



**Environmental
Protection
Authority**

Bunbury Outer Ring Road Southern Section

Commissioner for Main Roads Western Australia

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This document is an assessment report prepared by the Environmental Protection Authority (EPA) under s. 44 *Environmental Protection Act 1986*. It describes the outcomes of the EPA's environmental impact assessment of the Bunbury Outer Ring Road Southern Section proposal by the Commissioner for Main Roads Western Australia.

This assessment report is for the Western Australian Minister for Environment and sets out:

- what the EPA considers to be the key environmental factors identified during its assessment
- the EPA's recommendations as to whether the proposal may be implemented and, if the EPA recommends that implementation be allowed, the conditions and procedures to which implementation should be subject.



Prof. Matthew Tonts
Chair
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19 October 2021

Summary

Proposal

The Bunbury Outer Ring Road Southern Section is a proposal to extend the Bunbury Outer Ring Road Northern and Central Sections and connect it with Bussell Highway. The proposal is located about 200 kilometres south of Perth, mainly within the Shire of Capel (including the localities of Gelorup, North Boyanup and Statham), and a small component within the City of Bunbury, in the South West region of Western Australia. It also includes major upgrades to local distributor roads to connect Centenary Road to Lilydale Road via grade-separated interchanges.

The proponent is the Commissioner for Main Roads Western Australia.

The proposal includes freeway standard dual carriageway and associated bridges, interchanges and other road infrastructure including, but not limited to, culverts, lighting, noise barriers, fencing, landscaping, road safety barriers and signs.

Consultation

The EPA published the proponent's referral information for the proposal on its website for 7 days public comment. The EPA also published the proponent's updated Referral Information and Additional Information on its website for public review for 8 weeks (from 19 October to 14 December 2020). The EPA considered the comments received during these public comment periods in its assessment.

Mitigation hierarchy

The mitigation hierarchy is a sequence of proposed actions to reduce adverse environmental impacts. The sequence commences with avoidance, then moves to minimisation, rehabilitation, and offsets are considered as the last step in the sequence.

The proponent has considered the mitigation hierarchy in the development and assessment of its proposal, with the EPA also encouraging the proponent to include further additional mitigation measures throughout the assessment process. As a result, the proponent has:

- avoided impacts to an Aboriginal heritage tree and a heritage-listed tuart tree – the 'Grey Giant' (Heritage Place No. 26059)
- minimised impacts to conservation significant fauna, priority ecological communities and social amenity by:
 - narrowing the development envelope and clearing extent as much as possible (particularly in Gelorup)
 - implementing minimisation measures to reduce clearing and habitat fragmentation impacts, minimise noise and visual impacts and impacts to social connectivity.
- minimised impacts to water values by maintaining hydrological regimes and managing potential impacts to groundwater and surface water quality

- proposed rehabilitation measures to revegetate disturbed areas following construction of the proposal.

Residual impacts are those that remain after the mitigation hierarchy has been applied. The residual impacts of the proposal for each of the key environmental factors are outlined below.

Assessment of key environmental factors

The EPA identified the following key environmental factors during its assessment and has assessed that the proposal is likely to result in the following:

Terrestrial fauna

Residual impact	Assessment finding
<p>Direct impacts to 60.9 ha of western ringtail possum habitat.</p> <p>Indirect impacts from the displacement of western ringtail possum individuals and fragmentation of habitat.</p>	<p>The EPA advises that this is a significant residual impact that is likely to be able to be regulated through reasonable conditions (recommended conditions 1, 4, 5 and 6) including a requirement for offsets (recommended condition 9) so that the environmental outcome is unlikely to be inconsistent with the EPA's objective for terrestrial fauna.</p> <p>With the implementation of recommended conditions, including offsets, the likely environmental outcome is:</p> <ul style="list-style-type: none"> • small incremental loss of habitat for western ringtail possum relative to the respective remaining extents • the local population of western ringtail possums in Gelorup is likely to return to pre-disturbance levels in the long term (15 years) • a tangible improvement in western ringtail possum habitats (both in quality and quantity) in protected conservation tenure so that additional ringtail possums can be supported (potentially at densities greater than the proposal area) and hence improve the southern Swan Coastal Plain population.
<p>Direct impacts to:</p> <ul style="list-style-type: none"> • 60.9 ha of black cockatoo habitat • 1,088 black cockatoo trees with potential nesting hollows • 11 black cockatoo trees with suitable nesting hollows (two with signs of use) • 39.2 ha of south-western brush-tailed phascogale habitat. 	<p>The EPA advises that this is a significant residual impact that is likely to be able to be regulated through reasonable conditions (recommended conditions 1, 4, and 5) including a requirement for offsets (recommended condition 9) so that the environmental outcome is likely to be consistent with the EPA's objective for terrestrial fauna.</p> <p>With the implementation of recommended conditions, including offsets, the likely environmental outcomes are:</p>

	<ul style="list-style-type: none"> small incremental losses of habitat for black cockatoos and south-western brush-tailed phascogale relative to the respective remaining extents
Potential direct impacts to black cockatoos nesting in hollows during clearing activities.	The EPA advises that this is a residual impact that should be subject to conditions (recommended condition 4) to ensure that the outcome is likely to be consistent with the EPA's objective for terrestrial fauna.
Potential direct loss of 5.5 ha of black stripe minnow habitat and potential loss of individuals.	<p>The EPA advises that this is a residual impact that should be subject to conditions to limit extent (recommended condition 4) to ensure it is likely to be consistent with the EPA's objective for terrestrial fauna.</p> <p>With the implementation of recommended conditions, the likely environmental outcome is:</p> <ul style="list-style-type: none"> small incremental loss of habitat for black stripe minnow (and potentially individuals) relative to its extent.
Potential indirect impacts to hydrological regimes and water quality of black stripe minnow habitats.	The EPA advises that the residual impact from potential indirect impacts should be subject to conditions (recommended condition 2) to ensure the environmental outcome is consistent with the EPA's objective for terrestrial fauna.

Flora and vegetation

Residual impact	Assessment finding
<p>Direct impacts to:</p> <ul style="list-style-type: none"> 23.4 ha of vegetation representative of the Banksia woodlands of the Swan Coastal Plain Priority Ecological Community (PEC) 4.4 ha of vegetation representative of both Tuart (<i>Eucalyptus gomphocephala</i>) woodlands and forests of the Swan Coastal Plain ecological community PEC and Southern Swan Coastal Plain <i>Eucalyptus gomphocephala</i> – <i>Agonis flexuosa</i> woodlands PEC 4.5 ha of vegetation representative of the Southern Swan Coastal Plain <i>Eucalyptus gomphocephala</i> – 	<p>The EPA advises that this is a significant residual impact that is likely to be able to be regulated through reasonable conditions (recommended conditions 1 and 3) including a requirement for offsets (recommended condition 9) so that the environmental outcome is likely to be consistent with the EPA's objective for flora and vegetation.</p> <p>With the implementation of recommended conditions, including offsets, the likely environmental outcomes are:</p> <ul style="list-style-type: none"> small incremental losses to the extent of relevant PECs relative to their respective remaining extents a tangible improvement to the health and condition of relevant PECs and transfer of lands containing greater quantities of these communities to protected conservation tenure.

<i>Agonis flexuosa</i> woodlands PEC	
Potential indirect impacts to flora and vegetation within 20 metres of the development envelope as a result of changes to hydrological regimes, weed and dieback.	The EPA advises that this is a residual impact that is likely to be able to be regulated through reasonable conditions (recommended condition 3) so that the environmental outcome is likely to be consistent with the EPA's objective for flora and vegetation.

Inland waters

Residual impact	Assessment finding
Direct impacts to: <ul style="list-style-type: none"> • 0.2 ha of Conservation Category Wetlands • 1.4 ha of Resource Enhancement Wetlands 	The EPA advises that this is a residual impact that is likely to be able to be regulated through reasonable conditions (recommended conditions 1 and 2) so that the environmental outcome is likely to be consistent with the EPA's objective for inland waters. With the implementation of recommended conditions, the likely environmental outcomes are: <ul style="list-style-type: none"> • relatively small losses of Conservation Category Wetlands and Resource Enhancement Wetlands compared to the proportion remaining • maintenance of hydrological regimes and water quality in adjacent Conservation Category Wetlands, Resource Enhancement Wetlands, the Five Mile Brook and black stripe minnow habitats.
Potential indirect impacts to hydrological regimes and water quality in adjacent Conservation Category Wetlands, Resource Enhancement Wetlands, the Five Mile Brook and black stripe minnow habitats.	The EPA advises that this is a residual impact that is likely to be able to be regulated through reasonable conditions (recommended condition 2) so that the environmental outcome is consistent with the EPA's objective for inland waters.
Potential residual impacts to groundwater from abstraction and/or drawdown impacts provided minimisation measures are complied with.	The EPA advises that this is a residual impact (if abstraction is required) that is likely to be able to be regulated through reasonable conditions (recommended condition 2) so that the environmental outcome is consistent with the EPA's objective for inland waters.

Social surroundings

Residual impact	Assessment finding
Noise impacts to sensitive receptors.	The EPA has assessed that there may be direct impacts to sensitive receptors during operating. The EPA notes that further consultation with the community and residences will occur about the

	<p>final dimensions and configurations of the noise walls and about the influence of lowering the road profile on reducing noise further. The EPA advises that the residual impact should be subject to implementation conditions (recommended condition 7) to ensure that the proponent minimises operational noise impacts on existing noise sensitive receptors, as far as practicable. This ensures consistency with the EPA objective for social surroundings.</p>
<p>Amenity impacts to sensitive receptors from vegetation clearing changes to the landscape character, construction and operation of the highway.</p>	<p>The EPA has assessed that there may be impacts to amenity values during both construction and operation. The EPA notes that the proponent has proposed further minimisation measures including walk trails, visual screening and additional pedestrian overpasses/underpasses, and that consultation with the community will occur about these measures. The EPA advises that the residual impact should be subject to implementation conditions (recommended condition 8) to ensure that the proponent minimises the impacts to social connectivity and visual amenity. This ensures consistency with the EPA objective for social surroundings.</p>
<p>Direct loss of two community significant trees, and potential indirect impacts to the 'Grey Giant' Tuart Tree and an Aboriginal Heritage tree.</p>	<p>The EPA advises that there is a direct impact and potential indirect impacts as a result of the proposal's impact on locally significant trees. The EPA advises that the residual impacts should be subject to implementation conditions (recommended conditions 1 and 8) to ensure no project attributable direct or indirect impacts to significant trees. This ensures consistency with the EPA objective for social surroundings.</p>
<p>Potential residual impacts to Aboriginal Heritage site Place ID 18884 (artefact scatter) and four other sites lodged with the Department of Planning, Lands and Heritage</p>	<p>The EPA has assessed that there may be direct impacts to Aboriginal heritage sites. The EPA notes that consultation has occurred with the Gnaala Karla Booja Native Title Claimants. This consultation identified that the listed heritage site has no remaining stratigraphic integrity or research potential due to previous disturbance. They also identified that that the lodged sites are not considered Aboriginal sites. The EPA advises that the residual impacts should be subject to implementation conditions (recommended conditions 8) to ensure no project attributable direct or indirect impacts to a culturally modified significant tree. Based on this, the EPA considers the proposal is consistent with EPA objective for social surroundings.</p> <p>The EPA also notes that this is a residual impact that can be subject to another statutory decision-making process under the <i>Aboriginal Heritage</i></p>

	Act 1972 to ensure the environmental outcome is consistent with the EPA objective for social surroundings.
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Holistic impact assessment

Given the link between terrestrial fauna, flora and vegetation, inland waters and social surroundings factors, the EPA has considered the connections and interactions between these parts of the environment to inform a holistic view of impacts to the whole environment. The EPA formed the view that the holistic impacts from this proposal can be managed to be consistent with the EPA's environmental factor objectives.

Conclusion and Recommendations

The EPA has taken the following into account in its assessment of the proposal:

- environmental values likely to be significantly affected by the proposal
- residual impacts to all the key environmental factors, separately and holistically (this has included considering cumulative impacts of the proposal where relevant)
- likely environmental outcomes (taking into account the EPA's recommended conditions), and consistency of these with the EPA's objectives for the key environmental factors
- the EPA's confidence in the proponent's proposed mitigation measures
- whether other statutory decision-making processes that can mitigate the potential impacts of the proposal on the environment
- principles of the *Environmental Protection Act 1986*.

It is the EPA's view that reasonable conditions could be imposed on the proposal to ensure its implementation will be consistent with the EPA's objectives for the key environmental factors of terrestrial fauna, flora and vegetation, inland waters and social surroundings.

The EPA recommends that the proposal may be implemented subject to the conditions recommended in Appendix A.

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1 Proposal

The Bunbury Outer Ring Road Southern Section is a proposal to extend the Bunbury Outer Ring Road Northern and Central Sections and connect it with Bussell Highway. The proposal is located about 200 kilometres south of Perth, mainly within the Shire of Capel (including the localities of Gelorup, North Boyanup and Statham), and a small component within the City of Bunbury, in the South West region of Western Australia.

The proposal includes freeway standard dual carriageway and associated bridges, interchanges and other road infrastructure including, but not limited to, culverts, lighting, noise barriers, fencing, landscaping, road safety barriers and signs.

The proponent is the Commissioner for Main Roads Western Australia. The proponent referred the proposal to the Environmental Protection Authority (EPA) on 13 September 2019. The referral documents were available for public comment between 20 September to 26 September 2019. The level of assessment was set as Referral Information with Additional Information (8 weeks public review) on 3 October 2019. The Additional Information was available for public review between 19 October and 14 December 2020.

The proposal was determined to be a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 7 February 2020. The proposal was not assessed by the EPA as an accredited assessment under the EPBC Act, but the EPA had regard to issues relevant to matters of national environmental significance in its assessment.

The elements of the proposal which have been subject to the EPA's assessment are included in Table 1.

Table 1: Location and proposed extent of proposal elements

Proposal element	Location	Maximum extent or range
<i>Operational elements</i>		
10.5 km of freeway-standard dual carriageway, 3 km of rural distributor roads, bridges, drainage structures, noise walls, fauna crossings and other associated road infrastructure including fencing, landscaping, lighting and principal shared paths	Figure 1	Clearing of no more than 71.5 ha of native vegetation within a 200 ha development envelope.

Units and abbreviations

ha – hectare
km – kilometres

Proposal amendments

The original proposal is set out in the proponent's updated referral information (RI) (BORR Team 2020a), which is available on the EPA website.

In April 2020, the proponent requested a change to the proposal during the assessment to amend the design, construction and alignment of the road, which reduced the size of the development envelope and the extent of clearing required. These changes were determined to be unlikely to significantly increase any impacts of the proposal on the environment. The EPA Chair's notice of 28 April 2020 consenting to the change is available on the EPA website.

For the purposes of its assessment, the EPA requested the proponent investigate further opportunities to avoid and minimise impacts in addition to those included in the original proposal. In April 2021, the proponent responded by presenting additional measures for assessment by the EPA which included:

- lowering the road elevation by 0.5–1 metres at the Yalinda Drive bridge crossing
- construction of two vegetated fauna land-bridges and provision of additional fauna crossing structures
- retention of 5 ha of vegetated areas containing conservation significant fauna habitat
- inclusion of additional screen walls, local walk trails and pedestrian underpasses.

These additional measures were proposed to further mitigate the proposal's impacts to terrestrial fauna and social surroundings. The proponent subsequently requested another change to the proposal to incorporate these modifications. The EPA Chair determined these changes were unlikely to significantly increase any impacts of the proposal on the environment. The EPA Chair's notice of 1 September 2021 consenting to the change is available on the EPA website.

The consolidated and updated elements of the proposal which has been subject to the EPA's assessment is included in Table 1.

Proposal alternatives

Prior to the referral of this proposal, the proponent considered options to avoid and minimise impacts to EPA factors by investigating an alternative alignment to the south-east of the referred alignment. The alignment selection process involved:

- Environmental surveys and landowner consultation within the alternative alignment.
- Preliminary Environmental Impact Assessments (BORR Team 2019b) which determined:
 - The referred alignment would have greater impacts on native vegetation including threatened and priority ecological communities, and terrestrial fauna habitat for threatened western ringtail possum and black cockatoos.
 - In contrast, the alternative alignment would have a greater impact on threatened aquatic fauna and wetlands.

- The referred alignment would potentially have greater impacts on social surroundings in the context of visual amenity and noise to the surrounding residents of Gelorup; while the alternative alignment may have a larger impact on agricultural businesses, properties containing basic raw materials and mining tenements.

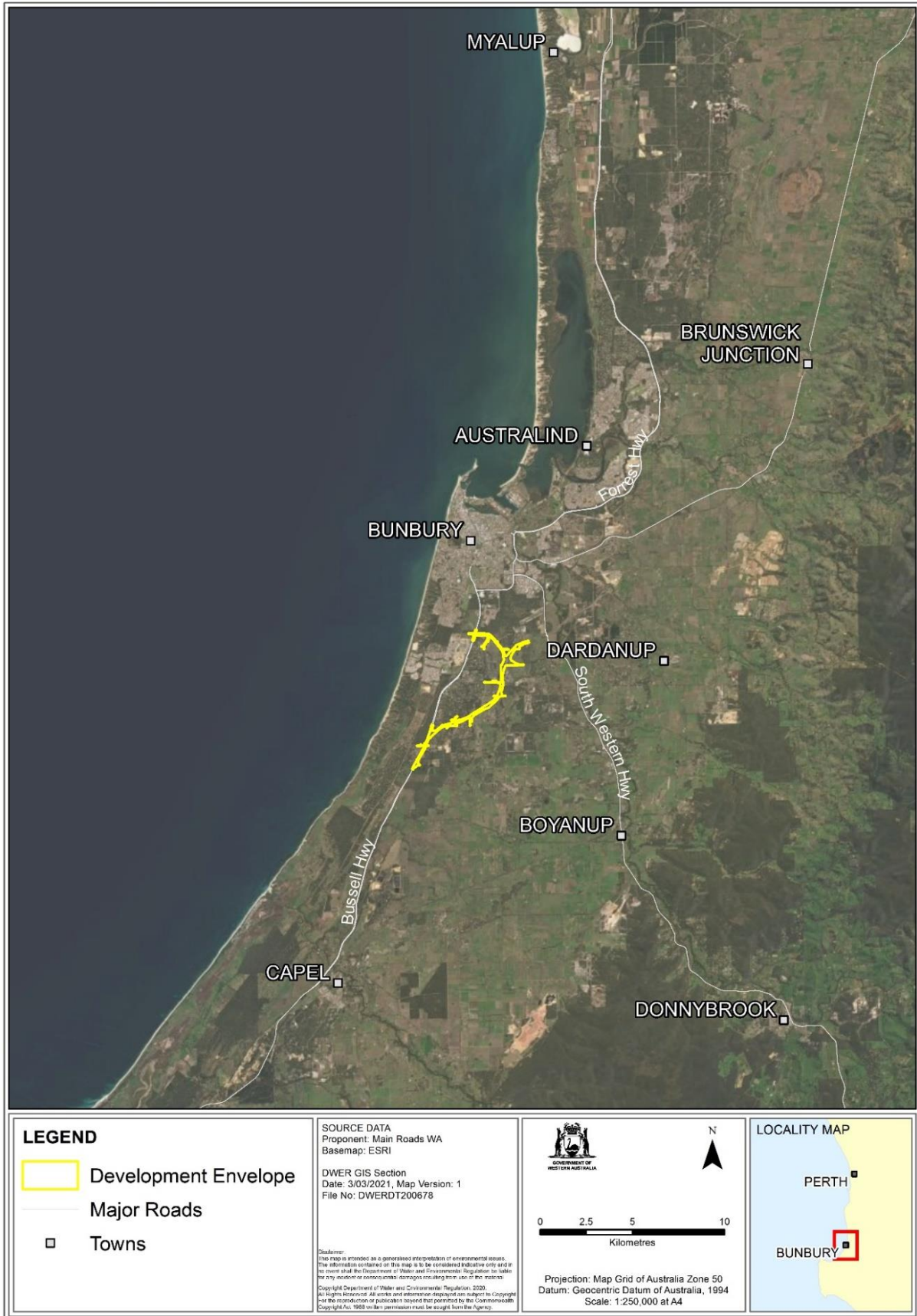
The proponent stated the referred alignment was selected due to the following:

- The referred alignment through the Gelorup route is historically zoned as Primary Regional Road in the Greater Bunbury Region Scheme.
- The regional survey work undertaken by the proponent identified a larger western ringtail possum population in the local Bunbury Western Ringtail Possum Management Zone (and more broadly across the entire species' range) than previously estimated in the Recovery Plan. As a result, the proponent anticipated that the revised species' population may reduce the significance of the proposal's impacts on the western ringtail possum.
- Engineering and land-use constraints, project costs and reduced network efficiency in the alternative alignment (BORR Team 2019b).

While the proponent investigated an alternative alignment, it referred the Gelorup route to the EPA for assessment and not an alternative alignment. Section 38 of the *Environmental Protection Act* (EP Act) requires the EPA to assess the proposal that has been referred.

Proposal context

The Bunbury Outer Ring Road Southern Section proposal is a component of the larger Bunbury Outer Ring Road project which is to construct and operate a freeway-standard dual carriageway to bypass Bunbury from Forest Highway in Kingston to Bussell Highway in Gelorup. The proponent submitted the project to the EPA as two separate proposals. The Northern and Central Sections proposal was assessed by the EPA in 2020 and approved for implementation in Ministerial Statement 1155. The Southern Section (this proposal) connects to the Central Section at its intersection with the South Western Highway in Davenport and runs in a south-westerly direction until it intersects with Bussell Highway in Gelorup.



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Figure 1: Regional location

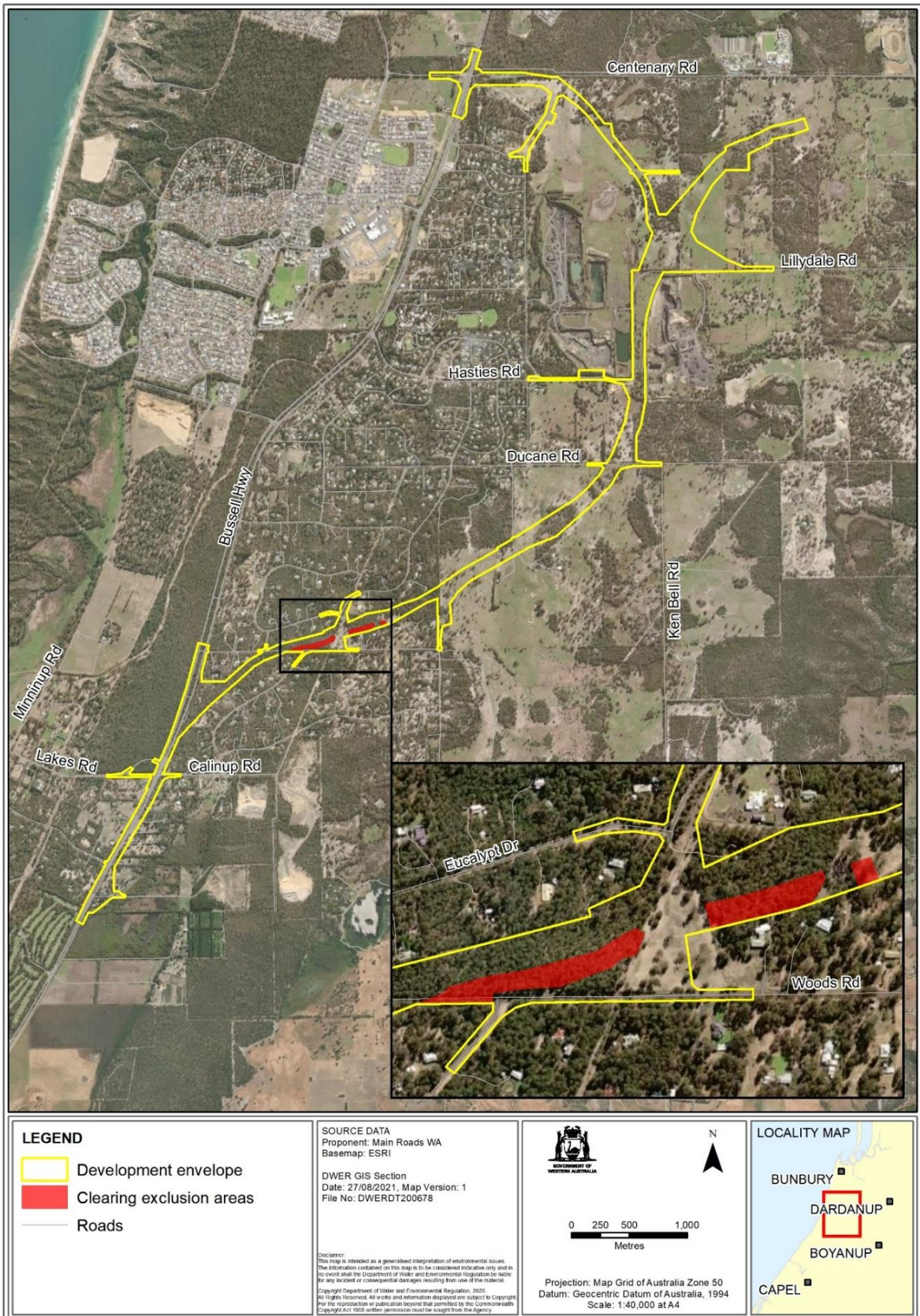


Figure 2: Development envelope

2 Assessment of key environmental factors

The EPA has determined that the key environmental factors for this assessment are terrestrial fauna, flora and vegetation, inland waters and social surroundings.

2.1 Terrestrial fauna

2.1.1 Environmental objective

The EPA's environmental objective for terrestrial fauna is *to protect terrestrial fauna so that biological diversity and ecological integrity are maintained* (EPA 2020c).

2.1.2 Investigations and surveys

The EPA advises that the following investigations were used to inform the assessment of potential impacts:

- Targeted Fauna Assessment (Biota Environmental Sciences (Biota 2020a))
- Targeted Conservation Significant Aquatic Fauna Survey (WRM 2020)
- Western Ringtail Possum *Pseudocheirus occidentalis* Regional Surveys (Biota 2020b)
- Several other environmental surveys were undertaken by the proponent to define the fauna values of the proposal area which are outlined in Table 4-37 of the updated RI (BORR Team 2020a).

The fauna surveys considered the *Technical Guidance – Vertebrate Fauna Surveys for Environmental Impact Assessment* (EPA 2020a).

2.1.3 Assessment context – existing environment

The proposal is located at the southern end of the Swan Coastal Plain. The 200 ha development envelope contains 71.5 ha of fauna habitat with the remaining 128.5 ha highly modified or cleared land.

There are three vegetated habitat types within the development envelope including: Marri / *Eucalyptus* Woodland; Marri / *Eucalyptus* in paddocks and road reserves; and Dampland with *Melaleuca* shrubland and/or woodland. The majority of the vegetation within the development envelope occurs in Gelorup where the proposed road bisects a peri-urban bushland residential area.

These fauna surveys identified 223 vertebrate fauna species, with the proposal having the potential to have a significant impact on the following conservation significant species:

- western ringtail possum (*Pseudocheirus occidentalis*) (Critically Endangered)
- Baudin's black cockatoo (*Calyptorhynchus baudinii*) (Endangered)
- Carnaby's black cockatoo (*Calyptorhynchus latirostris*) (Endangered)
- forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*) (Vulnerable)

- black-stripe minnow (*Galaxiella nigrostriata*) (Endangered)
- south-western brush-tailed phascogale (*Phascogale tapoatafa wambenger*) (Conservation Dependent / Schedule 6).

