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Kwinana Freeway Upgrade (Roe Highway to Mortimer Road)

Offset Strategy

Environment Protection and Biodiversity Conservation Act 1999 (EPBC 2025/10266)

D25#708292
May 2026

EXECUTIVE SUMMARY

Main Roads Western Australia (Main Roads) is proposing to widen and upgrade the Kwinana Freeway between Roe Highway and Mortimer Road (the Proposed Action) to improve safety, reduce congestion, enhance user journeys and provide better connection to Perth's southern suburbs. Additional lanes will increase the Freeway's capacity and smart technology will improve safety, smooth traffic flow and enhance freight efficiency.

The purpose of this Offset Strategy is to demonstrate that the significant residual impacts of the Proposed Action on *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) listed species and ecological communities have been adequately compensated for. The Proposed Action (EPBC 2025/10266) is currently being assessed by the Department of Climate Change, Energy, the Environment and Water (DCCEEW).

The significant residual impacts resulting from the Proposed Action include:

- 9.71 ha of Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community (Banksia TEC) – Endangered
- 3.04 ha of Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain Threatened Ecological Community (Tuart TEC) – Critically Endangered
- 21.21 ha of Carnaby's Cockatoo foraging habitat
- 20.17 ha of Forest Red-tailed Black Cockatoo (FRTBC) foraging habitat

Table E1 presents a summary of the proposed offset sites and their contribution to offsetting the significant residual impacts of the Proposed Action on environmental values.

Table E1 Summary of offset package for Kwinana Freeway Upgrade

Offset	Offset Type	Distance from Proposed Action	Offset Area (ha)	Banksia TEC (9.71 ha x Quality 5)		Tuart TEC (3.04 ha x Quality 5)		Carnaby's foraging habitat (21.21 ha x Quality 6)		FRTBC foraging habitat (20.17 ha x Quality 3)	
				ha	%	ha	%	ha	%	ha	%
Jandakot Regional Park	Restoration	4.1 km east	38.60	38.60	100.21			38.60	40.58		
	Revegetation		7.20					7.20	30.28	2.80	28.74
Postans-Thomas Road, Kwinana	Restoration	4 km west	14.00			8.00	56.48	14.00	29.44	14.00	71.85
Lot 1 Tamarisk Drive, Gabbadah	Restoration	100 km north	5.01			5.01	19.66				
Lot 277 Lake Mealup Road North, Birchmont	Revegetation	51 km south south-west	1.60			1.60	25.11				
Total				38.60	100.21	14.61	101.25	59.80	100.30	16.80	100.59

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Document Control

Report Compilation & Review	Name and Position	Reviewed/Approved	Date
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1 Introduction

1.1 Proposed Action Background

Main Roads is proposing to widen and upgrade the Kwinana Freeway between Roe Highway and Mortimer Road (the Proposed Action) to improve safety, reduce congestion, enhance user journeys and provide better connection to Perth's southern suburbs. Additional lanes will increase the Freeway's capacity and smart technology will improve safety, smooth traffic flow and enhance freight efficiency.

The Proposed Action involves:

- Vegetation clearing and earthworks
- Widening of the Kwinana Freeway and ramp upgrades
- Relocation of services and paths
- Construction of noise walls
- Improvements to safety barriers, surfacing and drainage.

The Proposal location and Proposed Action Area (PAA) are shown in Figure 1.

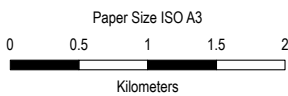
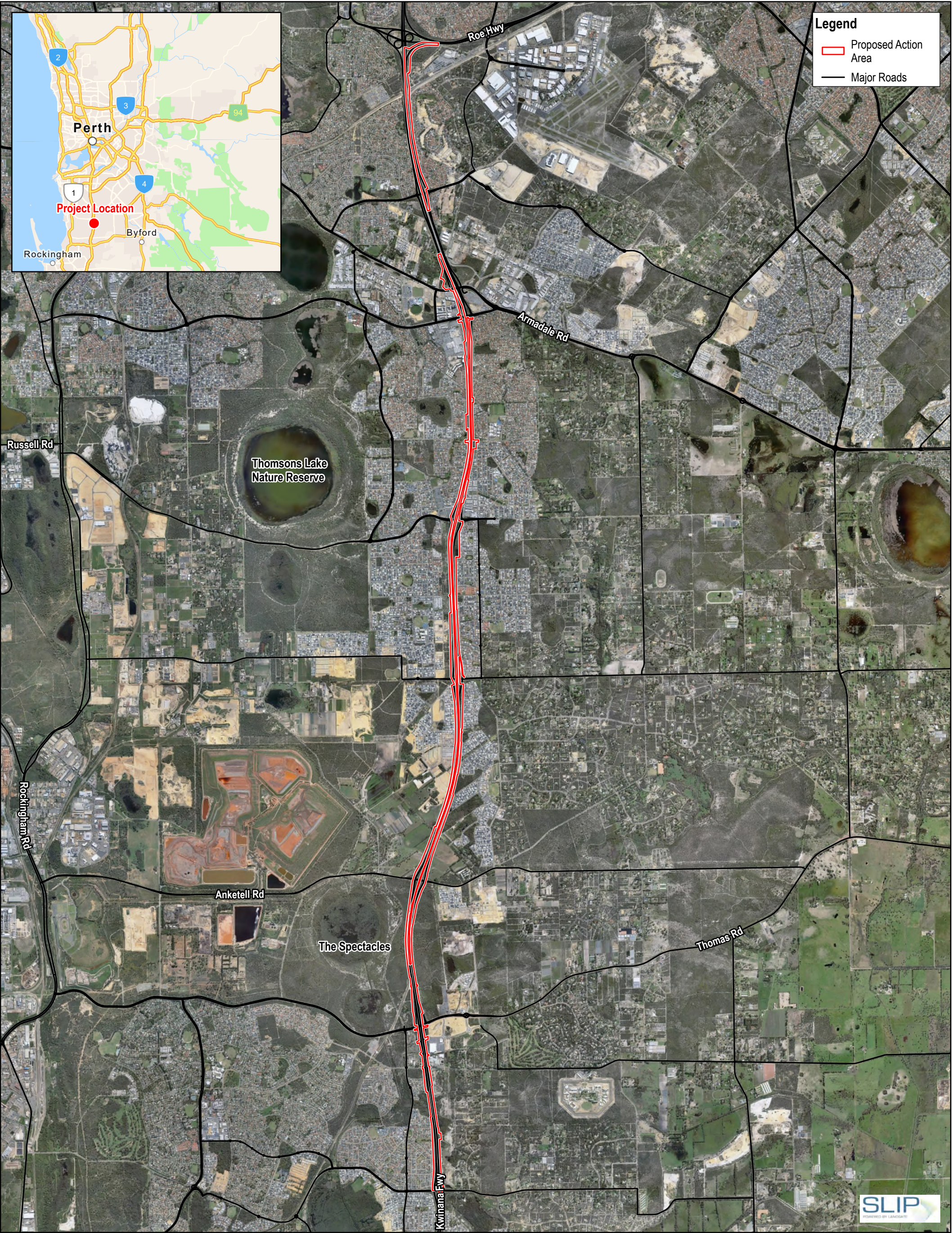
1.2 Environmental Approvals

The Proposed Action was referred to DCCEEW under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) in August 2025. On 5 December 2025, a delegate of the Federal Minister for the Environment determined the Proposed Action was a controlled action, to be assessed by Preliminary Documentation (PD).

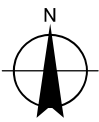
This Offset Strategy has been prepared as part of the additional information requested for the PD.

1.3 Purpose of this Strategy

The purpose of this Offset Strategy is to outline the offsets proposed for the Kwinana Freeway Upgrade (Assessment EPBC 2025/10266), in order to mitigate the significant residual impacts remaining after the application of the mitigation hierarchy. The Offset Strategy has been developed in accordance with the DCCEEW (EPBC Act) Environmental Offsets Policy (DSEWPAC, 2012).



Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 50



Main Roads WA
Kwinana Freeway Upgrade
EPBC Offset Strategy

**Kwinana Freeway Upgrade
Proposal Location**

Project No. 12657323
Revision No. 0
Date 14/05/2026

FIGURE 1

2 Application of the offsets mitigation hierarchy

Main Roads has implemented the offsets mitigation hierarchy in planning and preliminary design of the Proposed Action. The order in which the steps have been applied to Matters of National Environmental Significance (MNES) include:

1. Avoid
2. Mitigate
3. Offset.

2.1 Impact avoidance and minimisation

The Proposed Action is being designed to avoid impacts on MNES where possible. Measures considered and incorporated in the Proposed Action planning include:

- The PAA avoids additional bisection of patches of Threatened Ecological Communities (TECs)
- Infrastructure associated with the Proposed Action will be contained within the PAA, including road pavements, footpaths, noise walls, stormwater drainage and fencing, reducing impacts to MNES outside the PAA
- Laydowns, stockpiles and access tracks will be constructed within existing cleared areas or within the permanent footprint of the works. No TECs or Black Cockatoo habitat will be cleared for temporary works outside the permanent footprint
- The detailed design will seek to reduce earthworks (fill height/cut depth) which will reduce the PAA and potentially reduce clearing impacts to TECs and Black Cockatoo habitat
- The use of barriers will be considered during the detailed design phase to protect high-quality vegetation, which will reduce clearing requirements and potential MNES impacts. Use of steepened batters and retaining walls will be considered as part of detailed design
- Clearing and MNES impacts will be minimised during the detailed design process, by implementing measures such as the use of kerbing where appropriate to alleviate the need for table drains that require a larger clearing footprint
- Drainage design will maintain existing flow lines/watercourses to avoid impacting existing vegetation and MNES adjacent to the PAA.
- The detailed design of noise walls will seek to reduce impacts to Black Cockatoos by incorporating elements to reduce bird strike such as visual markers.

Further opportunities to reduce the impacts to TECs and other MNES values may be possible during detailed design and construction works for the Proposed Action, where construction methodology allows.

2.2 Impact mitigation and management

Throughout the design and construction phases of the Proposed Action, potential impacts on MNES will be managed via management plans. Mitigation and management measures relevant to MNES will be documented in one or more Proposed Action specific management plans, including a Construction Environmental Management Plan (CEMP). A CEMP has been prepared as part of the

PD to support assessment of the Proposed Action.

3 Significant Residual Impacts

Table 1 provides a summary of the significant residual impacts on MNES for the Proposed Action that Main Roads is proposing to offset. For the purposes of the EPBC Act offsets calculators, the weighted average habitat quality scores for MNES impacted by the Proposed Action have been rounded to the nearest whole number.

Table 1 Summary of Significant Residual Impacts

MNES	Conservation Significance of Environmental Value	Significant Residual Impact	Habitat Quality Score (weighted average/10)	Habitat Quality Score for EPBC Offset Calculator
Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community (Banksia TEC)	Endangered	9.71 ha	4.53	5
Tuart (<i>Eucalyptus gomphocephala</i>) Woodlands and Forests of the Swan Coastal Plain Threatened Ecological Community (Tuart TEC)	Critically Endangered	3.04 ha	4.51	5
Carnaby's Cockatoo (Carnaby's) foraging habitat	Threatened Species – Endangered	21.21 ha	5.94	6
Forest Red-tailed Black-Cockatoo (FRTBC) foraging habitat	Threatened Species – Vulnerable	20.17 ha	3.26	3

3.1 Banksia Woodlands of the Swan Coastal Plain TEC

The Proposed Action will impact up to 9.71 ha of the Banksia Woodlands of the Swan Coastal Plain TEC (Banksia TEC), listed as Endangered under the EPBC Act.

The Banksia TEC typically occurs on well drained, low nutrient soils on sandplain landforms, particularly the deep Bassendean and Spearwood sands and occasionally on Quindalup sands (DoEE, 2016). The Banksia TEC is described in the EPBC Act Approved Conservation Advice (DoEE, 2016) as:

A Woodland associated with the Swan Coastal Plain of southwest Western Australia. A key diagnostic feature is a prominent tree layer of Banksia, with scattered eucalypts and other tree species often present among or emerging above the Banksia canopy. The understorey is a species rich mix of sclerophyllous shrubs, graminoids and forbs. The ecological community is characterised by a high endemism and considerable localised variation in species composition across its range.

The Banksia TEC is restricted to the Perth (SWA02) and Dandaragan (SWA01) subregions of the Swan Coastal Plain Interim Biogeographic Regionalisation for Australia (IBRA) bioregion (DoEE, 2016). The range of the Banksia TEC extends from around Jurien Bay in the north, to Dunsborough in the south, and extending northwest on the Whicher and Darling escarpments (which lie within the JFA01 and JFA02 subregions of the Jarrah Forests IBRA bioregion).

3.2 Tuart Woodlands and Forests of the Swan Coastal Plain TEC

The Proposed Action will impact up to 3.04 ha of the Tuart Woodlands and Forests of the Swan Coastal Plain TEC (Tuart TEC), listed as Critically Endangered under the EPBC Act.

The Tuart TEC typically occurs as woodland, forest or other structural forms associated with soils of the Swan Coastal Plain with a prominent tree layer of *Eucalyptus gomphocephala* (Tuart) as the defining feature (DoEE, 2019). The distribution of the ecological community is limited by the distribution of Tuart, although Tuart trees do also occur as a component of other vegetation communities, including the nationally listed Banksia TEC (DoEE, 2016).

The Tuart TEC occurs within the Swan Coastal Plain IBRA region within the Perth subregion, from Jurien, 200 km north of Perth, to Sabina River near Busselton, 225 km south of Perth (DoEE, 2019).

3.3 Carnaby's Cockatoo (*Zanda latirostris*)

The Proposed Action will impact up to 21.21 ha of foraging habitat for the Carnaby's Cockatoo (Carnaby's) (*Zanda latirostris*), listed as Endangered under the EPBC Act.

Carnaby's are long-lived, slow-breeding birds, endemic to south-western Australia. Carnaby's are post-nuptial nomads as they generally migrate into coastal areas post-breeding season to forage (Johnstone and Kirkby, 2011).

During the breeding season, Carnaby's forage in native vegetation that surrounds the woodlands used for breeding. Breeding broadly occurs within Eucalypt woodland in the wheatbelt. Recent breeding activity records indicate the species has expanded its breeding range west and southward into the Jarrah-Marri forests of the Darling Scarp and into the Tuart forests of the Swan Coastal Plain (Johnstone et al., 2006), including the Yanchep area and near Bunbury (Johnstone et al., 2006, Lee et al., 2013).

Common Carnaby's foraging habitat in the Perth Metropolitan Area includes:

- Banksia woodlands or proteaceous understorey of eucalypt woodlands
- Marri and Jarrah woodlands and forest
- Pine plantations
- Planted native and non-native species around the Perth Metropolitan Area.

3.4 Forest Red-tailed Black-Cockatoo (*Calyptorhynchus banksii naso*)

The Proposed Action will impact up to 20.17 ha of foraging habitat for the Forest Red-tailed Black-Cockatoo (FRTBC) (*Calyptorhynchus banksii naso*), listed as Vulnerable under the EPBC Act.

FRTBC are endemic to the humid and sub-humid zones of the south-west of Western Australia (Mawson and Johnstone 1997), generally inhabiting the dense Jarrah, Marri and Karri forests receiving more than 600 mm average rainfall annually.

FRTBC distribution is from north of Perth to Augusta and Albany and to Mount Helena, Christmas Tree Well, North Bannister, Mt Saddleback, Rocky Gully and the upper King River in the east. Family groups and small flocks are now also observed on the Swan Coastal Plain throughout the year (Garnett et al. 2011).

Approximately 90% of the FRTBC diet is made up of Marri seeds and Jarrah fruit, but they will also feed on other species on the Swan Coastal Plain including the following:

- Blackbutt (*Eucalyptus patens*)
- Snottygobble (*Persoonia longifolia*).

4 THREATENING PROCESSES

4.1 Banksia TEC

The key, ongoing threat to the Banksia TEC is clearing and fragmentation, particularly in the urban centres of Perth, Bunbury and Busselton. Associated with these urban areas are related threatening processes for Banksia TEC including:

- The general degradation of the vegetation by disturbance through rubbish dumping, uncontrolled vehicle access and wildflower and seed harvesting
- Dieback diseases (e.g. *Phytophthora*)
- Invasive species/weeds
- Altered fire regimes
- Water table drawdown
- Climate change
- Kangaroo overgrazing
- Decline in pollinating and seed dispersing fauna.

All these threats combined are likely to lead to the loss of species and ecosystem function (DoEE, 2016).

4.2 Tuart TEC

The Tuart TEC occurs within a landscape that has mixed uses, including agriculture, industrial use and housing. Many of the current and future threats to the Tuart TEC are associated with decreased condition, vegetation clearing and fragmentation from prolonged grazing, and clearing for agriculture, urban development and associated infrastructure (DoEE, 2019).

Key threats to the community in urban areas (DoEE, 2019) include:

- Clearing and fragmentation of vegetation associated with urban development and infrastructure
- Invasive flora and fauna including weeds, invasive vertebrate and invertebrate animals
- Tree dieback and pathogens
- Altered fire regimes
- Climate change
- Water extraction and other hydrological change
- Loss of fauna supporting key ecological processes.

4.3 Carnaby's Cockatoo (*Zanda latirostris*)

Carnaby's Cockatoo is primarily threatened by the loss and fragmentation of breeding and foraging habitat as a result of vegetation clearing (EPA, 2019). Other key threats to Carnaby's Cockatoo include habitat loss, fragmentation and degradation and mortality of individuals from declining vegetation health (such as *Phytophthora* dieback), aging hollows, nest competition, fire, vehicle

strike, illegal shooting and taking, climate change and disease (DPaW, 2013; EPA, 2019).

4.4 Forest Red-tailed Black-Cockatoo (*Calyptorhynchus banksii naso*)

Key threats to FRTBC include killing by illegal shooting, feral Honeybees *Apis mellifera*, habitat loss, nest hollow shortage and competition for available nest hollows. Climate change is an additional threat that is likely to exacerbate the threatening processes (DEC, 2008; DEWHA, 2009).

5 Rationale for Offset Strategy

5.1 Relevant Policies and Guidelines

This Offset Strategy has used the following policy, guidelines and conservation advice to identify suitable offset sites to counterbalance the significant residual impacts for the Proposed Action:

- EPBC Act Environmental Offsets Policy (DSEWPaC, 2012a)
- Offsets Assessment Guide (DSEWPaC, 2012b)
- How to use the Offsets assessment guide (DSEWPaC, 2012c)
- Approved Conservation Advice for the Banksia Woodlands of the Swan Coastal Plain ecological community (DoEE, 2016)
- Approved Conservation Advice (incorporating Listing Advice) for the Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain Ecological Community (DoEE, 2019)
- Carnaby's Cockatoo (*Calyptorhynchus latirostris*) Recovery Plan (DPaW, 2013)
- Approved Conservation Advice for *Calyptorhynchus banksii naso* (Forest Red-tailed Black Cockatoo) (DEWHA 2009)
- Forest Red-tailed Black Cockatoo *Calyptorhynchus banksii naso* Recovery Plan (DEC, 2008).

DCCEEW has defined eight offset policy principles that outline the criteria of an offset site. Section 15 provides an assessment of how the offset package complies with these principles.

5.2 Overview

Main Roads has developed this offset package to counterbalance the significant residual impacts of the Proposed Action to Banksia TEC, Tuart TEC, as well as foraging habitat for both Carnaby's and FRTBC. The offset package comprises of restoration and revegetation to increase the extent and quality of habitat within the respective offset sites.

Four offset sites are proposed by Main Roads, with two sites being located within 5 km of the Proposed Action. Three of the sites are to be managed by the Department of Biodiversity, Conservation and Attractions (DBCA), with the other site managed by the City of Kwinana. Main Roads has engaged with both of these parties to determine preferred options and management actions to be undertaken in their respective proposed offset areas. Direct on-ground actions and management of the proposed offset sites for conservation purposes long-term will adequately offset the significant residual impacts to Banksia TEC, Tuart TEC and Black Cockatoo foraging habitat by the Proposed Action.

