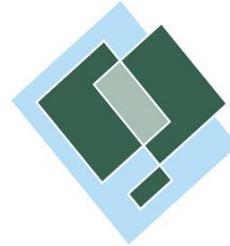




mainroads
WESTERN AUSTRALIA



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MAIN ROADS WESTERN AUSTRALIA

BUSSELL HIGHWAY DUPLICATION - HUTTON TO SABINA

REFERRAL OF A PROPOSED ACTION UNDER THE *ENVIRONMENT
PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999*

23 SEPTEMBER 2020

DOCUMENT ID: MRW-BHD-EPB-01

PREPARED FOR MAIN ROADS WESTERN AUSTRALIA
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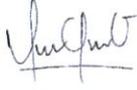
Document Title	EPBC Referral – Bussell Highway Duplication - Hutton to Sabina		
Document Number	MRW-BHD-EPB-01		
Revision Number	0		23/09/2020
Status	Final		
Author	Marilyn Quintero Preston Consulting Pty Ltd	 Signature	23/09/2020
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Approved	Guy Watson, Main Roads Western Australia	 Signature	23/09/2020



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1 SUMMARY OF YOUR PROPOSED ACTION

1.1 PROJECT INDUSTRY TYPE

Transport - Land

1.2 PROVIDE A DETAILED DESCRIPTION OF THE PROPOSED ACTION, INCLUDING ALL PROPOSED ACTIVITIES

Bussell Highway is the main link between Perth, Bunbury and the Busselton – Margaret River area, supporting the tourism, forestry and agricultural industries in the region. It is also an important commuter link for residents who live in the Busselton or Margaret River area and work in the Bunbury or Perth Metropolitan areas.

Bussell Highway between Bunbury and Busselton is 46 km in length and is dual carriageway in both directions, with the exception of a 17.85 km section between Capel and the Sabina River, east of Busselton, which is a two-lane single carriageway with passing lanes. Traffic flow currently exceeds the capacity of the single carriageway section resulting in congestion, delays and safety concerns. With a current traffic growth rate in the order of 5% per annum, periods of congestion on this major rural highway are predicted to become more frequent and longer in duration.

Main Roads Western Australia (Main Roads) is planning to construct a second carriageway along the 17.85 km section between Capel and the Sabina River, to provide dual carriageway access along the entire 46 km portion of the highway between Bunbury and Busselton (the Bussell Highway Duplication). Of the 17.85 km of proposed works, a 5.55 km section (Stage 1) has previously been approved under EPBC 2015/7626, and the remaining 12.3 km section (Stage 2) has not yet been assessed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

This Proposed Action is the construction of a 12.3 km two-lane carriageway (southbound) to duplicate the existing carriageway effectively between Hutton Road and the Sabina River bridge (Figure 1) and other road infrastructure including, but not limited to, bridges, culverts, lighting, noise barriers, fencing, landscaping, road safety barriers and signs.

The Proposed Action will upgrade this section of Bussell Highway to a four-lane highway with lane widths of 3.5 m across the two lanes. The left shoulder width is to be 2.5 m and will be fully sealed. The right shoulder width (median strip) is to be 1.5 m fully sealed. The total median width from edge to edge is to be a minimum of 27 m with a target width of 31 m.

The area within which the Proposed Action will occur is 128 hectares (ha) in size and referred to in this referral document as the Referral Area (Figure 1). Although the majority of the Referral Area is largely degraded or completely cleared, a total of 22.18 ha of vegetation (based on vegetation densities) is proposed to be cleared within the Referral Area to implement the Proposed Action.

Vegetation clearing will be followed by stripping of topsoil, followed by embankment construction and excavation before road layer works.



Licensing approvals under the *Rights in Water and Irrigation Act 1914* (WA) will be sought should the use of groundwater be required. Drainage and bridges will be designed to maintain existing surface water flows along the route.

Dust management will be managed during earthworks through the use of dust suppressants, water carts and other appropriate techniques. Apart from vehicle and machinery exhaust emissions, no other emissions are expected to be released by construction of the Proposed Action.

The construction of the road and bridgeworks will be conducted by a private construction contractor, on behalf of, and with oversight by Main Roads. No additional clearing will be required for laydown areas, site offices etc.

1.3 WHAT IS THE EXTENT AND LOCATION OF YOUR PROPOSED ACTION?

Note that this will be marked on EPBC website when submitting.

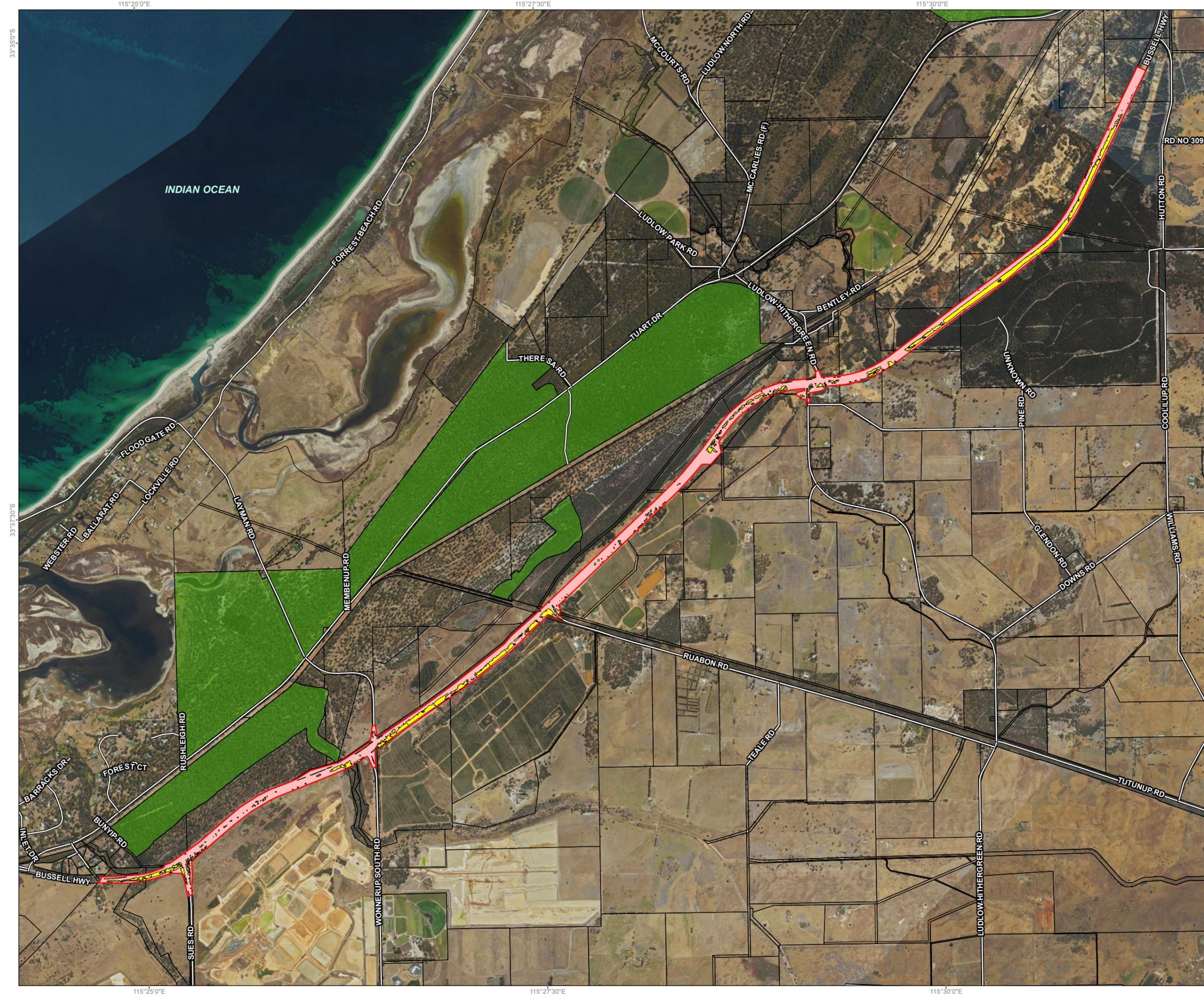
1.3.1 UPLOAD A SPATIAL FILE

Shape files have been uploaded.

1.4 UPLOAD IMAGES OF THE PROPOSED ACTION AREA (INCLUDING DISTURBANCE FOOTPRINT, AVOIDANCE FOOTPRINT (IF RELEVANT) AND MNES HABITAT AREA/S) AND IF AVAILABLE, A COMPLIANT GIS FILE. THE ACCEPTED FILE TYPES ARE: ZIP, .KML, .KMZ, .SHP OR .PDF.

Figure 1 - Figure 7 and GIS files have been uploaded.