These species are affected by several threats and pressures which have ultimately led to their respective conservation status listings. The threats and pressures that are relevant to these key terrestrial fauna values and the associated assessment of impacts for this proposal are discussed in more detail in section 2.1.8.

2.1.4 Consultation

During the eight-week public review of the updated RI the main concerns raised regarding this factor involved the proposal's impacts to threatened fauna habitat, particularly the western ringtail possum (herein referred to as ringtail possum), black cockatoos and black-stripe minnow.

2.1.5 Potential impacts from the proposal

The proposal has the potential to significantly impact terrestrial fauna by the:

- loss of 71.5 ha of fauna habitat
- loss of 60.9 ha of habitat for ringtail possum
- dispersal and displacement of ringtail possum, south-western brush-tailed phascogale (herein referred to as phascogale), and other fauna into habitat adjacent to the development envelope
- fragmentation of habitat for ringtail possum and other fauna, particularly in Gelorup
- loss of 39.2 ha of habitat for phascogale
- loss of 60.9 ha of foraging and potential breeding habitat for black cockatoo species including:
 - 1,088 trees with the potential to develop hollows
 - 11 trees containing suitable hollows (including two with signs of black cockatoo use)
- loss of 5.5 ha of black-stripe minnow habitat, and potential loss of individuals
- potential impacts to fauna from injury and/or mortality due to construction and operation
- potential indirect impacts from degradation of adjacent bushland habitat through introduction and/or spread of weeds and dieback
- potential changes to hydrological flow, hydrological connectivity and/or water quality in habitat for black-stripe minnow.

2.1.6 Minimisation measures (including regulation by other DMAs)

The proponent proposes the following measures to minimise the impacts to fauna:

- Modification of the development envelope since referral to reduce clearing of fauna habitat by 24.5 ha (from 96 ha to 71.5 ha). This has reduced the habitat loss for ringtail possum and black cockatoos by 19.1 ha (from 80 ha to 60.9 ha).
- Implementation of an environmental management plan with the following minimisation measures:
 - removal of vacant ringtail possum dreys (arboreal nests) and blocking unoccupied hollows during pre-clearance surveys
 - inspection of black cockatoo hollows and avoidance of any occupied breeding trees until parent-birds and fledglings have naturally vacated
 - installation of artificial dreys, artificial watering points and protective natural structures such as felled trees in the fauna habitat outside the development envelope to reduce risks to displaced ringtail possums
 - timed clearing to avoid ringtail possum peak population times of spring and summer and pouched young where possible
 - staged directional clearing towards habitat outside the development envelope
 - installation of erosion and sedimentation control measures during construction of the bridge at Five Mile Brook to protect water quality in black stripe minnow habitat
 - minimisation and management of the risk of accidental hydrocarbon release, spill response, and potential acid sulfate soil exposure to protect soil and water quality in fauna habitats.
- Installation of possum rope-bridges and fauna underpasses (containing arboreal rails, ropes and ledges, and furniture for ground-dwelling fauna), strategic fencing and two vegetated land-bridges to facilitate fauna movement.
- Construction of a clear-span bridge over Five Mile Brook to minimise impacts to aquatic habitat.
- Installation of drainage infrastructure to maintain existing hydrological regimes and habitat connectivity to black-stripe minnow habitats.

The EPA notes that the proponent would likely require an authorisation for any inadvertent take of threatened fauna in accordance with the *Biodiversity Conservation Act 2016* (BC Act).

2.1.7 Rehabilitation

The proponent proposes to revegetate areas disturbed during construction inside the development envelope but not required for the road infrastructure, and these areas will likely provide additional fauna habitat (BORR Team 2020a).

2.1.8 Assessment of impacts to environmental values

The EPA considers that the key terrestrial fauna values likely to be impacted by the proposal are the local and regional population levels of conservation significant

terrestrial fauna. The residual impacts to these values are predominately from clearing of breeding and foraging habitat, habitat fragmentation and changes to hydrological regimes of aquatic habitat.

Western ringtail possum

The ringtail possum is a small arboreal marsupial that was once widely distributed across the south and south-west parts of Western Australia and is now limited to areas of the Swan Coastal Plain south of Binningup, the Jarrah forests near Manjimup and the south coast between Walpole and Albany. The species' primary habitat is woodlands dominated by peppermint (*Agonis flexuosa*), but also marri (*Corymbia calophylla*) and jarrah (*Eucalyptus marginata*). Ringtail possums' shelter in tree-hollows and self-built dreys made from leaves and other vegetative material.

In the urban and semi-urban environment of the Swan Coastal Plain the ringtail possum has adapted to utilising alternative habitats such as roof-cavities and eaves, and alternative food and water sources from urban gardens. Ringtail possums use tree canopy connections to move through the landscape but are also known to use artificial structures such as fences, powerlines and purpose-built arboreal rope crossings.

The key threatening processes impacting the ringtail possum that are relevant to the impacts of this proposal are habitat loss and fragmentation. Historical and future clearing for urban development, industry and agriculture are key pressures for the species. Clearing on the Swan Coastal Plain, where the proposal occurs, has historically and continues to be in direct conflict with the species' habitat requirements.

The EPA considers the likely residual impacts of the proposal on the ringtail possum are:

- the direct loss of 60.9 ha of habitat
- displacement of individuals and fragmentation of the local population.

The details of these residual impacts are discussed below.

Direct impact – habitat loss

The EPA considers the residual impacts of the proposal on the ringtail possum is the direct loss of 60.9 ha of habitat.

Most of the proposed habitat clearing and associated impacts would occur within the Gelorup area between Jilley Road and Bussell Highway. Other habitat within the development envelope exists in paddocks or adjacent to reserved bushland (Figure 3).

To the west of the development envelope in Gelorup and separated by Bussell Highway is a large (approximately 146 ha) C-class reserve (Reserve 23000) that provides 'medium' to 'high' habitat suitability for ringtail possum (Shedley and Williams 2014). This area is reserved under the Greater Bunbury Regional Scheme

as Regional Open Space and managed for conservation by the Shire of Capel (Figure 3).

To the north of the proposal near the intersection with Centenary Road, the development envelope adjoins Manea Park and Tuart Brook reserves, which are part of the Kalgulup Regional Park (DBCA 2020). These adjacent reserves are mapped as 'medium' habitat suitability for ringtail possum (Shedley and Williams 2014). Where the proposal traverses Gelorup the habitat is mapped as 'medium' to 'high' suitability due to the large extent of bushland on private properties (Figure 3).

The *Western Ringtail Possum Recovery Plan* (DBCA 2017) identifies habitat loss as one of the key threatening processes for ringtail possums, and the EPA advises that this proposal will contribute further to this. Within the Bunbury Western Ringtail Possum Management Zone, there is a total of 6,264.2 ha of habitat of 'medium' or better suitability for ringtail possum (Shedley and Williams 2014). Given this, and the adjacent protected bushland reserves, the EPA considers that a reduction of 60.9 ha (approximately 1%) of habitat is not of a scale that is likely to be inconsistent with the EPA's objective for terrestrial fauna.

However, the EPA notes the existing threats, pressures and cumulative impacts to the species have resulted in its critically endangered status. The EPA therefore considers that the significant residual impacts on this species from habitat loss need to be adequately offset to ensure an environmental outcome that is likely to be consistent with the EPA factor objective is achieved.

The Department of Biodiversity, Conservation and Attractions (DBCA) has advised that the most strategic areas for habitat creation is within the secure conservation tenure of the Ludlow Tuart State Forest and Tuart Forest National Park. Given the relatively small proportion of habitat within conservation tenure, a focus on substantial creation of additional habitat in conservation tenure is a priority.

The EPA recognises that to counterbalance the loss of 60.5 ha of habitat, the proponent will acquire and protect about 179 ha of existing habitat and create 220 ha of new habitat. A large proportion of the habitat creation offsets are in the Ludlow Tuart State Forest/Tuart Forest National Park and have been proposed in addition to what was originally presented by the proponent during the public review period (Offset Strategy Revision 0, October 2020). Offsets are discussed further in section 4.

In considering the precautionary principle, the EPA advises that an irreversible impact due to habitat loss will occur. However, with the proposed offsets, the EPA considers the likely environmental outcomes expected from proposal will be the acquisition and protection of ringtail possum habitat, and the creation of significant additional habitat in areas that will have the most benefit to the ringtail possum population.

The significant residual impacts from habitat loss are likely to be able to be regulated through reasonable conditions (recommended condition 4) and counter-balanced by offsets (recommended condition 9) so that the environmental outcome is unlikely to be inconsistent with the EPA's objective for terrestrial fauna.



Figure 3: Western ringtail possum habitat

Indirect impacts – displacement of individuals and habitat fragmentation

The EPA considers the likely indirect residual impacts of the proposal on ringtail possum are:

- displacement of ringtail possum individuals during clearing
- short and long-term fragmentation of ringtail possum habitat.

The majority of the fragmentation impacts associated with this proposal would occur in the Gelorup area where ringtail possum habitat is connected to remnant bushland on private residential lots. While these lots contain suitable habitat, the EPA notes that the habitat has been previously fragmented by the clearing undertaken for the residential subdivision (Figure 3). Other patches of habitat within the development envelope are comparatively more fragmented than the Gelorup residential subdivision area, but connected in parts to bushland reserves including: Manea Park (part of the Kalgulup Regional Park) towards the north of the development envelope; the Shire of Capel Lot 23000 Reserve to the west (separated by Bussell Highway); and a large State-owned vegetated property in the east (Lot 1 Ducane Road) which is proposed to be put into conservation estate as part of the offsets for this proposal (Figure 3; see also section 4).

The proponent has seasonally surveyed the ringtail possum population in the proposal area between 2019 and 2020 and estimates that the home-ranges of between 49 to 72 individual ringtail possums are wholly within or partially intersect the development envelope. Of these, the proponent expects that a minimum of 10 and up to 20 would lose their entire home-range (pers. comms Barb Jones¹). The proponent expects that the other 30 to 50 individuals have home-ranges that extend outside the development envelope and would retreat to those partial home-range extents remaining after clearing (pers. comms Barb Jones). Potential impacts to these ringtail possums are most likely to occur during clearing and immediately post clearing as they take time to assimilate to their new environment.

To put the predicted impacts on individual ringtail possums in context of the local population, the EPA notes that 706 individuals were recorded during surveys of five sites within approximately 5 km of the development envelope. These five sites contain about 11% (745.8 ha) of habitat within the Bunbury Western Ringtail Possum Management Zone (Biota 2020a; Shedley and Williams 2014). The proponent has also used its survey records of abundance to estimate the local ringtail population within habitat areas mapped by Shedley and Williams (2014). Biota 2020a estimates that within approximately 5 km of the development envelope the estimated population of ringtail possums is 3,603 (see Figure 6.1 of Biota 2020a).

The EPA recognises that the predicted impact to ringtail possums from displacement as a result of the proposal represents a small proportion of the ringtail possum population within 5 km. Nevertheless, given the ringtail possum is listed as Critically Endangered, the EPA has considered the importance of being cautious to firstly avoid and otherwise minimise impacts to the habitats and individuals.

¹ Barb Jones has been studying the western ringtail possum population for more than 30 years and is recognised by the Commonwealth as one of the pre-eminent experts regarding western ringtail possum populations and ecology (TSSC 2018).

To minimise and manage impacts to ringtail possum individuals during clearing, the proponent is proposing to implement an environmental management plan with a series of clearing protocols specific to reducing impacts to ringtail possum (see details in section 0). The EPA notes that DBCA consider the proponent's clearing protocol standards are above those usually undertaken as best practice during habitat clearing. The EPA has recommended condition 5 that requires the proponent to implement and assess the suitability, adequacy and effectiveness of these clearing protocols. The EPA has also recommended condition 5-2 which requires the proponent to only clear vegetation during low-risk times of the year to further minimise impacts that clearing may have on displaced individuals.

In response to the EPA's advice to undertake further actions to minimise impacts on ringtail possums, the proponent has also proposed to increase the number of fauna crossing structures in the Gelorup area. This includes two extra ringtail possum rope-bridges and two vegetated land-bridges which are in addition to what was presented during the public review period (Fauna Action Management Plan, Revision 0). The EPA considers that the width of the vegetated land-bridge east of Yalinda Drive should be expanded (beyond the 5 metres proposed) to improve its effectiveness and maximise its role in the mitigation of fragmentation. The EPA therefore recommends the proponent to consult further with DBCA on an appropriate width between 5 and 10 metres.

The proponent has proposed a total of 26 fauna connections to provide multiple pathways to reconnect fauna habitats (Fauna Action Management Plan, Revision 2). The EPA has recommended condition 6 requiring the proponent to implement and monitor the effectiveness of these fauna crossings for a minimum of 15 years post-construction in addition to undertaking revegetation to maximise the remaining habitat for ringtail possums.

Notwithstanding the best practice and additional minimisation measures proposed, the DBCA has advised that disturbance and displacement of individuals and the fragmentation of habitat would likely result in a 2-8 year decline (representing 1-2 ringtail possum generations) in the ringtail possum population in Gelorup.

To further mitigate the short-term 2-8 year decline, the EPA, on advice from DBCA has recommended condition 6 to ensure predator control is undertaken prior to clearing and during construction. The EPA also recommended that predator control is continued post-construction at the exits/entrances to fauna crossings to assist with achieving the longer-term (10-15 years) outcome of a ringtail possum population equivalent to pre-disturbance levels. The EPA advises that non-lethal methods of predator control are available to ensure non-target domestic dogs are not impacted. The EPA also expects the proponent to engage the local community (notifications, signage etc.) to ensure domestic dogs are kept away from the area during control periods.

The DBCA has advised that it considers the predicted decline is likely to be reversible in the longer term (10 to 15 years) when the ringtail possum population recovers from the disturbance, after functional habitat is restored, reconnected by fauna crossings and predator risks are minimised.

The EPA advises that, consistent with the precautionary principle, the proposal presents a risk of irreversible harm if the population does not recover to pre-disturbance levels. As described above, the EPA has recommended conditions 5 and 6 requiring the proponent to implement a series of actions to minimise this risk of irreversible harm. The EPA also specifically recommends that the proponent be required to demonstrate that the abundance and persistence of ringtail possums returns to pre-disturbance levels within 15 years from the commencement of construction. The proponent should also be required to measure the effects of the proposal's fragmentation on the demographics (age structure, sex ratios, fecundity etc) and genetics of the local ringtail population.

The EPA advises that there is some scientific uncertainty regarding whether the local population will recover from this disturbance given the potential threats and pressures on ringtail possums over this period. The EPA has therefore recommended that, should the population not return to pre-disturbance levels, a further 'contingency offset' be required to counterbalance this additional significant residual impact (recommended condition 9). The EPA considers that these mitigation measures, together with the recommended offsets (see section 4) is unlikely to result in irreversible harm to the ringtail possum and the proposal is not inconsistent with the precautionary principle

The additional measures proposed by the proponent and the conditions recommended by the EPA align with the 10-year goal of the *Western Ringtail Possum Recovery Plan (2017)* to 'slow the decline in population size, extent and area of occupancy through managing major threatening processes affecting the subpopulations and their habitats, and allowing the persistence of the species in each of the key management zones: Swan Coastal Plain, southern forests and south coast.'

Based on these mitigation measures, the EPA considers that potential short and long-term impacts of displacement and fragmentation are unlikely to be inconsistent with the EPA's objective for terrestrial fauna and can be regulated through conditions (recommended conditions 1, 4, 5 and 6). With the successful implementation of the recommended conditions, the EPA considers that the ringtail possum would continue to persist at pre-disturbance levels after the implementation of the proposal and that the outcome is unlikely to be inconsistent with the EPA's objective for terrestrial fauna.

However, the EPA recognises the potential cumulative impacts of fragmentation is an ongoing threatening process for the species and has contributed to its critically endangered status. The implementation of this proposal, in combination with other proposals, would contribute cumulatively to fragmentation (see Table 2). The EPA therefore considers that after the application of the mitigation hierarchy by the proponent, residual impacts from fragmentation would remain. The EPA is of the opinion that these residual impacts can likely be counterbalanced to ensure the outcome is unlikely to be inconsistent with the EPA's objective for terrestrial fauna, provided that offsets result in strategic conservation benefits, including:

- a net gain in protected ringtail possum populations

- a reduction of fragmentation of ringtail possum habitat, and
- a reduction in predator related risks.

Offsets are discussed further in section 4.

South-western brush-tailed phascogale

The EPA considers the residual impacts of the proposal on the phascogale is the direct loss and fragmentation of 39.2 ha of habitat.

The phascogale is a small (100 to 300 gram), arboreal marsupial recorded by the proponent during field surveys. The phascogale is listed as Conservation Dependant (Schedule 6) under the BC Act.

Displacement of individuals during clearing of 39.2 ha of habitat is possible, but the number of phascogales is likely to be low given their relatively large home-ranges (greater than 20 ha) and the linear shape of the proposed clearing. While not formally modelled, the proponent estimates 4,791 ha of habitat for phascogale occurs within a 5 km radius of the proposal using native vegetation and habitat type data (BORR Team 2020a). The habitat loss of 39.2 ha is therefore likely to represent a small proportion of any individual phascogale's home-range and the available habitat for the species more broadly. Therefore, the EPA considers the impacts are likely to be consistent with the EPA's objective for terrestrial fauna.

The fragmentation impacts to phascogale are closely aligned with those of the ringtail possum as both species are arboreal and share similar habitat requirements. The proponent's minimisation and mitigation measures for the ringtail possum also reduce potential impacts to phascogale. The EPA has therefore considered the potential impacts of fragmentation to phascogale and the proposed mitigation and management measures in the context of the ringtail possum assessment as discussed above.

The significant residual impacts to phascogale from habitat loss and fragmentation can be regulated through conditions (recommended conditions 1, 4, 5 and 6) and counterbalanced by offsets (recommended condition 9) so that the environmental outcome is likely to be consistent with the EPA's objective for terrestrial fauna. Offsets are discussed further in section 4.

Black cockatoos

All three species of black cockatoos, including Carnaby's cockatoo (Endangered), Baudin's cockatoo (Endangered) and forest red-tailed black cockatoo (Vulnerable) have distributions overlapping the proposal area, including both foraging and breeding habitat.

The implementation of this proposal may exacerbate some of the threatening processes as outlined by the *Baudin's Cockatoo and Forest Red-tailed Black Cockatoo Recovery Plan* (Department of Environment and Conservation 2008), and the *Carnaby's Cockatoo Recovery Plan* (Department of Parks and Wildlife 2013), including:

- clearance of foraging and breeding habitat
- loss of breeding trees containing nest hollows or trees with the potential to develop nest hollows in the near future
- potential degradation of habitat through the introduction or spread of *Phytophthora cinnamomi* (dieback).

The EPA considers the likely residual impacts of the proposal on black cockatoos to be the clearing of 60.9 ha of foraging and breeding habitat.

Within the development envelope, the proponent recorded 1,088 trees with a diameter at breast height of greater than 500 millimetres of relevant species that have the potential to develop breeding hollows for black cockatoos (herein referred to as suitable trees with a DBH>500). While there are black cockatoo roosting habitats nearby the development envelope, the EPA notes there is no observed/recorded roosting sites proposed to be impacted within the development envelope (Biota 2020a; BORR Team 2021a).

Of the suitable DBH>500 trees, 105 trees contain hollows and were subject to further investigation by drone to confirm breeding suitability and to identify any evidence of past or current breeding (e.g. eggs, feathers, chew marks). Eight hollows were not assessable via drone, but the EPA acknowledges the proponent counted these as trees containing suitable hollows, concluding that a total of 11 trees with suitable nest hollows would be cleared (Biota 2020a; BORR Team 2021a). While proponent did not conclusively observe black cockatoo breeding activity within hollows during surveys, the EPA notes that surveys identified signs of use for black cockatoo breeding in two hollows (chew marks; egg shell) that are proposed to be cleared (Biota 2020a).

The proponent has identified approximately 8,000 ha of black cockatoo breeding and foraging habitat within a 12 km of the development envelope (Biota 2020a). The proposed 60.9 ha of habitat clearing represents less than 1% of the estimated black cockatoo breeding and foraging habitat within the local area. The EPA notes that of the habitat proposed to be lost, 40.6 ha represents high-quality foraging habitat (Marri/*Eucalyptus* woodland habitat type) containing high density foraging trees (Marri and Jarrah) and often *Banksia* in the mid-storey (Biota 2020a). A further 21.66 ha of Marri/*Eucalyptus* is in paddocks and road reserves, classified as moderate quality foraging habitat, is proposed to be cleared (Biota 2020a²).

The EPA has assessed these residual impacts as significant due to the permanent loss and cumulative impacts occurring to conservation significant black cockatoo species. The EPA considers that the residual impacts to foraging and breeding habitat can be offset to ensure the environmental outcome is likely to be consistent with the EPA objective for terrestrial fauna.

The EPA notes that indirect impacts to black cockatoos may occur as a result of the proposal, for example from vehicle strike, degradation of habitat through introduction

² Note the 'high' and 'moderate' black cockatoo habitat impact areas (ha) have been recalculated since the Biota 2020a survey due to the proposal changes approved under section 43A of the EP Act.

and/or spread of dieback and disturbance of nesting individuals during clearing. The proponent has proposed measures to minimise these potential impacts. Potential indirect impacts are likely to be manageable and regulated through recommended conditions 4.

The EPA notes the likely environmental outcomes to be expected from proposed black cockatoo offsets relate to the acquisition and protection of habitat, and the creation of additional habitat. Without the proposed offsets it is likely that the condition and health of these foraging habitats and the amount available would decline over time from existing threats and pressures.

It is also noted that the offset areas are larger than the extent of the significant residual impacts and are appropriately proportionate.

These significant residual impacts can be regulated through condition (recommended condition 4) and counter-balanced by offsets (recommended condition 9) so that the environmental outcome is likely to be consistent with the EPA's objective for terrestrial fauna. Offsets are discussed further in section 4.

Black stripe minnow

The proposal traverses a number of wetlands and waterways (discussed further in the context of the EPA factor for inland waters in section 2.3), including the Five Mile Brook, and would result in the direct loss of 5.5 ha of habitat for black stripe minnow and an unknown number of individuals.

The black stripe minnow (Endangered) is a small freshwater fish endemic to the south west and restricted to ephemeral and acidic wetlands (Ogston *et. al.* 2016). The fish aestivates (remains dormant) underground during dry periods and disperses in years of high rainfall (Threatened Species Scientific Committee (TSSC) 2018a).

The black stripe minnow is under threat from a number of processes including, but not limited to climate change, reduced rainfall /drying of habitats, and habitat modification or loss through filling and draining of wetlands for urban and/or industrial development (TSSC 2018a).

The proponent's records of the black stripe minnow in aquatic habitats within the proposal area mark a newly discovered extent for the species as it had not been recorded in this local area previously.

The EPA notes the proponent's estimates of 1,186 ha of potential habitat within the vicinity of the proposal (BORR Team 2020a) and considers that the direct loss of 5.5 ha (about 0.5%) is not considered a significant residual impact and is therefore likely to be consistent with the EPA's objective for terrestrial fauna. The black stripe minnow is short-lived after spawning, therefore the potentially small loss of individuals proposed is not likely to result in significant residual impacts, but should be regulated through recommended condition 4 to ensure the EPA's objective can be met.

The EPA also notes that the proponent would be required to obtain an authorisation to take or disturb threatened fauna in accordance with the BC Act.

The EPA notes that the proposal could indirectly impact black stripe minnow through potential changes to the hydrological regimes, hydrological connectivity and degradation of water quality in black stripe minnow habitats. The EPA considers these potential indirect impacts are manageable and able to be regulated through recommended condition 2. Further discussion about hydrological regimes is outlined in section 2.3.

Cumulative impacts to terrestrial fauna

The EPA notes that implementation of this proposal would contribute to cumulative impacts to terrestrial fauna values and has considered this in the broader context of the Bunbury Outer Ring Road (BORR) Northern and Central Sections (approved in accordance with Ministerial Statement 1155) and the Bussell Highway Duplication Stage 2 (approved in accordance with Clearing Permit 9168/1).

The EPA notes that these proposals contribute cumulatively to the loss of fauna habitat, but not to a level that would alter the likely environmental outcomes of this proposal as assessed in section 2.1 and summarised below. Further, the EPA notes that the approvals for the BORR Northern and Central Sections and the Bussell Highway Duplication Stage 2 are subject to a requirement for offsets to counterbalance the respective impacts, including but not limited to, land acquisitions, and strategic revegetation of fauna habitat in Bunbury and the Ludlow Tuart State Forest / Tuart Forest National Park near Busselton. Should this proposal also be approved with the EPA's recommendation for offsets (section 4), the offsets would combine strategically with the revegetation required by the other two proposals within the Ludlow Tuart State Forest / Tuart Forest National Park (discussed further in section 4).

Table 2: Terrestrial fauna cumulative impacts

Species	BORR Northern and Central Sections (Ministerial Statement 1155)	BORR Southern Section proposal	Bussell Highway Duplication Stage 2 (Clearing Permit 9168/1)	Total
Ringtail possum habitat (ha)	43.9	60.9	24	128.8
Ringtail possum (displaced individuals)	15-25	49-72	14-22	78-119
Phascogale	17.7	39.2	-	56.9
Black cockatoo breeding and foraging habitat (ha)	37.8	60.9	20.8	119.5
Black cockatoo DBH>500 trees containing suitable hollows	3	11	2	16

Species	BORR Northern and Central Sections (Ministerial Statement 1155)	BORR Southern Section proposal	Bussell Highway Duplication Stage 2 (Clearing Permit 9168/1)	Total
Black cockatoo DBH>500 trees with previous signs of nesting in hollows	0	2	0	2
Black cockatoo DBH>500 trees with potential to develop hollows	711	1109	156	1976
Black stripe minnow habitat (ha)	0.55	5.5	0	6.05

(BORR Team 2021c; EPA 2020b; Government of Western Australia-Department of Water and Environmental Regulation (DWER) 2021)

Likely residual impacts of proposal

The EPA has assessed the likely residual impacts of the proposal on terrestrial fauna to be:

1. direct loss of fauna habitat for ringtail possum, and indirect impacts during construction from displacement, fragmentation and predation
2. direct loss of fauna habitat for phascogale and black cockatoo species
3. potential direct impacts to black cockatoos nesting in hollows during clearing activities
4. direct loss of black stripe minnow habitat and potential loss of individuals
5. potential indirect impacts to hydrological regimes and water quality of black stripe minnow habitats.

With the implementation of recommended conditions, including offsets (discussed in section 4), the potential environmental outcomes as a result of the proposal are likely to be:

- small incremental losses to habitat for ringtail possums, black cockatoos, phascogale and black stripe minnow relative to their respective remaining extents
- the local population of ringtail possums in Gelorup is likely to return to pre-disturbance levels in the long term (15 years)
- a tangible improvement in ringtail possum habitats (both in quality and quantity) in protected conservation tenure so that additional ringtail possums can be supported (potentially at densities greater than the proposal area) and hence improve the southern Swan Coastal Plain population
- a tangible improvement in black cockatoo and phascogale habitat (both in quality and quantity) and transfer of lands containing greater quantities of these habitats to protected conservation tenure.

The EPA advises that, subject to recommended conditions, the environmental outcome of the proposal is expected to be consistent with the maintenance of diversity of local and regional population levels of conservation significant terrestrial fauna. The environmental outcome is expected to be consistent with the EPA's factor objective *to protect terrestrial fauna so that biological diversity and ecological integrity are maintained*.

2.1.9 Summary of key factor assessment and recommended regulation

The EPA has considered the likely residual impacts of the proposal. In doing so, the EPA has considered whether reasonable conditions could be imposed, or other decision-making processes can ensure consistency with the EPA factor objective. The EPA summary assessment findings are presented in Table 3.

