS\Maps\Working\BORR South Referral Update\Offset Strategy Update\61137041_006_OffsetPropertiesDucane_Rev1.mxd
Print date: 04 Aug 2021 - 16:28

Data source: Geoscience Australia: GeoData Topo 250k Series III - 2006; Landgate: Roads, LGA Boundaries - 20180501, Imagery - WA Now accessed 20210804; BORR: Proposal Area - 201912, Excluded area - 20200720; MRWA: Offset properties - 20200721. Created by: slei

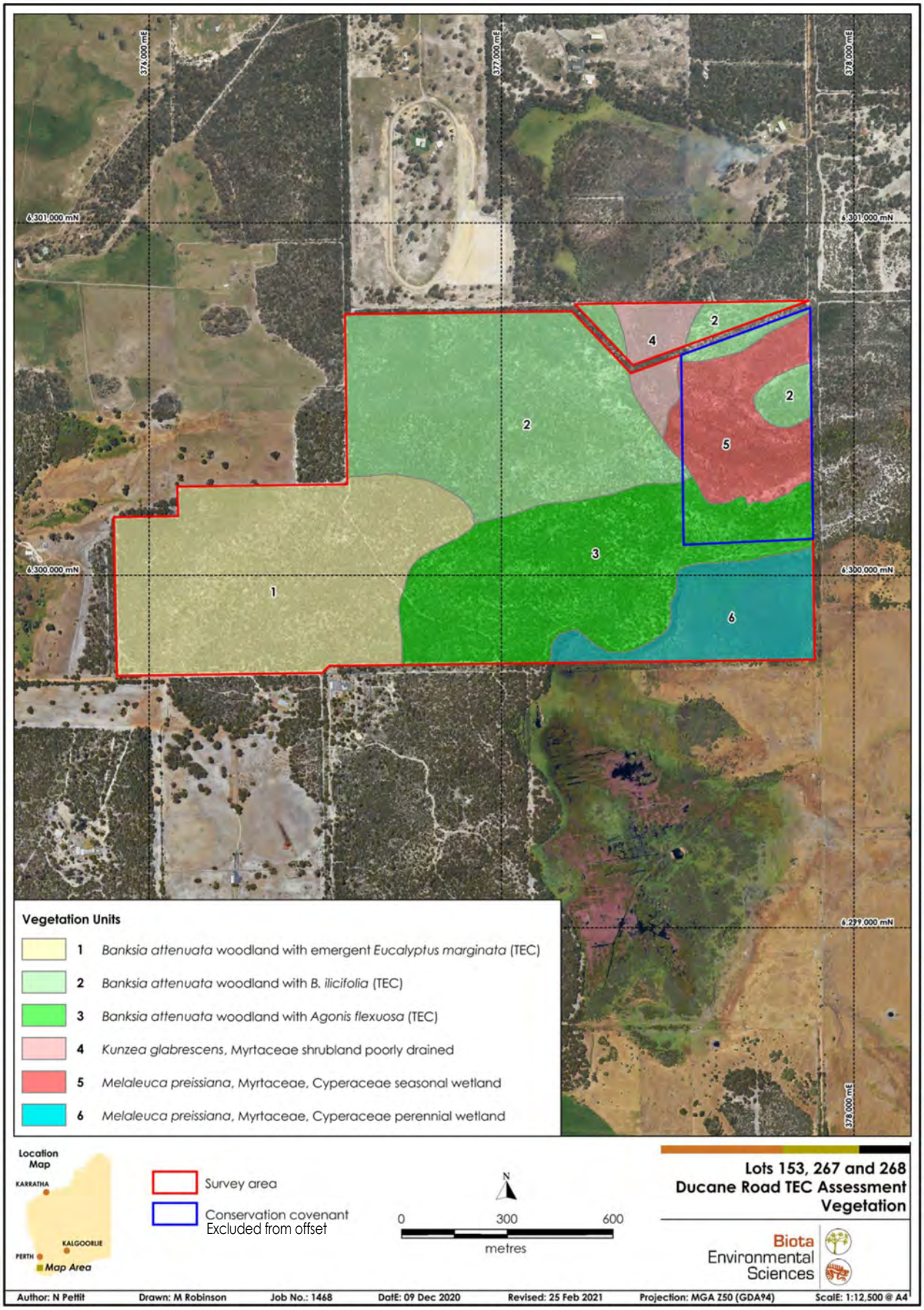


Figure **3** Vegetation **units and** the three *Banksia attenuata* woodland mapping units (1, 2 and 3) that are considered representative of Banksia Woodlands **TEC(P**EC**). The covenanted area marked in blue is excluded from the offset.**