Legend

- Proposed Action Referral Area
- Clearing Area
- Cadastre
- Tuart Forest National Park

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
 - LOCALITY MAP SOURCED LANDGATE 2006

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0 250 500 750 1,000
 metres
 Scale: 1:35,000 @ A3

LOCALITY MAP

CREATED BY	JOB	DATE	REVISION
ENVIRONMAPS	PC2900231	17/09/2020	0

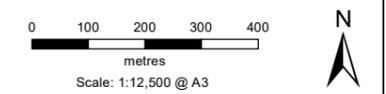
Main Roads

Figure 1: Proposed Action Referral Area and Clearing Areas



- Legend**
- Proposed Action Referral Area
 - Clearing Area
 - Cadastre
 - Tuart Forest National Park
 - Black Cockatoo Foraging Habitat
- Suitable DBH Trees**
- Outside Clearing Area
 - Inside Clearing Area
 - + Inside Clearing Area Containing Hollows

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
 - LOCALITY MAP SOURCED LANDGATE 2006



LOCALITY MAP



CREATED BY	JOB	DATE	REVISION
ENVIRONMAPS	PC2900231	21/09/2020	0

Main Roads

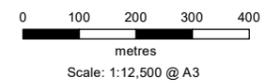
Figure 2: MNES habitat areas - Black Cockatoo foraging habitat and suitable DBH trees (1 of 3)



Legend

- Proposed Action Referral Area
 - Clearing Area
 - Cadastre
 - Tuart Forest National Park
 - Black Cockatoo Foraging Habitat
- Suitable DBH Trees
- Outside Clearing Area
 - Inside Clearing Area
 - + Inside Clearing Area Containing Hollows

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
- LOCALITY MAP SOURCED LANDGATE 2006



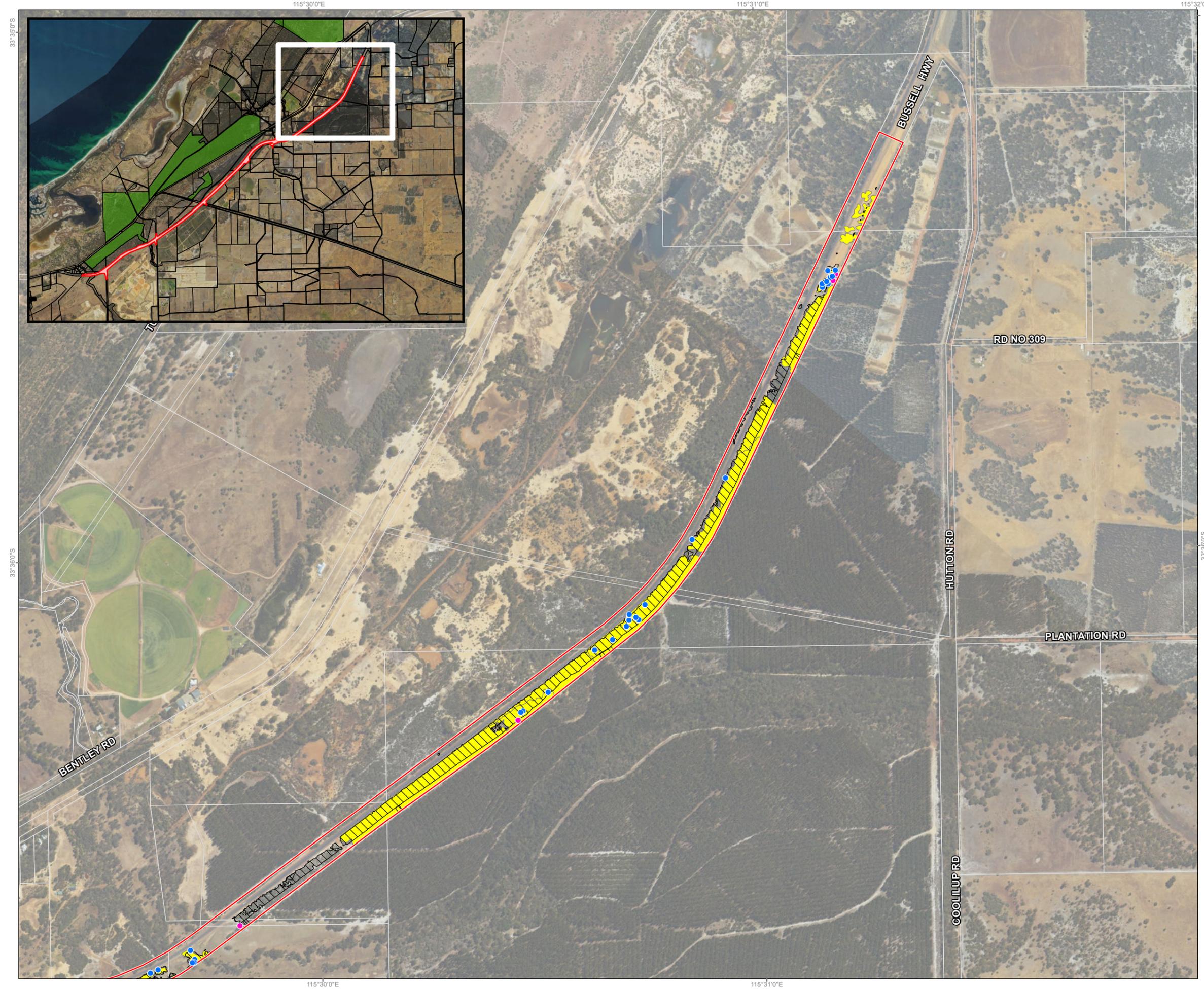
LOCALITY MAP



CREATED BY	JOB	DATE	REVISION
ENVIRONMAPS	PC2900231	21/09/2020	0

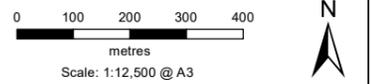
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Figure 3: MNES habitat areas - Black Cockatoo foraging habitat and suitable DBH trees (2 of 3)



- Legend**
- Proposed Action Referral Area
 - Clearing Area
 - Cadastral
 - Tuart Forest National Park
 - Black Cockatoo Foraging Habitat
- Suitable DBH Trees
- Outside Clearing Area
 - Inside Clearing Area
 - + Inside Clearing Area Containing Hollows

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
 - LOCALITY MAP SOURCED LANDGATE 2006



LOCALITY MAP



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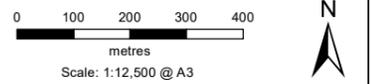
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Figure 4: MNES habitat areas - Black Cockatoo foraging habitat and suitable DBH trees (3 of 3)



- Legend**
- Proposed Action Referral Area
 - Clearing
 - Cadastre
 - Tuart Forest National Park
 - Western Ringtail Possum (*Pseudocheirus occidentalis*) Foraging Habitat
- Western Ringtail Possum (*Pseudocheirus occidentalis*) Sighting Location
- Inside Clearing
 - Outside Clearing

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
 - LOCALITY MAP SOURCED LANDGATE 2006



LOCALITY MAP



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Figure 5: MNES habitat areas - Western Ringtail Possum foraging habitat and recorded sightings (1 of 3)



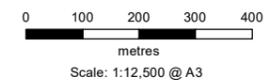
33°37'0"S

33°38'0"S

Legend

- Proposed Action Referral Area
- Clearing
- Cadastre
- Tuart Forest National Park
- Western Ringtail Possum (*Pseudocheirus occidentalis*) Foraging Habitat
- Western Ringtail Possum (*Pseudocheirus occidentalis*) Sighting Location**
- Inside Clearing
- Outside Clearing

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
 - LOCALITY MAP SOURCED LANDGATE 2006



LOCALITY MAP



CREATED BY	JOB	DATE	REVISION
ENVIRONMAPS	PC2900231	21/09/2020	0

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Figure 6: MNES habitat areas - Western Ringtail Possum foraging habitat and recorded sightings (2 of 3)



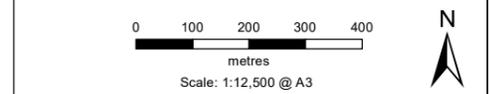
Legend

- Proposed Action Referral Area
- Clearing
- Cadastre
- Tuart Forest National Park
- Western Ringtail Possum (*Pseudocheirus occidentalis*) Foraging Habitat

Western Ringtail Possum (*Pseudocheirus occidentalis*) Sighting Location

- Inside Clearing
- Outside Clearing

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
 - LOCALITY MAP SOURCED LANDGATE 2006



CREATED BY	JOB	DATE	REVISION
ENVIRONMAPS	PC2900231	21/09/2020	0

Main Roads

Figure 7: MNES habitat areas - Western Ringtail Possum foraging habitat and recorded sightings (3 of 3)

1.5 PROVIDE A BRIEF PHYSICAL DESCRIPTION OF THE PROPERTY ON WHICH THE PROPOSED ACTION WILL TAKE PLACE AND THE LOCATION OF THE PROPOSED ACTION (E.G. PROXIMITY TO MAJOR TOWNS, OR FOR OFF-SHORE ACTIONS, SHORTEST DISTANCE TO MAINLAND)

The Proposed Action will take place at a section of Bussell Highway referred to as the “Hutton to Sabina Section”. It starts at approximately 950 m west of Hutton Road to 450 m west of the Sabina River crossing (Figure 1). The Hutton to Sabina Section occurs in the Shire of Capel and the City of Busselton.

The Proposed Action is located approximately 6 km east of the Busselton town site on the Swan Coastal Plain. Elevation on site falls from 20 m above sea level in the north-east to 10 m in the south west. According to the Shire of Busselton Town Planning Scheme 20, the Referral Area is currently zoned as Highway, adjacent to agriculture and recreation zones. Under the Shire of Capel Town Planning Scheme 7, the Referral Area is currently zoned as Primary Regional Road adjacent to rural and state forest zones (EcoEdge, 2014).

1.6 WHAT IS THE SIZE OF THE PROPOSED ACTION AREA DEVELOPMENT FOOTPRINT (OR WORK AREA) INCLUDING DISTURBANCE FOOTPRINT AND AVOIDANCE FOOTPRINT (IF RELEVANT)?

The Proposed Action area development footprint is 128 ha in size and referred to as the Referral Area, and includes 22.18 ha of vegetation clearing. The Referral Area and vegetation clearing area are illustrated in Figure 1.

1.7 PROPOSED ACTION LOCATION

Select: Lot

Bussell Highway, from 950 m west of Hutton Road to 450 m west of the Sabina River bridge.

1.8 PRIMARY JURISDICTION

Western Australia



1.9 HAS THE PERSON PROPOSING TO TAKE THE ACTION RECEIVED ANY AUSTRALIAN GOVERNMENT GRANT FUNDING TO UNDERTAKE THIS PROJECT?

Yes

1.9.1 PROVIDE DETAIL

The Proposed Action is Stage 2 of the Bussell Highway Duplication Project. On 21 June 2019, the Australian and State Government announced \$85 million in funding has been allocated for construction works to commence.