5.3 Scale of Offsets to Counterbalance Significant Impacts

The EPBC Act Offset Calculator Tool was used to evaluate how suitable the identified offset sites are to counterbalance potential significant residual impacts. The offsets package summarised in section 6 and presented in detail in sections 7 to 10, demonstrates that significant residual impacts can be appropriately counterbalanced. The offsets selected counterbalance at least 100% of the residual impact to Banksia TEC, Tuart TEC, as well as foraging habitat for both Carnaby's and

FRTBC.

5.4 Ecological Community Habitat Quality Scoring of the impact and offset sites

Habitat quality scoring for Banksia TEC and Tuart TEC for the impact and offsets site is based on the Habitat Quality Scoring (HQS) tools developed by DCCEEW. An overview on the scoring tools and their application to Banksia TEC and Tuart TEC within the PAA (the impact site) is provided in GHD (2026). Interim HQS for Banksia TEC and Tuart TEC have been calculated for all offsets sites based on preliminary survey data. Interim HQS scores are provided in Appendix 1.

5.5 Black Cockatoo Habitat Quality Scoring

Black cockatoo foraging habitat quality for both the impact and offset sites were rated using the Bamford Consulting Ecologists (BCE) foraging habitat scoring system (BCE, 2020). The BCE system has three components: site condition, site context and species density (stocking rate), which are used together to calculate an overall score out of 10, and a fourth value moderation component. The purpose of the moderation component is to prevent vegetation of little or no foraging value, receiving an excessive score out of ten. The calculated numerical foraging value score reflects the significance of vegetation as foraging habitat for Black Cockatoos (BCE, 2020).

For the site condition component, vegetation composition, condition and structure scoring is assigned a value from 0 to 6 (Table 2). Vegetation assessed as 1 or below are not considered to be habitats that provide foraging habitat, with the BCE system describing a score of 1 as a “Negligible to Low”, with “Low” being 2 and above, and scores of 0 representing “Nil” foraging habitat value.

In order to obtain a single habitat quality value for the offset calculation, a weighted average value was used. Under this approach, the area present of each foraging habitat is multiplied by the quality score, and these are then summed and divided by the total area of the impact to obtain the weighted average. This was applied to habitat with a site condition score of 2 or greater.

Table 2 Black cockatoo foraging habitat quality score (site condition component) using BCE system

Foraging value	Projected foliage cover (Carnaby's)	Projected foliage cover (FRTBC)	Impact/Offset Quality Score
High	>60%	>60%	6
Moderate to High	40-60%	40-60%	5
Moderate	20-40%	20-40%	4
Low to Moderate	10-20%	5-20%	3
Low	<10%	1-5%	2
Negligible to Low	<2%	<1%	1
Nil	0%	0%	0

5.6 Scores Applied in the Offset Calculators

5.6.1 Weighted averages

In order to obtain a single quality value per site, the vegetation condition or habitat quality value was averaged across the impact/offset site, using a weighted average. To arrive at a weighted average, the area of each vegetation condition/habitat quality is multiplied by the quality score,

and these are then summed and divided by the total area of the impact/offset site. The outcome of a weighted average is exactly the same as that obtained by running separate calculators for each area of vegetation condition/habitat quality present at each score.

5.6.2 'Like for Like'

For all MNES values impacted by the Proposed Action, Main Roads has ensured that the highest value impacted will be achieved or exceeded in the proposed offset sites to ensure a 'Like for Like' or better outcome. Further discussion on 'Like for Like' is provided in section 15.1.

5.6.3 Banksia TEC

The Proposed Action will clear up to 9.71 ha of Banksia TEC vegetation ranging from Very Good to Degraded condition (Biota 2025, GHD 2025a, GHD 2025b). The weighted average habitat quality score for Banksia TEC within the PAA is calculated to be 4.57 (GHD, 2026). For the purposes of the EPBC Act offsets calculators, the habitat quality score has been rounded to the nearest whole number 5.

5.6.4 Tuart TEC

The Proposed Action will clear up to 3.04 ha of Tuart TEC vegetation ranging from poor to high condition (GHD 2025a, GHD 2025b). The weighted average habitat quality score for Tuart TEC within the PAA is calculated to be 4.53 (GHD, 2026). For the purposes of the EPBC Act offsets calculators, the habitat quality score has been rounded to the nearest whole number 5.

5.6.5 Black Cockatoos

The Proposal will clear up to 21.21 ha of Carnaby's foraging habitat with quality scores of 5, 6 and 7 (Biota, 2025; GHD, 2025a, GHD 2025d) (Table 3). The weighted average foraging habitat quality score for the PAA is 5.94 as presented in Table 4. For the purposes of the EPBC Act offsets calculators, the habitat quality score has been rounded to the nearest whole number 6.

The Proposal will clear up to 20.17 ha of FRTBC foraging habitat with quality scores of 2, 4 and 7 (Biota, 2025; GHD, 2025a, GHD 2025d) (Table 5). The weighted average foraging habitat quality score for the PAA is 3.32 as presented in Table 6. For the purposes of the EPBC Act offsets calculators, the habitat quality score has been rounded to the nearest whole number 3.

It is to be noted that under the BCE scoring methodology, all scores of 2 or below are not considered to be habitats that provide foraging habitat.

Table 3 Carnaby's foraging habitat quality scores using the BCE system for the impact site

Fauna Habitat Type	Area (ha)	Condition (out of 6)	Context (out of 3)	Density (out of 1)	Foraging Score (out of 10)
Banksia woodland	10.17	4	1	1	6
Eucalyptus woodland over Banksia	9.52	4	1	1	6
Marri woodland	1.37	3	1	1	5
Jarrah/Banksia Woodland	0.15	5	1	1	7

Table 4 Carnaby's foraging habitat weighted average score for the impact site

Fauna Habitat Type	Area (ha)	Foraging Score	Weighted Score
Banksia woodland	10.17	6	61.03
Eucalyptus woodland over Banksia	9.52	6	57.12
Marri woodland	1.37	5	6.84
Jarra/Banksia Woodland	0.15	7	1.06
Weighted average score			5.94

Table 5 FRTBC foraging habitat quality scores using the BCE system for the impact site

Fauna Habitat Type	Area (ha)	Condition (out of 6)	Context (out of 3)	Density (out of 1)	Foraging Score (out of 10)
Banksia woodland	9.13	2	0	0	2
Eucalyptus woodland over Banksia	9.52	3	1	0	4
Marri woodland	1.37	5	1	1	7
Jarra/Banksia Woodland	0.15	5	1	1	7

Table 6 FRTBC foraging habitat weighted average score for the impact site

Fauna Habitat Type	Area (ha)	Foraging Score	Weighted Score
Banksia woodland	9.13	2	18.27
Eucalyptus woodland over Banksia	9.52	4	38.08
Marri woodland	1.37	7	9.57
Jarra/Banksia Woodland	0.15	7	1.06
Weighted average score			3.32

5.7 Development of milestone targets and completion criteria

Milestone targets provide an early warning system to determine if restoration/revegetation is on track or if corrective action (adaptive management) is needed. These are short-term, measurable targets or milestones used to assess the trajectory of ecological restoration, often updated annually based on monitoring data. Final criteria are designed to confirm achievement of stated targets. Indicative milestone targets and final completion criteria have been developed for each MNES at all offset sites and are presented in sections 7.5, 8.5, 9.5 and 10.5.

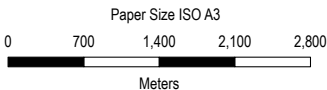
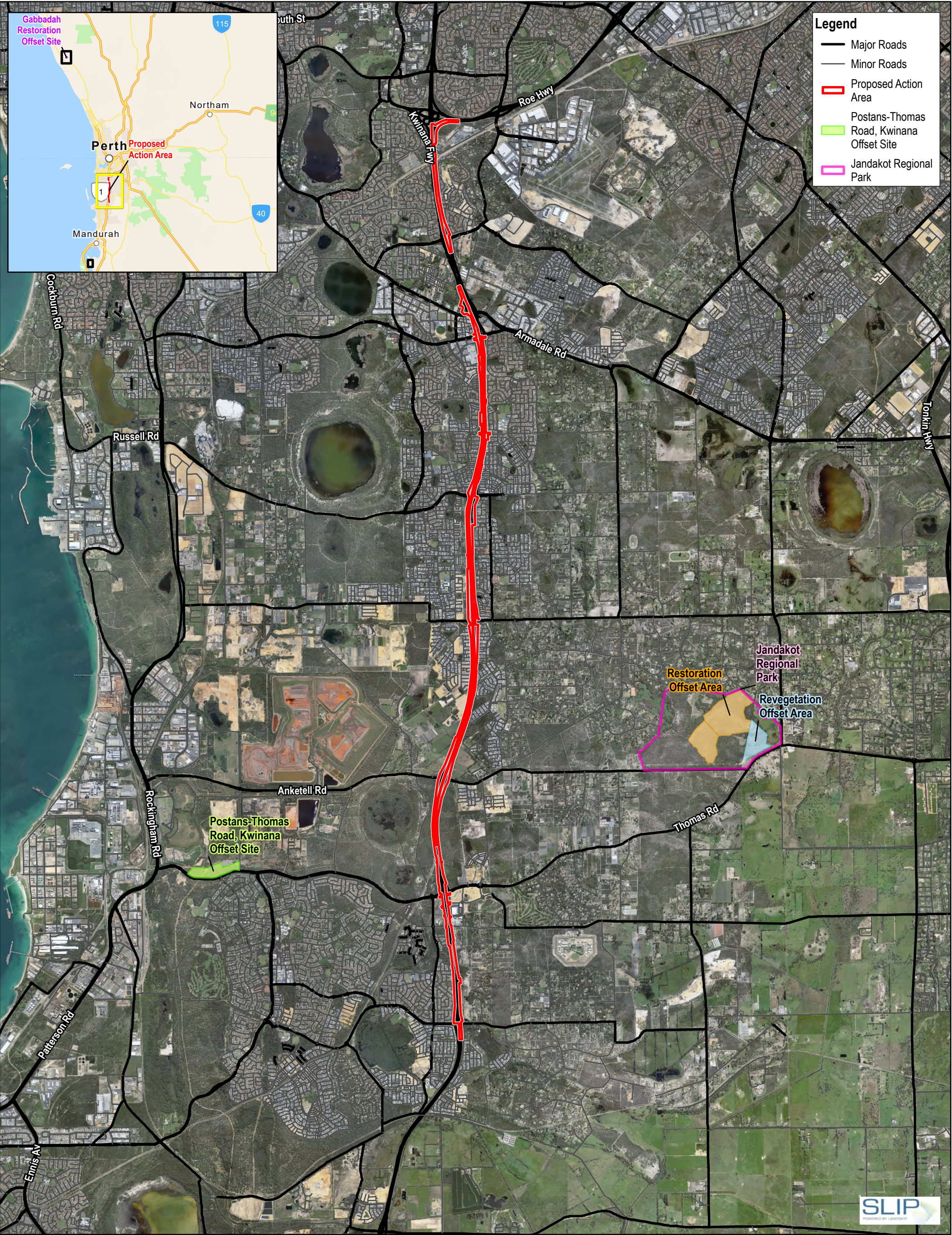
6 Summary of Offset Package

Four offset sites are proposed for Proposed Action offset package, and these are summarised below in Table 7. This Offset Strategy has determined the starting and predicted future quality score for each of these offsets for each environmental value, through referencing surveys to quantify the residual impacts and offset gains, and ongoing measurable management.

The location of each offset site in relation to the Proposed Action is shown in Figure 2. Each offset site is described in more detail in sections 7 to 10.

Table 7 Summary of Offset Package Kwinana Freeway Upgrade

Offset	Offset Type	Distance from Proposed Action	Offset Area (ha)	Banksia TEC (9.71ha x Quality 5)		Tuart TEC (3.04 ha x Quality 5)		Carnaby's foraging habitat (21.21 ha x Quality 6)		FRTBC foraging habitat (20.17 ha x Quality 3)	
				ha	%	ha	%	ha	%	ha	%
Jandakot Regional Park	Restoration	4.1 km east	38.60	38.60	100.21			38.60	40.58		
	Revegetation		7.20					7.20	30.28	2.80	28.74
Postans-Thomas Road, Kwinana	Restoration	4 km west	14.00			8.00	56.48	14.00	29.44	14.00	71.85
Lot 1 Tamarisk Drive, Gabbadah	Restoration	100 km north	5.01			5.01	19.66				
Lot 277 Lake Mealup Road North, Birchmont	Revegetation	51 km south south-west	1.60			1.60	25.11				
Total				38.60	100.21	14.61	101.25	59.80	100.30	16.80	100.59



Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 50



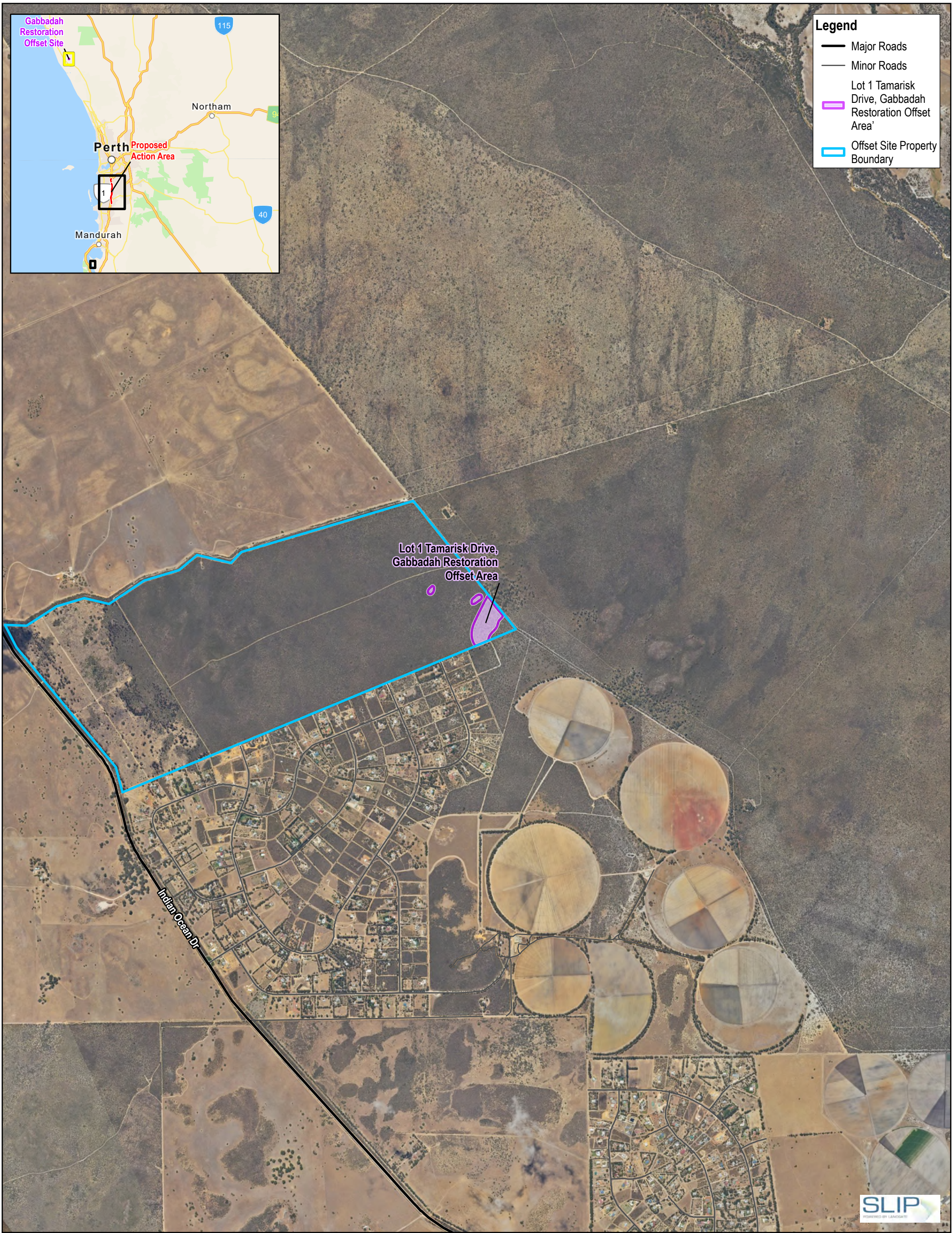
Main Roads WA
Kwinana Freeway Upgrade
EPBC Offset Strategy

**Location of Offset Properties in
Relation to the Proposed Action**

Project No. 12657323
Revision No. 1
Date 14/05/2026

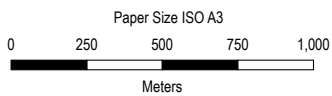
Page 1 of 3

FIGURE 2



Legend

- Major Roads
- Minor Roads
- Lot 1 Tamarisk Drive, Gabbadah Restoration Offset Area
- Offset Site Property Boundary



Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 50



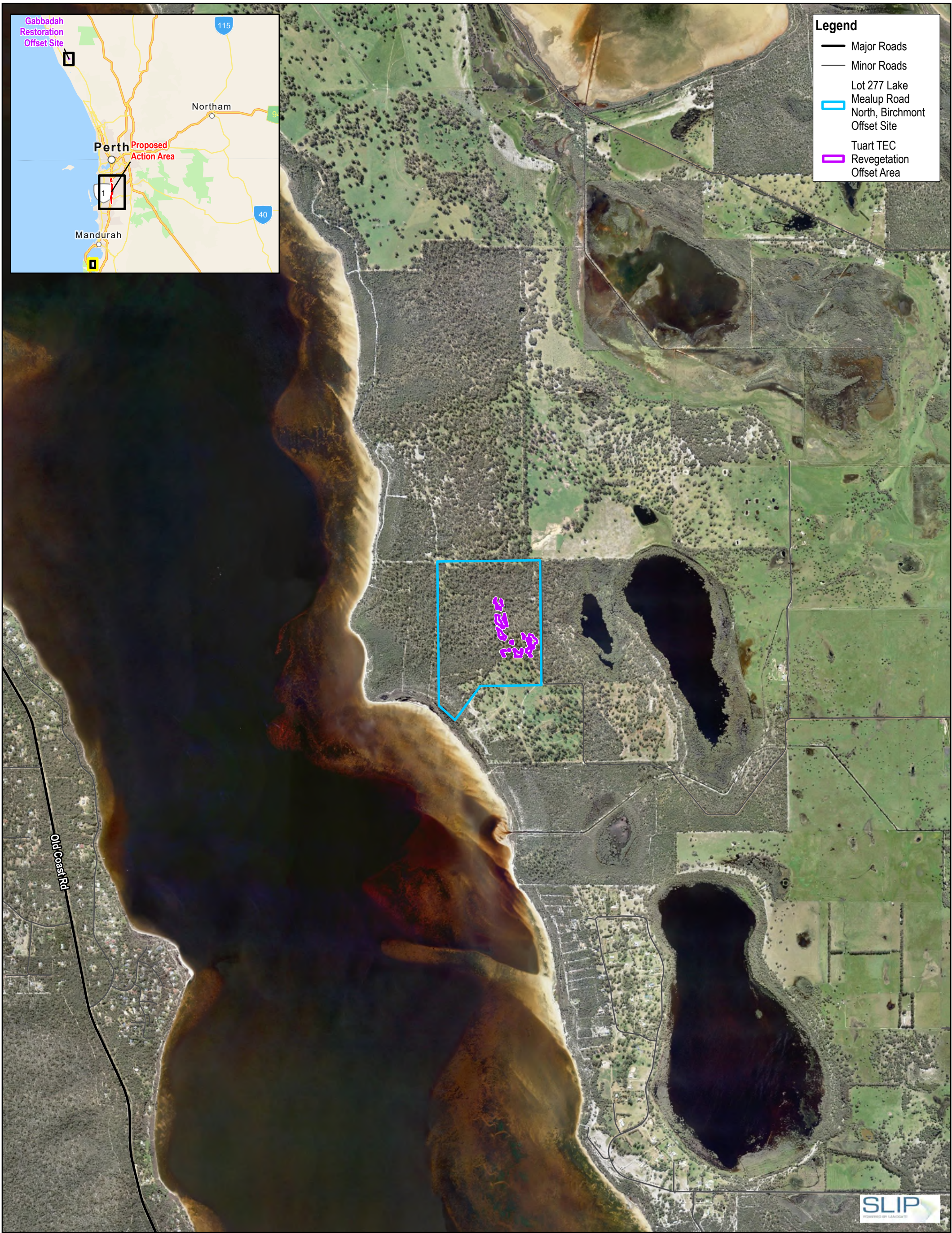
Main Roads WA
Kwinana Freeway Upgrade
EPBC Offset Strategy

**Location of Offset Properties in
Relation to the Proposed Action**

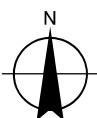
Project No. 12657323
Revision No. 1
Date 14/05/2026

Page 2 of 3

FIGURE 2



Paper Size ISO A3
0 250 500 750 1,000
Meters
Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 50



Main Roads WA
Kwinana Freeway Upgrade
EPBC Offset Strategy

Location of Offset Properties in
Relation to the Proposed Action

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Date 14/05/2026

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FIGURE 2

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Data source: Main Roads WA, Landgate. Created by: kdzon

7 Jandakot Regional Park

7.1 Site Description

Jandakot Regional Park comprises approximately 2,362 ha of land and is a mosaic stretching from the southern end of Jandakot Airport to south of Casuarina Prison (Conservation Commission, 2010). A 38.6 ha portion of Jandakot Regional Park (an area within Reserve numbers 4015/619 and 1892/770, which totals approximately 366 ha) is proposed as a restoration offset for Banksia TEC, and Carnaby's foraging habitat and 7.2 ha portion is being revegetated as an offset for Carnaby's and FRTBC foraging habitat (Figure 3). The Jandakot Regional Park offset site is situated within the Swan Coastal Plain IBRA Bioregion and is approximately 4.1 km east of the Proposed Action location. It is part of Bush Forever Site no. 347 (Wandi Nature Reserve and adjacent Bushland, Wandi/Oakford).