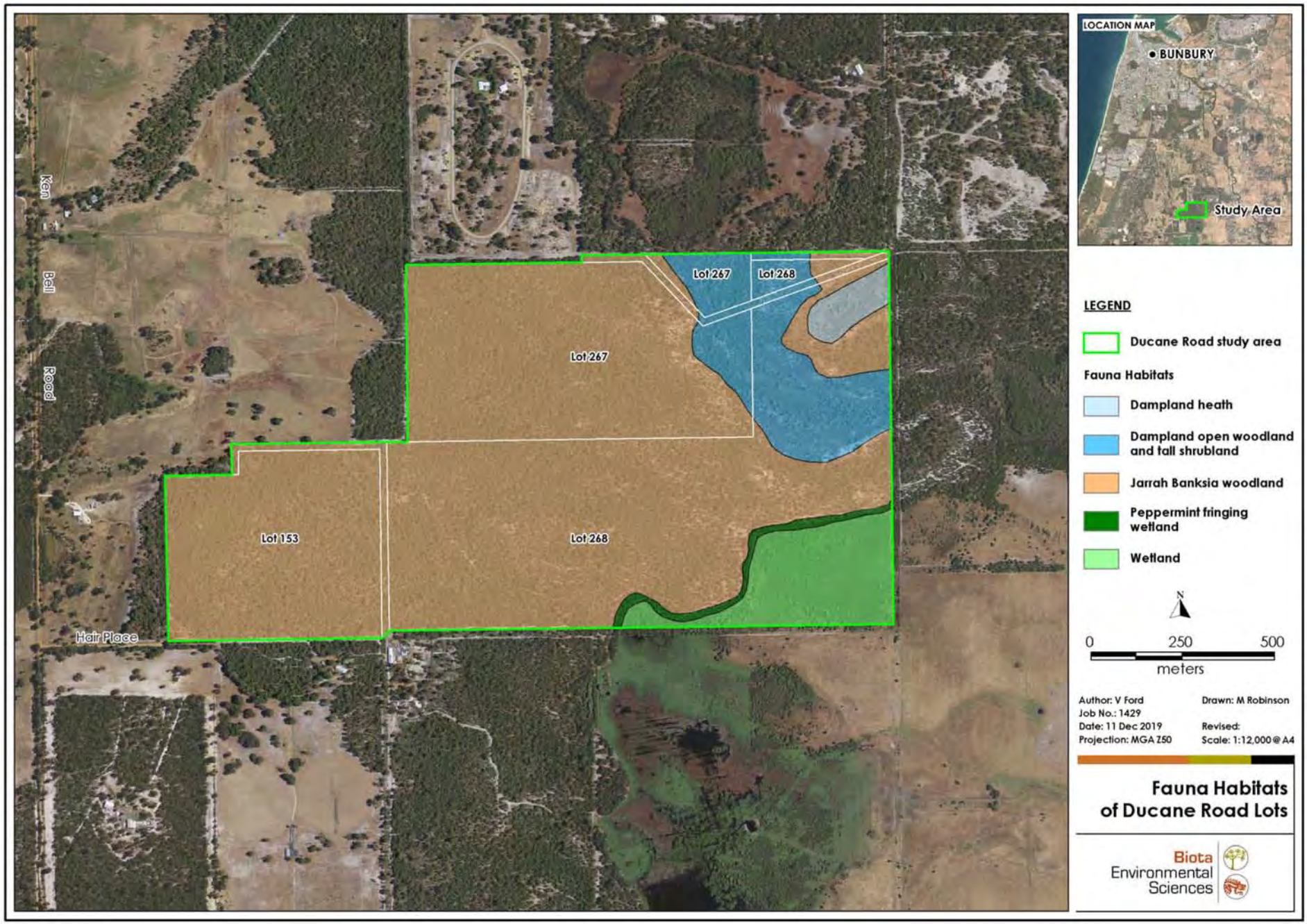


Figure **4** Fauna habitats of the **Ducane Offset Are**a

35,000 36,000 37,000

104,000 103,000 102,000 101,000

Patch 1
Patch 8
JENO2
JENO1
Patch 1
Patch 1

LEGEND

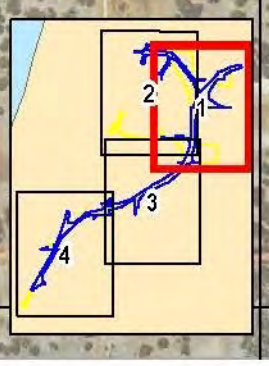
- Tuart Quadrat

Conservation Significant Flora

- *Lasiopetalum membranaceum* (DBCA-P3) (2019)
- *Acacia semitrullata* (DBCA-P4) (2019)
- BORR Southern Section Environmental Survey Area
- Banksia Woodland TEC/PEC
- Tuart Woodland TEC/PEC
- Tuart-Peppermint Woodland PEC

Lot 29 Offset Area

Patch 5



SLIP POWERED BY LANDGATE

Paper Size ISO A3

0 50 100 150 200

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA1994
Grid: GDA1994 Perth Coastal Grid 1994

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Banksia Woodland TEC/PEC (and significant flora) in the Lot 29 Offset Area

Project No. **61-37041**
Revision No. **4**
Date **08 Jul 2020**

FIGURE 5

G:\61\37041\19_0_GIS\Maps\Working\BORR GBRS Flora and Vegetation Report\61137041_011_ConservationAndSignificantEcologicalCommunities_Rev4.mxd
Print date: 08 Jul 2020 - 13:54

Data source: BORR team: South environmental survey area - 20200214, TEC/PEC - 20190219; EcoEdge: Tuart Location - 20190926; Landgate: Roads - 201805, Imagery accessed on 20200708. Created by: slei