1.10 IS THE PROPOSED ACTION SUBJECT TO LOCAL GOVERNMENT PLANNING APPROVAL?

No

1.11 PROVIDE AN ESTIMATED START AND ESTIMATED END DATE FOR THE PROPOSED ACTION

Start Date: 15/10/2021

End Date: 15/12/2022

1.12 PROVIDE DETAILS OF THE CONTEXT, PLANNING FRAMEWORK AND STATE AND/OR LOCAL GOVERNMENT REQUIREMENTS

The Proposed Action will also be referred to the WA Environmental Protection Authority (EPA) under Section 38 of the *Environmental Protection Act 1986* (EP Act). State and Commonwealth approval processes will be kept separate.

1.13 DESCRIBE ANY PUBLIC CONSULTATION THAT HAS BEEN, IS BEING OR WILL BE UNDERTAKEN, INCLUDING WITH INDIGENOUS STAKEHOLDERS

Main Roads has held discussions with landowners along the proposed duplication route and the Shire of Capel and City of Busselton.

Consultation is being undertaken in accordance with Main Roads Community and Stakeholder Engagement Strategy.



As part of Main Roads Community and Stakeholder Engagement Strategy, Indigenous stakeholder consultation was undertaken within the Heritage assessment process.

Consultation is expected to be ongoing throughout the planning and construction phase of the Proposed Action.

1.14 DESCRIBE ANY ENVIRONMENTAL IMPACT ASSESSMENTS THAT HAVE BEEN OR WILL BE CARRIED OUT UNDER COMMONWEALTH, STATE OR TERRITORY LEGISLATION INCLUDING RELEVANT IMPACTS OF THE PROJECT

Main Roads will be submitting a Section 38 referral to EPA under the EP Act in Q4 2020. Main Roads intends to keep the State and Commonwealth approval processes separate.

The impacts to two 'Potential Key Environmental Factors' may be considered significant:

Flora and Vegetation, primarily due to the disturbance of:

- 22.18 ha of vegetation, including species listed under the *Biodiversity Conservation Act 2016* (WA; BC Act);
- Four Priority flora species listed by the Department of Biodiversity, Conservation and Attractions (DBCA) including *Eucalyptus rudis* subsp. *cratyantha* (Flooded Gum) (Priority 4) – eleven individuals, *Synaphea petiolaris* subsp. *simplex* (Priority 3) – one individual, *S. hians* (Priority 3) – two individuals and *Verticordia attenuata* (Priority 3) – 13 individuals (Ecoedge, 2014);
- 2.5 ha vegetation of representative of DBCA listed Priority 1 Ecological Community – Busselton Yate Community; and
- Three vegetation types that have less than 30% of their pre-European extent remaining.

Terrestrial Fauna, primarily due to the disturbance of:

- 22.18 ha of potential habitat for fauna, including species listed under the BC Act and EPBC Act;
- 118 suitably sized diameter at breast height (DBH) trees (Suitable DBH Trees) not containing hollows that may be used in the future for Black Cockatoo nesting if suitable hollows develop; and
- Two Suitable DBH Trees with unused, suitably sized hollows potentially suitable for Black Cockatoo nesting.

1.14.1 ATTACH COPIES OF COMMONWEALTH, STATE AND/OR TERRITORY GOVERNMENT APPROVALS AND CONSENT CONDITIONS

N/A



1.15 IS THIS ACTION PART OF A STAGED DEVELOPMENT (OR A COMPONENT OF A LARGER PROJECT)?

Yes

1.15.1 PROVIDE INFORMATION ABOUT THE LARGER ACTION AND DETAILS OF ANY INTERDEPENDENCY BETWEEN THE STAGES/COMPONENTS AND THE LARGER ACTION

This Proposed Action is a section of the 'Bussell Highway Duplication Project'. The project covers 17.85 km between Capel and north of Busselton, consisting of two stages. Stage 1 is a section of 5.55 km from Capel Bypass to Hutton Road, previously approved under EPBC 2015/7626. Stage 2 (this Proposed Action) is a 12.3 km section from Hutton Road to Sabina River bridge.

1.16 IS THE PROPOSED ACTION RELATED TO OTHER ACTIONS OR PROPOSALS IN THE REGION?

Yes.

1.16.1 IDENTIFY THE NATURE/SCOPE AND LOCATION OF THE RELATED ACTION (INCLUDING UNDER THE RELEVANT LEGISLATION)

EPBC 2015/7626 Stage 1 of the Bussell Highway Duplication Project, as mentioned above.



2 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

2.1 IS THE PROPOSED ACTION LIKELY TO HAVE ANY DIRECT OR INDIRECT IMPACT ON THE VALUES OF ANY WORLD HERITAGE PROPERTIES?

No.

2.2 IS THE PROPOSED ACTION LIKELY TO HAVE ANY DIRECT OR INDIRECT IMPACT ON THE VALUES OF ANY NATIONAL HERITAGE PLACES?

No.

2.3 IS THE PROPOSED ACTION LIKELY TO HAVE ANY DIRECT OR INDIRECT IMPACT ON THE ECOLOGICAL CHARACTER OF A RAMSAR WETLAND?

Yes

2.3.1 IMPACT TABLE

Wetland

Vasse - Wonnerup System

Impact

The Proposed Action passes within 500 m of a Ramsar wetland (the Vasse - Wonnerup System), and intersects the Ludlow, Abba and Sabina Rivers that all drain into the wetland when flowing (generally in the wetter months). If not managed properly, construction works may have the potential to release sediment into these surface water features via run-off from cleared construction areas, or during bridge construction works.

Main Roads has well-established mitigation measures to avoid and minimise the sedimentation of surface water (Section 4), including conducting bridge earthworks during summer, and installing sediment traps and bunds where required.

With the implementation of mitigation measures, it is unlikely that the Proposed Action will significantly impact the Vasse – Wonnerup System wetland.



2.3.2 DO YOU CONSIDER THIS IMPACT TO BE SIGNIFICANT?

No

2.4 IS THE PROPOSED ACTION LIKELY TO HAVE ANY DIRECT OR INDIRECT IMPACT ON THE MEMBERS OF ANY LISTED SPECIES OR ANY THREATENED ECOLOGICAL COMMUNITY, OR THEIR HABITAT?

Yes

2.4.1 IMPACT TABLE

Table 1: Impact table

Species or threatened ecological community	Impact
<p>Listed Threatened Ecological Communities (TECs) (refer to Protected Matters Search Tool Report (PMST) Report in Attachment 1):</p> <ul style="list-style-type: none"> Banksia Woodlands of the Swan Coastal Plain Clay Pans of the Swan Coastal Plain Subtropical and Temperate Coastal Saltmarsh Tuart (<i>Eucalyptus gomphocephala</i>) Woodlands and Forests of the Swan Coastal Plain 	<p>Likelihood of occurrence: No Listed TECs within the Referral Area. Ecoedge (2014) did not identify any vegetation that was representative of these communities. A targeted survey was also conducted by Ecoedge (2020) of a small portion of vegetation to determine whether it represented the Tuart Woodlands and Forests of the Swan Coastal Plain TEC. It was determined that this TEC did not occur within the Referral Area.</p> <p>Potential impacts: N/A</p> <p>Significance of impacts: N/A</p>
<p>Wetland and marine fauna species (PMST Report in Attachment 1)</p>	<p>Likelihood of occurrence: No wetland and marine fauna species were identified within the Referral Area. 360 Environmental (2017) conducted a likelihood assessment for these species and determined that there was no suitable habitat for these species within the Referral Area. None of these species were identified during field surveys.</p> <p>Potential impacts: N/A</p> <p>Significance of impacts: N/A</p>
<p>Baudin's Cockatoo - <i>Calyptorhynchus baudinii</i> (Endangered)</p>	<p>Proposed Action may have a minor residual impact on Baudin's Cockatoo.</p> <p>Likelihood of occurrence: Likely as suitable habitat is present in the Survey Area and the Survey Area is in the species' known distribution.</p> <p>Baudin's Cockatoo was present in the three databases searched (DBCA threatened fauna database, NatureMap and EPBC PMST). However, no birds were seen or heard in the Survey Area or flying over during the assessment and no foraging evidence was recorded. The DBCA threatened fauna database has 19 records of the Baudin's</p>



