Report and recommendations of the Environmental Protection Authority

Bunbury Outer Ring Road
Northern and Central Sections

Commissioner for Main Roads Western Australia

Report 1682

June 2020

Environmental impact assessment process timelines

Date	Progress stages	Time (weeks)
03/07/2019	EPA decided to assess – level of assessment set	
17/07/2019	Request for Additional Information (40(2)(a))	2
09/03/2020	EPA accepted Additional Information	34
13/03/2020	Additional Information released for public review	4 days
09/04/2020	Public review period for Additional Information closed	4
11/05/2020	EPA received final information for assessment	4
21/05/2020	EPA board completed its assessment	1
24/06/2020	EPA provided report to the Minister for Environment	5
29/06/2020	EPA report published	3 days
13/07/2020	Close of appeals period	2

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.

Dr Tom Hatton
Chairman

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Summary

This document is an assessment report for Western Australia's Minister for Environment. It describes the outcomes of an Environmental Protection Authority (EPA) environmental impact assessment of the Bunbury Outer Ring Road Northern and Central Sections (the proposal). The proposal is located about 200 kilometres south of Perth and, at its closest point, about 6 kilometres south-east of Bunbury. The proponent for the proposal is the Commissioner for Main Roads Western Australia (Main Roads WA).

Proposal

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.

Background and context

The proponent referred the proposal to the EPA on 6 June 2019. On 3 July 2019, the EPA decided to assess the proposal and set the level of assessment at Referral Information with additional information required under s. 40(2)(a) of the *Environmental Protection Act 1986* with four weeks public review.

The public review period commenced on 13 March 2020 and concluded on 9 April 2020. Sixteen submissions were received.

Public submissions

Key issues raised in the submissions included:

- alignment and the consideration of alternative alignments, the number and scale of interchanges, and the size of the development envelope
- fragmentation and loss of Threatened Ecological Communities (TEC) and Priority Ecological Communities (PEC)
- location, number and proposed monitoring of fauna crossings for western ringtail possum
- clearing protocols for fauna
- maintenance of hydrology following construction
- impacts of noise on nearby sensitive premises, scope of amelioration proposed, mitigation during construction, scope and adequacy of the noise modelling, and loss of amenity on affected properties and neighborhoods
- western ringtail possum research as an offset, likelihood of success for rehabilitation offsets, and appropriateness of the offsets proposed
- potential cumulative impacts of the Bunbury Outer Ring Road proposal, which includes the northern, central and southern sections.

The proponent addressed the issues raised in the Response to Submissions document (BORR Team 2020b) and appended updated environmental management plans.

The EPA considers that the consultation process has been appropriate and that reasonable steps have been taken to inform the community and stakeholders about the proposed development. Relevant significant environmental issues identified from this process were taken into account by the EPA during its assessment of the proposal.

Key environmental factors and relevant principles

The EPA identified the following key environmental factors (see section 4) during the course of its assessment:

1. **Terrestrial Fauna** – direct and indirect impacts associated with the clearing and/or degradation of fauna habitat and the fragmentation of foraging habitat, and potential direct loss of individual fauna.
2. **Flora and Vegetation** – direct and indirect impacts from clearing of flora and vegetation including impacts to TECs and PECs.
3. **Inland Waters** – changes to hydrological flows causing impacts to aquatic fauna habitat, and indirect impacts relating to groundwater and surface water quality from construction activities and operational road run-off.
4. **Social Surroundings** – construction and operation impacts to social surroundings from noise and dust emissions.

In identifying the key environmental factors, the EPA had regard to the object and principles set out in s. 4A of the *Environmental Protection Act 1986*. The EPA considered that the following principles were particularly relevant to this assessment (see section 4):

1. The precautionary principle
2. The principle of intergenerational equity
3. The principle of the conservation of biological diversity and ecological integrity.

Appendix 2 provides a summary of the principles and how the EPA considered these principles in its assessment.

Conclusion and recommendations

Having assessed the proposal, the EPA recommends the proposal may be implemented subject to conditions.

The EPA recommends that the Minister for Environment notes:

1. That the proposal assessed is for construction and operation of the Bunbury Outer Ring Road Northern and Central Sections.
2. The key environmental factors identified by the EPA in the course of its assessment are Terrestrial Fauna, Flora and Vegetation, Inland Waters and Social Surroundings, set out in section 4.

3. The EPA has recommended that the proposal may be implemented, provided the implementation of the proposal is carried out in accordance with the recommended conditions and procedures set out in Appendix 4. Matters addressed in the conditions include:

   a) no adverse impacts on the viability of the local western ringtail possum population in habitats adjacent to and outside the development envelope

   b) maintaining hydrological regimes and water quality to conservation significant aquatic fauna, threatened ecological communities and significant wetlands

   c) minimising the impacts of noise during construction and operation

   d) offsetting to counterbalance impacts to the habitat for western ringtail possum, south-western brush-tailed phascogale, Carnaby's, Baudin's, and forest red-tailed black cockatoos; Herb rich shrublands in clay pans TEC (FCT08), *Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrublands of the Swan Coastal Plain TEC (FCT3c), and Banksia woodlands of the Swan Coastal Plain PEC.

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1. Introduction

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for Environment on the outcomes of the EPA's environmental impact assessment of the Bunbury Outer Ring Road Northern and Central Sections (the proposal). The proponent for the proposal is Main Roads Western Australia.

The EPA has prepared this report in accordance with s. 44 of the *Environmental Protection Act 1986* (EP Act). This section of the EP Act requires the EPA to prepare a report on the outcome of its assessment of a proposal and provide this assessment report to the Minister for Environment. The report must set out:

(a) what the EPA considers to be the key environmental factors identified during the assessment

(b) the EPA's recommendations as to whether or not the proposal may be implemented and, if the EPA recommends that implementation be allowed, the conditions and procedures to which implementation should be subject.

The EPA may also include any other information, advice and recommendations in the assessment report as it thinks fit.

The proponent referred the proposal to the EPA on 6 June 2019. On 3 July 2019, the EPA decided to assess the proposal and set the level of assessment at Referral Information with additional information required (four weeks public review). The additional information was released for public review from 13 March 2020 to on 9 April 2020.

EPA procedures

The EPA followed the procedures in the *Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2016* (State of Western Australia 2016) and the *Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual* (EPA 2020b).

Commonwealth assessment

The proposal was determined to be a controlled action by a delegate of the Commonwealth Minister for the Environment under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 26 September 2019. The proponent did not request the proposal be assessed as an accredited assessment, therefore this Report does not consider Matters of National Environmental Significance. The Commonwealth Department of Agriculture, Water and Environment has run a separate assessment process for impacted matters.

2. The proposal

The proposal is for the construction and operation of 19 kilometres (km) of the Bunbury Outer Ring Road, located about 200 km south of Perth and, at its closest point, about 6 km south-east of Bunbury. The 625 hectare (ha) development envelope occurs within the City of Bunbury and Shires of Capel, Dardanup and Harvey (Figure 1).

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 majority of the Central Section of the Bunbury Outer Ring Road was constructed in 2013. For the purposes of this proposal, the Central Section refers to the unbuilt portions required to ensure appropriate intersections and connections to local roads and to the Northern and Southern Sections of the Bunbury Outer Ring Road.

The key characteristics of the proposal are summarised in Tables 1 and 2 below. A detailed description of the proposal is provided in section 2 of the Additional Information Requirements that was released for public review (BORR Team 2020a).

Table 1: Summary of the proposal

Proposal title	Bunbury Outer Ring Road Northern and Central Sections
Short description	The proposal includes the construction and operation of 19 km of the Bunbury Outer Ring Road, located about 200 km south of Perth and, at its closest point, about 6 km south-east of Bunbury. The proposal consists of a dual carriageway connecting the Forrest Highway at Kingston to the South Western Highway, south of Centenary Road in the Shire of Capel.

Table 2: Location and proposed extent of physical and operational elements

Element	Location	Proposed extent
Physical elements		
Freeway standard dual carriageway, grade separated interchanges, local road extensions and connections, bridges, drainage structures, noise walls, fauna crossings, and other road infrastructure including fencing, landscaping and principal shared path.	Located within the development envelope as shown in Figure 1	Clearing and disturbance no more than 92 ha of native vegetation within a 625 ha development envelope.

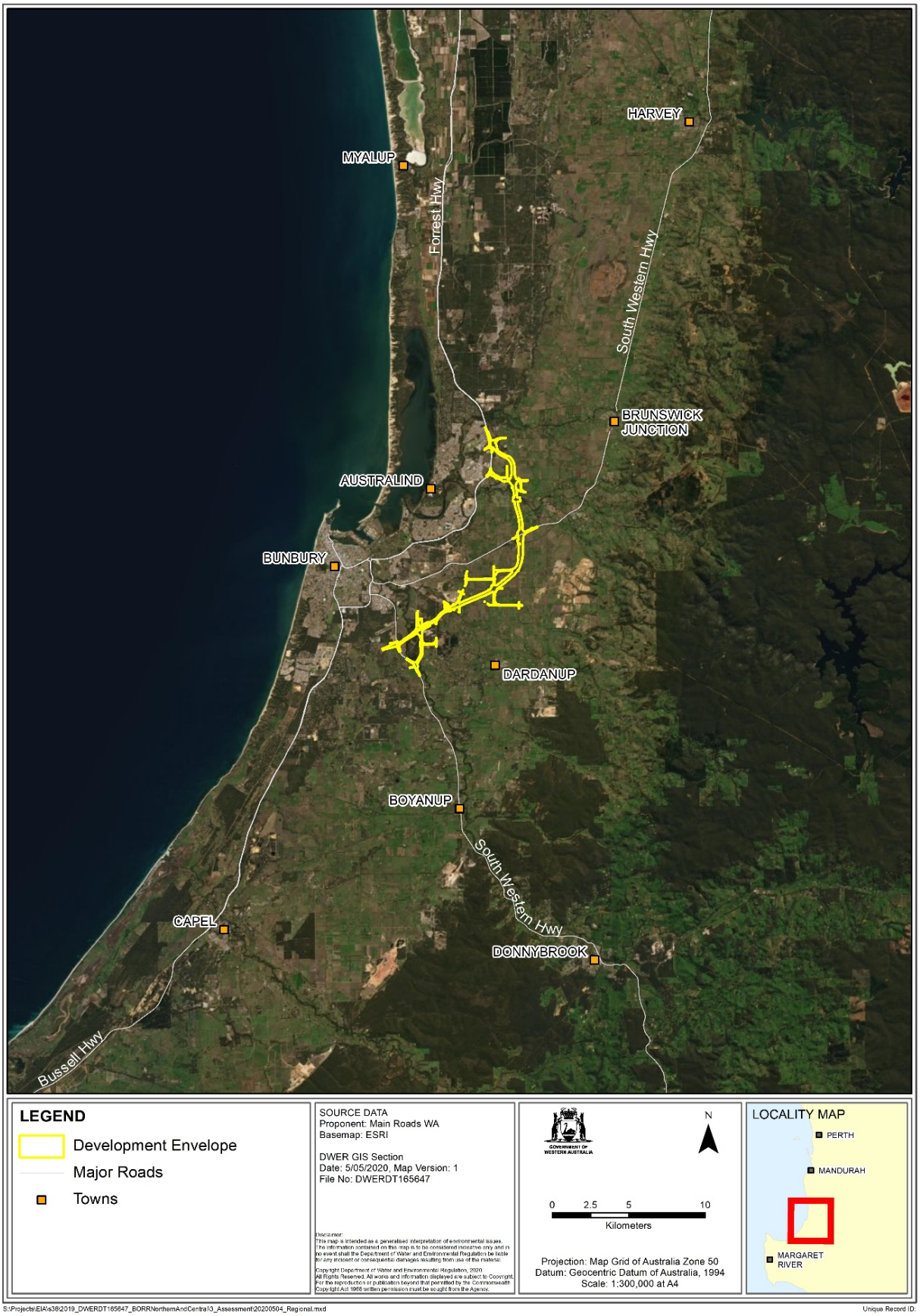

Figure 1: Regional location

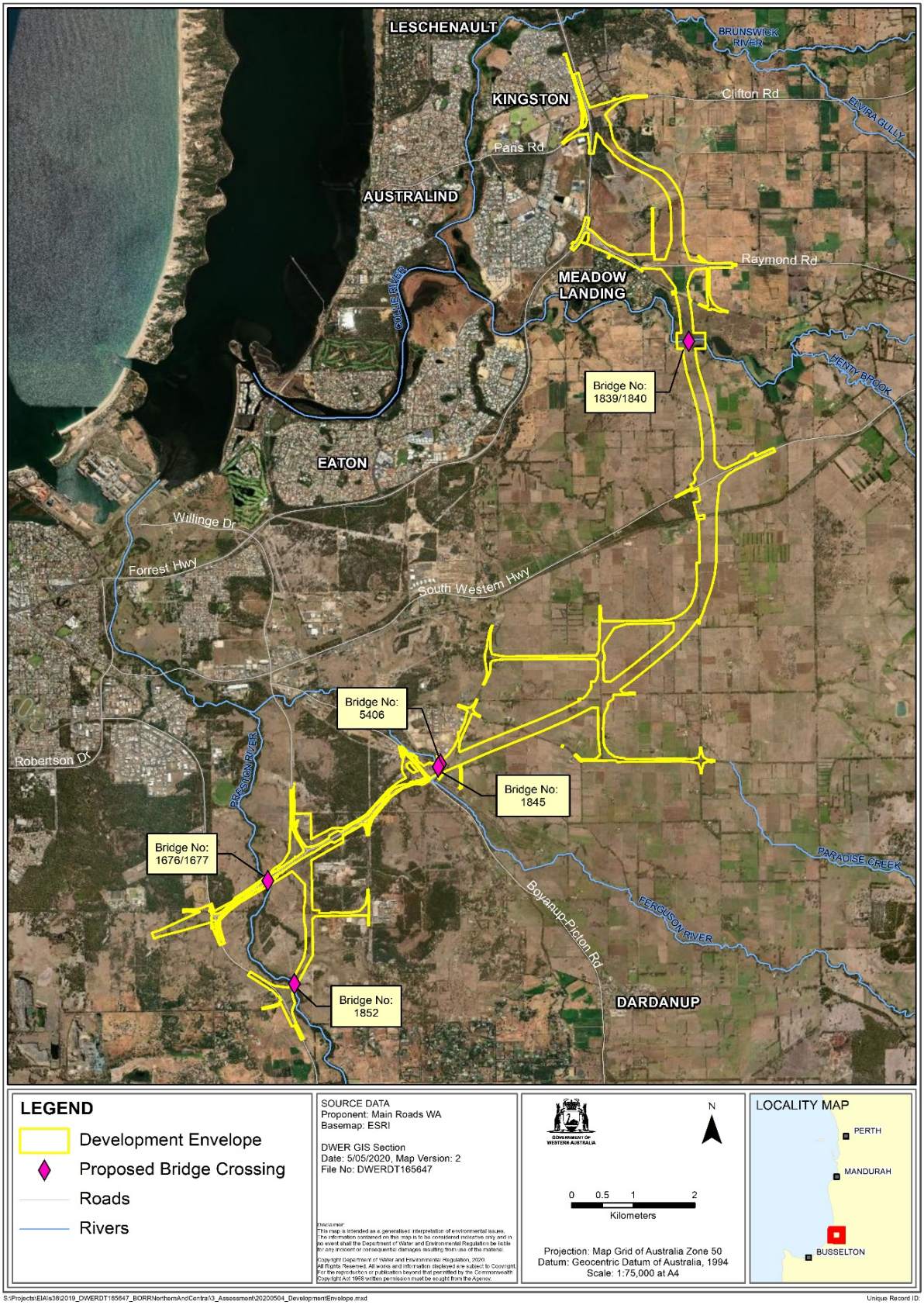

Figure 2: Development envelope

2.1. Changes to the proposal during assessment

The proponent requested the EPA consent to a change to the proposal during assessment on 29 January 2020. The change was to refine the area required for the proposal, which reduced the size of the development envelope by 26 ha and reduced the clearing of native vegetation required by 27 ha.

The EPA Chairman, as a delegate of the EPA, concluded that the changes were unlikely to significantly increase any impact that the proposal may have on the environment and gave consent under s. 43A of the EP Act to the change on 13 February 2020.

Tables 1 and 2 above include this change.

2.2. Context

The Bunbury Outer Ring Road project is for the construction of a freeway standard dual carriageway that will bypass Bunbury, connecting from the Forrest Highway at Kingston to the Bussell Highway at Gelorup. The proponent submitted the project to the EPA as two separate proposals, the Northern and Central Section (in June 2019), and the Southern Section (in September 2019). The EPA notes that this was because further investigations were being undertaken at the time on alternative alignments and also that the approach provides for staging of construction.

The EPA has determined that the ‘Additional Information’ required from the proponent to progress the Authority’s assessment of the Southern Section of the Bunbury Outer Ring Road will need to be published for an 8 week public comment period. While preliminary information about the Southern Section development envelope is available, the full suite of information regarding the design, the direct and indirect impacts (including from fragmentation), and mitigation measures for the Southern Section of the Bunbury Ring Road have not been submitted to the EPA.

The EPA’s recommendations in this report are specific to the Northern and Central Section. When assessing the Southern Section, the EPA will have regard to the recommendations in this report.

3. Consultation

The EPA advertised the referral information for the proposal for seven days public comment in June 2019 and received 98 submissions. Three submissions requested 'Do Not Assess', four submissions requested 'Assess – Referral Information', one submission requested 'Assess – Environmental Review – No Public Review' and 90 submissions requested 'Assess – Public Environmental Review'.

The proponent consulted with government agencies and key stakeholders during the preparation of the supplementary reports provided with the referral and in response to the EPA's request for further information. The agencies and stakeholders consulted, the issues raised, and the proponent's response are detailed in Section 3 of the proponent's Referral Supporting Document and Response to EPA of Decision to Assess report (BORR Team 2019, BORR Team 2020a).

During the public review period for the additional information, the EPA received 16 submissions on the proposal. The key issues raised relate to the:

- alignment and the consideration of alternative alignments, the number and scale of interchanges, and the size of the development envelope
- fragmentation and loss of Threatened Ecological Communities (TEC) and Priority Ecological Communities (PEC)
- location, number and proposed monitoring of fauna crossings for western ringtail possum
- clearing protocols for fauna
- maintenance of hydrology following construction
- impacts of noise on nearby sensitive premises, scope of amelioration proposed, mitigation during construction, scope and adequacy of the noise modelling, and loss of amenity on affected properties and neighborhoods
- western ringtail possum research as an offset, likelihood of success for rehabilitation offsets, and appropriateness of the offsets proposed
- potential cumulative impacts of the Bunbury Outer Ring Road proposal.

The proponent addressed the issues raised in the Response to Submissions document (BORR Team 2020b).

The EPA considers that the consultation process has been appropriate and that reasonable steps have been taken to inform the community and stakeholders about the proposed development. Relevant significant environmental issues identified from this process were taken into account by the EPA during its assessment of the proposal.

4. Key environmental factors

In undertaking its assessment of the proposal and preparing this report, the EPA had regard for the object and principles in s. 4A of the EP Act to the extent relevant to the particular matters that were considered.

The EPA considered the following information during its assessment:

- proponent's referral information and additional information
- stakeholder, public and agency comments received during the referral period
- proponent's response to submissions raised during the public review of additional information
- EPA's own inquiries
- *Statement of Environmental Principles, Factors and Objectives* (EPA 2020c)
- relevant principles, policy and guidance referred to in the assessment of each key environmental factor in sections 4.1 to 4.4.