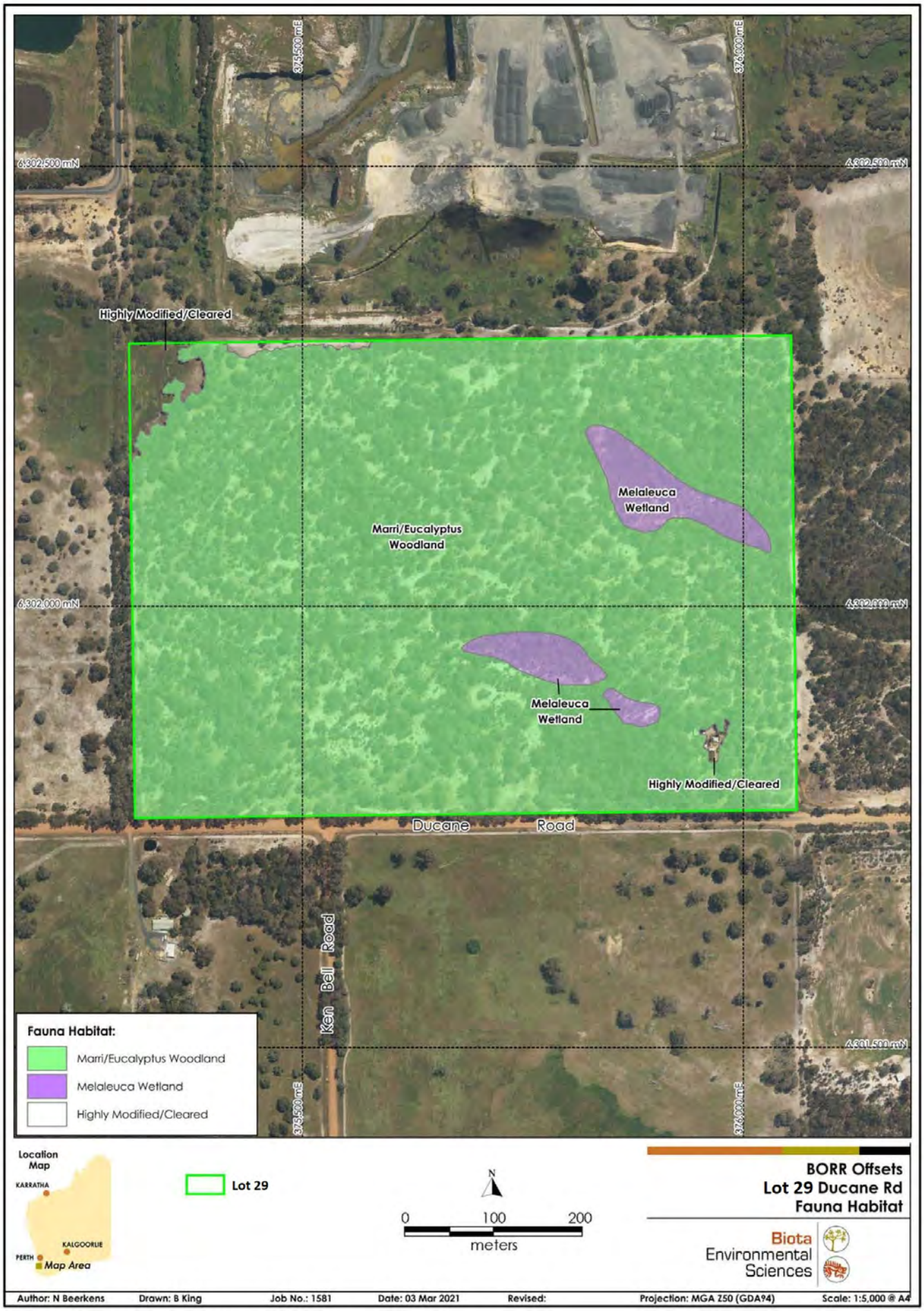

Figure 6 **Fauna habitats of the Lot 29 Offset Area**

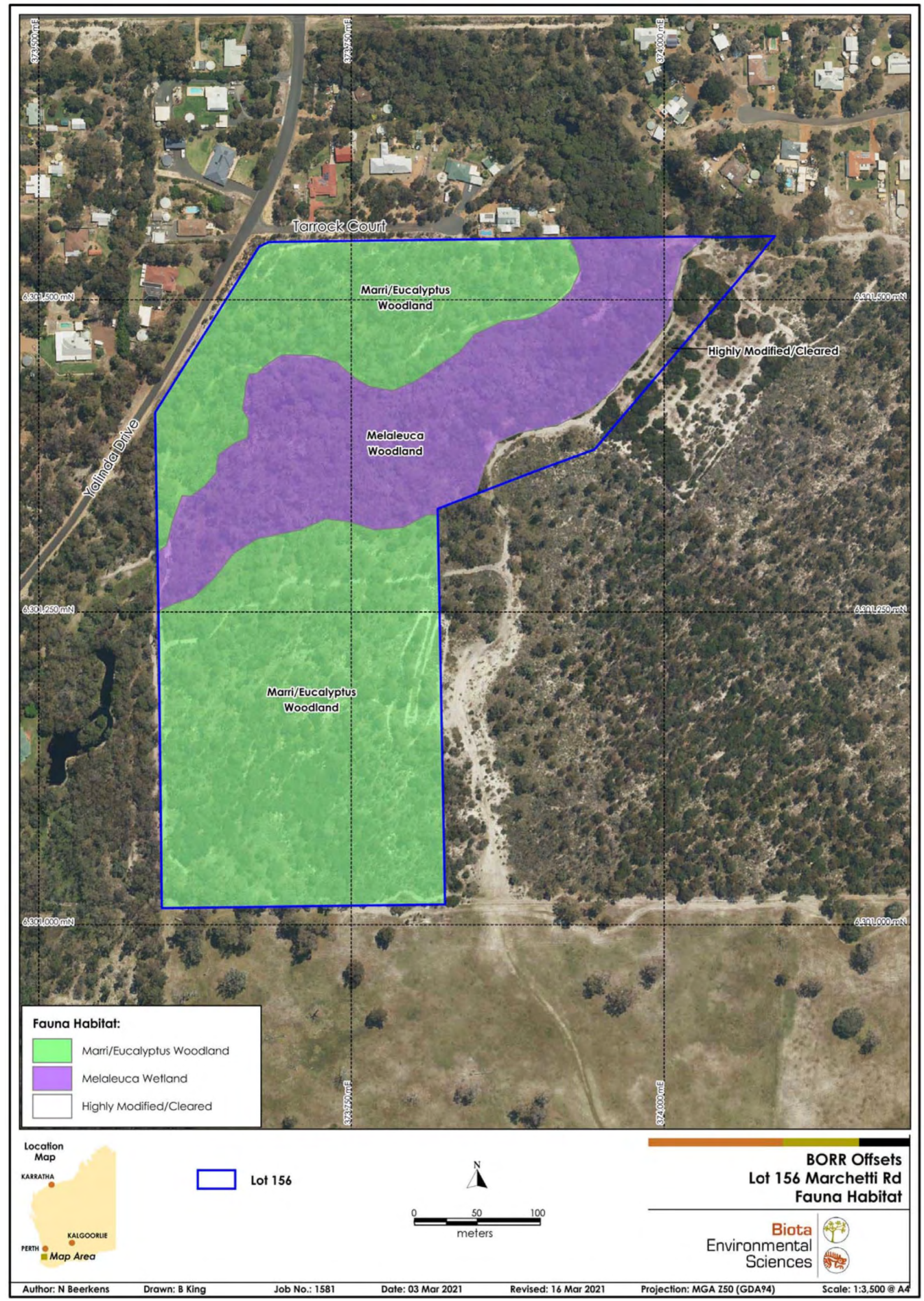

Figure 7 **Fauna habitats of the Lot 301 (previously 156) Offset Area**

35 ha revegetation offset for WRP, BTP and black cockatoo habitat

LEGEND

- Major Road
- Proposal Area
- Local Government Area Boundary
- Lot 104 North Offset Area
- Retention Vegetation Areas
- Clearing Exclusion Areas