Species or threatened ecological community	Impact
	<p>Cockatoo from 1999 - 2013. This species was recorded during surveys undertaken in 2013 near Wonnerup North, which is located approximately 3 km east of the Proposal Area (Biologic, 2014). Sections of the Survey Area contain species such as Marri (<i>Corymbia calophylla</i>) that provide potential suitable foraging habitat for Baudin's Cockatoo (360 Environmental, 2017).</p> <p>Potential impacts:</p> <ul style="list-style-type: none"> • Clearing of 18.0 ha of potential foraging habitat • Clearing of two Suitable DBH Trees with unused, suitably sized nesting hollows • Clearing of 118 Suitable DBH Trees without hollows <p>Significance of impacts:</p> <p>The potential impacts described above have been assessed against DAWE's Significant Impact Guidelines 1.1 (Department of the Environment (DotE), 2013) and guidance in the Forest Black Cockatoo (Baudin's Cockatoo <i>Calyptorhynchus baudinii</i> and Forest Red-tailed Black Cockatoo <i>Calyptorhynchus banksii naso</i>) Recovery Plan (DEC, 2008).</p> <p><u>Lead to a long-term decrease in the size of a population:</u></p> <p>The total population of the species is estimated to be 12,500 (Garnett et al., 2011). The population is believed to have declined greatly since the 1950s (Johnstone & Storr, 1998), although there are no quantitative data available. The species is most numerous in the far south-west during the breeding season (October - January) (Johnstone & Kirkby, 2008).</p> <p>The mobility of Baudin's Cockatoo, and the continuity of the forest habitat, suggest that discrete subpopulations are unlikely to exist and the species occurs as a single, contiguous population (Garnett & Cowley, 2000).</p> <p>The Proposed Action will not result in the loss of any trees currently being utilised by this species for breeding. The Proposed Action will result in an 18.0 ha reduction in potential foraging habitat for this species over 12.3 km. The foraging habitat to be disturbed is a mix of remnant and regrowth vegetation interspersed with larger portions of cleared land, within a narrow strip alongside an existing road corridor. An estimated 7,500 ha of remnant vegetation (likely foraging habitat) is located within 10 km of the Proposed Action. Large areas of suitable and higher value foraging habitat are located within the immediate area, including approximately 2,000 ha of remnant vegetation within the Tuart Forest National Park and 300 ha of pine plantation within the Coolilup State Forest. The loss of 18.0 ha of foraging habitat therefore represents less than 1% of the extent of protected foraging habitat in the immediate area based only on habitat within the Tuart Forest National Park.</p> <p>Given the presence of large areas of suitable foraging habitat in the area, the linear nature of clearing, the range of this species and the lack of known nesting hollows that will be disturbed, the Proposed Action is unlikely to lead to a long-term decrease in the population of this species.</p> <p><u>Reduce the area of occupancy of the species:</u></p> <p>Baudin's Cockatoo mainly occurs in eucalypt forests, especially Jarrah (<i>Eucalyptus marginata</i>), Marri and Karri (<i>Eucalyptus diversicolor</i>) forest. Sections of the disturbance footprint contain species such as Marri that provide potential suitable foraging habitat for Baudin's Cockatoo (360 Environmental, 2017) however, as discussed above this clearing is likely to be minor on a local or regional scale. This clearing represents a loss of less approximately 1% of suitable foraging habitat in the immediate vicinity of the Referral Area and does not take into account non-native vegetation such as the 300 ha pine plantation immediately south of the Referral Area in the Coolilup State Forest.</p> <p>The area of occupancy for this species will therefore not be significantly reduced as a result of the Proposed Action.</p> <p><u>Fragment an existing population into two or more populations:</u></p> <p>The Proposed Action is to duplicate the existing Bussell Highway. As such, the Proposed Action will not introduce any new fragmentation of Baudin's Cockatoo populations.</p> <p>The clearing of Baudin's Cockatoo habitat will occur as a relatively narrow linear strip adjacent to the existing Bussell Highway. Whilst this will nominally increase the distance between the areas of the foraging habitat occurring on either side of the Bussell Highway, the increase in the separation distance will not be significant to an extent that Baudin's Cockatoo would be fragmented into two or more populations, nor</p>



Species or threatened ecological community	Impact
	<p>introduce fragmentation that would restrict the movement of Baudin's Cockatoo across the Bussell Highway.</p> <p>The Proposed Action is therefore unlikely to fragment an existing population into two or more populations.</p> <p><u>Adversely affect habitat critical to the survival of a species:</u></p> <p>The Recovery Plan for this species (DEC, 2008) defines habitat critical to the survival of this species as areas:</p> <ul style="list-style-type: none"> • Currently occupied by the cockatoos; • Not currently occupied by the cockatoos due to recent fire but capable of supporting cockatoo populations when sufficiently recovered; • Of natural vegetation in which the cockatoos nest, feed and roost; • Of natural vegetation through which the cockatoos can move from one occupied area to another; and • Of suitable vegetation within the recorded range in which undiscovered cockatoo populations may exist. <p>DEC (2008) also provides a further definition specifically for Baudin's Cockatoo; all Marri, Karri and Jarrah forests, woodlands and remnants in the south-west of Western Australia receiving more than 600 mm of annual average rainfall.</p> <p>The Proposed Action will not result in the loss of any trees currently being utilised by this species for breeding. It will result in an 18.0 ha reduction in potential foraging habitat for this species, which is a mix of remnant and regrowth vegetation interspersed with larger areas of cleared land, within a narrow strip alongside an existing road corridor. The disturbance represents approximately 1% of the extent of protected foraging habitat in the immediate area based only on habitat within the Tuart Forest National Park.</p> <p>Given the presence of large areas of suitable continuous foraging and breeding habitat in the area, the habitat to be disturbed is unlikely to be critical to the survival of this species.</p> <p><u>Disrupt the breeding cycle of a population:</u></p> <p>Baudin's Cockatoo breeds in the Jarrah, Jarrah-Marri, Marri and Karri forests of the far south-west in areas averaging more than 750 mm of rainfall annually. Breeding generally occurs in woodland or forest but may also occur in former woodland or forest now present as isolated trees. Nesting occurs in hollows in live or dead trees of Karri, Marri, Wandoo and Tuart (DSEWPac, 2012). During the breeding season feeding primarily occurs in native vegetation, particularly Marri (DSEWPac, 2012).</p> <p>Three species of Eucalypts, Marri, Tuart and Flooded Gum recorded in the Survey Area are considered Black Cockatoo breeding habitat. Two trees contained hollows of suitable size for which Black Cockatoos could potentially nest, however no breeding evidence was noted (Harewood, 2018). 120 Suitable DBH Trees occur within the clearing area.</p> <p>Given there are no known nesting hollows within the clearing area and the adjacent foraging areas nearby, the Proposed Action is unlikely to disrupt the current breeding behaviour of a population.</p> <p>The Proposed Action is therefore not considered likely to disrupt the breeding cycle of a population.</p> <p><u>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline:</u></p> <p>The Proposed Action will decrease the availability of habitat for the Baudin's Cockatoo by up to 18.0 ha, however this represents approximately 1% of the available protected foraging and breeding habitat in the immediate area, based only on habitat within the Tuart Forest National Park. Given the range of this species and the presence of large areas of suitable habitat in the local area (potentially up to 7,500 ha), this loss of habitat is unlikely to lead to the decline of this species.</p> <p><u>Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat:</u></p> <p>No additional invasive species are likely to be introduced.</p>



Species or threatened ecological community	Impact
	<p>The DEC (2008) [now DBCA] identify the potential threats to the survival of Baudin's Cockatoo as including nest competition from feral bees (such as <i>Apis mellifera</i> (Honey bee)) and other native invasive species. The Proposed Action does not involve any actions which could potentially introduce Honeybees into the Proposed Action Area.</p> <p><u>Introduce disease that may cause the species to decline:</u></p> <p>Loss and degradation of habitat by secondary impacts such as the introduction of diseases including <i>Phytophthora cinnamomi</i> (Dieback) and <i>Quambalaria coyrecup</i> (Marri Canker) or weed invasion could result from the Proposed Action.</p> <p>Dieback infested vegetation was identified at the junction of Ruabon Road and the Bussell Highway (Great Southern Bio Logic, 2020). Disease expression was limited to the northern side of the highway however, the identified deaths were associated with a roadside drain that linked both sides via an underground culvert. Therefore, the extent of the infested area has been extended to cover vegetation along the drain on either side of the Bussell Highway.</p> <p>A second infested area was identified at the eastern end of the Study Area, with a positive sample being collected from the southern side of the highway in vegetation that was draining across the road.</p> <p>The disease status of Black Cockatoos in the wild remains unknown, although infectious diseases such as beak and feather disease, avian polyomavirus and chlamydophilosis may pose a threat, as they are significant in other captive and free-living psittacine species. The Proposed Action does not involve any actions which could potentially introduce infectious diseases within Baudin's Cockatoo populations which could cause the taxon to decline.</p> <p>Without controls, the Proposed Action could spread or introduce Dieback to Baudin's Cockatoo habitat. Dieback hygiene and management measures / procedures will be implemented to prevent the introduction or spread of Dieback as a result of construction and operation and significant impacts are considered unlikely.</p> <p><u>Interfere with the recovery of the species:</u></p> <p>The Recovery Plan (DEC, 2008) for this species provides measures for the species' recovery. These include identifying, protecting and managing important habitat. The Proposed Action will result in the clearing of up to 18.0 ha of habitat including two trees with suitable, but unused, nesting hollows for Black Cockatoos, and 118 Suitable DBH Trees without hollows.</p> <p>Species recovery of Baudin's Cockatoo, as defined by the Recovery Plan (DEC 2008) is dependent upon preventing further decline in the breeding populations and to ensure their persistence throughout their range in the south-west of WA.</p> <p>The Proposed Action is unlikely to interfere with the recovery of the species as the Proposed Action will not clear any trees with known active nesting hollows. An abundance of alternative foraging and breeding habitat is present within the region, therefore the clearing of 18.0 ha of habitat is unlikely to impact breeding success by reducing available food resources for breeding pairs.</p> <p>The Proposed Action is unlikely to interfere with the recovery of the species.</p> <p><u>Mitigation:</u></p> <p>Main Roads has currently revegetated approximately 30 ha of suitable Black Cockatoo and Western Ringtail Possum (WRP) habitat adjacent to the Referral Area. Once established, this habitat will support the fauna species affected from the Proposed Action clearing.</p> <p>Main Roads is also working with DBCA on the purchase/revegetation of several hundred hectares of land within the City of Bunbury and Shires of Capel and Busselton.</p> <p><u>Summary:</u></p> <p>Given the scale and nature of the Proposed Action, and the revegetation mitigation proposed, it is considered that the clearing of up to 18.0 ha of Baudin's Cockatoo habitat is not significant according to the Significant Impact 1.1. Guidelines.</p>
Carnaby's Cockatoo - <i>Calyptorhynchus latirostris</i> (Endangered)	<p>Proposed Action may have a minor residual impact on Carnaby's Cockatoo.</p> <p>Likelihood of occurrence: Recorded during the field assessment.</p> <p>Carnaby's Cockatoo was present in the three databases searched (DBCA threatened fauna database, NatureMap and EPBC PMST) and was observed flying over during the field assessment. Foraging evidence in the form of chewed Marri nuts and to a much</p>