Having regard to the EP Act principles, the EPA considered the following principles were particularly relevant to its assessment of the proposal:

1. **The precautionary principle** – the proposal has the potential to result in serious or irreversible damage to occurrences of TECs and fauna habitat, and potential for direct impacts to threatened fauna. The EPA has recommended conditions to ensure that risks are minimised or avoided where possible, and that relevant measures are undertaken by the proponent to manage residual impacts.
2. **The principle of intergenerational equity** – the proposal has the potential to impact the health, diversity and productivity of TECs, habitat for threatened fauna, and noise and amenity impacts to local premises and neighbourhoods. The EPA has recommended conditions to ensure the environment is maintained for the benefit of future generations.
3. **The principle of the conservation of biological diversity and ecological integrity** – the proposal will clear areas of TECs, a PEC, areas of foraging and potential breeding habitat for threatened black cockatoos, habitat for western ringtail possum, and potentially impact Carter's freshwater mussel and black striped minnow. The EPA has recommended conditions to manage the impacts on conservation significant vegetation and fauna so that biological diversity and ecological integrity are maintained.

Appendix 2 of this report provides a summary of the principles and how the EPA considered these principles in its assessment.

Having regard to the above information, the EPA identified the following key environmental factors during the course of its assessment of the proposal:

- **Terrestrial Fauna** – direct and indirect impacts associated with the clearing and/or degradation of fauna habitat and the fragmentation of foraging habitat, and potential direct loss of individual fauna.

- **Flora and Vegetation** – direct and indirect impacts from clearing of flora and vegetation including impacts to TECs and PECs.
- **Inland Waters** – changes to hydrological flows causing impacts to aquatic fauna habitat, and indirect impacts relating to groundwater and surface water quality from construction activities and operational road run-off.
- **Social Surroundings** – construction and operation impacts to social surroundings from noise and dust emissions.

The EPA considered other environmental factors during the course of its assessment of the proposal. These factors, which were not identified as key environmental factors, are discussed in the proponent's referral documentation (BORR Team 2019). Appendix 3 of this report contains an evaluation of why these other environmental factors were not identified as key environmental factors.

The EPA's assessment of the proposal's impacts on the key environmental factors is provided in sections 4.1 to 4.4. These sections outline whether or not the EPA considers that the impacts on each factor are manageable. Section 6 provides the EPA's recommendation as to whether or not the proposal may be implemented.

4.1. Terrestrial Fauna

The EPA's environmental objective for this factor is *to protect terrestrial fauna so that biological diversity and ecological integrity are maintained*.

Relevant policy and guidance

The EPA considers the following current environmental policy and guidance is relevant to its assessment of the proposal for this factor:

- *Environmental Factor Guideline – Terrestrial Fauna* (EPA 2016c)
- *Technical Guidance – Sampling methods for terrestrial vertebrate fauna* (EPA 2010)
- *Technical Guidance – Terrestrial fauna surveys* (EPA 2004)
- *WA Environmental Offsets Policy* (Government of Western Australia 2011)
- *WA Environmental Offsets Guidelines* (Government of Western Australia 2014).

The considerations for environmental impact assessment for this factor are outlined in *Environmental Factor Guideline – Terrestrial Fauna* (EPA 2016c).

In addition to the above policies and guidelines, the EPA also had regard to the:

- *Western Ringtail Possum (Pseudocheirus occidentalis) Recovery Plan* (Department of Parks and Wildlife 2017)
- *Forest Black Cockatoo (Baudin's Cockatoo Calyptorhynchus baudinii and Forest Red-tailed Black Cockatoo (Calyptorhynchus banksii naso) Recovery Plan* (Department of Environment and Conservation 2008)

- *Carnaby's Cockatoo (Calyptorhynchus latirostris) Recovery Plan* (Department of Parks and Wildlife 2013)
- *Conservation Advice Galaxiella nigrostriata black-stripe minnow* (Threatened Species Scientific Committee 2018a)
- *Conservation Advice Westralunio carteri Carter's freshwater mussel* (Threatened Species Scientific Committee 2018b).

EPA assessment

Consistent with the *Environmental Factor Guideline – Terrestrial Fauna* (EPA 2016c), the EPA has considered the potential direct and indirect impacts, cumulative impacts and risks to terrestrial fauna.

Existing environment

The fauna habitat within the development envelope is largely cleared and highly modified with less than 15 per cent native vegetation within a 625 ha area. The native vegetation occurs within narrow road reserves, as isolated patches or within the riparian zones of the Collie, Ferguson and Preston Rivers.

The proposal would involve clearing of up to 92 ha of native vegetation and resulting loss of fauna habitats.

The proponent completed a Level 1 terrestrial vertebrate fauna survey and a Level 2 survey targeting conservation significant terrestrial fauna species.

Conservation significant fauna includes species listed as:

- Threatened or Specially Protected (including migratory species) under the *Biodiversity Conservation Act 2016* (BC Act)
- Priority by the Department of Biodiversity, Conservation and Attractions (DBCA).

The proponent mapped six fauna habitats across the development envelope. The Level 1 survey recorded 230 vertebrate species, including the following conservation significant species:

- western ringtail possum (*Pseudocheirus occidentalis*) (Critically Endangered)
- Baudin's black cockatoo (*Calyptohynchus baudinii*) (Endangered)
- Carnaby's black cockatoo (*Calyptohynchus latirostris*) (Endangered)
- forest red-tailed black cockatoo (*Calyptohynchus banksia naso*) (Vulnerable)
- black-stripe minnow (*Galaxiella nigrostriata*) (Endangered)
- Carter's freshwater mussel (*Westralunio carteri*) (Vulnerable)
- south-western brush-tailed phascogale (*Phascogale tapoatafa wambenger*) (Schedule 6)
- southern brown bandicoot (*Isoodon fusciventer*) (Priority 4)

The EPA considers that the surveys were done in accordance to the relevant guidance and provided sufficient information for the EPA to assess the proposal.

Potential impacts

Based on the results of the surveys and the presence of species likely to occur, the EPA considers the potential direct impacts to terrestrial fauna from the proposal are:

- loss of 92 ha of fauna habitat
- loss of 43.9 ha of habitat for western ringtail possum
- loss of 17.7 ha of habitat for south-western brush-tailed phascogale (hereafter referred to as 'brush-tailed phascogale')
- loss of 37.8 ha of habitat for black cockatoo species (Baudin's black-cockatoo, Carnaby's black-cockatoo and forest red-tailed black cockatoo), including 711 trees with the potential to develop nesting hollows and three trees with suitable hollows
- loss of 0.55 ha of habitat for black stripe minnow, and potential loss of individuals from clearing.

The proposal has the potential to indirectly impact terrestrial fauna through:

- dispersal of 15 to 25 western ringtail possums, brush-tailed phascogale and other fauna into habitat adjacent to the development envelope
- loss of habitat connectivity through clearing and creation of infrastructure barriers to fauna movement pathways (both physical and genetic) through terrestrial and aquatic ecosystems
- increasing the risk of injury and/or mortality of fauna due to road construction and operation
- potential changes to hydrological flow, hydrological connectivity and/or water quality for black stripe minnow
- potential erosion and sedimentation of Carter's freshwater mussel habitat
- degradation of adjacent habitat through weeds, or introduction and/or spread of dieback.

Mitigation and management measures

The EPA notes the proponent's application of the mitigation hierarchy to reduce the proposal's impacts on terrestrial fauna and their habitat by:

- Altering the road alignment and road design to minimise the construction footprint and avoid clearing of adjacent habitat for fauna, particularly conservation significant species.
- Minimising clearance of black cockatoo potential breeding trees as far as practicable.
- Avoiding one known nesting tree and 18 trees with suitable nest hollows for black cockatoos

- Implementing an environmental management plan with actions to avoid, minimise and manage potential impacts to western ringtail possum.
- Providing infrastructure to reduce vehicle strike and facilitate fauna movement post-construction including possum rope bridges, fauna underpasses and strategic fencing.
- Rehabilitating all disturbed areas within the development envelope but outside the construction footprint. The risk of vehicle strike to conservation significant species will be reduced by not planting foraging species for black cockatoos within 10 meters of the road.
- Implementing best practice hygiene management during construction to reduce the risk of spreading dieback and weeds into adjacent fauna habitat.
- Avoiding impacts to Carter's freshwater mussel by not constructing bridge footings inside rivers and managing erosion and sedimentation.
- Providing drainage infrastructure to maintain hydrological flows and habitat connectivity for black strip minnow.

The EPA's assessment of the potential impacts and management on terrestrial fauna are discussed below with respect to the following subheadings:

- western ringtail possum
- brush-tailed phascogale
- black cockatoos (Baudin's, Carnaby's and red-tailed black cockatoos)
- aquatic fauna (black stripe minnow and Carter's freshwater mussel)

Western ringtail possum

The western ringtail possum was once widely distributed across the southern and south-western parts of Western Australia. However, the species is now restricted to the southern Swan Coastal Plain, the Jarrah forests near Manjimup and the south coast between Walpole and Albany. The species feeds primarily on peppermint leaves, but also marri and jarrah. They are predominantly arboreal, sheltering during the day in tree hollows or dreys (arboreal nests) constructed from vegetative material (Department of Parks and Wildlife 2017).

The species has adapted to the urban environment, particularly in areas where mature peppermint habitat trees have been retained. The urban and semi-urban areas offer artificial water sources, alternative habitat such as roof spaces, and artificial connections such as fences (Shedley and Williams 2014[1]). However, these urban habitat areas along the southern Swan Coastal Plain conflict with rapid urban development and as a result are highly fragmented.

The key threatening processes impacting the western ringtail possum relevant to the impacts of this proposal are habitat loss and fragmentation. Other threats include

1 https://www.dpaw.wa.gov.au/images/shedley_and_williams_2014_an_assessment_of_habitat_for_western_ringtail_possum_on_the_southern_swan_coastal_plain_-_binningup_to_dunsborough._department_of_parks_and_wildlife.pdf

predation by feral or domestic animals, climate change, tree harvesting, fire, competition for nest hollows and habitat tree decline (Department of Parks and Wildlife 2017).

The proponent mapped four woodland fauna habitat types within and adjacent to the development envelope that provide suitable breeding and foraging habitat for the western ringtail possum (BORR Team 2020a).

Targeted fauna surveys for western ringtail possum were undertaken by the proponent within suitable habitat in the proposal area, and across five sites within 10 km of the development envelope. Given the variability in western ringtail possum abundance over the three-year survey period, the proponent has presented their impacts conservatively as 15 to 25 individuals within the development envelope. The abundance of western ringtail possum across the five local sites surveyed by the proponent is estimated to be about 483 individuals.

Current knowledge of the western ringtail possum population

The conservation status of the western ringtail possum is listed as Critically Endangered under the BC Act. This listing refers to fauna that are facing an extremely high risk of extinction in the wild in the immediate future.

The *Western Ringtail Possum Recovery Plan* (Department of Parks and Wildlife 2017) recognises there are no definitive estimates of the total population of western ringtail possum in Western Australia, however it has been estimated to be less than 8,000 mature individuals. Within the local area, the population size between Bunbury and Dunsborough is estimated to be 2,000 to 5,000 (Department of Parks and Wildlife 2017). The Recovery Plan identifies the need for robust surveys to provide reliable estimates of the western ringtail population density and abundance across the three key management zones for the species (i.e. the southern Swan Coastal Plain, South Coast and Southern Forest).

The proponent has undertaken a regional survey of more than 4,000 ha of suitable habitat across all three management zones. The regional survey aimed to increase the knowledge of the species' distribution and abundance. The proponent has presented its preliminary results of the regional survey within its referral documentation. The proponent has also used the results to consider the cumulative impacts to western ringtail possums that would result from this proposal. The final technical report of the proponent's regional survey is not yet publicly available.

The EPA acknowledges that the proponent is working towards finalising the technical report and providing a contemporary understanding of the western ringtail possum population across its entire geographic range. The EPA anticipates that the proponent would also incorporate the results of the regional survey into their environmental impact statement for Bunbury Outer Ring Road Southern Section.

For this proposal, the EPA will assess the impacts to western ringtail possum having regard to:

- its conservation status of Critically Endangered

- the species Recovery Plan regional estimate of the southern Swan Coastal Plain population of 2,000 to 5,000 individuals
- the proponent's survey showing local observations of 483 individuals across five sites nearby the proposal area (Biota 2019)
- the 6,264 ha of suitable habitat within the Bunbury Western Ringtail Possum Management Zone as defined by the Department of Parks and Wildlife in 2014 (Shedley and Williams 2014).

Habitat loss

The proposal would result in clearing of up to 43.9 ha of suitable western ringtail possum habitat. Using mapped information from Shedley and Williams (2014) this equates to 0.7 per cent of the 6,264 ha of western ringtail possum habitat within the Bunbury Western Ringtail Possum Management Zone.

The proponent has estimated that of the 43.9 ha of western ringtail possum habitat proposed to be cleared, the majority has been classified by Shedley and Williams (2014) as 'Medium' habitat quality (58 per cent), with the remaining areas mapped as a combination of 'High' (6 per cent) and 'Low' (15 per cent) habitat quality.

The proponent considers that the proposal would partially impact the home ranges of 15 to 25 individual western ringtail possums. No single home range is expected to be cleared in its entirety. Given that home ranges of western ringtail possum on the southern Swan Coastal Plain are 2 to 5 ha in size (Department of Parks and Wildlife 2017) and the linear shape of the proposed road infrastructure, the EPA considers the potential impacts to home ranges is unlikely to significantly impact individual western ringtail possums.

The EPA also notes the relatively small proportion of individual western ringtail possums (15 to 25) that would be impacted compared to the 483 possums observed within the nearby local sites surveyed by the proponent. Of these five local sites, two are zoned Regional Open Space and being managed for conservation (Shire of Capel C-class Reserve 23000 and Manea Park). One is owned by the proponent and being offered as an offset site for this proposal (Lot 2 Boyanup-Picton Rd, see section 5), and the remaining two sites are privately owned and not within conservation tenure.

The EPA acknowledges that the proposal has the potential to result in injury and/or mortality of individual western ringtail possums during and following clearing. The EPA notes that the proponent has proposed a number of management and mitigation measures including, but not limited to:

- removing unoccupied possum dreys and blocking vacant hollows during pre-clearance surveys to encourage possums and other fauna to self-relocate to habitat outside the development envelope
- staging of clearing according to habitat quality for western ringtail possum
- fencing off habitat areas prior to ground disturbance to minimise the risk of vehicle strikes

- where practicable, avoiding clearing when pouched young are likely to be present, noting that this coincides with summer construction timeframes which minimise the potential to spread weeds and dieback, and may not be able to be achieved in all clearing circumstances
- the presence of fauna spotters during clearing.

The EPA supports these management and mitigation measures to reduce the likelihood of encountering fauna during clearing. The EPA also supports the proponent's avoidance of trapping and physical translocation of western ringtail possums given the low success rates of previous translocation projects (Clarke 2011[2]; de Tores 2005[3]). The EPA has considered the proponent's approach of encouraging western ringtail possums to self-relocate and move to adjacent habitat, and avoiding physical translocation which would minimise indirect impact by eliminating the stress placed on the animals during trapping and handling. However, the EPA notes that the survivorship and/or assimilation of displaced possums into the adjacent habitat areas can only be determined through tagging and monitoring possums prior to and following disturbance.

The EPA notes that prior to any clearing of habitat, the proponent would be required to apply for and obtain an authorisation to 'take or disturb' conservation significant fauna in accordance with the BC Act. The EPA acknowledges there is a risk that some individual possums within the development envelope may have limited opportunities for safe dispersal into neighbouring habitat. However, the BC Act contains assessment and regulatory provisions for animal welfare in these circumstances, and can impose conditions to monitor survivorship if required.

The EPA has recommended condition 6-1(3) requiring the proponent to undertake a baseline study prior to clearing to confirm the presence and numbers of western ringtail possum in consultation with DBCA. This study would inform decision-making under the BC Act, including but not limited to, development of appropriate clearing protocols, actions to monitor impacts to displaced western ringtail possum, and if required, survivorship of individuals following disturbance.

The EPA has recommended condition 7-2 requiring the proponent to undertake a survey within 30 days of clearing and compare results with the baseline information collected prior to clearing. The proponent would be required through condition 7-1 to demonstrate that there are no adverse impacts on the viability of the western ringtail possum population in the habitat areas adjacent to the development envelope.

With regard to habitat clearing of 43.9 ha, the EPA considers this loss to be small when considered at a regional level, particularly given the availability of about 6,200 ha of habitat within the Bunbury Western Ringtail Possum Management Zone.

2 https://www.parliament.wa.gov.au/publications/tabledpapers.nsf/displaypaper/3910849cc06f9d9ec5498a5148257c06000daaf5/$file/tp-849.pdf

3 https://library.dbca.wa.gov.au/static/FullTextFiles/022841.pdf

Given the cumulative impacts to the Critically Endangered western ringtail possum habitat to date, the EPA considers there is an unavoidable significant residual impact. Offsets to counterbalance these impacts are discussed further in section 5.

Fragmentation

Clearing to allow construction of the road will fragment western ringtail possum habitat by creating a barrier to species' movement and increase the risk of fauna vehicle strikes.

Connectivity between most habitat patches within the proposal area is already impacted by the existing Forrest Highway, the central section of the Bunbury Outer Ring Road constructed in 2013 (referred to as Stage 1), and large expanses of cleared agricultural land. Construction and operation of the remainder of the Bunbury Outer Ring Road, would create newly fragmented habitat.

The most notable impact areas are near the Clifton Road / Paris Road proposed interchange, near the Boyanup-Picton Road interchange and around Manea Park. Western ringtail possum habitat along the Collie, Preston and Ferguson Rivers will also be fragmented as clearing would be required to construct the vehicle bridges. The proponent's key strategy to mitigate the impacts of fragmentation is through the installation of fauna crossing structures to reconnect habitat areas.

The proponent is proposing a range of different crossing structures, such as rope bridge overpasses, rope bridge underpasses, and box culverts (with a dry ledge above flood level). The proponent considers that the structures have been designed using best practice management, and movement pathways have been informed by specialist advice to increase their function and effectiveness.

The EPA notes that there have been two previous attempts to mitigate habitat disconnections over existing roads. The first is a 26.5 metre rope bridge on Caves Road near Vasse built in 2013, which recorded 1,300 crossing in 270 days (nine months) of monitoring (Yokochi and Bencini 2015[4]).

The second is an 88 metre rope bridge overpass constructed by Main Roads WA over the Bunbury Outer Ring Road Stage 1 in 2014[5]. A study in 2016 by Chambers and Bencini[6] recorded very low success rates, with only two successful crossings in 13 months of monitoring. Factors influencing the under-utilisation of this rope bridge are potentially from the wider span, the influence of more artificial light, lower density canopy cover and lower densities of western ringtail possums (Chambers and Bencini 2016). The EPA notes that the relationship between these potential influencing factors and possum utilisation of rope bridges requires further study.

4 https://www.researchgate.net/publication/280534419_A_remarkably_quick_habituation_and_high_use_of_a_rope_bridge_by_an_endangered_marsupial_the_western_ringtail_possum

5 This segment of Bunbury Outer Ring Road is referred to in this assessment as the 'Central Section' as it is proposed to be substantially upgraded with implementation this proposal.

6 https://www.researchgate.net/publication/320358066_Bunbury_Outer_Ring_Road_fauna_monitoring_rope_bridge_and_fauna_underpass_use

Despite the very low use of the Bunbury Outer Ring Road Stage 1 rope bridge, it was concluded that the western ringtail possum population has not been significantly impacted by the fragmentation caused by construction of the road (Chambers and Bencini 2016).