One pre-European vegetation association (association 1001) is mapped within the offset site and is described as Medium very sparse woodland; Jarrah, with low woodland; Banksia and Casuarina (Beard 1990). This vegetation association has approximately 20.86% of its pre-European extent remaining on the Swan Coastal Plain (GoWA 2025).

One vegetation complex is mapped within the offset site, the Bassendean Complex – Central and South, which is described as woodland of *Eucalyptus marginata* (Jarrah) - *Allocasuarina fraseriana* (Sheoak) - Banksia species to low woodland of Melaleuca species, and sedgelands on the moister sites (Heddl et al 1980). This area includes the transition of *Eucalyptus marginata* (Jarrah) to *Eucalyptus tottiana* (Pricklybark). This complex has approximately 23.80% of its pre-European extent remaining on the Swan Coastal Plain (GoWA 2025).

The offset site is within the known distribution range for Carnaby's and FRTBC (DAWE 2022).

The Jandakot Regional Park offset site was inspected by a Main Roads botanist, along with DBCA officers in June 2025. The presence of Banksia vegetation was observed on average to be in Good-Very Good condition at the time of inspection. A biological survey of the offset site was undertaken in spring 2025. The draft survey report is being finalised in consultation with DBCA and can be provided to DCCEEW once finalised. The report confirms the presence of Banksia TEC within the proposed offset area. The interim HQS for Banksia TEC included in Appendix 1 will be updated and the offset quantum adjusted accordingly should the final report conclude vegetation condition differs from Good-Very Good condition.

7.2 Suitability of Site as an Offset

The Jandakot Regional Park offset site is located on the Swan Coastal Plain within 5 km of the Proposed Action. The offset site contains vegetation representative of Banksia TEC and foraging habitat for Carnaby's and has like-for-like qualities for these values compared within the PAA. The site is suitable for revegetation with species that will provide primary foraging habitat for both Carnaby's and FRTBC which will counterbalance the significant residual impacts in combination with habitat restoration at other offset sites.

Preliminary survey data indicates that there is approximately 38.6 ha of Banksia TEC in predominately Good-Very good condition within the proposed offset site. Application of the Banksia TEC HQS tool indicates Banksia TEC patch quality ranges from degraded to excellent with an overall offset site HQS of 6.2 (Appendix 1). The offset site contains foraging habitat for

Carnaby's, with foraging habitat quality calculated as 6 using the BCE system (BCE, 2020). The offset site is located within the modelled distribution of both Carnaby's and FRTBC and survey data shows recent use of the offset site by Carnaby's (foraging evidence) (Ecoscape Australia Pty Ltd (2026).

The future quality of Banksia TEC and Carnaby's foraging habitat within the restoration offset area will meet or be higher than the quality score for each of these values at the impact site (see section 15.1). The habitat quality within the offset site is anticipated to decline without the offset due to existing threats such as weed invasion, dieback infestation, pest animal invasion and unauthorised access. The habitat quality within the offset area can be improved (restored) and maintained through management actions such as weed, dieback and pest animal control, as well as access management. With these management actions in place, it is expected that the vegetation condition and habitat quality will improve by at least a score of one for Banksia TEC and Carnaby's, respectively. Existing degraded and cleared area(s) with the offset site will be revegetated to establish high quality foraging habitat for FRTBC and Carnaby's.

The Jandakot Regional Park offset site is considered a suitable offset site due to the clear environmental benefits of this offset to the protected matters, it's like-for-like qualities compared with the PAA and its close proximity to the Proposed Action.

7.3 Offset Security

The Jandakot Regional Park offset site lies within land currently managed by DBCA. Main Roads will liaise with DBCA to develop a Memorandum of Understanding (MoU) or similar, outlining arrangements for funding and management of the offset site for 20 years after approval of this Proposed Action. After this 20-year timeframe, management will revert back to DBCA. The MoU will be developed within 18 months of the Proposed Action being approved.

The offset site will be added to the DWER offsets register once it has been approved as an offset site.

7.4 MNES Values

The existing environmental values within the Jandakot Regional Park offset site pertaining to this Offset Strategy are:

- 38.6 ha of Banksia TEC with a HQS of 6
- 38.6 ha of Carnaby's foraging habitat with a quality score of 6 using the BCE system.

7.5 Environmental outcomes and targets

Through implementation of proposed management actions, the expected environmental outcomes and targets over the 20-year timeframe for each MNES are:

- Outcome: Improved condition in Banksia TEC.
- Target: Improving the condition within 38.6 ha of Banksia TEC to increase the HQS of 6 to a HQS of 7 and preventing it from declining from a HQS of 6 to a HQS of 5 using the DCCEEW HQS for Banksia TEC.
- Outcome: Improved foraging habitat quality for Carnaby's.
- Target: Improving the foraging habitat quality for 38.6 ha of Carnaby's foraging habitat by increasing the projected foliage cover from 20-40% (Moderate) to 40-60% (Moderate to

High) to achieve an overall quality score of 7 using the BCE system.

- Outcome: Creation of foraging habitat for Carnaby's and FRTBC.
- Target: Revegetation of 7.2 ha of cleared/degraded land to establish Carnaby's foraging habitat with projected foliage cover of >60% (High) to achieve an overall quality score of 8 using the BCE system.
- Target: Revegetation of 2.8 ha of cleared/degraded land to establish FRTBC foraging habitat with projected foliage cover of >60% (High) to achieve an overall quality score of 8 using the BCE system.

7.6 Management actions, methods and timing

The proposed performance targets, management actions and timing for the Jandakot Regional Park offset site are outlined in Table 8. The indicative timing will be refined as the 'Jandakot Regional Park offset management plan' is developed.

Table 8 Summary of proposed performance targets, management actions and timing for Jandakot Regional Park Offset Site

Performance target	Management actions	Indicative Timing	Reporting
Formalised land management agreement for Jandakot Regional Park offset site	Prepare MoU (or similar) agreement between Main Roads and DBCA which outlines governance framework, land management responsibilities, funding commitments, and required conservation actions.	Within 18 months of Proposed Action approval.	MoU (or similar) agreement in place
Completion of an offset site management plan for Jandakot Regional Park offset site.	Develop offset site management plan in consultation with DBCA which includes: • Environmental values present within the offset site based on desktop sources and field surveys/data • Offset site management actions and performance targets • Monitoring including methodology, frequency and duration • Milestone and completion criteria • Triggers and corrective actions • Roles and responsibilities • Reporting, auditing and review requirements.	Offset management plan prepared within 18 months of Proposed Action approval.	Jandakot Regional Park offset management plan (example in Appendix 2)
Measured decline in key threatening processes to Banksia TEC and Carnaby's.	Implement the Jandakot Regional Park offset management plan and on-ground management/threat abatement actions which may include weed control, dieback management, feral/pest animal control and access control to improve MNES values within the offset site.	Ongoing for duration of offset term (at least 20 years).	Annual compliance assessment report
Improvement in Banksia TEC condition from baseline condition.	Undertake vegetation condition monitoring using quadrats (monitoring criteria and measures as outlined in the Jandakot Regional Park offset management plan)	Every five years for duration of offset term (up to 20)	Annual compliance assessment report

Performance target	Management actions	Indicative Timing	Reporting
	(Example monitoring quadrats criteria in Appendix 3).	years), with Year 1 as baseline.	
Improvement in Carnaby's foraging habitat quality from baseline quality score	Undertake habitat quality monitoring using BCE system (monitoring criteria and measures as outlined in the Jandakot Regional Park offset management plan) (Example in Appendix 3)	Every five years for duration of offset term (up to 20 years), with Year 1 as baseline.	Annual compliance assessment report
Completion of a revegetation plan for Jandakot Regional Park offset site.	Develop revegetation plan in consultation with DBCA for Jandakot Regional Park revegetation areas which includes: • Revegetation strategy • Species selection and provenance • Site preparation • Revegetation methods • Monitoring including methodology, frequency and duration • Milestone and completion criteria • Triggers and corrective actions • Roles and responsibilities • Reporting, auditing and review requirements.	Revegetation plan prepared within 18 months of Proposed Action approval.	Jandakot Regional Park revegetation plan
Creation of Carnaby's and FRTBC foraging habitat.	Implement the Jandakot Regional Park revegetation plan	Ongoing for duration of offset term (at least 20 years).	Annual compliance assessment report
Improvement in Carnaby's and FRTBC foraging habitat quality from baseline quality score.	Undertake habitat quality monitoring using BCE system (monitoring criteria and measures as outlined in the Jandakot Regional Park revegetation plan)	Every five years for duration of offset term (up to 20 years), with Year 1 as baseline	Annual compliance assessment report

7.7 Indicative milestone targets and completion criteria

Indicative completion criteria have been developed for Banksia TEC, Carnaby's and FRTBC at the Jandakot Regional Park offset site. Over the proposed 20-year management timeframe, a set number of milestone targets have been proposed for each MNES to track the trajectory of vegetation and habitat quality improvement towards the proposed final completion criteria (Table 9). The timing for these milestone targets corresponds with the 5 yearly vegetation condition and habitat quality monitoring and assessment against relevant HQS tools.

Table 9 Indicative milestone targets and final completion criteria for restoration areas in Jandakot Regional Park offset site

Aspect	Milestone Target			Final completion criteria
	Year 5	Year 10	Year 15	
Banksia TEC (restoration)				
Vegetation condition rating (EPA, 2016)	Good to Very Good	Good to Very Good	Very Good	Very Good
Upper strata taxa	Dominant Banksia species same as baseline. Banksia % cover ≥ baseline.	Dominant Banksia species same as baseline. Banksia % cover ≥ Year 5.	Dominant Banksia species same as baseline. Banksia % cover ≥ Year 10.	Dominant Banksia species same as baseline. Banksia % cover ≥ Year 15.
Native species richness (count)	Average native species richness is ≥ baseline.	Average native species richness is ≥ Year 5.	Average native species richness is ≥ Year 10.	Average native species richness is ≥ Year 15.
Weed cover	Weeds not impacting achievement of environmental outcomes and targets as stated in Section 7.5	Weeds not impacting achievement of environmental outcomes and targets as stated in Section 7.5	Weeds not impacting achievement of environmental outcomes and targets as stated in Section 7.5	Weeds not impacting achievement of environmental outcomes and targets as stated in Section 7.5
Declared Plants (DP) and Weeds of National Significance (WoNS)	Measured against baseline, no new DP or WoNs records.	Measured against baseline, no new DP or WoNs records.	Measured against baseline, no new DP or WoNs records.	Measured against baseline, no new DP or WoNs records.
Vegetation satisfies diagnostic characteristics and condition for Banksia TEC (as per DoEE, 2016)	Yes	Yes	Yes	Yes
Banksia TEC HQS	6	6	6	7
Carnaby’s foraging habitat (restoration)				
Foraging species	Dominant Banksia species same as baseline (<i>Banksia attenuata</i> , <i>B. menziesii</i> , <i>B. ilicifolia</i>).	Dominant Banksia species same as baseline (<i>Banksia attenuata</i> , <i>B. menziesii</i> , <i>B. ilicifolia</i>).	Dominant Banksia species same as baseline (<i>Banksia attenuata</i> , <i>B. menziesii</i> , <i>B. ilicifolia</i>).	Dominant Banksia species same as baseline (<i>Banksia attenuata</i> , <i>B. menziesii</i> , <i>B. ilicifolia</i>).
Banksia tree/shrub mortality	Banksia tree/shrub deaths ≤ 10% from baseline.	Banksia tree/shrub deaths ≤ 10% from baseline.	Banksia tree/shrub deaths ≤ 10% from baseline.	Banksia tree/shrub deaths ≤ 10% from baseline.
Projected foliage cover (%)	Banksia species have 20-40% projected foliage cover.	Banksia species have 20-40% projected foliage cover.	Banksia species have 20-40% projected foliage cover.	Banksia species have 40-60% projected foliage cover.

Aspect	Milestone Target			Final completion criteria
	Year 5	Year 10	Year 15	
Carnaby's foraging quality score (BCE)	6	6	6	7
Carnaby's foraging habitat (revegetation)				
Foraging species	Primary foraging species for Carnaby's, including <i>Corymbia calophylla</i> , <i>Eucalyptus marginata</i> and proteaceous species seedlings or tubestock established.	Primary foraging species for Carnaby's, including <i>Corymbia calophylla</i> , <i>Eucalyptus marginata</i> and proteaceous species saplings present.	Primary foraging species for Carnaby's, including <i>Corymbia calophylla</i> , <i>Eucalyptus marginata</i> and proteaceous species dominating the upper storey.	Primary foraging species for Carnaby's, including <i>Corymbia calophylla</i> , <i>Eucalyptus marginata</i> and proteaceous species dominating the upper storey.
Foraging species mortality	≤ 30% of seedlings/tubestock planted	≤ 20% of established plants.	≤ 20% of established plants.	≤ 10% of established plants.
Projected foliage cover (%)	Banksia species have 10-20% projected foliage cover.	Banksia species have 20-40% projected foliage cover.	Banksia species have 40-60% projected foliage cover.	Banksia species have >60% projected foliage cover.
Carnaby's foraging quality score (BCE)	5	6	7	8
FRTBC foraging habitat (revegetation)				
Foraging species	<i>Corymbia calophylla</i> and <i>Eucalyptus marginata</i> seedlings or tubestock established.	<i>Corymbia calophylla</i> and <i>Eucalyptus marginata</i> saplings present	<i>Corymbia calophylla</i> and <i>Eucalyptus marginata</i> dominating the upper storey.	<i>Corymbia calophylla</i> and <i>Eucalyptus marginata</i> dominating the upper storey.
Foraging species mortality	≤ 30% of seedlings/tubestock planted	≤ 20% of established plants.	≤ 20% of established plants.	≤ 10% of established plants.
Projected foliage cover (%)	<i>Corymbia calophylla</i> and <i>Eucalyptus marginata</i> have 10-20% projected foliage cover.	<i>Corymbia calophylla</i> and <i>Eucalyptus marginata</i> have 20-40% projected foliage cover.	<i>Corymbia calophylla</i> and <i>Eucalyptus marginata</i> have 40-60% projected foliage cover.	<i>Corymbia calophylla</i> and <i>Eucalyptus marginata</i> have >60% projected foliage cover.
FRTBC foraging quality score (BCE)	5	6	7	8

7.8 Justification of Offset Calculator Values

Justification of values applied to the EPBC Act Environmental Offset Calculator to assess the adequacy of the proposed offset strategy, in order to counterbalance significant residual impacts are summarised in Table 10 - Table 13.

Table 10 Banksia TEC Justification of Offset Calculator Values – Jandakot Regional Park

Attribute	Value	Justification
Start Quality	6	Main Roads is proposing to restore 38.6 ha of Banksia TEC vegetation as an offset for Banksia TEC. The offset site is part of the broader Jandakot Regional Park and Bush Forever Site 347 (Wandi Nature Reserve and adjacent Bushland, Wandi/Oakford). Application of the Banksia TEC HQS tool provided by DCCEEW indicates Banksia TEC patch quality ranges from degraded to excellent with an overall offset site HQS of 6.2 (rounded to the nearest whole number) as detailed in Appendix 1.
Future quality without offset	5	Considering the existing threatening processes (weeds and edge effects, dieback) and lack of active management, the vegetation quality within the offset site is expected to decline over time without suitable management.
Future quality with offset	7	Management actions addressing potential threats such as weeds, dieback and other diseases, invasive species, pest animal grazing, and uncontrolled vehicle access will improve the quality of the vegetation over time.
Time over which loss is averted (years)	20	The site will be managed by DBCA for long-term conservation purposes. The maximum time over which loss is averted has been applied.
Time until ecological benefit (years)	20	The maximum time until ecological benefit been applied. This is the timeframe within which improvement in condition is expected to be achieved through on-ground management.
Risk of loss without offset (%)	0	Risk of loss scores do not apply to this offset
Risk of loss with offset (%)	0	Risk of loss scores do not apply to this offset
Confidence in result (%) risk of loss	N/A	Risk of loss scores do not apply to this offset
Confidence in result (%) future quality	80	The site will be managed by DBCA for long-term conservation purposes. High level of confidence that management actions will achieve results within the predicted timeframe.

Table 11 Carnaby's Justification of Offset Calculator Values – Jandakot Regional Park restoration

Attribute	Value	Justification
Start Quality	6	Main Roads is proposing to restore 38.6 ha of Banksia woodland vegetation as an offset for Carnaby's foraging habitat. The offset site is part of the broader Jandakot Regional Park and Bush Forever Site 347 (Wandi Nature Reserve and adjacent Bushland, Wandi/Oakford). The overall habitat quality for the proposed offset has been conservatively rated 6 using the BCE system (Ecoscape, 2026).
Future quality without offset	5	Considering the existing threatening processes (weeds, edge effects and dieback) and lack of active management, the foraging habitat quality within the offset site is expected to decline over time without suitable management.
Future quality with offset	7	Management actions addressing potential threats such as weeds, dieback and other diseases, invasive species, pest animal grazing, and uncontrolled vehicle access will improve the quality of the foraging habitat over time.
Time over which loss is averted (years)	20	The site will be managed by DBCA for long-term conservation purposes. The maximum time over which loss is averted has been applied.
Time until ecological benefit (years)	15	This is the timeframe within which improvement in condition is expected to be achieved through on-ground management.
Risk of loss without offset (%)	0	Risk of loss scores do not apply to this offset
Risk of loss with offset (%)	0	Risk of loss scores do not apply to this offset
Confidence in result (%) risk of loss	N/A	Risk of loss scores do not apply to this offset
Confidence in result (%) future quality	80	The site will be managed by DBCA for long-term conservation purposes. High level of confidence that management actions will achieve results within the predicted timeframe.