Species or threatened ecological community	Impact
	<p>lesser extent on Banksia cones were observed in sections of the Survey Area. There were chewed Pine Cones in some areas outside of the Pine Plantation section of the Survey Area, though they were typically found adjacent to Pine Plantations.</p> <p>Potential impacts:</p> <ul style="list-style-type: none"> • Clearing of 18.0 ha of potential foraging habitat • Clearing of two Suitable DBH Trees with unused, suitably sized nesting hollows • Clearing of 118 Suitable DBH Trees without hollows <p>Significance of impacts:</p> <p>The potential impacts described above have been assessed against the DAWE's Significant Impact Guidelines 1.1 (DotE, 2013) and guidance in the Carnaby's Cockatoo (<i>Calyptorhynchus latirostris</i>) Recovery Plan (DPaW, 2013).</p> <p><u>Lead to a long-term decrease in the size of a population:</u></p> <p>Carnaby's Cockatoo occurs widely throughout south-western WA, from the lower Murchison in the north and south to Esperance, and as far east as Forrestania (Storr and Johnstone, 1998). Clearing in the southern Wheatbelt has resulted in two genetically distinct subpopulations: a western and an eastern (White et al., 2014).</p> <p>The south-western sub-population is relevant to the Proposed Action, which breeds in the wheatbelt, from the Stirling Ranges north-west to near Three Springs, but has also been recorded on the coastal plain to the south-west, around Bunbury (Higgins, 1999; Saunders, 1974b).</p> <p>Black Cockatoos are known to be mobile and widely distributed, and the variation in flock compositions (for example, between breeding and non-breeding seasons) (DSEWPac, 2012).</p> <p>The Proposed Action will not result in the loss of any trees currently being utilised by this species for breeding. The Proposed Action will result in an 18.0 ha reduction in potential foraging habitat for this species. The foraging habitat to be disturbed is a mix of remnant and regrowth vegetation interspersed with larger portions of cleared land, within a narrow strip alongside an existing road corridor. An estimated 7,500 ha of remnant vegetation (likely foraging habitat) is located within 10 km of the Proposed Action. Large areas of suitable and higher value foraging habitat are located within the immediate area, including approximately 2,000 ha of remnant vegetation within the Tuart Forest National Park and 300 ha of pine plantation within the Coolilup State Forest. The loss of 18.0 ha of foraging habitat therefore represents less than 1% of the extent of protected foraging habitat in the immediate area based only on habitat within the Tuart Forest National Park.</p> <p>Given the presence of large areas of suitable foraging habitat in the area, the range of this species and the lack of known nesting hollows that will be disturbed, the Proposed Action is unlikely to lead to a long-term decrease in the population of this species.</p> <p><u>Reduce the area of occupancy of the species:</u></p> <p>The area of occupancy is estimated at 10,000 km² (based on the number of 1 km² grid squares that the species is thought to occur in at the time when its population is most constrained). This estimate is considered to be of low reliability (Garnett et al. 2011). No specific information is available on the number of locations at which Carnaby's Cockatoo occurs. This is because the mobility and widespread distribution of the species makes it difficult to determine the number, or even to apply the concept, of discrete locations. Carnaby's Cockatoo is distributed throughout a single fragmented location in the south-west of WA (DPaW, 2013).</p> <p>Sections of the disturbance footprint contain species that provide potential suitable foraging habitat for Carnaby's Cockatoo (360 Environmental, 2017), however as discussed above this clearing is likely to be minor on a local or regional scale. This clearing represents 0.9% of suitable foraging habitat in the immediate vicinity of the Referral Area and does not take into account non-native vegetation such as pine plantation.</p> <p>The area of occupancy for this species will therefore not be significantly reduced as a result of the Proposed Action.</p> <p><u>Fragment an existing population into two or more populations:</u></p>



Species or threatened ecological community	Impact
	<p>The Proposed Action is to duplicate the existing Bussell Highway, as such that the Proposed Action will not introduce any new fragmentation of Carnaby's Cockatoo populations.</p> <p>The clearing of Carnaby's Cockatoo habitat will occur as a relatively narrow linear strip adjacent to the existing Bussell Highway. Whilst this will increase the distance between the areas of the foraging habitat occurring on either side of the Bussell Highway, the increase in the separation distance will not be significant to an extent that Carnaby's Cockatoo would be fragmented into two or more populations, nor introduce fragmentation that would restrict the movement of this species across the Bussell Highway.</p> <p>The Proposed Action is therefore unlikely to fragment an existing population into two or more populations.</p> <p><u>Adversely affect habitat critical to the survival of a species:</u></p> <p>The Recovery Plan for this species (DPaW, 2013) defines habitat critical to the survival of this species as:</p> <ul style="list-style-type: none"> • The eucalypt woodlands that provide nest hollows used for breeding, together with nearby vegetation that provides feeding, roosting and watering habitat that supports successful breeding; • Woodland sites known to have supported breeding in the past, and which could be used in the future, provided adequate nearby food and/or water resources are available or are re-established; and • In the non-breeding season, the vegetation that provides food resources as well as the sites for nearby watering and night roosting that enable the cockatoos to effectively utilise the available food resources. <p>The Proposed Action will not result in the loss of any trees currently being utilised by this species for breeding. It will result in an 18.0 ha reduction in potential foraging habitat for this species, which is a mix of remnant and regrowth vegetation interspersed with larger areas of cleared land, within a narrow strip alongside an existing road corridor. The disturbance represents less than 1% of the extent of protected foraging habitat in the immediate area based only on habitat within the Tuart Forest National Park.</p> <p>Given the presence of large areas of suitable continuous foraging and breeding habitat in the area, the habitat to be disturbed is unlikely to be critical to the survival of this species.</p> <p><u>Disrupt the breeding cycle of a population:</u></p> <p>Two trees contained hollows of suitable size for which Black Cockatoos could potentially nest, however no breeding evidence was noted (Harewood, 2018). 120 Suitable DBH Trees occur within the clearing area.</p> <p>Given there are no known nesting hollows within the clearing area and the adjacent foraging areas nearby, the Proposed Action is unlikely to disrupt the current breeding behaviour of a population.</p> <p>The Proposed Action is therefore not considered likely to disrupt the breeding cycle of a population.</p> <p><u>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline:</u></p> <p>The Proposed Action will decrease the availability of habitat for the Carnaby's Cockatoo by up to 18.0 ha, however this represents approximately 1% of the available protected foraging and breeding habitat in the immediate area based only on habitat within the Tuart Forest National Park. Given the range of this species and the presence of large areas of suitable habitat nearby, this loss of habitat is unlikely to lead to the decline of this species.</p> <p><u>Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat:</u></p> <p>DPaW (2013) does not identify any invasive species as threats to this species, nevertheless no additional invasive species are likely to be introduced.</p> <p><u>Introduce disease that may cause the species to decline:</u></p>



Species or threatened ecological community	Impact
	<p>Loss and degradation of habitat by secondary impacts such as the introduction of diseases including Dieback and Marri Canker or weed invasion could result from the Proposed Action.</p> <p>Dieback infested vegetation was identified at the junction of Ruabon Road and the Bussell Highway (Great Southern Bio Logic, 2020). Disease expression was limited to the northern side of the highway however, the identified deaths were associated with a roadside drain that linked both sides via an underground culvert. Therefore, the extent of the infested area has been extended to cover vegetation along the drain on either side of the Bussell Highway.</p> <p>A second infested area was identified at the eastern end of the Study Area, with a positive sample being collected from the southern side of the highway in vegetation that was draining across the road.</p> <p>The disease status of Black Cockatoos in the wild remains unknown, although infectious diseases such as beak and feather disease, avian polyomavirus and chlamydophilosis may pose a threat, as they are significant in other captive and free-living psittacine species. The Proposed Action does not involve any actions which could potentially introduce infectious diseases within Carnaby's Cockatoo populations which could cause the taxon to decline.</p> <p>Without controls, the Proposed Action could spread or introduce Dieback to Carnaby's Cockatoo habitat. Dieback hygiene and management measures / procedures will be implemented to prevent the introduction or spread of Dieback as a result of construction and operation and significant impacts are considered unlikely.</p> <p><u>Interfere with the recovery of the species:</u></p> <p>The Recovery Plan (DPaW, 2013) for this species provides measures for the species' recovery. These include protecting and managing important habitat. The Proposed Action will result in the clearing of up to 18.0 ha of habitat including two trees with suitable, but unused, nesting hollows for Black Cockatoos, and 118 Suitable DBH Trees without hollows.</p> <p>Species recovery of Carnaby's Cockatoo, as defined by the Recovery Plan (DPaW, 2013) is dependent upon preventing further decline in the breeding populations and to ensure their persistence throughout their range in the south-west of WA.</p> <p>The Proposed Action is unlikely to interfere with the recovery of the species as the Proposed Action will not clear any trees with known active nesting hollows. An abundance of alternative foraging and breeding habitat is present within the region, therefore the clearing of 18.0 ha of habitat is unlikely to impact breeding success by reducing available food resources for breeding pairs.</p> <p>The Proposed Action is unlikely to interfere with the recovery of the species.</p> <p><u>Mitigation</u></p> <p>Main Roads has currently revegetated approximately 30 ha of suitable Black Cockatoo and WRP habitat adjacent to the Referral Area. Once established, this habitat will support the fauna species affected from the Proposed Action clearing.</p> <p>Main Roads is also working with DBCA on the purchase / revegetation of several hundred hectares of land within the City of Bunbury and Shires of Capel and Busselton.</p> <p><u>Summary:</u></p> <p>Given the scale and nature of the Proposed Action, and the revegetation mitigation proposed, it is considered that the clearing of up to 18.0 ha of Carnaby's Cockatoo habitat is not significant according to the Significant Impact 1.1. Guidelines.</p>
<p>Forest red-tailed Black Cockatoo (FRTBC) - <i>Calyptorhynchus banksii naso</i> (Vulnerable)</p>	<p>Proposed Action may have a minor residual impact on FRTBC.</p> <p>Likelihood of occurrence: Likely as suitable habitat is present in the Survey Area and the Survey Area is in the species' known distribution.</p> <p>FRTBC was present in the three databases searched (DBCA threatened fauna database, NatureMap and EPBC PMST). However, no birds were seen or heard in the Survey Area during the assessment and further to this no foraging evidence was recorded. The DBCA threatened fauna database had only one record of the FRTBC from 2012. This species was also not recorded during previous surveys that are in close proximity to this assessment (Harewood 2012; Biologic 2014; GHD 2015). Sections of the Survey Area contain species such as Marri that provide potential suitable foraging habitat for the FRTBC.</p>