The EPA considers that this proposal has similarities to the Bunbury Outer Ring Road Stage 1 (i.e. it is within the same local environment and involves relatively low densities of western ringtail possums). The EPA recognises that low densities may make it difficult to assess the success of the fauna crossings based on animal usage.

The EPA has recommended condition 7-4 requiring the proponent to confirm the locations and configurations of fauna crossings for western ringtail possum prior to clearing. The EPA also supports the proponent's commitment to implement an environmental management plan with provisions to monitor and make necessary modifications to the fauna crossings to encourage use by western ringtail possum.

Notwithstanding the efficacy of fauna crossings, the proponent considers that the adjacent vegetation has adequate habitat capacity to sustain the displaced western ringtail possums. The proponent also considers that through the implementation of their proposed management and mitigation measures, the adjacent habitat will remain viable following the implementation of the proposal.

Given its Critically Endangered status, the EPA considers there should be no adverse effects on the viability of the local western ringtail possum (in terms of its population size and occupancy) in the adjacent habitat outside the development envelope and has therefore recommended conditions 7-1 and 7-2 accordingly.

Brush-tailed phascogale

The brush-tailed phascogale is a small (100 to 300 gram), arboreal marsupial. They are carnivorous, short-lived and nocturnal. Brush-tailed phascogale was not recorded within the development envelope however it was recorded in the proponent's surveys on numerous occasions nearby the proposal area (Biota 2020).

The implementation of the proposal will directly impact the brush-tailed phascogale through clearing of 17.6 ha of suitable habitat, and indirectly impact the species through habitat fragmentation. As home-ranges are relatively large (greater than 20 ha) and the proposal is a linear shape of no more than 200 meters in width, the proponent considers it is highly likely that no single brush-tailed phascogale's home-range would be cleared in its entirety.

The habitat requirements of brush-tailed phascogale are closely aligned with those of the western ringtail possum as both species are nocturnal and arboreal. The EPA has therefore considered the potential impacts to brush-tailed phascogale and the proposed mitigation and management measures in the context of western ringtail possum as discussed above.

Similarly, to western ringtail possum, the EPA has recommended condition 6-1 to ensure a baseline study is undertaken to confirm presence/absence of brush-tailed phascogale prior to clearing, and that any potential construction impacts are

managed through condition 6-2. The EPA has also recommended that the significant residual impacts of 17.6 ha of habitat loss is offset. Offsets are discussed further in section 5.

Black cockatoos

The 'woodland' fauna habitat types recorded in the surveys provide suitable foraging and potential breeding habitat for all three black cockatoo species (Baudin's black cockatoo, Carnaby's black cockatoo and forest red-tailed black cockatoo). The development envelope also overlaps with the typical breeding range for forest red-tailed cockatoos and the partial breeding range of Carnaby's and Baudin's cockatoo.

The proponent identified 6,902 ha of available black cockatoo foraging and potential breeding habitat within a 12 km radius of the development envelope (Biota 2020). The habitat value within 12 km was analysed by cross-referencing the mapped vegetation complex data with the knowledge of habitat requirements for black cockatoos.

All trees within the development envelope were assessed to identify potential breeding trees and potential roosting habitat. Potential breeding trees were further surveyed using a drone and photo assessment to confirm hollow suitability and identify current or previous nesting activity.

Although habitat requirements differ slightly for each of the three species of black cockatoos, the proponent considers it likely that all three species utilise the habitat within the development envelope for foraging. Therefore, the proponent has not differentiated the habitat values and associated impacts between black cockatoo species. The EPA considers this to be reasonable for this assessment, as this approach is more likely to result in an over-estimation rather than underestimation of potential impacts to each black cockatoo species.

Habitat loss

Baudin's black cockatoo and forest red-tailed black cockatoo are subject to a combined Recovery Plan (Department of Environment and Conservation 2008), while Carnaby's black cockatoo is subject to a separate Recovery Plan (Department of Parks and Wildlife 2013). The key threatening processes outlined by the Recovery Plans, and assessed by the EPA relevant to this proposal, include habitat loss, nest hollow shortage, nest hollow competition, vehicle strike, and degradation of habitat through introduction and/or spread of *Phytophthora cinnamomi* (dieback) (Department of Environment and Conservation 2008; Department of Parks and Wildlife 2013).

The proposal will result in the clearing of 37.8 ha of foraging habitat, which includes 19.4 ha of high quality and 11.9 ha of moderate foraging value. No roosting habitat was identified. While no known nesting trees will be cleared, the implementation of the proposal will result in the loss of up to 711 suitable potential nesting trees and three trees with suitable hollows. The EPA notes that the proponent has undertaken a detailed design process to minimise the footprint of the road and reduce direct impacts to black cockatoo habitat including avoidance of one known nesting tree and 18 trees with suitable hollows in close vicinity.

The EPA notes that the proponent identified 6,902 ha of foraging and potential breeding habitat within 12 km of the development envelope. In considering the loss of foraging habitat in this context, the EPA notes that proposed clearing of 38.7 ha of habitat will result in a 0.5 per cent reduction of available foraging and potential breeding habitat. The EPA considers that these losses are unlikely to have a regional impact on the foraging and breeding habitat available and is unlikely to affect the species' distribution.

The EPA recognises that the proposal will contribute to the cumulative loss of black cockatoo potential breeding habitat broadly and may potentially exacerbate threats such as tree hollow shortage and competition. The EPA therefore considers offsets are required to counterbalance the significant residual impacts of 37.8 ha loss of foraging and potential breeding habitat. Offsets are discussed further in Section 5.

The EPA notes that indirect impacts to black cockatoos are possible as a result of this proposal, and include vehicle strike, introduction and spread of dieback and disturbance of nesting individuals.

To reduce the risk of vehicle strikes to black cockatoos, the EPA considers that black cockatoo foraging resources should not be planted within 10 metres of the road during landscaping activities. The EPA notes that this is consistent with the Carnaby's Cockatoo Recovery Plan (Department of Parks and Wildlife 2013), and has recommended condition 6-2(4) accordingly.

To minimise the potential indirect impacts to black cockatoos from the introduction or spread of dieback to susceptible vegetation, the EPA has recommended condition 8-2(1) requiring the proponent to manage and minimise the spread of dieback through best practice hygiene management.

To minimise impacts to nesting birds during construction, the EPA has recommended condition 6-1 requiring pre-clearing surveys to confirm if hollows are in use, and if so, prohibit clearing of any active nesting-trees. The proponent will also be required to demarcate any active nesting-trees and apply an appropriate clearing buffer until the end of the breeding season and the cockatoos have naturally completed nesting (young have fledged and dispersed).

Aquatic fauna

The proposal intersects a number of aquatic ecosystems including creek lines, wetlands and rivers. Impacts to aquatic ecosystems in the context of the EPA factor Inland Waters are discussed in Section 4.3, while potential impacts to two conservation significant aquatic fauna species, black stipe minnow and Carter's freshwater mussel, and associated aquatic habitats are outlined below.

Black stripe minnow

Black stripe minnow (Endangered) is a small freshwater fish restricted to ephemeral, acidic wetlands and endemic to the south west (Ogston *et. al.* 2016[7]). The species

[7] https://research-repository.uwa.edu.au/en/publications/living-on-burrowed-time-aestivating-fishes-in-south-western-austr

has a relatively short life-cycle (12 months), breeding between June to September and annually aestivates underground during dry periods. The fish emerges with the first seasonal rains and is known to disperse in years of high rainfall (Threatened Species Scientific Committee 2018a).

There are a number of key threatening processes for the species. These include but are not limited to climate change, reduced rainfall and drying of habitats, and habitat modification and loss through filling and draining of wetlands for urban and/or industrial development (Threatened Species Scientific Committee 2018a).

The proponent's targeted surveys recorded the species within wetlands with intact riparian vegetation within the proposal area. A single black stripe minnow individual was found at the southern end of the development envelope and two other occurrences were found downstream of the envelope near Manea Park (WRM 2020).

The EPA notes that the proposal would result in direct loss of 0.55 ha of black stripe minnow habitat and potential loss of individuals. The EPA considers that this impact is unlikely to have a significant impact at a regional level because 0.55 ha of direct loss is relatively small, only one individual was located within the development envelope during the proponent's surveys, and the species is short-lived after spawning.

Given the black stripe minnow requires moist ground during the dry season to aestivate and disperses following rainfall it is particularly susceptible to habitat drying. The proposal has the potential to indirectly impact wetland habitat by changing hydrological regimes and fragmenting the north-south habitat connection.

The proponent has designed the proposal to maintain hydrological regimes to black stripe minnow habitat by installing drainage infrastructure such as culverts to facilitate water movement and maintain pre-development flows to wetland habitat areas.

In addition to changes in regimes, the black stripe minnow is sensitive to decreases in water quality that could occur from earth movement during road construction. The EPA notes that the proponent intends to minimise indirect impacts to water quality by:

- undertaking majority of the construction near black stripe minnow habitat during the dry months when the fish is dormant
- implementing erosion and sediment control measures during construction
- implementing measures to avoid, minimise and manage accidental hydrocarbon release, spill response and potential acid sulfate soil exposure.

In recognition of the potential risk of impacts to black stripe minnow being manageable, the EPA has recommended condition 9-1(1) requiring hydrological regimes to be maintained to ensure no indirect impacts to the species (Figure 3). Further discussion about hydrological regimes is also outlined in Section 4.3 Inland Waters.

Carter's freshwater mussel

Carter's freshwater mussel (Vulnerable) is endemic to the south west and known to live in freshwater with greatest densities found under overhanging riparian vegetation near stream banks (Threatened Species Scientific Committee 2018b). Key threatening processes causing a decline of the species are predominately salinity and habitat degradation or direct loss. The proponent's surveys identified two occurrences of Carter's freshwater mussel within the development envelope and several occurrences in the close vicinity outside of the development envelope.

The EPA notes that direct impacts or relocation of Carter's freshwater mussel is not expected. To avoid and minimise impacts, the EPA has recommended condition 9-2 which requires the proponent to:

- not construct bridge footings, drainage structures and abutments within the Collie, Ferguson or Preston Rivers
- survey suitable habitat areas prior to commencing construction of bridges, clearing of riparian vegetation or earthworks near or on the Collie, Ferguson and Preston Rivers
- where Carter's freshwater mussel is found, submit a report with the number of individuals found and actions to manage impacts prior to and during construction to inform the required authorisation under the BC Act.

Implementation of the proposal may however result in indirect impacts during construction of bridges over the Collie, Preston and Ferguson Rivers and other smaller watercourses within the development envelope.

Activities such as clearing of riparian vegetation and erosion from construction earthworks could result in destabilisation of riverbanks and/or suspension of sediments in the water column. Disturbed sediments may decline water quality below the species' habitat requirements, or smothering could occur. The Carter's freshwater mussel may be indirectly impacted from altered surface water regimes from road construction, and potential acid sulphate soil exposure or accidental hydrocarbon release into the environment. The EPA considers that the indirect impacts from these activities are manageable subject to proven and feasible management measures.

The EPA has recommended condition 9-1(2) to ensure there are no indirect impacts to Carter's freshwater mussel in Figure 4.

Having reviewed the proponent's avoidance and minimisation of impacts, the EPA considers that significant residual impacts to Terrestrial Fauna remains due to the unavoidable loss of threatened fauna habitat. This is particularly the case for the western ringtail possum, brush-tailed phascogale and black cockatoos. The EPA's consideration of offsets to counterbalance significant residual impacts is set out in Section 5 of this report.

Figure 3: Black stipe minnow habitat

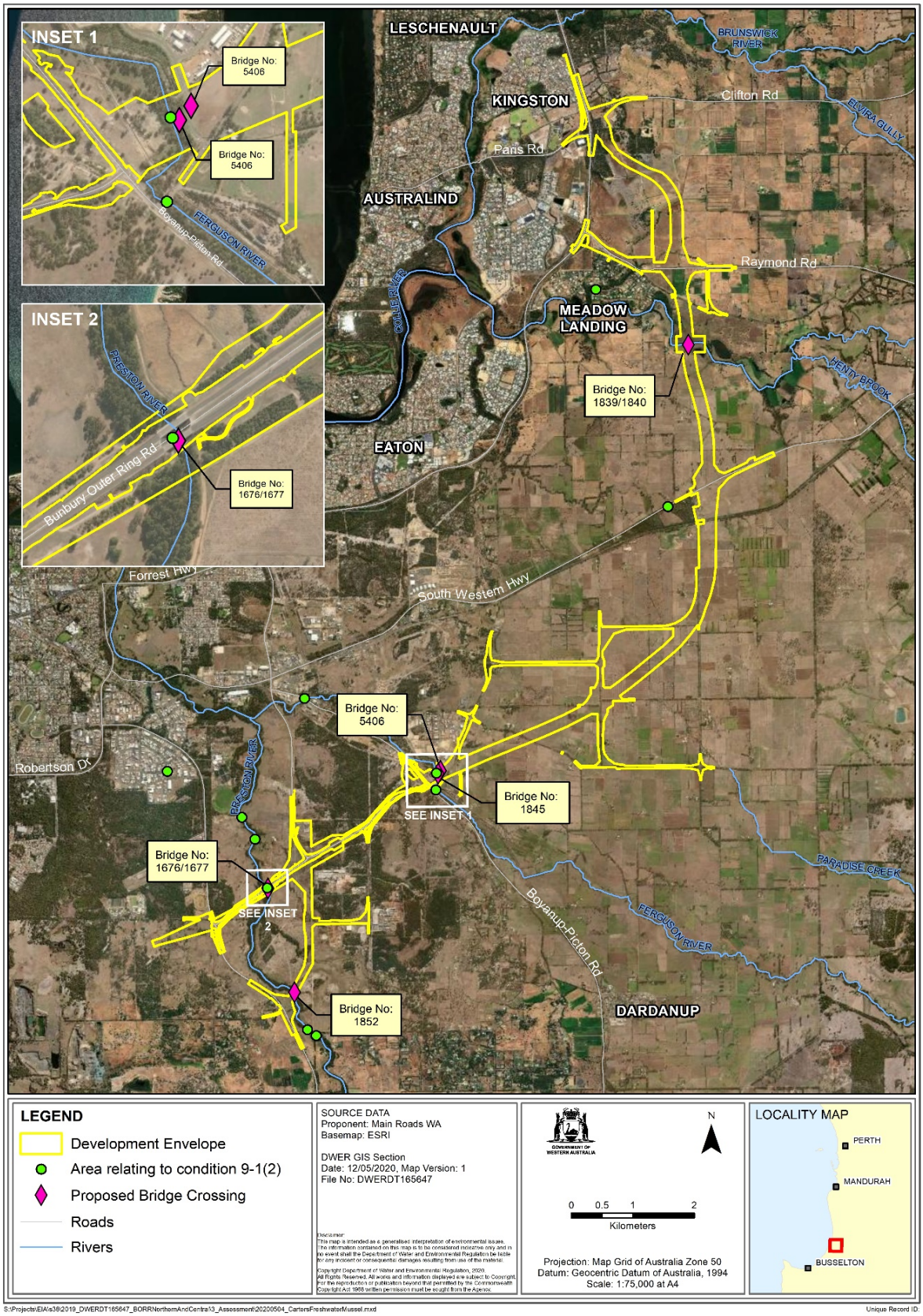

Figure 4: Carter's freshwater mussel habitat

Summary

The EPA has paid particular attention to:

- *Environmental Factor Guideline – Terrestrial Fauna* (EPA 2016c)
- *WA Environmental Offsets Policy* (2011) and *WA Environmental Offset Guidelines* (2014)
- the proponent's proposed avoidance, mitigation and management measures to ensure impacts to terrestrial fauna would be minimised
- the scale and extent of unavoidable impacts to threatened fauna habitats, particularly for the western ringtail possum, brush-tailed phascogale and black cockatoos
- the fragmentation of western ringtail possum habitat and the proponent's proposed fauna crossing structures as the proposed mitigation strategy
- the potential impact on western ringtail possum densities in fragmented habitat and potential impact of overcrowding
- the small scale of potential impacts to Carter's freshwater mussel and black stipe minnow.

The EPA considers, having regard to the relevant EP Act principles and environmental objective for Terrestrial Fauna that the impacts to this factor are manageable and would no longer be significant, provided there is:

- control through authorised extent in Schedule 1 of the Recommended Environmental Conditions (Appendix 4)
- implementation of condition 6 to ensure that potential impacts to terrestrial fauna are avoided and minimised prior to and during construction
- implementation of condition 7 requiring the proponent meet the environmental objective of ensuring no project attributable effects on the viability of the local population of western ringtail possum in habitat areas adjacent to and outside the development envelope
- implementation of condition 9 to manage potential impacts to Carter's freshwater mussel and maintain hydrological regimes and water quality in aquatic fauna habitats for black stripe minnow and Carter's freshwater mussel
- implementation of offsets (see section 5, condition 11) to counterbalance the significant residual impact of 43.9 ha of western ringtail possum habitat loss (inclusive of 17.6 ha of brush-tailed phascogale habitat loss), and 37.8 ha of black cockatoo habitat loss.

4.2. Flora and Vegetation

The EPA's environmental objective for this factor is *to protect flora and vegetation so that biological diversity and ecological integrity are maintained.*

Relevant policy and guidance

The EPA considers the following current environmental policy and guidance is relevant to its assessment of the proposal for this factor:

- *Environmental Factor Guideline – Flora and Vegetation* (EPA 2016a)
- *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016d)
- *WA Environmental Offsets Policy* (Government of Western Australia 2011)
- *WA Environmental Offsets Guidelines* (Government of Western Australia 2014).

The considerations for environmental impact assessment for this factor are outlined in *Environmental Factor Guideline – Flora and Vegetation* (EPA 2016a).

In addition to the relevant current policy and guidance above, the EPA also had regard to the:

- *Approved Conservation Advice for Clay Pans of the Swan Coastal Plain* (Department of Sustainability, Environment, Water, Population and Communities 2012)
- *Commonwealth Listing Advice on Clay Pans of the Swan Coastal Plain* (Threatened Species Scientific Committee 2012)
- *National Recovery Plan for the Clay Pans of the Swan Coastal Plain Ecological Community* (DBCA 2019)
- *Approved Conservation Advice for Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrublands *of the Swan Coastal Plain* (Department of the Environment and Energy 2017)
- *Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrublands Interim Recovery Plan 2000-2003 (Department of Conservation and Land Management 2000)
- Management of *Phytophthora cinnamomi* for Biodiversity Conservation in Australia: Part 2 - National Best Practice Guidelines (O'Gara *et. al.* 2005).

EPA assessment

The EPA considers that the information provided in the proponent's Referral information (BORR Team 2019), Additional Information (BORR Team 2020a) and Response to Submissions (BORR Team 2020b) is sufficient to enable its assessment of flora and vegetation for this proposal.

Consistent with the *Environmental Factor Guideline – Flora and Vegetation* (EPA 2016a), the EPA has considered the potential direct and indirect impacts, cumulative impacts and risks to flora and vegetation.

Numerous flora and vegetation surveys have been undertaken within, or relevant to, the proposal area. Table 4-1 of the proponent's Additional Information (BORR Team 2020a) lists twelve studies and surveys commissioned for flora and vegetation that are relevant to the proposal. A detailed flora and vegetation survey for the proposal was undertaken in August, September and November 2018 and covered approximately 1,128 ha (BORR Team 2020a). The 625 ha proposal development envelope was contained within this wider survey area. Additional targeted surveys for conservation significant flora and vegetation were completed.

The EPA considers that the flora and vegetation surveys are mostly consistent with *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016d) and provide sufficient detail to allow the EPA to undertake its assessment. The extensive clearing along the majority of the alignment did not warrant the undertaking of biological surveys beyond the proposed development envelope in most areas. The EPA notes that during the assessment, the proponent completed further targeted surveys to confirm the occurrence of, and impact on, TEC and PEC vegetation from the proposal.