Table 12 Carnaby's Justification of Offset Calculator Values – Jandakot Regional Park revegetation

Attribute	Value	Justification
Start Quality	0	Main Roads is proposing to revegetate 7.2 ha of cleared/degraded areas as an offset for Carnaby's foraging habitat. The offset site is part of the broader Jandakot Regional Park and Bush Forever Site 347 (Wandi Nature Reserve and adjacent Bushland, Wandi/Oakford).
Future quality without offset	0	Without this offset, these existing cleared/degraded areas would not be funded for revegetation and management.
Future quality with offset	8	Management actions addressing potential threats such as weeds, dieback and other diseases, invasive species, pest animal grazing, and uncontrolled vehicle access will improve the quality of the foraging habitat over time. A revegetation plan will be prepared in consultation DBCA including agreed upon completion criteria. It is assumed that vegetation will be of a foraging quality score of condition 8 or higher using the BCE system, upon meeting these completion criteria.
Time over which loss is averted (years)	20	The site will be managed by DBCA for long-term conservation purposes. The maximum time over which loss is averted has been applied.
Time until ecological benefit (years)	15	It is assumed that it will take approximately 15 years to achieve the desired habitat quality. Management measures proposed at the offset site will be funded for up to 20 years or until completion criteria however for the purposes of the calculation, it is assumed that ecological benefit will be achieved at 15 years.
Risk of loss without offset (%)	0	Risk of loss scores do not apply to this offset
Risk of loss with offset (%)	0	Risk of loss scores do not apply to this offset
Confidence in result (%) risk of loss	N/A	Risk of loss scores do not apply to this offset
Confidence in result (%) future quality	80	The offset site will be actively managed by DBCA through funding by Main Roads. A high degree of confidence has been applied as adaptive management and monitoring of completion criteria will allow ongoing and emerging threats to be dealt with as they occur.

Table 13 FRTBC Justification of Offset Calculator Values – Jandakot Regional Park revegetation

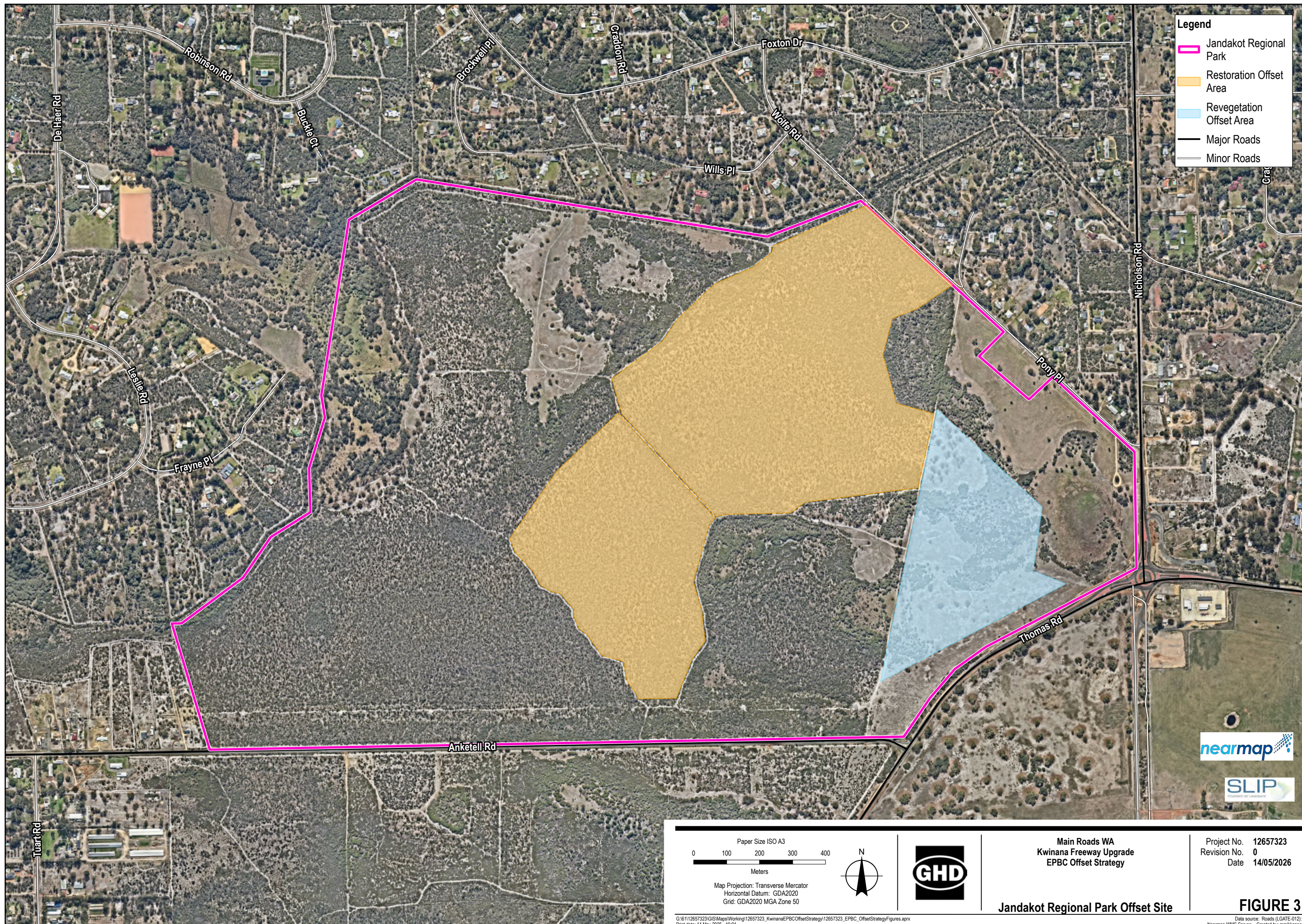
Attribute	Value	Justification
Start Quality	0	Main Roads is proposing to revegetate 2.8 ha of cleared/degraded areas as an offset for FRTBC foraging habitat. The offset site is part of the broader Jandakot Regional Park and Bush Forever Site 347 (Wandi Nature Reserve and adjacent Bushland, Wandi/Oakford).
Future quality without offset	0	Without this offset, these existing cleared/degraded areas would not be funded for revegetation and management.
Future quality with offset	8	Management actions addressing potential threats such as weeds, dieback and other diseases, invasive species, pest animal grazing, and uncontrolled vehicle access will improve the quality of the foraging habitat over time. An offset management plan will be prepared in consultation DBCA including agreed upon completion criteria. It is assumed that vegetation will be of a foraging quality score of condition 8 or higher using the BCE system, upon meeting these completion criteria.
Time over which loss is averted (years)	20	The site will be managed by DBCA for long-term conservation purposes. The maximum time over which loss is averted has been applied.
Time until ecological benefit (years)	15	It is assumed that it will take approximately 15 years to achieve the desired habitat quality. Management measures proposed at the offset site will be funded for up to 20 years or until completion criteria however for the purposes of the calculation, it is assumed that ecological benefit will be achieved at 15 years.
Risk of loss without offset (%)	0	Risk of loss scores do not apply to this offset
Risk of loss with offset (%)	0	Risk of loss scores do not apply to this offset
Confidence in result (%) risk of loss	N/A	Risk of loss scores do not apply to this offset
Confidence in result (%) future quality	80	The offset site will be actively managed by DBCA through funding by Main Roads. A high degree of confidence has been applied as adaptive management and monitoring of completion criteria will allow ongoing and emerging threats to be dealt with as they occur.

7.9 Offset Calculator Values

The EPBC Act Offset Calculator Tool was used to assess the significant residual impacts against the environmental values of the Jandakot Regional Park offset site. This demonstrates that the Jandakot Regional Park offset site provides 100.21% of the offset requirement for Banksia TEC, 70.86% of the offset requirement for Carnaby's foraging habitat and 28.74% of the offset requirement for FRTBC foraging habitat. A summary of the offset values is shown in Table 14 below.

Table 14 Offset Calculator Values for Jandakot Regional Park Offset Site

Environmental Value	Offset Size (ha)	Start Quality	Future Quality without Offset	Future Quality with Offset	Offset Value (%)
Banksia TEC restoration	38.6	6	5	7	100.21
Carnaby's foraging habitat restoration	38.6	6	5	7	40.58
Carnaby's foraging habitat revegetation	7.20	0	0	8	30.28
FRTBC foraging habitat revegetation	2.80	0	0	8	28.74



8 Postans-Thomas Road, Kwinana

8.1 Site Description

The Postans-Thomas Road, Kwinana offset site is situated on unallocated vacant crown land within the City of Kwinana (Figure 4). The site covers 19.75 ha and is located approximately 4 km west of the Proposed Action location within the same IBRA Bioregion (Swan Coastal Plain). A 14 ha portion of the Postans site is proposed as an offset for Carnaby's Cockatoo and FRTBC foraging habitat incorporating 8 ha of Tuart TEC.

One Beard (1990) pre-European vegetation association is mapped as occurring within the offset site: Vegetation association Spearwood 998, which is described as 'Medium woodland; tuart'. One Heddlé et al (1980) vegetation complex is mapped as occurring within the offset site, being the Cottesloe Complex-Central and South, which is described as Mosaic of woodland of *Eucalyptus gomphocephala* (Tuart) and open forest of *Eucalyptus gomphocephala* (Tuart) - *Eucalyptus marginata* (Jarrah) - *Corymbia calophylla* (Marri); closed heath on the Limestone outcrops'.

The proposed offset site was surveyed in spring 2025 and preliminary data indicates the site contains isolated *Banksia* trees in the western part and mid to low open woodland of *Eucalyptus marginata* and *E. gomphocephala* woodland to scattered trees of *E. gomphocephala* over a low woodland to isolated trees of *Banksia attenuata* in the central and eastern parts. Areas of Tuart TEC were mapped throughout the site during the survey (GHD, in prep.). Tuart patches were rated Moderate, High and Very High in condition based on condition categories outlined in DoEE (2019). The draft survey report is being finalised and can be provided to DCCEEW once finalised. Interim HQS for Tuart TEC will be updated and the offset quantum adjusted accordingly should the final report conclude the HQS differs from 6, as indicated in Appendix 1.

The Postans-Thomas Road, Kwinana offset site is located within the known foraging range of both Carnaby's and FRTBC. Potential Black Cockatoo Breeding Trees (>500 mm diameter at breast height) are present within the proposed site, although no known nesting occurs. There are three Black Cockatoo roosting sites within 5 km of the offset site (DBCA, 2019). There are no known breeding areas within 5 km of the offset site (Biota, 2025).

A black cockatoo foraging habitat quality assessment was completed as part of the spring 2025 survey. The overall foraging habitat quality was conservatively rated as 5 for Carnaby's Cockatoo and 5 for FRTBC using the BCE system (BCE, 2020), based on preliminary data.

8.2 Suitability of Site as an Offset

The Postans-Thomas Road, Kwinana offset site is located on the Swan Coastal Plain within 5 km of the Proposed Action. The offset site contains vegetation representative of Tuart TEC and foraging habitat for Carnaby's and FRTBC and has like-for-like qualities compared with the PAA.

Survey data shows there is approximately 8 ha of Tuart TEC in predominately High condition. Application of the Tuart TEC HQS tool provided by DCCEEW indicates an overall HQS of 6 for Tuart TEC within the offset site (GHD, in prep.). The offset site contains foraging habitat for Carnaby's and FRTBC, with foraging habitat quality scored as 5 for Carnaby's, and 5 for FRTBC using the BCE system. The offset site is located within the modelled distribution of both species and survey data shows recent use of the offset site (foraging evidence) by both species (GHD, in prep.).

The future habitat quality of Tuart TEC, as well as Carnaby's and FRTBC foraging habitat at the offset site will meet or exceed the quality score for each of these values at the impact site (see section 15.1). The habitat quality within the offset site is anticipated to decline without the offset due to existing threats such as weed invasion, dieback infestation, pest animal invasion and unauthorised access. The habitat quality within the offset area can be improved and maintained through management actions such as weed, dieback and pest animal control, as well as access management. With these management actions in place, the habitat quality is expected to improve by a score of four for Tuart TEC and three for Carnaby's and FRTBC.

The Postans-Thomas Road, Kwinana offset site is considered a suitable offset site due to the clear environmental benefits of this offset to the protected matters, it's like-for-like qualities compared with the PAA and close proximity to the Proposed Action.

8.3 Offset Security

The proposed Postans-Thomas Road, Kwinana offset site is currently managed by the City of Kwinana. Restoration of this offset site is consistent with the City of Kwinana Local Biodiversity Strategy 2022 (City of Kwinana, 2022). The Postans-Thomas Road, Kwinana site is located within the known foraging range of both Carnaby's Cockatoo and FRBTC, and forms part of a potential ecological linkage.

On-ground management will deliver improved Black Cockatoo foraging habitat and Tuart TEC vegetation quality and ensure that the risk of existing environmental values at the offset site being further impacted over the 20-year duration of the offset is reduced.

Main Roads and the City of Kwinana will develop a MoU (or similar) to formalise a land management agreement, including funding and actions required by both parties. The MoU will be developed within 18 months of the Proposed Action being approved.

The site will serve as a restoration offset for Tuart TEC and foraging habitat for Carnaby's and FRTBC. This will result in a net benefit to MNES impacted by the Proposed Action.

8.4 MNES Values

The existing environmental values within the Postans-Thomas Road, Kwinana offset site pertaining to this Offset Strategy include:

- 8 ha of Tuart TEC with a HQS of 6
- 14 ha of Carnaby's foraging habitat with a quality score of 5 using the BCE system
- 14 ha of FRTBC foraging habitat with a quality score of 5 using the BCE system.

8.5 Environmental outcomes and targets

Through implementation of proposed management actions, the expected environmental outcomes and targets over the 20-year timeframe for each MNES are:

- Outcome: Improved Tuart TEC habitat quality
- Target: Improving the condition within 8 ha of Tuart TEC to increase the HQS of 6 to a HQS of 10 and preventing it from declining from a HQS of 6 to a HQS of 5 using the DCCEEW HQS for Tuart TEC.

- Outcome: Improved foraging habitat quality for Carnaby's and FRTBC.
- Target: Improving the foraging habitat quality within 14 ha of Carnaby's foraging habitat by increasing the projected foliage cover from 20-40% (Moderate) to >60% (High) to achieve an overall quality score of 8 using the BCE system.
- Target: Improving the foraging habitat quality within 14 ha of FRTBC foraging habitat by increasing the projected foliage cover from 20-40% (Moderate) to >60% (High) to achieve an overall quality score of 8 using the BCE system.

8.6 Management actions, methods and timing

The proposed performance targets, management actions and timing for the Postans-Thomas Road, Kwinana offset site are outlined in Table 15. The indicative timing will be refined as the management plan for the Postans-Thomas Road, Kwinana offset site is developed.

Table 15 Summary of proposed performance targets, management actions and timing for the Postans-Thomas Road, Kwinana offset site Offset Site

Performance target	Management actions	Indicative Timing	Reporting
Formalised management agreement for Postans-Thomas Road, Kwinana offset site	Prepare MoU (or similar) agreement between Main Roads and City of Kwinana which outlines governance framework, land management responsibilities, funding commitments, and required conservation actions.	Within 18 months of Proposed Action approval.	MoU (or similar) agreement in place
Completion of an offset site management plan for the Postans-Thomas Road, Kwinana offset site	Develop offset site management plan in consultation with City of Kwinana which includes: • Environmental values present within the offset site based on desktop sources and field surveys/data • Offset site management actions and performance targets • Monitoring including methodology, frequency and duration • Milestone and completion criteria • Triggers and corrective actions • Roles and responsibilities • Reporting, auditing and review requirements.	Offset site management plan prepared within 18 months of Proposed Action approval.	Postans-Thomas Road, Kwinana offset site management plan (example in Appendix 2)
Measured decline in key threatening processes to Tuart TEC, Carnaby's and FRTBC.	Implement the Postans-Thomas Road, Kwinana offset management plan and on-ground management/threat abatement actions, which may include weed control, dieback management, feral/pest animal control, illegal dumping and access control to improve MNES values within the Postans-Thomas Road, Kwinana offset site.	Ongoing for duration of offset term (at least 20 years).	Annual compliance assessment report
Improvement in Tuart TEC condition from baseline condition rating.	Undertake vegetation condition monitoring using quadrats (monitoring criteria and measures as outlined in the Postans-Thomas Road, Kwinana offset management plan)	Every five years for duration of offset term (up to 20 years), with Year 1 as baseline.	Annual compliance assessment report

Performance target	Management actions	Indicative Timing	Reporting
	(Example monitoring quadrats criteria in Appendix 3).		
Improvement in Carnaby's and FRTBC foraging habitat quality from baseline quality score	Undertake habitat quality monitoring using BCE system (monitoring criteria and measures as outlined in the Postans-Thomas Road, Kwinana offset management plan) (Example in Appendix 3)	Every five years for duration of offset term (up to 20 years), with Year 1 as baseline.	Annual compliance assessment report

8.7 Indicative milestone targets and completion criteria

Indicative completion criteria have been developed for the Tuart TEC, as well as Carnaby's and FRTBC foraging habitat at the Postans-Thomas Road, Kwinana offset site. Over the proposed 20-year management timeframe, a set number of milestone targets have been proposed for each MNES to track the trajectory of vegetation and habitat quality improvement towards the proposed final completion criteria (Table 16). The timing for these milestone targets corresponds with the 5 yearly vegetation condition habitat quality monitoring and assessment against relevant HQS tools.

Table 16 Indicative milestone targets and final completion criteria for Postans-Thomas Road, Kwinana offset site

Aspect	Milestone Target			Final completion criteria
	Year 5	Year 10	Year 15	
Tuart TEC (restoration)				
Native understorey cover (number of species)	Averaged across monitoring quadrats, ≥8 native understorey species OR ≥60 % of all understorey vegetation cover is native	Averaged across monitoring quadrats, ≥8 native understorey species OR ≥60 % of all understorey vegetation cover is native	Averaged across monitoring quadrats, ≥12 native understorey species OR ≥80 % of all understorey vegetation cover is native	Averaged across monitoring quadrats, ≥12 native understorey species OR ≥80 % of all understorey vegetation cover is native
Natural regeneration of eucalypts	Average of <10 individuals per ha (DBH <15 cm)	Average of ≥10 individuals per ha (DBH <15 cm)	Average of ≥15 individuals per ha (DBH <15 cm)	Average of ≥15 individuals per ha (DBH <15 cm)
Weed cover	Weeds not impacting achievement of environmental outcomes and targets as stated in Section 8.5	Weeds not impacting achievement of environmental outcomes and targets as stated in Section 8.5	Weeds not impacting achievement of environmental outcomes and targets as stated in Section 8.5	Weeds not impacting achievement of environmental outcomes and targets as stated in Section 8.5
DP and WoNS	Measured against baseline, no new DP or WoNs records.	Measured against baseline, no new DP or WoNs records.	Measured against baseline, no new DP or WoNs records.	Measured against baseline, no new DP or WoNs records.
Dieback status	No change in Dieback status from baseline.	No change in Dieback status from baseline.	No change in Dieback status from baseline.	No change in Dieback status from baseline.

Aspect	Milestone Target			Final completion criteria
	Year 5	Year 10	Year 15	
Vegetation satisfies diagnostic characteristics and condition for Tuart TEC (as per DoEE, 2019)	Yes	Yes	Yes	Yes
Tuart TEC HQS	6	8	9	10
Carnaby's foraging habitat (restoration)				
Foraging species	Dominant Banksia species same as baseline (<i>Banksia attenuata</i> , <i>B. menziesii</i>).	Dominant Banksia species same as baseline (<i>Banksia attenuata</i> , <i>B. menziesii</i>).	Dominant Banksia species same as baseline (<i>Banksia attenuata</i> , <i>B. menziesii</i>).	Dominant Banksia species same as baseline (<i>Banksia attenuata</i> , <i>B. menziesii</i>).
Banksia tree/shrub deaths	Banksia tree/shrub deaths ≤ 10% from baseline.	Banksia tree/shrub deaths ≤ 10% from baseline.	Banksia tree/shrub deaths ≤ 10% from baseline.	Banksia tree/shrub deaths ≤ 10% from baseline.
Projected foliage cover (%)	Banksia species have 20-40% projected foliage cover.	Banksia species have 20-40% projected foliage cover.	Banksia species have 40-60% projected foliage cover.	Banksia species have >60% projected foliage cover.
Carnaby's foraging quality score (BCE)	5	6	7	8
FRTBC foraging habitat (restoration)				
Foraging species	Dominant eucalypt species same as baseline (Jarrah, Tuart)	Dominant eucalypt species same as baseline (Jarrah, Tuart)	Dominant eucalypt species same as baseline (Jarrah, Tuart)	Dominant eucalypt species same as baseline (Jarrah, Tuart)
Projected foliage cover (%)	Eucalypt species have 20-40% projected foliage cover.	Eucalypt species have 20-40% projected foliage cover.	Eucalypt species have 40-60% projected foliage cover.	Eucalypt species have >60% projected foliage cover.
FRTBC foraging quality score (BCE)	5	5	6	8

8.8 Justification of Offset Calculator Values

Justification of values applied to the EPBC Act Environmental Offset Calculator to assess the adequacy of the proposed offset strategy, in order to counterbalance significant residual impacts are summarised in Table 17 to Table 19, in the following sub-sections.