Species or threatened ecological community	Impact
	<p>Potential impacts:</p> <ul style="list-style-type: none"> • Clearing of 18.0 ha of potential foraging habitat • Clearing of two Suitable DBH Trees with unused, suitably sized nesting hollows • Clearing of 118 Suitable DBH Trees without hollows <p>Significance of impacts:</p> <p>The potential impacts described above have been assessed against the DAWE's Significant Impact Guidelines 1.1 (DotE, 2013) and guidance in the Forest Black Cockatoo (Baudin's Cockatoo <i>Calyptorhynchus baudinii</i> and Forest Red-tailed Black Cockatoo <i>Calyptorhynchus banksii naso</i>) Recovery Plan (DEC, 2008).</p> <p><u>Lead to a long-term decrease in the size of an important population:</u></p> <p>Declines in the population of this species are attributed to the destruction and fragmentation of habitat (especially Jarrah - Marri forest) (Johnstone et al., 2013a), the decline in Marri along the eastern side of the Darling plateau (possibly due to climate change), logging, the impact of competitors for nest hollows, and fire (Chapman 2008; Garnett et al. 2011).</p> <p>The FRTBC was formerly common but is now rare to uncommon and patchily distributed (Johnstone et al. 2013a). The subspecies' current population is estimated to be 15,000 birds, with a declining trend, an estimate of medium reliability (Garnett et al., 2011). Up to 2006, the subspecies had been sighted at over 130 locations (WA CALM, 2006). The birds usually occur in small family groups of up to ten birds, though groups may also flock together (Chapman, 2008).</p> <p>The Proposed Action will not result in the loss of any trees currently being utilised by FRTBC for breeding. The Proposed Action will result in an 18.0 ha reduction in potential foraging habitat for FRTBC. The foraging habitat to be disturbed is a mix of remnant and regrowth vegetation interspersed with larger portions of cleared land, within a narrow strip alongside an existing road corridor. An estimated 7,500 ha of remnant vegetation (likely foraging habitat) is located within 10 km of the Proposed Action. Large areas of suitable and higher value foraging habitat are located within the immediate area, including approximately 2,000 ha of remnant vegetation within the Tuart Forest National Park and 300 ha of pine plantation within the Coolilup State Forest. The loss of 18.0 ha of foraging habitat therefore represents less than 1% of the extent of protected foraging habitat in the immediate area based only on habitat within the Tuart Forest National Park.</p> <p>Given the presence of large areas of suitable foraging habitat in the area, the range of this species and the lack of known nesting hollows that will be disturbed, the Proposed Action is unlikely to lead to a long-term decrease in an important FRTBC population.</p> <p><u>Reduce the area of occupancy of an important population:</u></p> <p>Sections of the disturbance footprint contain species such as Marri that provide potential suitable foraging habitat for FRTBC (360 Environmental, 2017), however as discussed above this clearing is likely to be minor on a local or regional scale. This clearing represents 0.9% of suitable foraging habitat in the immediate vicinity of the Referral Area and does not take into account non-native vegetation such as pine plantation.</p> <p>The area of occupancy of an important population of FRTBC will therefore not be significantly reduced as a result of the Proposed Action.</p> <p><u>Fragment an existing important population into two or more populations:</u></p> <p>The Proposed Action is to duplicate the existing Bussell Highway, as such that the Proposed Action will not introduce any new fragmentation of FRTBC populations.</p> <p>The clearing of FRTBC habitat will occur as a relatively narrow linear strip adjacent to the existing Bussell Highway. Whilst this will increase the distance between the areas of the foraging habitat occurring on either side of the Bussell Highway, the increase in the separation distance will not be significant to an extent that FRTBC would be fragmented into two or more populations, nor introduce fragmentation that would restrict the movement of FRTBC across the Bussell Highway.</p> <p>The Proposed Action is therefore unlikely to fragment an existing important FRTBC population into two or more populations.</p> <p><u>Adversely affect habitat critical to the survival of a species:</u></p>



Species or threatened ecological community	Impact
	<p>The Recovery Plan for FRTBC (DEC, 2008) defines habitat critical to the survival of this species as areas:</p> <ul style="list-style-type: none"> • Currently occupied by the cockatoos; • Not currently occupied by the cockatoos due to recent fire but capable of supporting cockatoo populations when sufficiently recovered; • Of natural vegetation in which the cockatoos nest, feed and roost; • Of natural vegetation through which the cockatoos can move from one occupied area to another; and • Of suitable vegetation within the recorded range in which undiscovered cockatoo populations may exist. <p>The Proposed Action will not result in the loss of any trees currently being utilised by FRTBC for breeding. It will result in an 18.0 ha reduction in potential FRTBC foraging habitat, which is a mix of remnant and regrowth vegetation interspersed with larger areas of cleared land, within a narrow strip alongside an existing road corridor. The disturbance represents less than 1% of the extent of protected foraging habitat in the immediate area based only on habitat within the Tuart Forest National Park.</p> <p>Given the presence of large areas of suitable continuous foraging and breeding habitat in the area, the habitat to be disturbed is unlikely to be critical to the survival of this species.</p> <p><u>Disrupt the breeding cycle of an important population:</u></p> <p>Three species of Eucalypts, Marri, Tuart and Flooded Gum recorded in the Survey Area are considered Black Cockatoo breeding habitat. Two trees contained hollows of suitable size for which Black Cockatoos could potentially nest, however no breeding evidence was noted (Harewood, 2018). 120 Suitable DBH Trees occur within the clearing area.</p> <p>Given there are no known nesting hollows within the clearing area and the adjacent foraging areas nearby, the Proposed Action is unlikely to disrupt the current breeding behaviour of an important population.</p> <p>The Proposed Action is therefore not considered likely to disrupt the breeding cycle of an important population.</p> <p><u>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline:</u></p> <p>The Proposed Action will decrease the availability of habitat for the FRTBC by up to 18.0 ha, however this represents approximately 1% of the available protected foraging and breeding habitat in the immediate area based only on habitat within the Tuart Forest National Park. Given the range of this species and the presence of large areas of suitable habitat nearby, this loss of habitat is unlikely to lead to the decline of this species.</p> <p><u>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat:</u></p> <p>No additional invasive species are likely to be introduced.</p> <p>The DEC (2008) [now DBCA] identify the potential threats to the survival of FRTBC as including nest competition from feral bees (such as <i>Apis mellifera</i> (Honey bee)) and other native invasive species. The Proposed Action does not involve any actions which could potentially introduce Honeybees into the Proposed Action Area.</p> <p><u>Introduce disease that may cause the species to decline:</u></p> <p>Loss and degradation of habitat by secondary impacts such as the introduction of diseases including Dieback and Marri Canker or weed invasion could result from the Proposed Action.</p> <p>Dieback infested vegetation was identified at the junction of Ruabon Road and the Bussell Highway (Great Southern Bio Logic, 2020). Disease expression was limited to the northern side of the highway however, the identified deaths were associated with a roadside drain that linked both sides via an underground culvert. Therefore, the extent of the infested area has been extended to cover vegetation along the drain on either side of the Bussell Highway.</p> <p>A second infested area was identified at the eastern end of the Study Area, with a positive sample being collected from the southern side of the highway in vegetation that was draining across the road.</p>