Existing environment

The development envelope has been extensively cleared and highly modified for agriculture with less than 15 per cent native vegetation remaining within a 625 ha area. The native vegetation occurs within narrow road reserves, as isolated patches on private land or within the riparian zones of the Collie, Ferguson and Preston Rivers.

Twenty-five vegetation types, as well as cleared areas, planted vegetation and rehabilitated areas were identified and described for the survey area. The 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. The majority of the survey area vegetation condition was rated as 'Degraded to Completely Degraded' (93.2 per cent), 'Very Good to Excellent' (0.12 per cent) and 'Good' (4.88 per cent).

Three conservation significant ecological communities were identified in the development envelope; two State TECs and one PEC (refer Table 3).

Table 3: Significant ecological communities in the development envelope

Floristic Community Type (FCT)	Current known extent remaining	Extent within proposal survey area (ha)	Extent within development envelope (ha)	State listing; EPBC Act listing
Herb rich shrublands in clay pans TEC (FCT08)	132[1]	1	0.63	Vulnerable (B); Critically Endangered (Clay pans of the Swan Coastal Plain TEC)

Floristic Community Type (FCT)	Current known extent remaining	Extent within proposal survey area (ha)	Extent within development envelope (ha)	State listing; EPBC Act listing
Corymbia calophylla – Xanthorrhoea preissii woodlands and shrublands of the SCP TEC (FCT3c)	115[2]	2.1	1.3	Critically Endangered (B ii); Endangered
Banksia dominated woodlands of the SCP IBRA Region PEC	336,489[3]	25[4]	3.7	Priority 3 (iii), Endangered (Banksia woodlands of the SCP TEC)

1. Regional level (SCP) (Ecoedge, 2019b)
2. Regional level (SCP) from *Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrublands of the SCP Conservation Advice (DEE, 2017)
3. Regional level (SCP) from Banksia Woodlands of the SCP TEC Conservation Advice (DEE, 2016)
4. 14 ha aligns with Banksia Woodlands of the SCP EPBC Act TEC

There are multiple occurrences where the TECs and PEC intersect the development envelope (Figure 5). Much of the northern and southern extent of the survey area is mapped as Banksia woodlands PEC or its buffer area (typically a 500 metre area surrounding the community). The remaining two TECs (FCT08 and FCT3c) are restricted to scattered patches in the central and southern extent of the survey area.

The survey area traverses a number of rivers, small drainage lines, as well as seasonally inundated areas (wetlands) that support riparian vegetation. Vegetation type 11 (Open Forest of *Corymbia calophylla* and *Eucalyptus rudis* over *Agonis flexuosa*) which occurs as a fringe along the Preston River, is an example of a riverine community that has largely disappeared on the southern Swan Coastal Plain and is regionally significant (BORR Team 2019). Of the 1.6 ha of this vegetation type within the development envelope, 1.5 ha was rated as 'Good to Degraded' and 0.1 ha 'Degraded to Completely Degraded'. About 41 ha of vegetation associated with a watercourse and/or wetland (excluding vegetation type 11) was identified in the development envelope, of this 36 ha was mapped as 'Degraded or Completely Degraded'.

Surveys in the proposal area recorded 414 flora species, comprising 299 native species and 115 introduced / planted flora species. Five species are listed as Declared Pests under the *Biosecurity and Management Act 2007* and/or as Weeds of National Significance. No EPBC Act or BC Act listed flora were recorded from field surveys within the development envelope. However, five Priority-listed flora species were recorded.

Potential impacts

The proposal would directly impact on flora and vegetation through the clearing of up to 92 ha of native vegetation (or 15 per cent) within the 625 ha development envelope. This includes 73 ha of native vegetation and 19 ha of revegetation. An estimated 5.6 ha of this vegetation comprises vegetation representative of TECs and/or PEC.

Based on the results of the surveys and the presence of species likely to occur, the EPA considers the potential significant impacts to conservation significant flora and communities from the proposal are:

- clearing of up to 0.63 ha of vegetation representative of the Herb rich shrubland in clay pans TEC (FCT08)
- clearing of up to 1.3 ha of vegetation representative of *Corymbia calophylla* – *Xanthorrhoea preissii* woodlands and shrublands of the Swan Coastal Plain TEC (FCT3c).
- clearing of up to 3.7 ha of vegetation representative of the Banksia dominated woodlands of the Swan Coastal Plain IBRA region PEC.

The proposal also has the potential to indirectly impact on flora and vegetation through:

- fragmentation of native vegetation and edge effects
- changes to vegetation structure in surrounding areas
- the introduction and spread of weeds and disease, including dieback (*Phytophthora cinnamomi*)
- increased fire risk and changes to fire regimes
- increased dust emissions during construction
- alteration of hydrological processes.

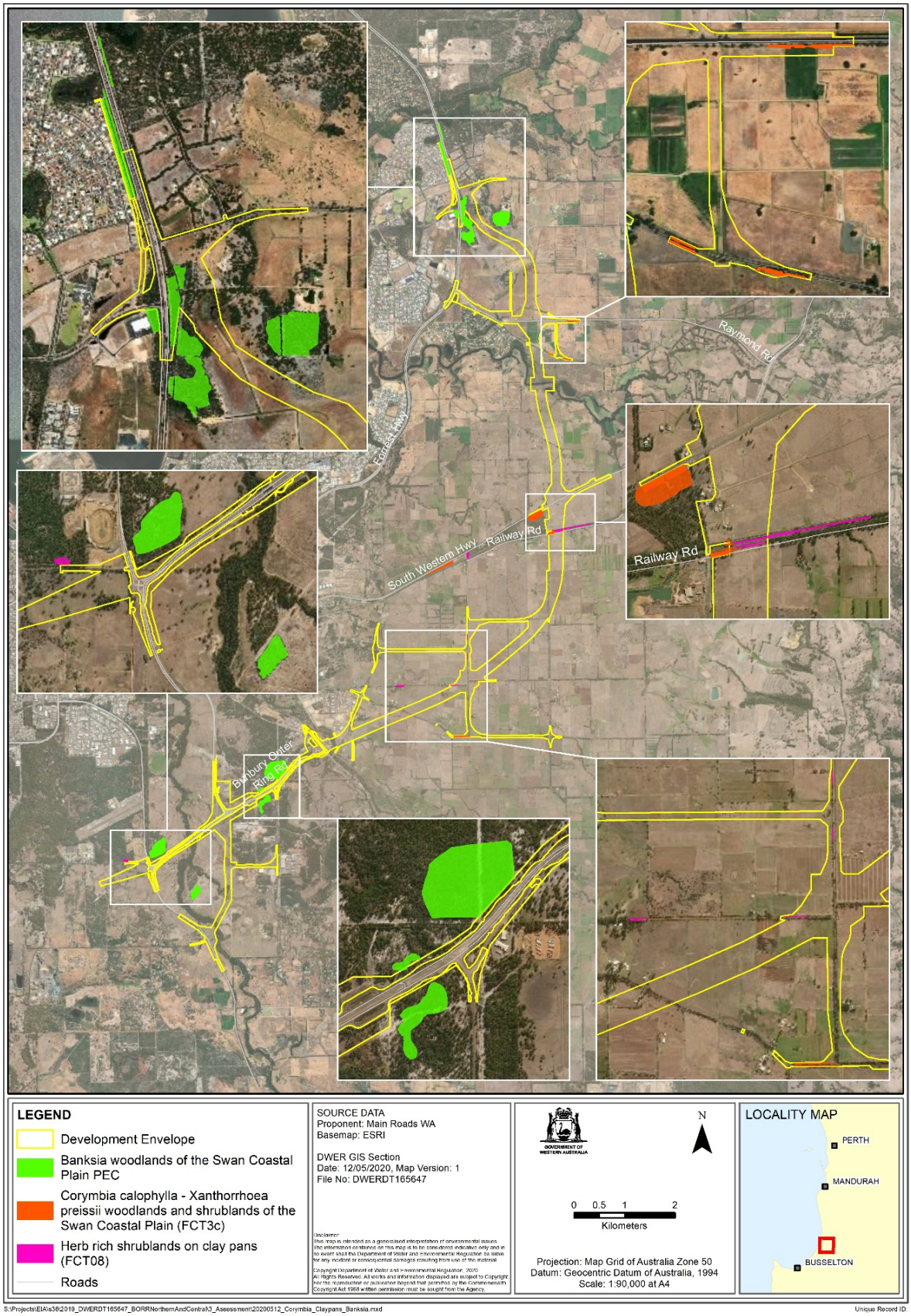

Figure 5: TEC and PEC occurrences

Mitigation and management

The EPA notes that in designing the proposal, the proponent has applied the mitigation hierarchy, in accordance with the *Environmental Factor Guideline – Flora and Vegetation* (EPA 2016a).

The proponent has invested considerable effort in site design and layout to optimise the proposal areas to minimise environmental impact, including:

- amending the alignment to reduce the area of native vegetation cleared
- reducing median widths where the alignment is on high fill embankments
- changes to interchanges to reduce impacts such as fragmentation
- increasing batter slope (gradients) and using retaining walls to reduce the area of clearing required
- designing bridges to avoid the need for piers or abutments within watercourses
- moving the principal shared path in closer to the highway to reduce the project footprint
- designing drainage to maintain hydrological regimes.

The proponent has proposed to minimise impacts to conservation significant flora and vegetation through the following mitigation and management measures:

- developing a Hygiene Management Plan to prevent the spread of dieback and weeds to adjacent vegetation
- infestations of Declared Plants and Weeds of National Significance within the proposal area and in adjacent TEC/PEC vegetation to be removed and treated with herbicide prior to construction and post construction
- clearing activities to occur during the dry months to reduce the risk of spreading dieback
- developing a Topsoil Management Plan and a Fire Management Plan
- installing low impact temporary fencing to TEC/PEC vegetation areas during active construction
- restricting machinery and vehicles to cleared areas or designated tracks
- maintaining existing hydrology for adjacent sites that could be indirectly impacted
- rehabilitating and revegetating using suitable native species in any areas disturbed during construction but not required for road and associated infrastructure
- monitoring programs provided to be implemented for the TEC/PEC vegetation, including at reference sites.

Assessment of impacts

Clearing of native vegetation

The proposal would result in the clearing of 92 ha of native vegetation within a 625 ha development envelope. The EPA acknowledges that the proponent has modified

the proposal throughout the assessment, reducing the development envelope by 26 ha. The extent of native vegetation to be cleared was reduced from 119.3 ha to 92 ha. This includes the clearing of up to 73 ha of vegetation and 19 ha of revegetation (15 per cent in total).

The EPA notes that the proposal is located in an area that has been extensively cleared and highly modified for agriculture with native vegetation remaining within narrow road reserves, as isolated patches on private land or within the riparian zones of the Collie, Ferguson and Preston Rivers.

Herb rich shrublands in clay pans TEC (FCT08)

The clay pans Commonwealth TEC (listed as Critically Endangered under the EPBC Act) corresponds to five separate State defined Floristic Community Types (FCTs). Implementation of the proposal would directly impact up to 0.63 ha of one of these FCTs, the Herb rich shrublands in clay pans TEC (FCT08), which is listed as Vulnerable under the BC Act, and occurs at three sites within the development envelope.

The *National Recovery Plan for the Clay pans of the Swan Coastal Plain Ecological Community* (DBCA 2019) identifies 114 occurrences of FCT08 in 50 separate locations that occupy a total of about 909 ha. FCT08 is highly fragmented, with about 60 per cent of occurrences under 10 ha in size. The Recovery Plan (DBCA 2019) estimates the total area of FCT08 remaining on the Swan Coastal Plain to be 298.1 ha, with 116.6 ha within conservation reserves.

The proponent completed an analysis of the data presented in the Recovery Plan (DBCA 2019) in consultation with the DBCA. Additional field surveys of potential clay pan TEC sites within and near the development envelope were also conducted during the assessment (Ecoedge 2019a). The field surveys identified three new occurrences, resulting in the addition of 1.7 ha to the known extent of FCT08. Based on the analysis of data and surveys undertaken, the proponent estimated that the extent of FCT08 remaining in the greater Bunbury region (defined as the Swan Coastal Plain within Harvey, Bunbury, Capel, Dardanup and Busselton local government areas) is 132 ha (Ecoedge 2019b).

Using the Ecoedge (2019b) assessment, the EPA notes that the clearing of up to 0.63 ha of FCT08 from the proposal would result in a 0.21 per cent reduction in the reported extent of the TEC on the Swan Coastal Plain. At the greater Bunbury region scale, this represents a reduction of up to 0.48 per cent. Of this, 0.58 ha was rated as in ‘Good or Better’ condition.

The EPA recognises that further habitat loss, disturbance and modification to this Vulnerable TEC should be avoided if possible and mitigated as far as practicable. The EPA is of the view that the proponent has made reasonable efforts to avoid impacts to FCT08 occurrences present in the survey area and has proposed adequate measures to minimise impacts. The EPA considers that the loss of 0.63 ha will have a small incremental impact on the regional extent of FCT08. Given the cumulative impacts that have occurred on the TEC to date, the EPA considers that a significant residual impact remains, and the proponent should provide an offset to counterbalance this impact. Offsets are discussed further in Section 5.

Corymbia calophylla – Xanthorrhoea preissii woodlands and shrublands of the Swan Coastal Plain TEC (FCT3c)

The *Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrublands of the Swan Coastal Plain TEC (FCT3c) is listed as Endangered under the EPBC Act and Critically Endangered under the BC Act. Implementation of the proposal would directly impact up to 1.3 ha of FCT3c at four sites within the development envelope.

Because of its very restricted distribution, no condition thresholds have been applied to the nationally listed ecological community and hence all areas meeting the description of the ecological community are habitat areas critical to its survival (DoEE 2017).

The Approved Conservation Advice for *Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrublands *of the Swan Coastal Plain* (DoEE 2017) identifies 29 occurrences of this community totalling about 115 ha between Bullsbrook and Capel. The EPA notes that the clearing of up to 1.3 ha of FCT3c from the proposal would result in a 1.1 per cent reduction in the reported extent of the TEC on the Swan Coastal Plain. Of this, 0.05 ha was rated as in 'Good or Better' condition (vegetation recorded at Railway Road site).

The EPA notes advice from the DBCA that the known mapped extent of FCT3c in the South West Region is currently 12 ha. The loss of 1.3 ha of FCT3c equates to a loss of 10.8 per cent in the South West Region. The EPA notes that the majority of impacts to this community from the proposal are to narrow, degraded remnants. The exception is the 0.05 ha occurrence in the development envelope (Railway Road site) which is part of a larger, relatively intact 0.15 ha remnant that is adjacent to the railway line. Removal of this occurrence would result in fragmentation of the existing vegetation within the rail reserve.

The proponent has advised the EPA that it has modified the proposal several times to avoid as many direct and indirect impacts to FCT3c as possible, and that the impact to the 0.05 ha occurrence of FCT3c at Railway Road cannot be avoided. The proponent has advised that it will attempt to further refine impacts to FCT3c TEC vegetation through its detailed design process. The proponent is of the view that the proposed clearing of this TEC would not impact it to the extent that persistence of the community as a whole is at risk.

The EPA recognises that further habitat loss, disturbance and modification to this Critically Endangered TEC should be avoided if possible and mitigated as far as practicable. The EPA is of the view that the proponent has made a reasonable effort to avoid impacts to the TEC present in the survey area, and has proposed adequate measures to minimise impacts. The EPA considers that the loss of 1.3 ha will have a small incremental impact on the regional extent of this community. Given the cumulative impacts that have occurred in the TEC to date, the EPA considers that a significant residual impact remains, and that the proponent should provide an offset to counterbalance this impact. Offsets are discussed further in Section 5.

Banksia dominated woodlands of the Swan Coastal Plain IBRA region PEC

The Banksia dominated woodlands of the Swan Coastal Plain IBRA region (referred to as the Banksia woodlands PEC) is a State listed as a PEC. The proposal would directly impact on 3.7 ha of vegetation representative of this PEC, of which 2.1 ha was rated as in 'Good or better' condition. The EPA notes that proponent surveys have identified that the extent of the PEC within the proposal development envelope (3.7 ha) also meets the criteria for the EPBC Act listed (Endangered) Banksia dominated woodlands of the SCP TEC.

The proponent has used the current known extent of the Banksia woodlands TEC as a proxy for the Banksia woodlands PEC, as current extent figures for the PEC are not available. The EPA recognises that the Banksia woodlands PEC is more prevalent than the Banksia woodlands TEC. The EPA notes that implementation of the proposal would result in the loss of 0.001 per cent of the known mapped extent of the PEC on the Swan Coastal Plain. At the Perth subregion scale, this would represent a reduction of up to 0.0045 per cent.

The EPA notes that the loss of 3.7 ha of the Banksia woodlands PEC for the Northern and Central Sections contributes to the decline in the geographic distribution of the community and reduces the size of the remaining occurrences. The EPA recognises that while the areas to be cleared represent a small portion of the Banksia woodlands PEC on a regional scale, clearing and construction activities may introduce an increased risk from indirect impacts to larger occurrences and the remaining extent.

The EPA considers that the loss of 3.7 ha will have a small incremental impact on the regional extent of this community. Given the cumulative impacts that have occurred to the PEC to date, the EPA considers that a significant residual impact still remains and the proponent should provide an offset to counterbalance this impact. Offsets are discussed further in Section 5.

Other significant vegetation

The proposal will directly impact up to 1.6 ha of riparian vegetation associated with the Preston River that has a restricted distribution. The EPA notes that the condition of the vegetation was rated as 'Good to Degraded' (1.5 ha) and 'Degraded to Completely Degraded' (0.1 ha). The proposal will also directly impact approximately 5 ha of other (not associated with the Preston River) riparian or wetland vegetation.

The EPA acknowledges that the proponent intends to maintain hydrological flow regimes through detailed drainage design as part of its proposal specific Construction Environmental Management Plan. This would minimise any further impacts to riparian vegetation. Further discussion is provided in Section 4.3 Inland Waters of this report.

Flora

The EPA notes that no conservation significant flora listed under the BC Act has been identified in the development envelope. The proponent has estimated impacts to the Priority species using FloraBase records, with impacts to the species'

populations ranging from 0.02 per cent to 8.9 per cent. The EPA notes that this method is likely to underestimate the potential impacts to the populations.

The EPA notes that the species to be impacted have relatively wide distributions, and given the small number to be impacted, is of the view that potential impacts associated with the proposal are not considered significant at a local or regional scale.

Indirect impacts

Potential indirect impacts to conservation significant vegetation adjacent, or within close proximity, to the proposal include:

- weed invasion
- introduction of disease (*Phytophthora* dieback)
- altered fire regimes
- hydrological changes.

The EPA notes that 113 introduced flora taxa were recorded in the survey area with four Declared Pests and/or weeds of National Significance. The EPA also notes that a *Phytophthora* dieback assessment was undertaken for the proposal area consistent with DBCA guidelines (DBCA 2015) and identified:

- the presence of the disease throughout most of the low-lying wetlands with some limited spread into elevated areas
- several areas of vegetation have been classified as uninfested
- significant areas of vegetation were also classified as uninterpretable.

The EPA supports the proponent's proposed management of weeds and disease through the development of a Hygiene Management Plan, and commitment to manage weeds prior to, and post construction within the proposal area and in adjacent native vegetation.