Estuary Dr
Newton Rd
Eelup Rd
Willinge Dr
Bunbury Outer Ring Rd
Picton Rd
Proffit St
Craigie St
Dodson Rd
Harris Rd
Boyanup-Picton Rd
Robertson Dr
Wallrodt Rd
Parade Rd
Rotary Av
Washington Av
Ocean Dr
Parade Rd
Bussell Hwy
BUNBURY, CITY OF
Centenary Rd
Bunbury Outer Ring Rd
Moore Rd
Lillydale Rd
Dalyellup Blvd
Jules Rd
Watkins Rd
Ducane Rd
South Western Hwy
Eucalypt Dr
Yalinda Dr
Ken Bell Rd
Brockway Dr
Manea Dr
Lakes Rd
CAPEL, SHIRE OF
Minninup Rd
Rich Rd
Kilpatrick Rd
Brookdale Rd
Chislehurst Av
Fowler Rd
Jilley Rd
Skippings Rd
Boyanup Rd
Forrest Hwy

SLIP POWERED BY LANDGATE

Paper Size ISO A3

0 500 1,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 Perth Coastal Grid 1994

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Lot 104 North (Willinge Drive) Offset Area

Project No. **61-37041**
Revision No. **1**
Date **4/08/2021**

FIGURE 8

G:\61\37041\19_0_GIS\Maps\Working\BORR South Referral Update\Offset Strategy Update\6137041_010_OffsetPropertyLot104_Rev1.mxd
Print date: 04 Aug 2021 - 16:27

Data source: Geoscience Australia: GeoData Topo 250k Series III - 2006; Landgate: Roads, LGA Boundaries - 20180501, Imagery - WA Now accessed 20210804; BORR: Proposal Area - 201912, Excluded area - 20200720; MRWA: Offset properties - 20210224. Created by: slei

LEGEND

- Proposal Area
- Local Government Area Boundary
- State Forest 2 Potential Offset Areas
- Retention Vegetation Areas
- Clearing Exclusion Areas

LSF Site 12

170 ha of restored WRP and BTP habitat incorporating 75.3 ha of black cockatoo habitat and 7.2 ha of Tuart Woodlands TEC/PEC (Tuart-Peppermint Woodland PEC)

10 ha of restored WRP and BTP habitat

5 ha of restored WRP and BTP habitat

LSF Site 2

LSF Site 4

Peppermint nursery

Hansen Rd
Ludlow Rd
Mallokup Rd
Halls Rd
Gun Club Rd
Stirling Rd
Higgins Rd
Bussell Hwy
Capel Dr
Ocean Dr
BUNBURY, CITY OF
DARDANUP, SHIRE OF
South Western Hwy
Boyanup Rd
Railway Rd
CAPEL, SHIRE OF
Tuart Dr
Layman Rd
BUSSELTON, CITY OF

Paper Size ISO A3

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 Perth Coastal Grid 1994

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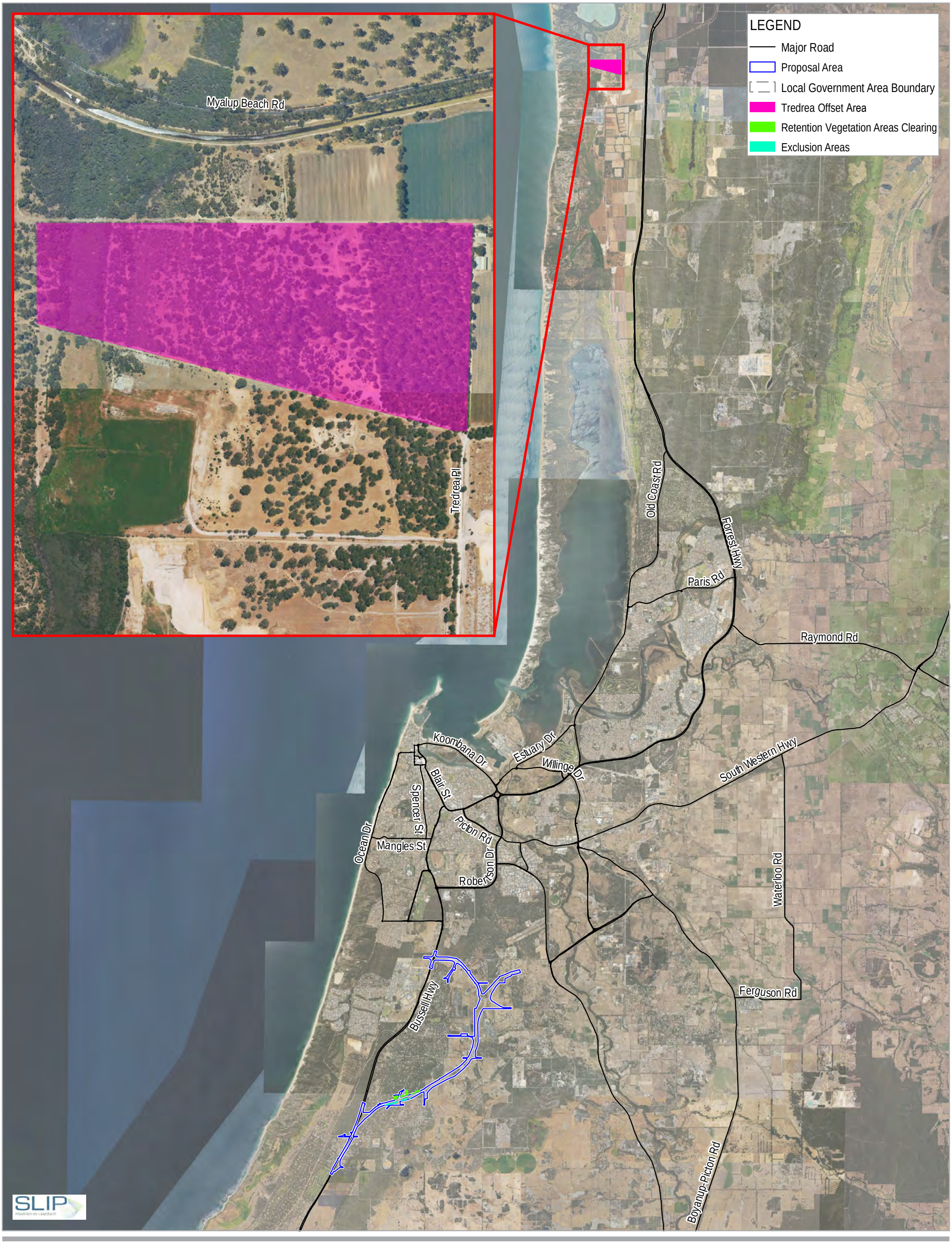
State Forest 2 Offset Areas