Species or threatened ecological community	Impact
	<p>The disease status of Black Cockatoos in the wild remains unknown, although infectious diseases such as beak and feather disease, avian polyomavirus and chlamydophilosis may pose a threat, as they are significant in other captive and free-living psittacine species. The Proposed Action does not involve any actions which could potentially introduce infectious diseases within FRTBC populations which could cause the taxon to decline.</p> <p>Without controls, the Proposed Action could spread or introduce Dieback to FRTBC habitat. Dieback hygiene and management measures / procedures will be implemented to prevent the introduction or spread of Dieback as a result of construction and operation and significant impacts are considered unlikely.</p> <p><u>Interfere substantially with the recovery of the species:</u></p> <p>The Recovery Plan (DEC, 2008) for FRTBC provides measures for the species' recovery. These include identifying, protecting and managing important habitat. The Proposed Action will result in the clearing of up to 18.0 ha of habitat including two trees with suitable, but unused, nesting hollows for Black Cockatoos, and 118 Suitable DBH Trees without hollows.</p> <p>Species recovery of FRTBC, as defined by the Recovery Plan (DEC 2008) is dependent upon preventing further decline in the breeding populations and to ensure their persistence throughout their range in the south-west of WA.</p> <p>The Proposed Action is unlikely to interfere with the recovery of FRTBC as the Proposed Action will not clear any trees with known active nesting hollows. An abundance of alternative foraging and breeding habitat is present within the region, therefore the clearing of 18.0 ha of habitat is unlikely to impact breeding success by reducing available food resources for breeding pairs.</p> <p>The Proposed Action is unlikely to interfere with the recovery of FRTBC.</p> <p><u>Mitigation</u></p> <p>Main Roads has currently revegetated approximately 30 ha of suitable Black Cockatoo and WRP habitat adjacent to the Referral Area. Once established, this habitat will support the fauna species affected from the Proposed Action clearing.</p> <p>Main Roads is also working with DBCA on the purchase/revegetation of several hundred hectares of land within the City of Bunbury and Shires of Capel and Busselton.</p> <p><u>Summary:</u></p> <p>Given the scale and nature of the Proposed Action, and the revegetation mitigation proposed, it is considered that the clearing of up to 18.0 ha of FRTBC habitat is not significant according to the Significant Impact 1.1. Guidelines.</p>
<p>Western Ringtail Possum - <i>Pseudocheirus occidentalis</i> (Critically Endangered)</p>	<p>Proposed Action may have a residual impact on Western Ringtail Possum.</p> <p>Likelihood of occurrence: Recorded during the field assessment.</p> <p>A high percentage of the remnant vegetation present (20.3 ha) represents potential WRP habitat (360 Environmental, 2017) with the species found at a number of locations within the survey area (Harewood, 2018). During the Phase 1 (spring) 2019 survey (on 11 September and 19 October), a total of 55 individual WRPs were recorded from 41 observations and in the Phase 2 (summer) 2020 survey (10 February 2020), a total of 77 individuals were recorded from 74 observations over the 51.85 ha survey area (Figure 8 and Figure 9) (Biota, 2020).</p> <p>A review of the observations compared to the proposed clearing area shows that a maximum of 33 individuals were recorded within the clearing area during these surveys.</p> <p>The sections of the Biota (2020) study area that contained uninterrupted vegetation supported the highest abundances of WRP. Most WRPs were observed in Jarrah, Marri, Tuart and <i>Agonis flexuosa</i> (Peppermint) trees, however, the species was also observed in less typical habitat types including in <i>Acacia</i> and <i>Melaleuca</i> shrubs.</p> <p>The density of WRPs in the 51.85 ha survey area (1.06 – 1.49 individuals/ha) is comparable to other sites sampled on the Swan Coastal Plain. The highest abundances of WRP were located at its southern Sabina end, where the road reserve is continuous with large remnant areas of habitat running outside the survey area including both the Tuart Forest National Park and the riparian vegetation of the Sabina River (Biota, 2020).</p> <p>Potential impacts:</p>



Species or threatened ecological community	Impact
	<ul style="list-style-type: none"> Loss of 20.3 ha of potential WRP habitat that supports an estimated 33 individual WRPs (representing approximately 0.9% of the local population). <p>Significance of impacts:</p> <p>The potential impacts described above have been assessed against:</p> <ul style="list-style-type: none"> Significant impact guidelines for the vulnerable Western Ringtail Possum (<i>Pseudocheirus occidentalis</i>) in the southern Swan Coastal Plain, Western Australia (Department of the Environment, Water, Heritage and the Arts (DEWHA), 2009) DAWE's Significant Impact Guidelines 1.1 (DotE, 2013); and Guidance in the Western Ringtail Possum (<i>Pseudocheirus occidentalis</i>) Recovery Plan (DPaW, 2017). <p>DEWHA (2009) states that there is a real chance or possibility of a significant impact on the species if the action will result in one or more of the following:</p> <ul style="list-style-type: none"> Clearing in a remnant habitat patch that is greater than 0.5 ha in size; Clearing of more than 50 per cent of a remnant habitat patch that is between 0.2 and 0.5 ha in size, or Fragmentation of existing habitat linkages. <p>The Proposed Action will require clearing within several remnant habitat patches that are greater than 0.5 ha in size and therefore the potential impacts of the Proposed Action have been assessed further using the DAWE's Significant Impact Guidelines 1.1 (DotE, 2013).</p> <p><u>Lead to a long-term decrease in the size of a population:</u></p> <p>The WRP is a medium-sized arboreal marsupial, endemic to south-western WA. The species is exclusively folivorous, feeding on leaves of myrtaceous species, predominantly Peppermint but also Marri and Jarrah. Home range size varies with the productivity of the habitat but is generally less than 5 ha, although densities of up to 20 individuals per hectare have been recorded in Peppermint woodland near Busselton (DPaW, 2017).</p> <p>WRP was once widely distributed across southern and south-western WA, however due to habitat clearing and fragmentation for agricultural and urban development it is now restricted to three areas: the southern Swan Coastal Plain, the Jarrah forests near Manjimup, and the south coast between Albany and Walpole (DPaW, 2017). The population size in the Bunbury to Dunsborough region has been estimated to be between 2,000 and 5,000 animals (DPaW 2017), and Biota (2020b) estimated a local population of 1,420 in 'Tuart Forest Central' located immediately north-west of the Proposed Action, with an estimated density of 1.32 individuals per hectare, and a local population of 2,145 in 'Tuart Forest South' located immediately to the south-west, with an estimated density of 3.4 individuals per hectare.</p> <p>The Proposed Action will result in up to a 20.3 ha reduction in potential habitat for WRP. The habitat to be disturbed is a mix of remnant, non-native and regrowth vegetation interspersed with larger portions of cleared land, within a narrow strip alongside an existing road corridor.</p> <p>Approximately 7,500 ha of remnant vegetation is mapped within 10 km of the Proposed Action. A significant portion of this vegetation is likely to be suitable habitat for WRP, including approximately 1,079 ha of suitable habitat within 'Tuart Forest Central' located immediately north-west of the Proposed Action, and 630 ha within 'Tuart Forest South' (Biota, 2020b). The loss of 20.3 ha of potential habitat therefore represents approximately 1% of the extent of habitat in these two immediately adjacent areas, a large portion of which is protected (the Tuart Forest National Park) and approximately 0.25% of the extent at a local level.</p> <p>An estimated 33 WRP individuals were recorded within the clearing area, and the Proposed Action will disturb the known habitat of these individuals. These individuals represent 0.9% of the estimated population (3565 individuals) in 1709 ha of suitable habitat in two areas immediately adjacent to the Proposed Action. The 'Tuart Forest Central' has an estimated density of 1.32 individuals per hectare, which is lower than the other Tuart Forest sites (North and South) which both had densities over 3.4 individuals per hectare, indicating that there is capacity within the 'Tuart Forest Central' mapped area (Biota, 2020b) for additional individuals. It is therefore likely that any individuals that have had their home ranges affected will be able to move to</p>



Species or threatened ecological community	Impact
	<p>other areas within their home range or re-establish within adjacent and surrounding habitat.</p> <p>Based on the above, the Proposed Action is unlikely to lead to a long-term decrease in the population of this species.</p> <p><u>Reduce the area of occupancy of the species:</u></p> <p>The area of occupancy of this species is estimated at 40,000 ha (Biota, 2020b). Sections of the disturbance footprint contain suitable habitat for WRP (360 Environmental, 2017; Harewood, 2018; Biota, 2020a), however the habitat to be disturbed is a mix of remnant, non-native and regrowth vegetation interspersed with larger portions of cleared land, within a narrow strip alongside an existing road corridor. Over 7,500 ha of remnant vegetation (likely suitable intact habitat) is located within 10 km of the Proposed Action, including approximately 1,079 ha of suitable habitat within 'Tuart Forest Central' located immediately north-west of the Proposed Action, and 630 ha within 'Tuart Forest South' (Biota, 2020b). The clearing represents approximately 1% of suitable habitat in the immediate area as mapped by Biota (2020b) and 0.25% at a mapped local level (10 km radius).</p> <p>The area of occupancy for this species will therefore not be significantly reduced as a result of the Proposed Action.</p> <p><u>Fragment an existing population into two or more populations:</u></p> <p>The Proposed Action is to duplicate the existing Bussell Highway, as such no new fragmentation of the local WRP population will occur. The Proposed Action will not fragment any populations that were not already fragmented.</p> <p>The clearing of WRP habitat will occur as a relatively narrow linear strip adjacent to the existing Bussell Highway. This will increase the distance between the areas of the habitat occurring on either side of the Bussell Highway. During construction, clearing will be undertaken to encourage any WRP individuals within the clearing corridor to self-relocate into nearby suitable habitat.</p> <p>To maintain and improve connectivity along riparian areas, Main Roads is proposing to install 'possum bridges' under bridges on the Ludlow, Abba and Sabina Rivers where linkage vegetation exists to allow WRPs to move between suitable habitat either side of the highway. The locations will be identified in the Fauna Management Plan, which will be developed in consultation with DBCA.</p> <p>Based on the above the Proposed Action is unlikely to fragment an existing population into two or more populations.</p> <p><u>Adversely affect habitat critical to the survival of a species:</u></p> <p>The Recovery Plan for this species (DPaW, 2017) notes that habitat critical to survival for WRPs is not well understood, and is therefore based on the habitat variables observed where WRPs are most commonly recorded. The common themes are high nutrient foliage availability for food, suitable structures for protection/nesting, and canopy continuity to avoid/escape predation and other threats. Long-term survival of the species requires linkages between suitable habitat patches and as such habitat critical to survival incorporates this. Vegetation communities critical to the species include long unburnt mature remnants of Peppermint woodlands with high canopy continuity and high foliage nutrients; Jarrah/Marri forests and woodlands with limited anthropogenic disturbance, that are intensively fox-baited and have low indices of fragmentation; coastal heath, Jarrah/Marri woodland and forest, Peppermint woodlands, myrtaceous heaths and shrublands, Bullich (<i>Eucalyptus megacarpa</i>) dominated riparian zones and Karri forest. Any habitat where WRPs occur naturally are considered critical and worthy of protection.</p> <p>The Proposed Action will result in a 20.3 ha reduction in habitat known to contain resident WRPs, which is a mix of remnant and regrowth vegetation interspersed with larger areas of cleared land, within a narrow strip alongside an existing road corridor. In addition the large areas of suitable habitat adjacent and close to the Proposed Action would likely meet the criteria of 'habitat critical to the survival' of WRPs. The Proposed Action disturbance represents approximately 1% of the extent of this critical habitat in the immediate area, most of which is protected as part of the Tuart Forest National Park.</p>