The EPA has also considered the principles of the EP Act (Appendix C) in assessing whether the residual impacts will be consistent with its environmental factor objective and whether reasonable conditions can be imposed (see Appendix A).

Table 3: Summary of assessment for terrestrial fauna

Residual impact		Assessment finding	Recommended conditions and DMA regulation
1.	<p>Direct impacts to 60.9 ha of ringtail possum habitat.</p> <p>Indirect impacts from the displacement of ringtail possum individuals, predation, and fragmentation of habitat.</p>	<p>Significant residual impacts are likely to be able to be regulated through reasonable conditions and counterbalanced by offsets so the environmental outcome is unlikely to be inconsistent with the EPA's objective for terrestrial fauna.</p>	<p>Regulated through recommended conditions:</p> <p>1 – limits on proposal extent (area)</p> <p>4 – limits on value extent (area)</p> <p>4 – construction limits</p> <p>5 – Construction Fauna Management Plan</p> <p>6 – Habitat Fragmentation Management Plan</p> <p>9 – Offsets</p> <p>Compliance with the lawful authority obtained under the <i>Biodiversity Conservation Act 2016</i></p>
2.	<p>Direct impacts to:</p> <ul style="list-style-type: none"> • 60.9 ha of black cockatoo habitat • 1,088 black cockatoo potential nesting trees • 11 black cockatoo trees with suitable hollows 	<p>Significant residual impacts are likely to be able to be regulated through reasonable conditions and counterbalanced by offsets so the environmental outcome is likely to be consistent with the EPA's objective for terrestrial fauna.</p>	<p>Regulated through recommended conditions:</p> <p>1 – limits on proposal extent (area)</p> <p>4 – limits on value extent (area)</p> <p>4 – construction limits</p> <p>5 – Construction Fauna Management Plan</p> <p>9 – Offsets</p>

Residual impact		Assessment finding	Recommended conditions and DMA regulation
	<ul style="list-style-type: none"> 39.2 ha of phascogale habitat. 		
3.	Potential direct impacts to black cockatoos nesting in hollows during clearing activities	Residual impact should be subject to conditions to ensure the environmental outcome is likely to be consistent with the EPA's objective for terrestrial fauna.	Regulated through recommended condition 4 – terrestrial fauna (construction limits)
4.	5.5 ha of black stripe minnow habitat and potential loss of individuals	Unlikely to be a significant residual impact and can be regulated through conditions so that the environmental outcome is likely to be consistent with the EPA's objective for terrestrial fauna.	Regulated through recommended conditions: 4 – limits on value extents (area) Compliance with the lawful authority obtained under the <i>Biodiversity Conservation Act 2016</i>
5.	Potential indirect impacts to hydrological regimes and water quality of black stripe minnow habitats	Residual impact should be subject to conditions to ensure the environmental outcome is consistent with the EPA's objective for terrestrial fauna.	Regulated through recommended condition 2 – no impacts to hydrological regimes and water quality

2.2 Flora and vegetation

2.2.1 Environmental objective

The EPA's environmental objective for flora and vegetation is *to protect flora and vegetation so that biological diversity and ecological integrity are maintained* (EPA 2020c).

2.2.2 Investigations and surveys

The EPA advises that the following investigations were used to inform the assessment of potential impacts:

- Vegetation and Flora Study (BORR Team 2020d)
- Targeted Rare Flora Survey for *Diuris drummondii* (Ecoedge 2019b)
- Phytophthora dieback survey (Great Southern Bio Logic 2020)
- Review of Regional Claypan Occurrences (Ecoedge 2019a)
- Preliminary Wetland Assessment Report (BORR Team 2018).

The EPA considers the surveys were consistent with the *Technical Guidance – Flora and vegetation surveys for environmental impact assessment* (EPA 2016).

2.2.3 Assessment context – existing environment

The development envelope is 200 ha, and has been extensively cleared for agriculture. The impact of the proposal within this development envelope is 71.5 ha of native vegetation and 124 ha of highly modified area (cleared paddock, existing infrastructure and non-native vegetation). The native vegetation occurs within road reserves, along rivers and creeklines, in patches on private land and as scattered trees.

Vegetation condition was assessed and mapped in accordance with the vegetation condition rating scale for the South West and Interzone Botanical Provinces of Western Australia. Within the development envelope, vegetation condition was rated as 'Degraded' or worse (49%), 'Good to Degraded' (23%) and 'Good' or better (28%).

Surveys recorded no flora listed under the BC Act and three species identified by DBCA as Priority flora species. *Lasiopetalum membranaceum* (Priority 3) and *Acacia semitrullata* (Priority 4) have relatively wide distributions and minor losses (one individual of each species). The proposal will result in the loss of 104 individuals of *Caladenia speciosa* (sandplain white spider orchid) (Priority 4), which is less than 3% of the regional population.

The following DBCA listed Priority Ecological Communities (PECs) (Priority 3) were identified in the development envelope (Figure 4a and 4b):

- Banksia woodlands of the Swan Coastal Plain (referred to as the Banksia Woodlands)

- Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain (referred to as the Tuart Woodlands)
- Southern Swan Coastal Plain *Eucalyptus gomphocephala* – *Agonis flexuosa* woodlands (FCT 25) (referred to as the Tuart-Peppermint Woodlands PEC).

Two of these communities are listed as Threatened Ecological Communities (TECs) under the EPBC Act and are considered Matters of National Environmental Significance for the Commonwealth assessment. The Banksia Woodlands is listed as Endangered, and the Tuart Woodlands is listed as Critically Endangered.

The State listing for the Banksia Woodlands and the Tuart Woodlands (that is, the community description, area, and condition thresholds) has been aligned to match those prescribed for these communities under the EPBC Act. The EPA has considered the State PEC and Commonwealth TEC as the same community for the purposes of this assessment.

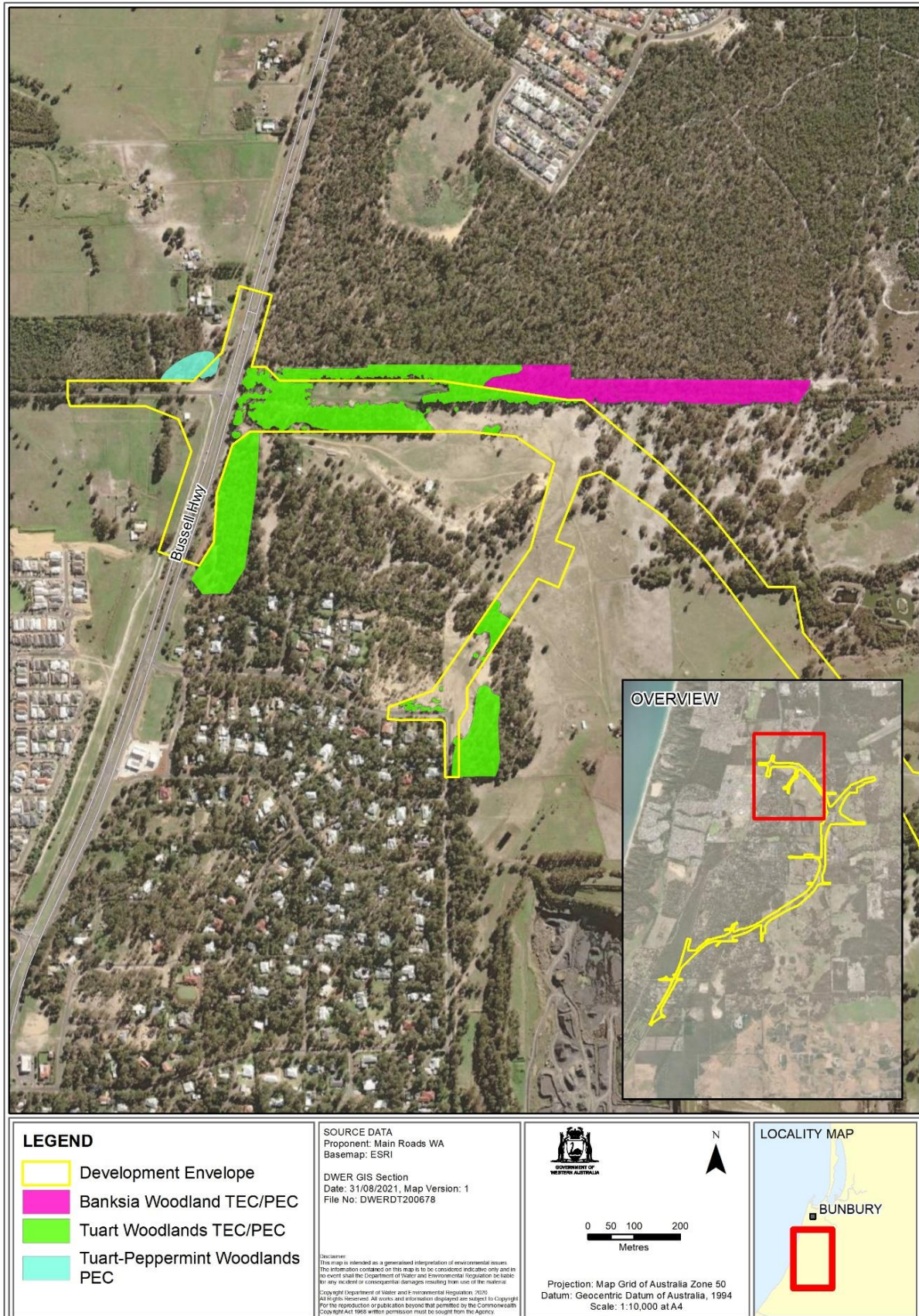
2.2.4 Consultation

During the eight-week public review period, concerns were raised regarding the direct impacts to conservation significant flora and vegetation, indirect impacts to adjacent vegetation from fragmentation, spread of weeds and disease and altered hydrological regimes. Submissions noted that alternative route/s have less impacts to conservation significant flora and vegetation. Concerns regarding the proposed offsets were also raised.

2.2.5 Potential impacts from the proposal

The proposal has the potential to significantly impact on flora and vegetation from:

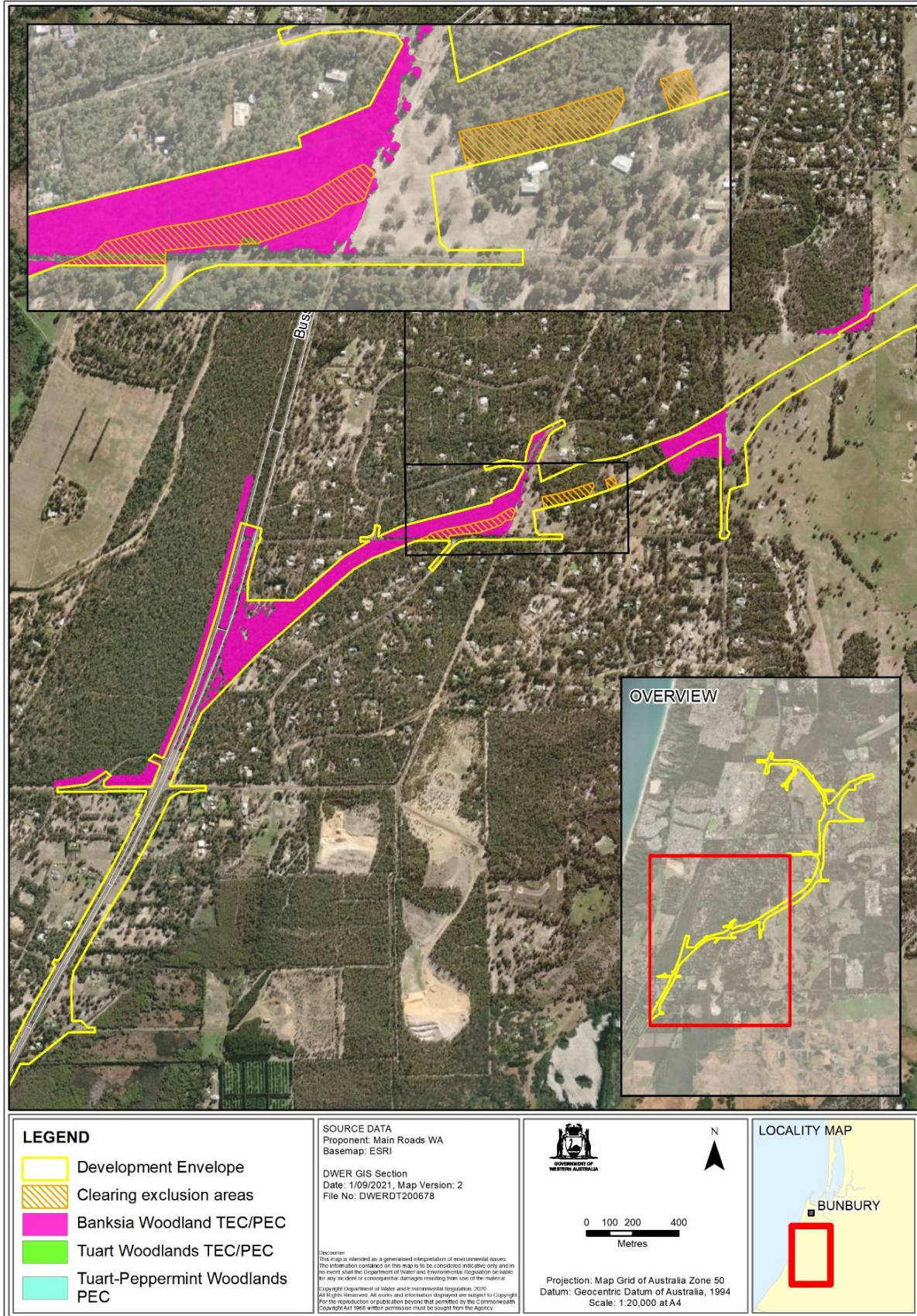
- clearing of up to 23.4 ha of vegetation representative of the Banksia Woodlands
- clearing of up to 4.4 ha of vegetation representative of Tuart Woodlands
- clearing of up to 4.5 ha of vegetation representative of the Tuart-Peppermint Woodlands PEC (4.4 ha of which also represents the Tuart Woodlands)
- potential indirect impacts from fragmentation and edge effects, the introduction/spread of weeds and disease (including dieback *Phytophthora cinnamomi*) and altered hydrological regimes.



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Figure 4a: Priority Ecological Communities Banksia Woodlands, Tuart Woodlands and Tuart-Peppermint Woodlands (north)



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Unique Record ID:

Figure 4b Priority Ecological Communities Banksia Woodlands, Tuart Woodlands and Tuart-Peppermint Woodlands (north)

2.2.6 Minimisation measures (including regulation by other DMAs)

The proponent has reduced the proposed clearing of native vegetation by 22 ha through an approved change to the proposal (via section 43A of the EP Act). This reduced the direct impact to the Banksia Woodlands by 1.7 ha and the Tuart Woodlands/Tuart-Peppermint Woodlands PEC by 0.5 ha.

In June 2021 the proponent proposed further changes to the proposal via section 43A which further reduced the clearing by 4.5 ha (from 76 ha to 71.5 ha), and reduced the loss of Banksia Woodland by another 1.5 ha.

The proponent has proposed minimisation measures including:

- modification of the development envelope since referral to reduce clearing of native flora and vegetation from 98 ha to 71.5 ha
- reduced median widths and redesigned interchanges to reduce the area of native vegetation proposed to be cleared
- installation of low impact temporary fencing on the active construction front of PEC vegetation areas prior to clearing and maintained during construction
- implementation of environmental management plans to mitigate risks during and post-construction for dieback, weeds, fire and revegetation
- installation of drainage infrastructure to maintain existing hydrological regimes
- implementation of a Vegetation Monitoring Program to ensure that potential indirect impacts to adjacent PEC vegetation are avoided and minimised.

The proponent will need to comply with regulations to manage declared weeds present on the site in accordance with the *Biosecurity and Agricultural Management Act 2007* and comply with any further approvals, permits and licenses under the BC Act.

2.2.7 Rehabilitation

The proponent is proposing to undertake revegetation of all areas disturbed inside the development envelope during construction but not required for the road infrastructure (BORR Team 2020b).

2.2.8 Assessment of impacts to environmental values

The EPA considers that the key flora and vegetation values likely to be impacted by the proposal are impacts to the three PECs. The residual impacts to these values are likely to arise from direct impacts from clearing and from indirect impacts from weeds, dieback and changes to hydrological regimes.

Banksia Woodlands

The EPA considers the likely residual impacts of the proposal on flora and vegetation to be the loss of 23.4 ha of the Banksia Woodlands.

The Banksia Woodlands support a rich and diverse array of flora and fauna species and is largely restricted to the Perth and Dandaragan subregions of the Swan

Coastal Plain bioregion. This proposal is within the Perth subregion. Fragmentation is identified as a key threat to this community as it occurs mostly in small and disconnected locations in a highly cleared and modified landscape (TSSC 2016).

Clearing associated with this proposal would result in the direct loss of 23.4 ha of the Banksia Woodlands at three impact (patch) sites. Of these sites, two are part of larger areas of consolidated vegetation that will be fragmented by the proposal. Both remaining patches extend north and south of the development envelope, occurring predominately in the rural residential areas. The EPA recognises that while fragmentation will occur, the remaining extent of the patches outside the development envelope will continue to meet the conservation criteria to still be considered part of the Banksia Woodlands, as outlined in the *EPBC Act Approved Conservation Advice* (TSSC 2016). Fragmentation will not occur at the remaining patch as vegetation loss occurs along the edge of the consolidated area.

To consider the cumulative impacts of this proposal, the proponent used the most recent data on the known extent of the Banksia Woodlands, published in 2016 (TSSC 2016). This proposal would result in a reduction of up to 0.007% of its total estimated extent within the Swan Coastal Plain Bioregion (>336,000 ha). In the Perth subregion, the proposal will result in the loss of less than 0.01% of its subregional extent (> 253,000 ha is in the Perth subregion). Approximately 81,800 ha of the Banksia Woodlands (approximately 25% of the total estimated extent) is estimated to occur within reserves, most of which are in the Perth subregion (TSSC 2016). When considered cumulatively with the loss from the Bunbury Outer Ring Road Northern and Central Sections, the total impact to Banksia Woodlands is 27.1 ha.

The EPA has assessed the residual impact to the Banksia Woodlands to be significant due to the cumulative impact on the community. The residual impact on this community aligns with the definition of significant residual impact which includes areas that are already defined as being critically impacted in a cumulative context (Government of Western Australia 2014).

The residual impact on this community needs to be able to be offset to ensure the environmental outcome is likely to be consistent with the EPA objective.

To offset the significant residual impact, the proponent is proposing to acquire and protect areas of Banksia Woodlands in adjacent or other nearby areas. The proposed offsets will increase the proportion of this community in reserves, and on ground management would ensure the health and condition are improved and maintained. Offsets are further discussed in section 4.

The EPA has assessed that this is a significant residual impact that is likely to be able to be regulated through reasonable conditions (recommended conditions 1 and 3) and counter-balanced by offsets (condition 9) so that the environmental outcome is likely to be consistent with the EPA's objective for flora and vegetation.

The EPA notes that the remaining occurrences of Banksia Woodlands adjacent to the development envelope may be indirectly impacted from activities associated with the proposal, which is discussed further below.

Tuart Woodlands

The EPA considers the likely residual impacts of the proposal on flora and vegetation to be the loss of 4.4 ha of the Tuart Woodlands.

The Tuart Woodlands occurs from Jurien, approximately 200 km north of Perth, to the Sabina River, near Busselton, 225 km south of Perth. The distribution of the ecological community is inherently limited by the distribution of tuart trees (*Eucalyptus gomphocephala*) as its defining species. The tuart woodlands and forests with a peppermint (*Agonis flexuosa*) sub-canopy in the southern part of the community's range remain particularly important for the Critically Endangered ringtail possum and the Conservation Dependant (Schedule 6) phascogale.

Fragmentation has been identified as a key threat in the EPBC Act *Approved Conservation Advice for the Tuart Woodlands* as this community is highly fragmented across its range (TSSC 2019). At least 64% of the area occupied by the Tuart Woodlands are less than 10 ha in size (TSSC 2019) with an overall median patch size of 5.2 ha, which is considered to be very restricted.

The implementation of the proposal would result in direct clearing of 4.4 ha of Tuart Woodlands at one impact (patch) site, and will result in the fragmentation of a larger area of consolidated vegetation. However, the patch extends outside the development envelope to the north and south and forms part of a much larger (>25 ha) expanse of Tuart Woodlands. The remaining extent of the patches outside the development envelope will continue to meet the conservation criteria to still be considered part of the Tuart Woodlands, as outlined in the *EPBC Act Approved Conservation Advice* (TSSC 2019).

To consider the cumulative impacts of this proposal, the proponent used the most recent data on the known extent of the Tuart Woodlands, published in 2019 (TSSC 2019). This proposal will result in a reduction of up to 0.03% of its total estimated extent (> 17,000 ha) (TSSC 2019). Of the remaining estimated extent, approximately 5,700 ha (22%) of the Tuart Woodlands has been reserved by the Government of Western Australia in 22 reserves (Department of Environment and Energy 2017).

The EPA has assessed the residual impact to the Tuart Woodlands to be significant due to the cumulative impact on the community. The residual impact on this community aligns with the definition of significant residual impact which includes areas that are already defined as being critically impacted in a cumulative context (Government of Western Australia 2014).

The residual impact on this community needs to be able to be offset to ensure the environmental outcome is likely to be consistent with the EPA objective.

To offset the significant residual impact, the proponent is proposing to acquire and protect areas of Tuart Woodlands in adjacent or other nearby areas. The proposed offsets will increase the proportion of this community in reserves and on ground management would ensure the health and condition are improved and maintained. Offsets are further discussed in section 4.

The EPA has assessed that this is a significant residual impact that is likely to be able to be regulated through reasonable conditions (recommended conditions 1 and 3) and counter-balanced by offsets (condition 9) so that the environmental outcome is likely to be consistent with the EPA's objective for flora and vegetation.

The EPA notes that the remaining occurrences of Tuart Woodlands adjacent to the development envelope may be indirectly impacted from activities associated with the proposal, which is discussed further below.

Tuart-Peppermint Woodlands PEC

The EPA considers the likely residual impacts of the proposal on flora and vegetation to be the loss of 4.5 ha of the Tuart-Peppermint Woodlands PEC.

The development envelope contains 4.5 ha of Tuart-Peppermint Woodlands PEC at two occurrences: one of 4.4 ha which overlaps entirely with the Tuart Woodlands assessed above; and one of 0.1 ha which does not meet the diagnostic criteria for the Tuart Woodlands. The impact to the additional 0.1 ha of Tuart-Peppermint Woodlands PEC occurs on the edge of one impact (patch) site. The EPA notes that patch site extends outside the survey area to the north and west.

The EPA notes that the regional and local extent of the Tuart-Peppermint Woodland PEC has not been mapped. The DBCA has advised that in the absence of extent remaining data for the Tuart-Peppermint Woodlands PEC, the statistics available for the Tuart Woodlands TEC in the EPBC Act Conservation Advice (TSSC 2019) are the best available alternative and should be used as a proxy.

Therefore the EPA notes that the loss of 4.5 ha of the Tuart-Peppermint Woodlands PEC should the proposal be implemented would result in a further reduction of up to 0.02% of its total extent (> 17,000 ha) (TSSC 2019).

Given the extent remaining, the EPA is of the view that the areas to be cleared represent a small and incremental loss of the Tuart-Peppermint Woodlands' total estimated extent. The EPA has assessed that the direct impact to 4.5 ha of the Tuart-Peppermint Woodlands PEC represents a significant residual impact given the cumulative impacts to the community to date (Government of Western Australia 2014).

The EPA has assessed that this is a significant residual impact that is likely to be able to be regulated through reasonable conditions (recommended conditions 1 and 3) and counter-balanced by offsets (condition 9) so that the environmental outcome is likely to be consistent with the EPA's objective for flora and vegetation.

The EPA also notes that the remaining occurrences of Tuart-Peppermint Woodlands PEC adjacent to the development envelope may be indirectly impacted from activities associated with the proposal, which is discussed further below.

Vegetation communities – indirect impacts

The EPA has considered the likely residual impacts to be indirect impacts to conservation significant flora and vegetation within 20 m of the development envelope from:

- changes to vegetation structure and floristic composition, particularly in road cuttings, through alteration of hydrological processes
- the introduction and spread of weeds and disease, including dieback (*Phytophthora cinnamomi*) to adjacent vegetation.

The potential indirect impacts need to be actively managed, especially in areas of Good to Excellent condition vegetation, to ensure the biological diversity and ecological integrity of the vegetation in the local area is not adversely impacted by implementation of the proposal. This is particularly needed for the four occurrences of Banksia Woodlands and four occurrences of Tuart Woodlands /Tuart-Peppermint Woodlands PEC that have been identified adjacent to the development envelope (Figure 4a and 4b).

The EPA considers that, with appropriate management, these indirect impacts can be managed such that no project attributable impacts would occur. The EPA notes that the proponent has prepared a Vegetation Monitoring Program and Hygiene Management Plan to manage potential indirect impacts. The EPA has recommended condition 3 due to the high environmental values adjacent to the development envelope.

Cumulative impacts to flora and vegetation

The EPA notes that implementation of this proposal with the BORR Northern and Central Sections proposal would cumulatively result in the clearing of 27.1 ha of Banksia Woodlands across the 825 ha area of both proposals for the BORR. This constitutes approximately 0.01% of the regional extent (>253,000 ha) and approximately 0.008% of the total extent of the estimated community (>335,000 ha).

The EPA also notes that the nearby Bussell Highway Duplication (Clearing Permit 9168/1) would result in a loss of 2 ha of Tuart Woodlands, bringing the total cumulative loss between the two proposals to 6.3 ha. Given these proposals would be subject to implementation conditions requiring offsets, this cumulative impact would likely be consistent with the EPA's objective for flora and vegetation.

Likely residual impacts of proposal

The EPA has assessed the likely residual impacts of the proposal on flora and vegetation to be the:

1. direct impacts to 23.4 ha of Banksia Woodlands, 4.4 ha of Tuart Woodlands and 4.5 ha of Tuart-Peppermint Woodlands PEC
2. indirect impacts to flora and vegetation within 20 m of the development envelope as a result of changes to hydrological regimes, weed and dieback.

With the implementation of recommended conditions, including offsets (discussed in section 4), the potential environmental outcomes as a result of the proposal are likely to be:

- small incremental losses to the extent of Banksia Woodlands, Tuart Woodlands and Tuart-Peppermint Woodlands PECs relative to their respective remaining extents
- a tangible improvement to the health and condition of Banksia Woodlands, Tuart Woodlands and Tuart-Peppermint Woodlands PECs and transfer of lands containing greater quantities of these communities to protected conservation tenure.

The EPA advises that, subject to recommended conditions, the environmental outcomes of the proposal are expected to be consistent with the EPA's factor objective.

2.2.9 Summary of key factor assessment and recommended regulation

The EPA has considered the likely residual impact of the proposal. In doing so, the EPA has considered whether reasonable conditions could be imposed, or other decision-making processes can ensure consistency with the EPA factor objective. The EPA summary assessment findings are presented in Table 4.

The EPA has also considered the principles of the EP Act (Appendix C) in assessing whether the residual impacts will be consistent with its environmental factor objective and whether reasonable conditions can be imposed (see Appendix A).