Table 17 Tuart TEC Justification of Offset Calculator Values – Postans-Thomas Road, Kwinana Offset Site

Attribute	Value	Justification
Start Quality	6	Main Roads is proposing to restore 8 ha of Tuart TEC vegetation at Postans-Thomas Road, Kwinana as an offset for Tuart TEC. Application of the Tuart TEC HQS tool provided by DCCEEW indicates an overall offset site HQS of 6.
Future quality without offset	5	Considering the existing threatening processes (weeds and edge effects, uncontrolled access, illegal dumping) and lack of active management, the vegetation quality within the offset site is expected to decline over time without suitable management.
Future quality with offset	10	With restoration and active management, the quality of Tuart TEC can be improved on this site. Management actions, addressing potential threats such as fire, weeds, uncontrolled access, invasive species and dieback will improve the quality of vegetation over time.
Time over which loss is averted (years)	20	The site will be managed via a MoU (or similar) with the City of Kwinana for long-term conservation purposes. The maximum time over which loss is averted has been applied.
Time until ecological benefit (years)	20	The maximum time until ecological benefit been applied. This is the timeframe within which improvement in condition is expected to be achieved through on-ground management.
Risk of loss without offset (%)	0	Risk of loss scores do not apply to this offset
Risk of loss with offset (%)	0	Risk of loss scores do not apply to this offset
Confidence in result (%) risk of loss	N/A	Risk of loss scores do not apply to this offset
Confidence in result (%) future quality	80	The site will be managed by the City of Kwinana for long-term conservation purposes. High level of confidence that management actions will achieve results within the predicted timeframe

Table 18 Carnaby's Justification of Offset Calculator Values - Postans-Thomas Road, Kwinana

Attribute	Value	Justification
Start Quality	5	Main Roads is proposing to restore 14 ha of Carnaby foraging habitat at Postans-Thomas Road, Kwinana as an offset for Carnaby's foraging habitat. The overall habitat quality for the proposed offset has been conservatively rated 5 using the BCE system.
Future quality without offset	4	Considering the existing threatening processes (weeds and edge effects, uncontrolled access, illegal dumping) and lack of active management, the habitat quality within the offset site is expected to decline over time without suitable management.
Future quality with offset	8	With restoration and active management, the quality of Carnaby's foraging habitat can be improved on this site. Management actions, addressing potential threats such as fire, weeds, uncontrolled access, invasive species and dieback will improve the quality of habitat over time.
Time over which loss is averted (years)	20	The site will be managed via a MoU (or similar) with the City of Kwinana for long-term conservation purposes. The maximum time over which loss is averted has been applied.

Time until ecological benefit (years)	15	It is estimated that it will take 15 years of management to achieve the improvement in habitat quality.
Risk of loss without offset (%)	0	Risk of loss scores do not apply to this offset
Risk of loss with offset (%)	0	Risk of loss scores do not apply to this offset
Confidence in result (%) risk of loss	N/A	Risk of loss scores do not apply to this offset
Confidence in result (%) future quality	80	The site will be managed by City of Kwinana for long-term conservation purposes. High level of confidence that management actions will achieve results within the predicted timeframe

Table 19 FRTBC Justification of Offset Calculator Values – Postans-Thomas Road, Kwinana

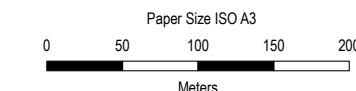
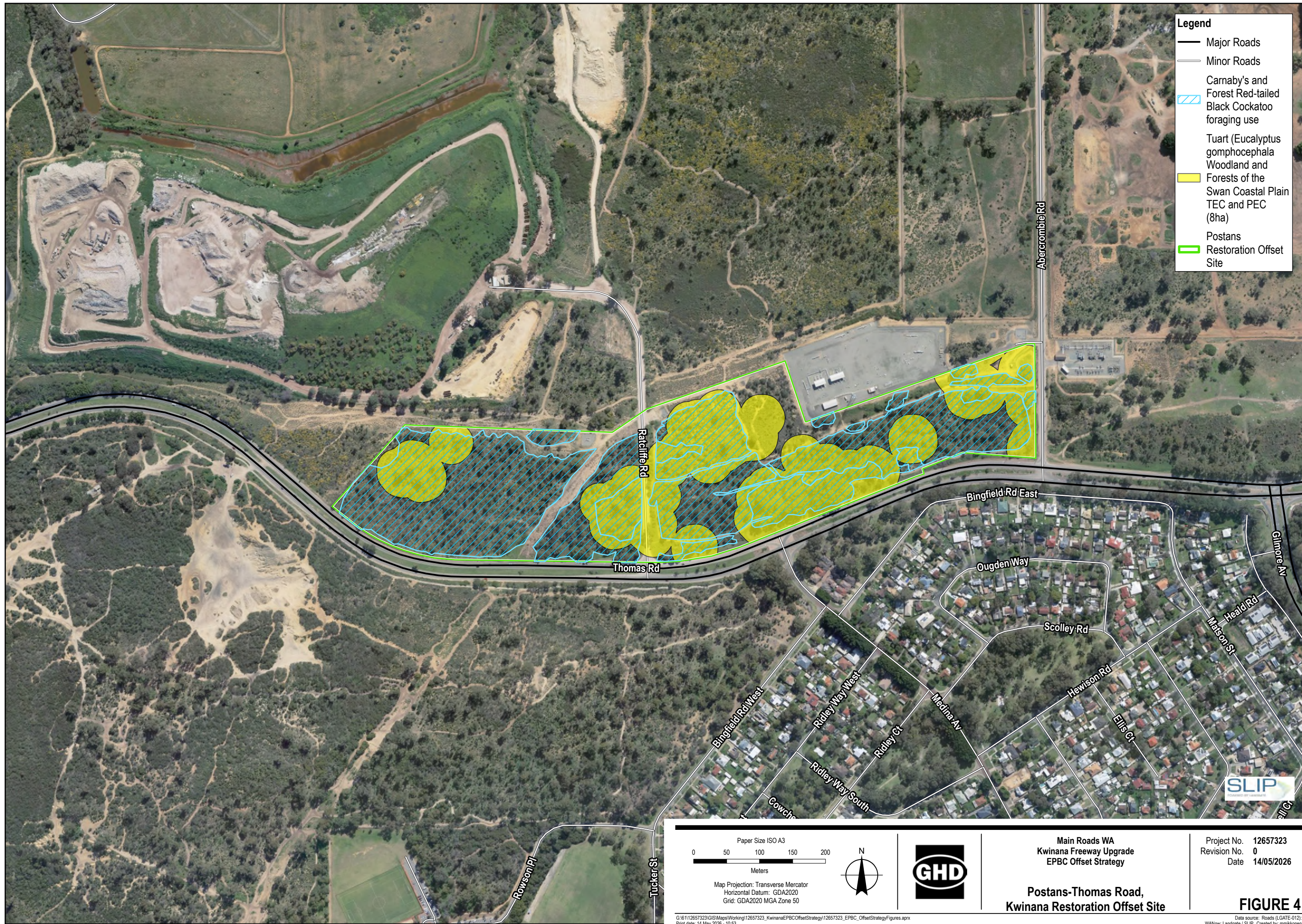
Attribute	Value	Justification
Start Quality	5	Main Roads is proposing to restore 14ha of FRTBC foraging habitat at Postans-Thomas Road, Kwinana as an offset for FRTBC. The overall habitat quality for the proposed offset has been conservatively rated 5 using the BCE system.
Future quality without offset	4	Considering the existing threatening processes (weeds and edge effects, uncontrolled access, illegal dumping) and lack of active management, the habitat quality within the offset site is expected to decline over time without suitable management.
Future quality with offset	8	With restoration and active management, the quality of FTRBC foraging habitat can be improved on this site. Management actions, addressing potential threats such as fire, weeds, uncontrolled access, invasive species and dieback will improve the quality of habitat over time.
Time over which loss is averted (years)	20	The site will be managed via a MoU (or similar) with the City of Kwinana for long-term conservation purposes. The maximum time over which loss is averted has been applied.
Time until ecological benefit (years)	15	It is estimated that it will take 15 years of management to achieve the improvement in habitat quality.
Risk of loss without offset (%)	0	Risk of loss scores do not apply to this offset
Risk of loss with offset (%)	0	Risk of loss scores do not apply to this offset
Confidence in result (%) risk of loss	N/A	Risk of loss scores do not apply to this offset
Confidence in result (%) future quality	80	The site will be managed by City of Kwinana for long-term conservation purposes. High level of confidence that management actions will achieve results within the predicted timeframe.

8.9 Offset Calculator Values

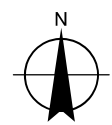
The EPBC Act Offset Calculator Tool was used to assess the significant residual impacts against the environmental values of Postans-Thomas Road, Kwinana offset site. This demonstrates Postans-Thomas Road, Kwinana offset site provides 56.48% of the offset requirement for Tuart TEC, 29.44% of the offset requirement for Carnaby's foraging habitat and 71.82% of the offset requirement for FRTBC foraging habitat. A summary of the offset values is shown in Table 20 below.

Table 20 Offset Calculator Values for Postans-Thomas Road, Kwinana Offset Site

Environmental Value	Offset Size (ha)	Start Quality	Future Quality without Offset	Future Quality with Offset	Offset Value (%)
Tuart TEC restoration	8	6	5	10	56.48
Carnaby's foraging habitat restoration	14	5	4	8	29.44
FRTBC foraging habitat restoration	14	5	4	8	71.85



Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 50



Main Roads WA
Kwinana Freeway Upgrade
EPBC Offset Strategy

Postans-Thomas Road,
Kwinana Restoration Offset Site

Project No. 12657323
Revision No. 0
Date 14/05/2026

FIGURE 4

9 Lot 1 Tamarisk Drive, Gabbadah

9.1 Site Description

Lot 1 Tamarisk Drive, Gabbadah encompasses a total area of 404.44 ha and is located approximately 5 km east of Seabird, within the Shire of Gingin (Figure 5). A 5.01 ha portion of the property will be restored as an environmental offset for Tuart TEC. The offset site is approximately 100 km north of the Proposed Action and occurs within the same Interim Biogeographical Regionalisation for Australia (IBRA) Region, i.e. Swan Coastal Plain, within the known distribution for Tuart TEC (DoEE, 2019).

One pre-European Beard (1990) vegetation association is mapped within the Gabbadah offset site. Vegetation Association 949 has 56.42% of its pre-European extent remaining (GoWA 2019a) and is described as a Low woodland or Open low woodland of *Acacia spp.*, *Banksia spp.*, *Casuarina spp.*, *Agonis flexuosa*, *Callitris spp.*, *Allocasuarina spp.* and *Eucalyptus loxophleba*.

One Heddlé et al. (1980) vegetation complex is mapped as occurring within the offset site, the Cottesloe Complex - North. This complex is described as predominantly low open forest and low woodland of *Banksia attenuata* (Slender Banksia) - *Banksia menziesii* (Firewood Banksia) - *Eucalyptus tottiana* (Pricklybark); closed heath on the Limestone outcrops. A total of 37.81% of the pre-European extent of the Cottesloe Complex - North remains on the Swan Coastal Plain, which is not considered poorly represented (GoWA 2019b).

The Gnanagara – Moore River State Forest (a Class A Reserve) abuts the eastern boundary of Lot 1 Tamarisk Drive and is zoned 'Rural uncoded' in the Shire of Gingin – Local Planning Strategy (Shire of Gingin 2012) and 'General Rural' in the Shire of Gingin Local Planning Scheme No. 9 (DPLH 2024).

A vegetation assessment conducted in September 2024 identified the presence of Tuart TEC (PGV Environmental 2024). Overall, the vegetation within the Tuart patch was rated Very High is condition based on condition categories outlined in DoEE (2019). Interim HQS for Tuart TEC indicated in Appendix 1 were developed based on survey data contained in the survey report (PGV Environmental 2024).

9.2 Suitability of Site as an Offset

Lot 1 Tamarisk Drive, Gabbadah offset site is located on the Swan Coastal Plain approximately 100 km north of the Proposed Action. The offset site contains vegetation representative of Tuart TEC and has like-for-like qualities compared within the PAA.

Survey data shows there is approximately 5.01 ha of Tuart TEC in predominately Very High condition. Application of the Tuart TEC HQS tool provided by DCCEEW indicates Tuart TEC patch quality within the offset site is in Very High condition with an overall HQS of 9 (Appendix 1).

The future habitat quality of Tuart TEC at the offset site will meet or exceed the quality score of the Tuart TEC at the impact site (section 15.1). The habitat quality of Tuart TEC within the offset site is anticipated to decline without the offset due to existing threats such as weed invasion, dieback infestation, pest animal invasion and unauthorised access. The habitat quality within the offset area can be improved and maintained through management actions such as weed, dieback and pest animal control, as well as access management. With these management actions in place, the

habitat quality of the Tuart TEC is expected to improve by a score of one.

Due to the limited availability of suitable vegetation and habitat closer to the PAA, this offset site has been selected for its high ecological value and it's like-for-like qualities compared with the PAA. The offset site is located directly adjacent to the Gnangara-Moore River State Forest, forming part of the broader ecological corridor exceeding 10,000 ha. The site will serve as a restoration offset for Tuart TEC and will result in a net benefit to MNES impacted by the PAA.

9.3 Offset Security

Lot 1 Tamarisk Drive, Gabbadah offset site has been acquired by Main Roads, with a portion in the process of being transferred to DBCA. The portion to be transferred will be restored and managed as part of the conservation estate. Main Roads has funded this acquisition and will fund 20 years of ongoing management by DBCA as an environmental offset. Approximately 300 ha of the property will be incorporated into the conservation estate and protected in perpetuity.

To formalise the land management arrangements, Main Roads and DBCA will develop a MoU (or similar) outlining the funding commitments and responsibilities of both parties. The MoU will be developed within 18 months of the Proposed Action being approved.

On-ground management will deliver improved Tuart TEC habitat quality and ensure that the risk of existing environmental values at the offset site being further impacted over the 20-year duration of the offset is reduced.

9.4 MNES Values

The existing environmental value currently within Lot 1 Tamarisk Drive, Gabbadah offset site pertaining to this Offset Strategy is:

- 5.01 ha of Tuart TEC with a HQS of 9.

9.5 Environmental outcomes and targets

Through implementation of proposed management actions, the expected environmental outcomes and targets over the 20-year timeframe for Tuart TEC are:

- Outcome: Improved Tuart TEC habitat quality
- Target: Improving habitat quality within 5.01 ha of Tuart TEC to increase the HQS of 9 to a HQS of 10 and preventing it from declining from HQS 9 to HQS 8 using the DCCEE HQS for Tuart TEC.

9.6 Management actions, methods and timing

The proposed performance targets, management actions and timing for Lot 1 Tamarisk Drive, Gabbadah offset site are outlined in Table 21. The indicative timing will be refined as the Lot 1 Tamarisk Drive, Gabbadah offset management plan' is developed.

Table 21 Summary of proposed performance targets, management actions and timing for Lot 1 Tamarisk Drive, Gabbadah Offset Site

Performance target	Management actions	Indicative Timing	Reporting
Formalised management agreement for Lot 1 Tamarisk Drive, Gabbadah offset site	Prepare MoU (or similar) agreement between Main Roads and DBCA which outlines governance framework, land management responsibilities, funding commitments, and required conservation actions.	Within 18 months of Proposed Action approval.	MoU (or similar) agreement in place
Completion of an offset site management plan for Lot 1 Tamarisk Drive, Gabbadah offset site.	Develop offset site management plan in consultation with DBCA which includes: • Environmental values present within the offset site based on desktop sources and field surveys/data • Offset site management actions and performance targets • Monitoring including methodology, frequency and duration • Milestone and completion criteria • Triggers and corrective actions • Roles and responsibilities • Reporting, auditing and review requirements.	Offset site management plan prepared within 18 months of Proposed Action approval.	Lot 1 Tamarisk Drive, Gabbadah offset site management plan (example in Appendix 2)
Measured decline in key threatening processes to Tuart TEC.	Implement the Lot 1 Tamarisk Drive, Gabbadah offset management plan and on-ground management/threat abatement actions, which may include weed control and reduction, dieback management, feral/pest animal control and prescribed burning to improve MNES values within Lot 1 Tamarisk Drive, Gabbadah offset site.	Ongoing for duration of offset term (at least 20 years).	Annual compliance assessment report
Improvement in Tuart TEC habitat quality from baseline condition rating.	Undertake vegetation condition monitoring using quadrats (monitoring criteria and measures as outlined in the Lot 1 Tamarisk Drive, Gabbadah offset management plan) (Example monitoring quadrats criteria in Appendix 3).	Every five years for duration of offset term (up to 20 years), with Year 1 as baseline.	Annual compliance assessment report

9.7 Indicative milestone targets and completion criteria

Indicative completion criteria have been developed for Tuart TEC at Lot 1 Tamarisk Drive, Gabbadah offset site. Over the proposed 20-year management timeframe, a set number of milestone targets have been proposed to track the trajectory of quality improvement towards the proposed final completion criteria (Table 22). The timing for these milestone targets corresponds with the 5 yearly vegetation condition monitoring and assessment against relevant HQS tools.

Table 22 Indicative milestone targets and final completion criteria for Lot 1 Tamarisk Drive, Gabbadah offset site

Aspect	Milestone Target			Final completion criteria
	Year 5	Year 10	Year 15	
Tuart TEC (restoration)				
Native understorey cover (# of species)	Averaged across monitoring quadrats, ≥12 native understorey species OR ≥80 % of all understorey vegetation cover is native	Averaged across monitoring quadrats, ≥12 native understorey species OR ≥80 % of all understorey vegetation cover is native	Averaged across monitoring quadrats, ≥12 native understorey species OR ≥80 % of all understorey vegetation cover is native	Averaged across monitoring quadrats, ≥12 native understorey species OR ≥80 % of all understorey vegetation cover is native
Natural regeneration of eucalypts	Average of <10 individuals per ha (DBH <15 cm)	Average of ≥10 individuals per ha (DBH <15 cm)	Average of ≥15 individuals per ha (DBH <15 cm)	Average of ≥15 individuals per ha (DBH <15 cm)
Weed cover (%)	Weeds not impacting achievement of environmental outcomes and targets as stated in Section 9.5	Weeds not impacting achievement of environmental outcomes and targets as stated in Section 9.5	Weeds not impacting achievement of environmental outcomes and targets as stated in Section 9.5	Weeds not impacting achievement of environmental outcomes and targets as stated in Section 9.5
DP and WoNS	Measured against baseline, no new DP or WoNs records.	Measured against baseline, no new DP or WoNs records	Measured against baseline, no new DP or WoNs records	Measured against baseline, no new DP or WoNs records
Vegetation satisfies diagnostic characteristics and condition for Tuart TEC (as per DoEE, 2019)	Yes	Yes	Yes	Yes
Tuart TEC HQS	9	9	10	10

9.8 Justification of Offset Calculator Values

Justification of values applied to the EPBC Act Environmental Offset Calculator to assess the adequacy of the proposed offset strategy, in order to counterbalance significant residual impacts are summarised in Table 23 below.