The EPA is of the view that indirect impacts from weeds and disease to native vegetation adjacent, or within close proximity, to the development envelope can be managed to meet the EPA's objective for Flora and Vegetation and ensure the future viability of nearby occurrences of vegetation. The EPA has recommended condition 8 to ensure there are no project attributable indirect impacts from weeds or disease within 20 metres of the development envelope.

The EPA notes that hydrologically, the Herb rich shrublands in clay pans (FCT08) and the *Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrublands of the Swan Coastal Plain (FCT3c) TEC vegetation is reliant on rainfall and infiltrating overland flows rather than groundwater. Any change to hydrological functioning of these communities is likely to significantly alter it. The EPA considers that adequate management of the natural hydrological regimes is therefore critical for any of these TECs adjacent, or within close proximity to, the development envelope.

The EPA acknowledges that the proponent is proposing to manage the adjacent, or nearby occurrences of FCT08 and FCT3c TEC vegetation through a combination of visual assessments and data collected from monitoring wells. The EPA has recommended condition 9-1(3) to ensure there are no project attributable indirect impacts from changes in the hydrological regime or water quality within the FCT08 and FCT3c TEC areas adjacent, or within close proximity, to the development envelope. The EPA has also recommended that the proponent undertake baseline and post construction monitoring annually to confirm that the hydrological regimes and water quality are being maintained.

Summary

The EPA has paid particular attention to the:

- *Environmental Factor Guideline – Flora and Vegetation* (EPA 2016a)
- *WA Environmental Offsets Policy* (2011) and *WA Environmental Offset Guidelines* (2014)
- proponent's changes to the proposal to ensure direct impacts to conservation significant vegetation were minimised as far a practical
- proposed direct impact of up to 0.63 ha of vegetation representative of the Herb rich shrubland in clay pans TEC (FCT08)
- proposed direct impact of up to 1.3 ha of vegetation representative of *Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrublands of the Swan Coastal Plain TEC (FCT3c)
- proposed direct impact of up to 3.7 ha of vegetation representative of Banksia woodlands on the Swan Coastal Plain PEC
- potential indirect impacts from the spread of weeds, introduction of disease and altered hydrological regimes to conservation significant vegetation
- proponent's proposed impact avoidance, mitigation and proposed management measures to ensure direct impacts to vegetation were minimised as far as practical.

The EPA considers, having regard to the relevant EP Act principles and environmental objective for Flora and Vegetation that the impacts to this factor are manageable and would no longer be significant, provided there is:

- control through authorised extent in Schedule 1 of the Recommended Environmental Conditions (Appendix 4)
- implementation of condition 8 to ensure that indirect impacts from weeds and dieback to areas of adjacent native vegetation are managed appropriately
- implementation of condition 9-1(3) to ensure that the hydrological regimes of adjacent TECs are maintained and managed appropriately
- implementation of offsets (see section 5, condition 11) to counterbalance the significant residual impact to 0.63 ha of the Herb rich shrubland in clay pans TEC (FCT08), 1.3 ha of the *Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrublands of the Swan Coastal Plain TEC (FCT3c) and 3.7 ha of the Banksia woodlands on the Swan Coastal Plain PEC.

4.3. Inland Waters

The EPA's environmental objective for this factor is *to maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected.*

Relevant policy and guidance

The EPA considers the following current environmental policy and guidance is relevant to its assessment of the proposal for this factor:

- *Environmental Factor Guideline – Inland Waters* (EPA 2018)
- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (Water Quality Guidelines 2018)
- *Contaminated Sites Guidelines: Assessment and Management of Contaminated Sites* (DER 2014)

The considerations for environmental impact assessment for this factor are outlined in *Environmental Factor Guideline – Inland Waters* (EPA 2018).

In addition to the relevant current policy and guidance above, the EPA also had regard to the:

- *Stormwater decision process for Western Australia* (DWER 2019).

EPA assessment

The EPA considers that the information provided in the proponent's Referral Information (BORR Team 2019) is sufficient to enable its assessment of Inland Waters for this proposal.

Consistent with the *Environmental Factor Guideline – Inland Waters* (EPA 2018), the EPA has considered the potential direct and indirect impacts, cumulative impacts and risks to inland waters.

Several studies have been undertaken within, or relevant to, the development envelope and utilised by the proponent to describe the receiving environment within the proposal area and to inform the design of the proposal. This includes measuring groundwater and surface water quality, flood modelling for the major waterways, and drainage assessment. Table 4-2 of the proponent's Referral Information (BORR Team 2019) identifies the studies that have been undertaken.

Existing environment

The proposal is within the Bunbury groundwater area and is intercepted by Brunswick River (adjacent to the proposal at its northern extent), Collie River, Leschenault Estuary and Preston River.

There are no Ramsar listed or Nationally Important wetlands within or close to the development envelope. However, about 89 per cent (578 ha) of the development envelope is mapped as 35 intersecting geomorphic wetlands. These include six

Conservation Category Wetlands totalling 2.93 ha (0.5 per cent of the development envelope), two Resource Enhancement wetlands totalling 0.77 ha (0.1 per cent of the development envelope), with the remainder Multiple Use wetlands totalling 573.78 ha (88.2 per cent of the development envelope).

The proponent mapped about 41 ha of vegetation associated with these wetlands, with 0.1 ha considered in 'Good' condition and 5.1 ha considered in 'Good to Degraded' condition. The remainder is considered in a 'Degraded to Completely Degraded' condition (BORR Team 2019). Vegetation associated with the Preston River is excluded from these totals and was discussed in section 4.2.

Potential impacts

The proposal would potentially impact on inland waters during road and bridge construction and during operation from the following:

- temporary abstraction of groundwater for construction activities (dust suppression, dewatering bridge footings)
- impact on riverbeds and banks
- increase in upstream water levels at proposed bridge sites
- erosion and sedimentation in surrounding areas
- contamination of surface water and/or groundwater
- potential changes to hydrological regimes and water quality of Geomorphic Wetlands and waterways and consequential impacts to aquatic fauna habitat and TECs.

Mitigation and management

The EPA notes that in designing the proposal, the proponent has applied the mitigation hierarchy, in accordance with the *Environmental Factor Guideline – Inland Waters* (EPA 2018).

The proponent states that the potential impacts from construction and operation will be further minimised during the detailed design phase and implementation of relevant environmental management plans, which will include the following:

- detailed design of a transverse drainage system to maintain the hydrological processes of the proposal area and to minimise drainage shadow effects on surrounding wetlands, waterways, vegetation and agricultural properties
- detailed design to maintain fish passage (black-stripe minnow) under the constructed road between Geomorphic Wetlands within and adjacent to the proposal area
- management of erosion, sedimentation and spills during operation consistent with the Drainage Strategy and Major Waterways Assessment that were prepared for the proposal
- implementation of a Construction Environmental Management Plan to ensure no direct run-off, to manage erosion and sediment, for watercourse crossings to include erosion control, and a Rehabilitation and Landscape Plan so that roadsides and medians will be capable of acting as filters

- not constructing bridge footings within the Collie, Ferguson or Preston Rivers
- implementation of an Acid Sulfate Soils Management Plan
- establishment of baseline data for groundwater and surface water to determine water quality performance criteria followed by monitoring for evidence of erosion, run-off and daily surface water monitoring.

Assessment of impacts

Construction related impacts

The potential impacts resulting from the construction of the proposal are primarily from bridge construction and the direct loss of wetlands.

Bridge construction will require the clearing of riparian vegetation and excavations near riverbanks, which could potentially destabilise soils and result in riverbank collapse. This is likely to cause a decline in water quality downstream from increased sediment and turbidity. Bridge footings may also require dewatering, however further detailed design is required to determine drawdown requirements and construction methodology. The proponent will prepare a Dewatering Management Plan to identify and manage risks from dewatering once detailed designs are available.

The EPA notes that the proponent has minimised water quality impacts as far as practicable by removing bridge abutments and footings from the waterways. The EPA also notes that any dewatering program will be temporary and localised given the type of construction, and a licence will be required from the Department of Water and Environmental Regulation (DWER). The EPA therefore considers that the potential impacts resulting from dewatering are unlikely to have a significant effect.

The EPA also notes that permits and licences will be required for bridge construction and dewatering in accordance with the *Rights in Water and Irrigation Act 1914*. The DWER advised that a permit for bridge construction will provide advice, but not conditions, on managing risks to water quality during construction to avoid impacts to downstream users. Noting that Carter's freshwater mussel is found within the Collie, Ferguson and Preston Rivers near the proposal, the EPA is proposing condition 9-2(3) that ensures that bridge footings, drainage structures and abutments are not constructed within the Collie, Ferguson or Preston Rivers.

The EPA notes that the proposal will result in the direct loss of wetlands, including Conservation Category Wetlands. However, the EPA notes that vegetation condition across the development envelope was predominately considered degraded, with only 0.1 ha considered in 'Good' or better condition. The EPA also notes that the areas of direct impact for the affected wetlands occurs along wetland edges and does not fragment large consolidated areas. The proponent predicted cumulative loss of these wetlands at a regional scale, and all losses are less than 0.1 per cent of the relevant consanguineous wetland suite. The EPA therefore considers that the loss of 3.7 ha of Conservation Category and Resource Enhancement wetland unlikely to have a significant impact on the local or regional extents.

Operation related impacts

The potential impacts resulting from operation of the proposal is a change to the existing hydrological regimes, which has the potential to impact to affect TECs, threatened aquatic fauna and wetlands. These impacts are primarily a result of the road forming a barrier and preventing surface flows.

To assess and manage hydrological regimes and ensure appropriate drainage structures, the proponent has prepared a Drainage Strategy for the proposal. This involved a Drainage Reference Group to consider surface water drainage elements of the proposal. The DWER advised that this group considered a range of matters including water quality and where surface water discharged to waterways, wetlands and/or major drains. A range of mitigation mechanisms were implemented, consistent with the *Stormwater decision process for Western Australia* (DWER 2019), such the use of kerbs adjacent to high value water resources and roadside swales.

The hydrological regimes for major and minor drains was also assessed. The change in magnitude and duration of localised inundation resulting from both frequent and major events was assessed in more detail with the Shire of Dardanup, the Department of Planning Lands and Heritage, and the DWER. This resulted in the design of some areas being modified with increased culverts to reduce the impact. The EPA notes that the Drainage Strategy has in principle support from the DWER.

The proponent also undertook flood modelling to ensure the hydrological regimes for major rivers was maintained and backwater upstream was minimised. The DWER have advised that flood modelling for crossings for previous designs have been completed and approved. The DWER also advised that removal of the bridge abutments and piers from the waterways does not require the flood models to be rerun.

The EPA acknowledges that the proponent has undertaken considerable work to ensure that hydrological flow regimes will be maintained through detailed drainage design. However, the EPA also acknowledges that two TECs, two species of threatened aquatic fauna and wetlands adjacent, or within close proximity, to the proposal rely on the maintenance of water quality and hydrological regimes. The EPA notes that a targeted flora and vegetation assessment was undertaken by the proponent in the South Western Highway road reserve which is within the northern area of Resource Enhancement Wetland Unique ID 1708 (adjacent to the development envelope between South Western Highway and Railway Road). The proponent identified vegetation in this area as *Corymbia calophylla* – *Xanthorrhoea preissii* woodlands and shrublands of the Swan Coastal Plain TEC (FCT3c). The EPA notes that the entire area of Resource Enhancement wetland Unique ID 1708 has not been surveyed to determine flora and vegetation present. The DBCA have advised the EPA that the road reserve associated with the Dardanup-Waterloo road in this wetland area is also likely to contain further FCT3c TEC vegetation.

The EPA is therefore recommending condition 9-1 that requires the proponent to maintain the hydrological regimes and water quality in habitats that support the TEC, threatened aquatic fauna and Resource Enhancement wetland values. The EPA is also requiring conditions 9-2 to 9-4 that require drainage measures are implemented

to maintain hydrological regimes and that a baseline study and annual monitoring are required to demonstrate that hydrological regimes for the TECs and wetland identified are being maintained.

Summary

The EPA has paid particular attention to:

- *Environmental Factor Guideline – Inland Waters* (EPA 2018)
- the proponent's proposed avoidance, mitigation and management measures to ensure impacts to Inland Waters would be minimised
- the small scale of direct impacts to and the vegetation condition of Conservation Category and Resource Enhancement wetlands
- the measures within the Drainage Study to maintain hydrological regimes and water quality.

The EPA considers, having regard to the relevant EP Act principles and environmental objective for Inland Waters that the impacts to this factor are manageable and would no longer be significant, provided there is:

- control through authorised extent in schedule 1 of the Recommended Environmental Conditions (Appendix 4)
- implementation of condition 9-2(3) restricting the construction of bridge footings, drainage structures and abutments in the Collie, Ferguson and Preston Rivers
- implementation of conditions 9-2 to 9-4 that require management measures are implemented to maintain hydrological regimes and that a baseline study and annual monitoring are required to demonstrate that hydrological regimes required for the two TECs and one Resource Enhancement wetland are being maintained.

4.4. Social Surroundings (Noise)

The EPA's environmental objective for this factor is *to protect social surroundings from significant harm.*

Relevant EPA policy and guidance

The EPA considers that the following current environmental policy and guidance is relevant to its assessment of the proposal for this factor:

- *Environmental Factor Guideline – Social Surroundings* (EPA 2016b).

The considerations for environmental impact assessment for this factor are outlined in *Environmental Factor Guideline – Social Surroundings* (EPA 2016b).

In addition to the above, the EPA also had regard to the guidance in the Western Australian Planning Commission's State Planning Policy 5.4 – *Road and Rail Noise* (WAPC 2009) and the *Environmental Protection (Noise) Regulations 1997* (Noise Regulations).

EPA Assessment

Noise emissions have the potential to unreasonably interfere with the welfare, convenience and comfort of people. The proposal has the potential to impact nearby noise-sensitive premises and land uses during both construction and operation through construction generated noise and vibration and traffic noise. Noise-sensitive premises are those occupied for residential or accommodation purposes and are defined in the Noise Regulations.

The key issue is the potential impacts from traffic noise and is discussed below.

Traffic noise

The EPA notes that the Noise Regulations do not apply to traffic noise and hence has had regard to the guidance in the *Environmental Factor Guideline – Social Surroundings*. It has also had regard to the guidance in the Western Australian Planning Commission *State Planning Policy 5.4: Road and Rail Noise* (SPP 5.4). One of the objectives of SPP 5.4 is to protect the community from unreasonable levels of transport noise. This policy applies to proposed new major road projects as well as major redevelopments of existing roads in the vicinity of existing or future noise-sensitive land uses.

As the proposal is for both the upgrade of existing roads and the development of a new major road, the EPA had regard to the noise targets (for day and night) in Table 2 of SPP 5.4 which apply to both ‘New’ and ‘Upgrade’ road developments.

Existing environment

The proponent has identified 138 noise sensitive premises in rural and residential zoned areas as potentially being impacted by the proposal (Figure 13 in Appendix A of BORR Team 2020a).

The majority of the proposal is located in a rural setting where noise sensitive premises are isolated and consist of sparsely distributed single dwellings.

Other sections of the proposal involve the upgrade of existing roads near residential zoned areas including Kingston Estate (west of Forrest Highway) and Meadow Landing estate (south of Raymond Road). Currently, there are no noise walls in place for these areas.

The proponent has undertaken traffic noise monitoring at five residences near the proposal.

Potential impacts

The proponent has modelled and predicted noise levels for a current baseline scenario (using 2018 traffic and recent noise data) and into the future (2041) along proposed upgrades and new roads. Current noise levels from traffic have been measured and used to calibrate the noise modelling.

Based on the modelling outputs for the 2041 scenario, the proponent predicts that without any mitigation measures:

- Forty-nine residences near existing roads will experience noise levels above the SPP 5.4 noise targets that apply to upgraded roads. Forty of these potentially affected residences are in the Kingston area west of the existing Forrest Highway.
- Thirty-eight residences near new sections of road will experience noise levels above the SPP 5.4 noise targets that apply to new roads.

Mitigation and management

Traffic noise

The proponent has used the noise targets in SPP 5.4 for assessing the noise impact and determining the appropriate noise mitigation measures. As a result, the proponent has proposed noise mitigation measures for a total of 87 residences that will potentially be exposed to traffic noise level above the noise target in 2041. The measures include the construction of noise wall and/or applying architectural treatment packages to houses.

To reduce noise impacts to the residences in the Kingston area, the proponent is proposing to construct noise walls (2.5 to 3.8 metres high) along the western side of the Forrest Highway. The proponent commits to using high density perspex in the top section of the wall to ensure sunlight reaches gardens of adjacent residences. When the proposed upgrade and noise walls are included and modelled, all 40 affected residences in Kingston are predicted (in 2041) to be exposed to traffic noise levels below the SPP 5.4 noise targets relevant for upgraded roads.

The proponent has identified that the remaining potentially affected residences (47) are sparsely located single dwellings (Figures 16 and 17 in Appendix A of BORR Team 2020a). Due to the isolated nature of the affected residences in a rural setting, the proponent is proposing to apply architectural treatment packages consisting of measures such as upgraded glazing and mechanical ventilation (to allow windows to be kept closed). These measures are aimed at minimising impacts to the indoor noise amenity.

The specific architectural treatments packages will be determined for each individual residence following the completion of an acoustic treatment inspection. The proponent will discuss the standard of treatment with potentially impacted residences and the final measures will be determined for each individual house through the detailed design phase of the proposal.

The EPA notes that other measures applied by the proponent to minimise traffic noise impacts include the modifications to the design of interchanges to reduce traffic near residential areas. For road upgrades, the proponent proposes resurfacing of roads with low noise emission graded asphalt. There are also further opportunities to minimise noise by selecting appropriate bridge expansion joints during detailed design, particularly where bridges are located near residences.

The EPA expects proponents use best practice noise management to minimise impacts on amenity and meet the relevant noise targets in SPP 5.4. 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.

The EPA recommends that the proponent continue to consult with the community and residences near the proposal about the final dimensions and configurations of the noise walls and quiet-house design treatments and measures.

Construction noise

To address noise emissions during the construction of the proposal, the proponent will be developing a Construction Environmental Management Plan which will include detailed strategies to ensure the proposal complies with the requirements of the Noise Regulations.

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*. Any noise and vibration impacts would be localised and temporary during the construction phase. It notes that a noise management plan will need to be developed and submitted for approval to the Chief Executive Officer of the City of Bunbury, should work be planned outside of the permissible hours as required by Regulation 13 of the Noise Regulations. With appropriate management and mitigation measures, noise and vibration impacts are expected to be manageable and meet the requirements of the Noise Regulations. Potential measures include using equipment with low noise levels and maintaining noise control devices on construction equipment.

Summary

The EPA has paid particular attention to the:

- *Environmental Factor Guideline – Social Surroundings* (EPA 2016b)
- magnitude of predicted increase in traffic noise levels
- construction of noise walls to minimise noise emissions from current and future traffic
- application of acoustic treatments to houses to reduce impacts to indoor noise amenity, where relevant
- measures applied to the design of the proposal.

The EPA considers, having regard to the relevant EP Act principles and environmental objective for Social Surroundings that the impacts to this factor are manageable and would not be significant. This is provided the proponent prepares and implements a Traffic Noise Management Plan to ensure the proposal minimises operational noise impacts on existing noise sensitive receptors, as far as practicable, as set out in recommended condition 10-2 (Appendix 4).

5. Offsets

Relevant policy and guidance

The EPA considers the following policy and guidance is relevant to its assessment of offsets for the proposal:

- *WA Environmental Offsets Policy* (Government of Western Australia 2011)
- *WA Environmental Offset Guidelines* (Government of Western Australia 2014)
- *Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual* (EPA 2020b).