Table 4: Summary of assessment for flora and vegetation

Residual impact		Assessment finding	Recommended conditions and DMA regulation
1.	Direct impacts to: <ul style="list-style-type: none"> • 23.4 ha of Banksia Woodlands • 4.4 ha of Tuart Woodlands • 4.5 ha to Tuart-Peppermint Woodlands PEC 	Significant residual impact is likely to be able to be regulated through reasonable conditions and counterbalanced by offsets so the environmental outcome is likely to be consistent with the EPA's objective for flora and vegetation.	Regulated through recommended conditions: <ul style="list-style-type: none"> 1 – limit on the extent of the proposal (area) 3 – flora and vegetation 9 – offsets
2.	Indirect impacts to flora and vegetation within 20 m of the development envelope as a result of changes to hydrological regimes, weed and dieback.	Residual impact from indirect impacts should be subject to implementation conditions to ensure the environmental outcome is consistent with the EPA objective for flora and vegetation.	Regulated through recommended condition 3 – flora and vegetation

2.3 Inland waters

2.3.1 Environmental objective

The EPA's environmental objective of the inland waters is to *maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected* (EPA 2020c).

2.3.2 Investigation and surveys

The EPA advises that the following investigations were used to inform the assessment of potential impacts:

- a number of desktop surveys were undertaken as described in section 4.6.3 of the updated RI
- Preliminary Wetland Assessment Report (BORR Team 2018)
- Geotechnical Investigation Report (BORR Team 2020e).

The EPA considers that the proponent's surveys are satisfactory for the purposes of its assessment.

2.3.3 Assessment context –existing environment

The proposal lies within the South West Drainage Division and intersects several geomorphic wetlands and water courses including the Five Mile Brook. Large parts of the proposal area have been extensively modified for agriculture, irrigation, drainage and urban/industrial development, with some remnant wetlands and waterways remaining.

The proposal is located within the Bunbury Groundwater Area and the Busselton-Capel Groundwater Area which are proclaimed under the *Rights in Water and Irrigation Act 1914* (RIWI Act).

Some areas on the western side of the development envelopment envelope overlap the Bunbury Water Reserve Public Drinking Water Source Areas (Priority 3).

Several surface water features including two Resource Enhancement Wetlands (REW), a Conservation Category Wetland (CCW), and 13 Multiple Use Wetlands (MUW) traverse the proposal area, however none of these are proclaimed under the RIWI Act.

The proponent has undertaken a pre-construction baseline survey of the ground and surface water along the proposed road alignment. A desktop survey identified that most of the adjacent wetlands and associated vegetation as having a moderate to high potential of being a Groundwater Dependent Ecosystems (GDE), predominately in areas associated with vegetated wetlands.

Desktop surveys have also identified that the majority of the proposal occurs in areas that are moderate to low risk of acid sulfate soils with some small areas of high risk near waterways and wetlands. The proponent has indicated that further site specific

geotechnical and acid sulfate soil investigations are planned following detailed design to identify potential swamp/lacustrine deposits and characterise soils underlying wetland areas (BORR Team 2020c).

Sampling at four surface water locations across the alignment determined that the water is generally of 'good' quality (further details are in the proponent's updated RI section 4.6.3.2). Field surveys to classify the vegetation types and condition associated with wetlands and waterways have also been undertaken.

The development envelope intersects a section of the Five Mile Brook where a vehicle bridge is proposed, and it is classified as a Multiple Use Wetland (Unique Feature Identifier UFI-1163). Directly downstream from the proposed bridge crossing, the Brook is classified as a Conservation Category Wetland (UFI-931) and contains suitable habitat for black stripe minnow. The Five Mile Brook catchment is also categorised as a recovery catchment as part of the Revitalising Geographe Waterways program which focuses on reducing nutrients entering the catchment from surrounding land uses³. The EPA has therefore considered the Five Mile Brook to contain important environmental values for this assessment.

2.3.4 Consultation

The main concerns raised during the eight-weeks public review of the referral information related to the risk of chemical spills and construction pollution to waterways, wetlands and black-stripe minnow habitat, in particular Five Mile Brook.

2.3.5 Potential impacts from the proposal

The proposal has the potential to significantly impact on inland waters from:

- the direct loss of 0.2 ha of a CCW (UFI-14478), 1.4 ha of REW (UFI-1117 and UFI-15493) and 41.8 ha of MUW
- short-term abstraction of groundwater for construction could affect groundwater levels in the superficial aquifer
- short-term dewatering during construction of bridge footings at Five Mile Brook could affect water quality
- disturbance of bed and banks of waterways and wetlands during construction
- surface and groundwater contamination from erosion and sedimentation, accidental chemical spills or disturbance of acid sulfate soils during construction and contaminated operational run-off, and associated risks to water quality in the Five Mile Brook and black tripe minnow habitats
- changes to the hydrogeological and/or hydraulic conditions resulting in an increased risk of localised flooding and inundation in areas where swamp and lacustrine deposits may be found
- changes to hydrological regimes of wetlands and waterways, that could also impact Five Mile Brook and black stripe minnow habitat

³ <https://rgw.dwer.wa.gov.au/geographe-waterways/five-mile-brook/>

- changes to vegetation structure/condition in surrounding GDEs (including geomorphic wetlands) resulting from changes to hydrological regimes or groundwater levels from abstraction and/or compaction of the construction footprint.

2.3.6 Minimisation measures (including regulation of other DMAs)

The proponent proposes to minimise impacts through the following:

- Design of a transverse drainage system to maintain the pre-development hydrological processes of the proposal area and to minimise potential drainage shadow effects on surrounding wetlands and waterways (black-stripe minnow habitat), vegetation and agricultural properties.
- Establishment of baseline surface and groundwater to determine water quality performance criteria followed by monitoring for evidence of erosion and run-off during construction and operations, and daily surface water monitoring during construction of the bridge over Five Mile Brook.
- Construction of detention and infiltration basins where there is potential for discharge of hazardous spills into waterways.
- Implementation of a construction environmental management plan including measures such as:
 - procedures for handling and storage of hydrocarbons and spill response,
 - no storage or refuelling within 200 metres of a natural watercourse or within 50 metres of a CCW or REW
 - erosion and sediment controls, to ensure no direct run-off during construction to protect water quality in Five Mile Brook and wetlands.
- Implementation of an Acid Sulfate Soils Management Plan and Dewatering Management Plan to ensure correct dewatering methods, effluent monitoring and management, effluent treatment, effluent disposal and monitoring requirements.
- Installation of erosion protection measures and a clear span bridge over Five Mile Brook to minimise riparian disturbance and maintain fish passage for black stripe minnow.
- Installation of biological filters where possible as part of the revegetation and landscape design to protect water quality from operational run-off.
- Investigation of alternate sources of water to reduce the reliance on groundwater for construction and dust suppression purposes (BORR Team 2021a).

2.3.7 Rehabilitation

The proponent proposes to revegetate the riparian zone of the Five Mile Brook where clearing is required for the bridge construction.

2.3.8 Assessment of impacts to environmental values

The EPA considers that the key inland waters values likely to result in residual impacts are:

- the direct loss of 0.2 ha of CCW, direct loss of 1.4 ha of REW and 41.8 ha of MUW
- potential indirect impacts to hydrological regimes and water quality in adjoining water values.

The residual impacts to these values result from construction, primarily from bridge construction, earthworks and during the clearing of wetlands and habitat for black-stripe minnow.

The direct loss of 0.2 ha of a CCW (Unique Feature Identifier (UFI-14478)) is not likely to be a significant residual impact given the clearing is located along the wetland edge and represents 0.003% of the total wetland. Loss of 1.4 ha of REWs (UFI-1117 and UFI-15493) is also not considered to be significant because only partial clearance is proposed, and the drainage system will allow for hydrological regimes to be maintained. Loss of habitat for black stripe minnow is also not considered a significant residual impact as discussed in section 2.1. Given the low environmental values associated with MUWs, there is no significant residual impact to MUWs.

The EPA notes that the transverse drainage system has been designed with the objective of maintaining the existing water cycle balance and minimising potential impacts on water values. However, the wetlands adjacent to the development envelope and associated environmental values could be indirectly impacted by the proposal through changes to hydrological flow or degradation of water quality.

Bridge construction would require clearing of riparian vegetation at the proposed crossing of Five Mile Brook which could potentially destabilise soils resulting in erosion and sedimentation of the waterway and habitat for black-stripe minnow. The EPA notes that where Five Mile Brook intersects with the proposal it contains lower values (reflected in its MUW status); however, recognises that further downstream (north of the development) the Brook is classified as CCW and contains habitat for black stripe minnow. For any disturbance to the bed or banks of the Brook, the EPA notes that a permit may be required under the RIWI Act.

The EPA notes that further detailed design of the proposal is underway to determine if the construction of bridge footings would require dewatering which could affect water quality if not managed. The proponent would implement minimisation measures to manage dewatering risks and implement appropriate monitoring. The EPA notes that if dewatering is required, the proponent would need to obtain a licence from the Department of Water and Environmental Regulation in accordance with the RIWI Act, but has also recommended condition 2 to ensure water values are protected.

Exposure of acid sulfate soils at Five Mile Brook and other wetland areas mapped as risk areas may also pose a risk to water quality and surrounding vegetation (Figure 23 of BORR Team 2020a). This could result from earthmoving, but the EPA considers this is manageable through the proposed minimisation measures and that it can be regulated (recommended condition 2).

The proponent proposes that abstraction of approximately 333 megalitres per annum of groundwater from the Yarragadee aquifer over a 36-month period may be required for construction purposes (BORR Team 2021a). The locations of groundwater bores are not specified in the updated RI as the proponent is still finalising the detailed design and currently investigating alternative water sources to further avoid groundwater abstraction where possible. The EPA considers potential impacts from drawdown are manageable and can be regulated through recommended conditions 2 to ensure that the outcome would be consistent with the EPA's objective for inland waters.

The EPA notes that if groundwater abstraction is required the proponent would need to obtain a licence from the Department of Water and Environmental Regulation in accordance with the RIWI Act.

The EPA considers that the proposed approach to the drainage design and the proponent's minimisation measures are appropriate to ensure that the existing hydrological regime and water quality of the proposal area is maintained during construction and operation of the proposal. The EPA considers the potential indirect impacts to hydrological regimes and water quality are manageable and can be regulated through recommended condition 2 to ensure that the outcome is consistent with the EPA's factor objective *to maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected*.

Likely residual impacts of the proposal

The EPA has assessed the likely residual impacts of the proposal on inland waters to be:

1. direct loss of 0.2 ha of CCWs and 1.4 ha of REWs
2. potential indirect impacts to hydrological regimes and water quality in adjacent CCWs, REWs, the Five Mile Brook and black stripe minnow habitats
3. potential indirect impacts to groundwater from abstraction and/or drawdown impacts

With the implementation of recommended conditions, the potential environmental outcomes as a result of the proposal are likely to be:

- relatively small losses of CCWs and REWs compared to the proportion remaining
- maintenance of hydrological regimes and water quality in adjacent CCWs, REWs, the Five Mile Brook and black stripe minnow habitats.

2.3.9 Summary of key factor assessment and recommended regulation

The EPA has considered the likely residual impact of the proposal. In doing so, the EPA has considered whether reasonable conditions could be imposed, or other decision-making processes can ensure consistency with the EPA factor objective. The EPA summary assessment findings are presented in Table 5.

The EPA has also considered the principles of the EP Act (Appendix C) in assessing whether the residual impacts will be consistent with its environmental factor objective and whether reasonable conditions can be imposed (see Appendix A).

Table 5: Summary of assessment for inland waters

Residual impact		Assessment finding	Recommended conditions and DMA regulation
1.	Direct loss of: <ul style="list-style-type: none"> • 0.2 ha of CCW • 1.4 ha of REW 	Residual impacts can be regulated through conditions so the environmental outcome is likely to be consistent with the EPA's objective for inland waters.	Regulated through recommended conditions: <ol style="list-style-type: none"> 1 – limits on proposal extent (area) 2 – limits on value extents (area)
2.	Potential indirect impacts to hydrological regimes and water quality in adjacent CCWs, REWs, the Five Mile Brook and black stripe minnow habitats.	Residual impacts can be regulated through conditions and can be subject to other statutory decision-making processes, so the environmental outcome is consistent with the EPA's objective for inland waters.	Regulated through recommended conditions: <ol style="list-style-type: none"> 2 – no impacts to hydrological regimes and water quality. Compliance with RIWI Act for any dewatering or bed and bank disturbance to manage water quality.
3.	Potential residual impacts to groundwater from abstraction and/or drawdown impacts provided minimisation measures are complied with.	Residual impacts are manageable and can be regulated through conditions and subject to other statutory decision-making processes, so the environmental outcome is consistent with the EPA's objective for inland waters.	Regulated through recommended conditions: <ol style="list-style-type: none"> 2 – no impacts to hydrological regimes and water quality Compliance with RIWI Act for any abstraction of groundwater.

2.4 Social surroundings

2.4.1 Environmental objective

The EPA's environmental objective for social surroundings is *to protect social surroundings from significant harm* (EPA 2020c).

2.4.2 Investigation and surveys

The EPA advises that the following investigations were used to inform the assessment of potential impacts:

- Aboriginal Heritage Inquiry System – Desktop Survey (DPLH 2020)
- Aboriginal Heritage Survey (Brad Goodes & Associates 2020)
- Ethnographic Surveys (Ethnoscience 2020a, Ethnoscience 2020b)
- Noise Assessment (Lloyd George Acoustics 2020)
- Landscape and Visual Impact Assessment (BORR Team 2020b).

The EPA considers the proponent's surveys satisfactory, and the noise modelling methodology and results reliable for the EPA's assessment.

2.4.3 Assessment context – existing environment

Within and adjacent to the development envelope there are a number of heritage values. There are no Aboriginal Heritage sites registered under the *Aboriginal Heritage Act 1972* (AH Act), however there are five lodged sites that intersect the development envelope and require further assessment under the AH Act. One additional site (BR1 culturally modified jarrah tree) was also discovered during ethnographic surveys (BORR Team 2020a). Five Mile Brook also has mythological or spiritual values and Aboriginal mythological or spiritual values associated with the Waugyl – the Noongar Rainbow Serpent which is present in all waterbodies.

Other heritage matters are six native trees valued by the community for their significant size and associated old age. These trees feature on the community-based National Registry of Big Trees, with one tuart ('Grey Giant') also registered by the Western Australian Heritage Council (Place No. 26059).

The proponent has identified 86 sensitive receptors in proximity to the development envelope that are potentially impacted by noise from the proposal (BORR Team 2021). The majority of these are dwellings located in rural residential areas, including in the more densely populated areas in Gelorup between Jilley Road and Bussell Highway.

The proposal would also affect amenity values, which includes both visual amenity and the ability for people to live and recreate within their surroundings without any unreasonable interference with their health, welfare, convenience and comfort. This is most relevant to the Gelorup area, where the proposal will bisect the community where most properties are bush blocks with extensive remnant bushland.

2.4.4 Consultation

The eight-week public comment period raised concerns regarding the proposal's impacts to Aboriginal and other heritage, noise and amenity to existing dwellings particularly in the Gelorup corridor, and loss of social connectivity.

2.4.5 Potential impacts from the proposal

The proposal has the potential to significantly impact on social surroundings from:

- clearing and excavation causing direct impacts to one Aboriginal Heritage site (Place ID 18884 artefact scatter) and four other sites lodged with the Department of Planning Lands and Heritage (DPLH) (Place IDs 37869, 37870, 38551 and 38552)
- loss of two *Nuytsia floribunda* trees registered on the National Registry of Big Trees, and potential indirect impacts to two other significant trees
- temporary noise and vibration during construction and ongoing traffic noise during operation on nearby noise-sensitive premises and land uses
- temporary and permanent changes to landscape character and amenity from construction and operation of the road, including from clearing, new earthworks and infrastructure, noise walls, changes to air quality and street lighting
- indirect impacts associated with the infrastructure physically dividing the Gelorup community on the northern side of the proposed road from the community on the southern side.

2.4.6 Avoidance measures:

The proposal has avoided:

- a modified Jarrah Tree (site BR1), which is 15 m east of the development envelope
- the big tuart 'Grey Giant' heritage listed by the Western Australian Heritage Council (Place No. 26059), which is inside the development envelope
- four (of six) trees registered on the National Registry of Big Trees, which are outside the development envelope.
- impacts to the Waugyl by not installing footings inside the Five Mile Brook and maintaining water quality and hydrological regimes.

2.4.7 Minimisation measures (including regulation of other DMAs)

The proponent proposes to minimise impacts through the following:

- Monitoring of ground disturbance in the vicinity of Place ID 18884 (artefact scatter) by two Aboriginal traditional custodians and repatriation of any significant cultural material, if present, to local traditional owners.
- Use of a quieter road surfaces to minimise noise between Jilley Road and Bussell Highway in Gelorup, and for Centenary Road between Bussell Highway and Jules Road.

- Lowering the road elevation by 0.5–1 metre at the Yalinda Drive crossing in Gelorup to minimise visual and noise impacts.
- Provision of social connectivity structures to connect people in Gelorup north to south, for example a pedestrian and cycle bridge alongside the Yalinda Drive bridge over BORR, and provision of walk-trails for recreation through retained vegetation and the Five Mile Brook.
- Installation of noise walls in the more densely populated area of Gelorup between Jilley Road and Bussell Highway to meet the requirements of SPP 5.4. Where appropriate, the noise walls will include clear perspex (or similar) to reduce visual impacts and assist in light transfer.
- Provision of architectural treatments such as double glazing and mechanical ventilation for the sparsely populated residences, determined on a case-by-case basis.
- Undertaking construction activities that generate noise and vibration during normal business hours (7 am to 7 pm, excluding Sundays and Public Holidays) and adapting construction techniques to minimise impacts to nearby sensitive receptors.
- Installation of screen walls in Gelorup to visually screen residents and users of Yalinda Drive bridge from the BORR.
- Screening plantings and landscaping for interfacing residences, amenity trees for median and interchange plantings for interchanges to improve visual amenity.
- Reducing the street lighting along the alignment to only intersections and interchanges which is required for safety. Other measures include back shades, reducing light pole height to minimise light spill to adjacent properties, and using white/yellow luminaire lights to minimise the levels of lower wavelength light (BORR Team 2021a).

2.4.8 Rehabilitation

The proponent proposes to revegetate and landscape areas disturbed during construction inside the development envelope but not required for road infrastructure (BORR Team 2020b).

2.4.9 Assessment of impacts to environmental values

The EPA considers that the key social surroundings values likely to be impacted by the proposal are heritage, noise impacts, social amenity (visual and connectivity), and air quality impacts.

The residual impacts to these values would arise from the vegetation clearing, and the construction and operation of the road.

Heritage

Aboriginal heritage

The proposal will directly impact Place ID 18884 (artefact scatter) which the EPA notes has been subject to previous disturbance through dam construction and

roadworks (BORR Team 2020a). While previous inspections have continued to reveal artifacts, the proponent's consultant has advised that the previous disturbance has resulted in no remaining stratigraphic integrity or research potential present (Brad Goode & Associates 2020). The EPA notes the minimisation measures proposed, and that a section 18 permit under the AH Act will be required to disturb Place ID 18884. The EPA advises that due to the low significance of Place ID 18884, the complementary regulation via section 18 of the AH Act, and the proponent's intent to implement the recommendations from heritage consultants and traditional owners, the outcome would be consistent with the EPA factor objective for social surroundings.

Regarding the remaining four lodged sites (Place IDs 37869, 37870, 38551 and 38552), a dedicated heritage consultant examined and assessed the documentary material lodged and conducted consultation with the Gnaala Karla Booja Native Title Claimants. The recommendation from this heritage assessment and consultation is that these sites are not considered Aboriginal sites as there is no customary or traditional reasons or professional basis for their lodgement (Ethnoscience 2020a; Ethnoscience 2020b). Given this, the EPA advises that the disturbance of Place IDs 37869, 37870, 38551 and 38552 is unlikely to have a significant residual impact on Aboriginal Heritage and is therefore consistent with the EPA's factor objective for social surroundings.

The EPA also notes a nearby culturally modified scar tree was identified as part of the Aboriginal heritage survey and is 15 metres from the edge of the development envelope. The proponent has indicated that the tree is much further from the road footprint (approximately 63 m) and therefore unlikely to be at risk of indirect impacts. However, to ensure that indirect impacts are avoided, and the outcome is consistent with the EPA's objective for social surroundings, the EPA has recommended condition 8.

Other heritage

Regarding other heritage matters, the EPA notes the proponent has avoided four of six trees that are identified on a community-owned database – the National Registry of Big Trees⁴ (BORR Team 2021a). Two *Nuytsia floribunda* trees on this Registry will be cleared as a result of the proposal (BORR Team 2021a). The EPA notes that a nomination of a tree on the National Registry of Big Trees promotes its preservation but does not hold any statutory protection over the tree. While the EPA recognises the local importance of these trees, the unavoidable loss of these trees is not inconsistent with the EPA's objective *to protect social surroundings from significant harm*.

The *Eucalyptus gomphocephala* tree identified on the National Registry of Big Trees is also heritage listed as 'Grey Giant' (Heritage Place No. 26059) by the Western Australian Heritage Council. This tree is inside the development envelope but within the clearing exclusion area identified in Figure 5. The proponent made changes to the road footprint to avoid this tree prior to referral. The EPA notes the proponent would manage the risks of potential indirect impacts by demarcating the tree and the clearing exclusion areas during construction. To ensure potential indirect impacts are avoided the EPA has recommended condition 8.

⁴ <https://www.nationalregisterofbigtrees.com.au/pages/tree-register>

Given the above, the EPA considers the proposal is not likely to cause significant residual impacts to Aboriginal and other heritage matters, and therefore the outcome is consistent with the EPA's factor objective for social surroundings.

Noise

Operations

Impacts to sensitive receptors from traffic noise is not covered by the *Environmental Protection (Noise) Regulations 1997* (Noise Regulations), and EPA consideration is based on the *Environmental Factor Guideline – Social Surroundings* and the *State Planning Policy 5.4 Road and Rail Noise* (SPP 5.4). This policy applies to both new major road projects as well as major upgrades of existing roads and specifies day and night-time noise targets for both new and upgraded roads. The proponent has applied the $L_{Aeq(Day)}$ parameter as noise monitoring results show compliance with the daytime parameter is predicted to result in compliance with the night-time parameter (Lloyd George Acoustics 2020).

The noise modelling by the proponent was undertaken prior to the changes to proposal being made through the section 43A (published on 6 September 2021) which included lowering the elevation of the road and the Yalinda Drive bridge over BORR in Gelorup. The EPA notes that the proponent would need to undertake supplementary modelling to confirm the influence of the road lowering on noise, however it is likely that this measure would reduce noise and potentially reduce the heights of noise walls.

Prior to the section 43A changes to the elevation of the road, the proponent's modelling predicted that in 2041, through the application of quieter road surfaces and the installation of noise walls, all properties the between Jilley Road and Bussell Highway would meet the noise targets for new roads specified in SPP 5.4. These properties are likely to receive further reduction in noise with the lowering of the Gelorup section.

Outside of this area, modelling has predicted that in 2041, a total of 19 sensitive receptors on 17 properties are expected to have exceedances of the noise target for upgraded roads specified in SPP 5.4. All premises except one will be offered architectural treatments to the buildings to minimise impacts to indoor noise amenity. The predicted exceedance on the single property is by one decibel, and the proponent has proposed specific noise monitoring post-construction to determine whether the target noise levels will actually be exceeded. The specific architectural treatments will be discussed on a one-on-one basis with the affected landowners. These sensitive receptors are outside the area between Jilley Road and Bussell Highway, with most located at the southern end of the development envelope.

The EPA considers the proponent is proposing reasonable and practicable measures to reduce traffic noise impacts (from current and future noise) which is consistent with measures in SPP 5.4 relevant to new and upgrades to roads, and is consistent with the EPA's social surroundings objective. The EPA recommends that the proponent further consult with the community and residences near the proposal

about the final dimensions and configurations of the noise walls and about the influence of lowering road profile on reducing noise further.

The EPA considers that the residual impacts from operational noise can be managed and regulated (recommended condition 7) so that the outcome is consistent with the EPA's objective for social surroundings.

Construction

During construction, temporary noise and vibration impacts may affect nearby sensitive receptors. The EPA notes that in accordance with Regulation 13 of the Noise Regulations, any construction noise made between 7.00 a.m. and 7.00 p.m. Monday to Saturday (excluding public holidays) is exempt from assigned noise limits in the Noise Regulations. This is provided the works are being carried out in accordance with the *Australian Standard 2436:2010 Guide to noise and vibration control on construction, demolition and maintenance sites*.

The proponent has proposed a number a measures to minimise construction noise impacts. The EPA notes that a noise management plan will need to be developed and submitted for approval to the Chief Executive Officer of the relevant Local Government Authority, should work be planned outside of the permissible hours as required by Regulation 13 of the Noise Regulations. The EPA considers that any noise and vibration impacts would be localised and temporary during the construction phase and with appropriate minimisation measures, impacts are expected to be manageable and meet the requirements of the Noise Regulations and be consistent with the EPA's objective for social surroundings.

Amenity

The proponent's predications are that, after the application of the minimisation measures described above, impacts to landscape character and therefore visual amenity will range from low to high. This is particularly in the Peri-Urban and Rural Landscape Character Units, located in the Gelorup section, where the impacts are moderate to high (BORR Team 2020b).

Residual impacts to visual amenity, social amenity and social connectivity are discussed in detail below.

Visual amenity

The EPA recognises that with the implementation of this proposal there would be unavoidable impacts to visual amenity to varying degrees, and most impacts through Gelorup. The EPA notes that construction impacts to visual amenity are likely to be higher than operational impacts but recognises that these impacts will be temporary in nature. The proponent has prepared four photomontages to simulate the proposed impacts to visual amenity at three temporal intervals following the initial impact clearing, construction and mitigation (BORR Team 2020b).

The EPA advises that after construction and mitigation, the vistas from some private properties would be permanently changed with the loss of vegetation; however notes this is to be minimised with the addition of screen walls or noise walls at appropriate locations through Gelorup (see Figure 2 in BORR Team 2021c for indicative screen

walls and noise walls). The proponent has proposed that the screen walls (in combination with the lowering of the road) could potentially be designed to prevent any direct views of the road from the adjacent private properties in Gelorup. Visual impacts from the noise and screen walls are proposed to be further minimised by planting vegetation and/or paint colour schemes or artworks to incorporate walls into the surrounds.

The lowering of the road profile is an important addition to the proposed mitigation to reduce visual impacts by reducing heights of noise walls (while still meeting noise criteria for SPP 5.4), eliminating or otherwise reducing vistas of the BORR from private properties and lowering the height of Yalinda Drive bridge by 0.5 – 1 metre than originally proposed. Screen walls are also proposed to ensure pedestrians and motorists would not have a view of the BORR whilst on the Yalinda Drive bridge, further reducing the local visual impacts (see Figure 2 in BORR Team 2021c).

It is likely that some visual impacts cannot be avoided entirely but the EPA is of the view that a sufficient level of minimisation has occurred, particularly with the addition of lowering the road, to ensure the outcomes is consistent with the EPA's objective for social surroundings.

The EPA notes that some of the placement of additional screen walls and other visual amenity minimisation measures as described above have yet to be discussed with the local community, therefore has recommended condition 8. This would ensure that the community is consulted about the proposed details as relevant to their properties and social uses of their surroundings in Gelorup.

Social amenity and connectivity

The proposal would result in changes to social amenity, particularly through Gelorup where majority of the vegetation clearing would occur and therefore reduce people's access to natural bushland. The proposal also has the potential to reduce social connectivity and local commuting through Gelorup as the proposal bisects the suburb.