Table 23 Tuart TEC Justification of Offset Calculator Values – Lot 1 Tamarisk Drive, Gabbadah Offset Site

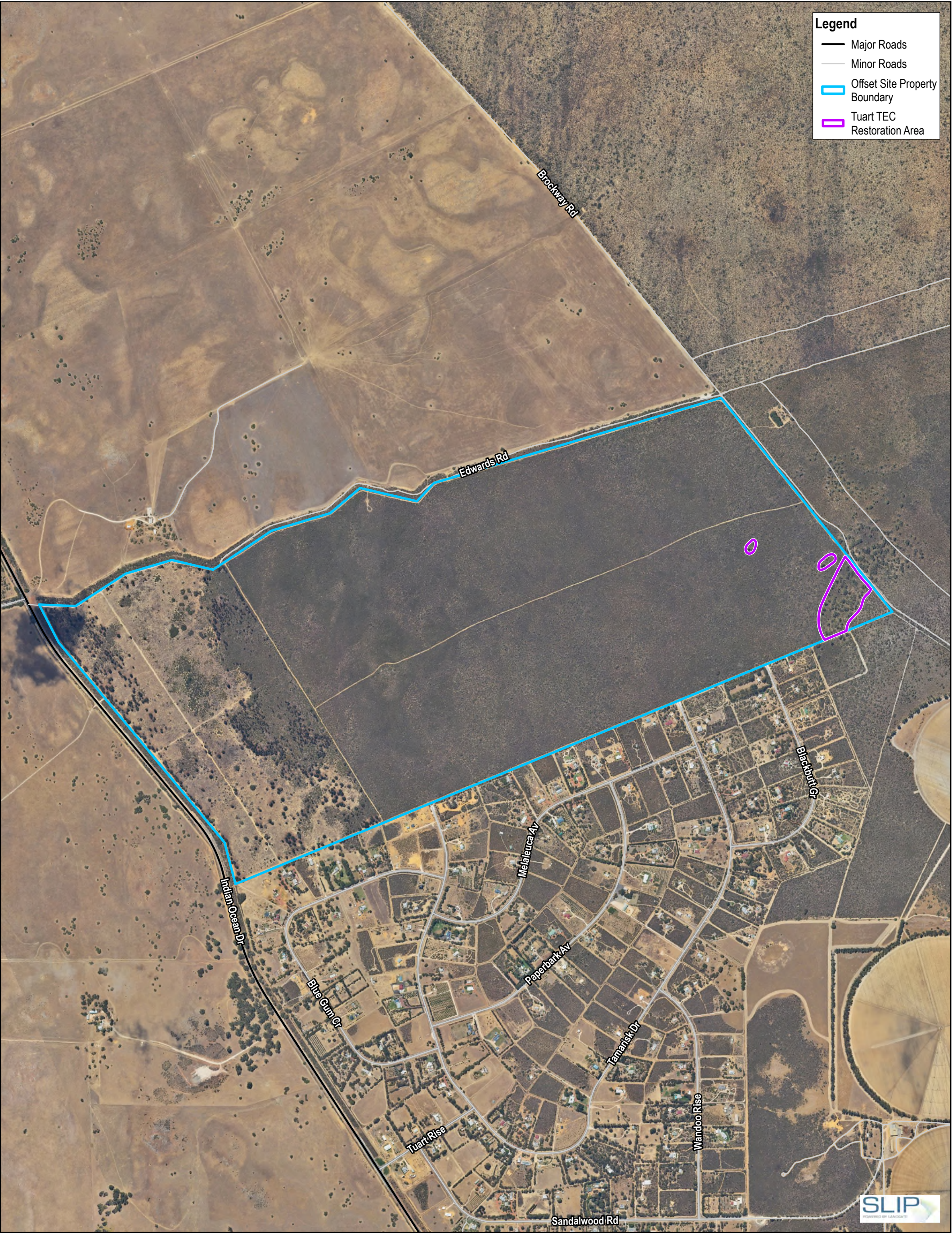
Attribute	Value	Justification
Start Quality	9	Main Roads is proposing to restore 5.01 ha of Tuart TEC vegetation at Lot 1 Tamarisk Drive, Gabbadah as an offset for Tuart TEC. Application of the Tuart TEC HQS tool provided by DCCEEW indicates a HQS of 9 (Appendix 1).
Future quality without offset	8	Considering the existing threatening processes (weeds, kangaroo grazing and edge effects) and lack of active management, the Tuart TEC quality within the offset site is expected to decline over time without suitable management.
Future quality with offset	10	Management actions, addressing potential threats such as kangaroo grazing, weeds, dieback and inappropriate fire regimes will improve the quality of the vegetation over time.
Time over which loss is averted (years)	20	The site will be managed by DBCA for long-term conservation purposes. The maximum time over which loss is averted has been applied.
Time until ecological benefit (years)	15	It is assumed that it will take approximately 15 years to achieve the desired species diversity, native vegetation cover and structure. The ecological benefit will be achieved at 15 years.
Risk of loss without offset (%)	0	Risk of loss scores do not apply to this offset
Risk of loss with offset (%)	0	Risk of loss scores do not apply to this offset
Confidence in result (%) risk of loss	N/A	Risk of loss scores do not apply to this offset
Confidence in result (%) future quality	80	The site will be managed by DBCA for long-term conservation purposes. High level of confidence that management actions will achieve results within the predicted timeframe.

9.9 Offset Calculator Values

The EPBC Act Offset Calculator Tool was used to assess the Tuart TEC significant residual impact against the environmental values of Lot 1 Tamarisk Drive, Gabbadah offset site. This demonstrates restoration at Lot 1 Tamarisk Drive, Gabbadah offset site provides 19.66% of the offset requirement for Tuart TEC. A summary of the offset value is shown in Table 24.

Table 24 Offset Calculator Values for Lot 1 Tamarisk Drive, Gabbadah Offset Site

Environmental Value	Offset Size (ha)	Start Quality	Future Quality without Offset	Future Quality with Offset	Offset Value (%)
Tuart TEC - restoration	5.01	9	8	10	19.66



10 Lot 277 Lake Mealup Road North, Birchmont

10.1 Site Description

Lot 277 Lake Mealup Road North, Birchmont offset property encompasses a total area of 74.22 ha within Lot 277 Lake Mealup Road North, Birchmont, Shire of Murray (Figure 6). It occurs on the eastern shore of the Peel Inlet, which is part of the Peel-Yalgorup Ramsar System, and is adjacent to the McLarty Nature Reserve (R24739) and Mealup Point Nature Reserve (R2738), both Class A Reserves for the conservation of flora and fauna (Figure 6). The offset site lies within the Swan Coastal Plain IBRA Region, approximately 50 km south of the Proposal. The offset site is zoned part (48.1%) 'Rural' and part (51.9%) 'Regional Open Space' under the Peel Regional Scheme.

Three Beard (1990) pre-European vegetation associations (126, 968 and 998) are mapped as occurring within the offset site and all three vegetation associations have more than 30% of their pre-European extent remaining (DBCA, 2019a).

- Vegetation association 126 - Bare areas; freshwater lakes
- Vegetation association 968 - Medium woodlands; Jarrah, Marri and Wandoo
- Vegetation association 998 - Medium woodlands; Tuart.

One Heddle et al. (1980) vegetation complex occurs within the offset site, the Cottesloe Complex – Central and South. The Cottesloe Complex – Central and South, supports a mosaic of woodland of Tuart and open forest of Tuart - Jarrah - Marri and closed heath on the Limestone outcrops. The Cottesloe Complex – Central and South has 32.16% of its pre-European extent remaining (DBCA, 2019b).

10.2 Suitability of Site as an Offset

The Lot 277 Lake Mealup Road North, Birchmont offset site is considered a suitable Tuart TEC revegetation offset site due to it being a site that would once have contained Tuart TEC vegetation and is located immediately adjacent to existing Tuart TEC vegetation. Revegetation of this site enables achievement of like-for-like qualities compared with the PAA.

The future quality of Tuart TEC at the offset site will meet or exceed the habitat quality score for the Tuart TEC at the impact site (section 15.1). The site is currently devoid of native vegetation and has a start quality score of zero. Without active revegetation and management of threats such as weeds, it is not likely that Tuart TEC vegetation would establish within the offset site. The offset site can be revegetated to achieve Very high condition Tuart TEC, with Tuart TEC habitat quality maintained through management actions such as weed, dieback and pest animal control, as well as access management. With these management actions in place, the habitat quality of Tuart TEC is expected to improve from a HQS score of zero to a score of eight.

The site will serve as a revegetation offset for Tuart TEC and will result in a net benefit to Tuart TEC impacted by the Controlled Action.

10.3 Offset Security

The Lot 277 Lake Mealup Road North, Birchmont offset site has been acquired by Main Roads on behalf of DBCA and will be managed by DBCA. Main Roads has funded the acquisition, and will fund revegetation and management for 20 years as an environmental offset. The property will

become part of DBCA's conservation estate and be protected in perpetuity.

Main Roads and DBCA will develop a MoU or similar to finalise the management agreement, including funding and actions required by both parties. The agreement will be developed and finalised within 18 months of the Proposed Action being approved.

On-ground management will deliver improved Tuart TEC habitat quality and ensure that the risk of environmental values established at the offset site being impacted over the 20-year duration of the offset is reduced.

10.4 MNES Values

The existing environmental values currently within the Lot 277 Lake Mealup Road North, Birchmont offset is 1.6 ha of cleared land adjacent to existing established Tuart TEC. These values were confirmed through a Main Roads' site inspection conducted on 14 October 2024.

10.5 Environmental outcomes and targets

Through implementation of proposed management actions, the expected environmental outcomes and targets over the 20-year timeframe for Tuart TEC are:

- Outcome: Revegetation to establish Tuart TEC
- Target: Revegetation of 1.6 ha of cleared land to establish Tuart TEC with a HQS of 8 using the DCCEE HQS Tuart TEC.

10.6 Management actions, methods and timing

The proposed performance targets, management actions and timing for the Lot 277 Lake Mealup Road North, Birchmont offset site are outlined in Table 25. The indicative timing will be refined as the offset management plan is developed.

Table 25 Summary of proposed performance targets, management actions and timing for the Lot 277 Lake Mealup Road North, Birchmont Offset Site

Performance target	Management actions	Indicative Timing	Reporting
Formalised management agreement for Lot 277 Lake Mealup Road North, Birchmont offset site	Prepare MoU (or similar) agreement between Main Roads and DBCA which outlines governance framework, land management responsibilities, funding commitments, and required conservation actions	Within 18 months of Proposed Action approval	MoU (or similar) agreement in place
Completion of an offset site revegetation and management plan for Lot 277 Lake Mealup Road North, Birchmont offset site	Develop offset site revegetation and management plan in consultation with DBCA which includes: Management • Environmental values present within the offset site based on desktop sources and field surveys/data • Revegetation strategy • Species selection and provenance • Site preparation	Offset site revegetation and management plan prepared within 18 months of Proposed Action approval	Lot 277 Lake Mealup Road North, Birchmont offset site revegetation and management plan (example in Appendix 2)

Performance target	Management actions	Indicative Timing	Reporting
	- Revegetation methods Offset site management actions and performance targets - Monitoring including methodology, frequency and duration - Milestone and completion criteria - Triggers and corrective actions - Roles and responsibilities - Reporting, auditing and review requirements		
Improvement in Tuart TEC habitat quality from baseline condition rating.	Undertake vegetation condition monitoring using quadrats (monitoring criteria and measures as outlined in the Lot 277 Lake Mealup Road North, Birchmont offset site revegetation and management plan (Example monitoring quadrats criteria in Appendix 2).	Every five years for duration of offset term (up to 20 years), with Year 1 as baseline.	Annual compliance assessment report

10.7 Indicative milestone targets and completion criteria

Indicative completion criteria have been developed for the establishment of Tuart TEC at the Lot 277 Lake Mealup Road North, Birchmont offset site. Over the proposed 20-year management timeframe, a set number of milestone targets have been proposed to track the trajectory of quality improvement towards the proposed final completion criteria (Table 26). The timing for these milestone targets corresponds with the proposed 5 yearly vegetation condition monitoring and assessment against relevant HQS tools.

Table 26 Indicative milestone targets and final completion criteria for Lot 277 Lake Mealup Road North, Birchmont offset site

Aspect	Milestone Target			Final completion criteria
	Year 5	Year 10	Year 15	
Tuart TEC (revegetation)				
Native understorey cover (# of species)	Averaged across monitoring quadrats, ≥4 native understorey species OR ≥80 % of all understorey vegetation cover is native	Averaged across monitoring quadrats, ≥8 native understorey species OR ≥80 % of all understorey vegetation cover is native	Averaged across monitoring quadrats, ≥12 native understorey species OR ≥80 % of all understorey vegetation cover is native	Averaged across monitoring quadrats, ≥12 native understorey species OR ≥80 % of all understorey vegetation cover is native
Natural regeneration of eucalypts	N/A (revegetation still immature at Year 5)	N/A (revegetation still immature at Year 10)	Average of ≥15 individuals per ha (DBH <15 cm)	Average of ≥15 individuals per ha (DBH <15 cm)
Weed cover (%)	Weeds not impacting achievement of environmental outcomes and targets as stated in Section 10.5	Weeds not impacting achievement of environmental outcomes and targets as stated in Section 10.5	Weeds not impacting achievement of environmental outcomes and targets as stated in Section 10.5	Weeds not impacting achievement of environmental outcomes and targets as stated in Section 10.5
DP and WoNS	Measured against baseline, no new DP or WoNs records.	Measured against baseline, no new DP or WoNs records	Measured against baseline, no new DP or WoNs records	Measured against baseline, no new DP or WoNs records
Vegetation satisfies diagnostic characteristics and condition for Tuart TEC (as per DoEE, 2019)	N/A (revegetation still immature at Year 5)	N/A (revegetation still immature at Year 10)	Yes	Yes
Tuart TEC HQS	N/A	N/A	8	8

10.8 Justification of Offset Calculator Values

Justification of values applied to the EPBC Act Environmental Offset Calculator to assess the adequacy of the proposed offset strategy, in order to counterbalance significant residual impacts are summarised in Table 27 below.

Table 27 Tuart TEC Justification of Offset Calculator Values – Lot 277 Lake Mealup Road North, Birchmont Offset Site

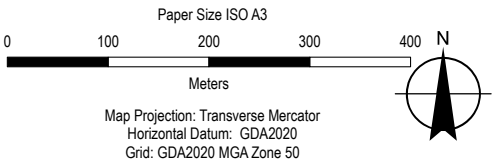
Attribute	Value	Justification
Start Quality	0	Main Roads is proposing the revegetation of 1.6 ha of cleared land to establish Tuart TEC vegetation at Lot 277 Lake Mealup Road North, Birchmont as an offset for Tuart TEC. The revegetation of the Lake Mealup offset site contains no Tuart TEC, however is directly adjacent to Tuart TEC vegetation within the property. The proposed revegetation offset area is devoid of native vegetation and would once have contained Tuart TEC, that will be revegetated to the TEC
Future quality without offset	0	Without this active revegetation of this offset, these existing cleared areas would not be funded for revegetation and management, or recover naturally to achieve Tuart TEC vegetation.
Future quality with offset	8	Management actions addressing potential threats such as weeds, dieback and other diseases, invasive species, pest animal grazing, and uncontrolled vehicle access will ensure the successful revegetation of Tuart TEC over time.
Time over which loss is averted (years)	20	The site will be managed by DBCA for long-term conservation purposes. The maximum time over which loss is averted has been applied.
Time until ecological benefit (years)	15	It is estimated that it will take 15 years of management to achieve the desired species diversity, native vegetation cover and structure.
Risk of loss without offset (%)	0	Risk of loss scores do not apply to this offset
Risk of loss with offset (%)	0	Risk of loss scores do not apply to this offset
Confidence in result (%) risk of loss	N/A	Risk of loss scores do not apply to this offset
Confidence in result (%) future quality	80	The site will be managed by DBCA for long-term conservation purposes. High level of confidence that management actions will achieve results within the predicted timeframe.

10.9 Offset Calculator Values

The EPBC Act Offset Calculator Tool was used to assess the Tuart TEC significant residual impact against the environmental values of Lot 277 Lake Mealup Road North, Birchmont offset site. This demonstrates Lot 277 Lake Mealup Road North, Birchmont offset site provides 25.11% of the offset requirement for Tuart TEC. A summary of the offset value is shown below in Table 28.

Table 28 Offset Calculator Values for Lot 277 Lake Mealup Road North, Birchmont Offset Site

Environmental Value	Offset Size (ha)	Start Quality	Future Quality without Offset	Future Quality with Offset	Offset Value (%)
Tuart TEC - revegetation	1.60	0	0	8	25.11



Main Roads WA
Kwinana Freeway Upgrade
EPBC Offset Strategy

**Lot 277 Lake Mealup Road North, Birchmont
Revegetation Offset Site**

Project No. 12657323
Revision No. 1
Date 14/05/2026

FIGURE 6

11 Risk Assessment

A risk assessment has been prepared which identifies any risk that may prevent Main Roads from achieving the expected environmental outcomes and rehabilitation objectives for each proposed offset site. Risks relevant to each offset site will be refined and finalised once the current discussions and negotiations with DBCA and City of Kwinana are concluded in parallel with this assessment.

Each risk has been assessed against the risk matrix presented in Table 29. The risk rating matrix uses the likelihood and consequence criteria outlined in the DCCEEW (2024) Environmental Management Plan Guidelines. This analysis then incorporated the management measures and correction actions proposed in this Offset Strategy to calculate a residual risk rating after this Offset Strategy has been implemented. The resultant residual risk ratings were all determined to be either low or medium indicating that the proposed management and corrective actions will successfully reduce the initial risk ratings.

To further manage the risk of the offset not succeeding, a more detailed risk assessment will also be prepared for each offset site as part of individual offset management plans referred to in sections 7 to 10. These plans will be prepared once offsets are finalised, and will include descriptions of contingency actions to be implemented in the event offset targets are at risk of not being met.

Table 29 Risk rating matrix (DCCEEW 2024)

Likelihood	Consequence				
	Minor	Moderate	High	Major	Critical
Highly Likely	Medium	High	High	Severe	Severe
Likely	Low	Medium	High	High	Severe
Possible	Low	Medium	Medium	High	Severe
Unlikely	Low	Low	Medium	High	High
Rare	Low	Low	Low	Medium	High

Table 30 Criteria to assess the likelihood of a risk even occurring (DCCEEW 2024)

Likelihood	Criteria
Highly likely	The risk event is expected to occur in most circumstances during the offset timeframe
Likely	The risk event will probably occur in most circumstances during the offset timeframe.
Possible	The risk event could occur at some time during the offset timeframe
Unlikely	The risk event will probably not occur in most circumstances during the offset timeframe
Rare	The risk event may only occur in exceptional circumstances during the offset timeframe.