Project No. **61-37041**
Revision No. **2**
Date **21/09/2022**

FIGURE 9

C:\Users\bmorgan\AppData\Local\Temp\arcF0E6\6137041_007_OffsetPropertiesStateForest2_Rev2.mxd
Print date: 21 Sep 2022 - 11:29

Data source: Geoscience Australia: GeoData Topo 250k Series III - 2006; Landgate: Roads, LGA Boundaries - 20180501, Imagery - WA Now accessed 20220921; BORR: Proposal Area - 201912, Offset properties - 20200130, Excluded area - 20200720. Created by: bmorgan



Paper Size ISO A3

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 Perth Coastal Grid 1994

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Bunbury Outer Ring Road Southern Section

Project No. 61-37041
Revision No. 1
Date 4/08/2021

Tredrea Offset **Area**

FIGURE **10**

G:\61\37041\19_0_GIS\Maps\Working\BORR South Referral Update\Offset Strategy Update\6137041_008_OffsetPropertiesTredrea_Rev1.mxd
Print date: 04 Aug 2021 - 16:23

Data source: Geoscience Australia: GeoData Topo 250k Series III - 2006; Landgate: Roads, LGA Boundaries - 20180501, Imagery - WA Now accessed 20210804; BORR: Proposal Area - 201912, Excluded area - 20200720; MRWA: Offset properties - 20200721. Created by: slei

Figure 11

Lot 27 Tredrea Road, Myalup

Offset Area

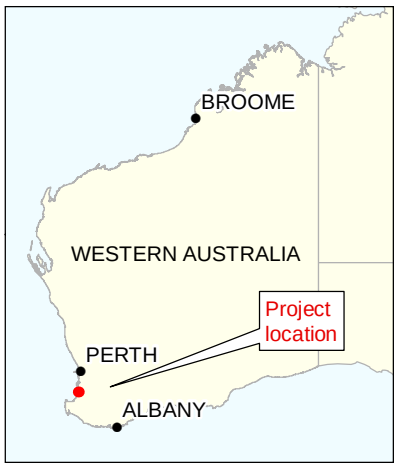
Legend

Survey Area

Tuart Woodlands PEC / Tuart-Peppermint Woodlands PEC Status

Confirmed

Unconfirmed



Document Path: \\Bunsrv01\Environmental\GIS shape files\OFFSETS\Tredrea Rd Offset\Tredrea Rd.mxd

Author: C8031
Date: 16/03/2021
SCALE @ A4 : 5,941
SOURCE:
Imagery sourced Landgate, all other data MRWA

0 100 200 300 Meters

Coordinate System: GDA 1994 MGA Zone 50Transverse Mercator
Projection: Transverse Mercator
Units: GDA 1994
Units: Meter

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APPENDIX B. DBCA confirmation of agreement regarding Ducane Offset Area

Subject: FW: HPRM: RE: DBCA Support - Lots 266, 267, 268 and 153 Ducane Road

---

From: Kim Williams <kim.williams@dbca.wa.gov.au>
Sent: Thursday, 11 July 2019 3:51 PM
To: Alex Errington <alex.errington@dbca.wa.gov.au>; Andrew Webb <andrew.webb@dbca.wa.gov.au>
Cc: Tracy Teede <tracy.teede@dbca.wa.gov.au>; MCCARTHY Neil (SEO) <neil.mccarthy@mainroads.wa.gov.au>
Subject: HPRM: RE: DBCA Support - Lots 266, 267, 268 and 153 Ducane Road

Alex, Neil,

I have had discussions with the Regional Manager regarding the merits and considerations of acquiring the four lots (267,268,269 and 153) principally for WRP's and Black Cockatoo values along Ducane Rd as an conservation offset against various MRD roading projects.

As a result the South West Region of the Parks and Wildlife Service sees the merit of such an acquisition and gives it support for proceeding with the negotiations to try and secure these areas.

With regard to Lot 269;
- the region would be prepared to accept the entire lot including the cleared portion if negotiations to only acquire the vegetated section were unsuccessful.
- support the need for a WRP survey prior to purchasing to confirm that the habitat is suitable and currently occupied by WRP.

If negotiations are successful, prior to accepting management responsibility for the lots the region would request that;
- the lots have their boundary fences and gates repaired/upgraded to facilitate ongoing management and access control.

-unformed and redundant road reserves, such as that which bisects the northern parts of Lot 268 and NE portions of Lot 267 and along the eastern boundary of Lot 153 be de-gazetted and incorporated into the lots. NB: There may be others that need to be reviewed.

-any significant collections of accumulated illegally dumped rubbish be removed.

-maintain an open line of communications between the two agencies (MRD, DBCA) with regard to other but as yet unforeseen matters that may arise during the purchasing process.