The EPA notes that the proposal has been designed to ensure local roads tie-into the BORR and a bridge over BORR is proposed at Yalinda Drive to provide vehicle and pedestrian connections from Gelorup-northside of BORR to south. However, the proposed additional measures as outlined in the section 43A documentation 2021 have been key considerations by the EPA for its assessment of impacts to social amenity. These include:

- lowering the elevation of the BORR at the Yalinda Drive bridge by 0.5–1 metre to reduce amenity impacts
- the provision of two additional pedestrian underpasses in Gelorup – one where the BORR crosses Tuart Brook and another located further west of Yalinda Drive bridge (Figure 5)
- a proposed new network of walk-trails connecting Gelorup-northside of BORR to the southside and providing recreation opportunities (Figure 5)
- retention of five properties acquired by Main Roads amounting to 5 ha on the northern side of BORR in Gelorup (Figure 5), to be reserved for passive

recreation (rather than being on-sold) and connected to the proposed walk-trail network

- protection of a bushland within the development envelope and connected to the proposed walk-trail network (Figure 5).

The EPA considers these additions have further minimised the impacts to social connectivity and amenity compared to what was originally proposed. However the EPA recognises that these proposed additions have not been discussed with the affected community, and has therefore proposed condition 8 which requires further consultation about the specifications and locations of additional minimisation measures.

In particular, the addition of 5 ha of bushland to the public reserve would minimise the impacts of vegetation loss and the associated loss of sense-of-place by providing access to nature for recreation, cultural and amenity values. As these areas would require protection and on-going management of indirect impacts, the EPA recommends condition 6-3 (11).

With these elements, along with the originally proposed mitigation measures to reduce impacts to amenity, the EPA is of the view that the outcome is consistent with its objective for social surroundings. In particular, as outlined in the EPA's *Environmental Factor Guidance – Social Surroundings* (EPA 2016) 'people's ability to live and recreate within their surroundings without any unreasonable interference with their health, welfare, convenience and comfort' has been mitigated to an acceptable level by the proponent's additional measures.

Air quality

The proposal has the potential to affect air quality from operational traffic emissions and dust generated during construction.

The proponent proposes to mitigate construction impacts to air quality through the implementation a construction environmental management plan including but not limited to dust-suppression measures such as surface watering, avoidance of large earthworks in high winds, restriction of construction vehicle speeds, and staged clearing with progressive construction to minimise soil exposure times. The proponent intends to monitor dust levels during construction and respond to any community complaints if required.

Using the AUSROADS dispersion model, the proponent undertook modelling of operational traffic volumes by 2041 compared with 2020 which predicted that the maximum concentration of each pollutant would not exceed the assessment criteria (Memo to EPA Chair from Main Roads, June 2021). The model also did not include the anticipated future 'cleaner' vehicle fleet where newer vehicles are likely to replace older less efficient vehicles, or future advancements in carbon-efficient technology. Therefore, it is unlikely that operational traffic would cause a significant residual impact to local air quality.

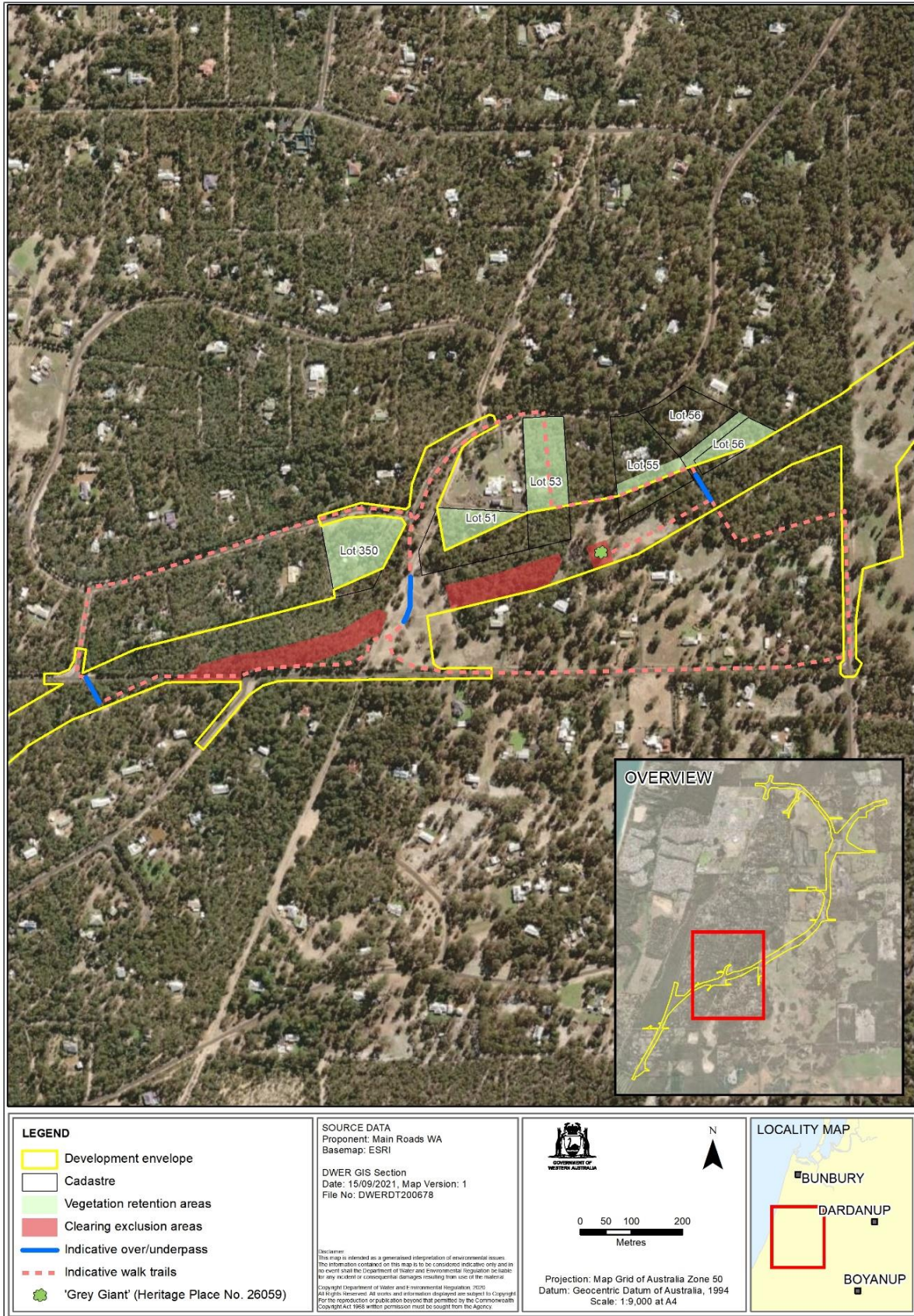


Figure 5: Vegetation retention areas, clearing exclusion areas and indicative walk-trails

The EPA notes that some residents nearby the proposal are not connected to Bunbury's watermains and rely entirely on land-owner rainwater tanks. According to the Department of Health guidelines, air contaminants from construction or operational traffic emissions in Australia are unlikely to cause significant impacts on the quality of rainwater collected in domestic tanks (Department of Health 2011). The EPA advises that the proposal is unlikely to result in significant residual impacts to air quality to such an extent that it would cause contamination of local rainwater sources.

Likely residual impacts of the proposal

The EPA has assessed the likely residual impacts of the proposal on social surroundings to be:

1. Direct loss of two community significant trees, and potential indirect impacts to the 'Grey Giant' tuart tree (Heritage Place No. 26059) and an Aboriginal Heritage tree
2. Noise impacts to sensitive receptors from operational noise
3. Amenity impacts from changes to the landscape character, visual and social amenity in Gelorup.
4. Potential residual impacts to Aboriginal Heritage site Place ID 18884 (artefact scatter) and four other sites lodged with the DPLH.

With the implementation of recommended conditions, the potential environmental outcomes as a result of the proposal are likely to be:

- changes in the local heritage, noise and amenity values, however the impacts would be minimised to ensure consistency with the EPA's objective for social surroundings
- protection of the 'Grey Giant' tuart tree, an Aboriginal Heritage tree and adjacent bushland areas and provision of additional measures for maintaining public access to nature.

2.4.10 Summary of key factor assessment and recommended regulation

The EPA has considered the likely residual impact of the proposal. In doing so, the EPA has considered whether reasonable conditions could be imposed, or other decision-making processes can ensure consistency with the EPA factor objective. The EPA summary assessment findings are presented in Table 6.

The EPA has also considered the principles of the EP Act (Appendix C) in assessing whether the residual impacts will be consistent with its environmental factor objective and whether reasonable conditions can be imposed (see Appendix A).

Table 6: Summary of assessment for social surroundings

Residual impact		Assessment finding	Recommended conditions and DMA regulation
1.	Noise impacts to sensitive receptors	Residual impacts to properties from operational noise should be subject to implementation conditions to ensure consistency with the EPA's objective for social surroundings.	Regulated through recommended condition: 7 – Noise Management Plan Compliance with <i>Environmental Protection (Noise) Regulations 1997</i> and <i>SPP 5.4 Road and Rail Noise</i>
2.	Amenity impacts to sensitive receptors from changes to the landscape character, construction and operation of the highway	Residual impacts to sensitive receptors from amenity impact should be subject to implementation conditions to ensure consistency with the EPA's objective for social surroundings.	Regulated through recommended conditions: 1 – limits on proposal extent (area) 6-8 – revegetation and protection of vegetation retention and clearing exclusion areas 8 – Amenity Management Plan
3.	Direct loss of two community significant trees, and potential indirect impacts to the 'Grey Giant' Tuart Tree and an Aboriginal Heritage tree	Residual impacts to significant trees should be subject to implementation conditions to ensure consistency with the EPA's objective for social surroundings.	Regulated through recommended condition: 1 – limits on proposal extent (area) 8 – Amenity Management Plan
4.	Potential residual impacts to Aboriginal Heritage site Place ID 18884 (artefact scatter) and four other lodged sites	Residual impact should be subject to implementation conditions to ensure there are no direct or indirect impacts to a culturally modified significant tree to ensure consistency with the EPA objective for social surroundings.	Regulated through: 8 – Amenity Management Plan Consent is also required under section 18 of the <i>Aboriginal Heritage Act 1972</i>

3 Holistic assessment

While the EPA has assessed the impacts of the proposal against the key environmental factors individually, the EPA recognises the complex linkages between flora and vegetation, terrestrial fauna, inland waters and social surroundings (see Figure 6). The EPA have therefore also considered the connections and interactions between parts of the environment to inform a holistic view of impacts to the whole environment.

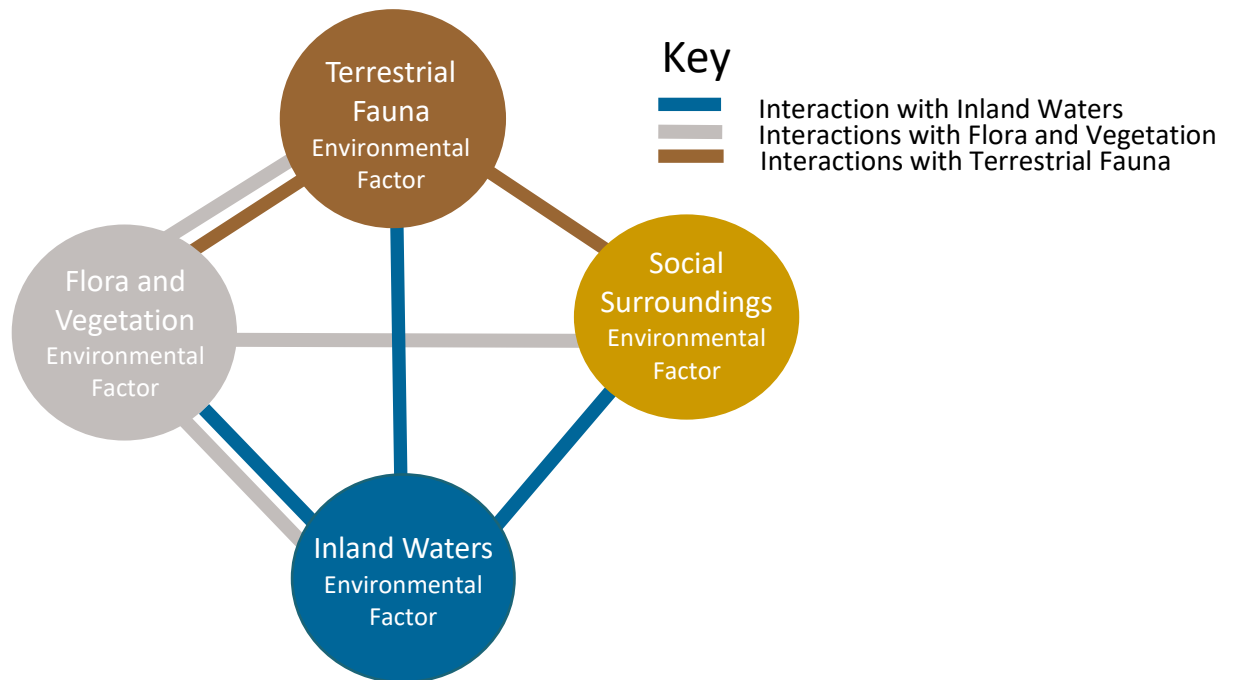


Figure 6: Intrinsic interactions between key environmental factors and other environmental factors

The EPA's evaluation of other environmental factors (that is, those which were not considered key factors for assessment) is included in Appendix D. The above diagram summarises the key relationships and links between the key environmental factors to inform the EPA's holistic assessment.

Terrestrial fauna

The proposal has been designed to minimise some clearing of habitats and utilise existing cleared areas. The proposal will impact on terrestrial fauna through clearing of 71.5 ha of fauna habitat containing habitat for conservation significant fauna. Species impacted include the ringtail possum, phascogale, black cockatoo species and black striped minnow through clearing of foraging and breeding habitat, displacement of ringtail possum individuals and associated habitat fragmentation.

The proposal has the potential to impact on terrestrial fauna and change the relationship between flora and vegetation and reduce people's social surroundings and interactions with nature.

In considering the impacts to the critically endangered status of the ringtail possum, the EPA had regard to its intrinsic value and its relationship with other biological and social values. Having considered the historical and cumulative impacts to habitats on the southern Swan Coastal Plain, the EPA considered it appropriate to recommend and apply offsets to counterbalance impacts, and contingency offsets to ensure that the proposal would not result in a long-term decline in the local population.

By applying the proposed mitigation, management, the recommended counterbalancing of impacts on terrestrial fauna through offsets, and the consideration of the precautionary principle, the EPA considers that the impacts to the health of other environmental factors including the values associated with social surroundings and flora and vegetation are unlikely to be inconsistent with the EPA's environmental factor objectives.

Flora and vegetation

The proposal has been designed to avoid some clearing of native vegetation and utilise existing cleared areas. The proposal would clear 71.5 ha of native vegetation including vegetation representative of the Banksia Woodlands, Tuart Woodlands and the Tuart-Peppermint Woodlands PEC.

Through the clearing of native vegetation, the proposal has the potential to impact on terrestrial fauna by removing and altering habitats, including fragmentation specifically to the ringtail possum. Clearing native vegetation may also change the relationship between people and their social surroundings.

The impact on flora and vegetation is assessed as being significant and is required to be counterbalanced through offsets. The EPA considers that the proposed mitigation measures and recommended conditions to regulate flora and vegetation impacts will also mean that the impacts to the health of other factors of the environment including the values associated with terrestrial fauna and social surroundings are likely to be consistent with the EPA's environmental factor objectives.

Inland waters

The proposal would result in the direct loss of wetlands however this has been assessed as not significant given the minor losses compared to the remaining extents.

The proposal may indirectly impact the natural hydrological regimes and water quality in areas adjoining the proposal, as well as potential impacts to groundwater through dewatering activities or abstraction (if conducted) and potential exposure of acid sulfate soils at the Five Mile Brook and other wetlands.

The potential impacts to hydrological regimes and water quality may also affect other values associated with flora and vegetation of adjacent wetlands and terrestrial fauna habitats of the conservation significant black stripe minnow. In turn this could impact social values associated with these other water-dependant values, and Aboriginal mythological or spiritual values associated with the Waugyl – the Noongar Rainbow Serpent present in all waterbodies including the Five Mile Brook.

The proposal has been designed with drainage infrastructure that would maintain the existing water balance of the proposal area and with the implementation of recommended conditions would not impact on hydrological regimes or water quality of adjoining CCWs, REWs, black stripe minnow and the Five Mile Brook.

By applying the proposed mitigation and management measures and recommended conditions for impacts to inland waters, the EPA considers that impacts to the health of other factors of the environment including the values associated with flora and vegetation, terrestrial fauna and social surroundings are likely to be consistent with the EPA's environmental factor objectives.

Social surroundings

While the existing primary road corridor has been in place in the Greater Bunbury Region Scheme for years and has been reviewed a number of times, the EPA recognises that the construction and ongoing operation of the road at this location will have attendant impacts on the visual and noise amenity of surrounding residents, and possibly affect the overall 'sense of place'.

The proposal has been designed to minimise and mitigate impacts to social surroundings elements such as amenity (noise and visual), Aboriginal and other heritage, and access to or appreciation of natural areas. A number of additional measures were proposed by the proponent to retain more vegetation, improve connectivity and therefore improve amenity outcomes in the area. The EPA recognises the intrinsic link between the factors of terrestrial fauna, flora and vegetation, inland waters and people's values of their social surroundings.

The EPA has assessed the impacts of the proposal on social surroundings and in relation to the other factors of terrestrial fauna, flora and vegetation, and inland waters. The EPA has concluded that with the application of mitigation measures to reduce visual and noise impacts and provide infrastructure to reconnect people to adjoining natural bushland, the Five Mile Brook and to each other; and through the implementation of the recommend conditions, the proposal would not unreasonably impact social surroundings or be inconsistent with the EPA's factor objective.

Summary of the holistic assessment

The EPA recognises the aggregation of the environmental values that coincide with the proposal development envelope (particularly at the south-western end of the proposal) including several conservation significant terrestrial fauna species and their habitats, priority ecological communities and the social surroundings of Gelorup. These interactions have the potential to influence the environment in a holistic and non-linear way, effecting all environmental values which are physically and intrinsically linked.

Due to the linkages between the biological and social values of the EPA's environmental factors of the proposal area and the proposed impacts to these values, the application of the EP Act precautionary principle, the principle of the conservation of biological diversity and ecological integrity and intergenerational

equity (Appendix C) were relevant considerations in the holistic assessment of the proposal.

When the separate environmental factors of the proposal were considered together in a holistic assessment, the EPA formed the view that the impacts from the proposal would not lead to any change to its view about consistency with the EPA's factor objectives.

4 Offsets

Environmental offsets are actions that provide environmental benefits which counterbalance the significant residual impacts of a proposal.

Consistent with the *WA Environmental Offsets Guidelines* (Government of Western Australia 2014), the EPA may consider the application of environmental offsets to a proposal where it determines that the residual impacts of a proposal are significant, after avoidance, minimisation and rehabilitation have been pursued.

In the case of this proposal, likely (and potential) significant residual impacts are:

- direct impacts to 60.9 ha of habitat for ringtail possum, displacement of individuals, and fragmentation of habitat particularly in Gelorup
- direct impacts to 60.9 ha foraging and potential breeding habitat for black cockatoo species (Carnaby's and Baudin's cockatoos and forest red-tailed black cockatoo), including 1088 trees with the potential to develop nest hollows and 11 trees with suitable hollows
- direct impacts to 39.2 ha of habitat for phascogale
- direct impacts to 23.4 ha of Banksia Woodlands
- direct impacts to 4.4 ha of Tuart Woodlands
- direct impacts to 4.5 ha of Tuart-Peppermint Woodlands PEC.

Environmental offsets are not appropriate in all cases. In this case the EPA considers offsets are appropriate given the:

- proponent's additional application of the mitigation hierarchy to further reduce potential impacts (principle 1 of the *WA Environmental Offsets Policy*)
- magnitude of the likely significant residual impacts on environmental biodiversity values facing increasing pressures, such as threatened ecological communities and threatened fauna habitat (principle 2 of the *WA Environmental Offsets Policy*)
- residual impacts can be counterbalanced by the provision of significant additional offsets that are likely to have a long-term strategic benefit and demonstrated environmental benefit (principle 6 of the *WA Environmental Offsets Policy*).

The proponent advertised its Offset Strategy (Revision 0) during the public review period for the proposal between October and December 2020. The EPA had regard for the proponent's use of the Commonwealth *Offsets assessment guide*, however considering the threat category of ringtail possums, did not consider the offsets proposed in Revision 0 of the Offset Strategy would adequately counterbalance the proposal's potential impacts to ringtail possum. Therefore, in July 2021 the EPA asked the proponent to present a revised and additional offset package that would:

- further reduce fragmentation of ringtail possum habitat
- ensure a net-gain in ringtail possum populations, and
- demonstrate a strategic conservation benefit for the species.

The proponent has provided an expanded Offset Strategy which includes eight specific offsets (Offset Strategy Revision 3) which have been consolidated into the 4 categories below. The EPA's view on whether these offsets are likely to address the significant residual impacts is presented under these categories.

Assessment of proponent's offsets

Acquisition of vegetated lands

The proponent has proposed a series of land acquisitions to fully counterbalance the significant residual impacts to Banksia Woodlands, Tuart Woodlands and Tuart-Peppermint Woodlands PEC, and partially counterbalance the significant residual impacts to ringtail possum, phascogale and black cockatoo species. These sites and the current tenure are:

- Lots 153, 267 and 268 Ducane Road, Gelorup (owned by the State of WA)
- Lot 27 Tredrea Road, Myalup (owned by the proponent)
- Lot 1 Ducane Road, Gelorup (acquisition by the proponent in process, currently owned by the Western Australian Planning Commission)
- Lot 156 Marchetti Road, Gelorup (final stages of acquisition by the proponent in process, currently in private ownership).

While the proponent has or will be acquiring each of the sites listed above, predominantly only a portion of each site is required to fulfill the offset requirements to counterbalance significant residual impacts (Offset Strategy Revision 3).

The EPA notes that surveys of the above sites have confirmed the presence and extent of the vegetation and fauna values for which significant residual impacts remain (Biota 2019, Biota 2021a, Biota 2021b, Main Roads Western Australia 2021, Stream Environment and Water 2021). This is consistent with principle 4 of the *WA Environmental Offsets Policy*, which states that offsets should be based on sound environmental information and knowledge.

Lots 153, 267 and 268 Ducane Road and Lot 27 Tredrea Road are proposed to offset the significant residual impacts to Banksia Woodlands and Tuart Woodlands/ Tuart-Peppermint Woodlands PEC respectively. In assessing the suitability of these offsets, the EPA notes that the total area of priority vegetation impacted is 27.9 ha, with the total area proposed to be acquired and offset is 111 ha. In addition, the vegetation on these offset sites is in much better condition than that being impacted. For example, over 50% of the Banksia Woodlands impacted is considered in a Good to Completely Degraded condition, whereas all of the offset site vegetation is rated as Good to Very Good.

All of the above lots (with the exception of Lot 27 Tredrea Road, Myalup) are also proposed to partially offset the significant residual impacts to ringtail possum, phascogale and black cockatoo species. In assessing the suitability of these offsets, the EPA notes that the total area of fauna habitat impacted is 60.9 ha, with the total area proposed to be acquired and offset is over 170 ha for the affected species.

Comparing the quality of the fauna habitat and its ability to support the affected fauna, the EPA considers the offset site are comparable. For black cockatoos, there are more suitable trees with hollows and the foraging value of the habitat is of higher quality on the offset sites compared to the development envelope. For ringtail possums, the relative proportions of habitat quality are similar, although it is noted the density of individuals is slightly lower. The proponent has proposed further offsets for black cockatoos and ringtail possums, which are discussed below.

The Ducane Roads Lots form part of an identified South West Regional Ecological Linkage (Molloy *e.t. al.* 2009) and the 'Dalyellup/Gelorup/ Crooked Brook Ecological Linkage' identified in the EPA's assessment of the GBRS (EPA 2003). Lot 156 Marchetti Road 3 is traversed by Five Mile Brook which creates a vegetated linkage to local government managed reserves within the Gelorup area to the north west. Objective 1 of the recovery plan is *habitat critical for survival for western ringtail possums is identified and protected in each key management zone* (Department of Parks and Wildlife 2017). This offset is consistent with this objective.

In considering the precautionary principle, the EPA advises the proposal presents a risk of irreversible harm given the identified threats and pressures facing ringtail possums. However, the acquisition and protection of sites, particularly sites that can contribute to the creation of ecological linkages, is important given that fragmentation is identified as a key threatening process for ringtail possums.

All of the above sites are currently zoned as either Rural or Primary Regional Road under the Greater Bunbury Region Scheme. However, the proponent has committed to requesting these sites be rezoned to either Regional Open Space or Conservation to secure these sites for future conservation.

Of the sites listed above, DBCA supports the incorporation of Lots 153, 267 and 268 Ducane Road into the conservation estate. For the remaining sites, the proponent is investigating alternative management arrangements with agencies (such as DBCA and the Shires of Capel, Dardanup, Harvey), but will maintain responsibility for them until alternative arrangements have been agreed.

The EPA will require ongoing site management to ensure long term conservation. Site works identified by the proponent include access management, firebreak establishment, on-going feral animal control and targeted weed control to protecting environmental values. The proponent has also identified opportunity for additional revegetation and infill planting at Lot 27 Tredrea Road to improve the site's conservation value. Where a third party such as DBCA or the local Shire agrees to take responsibility for the site, the EPA will require the proponent to commit to funding ongoing site management for 20 years.

With the transfer of these acquired lands to secure tenure and ongoing site management, the EPA considers the outcome of these offsets will improve connectivity of ringtail possum habitat and assist in ensuring a net gain in vegetation communities, fauna habitat and ringtail possum populations within conservation tenure. This will ultimately contribute to the long-term conservation of environmental values impacted by this proposal. Without the proposed offsets it is likely that the

condition and health of the remnant communities and fauna habitats would decline over time from existing threats and pressures.

Revegetation of fauna habitat

The proponent has proposed revegetated at two sites to partially counterbalance the significant residual impacts to ringtail possum, phascogale and black cockatoo species. Together with the land acquisition offsets described above, these direct offsets fully counterbalance the residual impacts to these fauna species (Offset Strategy Revision 3). Additional indirect offsets are also proposed and described further below.

Revegetation is proposed to occur at:

- 35 ha at Lot 104 Willinge Drive (owned by the proponent)
- 185 ha at 3 sites within the Ludlow Tuart State Forest/Tuart Forest National Park (owned by the State of WA and vested in the Conservation and Parks Commission).

Lot 104 Willinge Drive occurs as two parcels of land bisected by the existing BORR Central Section. This offset is for the northern portion, which was previously used as a commercial blue gum plantation but has now been harvested and cleared. This site is adjacent to the Preston River, which provides a habitat corridor for ringtail possum. This site is also in close proximity to other offset sites along Willinge Drive which are owned by the proponent and intended to be revegetated for the purposes of offsetting the impacts associated with the BORR Northern and Central Sections proposal (EPA Report 1684).

The proponent has also proposed to revegetate 185 ha of degraded land at 3 sites within the Ludlow Tuart State Forest/Tuart Forest National Park. Of the 185 ha to be revegetated 170 ha is located approximately 13.5 km to the south of the development envelope within the Shire of Capel and the remaining 15 ha is located within the Shire of Busselton.

Lot 104 Willinge Drive is currently zoned as Rural under the Greater Bunbury Region Scheme. However, the proponent has committed to requesting this site be rezoned to either Regional Open Space or Conservation to secure the site for future conservation. The sites within Ludlow Tuart State Forest/Tuart Forest National Park are already vested with the Conservation Commission of WA.

In assessing the suitability of these offsets, the EPA recognises that once successfully revegetated, Lot 104 Willinge Drive (together with the offset sites for BORR Northern and Central – Ministerial Statement 1155) would combine to add a significant area of connected ringtail possum habitat alongside the Preston River corridor nearby the impact site (Offset Strategy Revision 3).