EPA Assessment

Environmental offsets are actions that provide environmental benefits which counterbalance the significant residual impacts of a proposal. The EPA may apply environmental offsets where it determines that a proposal's residual impacts are significant, after avoidance, minimisation and rehabilitation have been pursued.

Consistent with Principle 1 of the *WA Environmental Offsets Policy* (Government of Western Australia 2011) the proponent has applied the mitigation hierarchy by identifying measures to avoid and minimise environmental impacts. The proponent has also committed to rehabilitating areas disturbed during construction, but not required for operation with suitable native species.

Mitigation measures are assessed under the relevant key environmental factor (see section 4). In applying the residual impact significance model (Government of Western Australia 2014), the EPA considers that the proposal would have a significant residual impact from the loss of:

- 1.3 ha of '*Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrublands of the SCP' TEC (FCT3c)
- 0.63 ha 'Herb rich shrublands on clay pans' TEC (FCT08)
- 3.7 ha 'Banksia woodlands on the Swan Coastal Plain PEC'
- 43.9 ha of habitat for western ringtail possum
- 17.7 ha of habitat for brush-tailed phascogale
- 37.8 ha of habitat for Baudin's black-cockatoo, Carnaby's black-cockatoo and forest red-tailed black cockatoo.

In noting the above significant residual impacts, the EPA has considered Principle 2 (environmental offsets are not appropriate for all projects) of the *WA Environmental Offsets Policy*
and has determined that offsets are appropriate and applicable for this proposal.

Consistent with the approach used in other assessments, the proponent has used the Commonwealth's Offset Assessment Guide to calculate the offset quantum for the above environmental values. This is in accordance with Principle 4 (based on sound environmental information) of the *WA Environmental Offsets Policy*, whereby

an assessment should be undertaken for any land acquisition offsets once the condition and values of the proposed site and extent of any rehabilitation works is known. The EPA notes that western ringtail possum has been used as a proxy for brush-tailed phascogale, and considers the overall approach and use of the guide appropriate.

In considering the offsets proposed, the EPA notes the proponent had regard for Principles 3 (relevant and proportionate) and 4 (based on sound environmental information) of the *WA Environmental Offsets Policy*. The size and location of the proposed offset sites contain the appropriate environmental values, and are in close proximity to the proposal.

To offset the above significant residual impacts, the proponent is proposing a combination of land acquisition, on-going management, on-ground management, and research. Each offset is described below, while Table 4 summarises the offset conditions proposed and the percentage of each significant residual impact for each offset condition.

Table 4: Offset condition and significant residual impact per condition

Condition	Percentage of values being offset
Lot 2 Boyanup Picton Road and Lot 104 Willinge Drive Davenport Offset Plan	• 45.9 per cent of habitat for western ringtail possum and brush-tailed phascogale • 81.9 per cent of habitat for Baudin's black-cockatoo, Carnaby's black-cockatoo and forest red-tailed black cockatoo • 100 per cent of 'Banksia woodlands on the Swan Coastal Plain PEC'.
Land Acquisition and On-ground Management Offset Strategy	• 54.1 per cent of habitat for western ringtail possum and brush-tailed phascogale • 18.1 per cent of habitat for Baudin's black-cockatoo, Carnaby's black-cockatoo and forest red-tailed black cockatoo • 100 per cent of 'Herb rich shrublands on clay pans' TEC (FCT08) • 100 per cent of *Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrublands of the SCP' TEC (FCT3c).

Land acquisition

The proponent has proposed land acquisition to partially offset the significant residual impacts to habitat for western ringtail possum, brush-tailed phascogale and black cockatoos and to fully offset the significant residual impact to TECs.

Fauna habitat

The proponent is proposing as an offset a 55 ha portion of Lot 2 Boyanup Picton Road, which is owned by the Commissioner of Main Roads. This site was purchased to use an offset for the Bunbury Outer Ring Road proposal, and a portion has already been utilised for the Central Section constructed in 2013. This site is directly adjacent to the proposal. Since the purchase of the site, it has been rezoned as Regional Open Space under the Bunbury Region Scheme, which the proponent considers provides long-term security.

Surveys conducted by Biota (2019) have shown that the property supports habitat for, and a population of, both western ringtail possum and brush-tailed phascogale. The property has also been shown to provide foraging habitat, potential breeding (suitable nest hollows) and roosting sites for black cockatoo species (GHD 2014). The proponent has been actively managing the site for long-term conservation (maximum of 20 years) and has been undertaking on-going management actions including fencing and access management, weed control, firebreaks and feral animal control to maintain and/or improve habitat quality.

The EPA has recommended condition 11-2 requiring that Lot 2 Boyanup Picton Road forms part of the Lot 2 Boyanup Picton Road and Lot 104 Willinge Drive Davenport Offset Plan. This Offset Plan will require the proponent to spatially identify the values of the site, identify how the site will be protected in the long-term, and detail on-going management actions to be undertaken to counterbalance the significant residual impacts of the proposal to western ringtail possum, brush-tailed phascogale and black cockatoos.

Banksia woodlands on the Swan Coastal Plain PEC

Lot 2 Boyanup Picton Road is also proposed as an offset for the Banksia woodlands on the Swan Coastal Plain PEC.

A site survey conducted in October 2013 (GHD 2014) identified six main vegetation types within the property including:

- Dense Banksia woodland
- Jarrah, Marri, *Banksia ilicifolia* and Melaleuca woodland
- Agonis, Jarrah, Marri and *Banksia ilicifolia* woodland.

Additional site assessment is proposed in spring 2020 to confirm that the proposed offset area vegetation conforms to Banksia woodland TEC/PEC. Site management for long-term conservation (maximum 20 years) will include fencing and access management, weed control, firebreaks and feral animal control to maintain/improve habitat quality.

The EPA has recommended condition 11-2 requiring the Lot 2 Boyanup Picton Road and Lot 104 Willinge Drive Davenport Offset Plan. This Offset Plan will require the proponent to spatially identify the values of the site, identify how the site will be protected in the long-term, and detail on-going management actions to be undertaken to counterbalance the significant residual impacts of the proposal to the Banksia woodlands PEC.

Herb rich shrublands on clay pans TEC (FCT08)

The proponent is currently investigating the purchase of a local 1.3 ha property that potentially supports 1.07 ha of vegetation that represents this community. While surveys conducted in 2019 indicated that this community was present, further surveys are required to clearly define the exact community present (Ecoscape 2019). These surveys will be conducted in consultation with DBCA in spring 2020. The EPA notes that using the Commonwealth Offset Assessment Guide this site comprises only 83.1 per cent of the required offset for herb rich shrublands on clay pans.

The EPA notes that the DBCA has advised that apart from the new sites from Ecoscape 2019 survey, there are no other known occurrences of this community within the South West region that are in 'Good' or better condition. However, the proponent has advised that further investigations both locally and within the Peel Region for suitable sites are occurring. The proponent has advised that, even if the spring 2020 surveys do not determine this community is present on the local property, they are confident that a suitable offset can be obtained.

The EPA has recommended condition 11-7 requiring a Land Acquisition and On-Ground Management Offset Strategy. This Offset Strategy will require the proponent to spatially identify a site that contains FCT08 to be protected and/or managed, identify how the site will be protected in the long-term and detail on-going management actions required to counterbalance the significant residual impacts of the proposal to this community.

Corymbia calophylla – Xanthorrhoea preissii woodlands and shrublands of the SCP TEC (FCT3c)

The proponent has not proposed an offset for the FCT3c community. However, the EPA has recommended an additional offset be provided given the existing cumulative loss of the Critically Endangered floristic community (12 ha in the South West Region).

The DBCA have advised that is it likely that FCT3c occurs within road reserves associated with the South West Highway near the proposal area which could provide an offset if transfer of those road reserves into conservation vesting could be secured.

Further opportunities to offset FCT3c exist through on-ground management such as rehabilitation of FCT3c on crown-land that is directly adjacent to the proposal development envelope and the Waterloo Nature Reserve.

The EPA has recommended condition 11-7 requiring a Land Acquisition and On-Ground Management Offset Strategy. This Offset Strategy will require the proponent to spatially identify a site that contains FCT3c to be protected and/or managed, identify how the site will be protected in the long-term and detail on-going management actions required to be undertaken to counterbalance the significant residual impacts of the proposal to this community.

On-going and on-ground management

The proponent is proposing two offsets that involve on-ground management, including rehabilitation, to provide habitat for western ringtail possum, brush-tailed phascogale and black cockatoo species.

The first offset site is a 79.6 ha portion at Lot 104 Willinge Drive Davenport, which is located close the proposal. This site is currently owned by the Commissioner for Main Roads and is zoned rural under the Greater Bunbury Region Scheme. Most of this site is cleared, but still supports about 15 ha of 'Good to Degraded' remnant vegetation comprising:

- Jarrah, Marri, Peppermint and *Banksia attenuata* woodland
- Jarrah, Peppermint and Banksia woodland
- *Eucalyptus rudis* and *Corymbia calophylla* over *Melaleuca rhaphiophylla* Woodland.

This offset site also supports a population of western ringtail possum (Biota 2020). The site abuts the Preston River and is traversed east to west by Gavins Gully (Reserve 31 866). Together the vegetation of Gavins Gully and the riparian woodland of the Preston River represents a habitat linkage to a number of other reserves outside the proposal, for example Manea Park and Franklandia Nature Reserve (Biota 2019).

The proponent proposes to rehabilitate 45 ha of the site for western ringtail possum and 38 ha of the site for black cockatoos using suitable flora species to provide habitat and foraging resources suitable for the relevant fauna. The EPA notes that there are partially overlapping habitat requirements for western ringtail possum and black cockatoos. The proponent is also proposing on-going management for long-term conservation (maximum 20 years) which will include fencing and access management, weed control, firebreaks and feral animal control to maintain/improve habitat quality.

The second proposed site for rehabilitation is State Forest No. 2, which is located approximately 10-15 km east of the Busselton town centre. The proponent proposes to rehabilitate 90 ha of the site for western ringtail possum and 16 ha of the site for black cockatoo. This site is currently the focus of a revegetation program undertaken by the proponent as an offset for other proposals. The site is proposed for inclusion in the Tuart Forest National Park and is managed by the DBCA under the *Conservation and Land Management Act 1984*, and consequently the offset area will be protected in the long-term.

The DBCA advised that consultation regarding the proposed works within State Forest No. 2 is occurring, and that the department is broadly supportive of the proposed offset. The DBCA advised that formal agreement regarding the proposed rehabilitation works is pending the submission of a detailed rehabilitation plan that contains suitable completion criteria.

In considering these two proposed offsets, the EPA notes that direct offsets are actions designed to provide for on-ground improvement, rehabilitation and

conservation of habitat and can include restoration, revegetation and rehabilitation of natural areas outside the proposal area (Government of Western Australia 2011). The EPA further notes Principle 6 of the *WA Environmental Offset Policy* outlines that environmental offsets are to be designed to be enduring, enforceable and deliver long-term strategic outcomes.

The EPA recognises that land acquisition as an offset is consistent with the relevant recovery plans, which identify that protection of habitat is an important aspect for species conservation. However, an emphasis on land acquisition does not improve or increase the area of habitat available for species in the long-term (EPA 2019).

The EPA recognises that rehabilitation of areas to improve and create suitable habitat contains a level of risk as the success of rehabilitation cannot be guaranteed. The EPA also recognises that a lag time between habitat clearing and habitat creation exists. However, the EPA is strongly supportive of rehabilitation-based offsets as part of a suite of measures to provide a sustainable, long-term strategy for species' conservation (EPA 2019).

The EPA has recommended condition 11-2 requiring that Lot 104 Willinge Drive Davenport Offset Plan forms part of the Lot 2 Boyanup Picton Road and Lot 104 Willinge Drive Davenport Offset Plan. This Offset Plan will require the proponent to spatially define the area to be rehabilitated, identify how the site will be protected in the long-term, the competition criteria for on-ground works and detail on-going management actions required to be undertaken.

The EPA has also recommended condition 11-7 requiring a Land Acquisition and On-ground Management Offset Strategy. This Offset Strategy will require the proponent to spatially define an area to be rehabilitated, the competition criteria for on-ground actions and detail on-going management actions required to be undertaken.

Western ringtail possum research offset proposal

The proponent proposed in its Offset Strategy that the Western Ringtail Possum Regional Survey be considered as a research offset, to a maximum of 10 per cent of the total offset required for western ringtail possum. The *WA Environmental Offset Guidelines* acknowledges that research projects can add significant value to the outcomes of on-ground management and the understanding of the environmental value being impacted. The Guidelines state that research offsets are generally only appropriate as offsets where there is a high degree of uncertainty regarding impacts of a project and new science is required to develop better mitigation measures or predictive tools to avoid and minimise the particular type of impact. Research offsets must directly contribute to positive conservation outcomes for the environmental value being impacted.

The EPA notes that the proponent's regional survey work is relevant to the consideration of the significance of the cumulative impacts for this proposal and potentially other proposals. The EPA recognises that the proponent is working towards a contemporary understanding of the species' population through their regional survey work and considers this to be valuable knowledge for current and future management of the species.

In considering the *WA Environmental Offset Guidelines* and the proponent's Offset Strategy, the EPA considers the Western Ringtail Regional Survey does not directly relate to the particular environmental impacts of this proposal and the associated mitigation. That is, the regional survey work does not address impacts relating to habitat loss, fragmentation and/or the efficacy of fauna crossings for mitigating fragmentation impacts to western ringtail possum. Therefore, the EPA does not consider the proposed research to be an offset for this proposal.

Summary

The EPA has recommended that an offset (condition 11) is imposed to counterbalance the significant residual impacts of the proposal. The condition requires the proponent to submit within 12 months of the publication of the Ministerial Statement a:

- Lot 2 Boyanup Picton Road and Lot 104 Willinge Drive Davenport Offset Plan to outline how these two blocks will be protected, managed and rehabilitated.
- Land Acquisition and On-ground Management Offset Strategy to outline how the remaining environmental values.

6. Conclusion

The EPA has considered the proponent's proposal to construct and operate the Bunbury Outer Ring Road Northern and Central Sections.

Application of mitigation hierarchy

Consistent with relevant policies and guidance, the proponent has addressed the mitigation hierarchy by identifying measures to avoid, minimise and rehabilitate environmental impacts including:

- refining the construction footprint via s. 43A of the EP Act to avoid where possible direct impacts to conservation significant fauna, ecological communities and inland waters
- ensuring no adverse impacts on the viability of the local western ringtail possum population in habitats adjacent to and outside the development envelope
- minimising fragmentation impacts on terrestrial fauna, particularly western ringtail possum and black stripe minnow through the provision of best practice design fauna crossings and drainage infrastructure respectively
- maintaining hydrological regimes and water quality to conservation significant environmental values:
    - black stripe minnow and Carter's freshwater mussel
    - TECs *Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrublands of the SCP (FCT3c) and Herb rich shrublands in clay pans TEC (FCT08)
    - Resource Enhancement Wetland Unique Feature ID 1708
- implementing weed and dieback management to minimse impacts to adjacent vegetation
- avoiding construction of bridge footings, drainage structures and abutments within waterways
- constructing noise walls to minimise noise emissions from current and future traffic
- applying acoustic treatments to houses to reduce impacts to indoor noise amenity, where relevant.

Offsets

The EPA considers the proposal would have a significant residual impact from:

- clearing of 43.9 ha of western ringtail possum habitat
- clearing of 17.7 ha of south-western brush-tailed phascogale habitat
- clearing of 37.8 ha of habitat and three potential breeding trees for Carnaby's, Baudin's, and forest red-tailed black cockatoos
- clearing of 0.63 ha of Herb rich shrublands in clay pans TEC (FCT08)
- clearing of 1.3 ha of *Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrublands of the SCP TEC (FCT3c)

- clearing of 3.7 ha of Banksia woodlands of the Swan Coastal Plain PEC.

The EPA has recommended conditions for a Lot 2 Boyanup Picton Road and Lot 104 Willinge Drive Davenport Offset Plan and a Land Acquisition and On-ground Management Offset Strategy. This Plan and Strategy will demonstrate that the offsets adequately counterbalance the significant residual impacts.

Conclusion

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

- impacts to all the key environmental factors
- EPA's confidence in the proponent's proposed mitigation measures
- relevant EP Act principles and the EPA's objectives for the key environmental factors of Terrestrial Fauna, Flora and Vegetation, Inland Waters and Social Surroundings
- EPA's view that the impacts to the key environmental factors are manageable, provided the recommended conditions are imposed.

Given the above, the EPA recommends that the proposal may be implemented subject to the conditions recommended in Appendix 4.

7. Recommendations

The EPA recommends that the Minister for Environment notes:

1. That the proposal assessed is for construction and operation of the Bunbury Outer Ring Road Northern and Central Sections.
2. The key environmental factors identified by the EPA in the course of its assessment are Terrestrial Fauna, Flora and Vegetation, Inland Waters and Social Surroundings, set out in section 4.
3. The EPA has recommended that the proposal may be implemented, provided the implementation of the proposal is carried out in accordance with the recommended conditions and procedures set out in Appendix 4. Matters addresses in the conditions include:
    a) no adverse impacts on the viability of the local western ringtail possum population in habitats adjacent to and outside the development envelope
    b) maintaining hydrological regimes and water quality to conservation significant aquatic fauna, threatened ecological communities and significant wetlands
    c) minimising the impacts of noise during construction and operation
    d) offsetting to counterbalance impacts to habitat for western ringtail possum, south-western brush-tailed phascogale, Carnaby's, Baudin's, and forest red-tailed black cockatoos; Herb rich shrublands in clay pans TEC (FCT08), *Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrublands of the SCP TEC (FCT3c) and Banksia woodlands of the SCP PEC.

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Appendix 1: List of submitters

Organisations

Birdlife WA
Department of Biodiversity, Conservation and Attractions
Department of Planning, Lands and Heritage
Urban Bushland Council WA Inc.
Wildflower Society of WA

Individuals

Anonymous
Donna Brown
Sarah Cooney
Ron Couacaud
Hon. Diane Evers MLC
Peta Gelmi
Peter Gibson and Natasha Oke
Glen Holland
Charles Kampanelli
Jane Putland
Michael Tichbon

Appendix 2: Consideration of Environmental Protection Act principles

EP Act Principle	Consideration
1. The precautionary principle *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 –* *a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and* *b) an assessment of the risk-weighted consequences of various options.*	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. Investigations into the biological and physical environment undertaken by the proponent have provided sufficient scientific certainty to assess the risks and identify measures to avoid or minimise impacts. To assist in providing this certainty, the proponent completed additional regional surveys to better understand local and regional populations of western ringtail possum. The EPA notes that the proponent took further actions to minimise the size of the development envelope during the assessment process and identified measures to avoid or minimise impacts. From its assessment of this proposal the EPA has concluded that there is no threat of serious or irreversible harm.
2. The principle of intergenerational equity *The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.*	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 EPA notes that the proponent has sought to avoid and minimise impacts from the proposal, including taking further actions to minimise the size of the development envelope during the assessment process. The proponent has placed infrastructure in cleared land where possible to reduce impacts to flora and vegetation and maintain as much fauna habitat as possible. The proponent will also establish noise walls to reduce noise impacts as much as possible and has designed the proposal to maintain hydrological regimes.