Thanks

Kim Williams
Regional Leader Nature Conservation
Parks and Wildlife Service
Department of Biodiversity, Conservation and Attractions
SW Region, Bunbury, WA
Ph: 97254300

kim.williams@dbca.wa.gov.au

Department of Biodiversity, Conservation and Attractions

GOVERNMENT OF WESTERN AUSTRALIA

PARKS AND WILDLIFE SERVICE

We're working for Western Australia.

Thanks

Kim

APPENDIX C. Offset 'Start' and 'Future Quality with Offset' Values

Excerpt from Ministerial Statement 1191

Site and location	Environmental value	Start quality	Future quality with offset
Offset 1: Ducane Offset Area Lots 153, 267, 268 Ducane Road, Gelorup	Western ringtail possum	7	7
	Black cockatoos	8	8
	Banksia Woodlands TEC/PEC	8	8
Offset 2: Lot 29 Offset Area Lot 29 Ducane Road, Gelorup	Western ringtail possum	7	7
	Black cockatoos	8	8
	Banksia Woodlands TEC/PEC	7	7
Offset 3: Lot 156 Offset Area Lot 156 Marchetti Road, Gelorup	Western ringtail possum	8	8
	Black cockatoos	8	8
Offset 4: Lot 104 North Offset Area Lot 104 Willinge Drive, Davenport	Western ringtail possum	0	6
Offset 5: Ludlow Offset Area Sites 2 and 4: Tuart Forest National Park / Ludlow State Forest No.2	Western ringtail possum	0	6
Offset 5: Ludlow Offset Area Site 12: Tuart Forest National Park / Ludlow State Forest No.2	Western ringtail possum	3	6
	Black cockatoos	3	6
	Tuart Woodlands TEC/PEC	3	7
Offset 8: Tredrea Offset Area Lot 27 Tredrea Road, Myalup	Tuart Woodlands TEC/PEC	7	7

APPENDIX D. Offset Calculations

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	WRP
EPBC Act status	Critically Endangered
Annual probability of extinction Based on IUCN category definitions	**6.8%**

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	Clearing of up to 60.9 ha of WRP habitat	**Area**	60.9	Hectares	Site assessment and the Proposal design have been used to identify impacts
			Quality	**7**	Scale 0-10	
			Total quantum of impact	42.63	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	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	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	42.63	Adjusted hectares	126.0 ha of Lot 153, 267 and 268 Queelup Rd, Gelorup (Ducane Offset Area)	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	126	**Risk of loss (%) without offset**	15%	**Risk of loss (%) with offset**	5%	12.60	100%	12.60	3.38	12.39	29.07%	No	
									Future area without offset (adjusted hectares)	107.1	**Future area with offset (adjusted hectares)**	119.7								
					Time until ecological benefit	1	**Start quality (scale of 0-10)**	**7**	**Future quality without offset (scale of 0-10)**	**6**	**Future quality with offset (scale of 0-10)**	**7**	1.00	100%	1.00	0.94				
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	42.63	12.39	29.07%	**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	WRP
EPBC Act status	Critically Endangered
Annual probability of extinction Based on IUCN category definitions	**6.8%**

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	Clearing of up to 60.9 ha of WRP habitat	**Area**	60.9	Hectares	Site assessment and the Proposal design have been used to identify impacts
			Quality	**7**	Scale 0-10	
			Total quantum of impact	42.63	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	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	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	42.63	Adjusted hectares	38.5 ha of Lot 29 Queelup Rd, Gelorup	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	38.5	**Risk of loss (%) without offset**	15%	**Risk of loss (%) with offset**	5%	3.85	100%	3.85	1.03	3.79	8.88%	No	
									Future area without offset (adjusted hectares)	32.7	**Future area with offset (adjusted hectares)**	36.6								
					Time until ecological benefit	1	**Start quality (scale of 0-10)**	**7**	**Future quality without offset (scale of 0-10)**	**6**	**Future quality with offset (scale of 0-10)**	**7**	1.00	100%	1.00	0.94				
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	42.63	3.79	8.88%	**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	WRP
EPBC Act status	Critically Endangered
Annual probability of extinction Based on IUCN category definitions	**6.8%**

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	Clearing of up to 60.9 ha of WRP habitat	**Area**	60.9	Hectares	Site assessment and the Proposal design have been used to identify impacts
			Quality	**7**	Scale 0-10	
			Total quantum of impact	42.63	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	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	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	42.63	Adjusted hectares	14.2 ha of WRP habitat at 301 Marchetti Road	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	14.2	**Risk of loss (%) without offset**	15%	**Risk of loss (%) with offset**	5%	1.42	100%	1.42	0.38	1.43	3.37%	No	
									Future area without offset (adjusted hectares)	12.1	**Future area with offset (adjusted hectares)**	13.5								
					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	100%	1.00	0.94				
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	42.63	1.43	3.37%	**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

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Matter of National Environmental Significance	
Name	WRP
EPBC Act status	Critically Endangered
Annual probability of extinction Based on IUCN category definitions	**6.8%**

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	Clearing of up to 60.9 ha of WRP habitat	**Area**	60.9	Hectares	Site assessment and the Proposal design have been used to identify impacts
			Quality	**7**	Scale 0-10	
			Total quantum of impact	42.63	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	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	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	42.63	Adjusted hectares	Lot 104 - 35 ha of revegetation to create WRP habitat	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	35	**Risk of loss (%) without offset**	0%	**Risk of loss (%) with offset**	5%	-1.75	100%	-1.47	10.60	24.85%	No		
									Future area without offset (adjusted hectares)	35.0	**Future area with offset (adjusted hectares)**	33.3								
					Time until ecological benefit	10	**Start quality (scale of 0-10)**	**0**	**Future quality without offset (scale of 0-10)**	**0**	**Future quality with offset (scale of 0-10)**	**6**	6.00	100%	6.00	3.11				
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	42.63	10.60	24.85%	**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

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Matter of National Environmental Significance	
Name	WRP
EPBC Act status	Critically Endangered
Annual probability of extinction Based on IUCN category definitions	**6.8%**