Completion criteria will apply to the revegetation program for these offset sites, with flora species selected to provide habitat and foraging vegetation suitable for these fauna species. Ongoing site management for long term conservation will include fencing and access management, weed control, firebreaks and feral animal control

to maintain/improve habitat quality. These criteria and actions will be developed in consultation with DBCA.

The DBCA has advised the EPA that the most strategic and beneficial sites for the long-term protection and conservation of the ringtail possum are within the Ludlow Tuart State Forest/Tuart Forest National Park. DBCA have also advised that with successful revegetation, these sites have the capacity to support higher densities of possums than the impact site. This is consistent with principle 6 of the *WA Environmental Offsets Policy*, which states that environmental offsets should be focused on longer term strategic outcomes.

The proponent has previously undertaken revegetation within the Ludlow Tuart State Forest/Tuart Forest National Park, and will apply learnings from these works to this revegetation program. This is consistent with principles 4 and 5 of the *WA Environmental Offsets Policy*, which states that offsets should be based on sound environmental knowledge and are to be applied within a framework of adaptive management. The DBCA have advised the EPA that, based on this previous work and the proponent's ongoing commitment to achieving revegetation objectives, they have sufficient level of confidence that the revegetation will be successful.

In considering the precautionary principle, the EPA advises the proposal presents a risk of irreversible harm given the identified threats and pressures facing ringtail possums. However, this offset substantially increase the quantity and quality of ringtail possum habitat within secure conservation tenure with the expected outcome of increasing ringtail populations. This offset is also a Priority 1 action under Objective 2 of the Recovery Plan *mitigate threatening processes constraining the recovery of western ringtail possums* (Department of Parks and Wildlife 2017).

The EPA considers the likely outcome of the revegetation of habitat locally and regionally would be improved connectivity of ringtail possum habitats and a net gain in habitat (and ringtail possum populations) within secure conservation tenure for the affected species.

Expansion of the fox baiting program

The European fox and cats are known to be major predators of ringtail possums and are also major contributing factors to the failure of ringtail possum translocation programs. A study conducted along a road identified as a roadkill hotspot for the species in the Swan Coastal Management Zone found 10% of mortalities were attributed to road kills and 70% were attributed to fox predation (Department of Parks and Wildlife 2017).

DBCA currently conducts fox baiting within the Ludlow Tuart State Forest/Tuart Forest National Park, primarily around the perimeter of the forest blocks and along selected strip transects within blocks. The proponent has proposed to contribute \$200,000 to DBCA to enhance on-ground feral animal baiting to manage predation on ringtail possums. This amount will provide additional baiting for up to eight years.

In assessing the suitability of this offset, the EPA recognises this funding will contribute to one of the priority 1 actions under Objective 2 of the recovery plan

Threatening processes that are constraining the recovery of western ringtail possums are mitigated in each key management zone (Department of Parks and Wildlife 2017). This funding is also additional to what is currently undertaken by DBCA and will allow the fox baiting program to be expanded within the DBCA reserve. This could include additional baiting transects and analysis of bait uptake to provide further information regarding how foxes move through the landscape. The EPA also recognises that the Ludlow Tuart State Forest/Tuart Forest National Park is a significant habitat hotspot for the species and managing threatening processes in this area will have a strategic long-term benefit for the population. This is consistent with principle 6 of the *WA Environmental Offsets Policy*, which states that environmental offsets should be focused on longer term strategic outcomes.

Given the significant threat posed by foxes to ringtail possum abundance, the EPA considers the expansion of the fox baiting program would complement the proposed revegetation offsets and facilitate achieving a net gain in ringtail possum populations within secure conservation tenure.

Establishment of a peppermint orchard

Approximately 200 ringtail possums per year enter rehabilitation in the Busselton area. They are rescued by volunteer wildlife rehabilitators or the general public. Of these, only 25 to 50% are thought to successfully survive the rehabilitation program (Department of Parks and Wildlife 2017).

A requirement for successful rehabilitation is appropriate and sufficient forage material every day or every few days, and newer growth from peppermints (*Agonis flexuosa*) is often targeted. This is harvested from both private lands and public reserves, which can compromise rehabilitation success as well as potentially impact in-situ food resources for resident ringtail possums.

Objective 4 of the ringtail possum recovery plan is *the management of displaced, orphaned, injured and rehabilitated western ringtail possums aids the conservation outcome for the species* (Department of Parks and Wildlife 2017). To assist in achieving this objective, the proponent has proposed, in consultation with DBCA, the establishment of a 1 ha peppermint orchard to aid wildlife carers with a ready source of foliage for rescued ringtail possums. The orchard will be established on DBCA managed lands, Lot 12 Bussell Highway, with foliage expected to be available for harvesting in 2023 (Offset Strategy, Revision 3).

Objective 4 is a Priority 1 on the Swan Coastal Plain, and together the South West Catchments Council, Fostering and Assistance for Wildlife Needing Aid, the University of Western Australia and the DBCA are collaborating to research the fate of ringtail possums raised by rehabilitators after their release back into the wild. This has involved establishment of the Possum Finishing School, where individuals are held under standard conditions for at least one month to ensure that factors that may affect survival post release can be standardised. Ringtail possums held in this facility require daily foliage changes, and therefore requires significant foliage.

In assessing the suitability of this offset, the EPA recognises that ringtail possums have poor rehabilitation and translocation success, and research into improving

survivorship will provide a significant long-term environmental benefit to the species. The EPA considers that the peppermint orchard will support the requirements of the Possum Finishing School and also reduce foliage harvesting in remnant vegetation and therefore is also likely to reduce pressures on in-situ ringtail possums. This is consistent with principle 6 of the *WA Environmental Offsets Policy*, which states that environmental offsets should be focused on longer term strategic outcomes.

The EPA acknowledges that this is an indirect offset but considers that it may indirectly contribute to an increase in ringtail populations in the local area through reduced competition for in-situ resources and by assisting in the success of ringtail possum rehabilitation programs.

Contingency offset for ringtail possums

As discussed in Section 2.1, the EPA advises that, consistent with the precautionary principle, the proposal presents a risk of irreversible harm should the population not recover to pre-disturbance levels. While the EPA has proposed a series of conditions to require the proponent to ensure the ringtail population recovers, there is some uncertainty regarding whether this will occur given both the timescale of 15 years and the likely threats and pressures. Principle 3 of the *WA Environmental Offsets Policy* also states that offsets should be proportionate to the impact and should ringtail populations not recover the proposal would be at variance with Principle 3.

The EPA has therefore proposed a contingency offset (condition 9-13), which will require the proponent to provide an additional offset to address the additional significant residual impact that would result should the population not return to pre-disturbance levels.

As outlined above, the EPA considers that both acquisition and revegetation-based offsets can achieve a net environmental gain. Should a contingency offset be required after 15 years, the proponent would be required to update the offset management plan required by condition 9 within 12 months with the additional offset required.

Summary

The EPA has considered and assessed the offsets proposed and whether they would result in a net environmental benefit. The anticipated outcome from the offsets is:

- protection of Banksia Woodlands, Tuart Woodlands and Tuart-Peppermint Woodlands PEC in good condition or better
- protection of habitat critical for the survival of ringtail possums
- protection of foraging habitat for black cockatoos and habitat and phascogale
- creation of additional habitat and foraging habitat for ringtail possums, phascogale and black cockatoos
- a net gain in ringtail possum populations within secure conservation tenure
- a reduction in regional fragmentation of habitat for ringtail possums.

The EPA considers that the environmental outcomes of protection of conservation significant vegetation and the protection and creation of fauna habitat in offsets is likely to be consistent with the EPA's objectives for these factors and will therefore result in a net environmental benefit.

The EPA has recommended condition 9 'Offsets' that requires the proponent undertake offset measures to counterbalance the significant residual impact of direct and indirect impacts to the relevant environmental values. Condition 9 sets out the offset locations, the type of offset measures to be implemented and the extent of the offset location that should be subject to the offset measures.

To demonstrate that the objective to counterbalance the significant residual impacts will be met, condition 9-3 requires the proponent to prepare and submit an offset management plan which is to include the offset measures to be implemented. Further, where on-ground management or revegetation is proposed, the offset management plan is to include targets to be achieved, including for completion criteria and vegetation condition, which will result in a tangible improvement to the environmental values being offset. The offset management plan is to be prepared and submitted prior to ground-disturbing activities or clearing of vegetation.

5 Recommendations

The EPA has taken the following into account in its assessment of the proposal:

- environmental values likely to be significantly affected by the proposal
- assessment of key environmental factors separately and holistically (this has included considering cumulative impacts of the proposal where relevant)
- the likely environmental outcomes that can be achieved with the imposition of the EPA's recommended conditions
- consistency of environmental outcomes with the EPA's objectives for key environmental factors
- whether other statutory decision-making processes that can mitigate the potential impacts of the proposal on the environment
- principles of the EP Act.

The EPA recommends that the proposal may be implemented subject to the conditions recommended in Appendix A.

Appendix A: Recommended conditions

Section 44(2) of *Environmental Protection Act 1986* specifies that the EPA's report must set out (if it recommends that implementation be allowed) the conditions and procedures, if any, to which implementation should be subject. This appendix contains the EPA's recommended conditions and procedures.

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED **(*Environmental Protection Act 1986*)**

BUNBURY OUTER RING ROAD SOUTHERN SECTION

Proposal: The proposal is for the construction and operation of 10.5 kilometres of the Bunbury Outer Ring Road Southern Section, located about 200 km south of Perth. The 200 hectare development envelope occurs mainly within the Shire of Capel (including the localities of Gelorup, North Boyanup and Statham), and a small component within the City of Bunbury.

Proponent: Commissioner for Main Roads Western Australia
Australian Business Number 50 860 676 021

Proponent Address: Waterloo Crescent
EAST PERTH WA 6004

Assessment Number: 2225

Report of the Environmental Protection Authority: 1714

Pursuant to section 45 of the *Environmental Protection Act 1986* (EP Act), it has been agreed that the proposal described in section 2 of the proponent's Updated Referral Information (Revision 2, October 2020), and subsequently amended by the change to the proposal approved under section 43A of the EP Act on 1 September 2021 may be implemented and that the implementation of the proposal is subject to the following implementation conditions and procedures:

1 Limitations and extent of proposal

When implementing the proposal, the proponent shall ensure the proposal does not exceed the following extents:

Proposal element	Location	Maximum extent or range
<i>Physical elements</i>		
Freeway standard dual carriageway, grade separated	Located within the development	Clearing and disturbance of no more than 71.5 ha of

interchanges and vehicle bridges, regional distributor roads, local road modifications, drainage structures, and other infrastructure, including but not limited to, noise walls, screen walls, fauna-crossings and land-bridges, possum rope-bridges, pedestrian underpass/overpass, principle shared path, lighting, fencing, signage and safety barriers.	envelope as shown in Figure 1	native vegetation within a 200 ha development envelope.
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2 Inland Waters

2-1 The proponent shall implement the proposal to achieve the following environmental **outcomes**:

- (1) clear no more than:
 - (a) 0.2 ha of **Conservation Category Wetlands**; and
 - (b) 1.4 ha of **Resource Enhancement Wetlands**.

- (2) no project attributable impacts to the hydrological regime and water quality of the following values when compared to preconstruction baseline conditions:
 - (a) Five Mile Brook (incorporating **Multiple Use Wetland** UFI-1163 and **Conservation Category Wetland** UFI-931);
 - (b) **Conservation Category Wetland** (UFI-14478);
 - (c) **Resource Enhancement Wetlands** (UFI-1117 and UFI-15493) and;
 - (d) black stripe minnow (*Galaxiella nigrostriata*) habitats defined and mapped in the proponent's Action Management Plan Conservation Significant Fauna (Revision 2 August 2021) that are within or adjoins the **development envelope**, except for the black stripe minnow habitats permitted to be cleared in condition 4-1(1)(e).

2-2 Prior to ground-disturbing activities, the proponent shall undertake monitoring of the hydrological regimes of the values listed in condition 2-1(2) and submit a report to the CEO about the preconstruction baseline conditions and predicted post-development hydrological regime.

- 2-3 The proponent shall continue to undertake monitoring of hydrological regime and water quality during and post-construction until the CEO is satisfied that the proponent has demonstrated the **outcomes** in condition 2-1(2) have been met.
- 2-4 The proponent shall annually submit a report as part of the Compliance Assessment Report required by condition 12-6, that shall:
- (1) outline the monitoring that was undertaken during the implementation of the proposal;
 - (2) outline the results of the monitoring undertaken to report whether that the environmental outcomes specified in condition 2-1(2) were achieved;
 - (3) report whether that the outcomes in condition 2-1(2) were achieved; and
 - (4) outline any management actions undertaken during the implementation of the proposal to meet the **outcomes** in condition 2-1(2).
- 2-5 The proponent shall not construct bridge footings, drainage structures and abutments within the Five Mile Brook.

3 Flora and Vegetation

- 3-1 The proponent shall implement the proposal to achieve the following environmental **outcomes**:
- (1) clear no more than:
 - (a) 23.4 ha of vegetation representative of the Banksia Woodlands of the Swan Coastal Plain Priority Ecological Community (PEC) (Banksia Woodlands);
 - (b) 4.4 ha of vegetation representative of Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain PEC (Tuart Woodlands); and
 - (c) 4.5 ha of vegetation representative of the Southern Swan Coastal Plain *Eucalyptus gomphocephala* – *Agonis flexuosa* Woodlands PEC (Tuart-Peppermint Woodlands).
 - (2) ensure there are no project attributable **indirect impacts**, when compared to preconstruction baseline conditions, to Banksia Woodlands, Tuart Woodlands and Tuart-Peppermint Woodlands within twenty (20) metres outside the **development envelope** (defined in Figure 2a and Figure 2b) and within the **clearing exclusion areas** (defined in Figure 1).

- 3-2 Prior to **ground-disturbing activities**, the proponent shall undertake monitoring of the values listed in condition 3-1(2) and submit a report about the preconstruction baseline conditions to the CEO.
- 3-3 The proponent shall continue to undertake monitoring during and post-construction until the CEO is satisfied that the proponent has demonstrated the **outcomes** in condition 3-1(2) has been met.
- 3-4 The proponent shall annually submit a report as part of the Compliance Assessment Report required by condition 12-6, that shall:
- (1) outline the monitoring that was undertaken during the implementation of the proposal;
 - (2) outline the results of the monitoring undertaken to report whether that the environmental **outcomes** specified in condition 3-1(2) were achieved;
 - (3) report whether that the **outcomes** in conditions 3-1(1) and 3-1(2) were achieved; and
 - (4) outline any management actions undertaken during the implementation of the proposal to meet the **outcomes** in conditions 3-1(1) and 3-1(2).
- 3-5 The proponent shall undertake the following actions within the development envelope during construction and for five (5) years post-construction:
- (1) implement hygiene protocols consistent with the *Management of Phytophthora cinnamomi for Biodiversity Conservation in Australia, Part 2 National Best Practice Guidelines* as amended or replaced from time to time; and
 - (2) undertake weed control and management to prevent the introduction or spread of **environmental weeds**.

4 Terrestrial Fauna (Construction)

- 4-1 The proponent shall implement the proposal to achieve the following environmental **outcomes**:
- (1) clear no more than:
 - (a) 60.9 ha of habitat for western ringtail possum;
 - (b) 60.9 ha of **black cockatoo** foraging and breeding habitat;
 - (c) 1088 **black cockatoo potential nesting trees**, and 11 **trees with suitable hollows**;
 - (d) 39.2 ha of habitat for south-western brush-tailed phascogale; and

(e) 5.5 ha of habitat for black stripe minnow.

4-2 Prior to **ground-disturbing activities** the proponent shall undertake the following actions:

- (1) within seven (7) days prior to clearing, using a qualified and licensed terrestrial **fauna spotter** with experience in surveying for **black cockatoos**, inspect all **potential nesting trees** hollows within the **development envelope** to determine if any hollows are being used for nesting by **black cockatoos**;
- (2) if any hollows are in use by **black cockatoos**, the proponent shall not **disturb** or clear the nesting tree, or vegetation within a 10 metre radius of the nesting tree, until after the cockatoos have naturally completed nesting (young have fledged and dispersed) and an appropriately qualified terrestrial **fauna spotter** has verified that the hollow(s) are no longer being used by **black cockatoos**; and
- (3) within seven (7) days prior to clearing (or if staged, prior to each stage) implement **pre-clearance protocols** to minimise impacts to terrestrial fauna.

4-3 During the construction of the proposal the proponent shall:

- (1) ensure the presence of appropriately qualified **fauna spotters** during clearing activities;
- (2) not clear or cause any project attributable **indirect impacts** to the **clearing exclusion areas** as defined in Figure 1; and
- (3) ensure foraging species for **black cockatoos** are not planted within ten (10) metres of the road.

5 Construction Fauna Management Plan

5-1 The proponent shall implement the proposal to achieve the following environmental **objective**:

- (1) during construction, minimise and manage project attributable adverse impacts to conservation significant terrestrial fauna including western ringtail possum and south-western brush-tailed phascogale.

5-2 The proponent shall prepare a Construction Fauna Management Plan and submit to the CEO prior to **ground-disturbing activities**. This Plan shall:

- (1) specify the **passive relocation management actions** to be implemented prior to and during clearing;

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- (2) define the **low-risk clearing timeframe for western ringtail possum** applicable to **Category 1 Clearing Areas** and append supplementary survey evidence to justify the chosen timeframe;
 - (3) specify monitoring that:
 - (a) includes a baseline survey to be undertaken within thirty (30) days prior to clearing (or if staged, prior to each clearing stage) to confirm presence/absence and number of western ringtail possum and south-western brush-tailed phascogale individuals within the **development envelope** and at **receival sites**. The baseline survey shall be prepared and undertaken on advice of **DBCA** during the preparation of the Construction Fauna Management Plan;
 - (b) records whether **threatened or priority fauna** is encountered during clearing, and reports to the CEO and **DBCA** within thirty (30) days after clearing (or each clearing stage) on the number of individuals relocated in accordance with any requirements of the lawful authority obtained under the *Biodiversity Conservation Act 2016*;
 - (c) evaluates the suitability, adequacy and effectiveness of **passive relocation management actions** at reducing impacts to western ringtail possum individuals displaced by clearing from **Category 1 Clearing Areas** defined in Figure 3;
 - (d) evaluates impacts to residential western ringtail possum individuals at **receival sites**; and
 - (e) uses monitoring methods including, but not limited to, radio telemetry with robust sample sizes (the minimum number of tagged animals to be determined in consultation with **DBCA**).
 - (4) identify and spatially define the study area(s) and reference sites proposed for monitoring and evaluation and provide rationale for the location of the sites;
 - (5) specify **management actions**; **management targets**; monitoring locations, methodologies, indicators and timing; actions and investigations in the event of a failure to meet a **management target**; and reporting to demonstrate that the objective in condition 5-1 will be met; and
 - (6) be prepared in consultation with the **DBCA** and in accordance with any requirements of a lawful authority obtained under the *Biodiversity Conservation Act 2016*.

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- 5-3 The proponent shall not commence **ground-disturbing activities** until the CEO has confirmed in writing that the Construction Fauna Management Plan satisfies the requirements of condition 5-2.
- 5-4 The proponent shall implement the latest revision of the Construction Fauna Management Plan approved by the CEO.
- 5-5 The proponent:
- (1) may review and submit proposed amendments to the Construction Fauna Management Plan; or
 - (2) shall review and submit proposed amendments to the Construction Fauna Management Plan when directed by the CEO.
- 5-6 The proponent shall continue to implement the Construction Fauna Management Plan as approved by the CEO in writing, until the CEO has confirmed by written notice that the proponent has demonstrated that the requirements of the Construction Fauna Management Plan have been achieved.

6 Habitat Fragmentation Management Plan

- 6-1 The proponent shall ensure the implementation of the proposal achieves the following environmental **objectives**:
- (1) minimise the impacts of habitat fragmentation that are attributable to the proposal on western ringtail possum; and
 - (2) minimise the impacts from predation that are exacerbated by the proposal on western ringtail possum.
- 6-2 The proponent shall ensure the implementation of the proposal achieves the following environmental **outcome**:
- (1) abundance and persistence of the western ringtail possum in the **receival sites** returns to pre-disturbance levels within a maximum of fifteen (15) years from the commencement of construction.
- 6-3 The proponent shall prepare a Habitat Fragmentation Management Plan and submit to the CEO prior to **ground-disturbing activities**. This Plan shall:
- (1) when implemented, substantiate and ensure that conditions 6-1 and 6-2 are being met;

Fauna crossings, land-bridges and fragmentation

- (2) specify the locations, dimensions and designs of **fauna crossings** to reconnect terrestrial fauna habitats, including tree-canopy connections to

- fauna crossings** for western ringtail possum (and brush-tailed phascogale);
- (3) specify the locations and designs of a minimum of two (2) **fauna land bridges**, which are to be:
 - (a) a minimum width of five (5) metres at the Yalinda Drive traffic bridge; and
 - (b) between five (5) and ten (10) metres at the dedicated fauna land bridge east of Yalinda Drive (to be determined in consultation with **DBCA**).
 - (4) specify the revegetation and maintenance requirements of the **fauna land bridges** to maximise utilisation by western ringtail possums and ensure revegetation is **self-sustaining** or otherwise managed to ensure its ongoing survival;
 - (5) specify monitoring methodologies to evaluate the effectiveness and utilisation of **fauna crossings** and **fauna land bridges** by western ringtail possum against the objectives in condition 6-1 which must include, but not be limited to, monitoring of DNA scat analysis and camera-monitoring;
 - (6) specify monitoring methodologies to evaluate the project attributable effects of fragmentation on the **demographics** and genetics of the local western ringtail possum population and the effectiveness of minimisation measures to demonstrate whether the objective in condition 6-1(1) and outcome in 6-2 will be met;

Predator control

- (7) specify actions to undertake targeted predator control to reduce predation impacts to conservation significant fauna, to be implemented:
 - (a) one (1) month prior to clearing;
 - (b) during construction of the proposal; and
 - (c) at entrances/exits to **fauna crossings** and **fauna land bridges** for a minimum of five (5) years post-construction, subject to the five (5) yearly review required by condition 6-3(12);

Abundance and persistence of western ringtail possum

- (8) specify monitoring methodologies to evaluate the abundance and persistence of the western ringtail possum at the **receiving sites** to demonstrate whether the outcome in condition 6-2 will be met;

Protection and enhancement of adjacent habitat

- (9) demonstrate how the habitat within the **clearing exclusion areas** (excluding the 'Grey Giant' Heritage Place No. 26059 site) and **vegetation retention areas** (defined in Figure 4) in Gelorup will be maximised for benefits to western ringtail possums and, where relevant, include provisions to establish revegetation of degraded areas;
- (10) include provisions to monitor revegetation required by condition 6-3(9), and undertake maintenance and remedial measures as required to demonstrate it is **self-sustaining** and habitat is maximised for benefits to western ringtail possums;
- (11) outline the long-term management and protection mechanism of the **clearing exclusion areas** and the **vegetation retention areas** as defined in Figure 4;

General plan provisions

- (12) be implemented for a minimum of fifteen (15) years post-construction, or otherwise agreed to by the CEO and on advice of **DBCA** following review of effectiveness every five (5) years;
 - (13) specify **management actions**; **management targets**; monitoring locations, methodologies, indicators and timing; **contingency actions** and investigations in the event of a failure to meet a **management target**; and reporting to demonstrate that the **objectives** in condition 6-1 and **outcome** in condition 6-2 will be met; and
 - (14) be prepared in consultation with **DBCA** and in accordance with any requirements of a lawful authority obtained under the *Biodiversity Conservation Act 2016*.
- 6-4 The proponent shall not commence **ground-disturbing activities** until the CEO has confirmed in writing that the Habitat Fragmentation Management Plan satisfies the requirements of condition 6-3.
- 6-5 The proponent shall implement the latest revision of the Habitat Fragmentation Management Plan approved by the CEO.
- 6-6 The proponent:
- (1) may review and submit proposed amendments to the Habitat Fragmentation Management Plan; or
 - (2) shall review and submit proposed amendments to Habitat Fragmentation Management Plan when directed by the CEO.

6-7 The proponent shall continue to implement the Habitat Fragmentation Management Plan as approved by the CEO in writing, until the CEO has confirmed by written notice that the proponent has demonstrated that the environmental objectives and outcomes detailed in conditions 6-1 and 6-2 of the Habitat Fragmentation Management Plan have been achieved.

6-8 Within a maximum of sixteen (16) years from the commencement of construction, the proponent shall submit a Habitat Fragmentation Performance Report to the CEO to demonstrate whether the outcome in condition 6-2 has been met.

7 Social Surroundings (Noise)

7-1 The proponent shall implement the proposal to meet the following environmental **objective**:

- (1) minimise operational noise impacts on existing noise sensitive receptors, as far as practicable.

7-2 At least six (6) months prior to the operation of the proposal and in order to meet the requirements of condition 7-1, the proponent shall prepare a Traffic Noise Management Plan to include:

- (1) outdoor noise **management targets**;
- (2) indoor noise **management targets** to apply to noise sensitive receptors where the construction of noise walls is not feasible or practicable;
- (3) the noise **management actions** to ensure the noise **management targets** are met during the operation of the proposal;
- (4) where noise walls will be constructed, the location, height and timing of construction of the walls;
- (5) where acoustic treatment of houses will be implemented, the standard of treatments, timing and evidence of consultation with affected stakeholders;
- (6) road design measures to minimise noise emissions where relevant and appropriate, including low noise road surfaces and selection of appropriate bridge expansion joints;
- (7) post-construction noise monitoring to demonstrate that noise **management actions** meet the relevant outdoor noise **management targets**; and
- (8) contingency actions in the event relevant noise **management targets** are not met.

- 7-3 The Traffic Noise Management Plan shall be approved by notice in writing from the CEO prior to the commencement of operation.
- 7-4 The proponent:
- (1) may review and revise the Traffic Noise Management Plan; or
 - (2) shall review and revise the Traffic Noise Management Plan when directed by the CEO by notice in writing.
- 7-5 The proponent shall implement the approved Traffic Noise Management Plan, or the most recent version, which the CEO has confirmed by notice in writing satisfies the requirements of condition 7-2.
- 7-6 The proponent shall continue to implement the Traffic Noise Management Plan, or any subsequently approved revisions until the CEO has confirmed by notice in writing that the proponent has demonstrated that the objective in condition 7-1 is being and will continue to be met.
- 7-7 In the event of failure to implement **management actions** detailed in the approved Traffic Noise Management Plan, the proponent shall meet the requirements of condition 12-6 (Compliance Reporting) and shall immediately implement **management actions** to meet the requirements of condition 7-1.

8 Social Surroundings (Amenity Management Plan)

- 8-1 The proponent shall demonstrate that the proposal is designed and constructed in order to meet the following environmental **objective**:
- (1) minimise the impacts to **social connectivity** and **visual amenity**.
- 8-2 The proponent shall demonstrate that the proposal is implemented to meet the following environmental **outcome**:
- (1) ensure no project attributable direct or indirect impacts to **significant trees**.
- 8-3 The proponent shall prepare an Amenity Management Plan and submit to the CEO within twelve (12) months of the issue of the statement. The Plan shall include, but not be limited to:
- (1) outcomes of consultation undertaken with the local community and relevant stakeholders regarding:
 - (a) the specifications and locations of amenity infrastructure such as screen-walls, noise-walls, vegetative screening, landscaping, revegetation, pedestrian overpasses/underpasses, walking trails, foot/cycle paths, and any other relevant infrastructure;

- (2) a map of the amenity infrastructure to be constructed/installed;
 - (3) the roles and responsibilities for on-going maintenance of the amenity infrastructure; and
 - (4) information to demonstrate how the **objective** in condition 8-1 and **outcome** in condition 8-2 will be achieved by the Amenity Management Plan.
- 8-4 After submitting the Amenity Management Plan and receiving approval by notice in writing from the CEO the proponent shall implement the Amenity Management Plan.
- 8-5 Following construction, the proponent shall prepare and submit a report to demonstrate that the requirements of the Amenity Management Plan have been implemented and the objective of condition 8-1 and outcome of condition 8-2 has been achieved.