EP Act Principle	Consideration
	From its assessment of this proposal the EPA has concluded that the environmental values will be protected and the health, diversity and productivity of the environment will be maintained for the benefit of future generations.
3. The principle of the conservation of biological diversity and ecological integrity *Conservation of biological diversity and ecological integrity should be a fundamental consideration.*	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. The EPA notes that the proponent has sought to avoid and minimise impacts from the proposal, including taking further actions to minimise the size of the development envelope during the assessment process. The proponent has placed infrastructure in cleared land where possible to reduce impacts to flora and vegetation and maintain as much fauna habitat as possible. The proponent has designed the proposal to maintain hydrological regimes to minimise impacts to aquatic fauna and minimise impacts to threatened ecological communities. The proponent completed additional regional surveys to better understand local and regional populations of western ringtail possums, and are proposing to maintain connectivity between suitable areas of habitat through the use of fauna crossings. The EPA has considered these measures during its assessment. The EPA has also considered to what extent the potential impacts from the proposal can be ameliorated by recommended conditions, including offsets. The EPA has concluded that given the nature of the impacts, the proposed offsets are likely to ameliorate the impacts of the loss of biological diversity and ecological integrity, given the proposed offsets will protect existing fauna habitat and will create additional fauna habitat through rehabilitation of degraded areas.
4. Principles relating to improved valuation, pricing and incentive mechanisms	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

EP Act Principle	Consideration
(1) Environmental factors should be included in the valuation of assets and services. *(2) The polluter pays principles – those who generate pollution and waste should bear the cost of containment, avoidance and abatement.* *(3) 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.* *(4) 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.*	surroundings. The proponent also would bear costs relating to offsetting the significant residual impacts from the proposal. The EPA has had regard to this principle during the assessment of the proposal.
5. The principle of waste minimisation *All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.*	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.

Appendix 3: 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	• Excavation and exposure of 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. • Erosion impacts potentially leading to poor soil structure, reduced water infiltration and general loss of soil health from vegetation clearing and soil excavation. • Exposure of potentially contaminated material from one site within the development envelope.	No agency or public comments were received	Terrestrial Environmental Quality was not identified as a preliminary key environmental factor when the EPA decided to assess the proposal. Having regard to: • minimal excavation of soils during construction • management and mitigation measures proposed by the proponent, including a Construction Environmental Management Plan • preparation of an Acid Sulfate Soil Management Plan • further investigations of the potentially contaminated site • the significance considerations in the *Statement of Environmental Principles, Factors and Objectives* (EPA 2020c) • ability to regulate impacts under the *Contaminated Sites Act 2003,* the DWER guidelines for Assessment and Management of Contaminated Sites and the DWER guidelines for management of Acid Sulfate Soils, the EPA considers it is unlikely that the

<table>
<tr><th>Environmental factor</th><th>Description of the proposal's likely impacts on the environmental factor</th><th>Government agency and public comments</th><th>Evaluation of why the factor is not a key environmental factor</th></tr>
<tr><td></td><td></td><td></td><td>proposal would have a significant impact on Terrestrial Environmental Quality and that the impacts to this factor are manageable.

Accordingly, the EPA did not consider Terrestrial Environmental Quality to be a key environmental factor at the conclusion of its assessment.</td></tr>
<tr><td colspan="4">Air</td></tr>
<tr><td>Greenhouse Gas Emissions</td><td>Increased greenhouse gas (GHG) emissions:

Over the three-year construction period, the modelled estimates for the proposal are:
<table>
<tr><th>Activity</th><th>Scope 1</th><th>Scope 2</th><th>Scope 3</th></tr>
<tr><td>site offices /general</td><td>754</td><td>-</td><td>57</td></tr>
<tr><td>vegetation removal</td><td>24,702</td><td>-</td><td>24</td></tr>
<tr><td>demolition and earthworks</td><td>52,414</td><td>-</td><td>3,997</td></tr>
<tr><td>construction</td><td>15,264</td><td>-</td><td>226,823</td></tr>
<tr><td>Totals: tonnes carbon dioxide equivalent (tCO_2-e)</td><td>93,134 (t CO_2 -e)</td><td>-</td><td>230,901 (t CO_2 -e)</td></tr>
</table></td><td>No agency or public comments were received</td><td>Greenhouse Gas Emissions was not identified as a preliminary key environmental factor when the EPA decided to assess the proposal.

Having regard to:
• modelled Scope 1 greenhouse gas emissions of 93,134 tCO_2-e over three years (or 31,045 tCO_2-e per annum) 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 tCO_2-e per annum (BORR Team 2020c)
• the management and mitigation proposed in section 4.7.6 of the BORR Northern and Central referral supporting document Rev 0
• proponent's prediction that the road upgrade will result in a net reduction in</td></tr>
</table>

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
	(BORR Team 2020c)		Scope 3 operational greenhouse gas emissions on the regional road network through potential increases in freight efficiencies • the significance considerations in the *Statement of Environmental Principles, Factors and Objectives* (EPA 2020c), the EPA considers it is unlikely that the proposal would have a significant impact on Greenhouse Gas Emissions and that the impacts to this factor are manageable. Accordingly, the **EPA did not consider Greenhouse Gas Emissions to be a key environmental factor** at the conclusion of its assessment.
People			
Social Surroundings (Aboriginal heritage and culture)	Potential disturbance to Aboriginal heritage sites.	No agency or public comments were received	Social Surroundings (Aboriginal heritage and culture) was not identified as a preliminary key environmental factor when the EPA decided to assess the proposal. Having regard to: • the information received at the referral stage about mapped Aboriginal heritage sites and consultation undertaken to date • the types of measures available to avoid and minimise impacts. For example, the proponent has modified certain bridge designs to avoid

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
			structures that impact the main channel of the watercourses and minimise effects upon cultural values and beliefs as requested by the Gnaala Karla Booja Native Title Claim group • the proposal impacts on Aboriginal heritage sites will be minimised and managed through the implementation of a Construction EMP and an Aboriginal Heritage Management Plan which addresses the recommendations provided in the Final Report of an Aboriginal Heritage Survey for the proposal (Brad Goode and Associates 2020) • an additional survey (ethnographic and archaeological) will be undertaken as required and ongoing consultation with all relevant groups will occur • where impacts to sites are unavailable, consent will be sought under section 18 of the *Aboriginal Heritage Act 1972* to carry out the proposed bridge and road works located within the extent of registered sites, the EPA considers it is unlikely that the proposal would have a significant impact on Social Surroundings (Aboriginal

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
			heritage and culture) and that the impacts to this factor are manageable. Accordingly, the **EPA did not consider Social Surroundings (Aboriginal heritage and culture) to be a key environmental factor** at the conclusion of its assessment.

Appendix 4: Identified Decision-Making Authorities and Recommended Environmental Conditions

Identified Decision-Making Authorities

Section 44(2) of EP Act 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.

Section 45(1) 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 decision-making authorities have been identified:

Decision-Making Authority	Legislation (and Approval)
1. Minister for Environment	*Biodiversity Conservation Act 2016* (Authorisation to take or disturb threatened fauna; and modify a TEC occurrence) *Contaminated Sites Act 2003* (Section 58 disturbance of contaminated sites)
2. Minister for Water	*Rights in Water and Irrigation Act 1914* (Water abstraction licence; and interference with bed and banks of a watercourse)
3. Minister for Aboriginal Affairs	*Aboriginal Heritage Act 1972* (Section 18 clearances)
4. Minister for Lands	*Land Administration Act* (Section 28(1) compulsory acquisition of land)
5. Minister for Planning	*Planning and Development Act 2005* (Planning Amendment to the Greater Bunbury Regional Scheme)
6. Minister for Transport	*Main Roads Act 1930* (Section 22 approval to construct roads)
7. Western Australian Planning Commission	*Planning and Development Act 2005* (Development application approval for lands outside the Greater Bunbury Regional Scheme primary regional road reserve)
8. Chief Executive Officer, Department of Biodiversity, Conservation and Attractions	*Biodiversity Conservation Act 2016* (Permit to take flora and fauna other than threatened flora and fauna)
9. Chief Executive Officer, Department of Water and Environmental Regulation	*Environmental Protection Act 1986* (Native vegetation clearing permit)

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

Recommended Environmental Conditions

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

BUNBURY OUTER RING ROAD NORTHERN AND CENTRAL SECTIONS

Proposal: The proposal includes the construction and operation of 19 kilometres of the Bunbury Outer Ring Road, located about 200 kilometres south of Perth and, at its closest point, about 6 kilometres south-east of Bunbury. The proposal consists of a dual carriageway connecting the Forrest Highway at Kingston to the South Western Highway, south of Centenary Rd in the Shire of Capel.

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

Proponent Address: Waterloo Crescent
EAST PERTH WA 6004

Assessment Number: 2215

Report of the Environmental Protection Authority: 1682

Pursuant to section 45 of the *Environmental Protection Act 1986,* it has been agreed that the proposal described and documented in Table 2 of Schedule 1 may be implemented and that the implementation of the proposal is subject to the following implementation conditions and procedures:

1 Proposal Implementation

1-1 When implementing the proposal, the proponent shall not exceed the authorised extent of the proposal as defined in Table 2 of Schedule 1, unless amendments to the proposal and the authorised extent of the proposal have been approved under the *Environmental Protection Act 1986*.

2 Contact Details

2-1 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.

3 Time Limit for Proposal Implementation

3-1 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.

3-2 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.

4 Compliance Reporting

4-1 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 4-6, or prior to implementation of the proposal, whichever is sooner.

4-2 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.

4-3 After receiving notice in writing from the CEO that the Compliance Assessment Plan satisfies the requirements of condition 4-2 the proponent shall assess compliance with conditions in accordance with the Compliance Assessment Plan required by condition 4-1.

4-4 The proponent shall retain reports of all compliance assessments described in the Compliance Assessment Plan required by condition 4-1 and shall make those reports available when requested by the CEO.

4-5 The proponent shall advise the CEO of any potential non-compliance within seven (7) days of that non-compliance being known.

4-6 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 4-1.

5 Public Availability of Data

5-1 Subject to condition 5-2, 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.

5-2 If any data referred to in condition 5-1 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.

6 Terrestrial Fauna

6-1 Prior to **ground-disturbing activities** associated with the proposal the proponent shall undertake the following actions to minimise impacts to terrestrial fauna:

(1) within seven (7) days prior to clearing, using a qualified and licensed terrestrial **fauna spotter**(s) with experience in surveying for black cockatoos, inspect all **potential nesting trees** with 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** for nesting, the proponent shall not **disturb** or clear the nesting tree, or vegetation within a ten (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 the **black cockatoos**; and

(3) within thirty (30) days prior to clearing, using a qualified and licensed terrestrial **fauna spotter**(s) undertake a baseline study of suitable habitat within the development envelope and within the **western ringtail habitat areas** where **disturbance** is proposed, to:

(a) confirm the presence/absence and number of western ringtail possum and/or south-western brush-tailed phascogale; and

(b) submit a report to the CEO outlining the actions to monitor and manage impacts to western ringtail possums prior to and following **disturbance** on advice of DBCA.

6-2 Prior to and during activities associated with the construction of the proposal the proponent shall undertake the following actions to minimise impacts to terrestrial fauna:

(1) ensure the presence of appropriately qualified **fauna spotters** during clearing activities;

(2) ensure appropriate protocols are implemented within seven (7) days prior to clearing activities to avoid and minimise impacts to terrestrial fauna including, but not limited to, western ringtail possum and south-western brush-tailed phascogale;

(3) if western ringtail possum and/or south-western brush-tailed phascogale are encountered during clearing activities, the proponent shall submit a report to the CEO and the DBCA within thirty (30) days, with the number of individuals encountered and any relocation conducted in accordance with the requirements of the threatened fauna authorisation obtained under the *Biodiversity and Conservation Act 2016*; and

(4) ensure no foraging species for black cockatoos are planted within ten (10) meters of the road.

7 Terrestrial Fauna (Western Ringtail Possum)

7-1 The proponent shall design and manage the ongoing implementation of the proposal to achieve the following environmental outcomes:

(1) no more than 43.9 ha of western ringtail possum habitat is cleared; and

(2) no project attributable adverse effects on the **viability** of the local western ringtail possum population in **western ringtail habitat areas** adjacent to and outside the development envelope.

7-2 To demonstrate that the outcome in condition 7-1(2) is being met the proponent shall complete a survey within the **western ringtail habitat areas** within thirty (30) days of completion of vegetation clearing, or if staged, after each distinct stage of clearing, and submit a report within sixty (60) days of completion of vegetation clearing to the CEO and DBCA. The report shall include an evaluation of the survey results against the baseline information collected by condition 6-1(3).

7-3 The proponent shall submit a report outlining how the outcomes in condition 7-1 are being met:

(1) to the CEO and the DBCA within twelve (12) months from the commencement of clearing activities; and

(2) subsequently as part of the Compliance Assessment Report in condition 4-6, or as otherwise agreed to in writing by the CEO.

7-4 Prior to clearing activities submit the location and configuration of fauna crossings for western ringtail possum to the CEO.

8 Flora and Vegetation – Indirect impacts

8-1 The proponent shall implement the proposal to achieve the following environmental outcome:

(1) there are no project attributable indirect impacts to Threatened Ecological Communities (Herb rich shrublands in clay pans FCT08) and (*Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrublands of the Swan Coastal Plain FCT3c) and Priority Ecological Community (Banksia woodlands on the Swan Coastal Plain) outside and within twenty (20) metres of the development envelope.

8-2 The proponent shall undertake the following actions when implementing the proposal:

(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.

8-3 The proponent shall continue to implement the requirements of condition 8-2 during construction and for five (5) years from the completion of construction, or as otherwise agreed in writing by the CEO.

9 Inland Waters

9-1 The proponent shall manage the implementation of the proposal to maintain hydrological regimes and water quality in habitats that support the:

(1) black-stripe minnow (*Galaxiella nigrostriatal*) habitat (defined in Figure 2);

(2) Carter's freshwater mussel (*Westralunio carteri*) individuals or habitat (defined in Figure 3);

(3) Threatened Ecological Communities (Herb rich shrublands in clay pans FCT08) and (*Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrublands of the Swan Coastal Plain FCT3c) (defined in Figure 4); and

(4) Resource Enhancement Wetland Unique Feature ID 1708.

9-2 The proponent shall undertake the following actions when implementing the proposal:

(1) no more than sixty (60) days prior to commencing construction of bridges, clearing of riparian vegetation or earthworks near or on the Collie, Ferguson and Preston Rivers, the proponent shall undertake a survey for Carter's freshwater mussel (*Westralunio carteri*) in areas to be **disturbed**;

(2) where Carter's freshwater mussel is found, the proponent shall submit a report to the CEO and the DBCA before undertaking the construction activities as referred to in 9-2(1). The report shall identify the number of individuals found and actions to manage impacts prior to and during construction, and any fauna authorisation obtained under the *Biodiversity and Conservation Act 2016*;

(3) not construct bridge footings, drainage structures and abutments within the Collie, Ferguson or Preston rivers;

(4) prior to the commencement of construction, undertake a study of the hydrological regime of the Threatened Ecological Communities and wetlands referred to in condition 9-1 and submit a report about the baseline and predicted post-development hydrologic regime to the CEO; and

(5) implement management measures to maintain the hydrological regimes at the Threatened Ecological Communities and wetlands in condition 9-1.

9-3 Upon commencement of construction the proponent shall undertake an annual study of the hydrological regime of Threatened Ecological Communities and wetlands referred to in condition 9-1, and compare the results to the baseline study required in condition 9-2, until the CEO has confirmed by notice in writing that the proponent has demonstrated that the requirements of condition 9-1(3) and (4) have been met.

9-4 In the event that the surveys of hydrological regimes indicate that the requirements of condition 9-1(3) and condition 9-1(4) are not being met the proponent shall in consultation with DBCA implement preventative and corrective actions and provide a report to the CEO within thirty (30) days under condition 4-6.

10 Social Surroundings (Noise)

10-1 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.

10-2 At least six (6) months prior to the operation of the proposal and in order to meet the requirements of condition 10-1(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.

10-3 The Traffic Noise Management Plan shall be approved by notice in writing from the CEO prior to the commencement of operation.

10-4 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 a notice in writing.

10-5 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 10-2.

10-6 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 10-1 is being and will continue to be met.

10-7 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 4-5 (Compliance Reporting) and shall immediately implement **management actions** to meet the requirements of condition 10-1.

11 Offsets

11-1 The proponent shall undertake offsets to achieve the objective of counterbalancing the significant residual impact as a result of the implementation of the proposal on the following environmental values:

(1) 0.63 ha 'Herb rich shrublands on clay pans' (FCT08) threatened ecological community;

(2) 1.3 ha of '*Corymbia calophylla* - *Xanthorrhoea preissii* woodlands and shrublands of the Swan Coastal Plain' (FCT3c) threatened ecological community;

(3) 3.7 ha of 'Banksia woodlands on the Swan Coastal Plain' priority ecological community;

(4) 43.9 ha of habitat for western ringtail possum (*Pseudocheirus occidentalis*);

(5) 17.7 ha of habitat for the south-western brush-tailed phascogale (*Phascogale tapoatafa wambenger*); and

(6) 37.8 ha of habitat for Baudin's black-cockatoo (*Calyptorhynchus baudinii*), Carnaby's black-cockatoo (*Calyptorhynchus latirostris*) and forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*).

Lot 2 Boyanup Picton Road and Lot 104 Willinge Drive Davenport Offset Plan

11-2 Within twelve (12) months of the publication of this Statement, or as otherwise agreed by the CEO, the proponent shall prepare and submit a Lot 2 Boyanup Picton Road and Lot 104 Willinge Drive Davenport Offset Plan to the CEO.

11-3 The Lot 2 Boyanup Picton Road and Lot 104 Willinge Drive Davenport Offset Plan required by condition 11-2 shall:

(1) spatially define and map the vegetation condition of Lot 2 Boyanup Picton Road and Lot 104 Willinge Drive Davenport which must contain:

(a) 14.5 ha of Banksia woodlands on the Swan Coastal Plain priority ecological community;

(b) 100 ha of habitat for western ringtail possum (*Pseudocheirus occidentalis*) and the south-western brush-tailed phascogale (*Phascogale tapoatafa wambenger*); and

(c) 93 ha of habitat for Baudin's black-cockatoo (*Calyptorhynchus baudinii*), Carnaby's black-cockatoo (*Calyptorhynchus latirostris*) and forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*).

(2) identify how Lot 2 Boyanup Picton Road and Lot 104 Willinge Drive Davenport 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;

(3) specify the management body for ongoing management, including its role and confirmation in writing that the relevant management body accepts responsibility for its role for Lot 2 Boyanup Picton Road and Lot 104 Willinge Drive Davenport;

(4) identify the quantum of, and provide funds for, establishing the protecting mechanism and maintaining the offset for at least seven (7) years;

(5) detail any **On-going Management Actions**, a timeframe for the actions to be undertaken, and funding arrangements for these actions, and any contingency actions to be undertaken on Lot 2 Boyanup Picton Road;

(6) detail any **On-going Management Actions** and **On-ground Management Actions**, objectives and targets to be achieved including competition criteria, funding arrangements for these actions, and any contingency actions to be undertaken on Lot 104 Willinge Drive Davenport;

(7) demonstrate how the **On-going Management Actions** and **On-ground Management Actions** to be undertaken on Lot 104 Willinge Drive Davenport will result in a tangible improvement to the environmental values being offset; and

(8) detail the monitoring, reporting and evaluation mechanisms for actions identified under conditions 11-3(5) and 11-3(6).

11-4 The proponent:

(1) may review and revise the Lot 2 Boyanup Picton Road and Lot 104 Willinge Drive Davenport Offset Plan; or

(2) shall review and revise the Lot 2 Boyanup Picton Road and Lot 104 Willinge Drive Davenport Offset Plan as and when directed by the **CEO** by a notice in writing.

11-5 The proponent shall implement the latest revision of the Lot 2 Boyanup Picton Road and Lot 104 Willinge Drive Davenport Offset Plan that the CEO has confirmed in writing satisfies the requirements of condition 11-3.