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	Clearing of up to 60.9 ha of WRP habitat	**Area**	60.9	Hectares	WRP impact assessed through site surveys and assessment of the concept design
			Quality	**7**	Scale 0-10	
			Total quantum of impact	42.63	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	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

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	42.63	Adjusted hectares	Revegetation of 170 ha of State Forest No.2 Site 12 to create WRP habitat	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	170	**Risk of loss (%) without offset**	5%	**Risk of loss (%) with offset**	5%	0.00	100%	0.00	0.00	33.46	78.49%	No		
									Future area without offset (adjusted hectares)	161.5	**Future area with offset (adjusted hectares)**	161.5								
					Time until ecological benefit	10	**Start quality (scale of 0-10)**	**3**	**Future quality without offset (scale of 0-10)**	**2**	**Future quality with offset (scale of 0-10)**	**6**	4.00	100%	4.00	2.07				
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

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	42.63	33.46	78.49%	**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

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Matter of National Environmental Significance	
Name	WRP
EPBC Act status	Critically Endangered
Annual probability of extinction Based on IUCN category definitions	**6.8%**

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	Clearing of up to 60.9 ha of WRP habitat	**Area**	60.9	Hectares	WRP impact assessed through site surveys and assessment of the concept design
			Quality	**7**	Scale 0-10	
			Total quantum of impact	42.63	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	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	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	42.63	Adjusted hectares	Revegetation of 15 ha of State Forest No.2 Sites 2 and 4 to create WRP habitat	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	15	**Risk of loss (%) without offset**	5%	**Risk of loss (%) with offset**	5%	0.00	100%	0.00	0.00	2.95	6.93%	No	
									Future area without offset (adjusted hectares)	14.3	**Future area with offset (adjusted hectares)**	14.3								
					Time until ecological benefit	10	**Start quality (scale of 0-10)**	**0**	**Future quality without offset (scale of 0-10)**	**2**	**Future quality with offset (scale of 0-10)**	**6**	4.00	100%	4.00	2.07				
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	42.63	2.95	6.93%	**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	Black Cockatoo species
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**		Hectares	
			Quality		Scale 0-10	
			Total quantum of impact	0.00	Adjusted hectares	
Threatened species habitat						
Area of habitat	Yes	65.4 ha of Black Cockatoo foraging, and potential nesting and roosting habitat	**Area**	60.9	Hectares	Impact determined through field survey and assessment of concept design
			Quality	7	Scale 0-10	
			Total quantum of impact	42.63	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	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		Adjusted hectares		**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**		0.00		0.00	0.00	0.00	#DIV/0!	#DIV/0!	
									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)**		0.00		0.00	0.00				
Threatened species habitat																				
Area of habitat	Yes	42.63	Adjusted hectares	124.1 ha of cockatoo habitat (Banksia Woodland) on Lots 153, 267 and 268 Queelup Road Gelorup (Ducane Offset Area)	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	124.1	**Risk of loss (%) without offset**	15%	**Risk of loss (%) with offset**	5%	12.41	100%	12.41	9.78	18.24	42.80%	No	
									Future area without offset (adjusted hectares)	105.5	**Future area with offset (adjusted hectares)**	117.9								
					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	100%	1.00	0.99				
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	42.63	18.24	42.80%	**No**	$0.00	#DIV/0!	#DIV/0!
Area of community	0	0.00	#DIV/0!	**#DIV/0!**	$0.00	#DIV/0!	#DIV/0!
					$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