9 Offsets

- 9-1 The proponent shall implement offset measures to counterbalance the significant residual impacts to the following environmental values:
- (1) 60.9 ha of habitat for western ringtail possum;
 - (2) 60.9 ha of black cockatoo foraging and breeding habitat;
 - (3) 39.2 ha of habitat for south-western brush-tailed phascogale;
 - (4) 23.4 ha of Banksia Woodlands of the Swan Coastal Plain PEC;
 - (5) 4.4 ha of Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain PEC; and
 - (6) 4.5 ha of Southern Swan Coastal Plain *Eucalyptus gomphocephala* – *Agonis flexuosa* Woodlands PEC.
- 9-2 To meet the requirement of condition 9-1 the proponent shall undertake offset measures to the extent and at the locations as set out and described in Table 1:

Table 1: Type, locations and extent of offset measures required to meet the requirement of condition 9-1

Environmental value	Offset locations	Minimum extent of area to receive offset measures (hectares)	Type of offset measures
Western ringtail possum habitat and south-western brush-tailed phascogale habitat	Lots 1, 153, 267, and 268 Ducane Road Gelorup	164.5	– land acquisition – on-ground management
	Lot 156 Marchetti Road Gelorup	14.2	– land acquisition – on-ground management
	Lot 104 Willinge Drive, Davenport	35	– land acquisition – revegetation – on-ground management
	Ludlow-Tuart State Forest and Tuart Forest National Park	185	– revegetation – on-ground management
Black cockatoo foraging and breeding habitat	Lots 1, 153, 267, and 268 Ducane Road Gelorup	161.1	– land acquisition – on-ground management
	Lot 156 Marchetti Road Gelorup	9.7	– land acquisition – on-ground management
	Ludlow-Tuart State and Forest Tuart Forest National Park	50	– revegetation – on-ground management
Banksia Woodlands of the Swan Coastal Plain Priority Ecological Community (PEC)	Lots 153, 267, 268 Ducane	92	– land acquisition – on-ground management
Tuart (<i>Eucalyptus gomphocephala</i>) woodlands and forests of the Swan Coastal Plain PEC	Lot 27 Tredrea Road, Myalup	19	– land acquisition – revegetation – on-ground management

Southern Swan Coastal Plain <i>Eucalyptus gomphocephala</i> – <i>Agonis flexuosa</i> Woodlands PEC			
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Bunbury Outer Ring Road Southern Section Offset Management Plan

9-3 Prior to clearing native vegetation, the proponent shall prepare and submit the Bunbury Outer Ring Road (BORR) Southern Section Offset Management Plan to the requirements of the CEO, and to meet the following **objectives**:

- (1) counterbalance the significant residual impacts listed in condition 9-1;
- (2) improve connectivity of western ringtail possum habitats;
- (3) ensure a **net-gain in western ringtail possum populations** in secure conservation tenure within fifteen (15) years from the commencement of construction; and
- (4) demonstrate a strategic conservation benefit for the western ringtail possum species.

9-4 The BORR Southern Section Offset Management Plan shall:

- (1) demonstrate that the objectives in condition 9-3 will be met;
- (2) describe how the offset measures will be implemented consistent with condition 9-2;
- (3) be prepared in consultation with **DBCA**, the Shire of Capel and the Shire of Dardanup;
- (4) consistent with condition 9-2, spatially identify the areas (**Proposed Offset Conservation Areas**) of:
 - (a) **acquired** lands offset areas to receive **on-ground management** and/or revegetation offset measures;
 - (b) **DBCA** lands to receive **on-ground management** and revegetation offset measures.
- (5) demonstrate how the environmental values within the **Proposed Offset Conservation Areas** will be maintained and improved in order to counterbalance the significant residual impact to the environmental values in condition 9-1 through application of the principles of the WA Environmental Offsets Policy and completion of the WA Offsets

Template, as described in the *WA Environmental Offsets Guidelines*, and the *Environmental Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy Assessment Guide*, or any subsequent revisions of these documents.

- (6) for the land acquisition offsets identified in condition 9-2:
- (a) demonstrate that the **Proposed Offset Conservation Areas** contain the minimum extents of the environmental values identified in condition 9-2:
 - (b) identify how the **Proposed Offset Conservation Areas** will be protected, being either the sites are ceded to the Crown for the purpose of management for conservation, or the sites are managed under other suitable mechanism for the purpose of conservation as agreed by the CEO by notice in writing;
 - (c) specify the quantum of works associated with establishing the **Proposed Offset Conservation Areas**, including a contribution for maintaining the offset for at least twenty (20) years after completion of purchase; and
 - (d) identify the **relevant management body** for the on-going management of the **Proposed Offset Conservation Areas**, including its role, and the role of the proponent, and confirmation in writing that the **relevant management body** accepts responsibility for its role.
- (7) For revegetation and/or **on-ground management** offsets identified in condition 9-2:
- (a) state the targets to be achieved by the revegetation and **on-ground management**, including completion criteria, which will result in a **tangible improvement** to the environmental values being offset. For revegetation offsets relating to western ringtail possum environmental values, this shall include, but not be limited to:
 - (i) western ringtail possum target densities;
 - (ii) completion criteria to measure (at a minimum) ringtail possum abundance/distribution, habitat structure and vegetation condition; and
 - (iii) adaptive management to inform successful habitat revegetation for western ringtail possum.

- (b) demonstrate the consistency of the targets with the objectives of any relevant guidance, including but not limited to, recovery plans or area management plans;
 - (c) detail the **on-ground management** actions, with associated timeframes for implementation and completion, to achieve the targets identified in condition 9-4(7)(a); and
 - (d) detail the monitoring, reporting and evaluation mechanisms for the targets and actions identified under conditions 9-4(7)(a) and 9-4(7)(c).
- (8) for the predator control program within the Ludlow Tuart State Forest/Tuart Forest National Park (consistent with the proponent's Offset Strategy Revision 3 August 2021):
- (a) state the targets to be achieved by the predator control program which will result in a **tangible improvement** to the environmental values being offset;
 - (b) demonstrate the consistency of the targets with the objectives of any relevant guidance, including but not limited to, recovery plans or area management plans;
 - (c) detail the **on-ground management** actions, with associated timeframes for implementation and completion to achieve the targets identified in condition 9-4(8)(a), and how the implementation of the predator control program will facilitate the achievement of the objectives in conditions 9-3(3) and 9-3(4); and
 - (d) detail the monitoring, reporting and evaluation mechanisms for the targets and actions, including but not limited to, a review of the program's effectiveness to demonstrate that the objective of conditions 9-3(3) and 9-3(4) will be met.
- (9) for the establishment of a Wildlife Carer's Peppermint Orchard:
- (a) identify the location of the Wildlife Carer's Peppermint Orchard and state the completion criteria for this offset measure in accordance with **DBCA** requirements; and
 - (b) detail the monitoring, reporting and evaluation mechanisms to demonstrate the completion criteria identified under condition 9-4(9)(a) will be met.

9-5 The proponent:

- (1) may review and revise the BORR Southern Section Offset Management Plan; or
 - (2) shall review and revise the BORR Southern Section Offset Management Plan as and when directed by the CEO by a notice in writing.
- 9-6 The proponent shall not commence **ground-disturbing activities** until the CEO has confirmed in writing that the BORR Southern Section Offset Management Plan satisfies the requirements of conditions 9-3 and 9-4.
- 9-7 The proponent shall implement the latest revision of the BORR Southern Section Offset Management Plan approved by the CEO.
- 9-8 The proponent shall continue to implement the BORR Southern Section Offset Management Plan until the CEO has confirmed by notice in writing that the proponent has demonstrated that the objectives in condition 9-3 are being met.
- 9-9 When a notification to the CEO occurs in accordance with condition 12-5, the proponent shall provide a report to the CEO within sixty (60) days if the actions, objectives, or targets in the BORR Southern Section Offset Management Plan are unable to be met, and provide details and timing of **contingency actions** to be undertaken, to the satisfaction of the CEO.
- 9-10 The proponent shall report to the CEO on the outcomes of the **contingency actions** as required by condition 9-9 within sixty (60) days of completion.
- 9-11 The proponent shall continue to implement **contingency actions** as required by condition 9-9 until the CEO has confirmed by notice in writing that the proponent has demonstrated that the objectives in condition 9-3 are being met.

Contingency offsets

- 9-12 If, after receiving the Habitat Fragmentation Performance Report required by condition 6-8 the CEO determines that the proposal has not met the environmental **outcome** in condition 6-2 and has resulted in an additional significant residual impact to western ringtail possum, and after notifying the proponent in writing, the proponent must undertake an additional offset to counterbalance the significant residual impact from the additional impact to western ringtail possum in habitats adjoining the development envelope.
- 9-13 Within twelve (12) months of receiving notice in writing from the CEO that an additional offset is required under condition 9-12, the proponent shall update the BORR Southern Section Offset Management Plan required by condition 9-3 to include additional offsets to counterbalance the significant residual impacts to western ringtail possums.

9-14 The proponent shall implement the latest version of the BORR Southern Section Offset Management Plan, which the CEO has confirmed in writing satisfies the requirements of condition 9-4.

10 Contact Details

10-1 The proponent shall notify the CEO of any change of its name, physical address or postal address for the serving of notices or other correspondence within twenty-eight (28) days of such change. Where the proponent is a corporation or an association of persons, whether incorporated or not, the postal address is that of the principal place of business or of the principal office in the State.

11 Time Limit for Proposal Implementation

11-1 The proponent shall not commence implementation of the proposal after five (5) years from the date of this Statement, and any commencement, prior to this date, must be substantial.

11-2 Any commencement of implementation of the proposal, on or before five (5) years from the date of this Statement, must be demonstrated as substantial by providing the CEO with written evidence, on or before the expiration of five (5) years from the date of this Statement.

12 Compliance Reporting

12-1 The proponent shall prepare, and maintain a Compliance Assessment Plan which is submitted to the CEO at least six (6) months prior to the first Compliance Assessment Report required by condition 12-6, or prior to implementation of the proposal, whichever is sooner.

12-2 The Compliance Assessment Plan shall indicate:

- (1) the frequency of compliance reporting;
- (2) the approach and timing of compliance assessments;
- (3) the retention of compliance assessments;
- (4) the method of reporting of potential non-compliances and corrective actions taken;
- (5) the table of contents of Compliance Assessment Reports; and
- (6) public availability of Compliance Assessment Reports.

12-3 After receiving notice in writing from the CEO that the Compliance Assessment Plan satisfies the requirements of condition 12-2 the proponent shall assess compliance with conditions in accordance with the Compliance Assessment Plan required by condition 12-1.

-
- 12-4 The proponent shall retain reports of all compliance assessments described in the Compliance Assessment Plan required by condition 12-1 and shall make those reports available when requested by the CEO.
- 12-5 The proponent shall advise the CEO of any potential non-compliance within seven (7) days of that non-compliance being known.
- 12-6 The proponent shall submit to the CEO the first Compliance Assessment Report fifteen (15) months from the date of issue of this Statement addressing the twelve (12) month period from the date of issue of this Statement and then annually from the date of submission of the first Compliance Assessment Report, or as otherwise agreed in writing by the CEO.

The Compliance Assessment Report shall:

- (1) be endorsed by the proponent's Chief Executive Officer or a person delegated to sign on the Chief Executive Officer's behalf;
- (2) include a statement as to whether the proponent has complied with the conditions;
- (3) identify all potential non-compliances and describe corrective and preventative actions taken;
- (4) be made publicly available in accordance with the approved Compliance Assessment Plan; and
- (5) indicate any proposed changes to the Compliance Assessment Plan required by condition 12-1.

13 Public Availability of Data

- 13-1 Subject to condition 13-2, within a reasonable time period approved by the CEO of the issue of this Statement and for the remainder of the life of the proposal, the proponent shall make publicly available, in a manner approved by the CEO, all validated environmental data (including sampling design, sampling methodologies, empirical data and derived information products (e.g. maps)), management plans and reports relevant to the assessment of this proposal and implementation of this Statement.
- 13-2 If any data referred to in condition 13-1 contains particulars of:
- (1) a secret formula or process; or
 - (2) confidential commercially sensitive information;
- the proponent may submit a request for approval from the CEO to not make these data publicly available. In making such a request the proponent shall

provide the CEO with an explanation and reasons why the data should not be made publicly available.

Schedule 1

Table 2: Abbreviations and Definitions

Acronym or Abbreviation	Definition or Term
acquired	The protection of environmental values on an area of initially unprotected land for the purpose of conservation through improved security of tenure or restricting the use of land (e.g. ceding land to the Crown or perpetual conservation covenants). This includes upfront costs of establishing the offset site and the on-going management of costs of maintaining the offset for the long term (20 years).
black cockatoos	Carnaby's black cockatoo (<i>Calyptorhynchus latirostris</i>), forest red-tailed black cockatoo (<i>Calyptorhynchus banksii naso</i>) and Baudin's black cockatoo (<i>Calyptorhynchus baudinii</i>)
Category 1 Clearing Areas	The area identified in <i>red</i> in Figure 3 of this Statement.
CEO	The Chief Executive Officer of the Department of the Public Service of the State responsible for the administration of section 48 of the <i>Environmental Protection Act 1986</i> , or delegate.
clearing exclusion areas	The area identified in <i>red</i> in Figure 1 of this Statement.
Conservation Category Wetland	As identified in the Geomorphic Wetlands of the Swan Coastal Plain (DBCA-019) dataset as updated from time-to-time.
contingency actions	Actions to be implemented when monitoring determines that a management target may not be met, and where the actions will bring the impact within the management target.
DBCA	Department of Biodiversity, Conservation and Attractions
demographic	relating to the structure of populations; the particular characteristics of a population over a specific time interval, including age structure, fecundity, mortality rates and sex ratios.
development envelope	The area within the <i>yellow</i> line marked in Figure 1 of this Statement.
disturb / disturbance	is to be defined as per the definition of 'disturb' in section 5 [subsection disturb — (a)(i)(ii)(iii) and (iv)] of the <i>Biodiversity Conservation Act 2016</i>
environmental weeds	Any plant declared under section 22(2) of the <i>Biosecurity and Agriculture Management Act 2007</i> , any plant listed on the Weeds of National Significance List and any weeds listed on the Department of Biodiversity, Conservation and Attractions South West Region Impact and Invasiveness Ratings list, as amended or replaced from time to time.
EP Act	<i>Environmental Protection Act 1986</i>
fauna crossings	Infrastructure to reduce fauna vehicle strike and facilitate fauna movement including, but not be limited to, fauna underpasses (containing arboreal rails, ropes and ledges, and furniture for ground-dwelling fauna), dual-use culverts (ie: for fauna and drainage), possum rope-bridges, and strategic fencing.

fauna land-bridge	An engineered vegetated infrastructure overpass with a minimum soil depth of one (1) metre that provides a habitat linkage between areas containing terrestrial fauna environmental values. Planting species and fauna furniture should be selected to maximise use by western ringtail possums, but also provide suitable habitat to provide protection for ground dwelling terrestrial fauna. A minimum of two (2) fauna land-bridges to be installed along in Gelorup.
fauna spotter	A person who has a relevant lawful authority under the <i>Biodiversity Conservation Act 2016</i> .
ground disturbing activity	Activities that are associated with the substantial implementation of the proposal including but not limited to, earthmoving, vegetation clearing, grading, construction of new or widening of existing roads and tracks. Ground disturbing activities does not include Geotechnical investigations (including potholing for services and the installation of piezometers) and other preconstruction activities where no clearing of vegetation is required.
ha	Hectare
indirect impacts	Any potential impacts outside the development envelope as a result of the clearing and disturbance authorised in this Statement. This includes but is not limited to: hydrological change, spread or introduction of environmental weeds , altered fire regimes, introduction or spread of disease, changes in erosion/deposition/accretion and edge effects.
low-risk clearing timeframe for western ringtail possum	a defined time period that avoids western ringtail possum population peaks and times when pouched young are present; and has been determined in consultation with DBCA in accordance with condition 5-2(2)
management actions	management actions are the identified actions implemented to meet the environmental objective.
management targets	management targets are a type of indicator that is defined to demonstrate that the objective is being met.
Multiple Use Wetland	As identified in the Geomorphic Wetlands of the Swan Coastal Plain (DBCA-019) dataset as updated from time-to-time.
net-gain in western ringtail possum populations	The extent of the environmental benefit associated with the offset must exceed the extent of the significant residual impact, allowing for natural background variation, seasonal changes or other factors outside the control of the proponent and as agreed to by the CEO in writing.
on-ground management	This includes revegetation (re-establishment of native vegetation in degraded areas) and rehabilitation (repair of ecosystem processes and management of weeds, disease or feral animals) with the objective to achieve a tangible improvement to the environmental values in the offset area.
objective	An objective is the proposal-specific desired state for an environmental factor/s to be achieved from the implementation of management actions.
outcome	A proposal-specific result to be achieved when implementing the proposal.

passive relocation management actions	<p>Management actions to avoid, minimise and manage potential impacts to conservation significant terrestrial fauna during clearing; including but not limited to:</p> <ul style="list-style-type: none"> • staged and directional clearing progressing toward suitable habitat outside the development envelope • passive relocation (<i>i.e.</i> avoidance of physical capture and relocation where possible) of western ringtail possum, brush-tailed phascogale and other fauna • installation of artificial dreys, artificial watering points and protective natural structures (such as felled trees) in suitable habitat outside the development envelope at least six weeks prior to clearing • installation of arboreal ropes to provide connections from habitat inside the development envelope to habitat outside the development envelope at least six weeks prior to clearing, to minimise the need for western ringtail possum and brush-tailed phascogale to relocate on-ground.
pre-clearance protocols	<p>Pre-clearance protocols should include, but not be limited to, fauna searches of hollows, dreys, ground debris, dense ground-level vegetation, fallen timber and logs undertaken by a qualified fauna spotter immediately prior to and during clearing operations.</p> <p>Vacant dreys, suitable for western ringtail possum should be removed and hollows blocked prior to clearing.</p>
priority fauna	means fauna that belongs to a priority species listed in accordance with the <i>Biodiversity Conservation Act 2016</i> .
Proposed Offset Conservation Area	The area of land identified in condition 9-4(4).
potential nesting trees	Any existing tree of a species known to support black cockatoo breeding which has a diameter at breast height of 500 millimetres or greater and therefore may develop a nest hollow.
relevant management body	A party or parties that has a role in the establishment and/or on-going management of the Proposed Offset Conservation Area. Note: This includes the role of the proponent.
Resource Enhancement Wetland	As identified in the Geomorphic Wetlands of the Swan Coastal Plain (DBCA-019) dataset as updated from time-to-time.
tangible improvement	a perceptible, measurable and definable improvement that provides additional ecological benefit and/or value.
threatened fauna	means fauna that belongs to a threatened species listed in accordance with the <i>Biodiversity Conservation Act 2016</i> .
trees with suitable hollows	Any existing tree of a species known to support black cockatoo breeding which contains a suitable hollow(s) with entrance, width and depth suitable for black cockatoo nesting.

receiving sites	Habitat outside the development envelope that contains home-ranges of residential western ringtail possums intersecting or adjoining the Category 1 Clearing Areas defined in Figure 3 where western ringtail possums from inside the development envelope are moved into, and are: <ul style="list-style-type: none"> • owned by State or Local Government; • owned by the Proponent (such as the clearing exclusion areas vegetation retention areas or nominated offset sites); and • residential private lands (<i>evidence of multiple denied access requests would be required if private lands are not included in the monitoring program</i>).
self-sustaining	Refers to vegetation that can survive (continue indefinitely) without on-going management actions such as watering, weed control or infill planting. If the proponent cannot demonstrate that the vegetation is self-sustaining, on-going management actions should be implemented to ensure its ongoing survival.
social connectivity	Social connectivity is defined as an amenity value as defined in the EPA's Factor Guidance for Social Surroundings <i>i.e.</i> : " <i>the ability for people to live and recreate within their surroundings without any unreasonable interference with their health, welfare, convenience and comfort</i> ".
significant trees	<ol style="list-style-type: none"> 1. a <i>Eucalyptus gomphocephala</i> tree – listed by the WA Heritage Council as 'Grey Giant' (Heritage Place No. 26059) 2. a culturally modified tree <p>GPS co-ordinates of these trees are held by the Department of Water and Environmental Regulation (Record no. DWERDT505171)</p>
vegetation retention areas	The area of land identified in <i>green</i> in Figure 4 of this Statement.
visual amenity	<p>'Visual amenity' may include natural landscapes and views and should be defined in relation to the visual aspects of the EPA's below definition of amenity:</p> <p>'Amenity' is defined in accordance with the EPA's Factor Guidance for Social Surroundings as "<i>a broad term that generally means the qualities, attributes and characteristics of a place that make a positive contribution to quality of life</i>".</p>

Figures (attached)

Figure 1 Bunbury Outer Ring Road Southern Section Development Envelope and clearing exclusion areas

Figure 2a Priority Ecological Communities Banksia Woodlands, Tuart Woodlands and Tuart-Peppermint Woodlands (north)

Figure 2b Priority Ecological Communities Banksia Woodlands, Tuart Woodlands and Tuart-Peppermint Woodlands (south)

Figure 3 Category 1 Clearing Areas

Figure 4 Clearing exclusion areas and vegetation retention areas

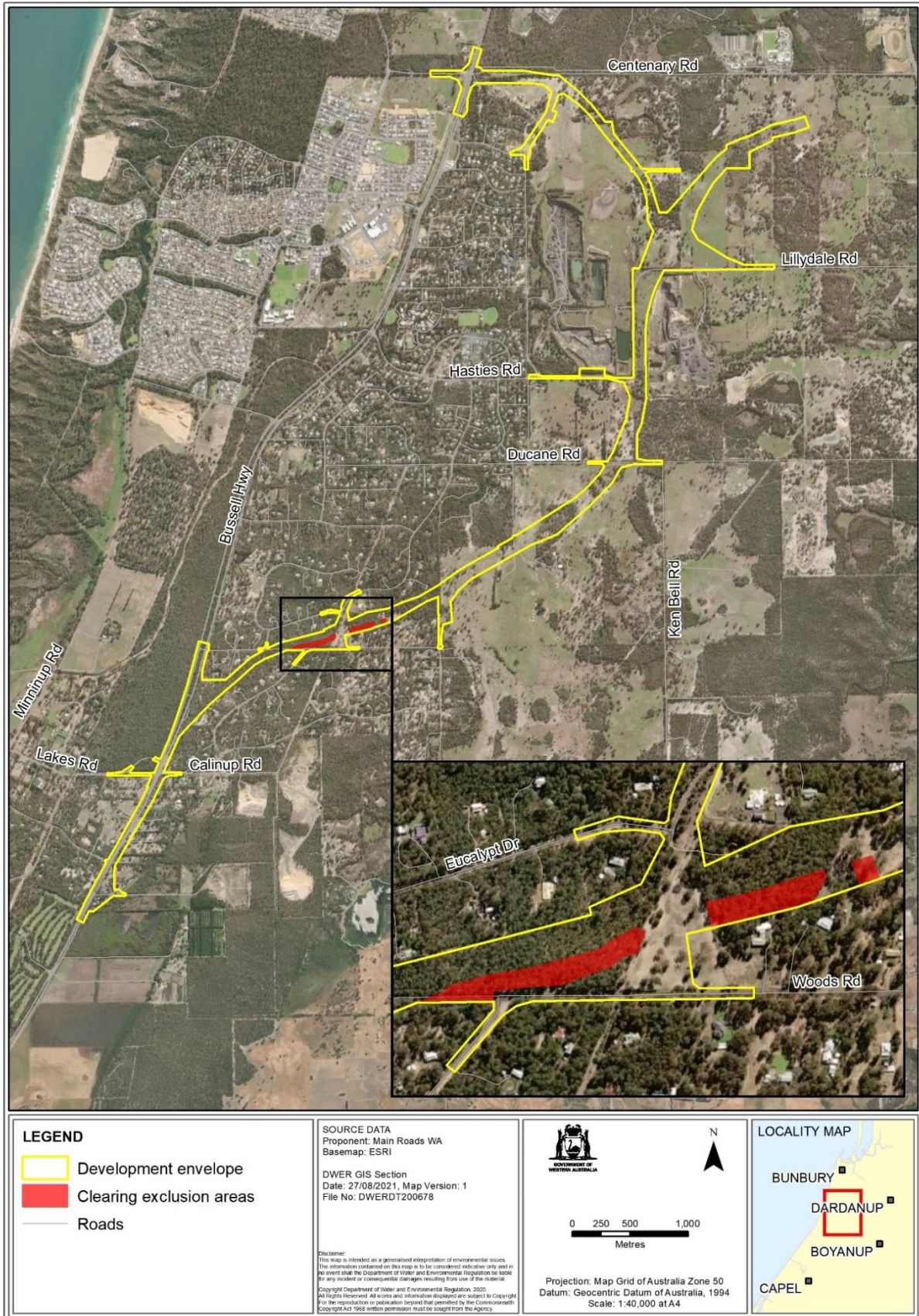
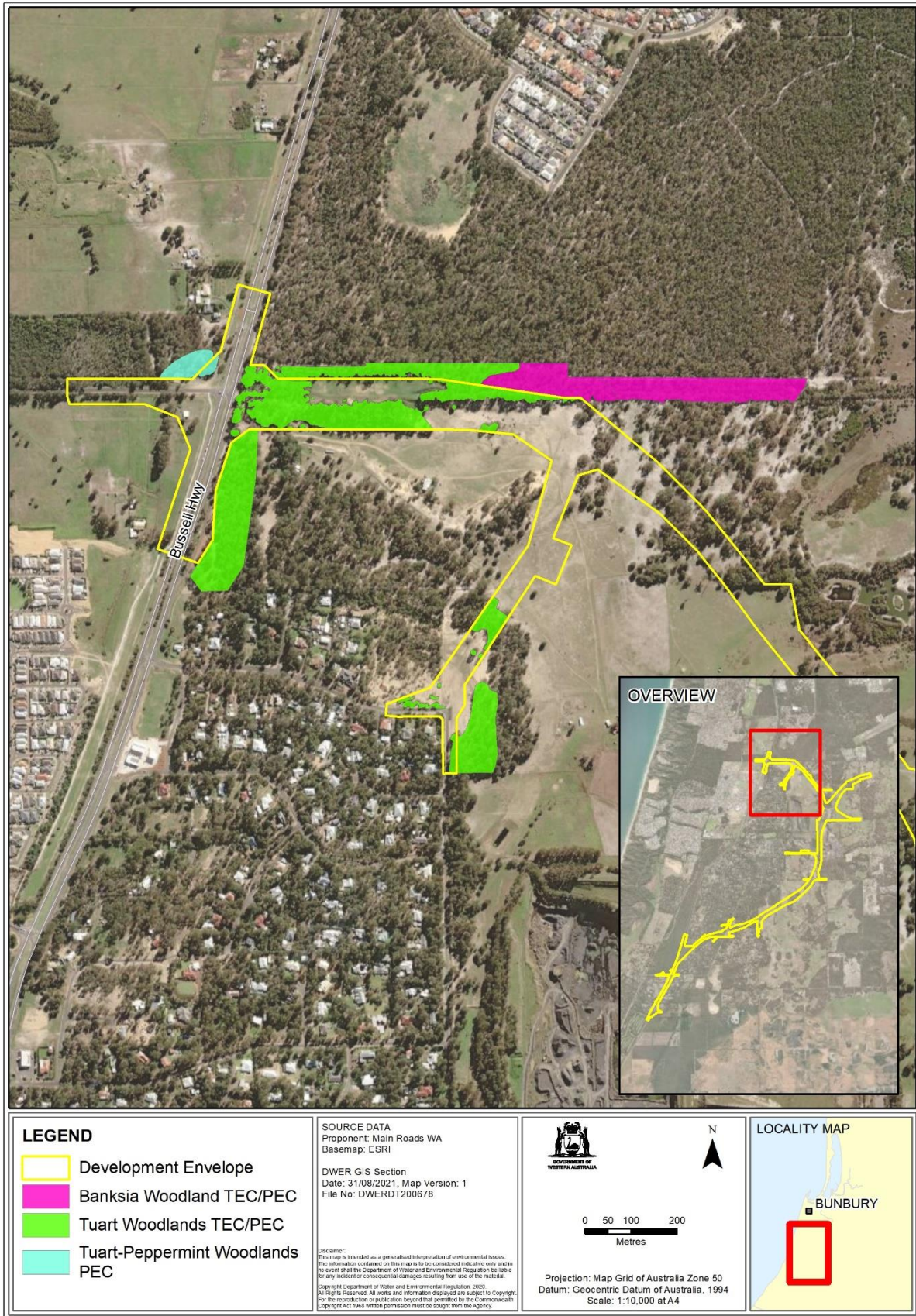