Table 31 Criteria to assess the consequence of a risk event occurring (DCCEEW 2024)

Consequence	Criteria
Critical	- Severe widespread loss of environmental amenity and irrecoverable environmental damage - Onsite impacts: catastrophic - Offsite impacts local scale: high level or above - Offsite impacts wider scale: mid-level or above - Mid to long-term or permanent impact to an area of high conservation value or special significance - Specific Consequence Criteria (for environment) are significantly exceeded
Major	- Major loss of environmental amenity and real danger of continuing - Onsite impacts: high level - Offsite impacts local scale: mid-level - Offsite impacts wider scale: low level - Short-term impact to an area of high conservation value or special significance - Specific Consequence Criteria (for environment) are exceeded
High	- Substantial instances of environmental damage that could be reversed with intensive efforts - Onsite impacts: mid-level - Offsite impacts local scale: low level - Offsite impacts wider scale: minimal - Specific Consequence Criteria (for environment) are at risk of not being met
Moderate	- Isolated but substantial instances of environmental damage that could be reversed with intensive efforts - Onsite impacts: low level - Offsite impacts local scale: minimal - Offsite impacts wider scale: not detectable - Specific Consequence Criteria (for environment) likely to be met
Minor	- Minor incident of environmental damage that can be reversed - Onsite impact: minimal - Specific Consequence Criteria (for environment) met

Table 32 Risk Assessment for Offset Management Activities

Risk Event	Description	Initial Risk Rating			Risk mitigation strategies	Residual Risk			Management Trigger	Relevant Correction Actions
		Likelihood	Consequence	Risk Rating		Likelihood	Consequence	Risk Rating		
Climate change - Drought (Extreme and/or prolonged weather event) - Flooding	Potential to impact long-term success of restoration / revegetation areas as a result of - Extreme temperatures - Less rainfall - Storms - Increase risk of bushfire	Possible	Major	High	Planting of tube stock should be undertaken during colder and wetter months to avoid significant impacts as a result of summer droughts. Infill planting undertaken at restoration offset sites if required to achieve stated targets	Possible	Moderate	Medium	Frequent extreme weather events such as droughts, extreme heat and flooding. Offset fails to achieve milestone targets or completion criteria. Significant plant death within the restoration / revegetation area(s)	Adaptive management and review of management methodologies as required to ensure stated targets are achieved.
Increased fire risk of severe uncontrolled fires	An uncontrolled severe bushfire may degrade or destroy a portion or an entire restoration / revegetation area	Possible	Major	High	Development and implementation of fire management strategies and or plans for the restoration / revegetation areas, if not already in place by landowners/managers. Application of the relevant local government fire hazard reduction notices including construction of firebreaks around the restoration / revegetation boundary (where applicable) and fuel load management such as weed control to minimise impacts from external bushfires and reduce overall bushfire hazard	Unlikely	Major	Medium	Unplanned fire within the restoration / revegetation areas. Bushfire mitigation measures such as firebreaks or fuel load control not being achieved. Significant weed coverage increasing potential fuel loads.	Monitoring required (routine inspection) prior to every bushfire season to include an assessment of dominant weeds adding to the fuel load, if any, and fire break implementation. If required, revise fire management to reduce future risk.
Ignition of bushfire	Operations and maintenance activities have the potential to ignite an uncontrolled bushfire, and fire has high impact on restoration / revegetation progress and success.	Possible	High	Medium	Grass weeds to be controlled in line with DFES and/or Local Government requirements. Driving of vehicles will be restricted to approved timeframes (in line with DFES and/or Local Government restrictions) and to existing tracks. No parking within areas containing long grass is to occur within the offset site. Smoking will not be permitted in the offset sites.	Unlikely	Moderate	Low	Bushfire ignition during operation or maintenance of rehabilitation area	Review and revise fire management plans if and as required to reduce future risk. Increase frequency of grassy weed control Ensure contractors accessing the offset sites are aware of fire management requirements.
The Offset fails to meet the nominated milestone targets and/or final completion criteria	The restoration / revegetation areas do not meet stated milestone targets and/or completion criteria. This includes not meeting the relevant restoration / revegetation targets for example as a result of inability to obtain seed/plant material, or unexpected dry spells resulting in plant death	Possible	High	Medium	Interim milestones and completion criteria for each offset site will be detailed within the site offset management plans. Adaptive management including implementation of contingency actions such as amending frequency or methodology of weed and/or pest animal control, planting methodologies, and/or undertaking infill planting as required. Three-yearly audit reports of compliance with restoration / revegetation targets and completion criteria.	Unlikely	High	Medium	Two consecutive audit reporting periods indicating that milestone targets are not trending towards achievement and/or target timeframes cannot be met. The restoration / revegetation does not comply with the obligations in the site offset management plans.	Continual review in line with the milestone targets and completion criteria. Review and revise offset management plans and contingency measures as required. Review why obligations and targets have not or cannot be met/achieved.

Risk Event	Description	Initial Risk Rating			Risk mitigation strategies	Residual Risk			Management Trigger	Relevant Correction Actions
		Likelihood	Consequence	Risk Rating		Likelihood	Consequence	Risk Rating		
Damage of the restoration / revegetation areas	Damage of habitat, modification or loss, fragmentation as a result of illegal clearing and unauthorised access	Possible	Minor	Low	Restoration / revegetation areas will be fenced where feasible to avoid unauthorised clearing and vehicle access. Management actions, timing and performance targets specific to each offset site will be detailed in site offset management plans.	Unlikely	Minor	Low	Evidence of unauthorised vehicle access or vegetation clearing	Review offset success in line with stated milestone targets and completion criteria and detection of prohibited activities within the offset sites. Revise site offset management plans and land management requirements if and as necessary to prevent further damage and / or unauthorised access.
New infestations or expansion of invasive weeds and diseases in the offset site	Introduction of new weeds and diseases within the restoration / revegetation areas of the offset sites.	Possible	Moderate	Medium	Standard environmental management, such as clean on entry requirements, will be in place to control potential spread of weeds and diseases to and from the restoration / revegetation offset areas. Targeted control of high impact weed species that may be present or may become established Weed hygiene controls during site management and firebreak and fencing maintenance. Implement appropriate vehicle and tools hygiene measures. All vehicles/machinery and tools are required to under a weed inspection and hygiene check confirming they are weed free. Chemical and mechanical control of weeds will be undertaken during the restoration / revegetation activities. Management actions, timing and performance targets specific to each offset area will be detailed within the site- specific offset management plans.	Unlikely	Minor	Low	An increase in invasive weed species within the restoration / revegetation areas. Signs of diseases such as dieback within or surrounding the restoration / revegetation areas.	Visual observation of increases in dominant weed species and/or signs of disease such as dieback. Reassess environmental training requirements for restoration / revegetation personnel. Check site logs and / or other records to determine whether hygiene protocols are being complied with n Undertake additional or alternative weed and/or disease control events if and as required.
Increased population of pest animals in the offset area.	Pest animals such as foxes and rabbits substantially impacting the success of the restoration / revegetation work through destroying tube stock and impacting rates of natural regeneration	Likely	High	Medium	Undertake restoration / revegetation monitoring to detect evidence of impacts Implement pest control activities as required to minimise impacts to offset site values Management actions, timing and performance targets specific to each offset site will be detailed in the site-specific offset management plans.	Unlikely	High	Medium	Damage tube stock/vegetation from uncontrolled pests	Undertake monitoring to identify evidence of pest animal impacts on achievement of stated millstone targets and completion criteria Increase frequency of monitoring and/or control measures as required. Undertake or improve fencing maintenance where this is a factor in pest animal impacts to offset values.

Risk Event	Description	Initial Risk Rating			Risk mitigation strategies	Residual Risk			Management Trigger	Relevant Correction Actions
		Likelihood	Consequence	Risk Rating		Likelihood	Consequence	Risk Rating		
										Revise pest control methods if impacts persist.
Offset scarcity	Suitable and acceptable offset sites are not available to counterbalance significant residual impacts	Unlikely	High	Medium	Investigation and understanding of relevant MNES and environmental factors to understand distributions and associated offset site potential ranges. Environmental values requiring offsets for this project are widely distributed and reasonably common. Liaison to date with land managers of the proposed suitable offset sites confirms availability of these sites. Multiple options have been identified, exceeding the minimum requirements to ensure adequate offset coverage.	Rare	High	Low	Suitable offset site cannot be identified to enable the progression of assessment	Progress and resolve offset proposal during assessment process. Undertake additional land acquisition and/or enter into additional partnership arrangements to provide for any shortfall in required offset value extents
Offset sites are not of sufficient size	Proposed offsets are not considered appropriate by regulators. Following further detailed assessments, proposed restoration / revegetation management actions are not supported by current land managers (DBCA or City of Kwinana).	Unlikely	Major	High	Undertake initial investigations desktop assessments, and preliminary and detailed site assessments as required to confirm offset site values in terms of habitat suitability and restoration area extent. Design an adaptive offset approach to allow substitution with equivalent sites if required Refine proposed restoration / revegetation areas as required based on detailed assessments. Identify a range of suitable offset site options to maintain flexibility. Continue engagement with land managers to understand site availability.	Rare	Major	Medium	Suitable offset option is not considered appropriate after detailed assessment and/ or land manager is unsupportive of restoration / revegetation outcomes once refined and confirmed. Remaining offset site options are unlikely to meet the total offset contributions	Explore alternative pathways, undertake detailed site assessments and broaden offset site search area. Continued and frequent engagement with land owners. Undertake additional land acquisition and/or enter into additional partnership arrangements to provide for any shortfall in required offset value extents
Commercial risks associated with delivery of the offset by the proponent	The commercial risk factors resulting in Main Roads not achieving all offset obligations. Risk of contractors not having capacity to deliver the offset requirement	Rare	Minor	Low	Main Roads is a state entity with a strong track record of delivering project offset requirements within both Perth metro area and WA. This minimises any commercial risk associated with the delivery of the offsets. Identify a range of contractors with suitable experience and expertise that are able to assist with offset implementation. Encourage development of industry through supporting a wide range of contractors and delivery agents as appropriate.	Rare	Minor	Low	For more than one revegetation season, suitably experienced contractors are not available to undertake required offset activities.	Monitor responsiveness of industry to released Requests for Tender and Requests for Quote for offset activities. Engage early with industry and contractors to ensure their availability to deliver required works programs.

12 OFFSET AREA MANAGEMENT

12.1 Management Actions

The specific environmental outcomes and targets outlined in sections 7.5, 8.5, 9.5 and 10.5 will be achieved by implementing on-ground management actions for each MNES. The proposed management actions may include a combination of unauthorised access deterrence and/or control, weed management and pest animal management, dieback management and fire management. It is anticipated that implementation of the management actions will reduce existing threats and/or key threatening processes specific to each MNES. In turn, Banksia TEC and Tuart TEC vegetation condition and/or habitat quality will be restored, leading to an increase in the HQS of at least one (1) point from the present values. The foraging quality score for Carnaby's and FRTBC is also expected to increase by at least one point through restoration. Revegetation will be undertaken to establish foraging habitat for Carnaby's and FRTBC, as well as establish Tuart TEC. Once established, these areas will also be managed to prevent/reduce threats and/or key threatening processes specific to these species/communities.

The management actions proposed as part of this Offset Strategy have been developed in line with relevant recommended actions as outlined in Conservation Advice and Recovery Plans specific to Banksia TEC, Tuart TEC, Carnaby's and FRTBC.

An example of the proposed management actions, methods and/or monitoring strategies and timing that will be detailed as part of offset management plan development is provided in Appendix 2.

12.2 Monitoring

The overarching objectives of the monitoring program are to evaluate performance of the Offset Strategy against the milestone targets and completion criteria and to assist with the development and implementation of corrective actions if the criteria are not trending towards achievement. This allows for evaluation and updates of the Offset Strategy to include additional management actions as required.

Monitoring will be conducted at each offset site to enable early detection of changes that may impede realisation of the ecological benefits and to enable measurement of progress towards and maintenance of the ecological benefit. The monitoring program will be detailed in the site-specific offset management plans.

12.2.1 Habitat Quality and Vegetation Condition Monitoring

Where required, baseline flora and vegetation surveys and targeted Black Cockatoo surveys have been undertaken at each offset site.

To ensure consistency with values presented in this Strategy, ongoing monitoring of offset site values will be undertaken across the offset sites. Monitoring quadrats will be established at each offset site with an example of the criteria to be monitored provided Appendix 3. The criteria will be used to calculate HQS for Banksia TEC and Tuart TEC using DCCEEW's HQS tools and for Carnaby's and FRTBC foraging habitat using the BCE system.

This Offset Strategy will be reviewed after each monitoring event to determine what amendments to management actions (if any) are required, to ensure progress towards the stated completion

criteria.

12.2.2 Photo-point Monitoring

Photo-point monitoring will be undertaken at designated locations within the offset sites. These will be aligned with photo-points used for the baseline assessments where possible. This monitoring will be used to provide a visual record of changing site conditions over time. Each photograph will have a location, date and time at which it was recorded.

12.2.3 Offset Area Condition Assessment Inspections

In addition to ecological monitoring, annual inspections of the offset area will be undertaken to assess:

- Condition of access controls and infrastructure
- Condition of firebreaks
- Presence of illegally dumped waste.

13 ADAPTIVE MANAGEMENT

This strategy 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 strategy 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. This strategy may also be revised to address learnings from the implementation of corrective actions, should this occur.

Adaptive management measures may also be applied where those measures are likely to provide a better environmental outcome or where the measures proposed within the strategy will provide little to no benefit. For example, if monitoring was required in year five and a fire swept through the area in year four, monitoring would not be undertaken until such time that the monitoring is likely to provide useful information, e.g. two years following the fire event.

Deviations from the Offset Strategy will be reported within the relevant annual report.

Measures to detect the need to implement corrective actions will include monitoring as described for each offset. Where monitoring results detect issues, a decline in vegetation/habitat condition or revegetation failure or issues, the following will be carried out:

- Evaluate the cause of the decline, failures or issues
- Determine the appropriate corrective or contingency actions.

Corrective actions may include:

- Supplementary planting or/or seeding
- Changes to species lists for planting and/or seeding
- Altered weed control scheduling
- Altered herbicides or weed management techniques
- Altered pest management
- Active dieback management, including phosphite treatment
- Additional or alternative access control, including fencing
- Engagement of additional resources.

An example of triggers and threshold criteria for vegetation condition, weed cover and dieback are provided in Appendix 4.

13.1 Unplanned events

Where an unplanned event occurs that potentially impacts the progress of revegetation, such as flooding, fire, drought, etc, the timing of any management triggers and targets specified within the strategy, and subsequent plans, will be adjusted accordingly. For example, if in year 12, a major fire impacted an offset site, it may be appropriate to consider the rehabilitation progress has been pushed back.

13.2 Environmental Review

Main Roads will review and revise this Offset Strategy as required and in accordance with any

Approval conditions. The latest approved version of the strategy shall be implemented.

Main Roads proposes to review this Offset Strategy every five years after its approval in order to consider:

- The management and monitoring actions
- Opportunities for an improvement in environmental performance (for example, changes to methodologies or timing)
- Identify a need to update this strategy to capture changes to the management and / or monitoring actions
- Incorporation of research findings
- Identify any general need to update this strategy.

Management actions will be evaluated against the milestone targets to assess effectiveness towards achieving completion criteria, by assessing the change in vegetation condition and / or habitat quality relative to the baseline starting condition/quality. This will enable management actions to be adapted as required and identify corrective actions to achieve the stated outcomes.

14 REPORTING AND ACCOUNTABILITY

14.1 Roles and Responsibilities

This Offset Strategy outlines the environmental management activities to be undertaken by Main Roads or its delegate in association with the offset areas for the Proposed Action. The actions contained within this Offset Strategy will be implemented in accordance with any future conditions of the Proposed Action.

The Director Environment and Heritage at Main Roads will maintain responsibility for implementation of the management actions specified in this Offset Strategy on behalf of the Main Roads Managing Director.

14.2 Reporting

For each offset site, an annual monitoring report will be prepared, that report will follow the format in Table 33. The annual compliance report will be made publicly available on Main Roads' website.

Table 33 Format of Annual Monitoring Report for each Offset Site

Section	Potential Inclusions
Introduction	- Background - Objective - Scope of works - Summary of management activities for the period - Assumptions/limitations
Environmental Setting	- Climatic/weather conditions over the reporting period (rainfall, storms, dry periods) - Changes to topography, drainage or hydrology (surface water runoff, flow direction) - Environmental events such as flooding or fires - Wetlands (if applicable)
Management Activities	- Details of on-ground management works or other works undertaken as per the agreed management actions - Identification and justification for deviations from on-ground management works or other works specified in the operational works plan for the period - Identification and justification of any corrective actions (if required) implemented during the period - Result of any surveys, including monitoring surveys, undertaken (e.g. dieback mapping, weed mapping, flora and vegetation surveys) - Any observed or anecdotal results noted from the implementation of on-ground management works (i.e. observable reduction in feral animals or reduction in weeds)
Financial Arrangements	- Details of expenditure incurred during the management period - Identification of and justification for deviations in anticipated expenditure during the management period - Proposed re-allocation of funds from one management activity to another - Any proposed re-allocation of funds from one management period to another - Risk assessment for proposed funding changes for the upcoming management period
Stakeholder Consultation	Details of any stakeholder consultation conducted
Figures	Site layout

Section	Potential Inclusions
	• Locations of on-ground management activities (e.g. fencing, signage, weed control, track maintenance) • Locations of work areas (e.g. weed control, track maintenance) • Locations of observations (e.g. areas showing reduced feral animal activity) • Indications of proposed works areas for the upcoming management period • Provision of spatial data
Photographs	• Evidence of works implemented (e.g. fencing, signage, rubbish removal) • Evidence justifying deviations from operational works plan • Visible changes to the site and/or surrounds • Visible changes (improvement or degradation) to environmental values (e.g. vegetation condition, flora, fauna habitat, wetlands)
Conclusions	• Management activities completed to date • Comment on the effectiveness of management activities that have been implemented this far
Recommendations	• Recommendations for management activities for the upcoming management period • Recommendations for deviations to any management activities for the upcoming management period • Recommendations for funding allocation for management activities for the upcoming management period • Any other recommendations

Progress against the objectives of this Offset Strategy will be reported in accordance with the schedule outlined in Table 34.

Table 34 Reporting Schedule

Reports	Reporting Period	Responsibility
Annual compliance report in accordance with the EPBC Act Annual Compliance Report Guideline	Annually	Main Roads

Where monitoring results indicate that management actions are not working, contingency measures will be triggered. These will include corrective actions guided by expert opinion and will result in necessary revisions of the management measures and monitoring programs. The revisions will be documented in accordance with Main Roads document control procedures. These corrective actions may include:

- Increase in monitoring frequency
- Additional survey works to better understand the factors that are influencing the unanticipated changes in the environment
- Change in approach to weed, fire and/or pest animal control.

15 Application of EPBC Act Environmental Offsets Policy

This Offset Strategy has been developed to be consistent with the EPBC Act Environmental Offsets Policy (DSEWPaC, 2012a). The overarching principles of this Policy have been considered in preparing this Offset Strategy as outlined in Table 35.

Table 35 Consideration of the EPBC Act Environmental Offsets Policy

Offset Principle	Consideration
Suitable offsets must deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed action	The offsets will provide a conservation outcome that improves and maintains the viability of MNES. The proposed offset package includes direct land management actions. The proposed offset sites will counter-balance the residual impacts to MNES by at least 100% when assessed using the EPBC Act Offset Assessment Guide. The offsets package will restore and revegetate a total of approximately 69.05 ha of land for conservation. The selection of sites protects MNES within proximity to the Proposed Action as well as within the wider region where MNES also occur. Conservation of large, intact patches of TEC and Black-Cockatoo habitat results in a greater overall conservation benefit than many smaller areas. Larger patches of bushland sustain higher native species diversity and are less susceptible to disturbances such as edge effects. The Offset Strategy also aligns with local Biodiversity Strategies. The Offset Strategy comprises restoration and revegetation offsets, which have been shown to be effective in producing a measurable environmental benefit (May et al. 2017).
Suitable offsets must be built around direct offsets but may include other compensatory measures	The entire proposed offset package consists of direct offsets for Banksia TEC, Tuart TEC, Carnaby's and FRTBC.
Suitable offsets must be in proportion to the level of statutory protection that applies to the protected matter	Offsets were calculated and assessed using the EPBC Act Offset Assessment Guide (DSEWPaC, 2012b). This guide was developed to give effect to the Offset Policy's requirements. The EPBC Act Offset Assessment Guide has an adjustment to ensure that offset is in proportion to the level of statutory protection that applies to the protected matter. This Offset Strategy is guided by DCCEEW's Habitat Quality Scoring frameworks for TEC offset requirements, and the BCE system for black cockatoo impacts.
Suitable offsets must be of a size and scale proportionate to the residual impacts on the protected matter	The offsets package proposed in this Offset Strategy exceeds 100% of the offset requirement to ensure that the size and scale of the offset is proportionate to the residual impacts on the MNES. The contribution of each offset proposed in the Offset Strategy to the overall offset requirement has been calculated using the EPBC Act Offset Assessment Guide which utilises a balance sheet approach to quantify impacts and offsets.
Suitable offsets must effectively account for and manage the risks of the offset not succeeding	The EPBC Act Offset Assessment Guide accounts for the risks of the offset not succeeding by weighting the scoring in the guide. Contingency actions will be implemented where a particular offset is not meeting targets to manage the risk of the offset not succeeding. The proposed offset package exceeds the 100% offset requirement and is considered to be low risk. The estimation of direct offsets is based on completed offset assessment guide calculations, incorporating a conservative assessment of confidence in results of the offset succeeding (80%).