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Matter of National Environmental Significance	
Name	Black Cockatoo species
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**		Hectares	
			Quality		Scale 0-10	
			Total quantum of impact	0.00	Adjusted hectares	
Threatened species habitat						
Area of habitat	Yes	65.4 ha of Black Cockatoo foraging, and potential nesting and roosting habitat	**Area**	60.9	Hectares	Impact determined through field survey and assessment of concept design
			Quality	**7**	Scale 0-10	
			Total quantum of impact	42.63	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	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		Adjusted hectares		**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**		0.00		0.00	0.00		0.00	#DIV/0!	#DIV/0!		
									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)**		0.00		0.00	0.00					
Threatened species habitat																					
Area of habitat	Yes	42.63	Adjusted hectares	37.7 ha of BC habitat on Lot 29 Queelup Rd, Gelorup Jarrah Banksia woodland.	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	37.7	**Risk of loss (%) without offset**	15%	**Risk of loss (%) with offset**	5%	3.77	100%	3.77	2.97		13.00%	No		
									Future area without offset (adjusted hectares)	32.0	**Future area with offset (adjusted hectares)**	35.8					5.54				
					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	100%	1.00	0.99					
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	42.63	5.54	13.00%	**No**	$0.00	#DIV/0!	#DIV/0!
Area of community	0	0.00	#DIV/0!	**#DIV/0!**	$0.00	#DIV/0!	#DIV/0!
					$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	Black Cockatoo species
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**		Hectares	
			Quality		Scale 0-10	
			Total quantum of impact	0.00	Adjusted hectares	
Threatened species habitat						
Area of habitat	Yes	65.4 ha of Black Cockatoo foraging, and potential nesting and roosting habitat	**Area**	60.9	Hectares	Impact determined through field survey and assessment of concept design
			Quality	**7**	Scale 0-10	
			Total quantum of impact	42.63	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	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		Adjusted hectares		**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**		0.00		0.00	0.00		0.00	#DIV/0!	#DIV/0!		
									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)**		0.00		0.00	0.00					
Threatened species habitat																					
Area of habitat	Yes	42.63	Adjusted hectares	9.7 ha of BC habitat on Lot 301 Marchetti Rd, Gelorup	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	9.7	**Risk of loss (%) without offset**	15%	**Risk of loss (%) with offset**	5%	0.97	100%	0.97	0.76		3.35%	No		
									Future area without offset (adjusted hectares)	8.2	**Future area with offset (adjusted hectares)**	9.2					1.43				
					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	100%	1.00	0.99					
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	42.63	1.43	3.35%	**No**	$0.00	#DIV/0!	#DIV/0!
Area of community	0	0.00	#DIV/0!	**#DIV/0!**	$0.00	#DIV/0!	#DIV/0!
					$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	Black Cockatoo species
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**		Hectares	
			Quality		Scale 0-10	
			Total quantum of impact	0.00	Adjusted hectares	
Threatened species habitat						
Area of habitat	Yes	65.4 ha of Black Cockatoo foraging, and potential nesting and roosting habitat	**Area**	60.9	Hectares	Impact determined through field survey and assessment of concept design
			Quality	**7**	Scale 0-10	
			Total quantum of impact	42.63	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	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		Adjusted hectares		**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**		0.00		0.00	0.00		0.00	#DIV/0!	#DIV/0!		
									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)**		0.00		0.00	0.00					
Threatened species habitat																					
Area of habitat	Yes	42.63	Adjusted hectares	Revegetation of 75.3 ha of BC habitat within State Forest No. 2 Site 12	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	75.3	**Risk of loss (%) without offset**	5%	**Risk of loss (%) with offset**	5%	0.00	100%	0.00	0.00		44.68%	No		
									Future area without offset (adjusted hectares)	71.5	**Future area with offset (adjusted hectares)**	71.5									
					Time until ecological benefit	10	**Start quality (scale of 0-10)**	**3**	**Future quality without offset (scale of 0-10)**	**3**	**Future quality with offset (scale of 0-10)**	**6**	3.00	100%	3.00	2.66	19.05				
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	42.63	19.05	44.68%	**No**	$0.00	#DIV/0!	#DIV/0!
Area of community	0	0.00	#DIV/0!	**#DIV/0!**	$0.00	#DIV/0!	#DIV/0!
					$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	Banksia Woodlands of the
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	Clearing of up to 23.4 ha of Bansia woodland TEC/PEC	**Area**	23.4	Hectares	Site assessment and proposal design have used to identify residual impact
			Quality	**7**	Scale 0-10	
			Total quantum of impact	16.38	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	16.38	Adjusted hectares	124.1 ha of Banksia woodland TEC within Lot 153, 267 and 268 Queelup Rd	**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**	20 124.1	**Risk of loss (%) without offset**	15%	**Risk of loss (%) with offset**	5%	12.41	100%	12.41	9.78	18.24	111.38%	Yes		
									Future area without offset (adjusted hectares)	105.5	**Future area with offset (adjusted hectares)**	117.9								
					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	100%	1.00	0.99				
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	16.38	18.24	111.38%	**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	Banksia Woodlands of the
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	Clearing of up to 23.4 ha of Bansia woodland TEC/PEC	**Area**	23.4	Hectares	Site assessment and proposal design have used to identify residual impact
			Quality	**7**	Scale 0-10	
			Total quantum of impact	16.38	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	16.38	Adjusted hectares	2.8 ha of Banksia woodland TEC within Lot 29 Queelup Road	**Risk-related time horizon (max. 20 years)**	20	**Start area (hectares)**	2.8	**Risk of loss (%) without offset**	15%	**Risk of loss (%) with offset**	5%	0.28	100%	0.28	0.22	0.39	2.38%	No		
									Future area without offset (adjusted hectares)	2.4	**Future area with offset (adjusted hectares)**	2.7								
					Time until ecological benefit	1	**Start quality (scale of 0-10)**	**7**	**Future quality without offset (scale of 0-10)**	**6**	**Future quality with offset (scale of 0-10)**	**7**	1.00	100%	1.00	0.99				
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	16.38	0.39	2.38%	**No**	$0.00	#DIV/0!	#DIV/0!
					$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	Tuart Woodlands and Forests of the
EPBC Act status	Critically Endangered
Annual probability of extinction Based on IUCN category definitions	**6.8%**

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	Clearing of up to 4.4 ha of Tuart woodland TEC/PEC	**Area**	4.4	Hectares	Site assessment and proposal design have used to identify residual impact
			Quality	**6**	Scale 0-10	
			Total quantum of impact	2.64	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	2.64	Adjusted hectares	19 ha of Tuart woodland TEC within Lot 27 Tredrea Rd	**Risk-related time horizon (max. 20 years)**	20	**Start area (hectares)**	19	**Risk of loss (%) without offset**	15%	**Risk of loss (%) with offset**	5%	1.90	100%	1.90	0.51	1.87	70.79%	No		
									Future area without offset (adjusted hectares)	16.2	**Future area with offset (adjusted hectares)**	18.1								
					Time until ecological benefit	1	**Start quality (scale of 0-10)**	**7**	**Future quality without offset (scale of 0-10)**	**6**	**Future quality with offset (scale of 0-10)**	**7**	1.00	100%	1.00	0.94				
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	2.64	1.87	70.79%	**No**	$0.00	#DIV/0!	#DIV/0!
					$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

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Matter of National Environmental Significance	
Name	Tuart Woodlands and Forests of the
EPBC Act status	Critically Endangered
Annual probability of extinction Based on IUCN category definitions	**6.8%**

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	Clearing of up to 4.4 ha of Tuart woodland TEC/PEC	**Area**	4.4	Hectares	Site assessment and proposal design have used to identify residual impact
			Quality	**6**	Scale 0-10	
			Total quantum of impact	2.64	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	2.64	Adjusted hectares	7.2 ha of re-created Tuart woodland TEC within State Forest No.2 Site 12	**Risk-related time horizon (max. 20 years)**	20	**Start area (hectares)**	7.2	**Risk of loss (%) without offset**	5%	**Risk of loss (%) with offset**	5%	0.00	100%	0.00	0.00	1.42	53.68%	No		
									Future area without offset (adjusted hectares)	6.8	**Future area with offset (adjusted hectares)**	6.8								
					Time until ecological benefit	10	**Start quality (scale of 0-10)**	**3**	**Future quality without offset (scale of 0-10)**	**3**	**Future quality with offset (scale of 0-10)**	**7**	4.00	100%	4.00	2.07				
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	2.64	1.42	53.68%	**No**	$0.00	#DIV/0!	#DIV/0!
					$0.00	**#DIV/0!**	**#DIV/0!**