Figure 1 Bunbury Outer Ring Road Southern Section Development Envelope and clearing exclusion areas



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Unique Record ID

Figure 2a Priority Ecological Communities Banksia Woodlands, Tuart Woodlands and Tuart-Peppermint Woodlands (north)

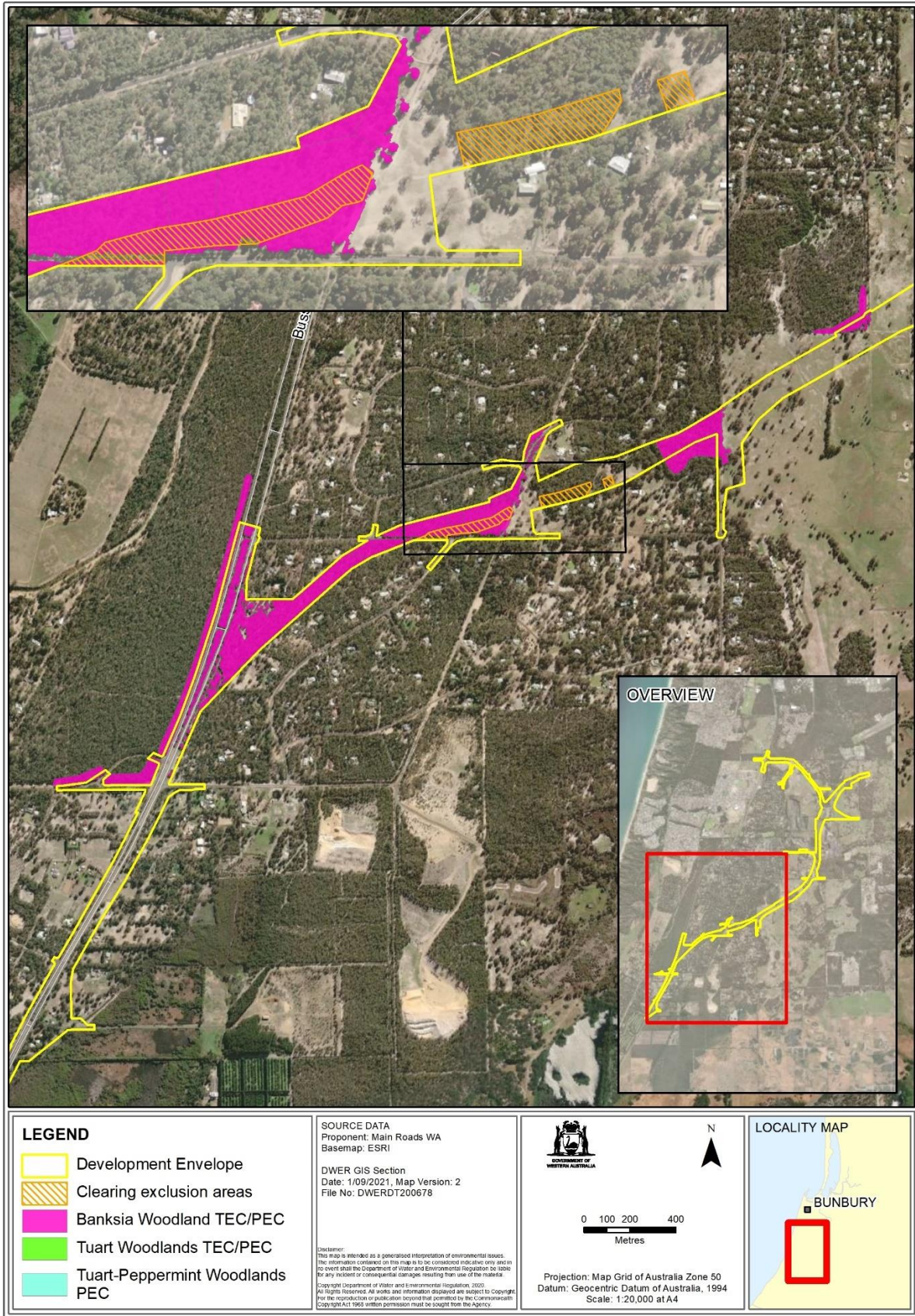


Figure 2b Priority Ecological Communities Banksia Woodlands, Tuart Woodlands and Tuart-Peppermint Woodlands (south)

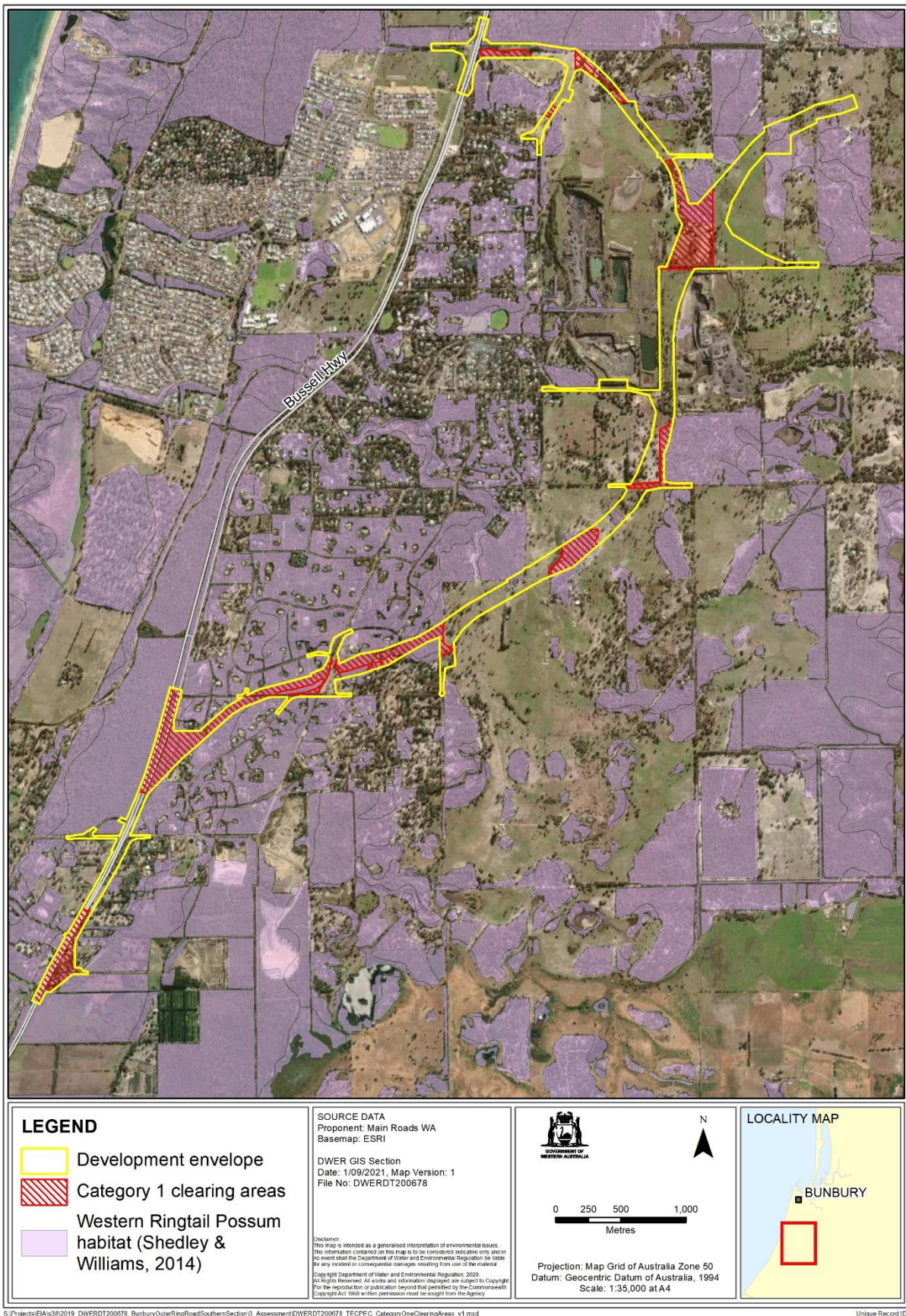
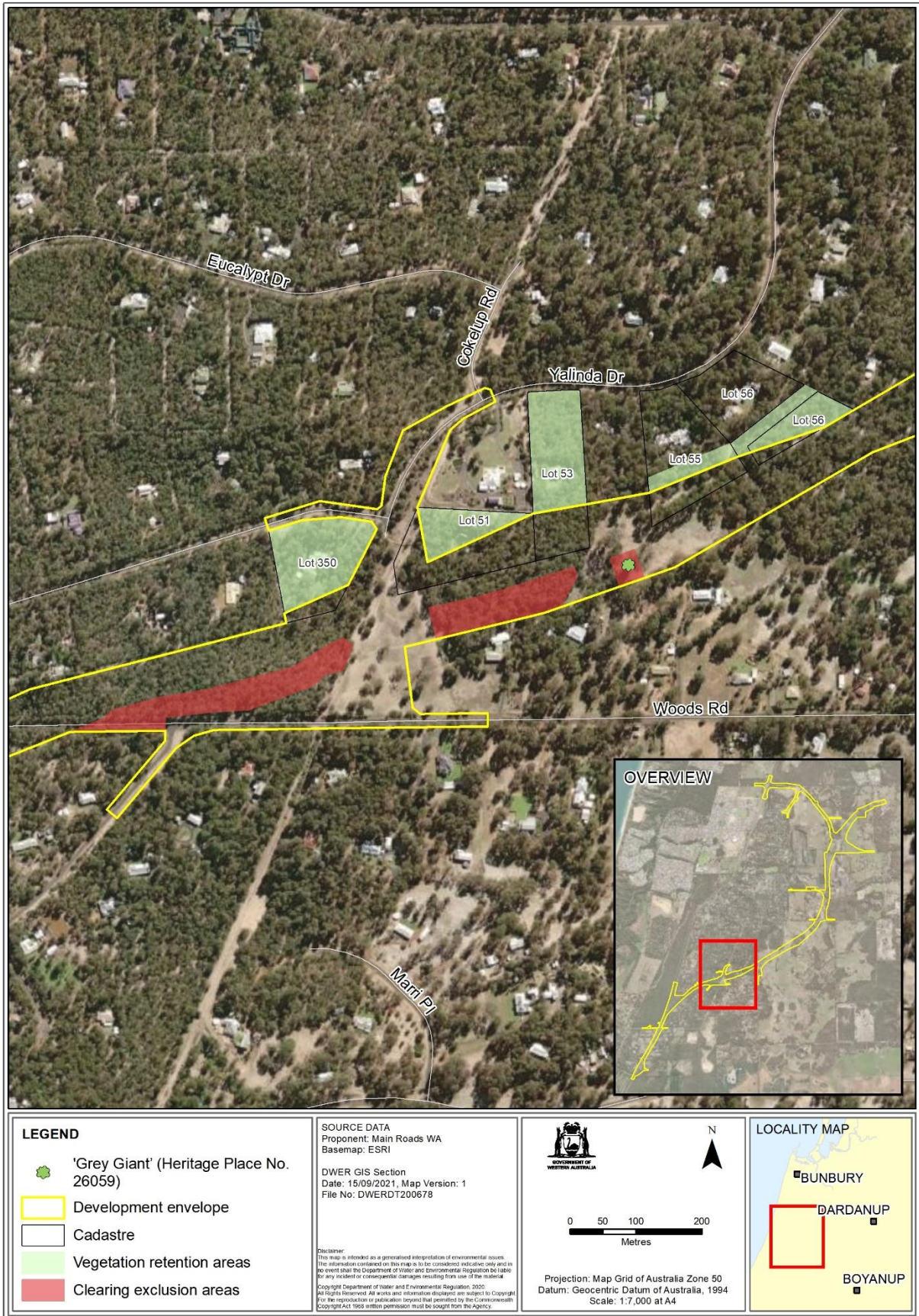


Figure 3 Category 1 Clearing Areas



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Figure 4 Clearing exclusion areas and vegetation retention areas

Schedule 1

All co-ordinates are in metres, listed in Map Grid of Australia Zone 50 (MGA Zone 50) datum of Geocentric Datum of Australia 1994 (GDA94).

Spatial data depicting the figures are held by the Department of Water and Environmental regulation. Record no. DWERDT511980

Appendix B: Decision-Making Authorities

Section 45(1) of the *Environmental Protection Act 1986* requires the Minister for Environment to consult with decision-making authorities (DMAs), and if possible, agree on whether or not the proposal may be implemented, and if so, to what conditions and procedures, if any, that implementation should be subject.

The following DMAs have been identified:

Decision-Making Authority	Legislation (and approval)
1. Minister for Environment	<i>Biodiversity Conservation Act 2016</i> (Authorisation to take or disturb threatened fauna)
2. Minister for Water	<i>Rights in Water and Irrigation Act 1914</i> (Licence to take water; Permit to interfere with bed and banks)
3. Minister for Aboriginal Affairs	<i>Aboriginal Heritage Act 1972</i> (Consent to disturb an Aboriginal Heritage site under section 18)
4. Minister for Lands	<i>Land Administration Act 1997</i> (section 28 (1) compulsory acquisition of land)
5. Minister for Planning	<i>Planning and Development Act 2005</i> (Planning Amendment to the Greater Bunbury Regional Scheme)
6. Minister for Transport	<i>Main Roads Act 1930</i> (section 22 approval to construct roads)
7. Chair, Western Australian Planning Commission (WAPC)	<i>Planning and Development Act 2005</i> – <i>Development application approval</i>

Note: In this instance, agreement is only required with DMA 1-6, since these DMAs are Ministers.

Appendix C: Consideration of Environmental Protection Act Principles

EP Act Principle	Consideration
<p>1. The precautionary principle</p> <p><i>Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In application of this precautionary principle, decisions should be guided by –</i></p> <p><i>a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and</i></p> <p><i>b) an assessment of the risk-weighted consequences of various options.</i></p>	<p>In considering this principle, the EPA notes that terrestrial fauna, flora and vegetation, and inland waters could be significantly impacted by the proposal. The assessment of these impacts is provided in this report.</p> <p>The EPA has had particular regard to this principle in its assessment of impacts to terrestrial fauna, in particular the direct and indirect impacts to the local ringtail possum population. The EPA recognises that an irreversible impact at the clearing site from habitat loss and a short to medium term decline in the local ringtail possum population is possible. Consistent with the precautionary principle, the EPA also advises that the proposal may present a risk of irreversible harm if the ringtail possum population does not recover to pre-disturbance levels in the longer-term (15 years from disturbance).</p> <p>In assessing this risk to the ringtail possum, the EPA's consideration of the precautionary principle is outlined in this report and reflected in its recommendations. The EPA considers that with the implementation of the EPA recommendations, the risk of irreversible harm is minimised and offsets would ensure the outcome of the proposal is unlikely to result in an irreversible decline to the ringtail possum. In addition, the EPA further applied the precautionary principle in its recommendation for a contingency offset in the event that the outcome (i.e. recovery of the local ringtail possum population) is not met within 15 years.</p> <p>With the successful implementation of recommended conditions including offsets, a tangible improvement is anticipated resulting in a net-gain in protected ringtail possum habitat locally (Bunbury) and regionally (Swan Coastal Plain).</p> <p>In considering the precautionary principle the EPA has concluded that the environmental outcome of the proposal is unlikely to be inconsistent with this principle or the EPA's factor objective for terrestrial fauna.</p>

EP Act Principle	Consideration
<p>2. The principle of intergenerational equity</p> <p><i>The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.</i></p>	<p>This principle is a fundamental and relevant consideration for the EPA when assessing and considering the impacts of the proposal on the environmental factors of terrestrial fauna, flora and vegetation, inland waters, and social surroundings. The assessment of these impacts is provided in this report.</p> <p>The EPA has had particular regard to this principle in its assessment of social surroundings and the proposal's impacts to the Gelorup community. In doing so, the EPA requested the proponent to propose additional measures for assessment that would further mitigate its impacts on social surroundings which are outlined in this report.</p> <p>In considering this principle, the EPA assessed the proposal's likely impacts in the context of the original and additional measures to avoid and minimise impacts to social surroundings. The further actions to minimise impacts including lowering the road profile, increasing screen-walls, reserving some adjoining bushland for the Gelorup community, and providing additional social connectivity structures and walk-trails were of particular note by the EPA in its assessment and consideration of this principle.</p> <p>In considering the principle of intergenerational equity, the EPA has concluded that these additional mitigation actions (along with the original mitigations measures) would ensure that the proposal would not unreasonably reduce future generations' options in terms of the health, diversity and productivity of the natural and social environment.</p>
<p>3. The principle of the conservation of biological diversity and ecological integrity</p> <p><i>Conservation of biological diversity and ecological integrity should be a fundamental consideration.</i></p>	<p>This principle is a fundamental and relevant consideration for the EPA when assessing and considering the impacts of the proposal on the environmental factors of terrestrial fauna, flora and vegetation, and inland waters. This principle is also relevant to the EPA consideration of the offset package.</p> <p>The EPA has considered to what extent the potential impacts from the proposal to can be mitigated and offset to ensure consistency with the principle of conservation of biological diversity and ecological integrity.</p>

EP Act Principle	Consideration
	<p>In considering this principle the EPA was not initially satisfied until the proponent sought to further avoid and minimise impacts from the proposal, including taking further actions to reduce its clearing footprint, provide additional artificial fauna crossings and land-bridges and offer a more extensive offset package than what was originally proposed.</p> <p>The EPA notes the offsets for ringtail possum area consistent with this principle as they would result in a significant increase in protected habitat locally and regionally on the Swan Coastal Plain compared to the loss at the impact site. In particular, the habitat creation sites in the Ludlow Tuart State Forest and Tuart Forest National Park, once successfully restored, are likely to provide habitat with greater carrying capacity for ringtail possum than that of the impact site. This was fundamental to the EPA consideration of this principle during the assessment.</p> <p>Further consideration for the principle of conservation of biological diversity and ecological integrity by the EPA is also reflected in its recommendation for contingency offsets in the unlikely event that the short to medium term decline of the local ringtail possum population does not recover within 15 years.</p> <p>In considering this principle the EPA has concluded that the environmental outcome of the proposal is unlikely to be inconsistent with this principle or the EPA's factor objective for terrestrial fauna, flora and vegetation or inland waters factors.</p>
<p>4. Principles relating to improved valuation, pricing and incentive mechanisms</p> <p>(1) <i>Environmental factors should be included in the valuation of assets and services.</i></p> <p>(2) <i>The polluter pays principles – those who generate pollution and waste should bear the cost of containment, avoidance and abatement.</i></p>	<p>In considering this principle, the EPA notes that the proponent would bear the cost relating to mitigation and management of proposal-related impacts to terrestrial fauna, flora and vegetation, inland waters and social surroundings. The EPA has had regard to this principle during the assessment of the proposal.</p>

EP Act Principle	Consideration
<p>(3) <i>The users of goods and services should pay prices based on the full life-cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste.</i></p> <p>(4) <i>Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structure, including market mechanisms, which enable those best placed to maximise benefits and/or minimize costs to develop their own solution and responses to environmental problems.</i></p>	
<p>5. The principle of waste minimisation</p> <p><i>All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.</i></p>	<p>In considering this principle, the EPA notes that the proponent proposes to minimise waste by adopting construction techniques designed to minimise waste, such as using cut and fill techniques to minimise external fill requirements and use of waste material such as crushed concrete during construction. The proposal includes properly designed drainage systems to minimise the discharge of contaminated water into the environment. The EPA has had regard to this principle during the assessment of the proposal.</p>

Appendix D: Evaluation of Other Environmental Factors

Environmental factor	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of why the factor is not a key environmental factor
Land			
Terrestrial environmental quality	<ul style="list-style-type: none"> Excavation, particularly during construction of the bridge footings near Five Mile Brook, potentially exposing acid sulfate soils into the receiving environment causing contamination of land and/or waters. Accidental release of environmentally hazardous material from storage or handling areas, causing contamination of land. Contamination of land and erosion from stormwater runoff during construction (operational runoff to be controlled by drainage design). Erosion impacts potentially leading to poor soil structure, reduced water infiltration and general loss of soil health from vegetation clearing, soil excavation and bituminising the road area. 	No agency or public comments were received	<p>Terrestrial environmental quality was not identified as a preliminary key environmental factor when the EPA decided to assess the proposal.</p> <p>Having regard to:</p> <ul style="list-style-type: none"> management and mitigation measures proposed by the proponent, including a Construction Environmental Management Plan preparation and implementation of an Acid Sulfate Soil Management Plan the significance considerations in the <i>Statement of Environmental Principles, Factors and Objectives</i> (EPA 2020c) ability to consider impacts under the DWER guidelines for management of Acid Sulfate Soils <p>the EPA considers it is unlikely that the proposal would have a significant impact on Terrestrial Environmental Quality and that the impacts to this factor are manageable.</p> <p>Accordingly, the EPA did not consider terrestrial environmental quality to be a key environmental factor at the conclusion of its assessment.</p>
Air			

Environmental factor	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of why the factor is not a key environmental factor																								
Greenhouse gas emissions	<p>Increased greenhouse gas (GHG) emissions:</p> <p>Over the three-year construction period, the modelled estimates for the proposal are:</p> <table border="1" data-bbox="450 550 974 1088"> <thead> <tr> <th>Activity</th> <th>Scope 1</th> <th>Scope 2</th> <th>Scope 3</th> </tr> </thead> <tbody> <tr> <td>Vegetation clearing</td> <td>16,018</td> <td>-</td> <td>15</td> </tr> <tr> <td>Demolition and earthworks</td> <td>18,568</td> <td>-</td> <td>1,416</td> </tr> <tr> <td>Construction</td> <td>6,911</td> <td>-</td> <td>90,150</td> </tr> <tr> <td>Site offices / general areas</td> <td>754</td> <td>-</td> <td>57</td> </tr> <tr> <td>Total: (tCO₂-e)</td> <td>42,251</td> <td><i>Nil</i></td> <td>91,638</td> </tr> </tbody> </table> <p>(BORR Team 2020a)</p>	Activity	Scope 1	Scope 2	Scope 3	Vegetation clearing	16,018	-	15	Demolition and earthworks	18,568	-	1,416	Construction	6,911	-	90,150	Site offices / general areas	754	-	57	Total: (tCO₂-e)	42,251	<i>Nil</i>	91,638	No agency or public comments were received	<p>Greenhouse gas emissions was not identified as a preliminary key environmental factor when the EPA decided to assess the proposal.</p> <p>Having regard to:</p> <ul style="list-style-type: none"> modelled Scope 1 greenhouse gas emissions of 42,251 tCO₂-e over three years from the vegetation clearing and construction of the proposal. This is below the EPA's criteria for assessment of Scope 1 emissions ie: 100,000 tCO₂- e per annum (BORR Team 2020a) the carbon reduction measures proposed in section 4.8.5 of the updated Referral Information documentation (BORR Team 2020a) proponent's prediction that the road upgrade will result in a net reduction in Scope 3 operational greenhouse gas emissions on the regional road network through potential increases in freight efficiencies the significance considerations in the <i>Statement of Environmental Principles, Factors and Objectives</i> (EPA 2020c). <p>the EPA considers the outcomes for the proposal is unlikely to result in significant impact on greenhouse gas emissions and that the impacts to this factor are manageable.</p> <p>Accordingly, the EPA did not consider greenhouse gas emissions to be a key environmental factor at the conclusion of its assessment.</p>
Activity	Scope 1	Scope 2	Scope 3																								
Vegetation clearing	16,018	-	15																								
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Appendix E: Relevant policy, guidance and procedures

The EPA had particular regard to the policies, guidelines and procedures listed below in the assessment of the proposal.

- *Environmental Factor Guideline – Flora and Vegetation* (EPA 2016)
- *Environmental Factor Guideline – Inland Waters* (EPA 2016)
- *Environmental Factor Guideline – Social Surroundings* (EPA 2016)
- *Environmental Factor Guideline – Terrestrial Fauna* (EPA 2016)
- *Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures* (State of Western Australia 2016)
- *Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual* (EPA 2020)
- *Statement of Environmental Principles, Factors and Objectives* (EPA 2020c)
- *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016)
- *Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA 2020a)
- *Technical Guidance – Protection of benthic communities and habitats* (EPA 2016).

Appendix F: List of submitters

Organisations

Birdlife Western Australia
Conservation Council Western Australia
Greens, Western Australia
Friends of the Gelorup Corridor Inc.
Hanson Construction Materials Pty Ltd
Hon. Adele Farina MLC, Member for South West Region, Australian Labor Party
Shire of Capel
South West Development Commission
South West Environment Centre
Urban Bushland Council Western Australia Inc.
Wildflower Society of Western Australia

Individuals

987 submissions from individuals, of which 824 were received via a proforma email campaign.

Appendix G: Assessment timeline

Date	Progress stages	Time (weeks)
21 December 2020	EPA decided to assess – level of assessment set	
21 December 2020	Request for Additional Information	0
19 February 2021	EPA accepted Additional Information	8
1 September 2021	EPA received final information for assessment and accepted proponent's Response to Submissions	37
16 September 2021	EPA considered its assessment	2
20 October 2021	EPA provided report to the Minister for Environment	5
25 October 2021	EPA report published	3 days
15 November 2021	Close of appeals period	3

Timelines for an assessment may vary according to the complexity of the proposal and are usually agreed with the proponent soon after the Environmental Protection Authority (EPA) decides to assess the proposal and records the level of assessment.

In this case, the EPA met its timeline objective to complete its assessment and provide a report to the Minister.

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BORR Team 2020a, *Bunbury Outer Ring Road Southern Section Updated Environmental Referral Supporting Document and Additional Information (BORR-02-RP-EN-0014)*, Revision 2, Perth, Western Australia

BORR Team 2020b *Bunbury Outer Ring Road Southern Section Landscape and Visual Impact Assessment Rev 1*, Perth, Western Australia

BORR Team 2020c *Response to DWER Memorandum, BORR Southern Section, Request for Advice*

BORR Team 2020d *Bunbury Outer Ring Road Southern Section Vegetation and Flora Study (BORR-02-RP-EN-0003)*, Rev 1 Final, Perth, Western Australia

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