11-6 The proponent shall continue to implement the Lot 2 Boyanup Picton Road and Lot 104 Willinge Drive Davenport Offset Plan until the CEO has confirmed by notice in writing that the proponent has demonstrated that the objective in condition 11-1 has been met.

Land Acquisition and On-ground Management Offset Strategy

11-7 Within twelve (12) months of the publication of this Statement, or as otherwise agreed by the CEO, the proponent shall prepare and submit a Land Acquisition and On-ground Management Offset Strategy to the CEO to counterbalance significant residual impacts to:

(1) 23.8 ha of habitat for western ringtail possum (*Pseudocheirus occidentalis*) and the south-western brush-tailed phascogale (*Phascogale tapoatafa wambenger*);

(2) 6.8 ha of habitat for Baudin's black-cockatoo (*Calyptorhynchus baudinii*), Carnaby's black-cockatoo (*Calyptorhynchus latirostris*) and forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*);

(3) 0.63 ha 'Herb rich shrublands on clay pans' (FCT08) threatened ecological community;

(4) 1.3 ha of '*Corymbia calophylla* - *Xanthorrhoea preissii* woodlands and shrublands of the Swan Coastal Plain' (FCT3c) threatened ecological community.

11-8 The Land Acquisition and On-ground Management Offset Strategy required by condition 11-7 shall:

(1) identify any area(s) to be acquired and the manner in which all area(s) will be protected with **On-Going Management Actions** and/or with **On-Ground Management Actions** that contain the environmental values identified in condition 11-7;

(2) demonstrate how the area(s) counterbalances the significant residual impact to the environmental values identified in condition 11-7 through application of the principles of the WA Environmental Offsets Policy 2011

and completion of the WA Offsets Template, as described in the WA Environmental Offsets Guidelines 2014, and the *Environment Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy Assessment Guide (October 2012), or any subsequent revisions of these documents;

(3) identify how any area(s) of land acquired will be protected, being either the area(s) is ceded to the Crown for the purpose of management for conservation, or the area(s) are managed under other suitable mechanism for the purpose of conservation as agreed by the CEO;

(4) specify the management body for ongoing management, including its role and confirmation in writing that the relevant management body accepts responsibility for its role for and land area identified in condition 11-8(1);

(5) for any area(s) acquired, identify the quantum of, and provide funds for, the upfront works associated with establishing the area(s), including a contribution for maintaining the offset for at least seven (7) years after completion of purchase;

(6) detail any **On-going Management Actions**, a timeframe for the actions to be undertaken, and funding arrangements for these actions, and any contingency actions to be undertaken on the area(s);

(7) detail any **On-ground Management Actions**, objectives and targets to be achieved including completion criteria, funding arrangements for these actions, and any contingency actions to be undertaken on the area(s);

(8) demonstrate how any **On-going Management Actions** and **On-ground Management Actions** to be undertaken on the area(s) will result in a tangible improvement to the environmental values being offset;

(9) demonstrate how the area(s) and any actions takes on the area(s) is consistent with the objectives and targets with the objectives of the relevant Recovery Plans for the species or community;

(10) detail the monitoring, reporting and evaluation mechanisms for actions identified under conditions 11-8(6) and 11-8(7); and

(11) be prepared on advice of Department of Biodiversity, Conservation and Attractions.

11-9 The proponent:

(1) may review and revise the Land Acquisition and On-ground Management Offset Strategy; or

(2) shall review and revise the Land Acquisition and On-ground Management Offset Strategy as and when directed by the CEO by a notice in writing.

11-10 The proponent shall implement the latest revision of the Land Acquisition and On-ground Management Offset Strategy that the CEO has confirmed in writing satisfies the requirements of condition 11-8.

11-11 The proponent shall continue to implement the Land Acquisition and On-ground Management Offset Strategy until the CEO has confirmed by notice in writing that the proponent has demonstrated that the objective in condition 11-7 has been met.

Schedule 1

Table 1: Summary of the proposal

Proposal title	Bunbury Outer Ring Road Northern and Central Sections
Short description	The proposal includes the construction and operation of 19 kilometres of the Bunbury Outer Ring Road, located about 200 kilometres south of Perth and, at its closest point, about 6 kilometres south-east of Bunbury. The proposal consists of a dual carriageway connecting the Forrest Highway at Kingston to the South Western Highway, south of Centenary Rd in the Shire of Capel.

Table 2: Location and proposed extent of physical and operational elements

Element	Location	Proposed extent
Physical elements		
Freeway standard dual carriageway, grade separated interchanges, local road extensions and connections, bridges, drainage structures, noise walls, fauna crossings, and other road infrastructure including fencing, landscaping, principal shared path.	Located within the development envelope as shown in Figure 1	Clearing and disturbance of no more than 92 ha of native vegetation within a 625 ha development envelope.

Table 3: Abbreviations and Definitions

Acronym or Abbreviation	Definition or Term
black cockatoos	Carnaby's black cockatoo *(Calyptorhynchus latirostris),* forest red-tailed black cockatoo *(Calyptorhynchus banksii naso) and* Baudin's black cockatoo *(Calyptorhynchus baudinii)*
potential nesting tree	Any existing tree of a species known to support black cockatoo breeding which either has a hollow or has a diameter at breast height of 500 millimetres or greater and therefore may develop a nest hollow.
CEO	The Chief Executive Officer of the Department of the Public Service of the State responsible for the administration of section 48 of the *Environmental Protection Act 1986*, or his delegate.
DBCA	Department of Biodiversity, Conservation and Attractions
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 *Biodiversity Conservation Act 2016*
Environmental weeds	Any plant declared under section 22(2) of the *Biosecurity and Agriculture Management Act 2007*, any plant listed on a National Weeds 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.

fauna spotter	A person who is qualified and licenced under Section 40 of the *Biodiversity Conservation Act 2016*
ground-disturbing activities	Activities that are associated with the substantial implementation of a proposal including but not limited to, digging (with mechanised equipment), blasting, earthmoving, vegetation clearance, grading, gravel extraction, construction of new or widening of existing roads and tracks.
ha	Hectare
Management actions	Identified actions undertaken to mitigate the impacts of implementation of a proposal on the environment and achieve the condition environmental objective.
Management targets	A measurable boundary of acceptable impact with proposal or site specific parameters, that assesses the efficacy of **management actions** against the condition environmental objective and beyond which **management actions** have to be reviewed and revised. Proposal- or site-specific parameters may include location, scale, time period, specific species/ population/community and a relative benchmark (e.g. baseline or reference).
On-ground Management Actions	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.
On-going Management Actions	This includes any management actions (in addition to and longer-term than ***on-ground management actions)*** required to ensure enduring conservation outcomes for the environmental values being offset. Actions may include fencing, fence maintenance and access management, weed control, firebreaks and feral animal control to maintain and/or improve environmental values of the offset.
viability	means the ability of the western ringtail possums to persist in a similar size and occupancy within the ***western ringtail habitat areas***
western ringtail habitat areas	Areas within a minimum of 750 metres of the development envelope known to support or have the potential to support western ringtail possums (*Pseudocheirus occidentalis*). This includes stands of myrtaceous trees (predominantly Peppermint Trees (*Agonis flexuosa*) growing near watercourses or floodplains; stands of Marri (*Corymbia calophylla)* and / or Jarrah (*Eucalyptus marginata*); or riparian woodland vegetation within a minimum of 750 metres of the development envelope.

Figures (attached)

Figure 1 Development envelope
Figure 2 Black stripe minnow habitat
Figure 3 Carter's freshwater mussel locations
Figure 4 Threatened Ecological Communities *Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrublands of the Swan Coastal Plain (FCT3c) and Herb rich shrublands on clay pans (FCT08) indirect impact areas

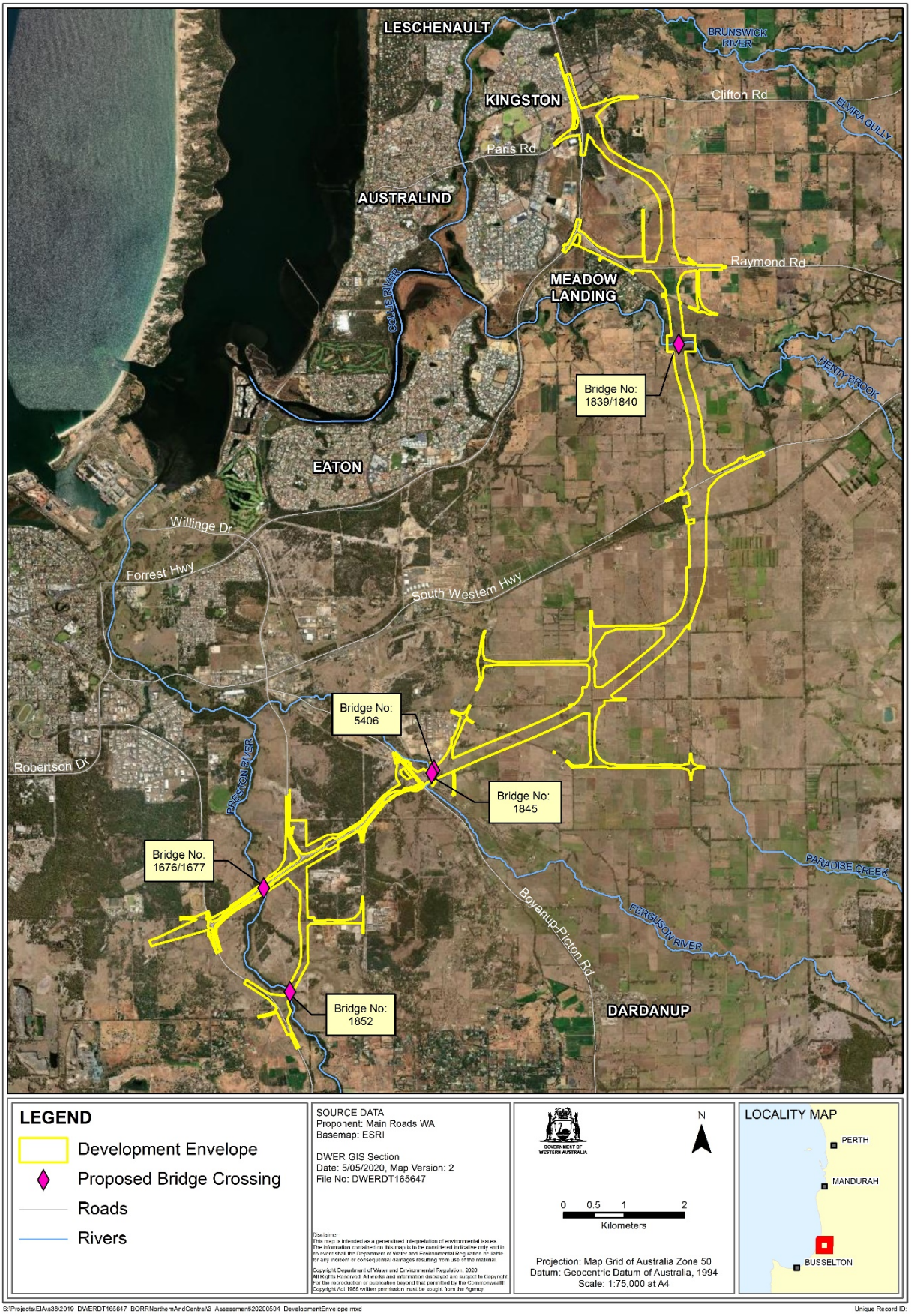

Figure 1: Development envelope

Figure 2: Black stripe minnow habitat

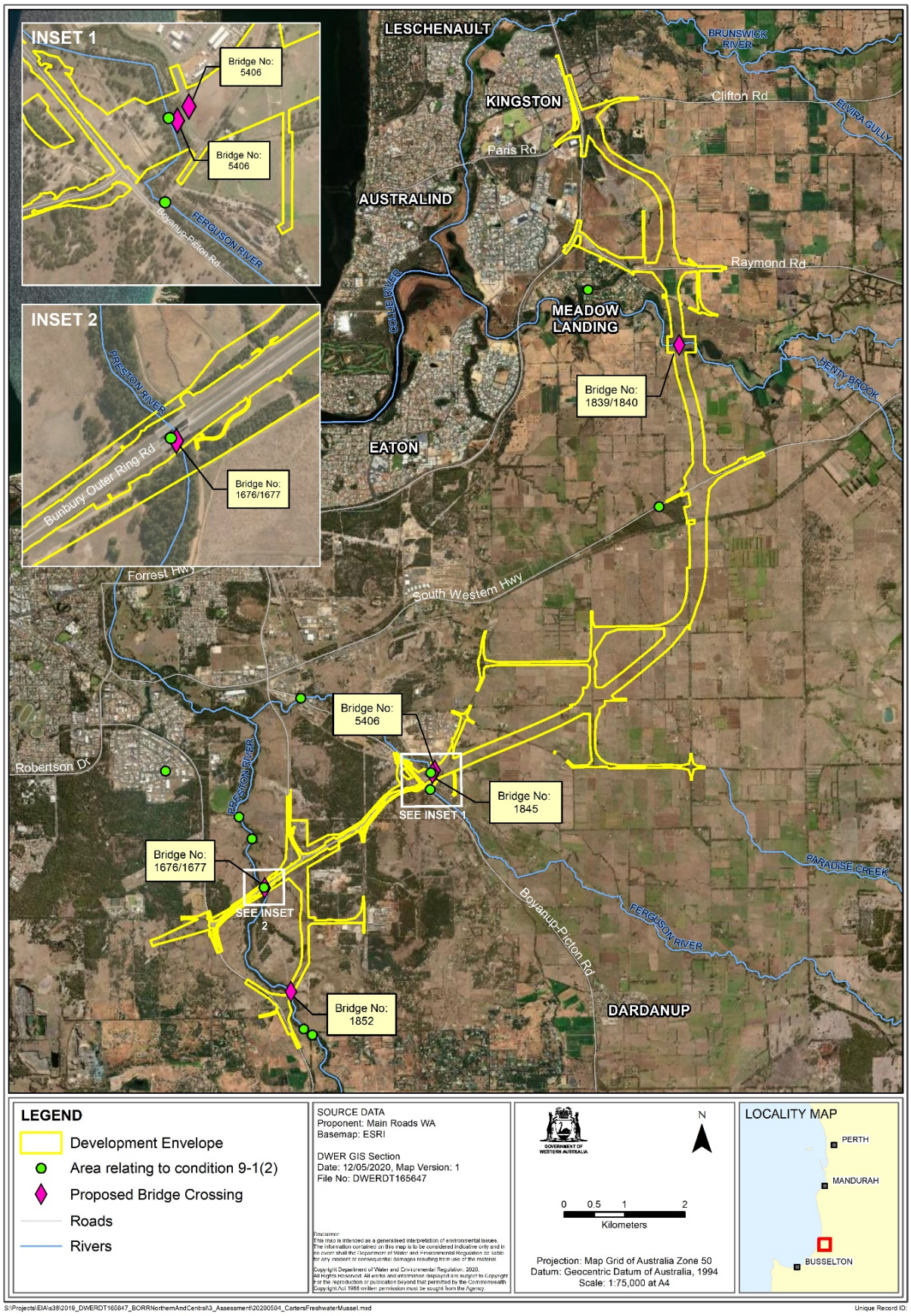

Figure 3: Carter's freshwater mussel locations

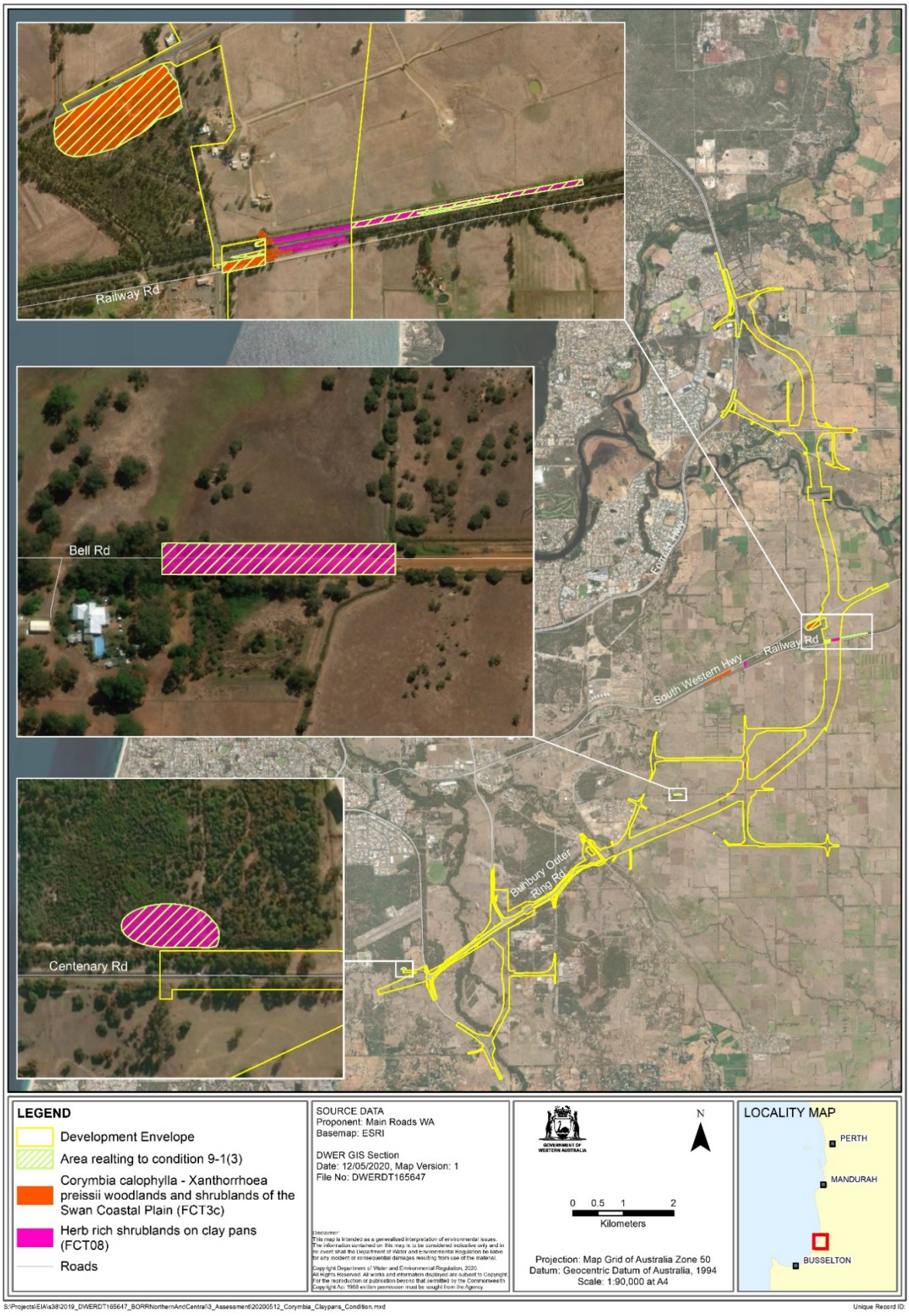

Figure 4: Threatened Ecological Communities *Corymbia calophylla* – *Xanthorrhoea preissii* woodlands and shrublands of the Swan Coastal Plain (FCT3c) and Herb rich shrublands on clay pans (FCT08) indirect impact areas

Schedule 2

Coordinates defining the development envelope in Figure 1; black stripe minnow habitat and observations in Figure 2; Carter's freshwater mussel locations in Figure 3 and Threatened Ecological Communities FCT3c and FCT08 locations in Figure 4 are held by the Department of Water and Environmental Regulation, Document Reference Number DWERDT288822.