Offset Principle	Consideration
	Management actions proposed to be undertaken on the offset sites may include (where and as required): - Access control - Fire breaks - Weed control - Pest animal control - Rubbish removal - Dieback assessment and management These actions will prevent the decline or deterioration of the protected matters within the offset sites. Jandakot Regional Park is managed by DBCA, which provides additional assurance in implementing land management actions. The adjacent vegetation will protect the offset sites from edge effects and unrestricted access. To further manage the risk of the offset not succeeding, each offset site will have an offset management plan prepared which will describe contingency actions to be implemented in the event offset targets are at risk of not being met.
Suitable offsets must be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs (this does not preclude the recognition of state or territory offsets that may be suitable as offsets under the EPBC Act for the same action)	The offsets have been selected specifically to counterbalance significant residual impacts of the Proposed Action. The proposed offsets in the Offset Strategy are additional to those that would occur under a business-as-usual scenario, or to any existing requirement. In the absence of the proposed offsets, the sites would continue to be managed in accordance with existing land tenure and current land use practices. It is anticipated that the future condition/quality of the sites would remain static or decline over time due to ongoing existing threats/threatening processes such as weed invasion, altered fire regimes, dieback infestation, pest animal invasion and unauthorised access. Under this Offset Strategy, offset sites will be subject to formal management arrangements and resourced through dedicated offset funding. These arrangements will enable the implementation of targeted management actions that go beyond existing obligations and typical land management practices. Additionality is demonstrated through the following: • The offset actions are not required under any existing approval, land management agreement or regulatory framework. • The environmental outcomes are dependent on the offset funding and management actions and would not be financially or operationally viable under business-as-usual conditions. • The offset secures long-term protection and management of the sites that would otherwise remain unmanaged or subject to ongoing degradation. • The proposed actions will result in quantifiable improvements for the relevant MNES relative to the predicted future condition of the sites without the offset.
Suitable offsets must be efficient, effective, timely, transparent, scientifically robust and reasonable	Direct offsets are considered to be the most effective and efficient type of offset, when considered against other compensatory measures. Each offset site selected has been deemed suitable and efficient as they aim to meet Commonwealth regulatory requirements. Where possible, large offset sites in proximity to the Proposed Action have

Offset Principle	Consideration
	been selected to reduce management requirements. For example, Jandakot offsets 100% of the Banksia TEC impacts, therefore all land required for the management of TEC can be targeted for just this site. This ensures the efficient use of resources (i.e. labour, time and materials) and further validates the effectiveness of the offset based on the protection and enhancement of a large-scale lot of suitable Banksia TEC. Management actions will be conducted in accordance with the indicative schedules and will be further refined in the offset management plans for each site. Sections 7 to 10 provide details for each offset site. Information has been acquired either from past environmental reports or surveys, or from biological surveys and reports conducted specifically for the purpose of informing Main Roads and DCCEEW of the offset site's ecological characteristics and conservation values. All associated information is presented in a clear and concise manner, summarising details as they are written in the referenced documentation.
Suitable offsets must have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.	The Offset commitments outlined in this Strategy will be funded by Main Roads. Main Roads will enter into an MoU or similar agreements with DBCA and the City of Kwinana, that detail the requirements for offset site management, funding and monitoring consistent with the Offset Strategy. The actions contained within this Offset Strategy are required to be implemented in accordance with the approval conditions of the Proposed Action. Main Roads will publish an annual compliance report on its website, which will include the details of measures within the Offset Strategy, ensuring public accessibility and accountability. This Offset Strategy has been developed to demonstrate that the significant residual impacts of the Proposed Action are able to adequately counterbalanced. The governance of each offset site, including monitoring, auditing and reporting, will be documented within each individual site offset management plan, which, if and as required, will be refined over time based on the finding of any additional surveys and consultation with stakeholders.

15.1 'Like for Like'

Table 36 to Table 39 show the habitat quality of the impact and the offset area(s) by current and future habitat quality for Banksia TEC, Tuart TEC, Carnaby's and FRTBC. This comparison shows that overall, the impact site is of lower quality than the current and future quality of any of the offset sites. This demonstrates that the offset package proposed provides higher habitat quality than what was impacted and that the offsets will deliver a 'like for like' or better outcome for each MNES.

Table 36 Banksia TEC Impact Habitat Quality versus Habitat Quality with Offset

Habitat Quality Score	PAA (Impact site)	Current quality		Future quality	
		Jandakot Regional Park	Total Area Offset site	Jandakot Regional Park	Total Area Offset site
3	1.1				
4	2.54				
5	6.07				
6		38.6	38.6		
7				38.6	38.6
Total	9.71	38.6	38.6	38.6	38.6

Table 37 Tuart TEC Impact Habitat Quality versus Habitat Quality with Offset

Habitat Quality Score	PAA (Impact site)	Current quality				Future quality			
		Postans-Thomas Road, Kwinana	Lot 1 Tamarisk Drive, Gabbadahh	Lot 277 Lake Mealup Road North, Birchmont	Total Area Offset Sites	Postans-Thomas Road, Kwinana	Lot 1 Tamarisk Drive, Gabbadah	Lot 277 Lake Mealup Road North, Birchmont	Total Area Offset Sites
0				1.60	1.60				
3	0.7								
4	1.66								
5	0.68								
6		8.00			8.00				
8								1.60	1.60
9			5.01		5.01				
10						8.00	5.01		13.01
Total	3.04	8.00	5.01	1.60	14.61	8.00	5.01	1.60	14.61

Table 38 Carnaby's Cockatoo Impact Habitat Quality versus Habitat Quality with Offset

Habitat Quality Score	PAA (Impact site)	Current quality			Future quality		
		Jandakot Regional Park	Postans-Thomas Road, Kwinana	Total Area Offset Sites	Jandakot Regional Park	Postans-Thomas Road, Kwinana	Total Area Offset Sites
0		7.20		7.20			
4			11.01	11.01			
5	1.37		2.99	2.99			
6	19.69	38.6		38.60			
7	0.15				38.60		38.60
8					7.20	14.00	21.20
Total	21.21	45.80	14.00	59.80	45.80	14.00	59.80

Table 39 FRTBC Impact Habitat Quality versus Habitat Quality with Offset

Habitat Quality Score	PAA (Impact site)	Current quality			Future quality		
		Jandakot Regional Park	Postans-Thomas Road, Kwinana	Total Area Offset Sites	Jandakot Regional Park	Postans-Thomas Road, Kwinana	Total Area Offset Sites
0		2.80		2.80			
2	9.13						
3							
4	9.52		11.01	11.01			
5			2.99	2.99			
6							
7	1.52						
8					2.80	14.00	16.80
Total	20.17	2.80	14.00	16.80	2.80	14.00	16.80

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17 APPENDICES

Appendix	Title
1	Interim Habitat Quality Scores
2	Offset Management Plan example
3	Monitoring Quadrat Criteria example
4	Contingency Measures example

Appendix 1 Site Habitat Quality Scores

Interim HQS score – Jandakot Regional Park – Banksia TEC

Aspect	Single patch therefore scores averaged across the nine banksia quadrats.	
	Score	Comments
Site Condition		
Vegetation condition	50	Good to Very good
Species richness	0	Average native species richness from sampled quadrats in patch is 20.0 plant taxa
Presence of Threatened taxa	10	Patch is critical habitat for Threatened taxa (Black cockatoos)
Contains State listed TEC/PEC	10	Patch considered likely to contain WA FCT listed PEC (FCT 21c; Low lying <i>Banksia attenuata</i> woodlands or shrublands).
Presence of Dieback	5	Patch has some evidence of dieback
Condition total	75	
Condition score	35	
Site Context		
Connectivity	30	Patch is continuous with remnant vegetation and forms a corridor that links different landscape units (wetlands present).
Patch size	50	>100 ha
Site location and risk	10	Patch is in Perth metropolitan area, on the SCP. Patch is located in an area where the TEC has been extensively cleared.
	0	Patch is not located at the geographical edge of the recorded range.
Context total	90	
Context score	27	
Quality		
Quality total	62	
Final Patch Habitat Quality Score	6.2	
Rounded Score	6	

Sources: Ecoscape draft flora and vegetation survey report (March 2026), Main Roads site assessment.

Interim HQS score – Postans-Thomas Road, Kwinana - Tuart TEC

Aspect	Patch 16		Patch 33	
	Score	Comments	Score	Comments
Site Condition				
Native understory cover	20	Moderate condition	60	Very High condition
Contains a habitat role	15	Survey data indicates 1.99 trees per 0.5 ha	15	Survey data indicates 8.62 trees per 0.5 ha
Site shows regeneration	0	No regeneration of Eucalyptus or Corymbia observed during the survey	0	No regeneration of Eucalyptus or Corymbia observed during the survey
Presence of Key Fauna Species	0	Minor presence	0	Minor presence
Presence of Dieback	15	No evidence of Dieback recorded	15	No evidence of Dieback recorded
Condition total (out of 115)	50		90	
Condition score	30.43		54.78	
Site Context				
Patch size	100	Total patch size is 53.86 ha	50	Total patch size 2.84
Landscape role	15	Eastern part of patch connects to native vegetation that extends eastwards	15	Patch connected to native vegetation patch to west and east of patch.
Buffer zone	0	Large parts of patch with no buffer	15	Greater than 50% of patch with appropriate buffer zone
Context total (out of 130)	115		80	
Context score	26.54		18.46	
Quality				
Quality total (out of 100)	56.97	Out of 100	73.24	Out of 100
Final Patch Habitat Quality Score	5.70	Out of 10	7.32	Out of 10
Weighted Patch Score	8.49	Final Patch Habitat Quality Score * Area of patch within Offset site (1.49 ha)	20.80	Final Patch Habitat Quality Score * Area of patch within Offset site (2.84 ha)

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Kwinana Freeway Upgrade (Roe Highway to Mortimer Road) EPBC Offset Strategy – May 2026

Aspect	Patch 34		Patch 35	
	Score	Comments	Score	Comments
Site Condition				
Native understory cover	60	Very High condition	40	High condition
Contains a habitat role	15	Survey data indicates 3.02 trees per 0.5 ha	15	Survey data indicates 2 trees per 0.5 ha
Site shows regeneration	0	No regeneration of Eucalyptus or Corymbia observed during the survey	0	No regeneration of Eucalyptus or Corymbia observed during the survey
Presence of Key Fauna Species	0	Minor presence	0	Minor presence
Presence of Dieback	5	Some Banksia deaths which may indicate dieback presence	5	Some Banksia deaths which may indicate dieback presence
Condition total (out of 115)	80		60	
Condition score	48.70		36.52	
Site Context				
Patch size	50	Total patch size is 3.97 ha	0	Total patch size 1.08
Landscape role	15	Patch connected to native vegetation patch to west and east of patch.	15	Patch connected to native vegetation patch to west and east of patch.
Buffer zone	15	Greater than 50% of patch with appropriate buffer zone	15	Patch has appropriate buffer zone
Context total (out of 130)	80		30	
Context score	18.46		6.92	
Quality				
Quality total	67.16	Out of 100	43.44	Out of 100
Final Patch Habitat Quality Score	6.72	Out of 10	4.34	Out of 10
Weighted Patch Score	26.66	Final Patch Habitat Quality Score * Area of patch within Offset site (3.97 ha)	4.69	Final Patch Habitat Quality Score * Area of patch within Offset site (1.08 ha)

Sources: Westport Roads IPT (2026)

The summed total of each weighted patch score divided by the total patch size within the offset site (9.38 ha) is 6.47. Rounded score is 6.

Interim HQS score – Lot 1 Tamarisk Drive, Gabbadah - Tuart TEC

Aspect	Based on the sole Tuart quadrat scored	
	Score	Comments
Native understorey cover	60	>12 native spp and >80% cover, very high condition
Contains a habitat role	15	Based on aerial imagery, quadrat photo and recollection of that vegetation
Site shows regeneration	0	Assumption based on the density of vegetation and general evidence of disturbance, no information available. To be confirmed.
Presence of Key Fauna Species	10	Assumption. Key fauna species highly likely to be present based on the location and extent of the patch. To be confirmed.
Presence of Dieback	15	No evidence of dieback observed during site inspection and not referred to in DBCA's report or PGV report. Site is situated on Spearwood soils which are less likely to support dieback.
Condition total	100	
Condition score	60.87	
Patch size	100	~20 ha
Landscape Role	15	Patch contiguous with large expanse of intact native vegetation
Buffer Zone	15	Patch has an appropriate buffer zone
Context total	130	
Context score	30	
Quality total	90.87	
Final Patch Habitat Quality Score	9.1	
Site habitat Quality Score	9.1	
Rounded Score	9	

Sources: PGV flora survey report (Nov 2024), DBCA site assessment report (not for issue outside of Main Roads), Main Roads site assessment.

Appendix 2 Offset Management Plan Actions Example

Summary of management actions that may be included in an offset management plan

Aspect	Management action	Description of methodology / monitoring strategy	Indicative timing
Access control	Review existing access and controls	Visual inspection of existing conditions	Year 1
	Install perimeter access controls (i.e. fencing) and limit vehicle and foot access points where appropriate	Suitably qualified service provider to install access controls.	Years 1 to 3
	Maintain access controls and points.	Inspection and maintenance of access controls and points.	Annual inspection. Ongoing for duration of offset term
Fire management	Inspect and maintain firebreaks in accordance with the LGA firebreak requirements.	Maintain firebreaks through mechanical or chemical means.	Annual inspection. Ongoing for duration of offset term
	Develop and implement an ecologically sensitive fire management plan	Methods to reduce fuel loads and increase natural regeneration	Year 5 Ongoing for duration of offset term
Dieback management	Complete baseline Phytophthora Dieback Occurrence Assessment to detect and map occurrences of Dieback.	Dieback mapping in accordance with DBCA procedures (2015) and completed by an accredited Dieback Assessor.	Year 1
	Prepare and implement Dieback management program	Program to include identification and marking of 'Uninfested', 'Infested' and 'Un-interpreted' areas on-ground, hygiene measures and Dieback treatments were appropriate. Program to be implemented by suitably qualified personnel.	Year 1 Program implemented for duration of offset term
	Complete follow-up Dieback mapping	Mapping to be completed by an accredited Dieback Assessor.	Year 3, repeat every three years
Weed management	Complete baseline weed mapping to record and map locations and densities of Declared Plants, WoNS and environmental weeds (by growth form).	Baseline weed assessment to be undertaken by suitably qualified personnel..	Year 1

Aspect	Management action	Description of methodology / monitoring strategy	Indicative timing
	Complete weed control events based on optimal control times and suggested herbicide selections for the growth form groups/species recorded.	Weed control using manual, chemical and/or biological methods.	Year 1 to 3 - twice per annum (pa) Year 4 to 5 – once pa Year 6 to 20 - as required based on site observations
	Establish and implement weed monitoring program.	Weed monitoring to be undertaken using nominated monitoring sites (combination of plots, transects and photo points). Monitoring to be undertaken by suitably qualified personnel.).	Year 1 Monitoring repeated every three years.
Pest animal control	Complete pest animal inspection to identify and map locations of warrens/burrows etc. and estimate species' population density/size	Visual inspection	Year 1
	Implement control measures where appropriate	Pest animal control using chemical (e.g. fumigation, baits) and/or mechanical methods (e.g. ripping).	Years 1 to 3, then as required.
	Establish and implement feral animal monitoring program	Monitoring to be undertaken by suitably qualified personnel.	Year 1 Program implemented for duration of offset term
Rubbish management	Review existing site condition	Visual inspection of existing waste	Year 1
	Complete waste removal	Inspection for and removal of waste at an appropriately licenced facility.	Annual inspection and removal activities. Ongoing for duration of offset term

Appendix 3 Indicative Monitoring Quadrats Criteria Example

Indicative Monitoring Quadrats Criteria

Criteria	Measure	Indicator
Site Code	Quadrat number	-
Monitoring Date	Date	-
Location	Location	-
Quadrat Size and Shape	10m x 10m	-
Vegetation unit and description		Change compared to baseline
Vegetation condition	EPA 2016, adapted from Keighery 1994 vegetation condition scale	Change or decline from baseline condition
Total species	List of all species present and individual % cover	
Native species richness	Count of native species	Decline in species richness
Understorey taxa (native)	List of all species present and % cover	Change or decline in native understorey from baseline
Natural regeneration	Evidence of germinants, seedlings	Indicator of ecosystem function
Natural regeneration (eucalypts)	Stems (DBH < 15cm) per ha	Decline in eucalypt natural regeneration
Presence of native eucalypts	Stems (DBH ≥ 50 cm) per ha	Decline in native eucalypts
Revegetation	Number of species, % foliage cover	Site specific
Bare ground	% within quadrat	Increase or decrease of > 10% surface area from baseline
Weed cover	Weed type, percentage of weed foliage cover	Increase in weed cover from baseline
DP and WONS	Presence and % of DP and WONS	Increase in number of DP and WONS species present
Dieback status (if known)	Infested, uninfested or uninterpretable	Change to dieback status
Overstorey taxa (dominants)	Identify dominant overstorey species	Change in dominant taxa
Overstorey taxa (deaths)	Count of overstorey species deaths	Increase in overstorey species deaths
Projected foliage cover of black cockatoo foraging species	% cover	Decline in % cover
Black cockatoo foraging score	Bamford's Foraging Scoring system (BCE, 2020)	Decline in foraging score from baseline
Feral and native fauna	Evidence and presence	Significant signs of herbivory or predation
Fire age	Time since last fire	
Other disturbances and threats	Evidence and impact	
Photo monitoring	North-west corner to south-east corner	

Appendix 4: Contingency Measures Example

Adaptive Management Response Table

Environmental Value: Maintain vegetation condition within the Offset Site			
Criterion 1. Vegetation Condition		Monitoring Type and Frequency	Response Actions
Trigger	Decline in the vegetation condition rating from Year 1 baseline	Vegetation condition monitoring – every 5 years	- Investigate cause - Has more than one monitoring site declined? Are they potentially related? - Review weather data over reporting period to examine impacts from climatic factors - If investigation identifies cause of decline, implement remedial actions if able to do so - Continue to monitor - Report as per Section 14
Threshold	Significant decline in the vegetation condition from the baseline	Vegetation condition monitoring – every 5 years	- Investigate cause and implement trigger response actions - Implement investigation report for regulators - Review management actions - Report as per Section 14
Criterion 2. Weed Cover		Monitoring Type and Frequency	Response Actions
Trigger	Increase in weed cover from Year 1 baseline mapping Presence of new weed species	Weed mapping every three years	- Investigate cause - Has there been a change in weed species present? Are one or more weed species dominant? - Are the weeds annuals or perennial? - Review weed control procedures - Report as per Section 14
Threshold	Overall increase >20% in weed cover within any monitoring quadrat from Year 1 baseline Presence of new DP or WoNS	Weed mapping every three years	- Investigate cause - Implement investigation reporting for regulators - Review management actions - Report as per Section 14
Criterion 3. Dieback Status		Monitoring Type and Frequency	Response Actions

Environmental Value: Maintain vegetation condition within the Offset Site			
Trigger	Decline in dieback status from baseline mapping	Dieback mapping every 3 years	- Investigate cause - Implement remedial actions where possible such as phosphite treatment - Implement investigation reporting for regulators - Review dieback management procedures - Report as per Section 14
Threshold	Dieback infested area within Offset Site from baseline mapping	Dieback mapping every 3 years	- Investigate cause - Implement remedial actions where possible such as phosphite treatment - Implement investigation reporting for regulators - Review dieback management procedures - Report as per Section 14
Criterion 4. Plant Pest or Disease other than Dieback		Monitoring Type and Frequency	Response Actions
Trigger	Presence of other pest or disease that may cause vegetation condition to decline within Offset Site	Vegetation condition mapping – every 5 years Ad hoc site inspections noting tree decline	- Investigate cause - Is the pest/disease established and causing damage? - Is the damage seasonal or an environmental stressor, should it be treated? - Implement treatment if feasible - Report as per Section 14
Threshold	Presence and impact of other pest or disease that may cause vegetation condition to decline within Offset Site	Vegetation condition mapping – every 5 years Ad hoc site inspections noting tree decline	- Investigate cause - Is the pest/disease established; will it result in long term damage? - Can it be managed or treated? - Implement treatment if feasible - Implement investigation reporting for regulators - Review management procedures - Report as per Section 14