Species or threatened ecological community	Impact
	<p>Given the presence of large areas of suitable continuous habitat in the area, the habitat to be disturbed is unlikely to be critical to the survival of this species.</p> <p><u>Disrupt the breeding cycle of a population:</u></p> <p>The Proposed Action will result in a 20.3 ha reduction in habitat which may be utilised for breeding by resident WRPs. The habitat to be cleared is a mix of remnant and regrowth vegetation interspersed with larger areas of cleared land, within a narrow strip alongside an existing road corridor. The large areas of suitable habitat adjacent and close to the Proposed Action would likely be utilised for breeding by WRPs. The Proposed Action disturbance represents approximately 1% of the extent of this habitat in the immediate area, most of which is protected as part of the Tuart Forest National Park and 0.25% of the extent at a local level.</p> <p>Main Roads will develop a Fauna Management Plan in consultation with DBCA, which will specify how clearing will occur to minimise the impact on the breeding cycle of resident WRP.</p> <p>Based on the above, the Proposed Action is therefore not considered likely to disrupt the breeding cycle of a population.</p> <p><u>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline:</u></p> <p>The Proposed Action will decrease the availability of habitat for the WRP by up to 20.3 ha however this represents approximately 1% of the available suitable habitat in the immediate area and 0.25% at a local level. Given the presence of large areas of suitable habitat nearby, this loss of habitat is unlikely to lead to the decline of this species.</p> <p><u>Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat:</u></p> <p>No additional invasive species are likely to be introduced as a result of the Proposed Action.</p> <p><u>Introduce disease that may cause the species to decline:</u></p> <p>Loss and degradation of habitat by secondary impacts such as the introduction of diseases including Dieback and Canker pathogen (<i>Neofusicoccum australe</i>) or weed invasion could result from the Proposed Action.</p> <p>Dieback infested vegetation was identified at the junction of Ruabon Road and the Bussell Highway (Great Southern Bio Logic, 2020). Disease expression was limited to the northern side of the highway however, the identified deaths were associated with a roadside drain that linked both sides via an underground culvert. Therefore, the extent of the infested area has been extended to cover vegetation along the drain on either side of the Bussell Highway.</p> <p>A second infested area was identified at the eastern end of the Study Area, with a positive sample being collected from the southern side of the highway in vegetation that was draining across the road.</p> <p>WRPs can be at a greater risk of disease due to human disturbance and exposure to exotic species and pathogens (de Tores et al., 2008). The Proposed Action does not involve any actions which could potentially introduce infectious diseases within WRP populations which could cause the taxon to decline.</p> <p>Without controls, the Proposed Action could spread or introduce Dieback to WRP habitat. Dieback hygiene and management measures / procedures will be implemented to prevent the introduction or spread of Dieback as a result of construction and operation and significant impacts are considered unlikely.</p> <p><u>Interfere with the recovery of the species:</u></p> <p>The Recovery Plan (DPaW, 2017) for this species provides measures for the species' recovery. These include protecting and managing important habitat and mitigating threatening processes.</p> <p>The Proposed Action will result in the clearing of up to 20.3 ha of suitable WRP habitat, however this is unlikely to interfere with the recovery of the species as an abundance of alternative foraging and breeding habitat is present within the region, therefore the clearing of 20.3 ha of habitat is unlikely to impact breeding success.</p> <p>The Proposed Action is unlikely to interfere with the recovery of the species.</p> <p><u>Mitigation</u></p>



Species or threatened ecological community	Impact
	<p>Main Roads has currently revegetated approximately 30 ha of suitable Black Cockatoo and WRP habitat adjacent to the Referral Area in areas managed by DBCA. In time, these areas will provide additional WRP habitat.</p> <p>Main Roads is also revegetating/purchasing several hundred hectares within the City of Bunbury and Shires of Capel and Busselton that will provide additional WRP habitat in the local area.</p> <p><u>Summary:</u></p> <p>Given the scale and nature of the Proposed Action, it is considered that the clearing of up to 20.3 ha of WRP habitat occupied by an estimated 33 individuals is not significant according to the Significant Impact 1.1. Guidelines.</p>
<p>Carter's Freshwater Mussel - <i>Westralunio carteri</i> (Vulnerable)</p>	<p>Proposed Action unlikely to have an impact on Carter's Freshwater Mussel.</p> <p>Likelihood of occurrence: Unlikely as the Sabina, Abba and/or Ludlow Rivers are ephemeral. This species was recorded at the nearby Lower Vasse River (Murdoch University, 2017) which contains water all year round.</p> <p>Carter's Freshwater Mussel is the only native freshwater mussel in southwestern Australia. The distribution of this species has been mapped and it was found that the range of the species has contracted by 49% in less than 50 years, principally because of secondary salinisation and reduced water flow from a drying climate (Klunzinger et al, 2015).</p> <p>Potential impacts:</p> <ul style="list-style-type: none"> Disturbance within three rivers; the Sabina, Abba and Ludlow River. <p>Significance of impacts:</p> <p>The Proposed Action includes the construction of three river crossings, however the construction of these (single span) bridges require minor disturbance of the river banks and construction will occur only when the rivers are dry. Once the crossings are installed there will be no significant impediments to the flow of water under the bridge and therefore little to no impact on this species is predicted.</p>
<p>Balston's Pygmy Perch - <i>Nannatherina balstoni</i> (Vulnerable)</p>	<p>Likelihood of occurrence: Possibly occurring within the Ludlow, Abba and Sabina Rivers when flowing.</p> <p>This species is confined to smaller streams within major river systems of south-west WA (Allen et al. 1994). They typically inhabit acidic, tannin stained freshwater pools, streams and lakes (Morgan et al., 1998).</p> <p>The species breeds during winter (spawning occurs from June - September with a peak in mid-July to early August when water levels are at their maximum) at the end of their first year of life, and then die shortly after spawning (Morgan et al., 1995).</p> <p>Sampling by DWER (Healthy Rivers Program) of the Ludlow (in 2009), Abba (in 2009) and Sabina (in 2009 and 2017) Rivers did not find any Balston's Pygmy Perch.</p> <p>Potential impacts:</p> <ul style="list-style-type: none"> Disturbance within three rivers; the Ludlow, Abba and Sabina Rivers. <p>Significance of impacts:</p> <p>The Proposed Action includes the construction of three river crossings, however the construction of these (single span) bridges require minor disturbance of the river banks and construction will occur only when the rivers are dry. Once the crossings are installed there will be no significant impediments to the flow of water under the bridge and therefore little to no impact on this species is predicted.</p>
<p>Listed Threatened Flora: (refer to PMST Report in Attachment 1)</p>	<p>Likelihood of occurrence: Unlikely to occur</p> <p>Ecoedge (2014) did not identify any BC Act or EPBC Act Threatened Flora within the Referral Area.</p> <p>Potential impacts:</p> <p>N/A</p> <p>Significance of impacts:</p> <p>N/A</p>



Species or threatened ecological community	Impact
Migratory fauna species (refer to PMST Report in Attachment 1)	<p>Likelihood of occurrence: Unlikely to occur</p> <p>360 Environmental (2017) conducted a likelihood assessment for these species and determined that there was no suitable habitat for these species within the Referral Area. None of these species were identified during field surveys nor likely to be impacted by the Proposed Action.</p> <p>Potential impacts: N/A</p> <p>Significance of impacts: N/A</p>

2.4.2 DO YOU CONSIDER THIS IMPACT TO BE SIGNIFICANT?

No

2.5 IS THE PROPOSED ACTION LIKELY TO HAVE ANY DIRECT OR INDIRECT IMPACT ON THE MEMBERS OF ANY LISTED MIGRATORY SPECIES, OR THEIR HABITAT?

No.

2.6 IS THE PROPOSED ACTION TO BE UNDERTAKEN IN A MARINE ENVIRONMENT (OUTSIDE COMMONWEALTH MARINE AREAS)?

No.

2.7 IS THE PROPOSED ACTION TO BE TAKEN ON OR NEAR COMMONWEALTH LAND?

No.

2.8 IS THE PROPOSED ACTION TAKING PLACE IN THE GREAT BARRIER REEF MARINE PARK?

No.

2.9 IS THE PROPOSED ACTION LIKELY TO HAVE ANY DIRECT OR INDIRECT IMPACT ON A WATER RESOURCE FROM COAL SEAM GAS OR LARGE COAL MINING DEVELOPMENT?

No.



2.10 IS THE PROPOSED ACTION A NUCLEAR ACTION?

No.

2.11 IS THE PROPOSED ACTION TO BE TAKEN BY THE COMMONWEALTH AGENCY?

No.

2.12 IS THE PROPOSED ACTION TO BE UNDERTAKEN IN A COMMONWEALTH HERITAGE PLACE OVERSEAS?

No.

2.13 IS THE PROPOSED ACTION LIKELY TO HAVE ANY DIRECT OR INDIRECT IMPACT ON ANY PART OF THE ENVIRONMENT IN THE COMMONWEALTH MARINE AREA?

No.

2.14 UPLOAD ANY TECHNICAL REPORTS RELEVANT TO THE ASSESSMENT OF IMPACTS ON PROTECTED MATTERS THAT SUPPORT THE ARGUMENTS AND CONCLUSIONS IN THE REFERRAL

Attachment 1: EPBC Act Protected Matters Report. Report created: 27/07/20 14:05:53

Attachment 2: Level 1 Flora and Vegetation Survey – Bussell Highway, Hutton Rd to Sabina River (Ecoedge, 2014);

Attachment 3: Report of a Targeted Rare Flora Survey for *Verticordia attenuata* along Bussell Highway between Capel and the Sabina River (Ecoedge, 2017);

Attachment 4: Detailed and Targeted Flora and Vegetation Survey along Bussell Highway, Hutton Road to Sabina River (Ecoedge, 2019);

Attachment 5: Targeted Vegetation Survey of Threatened and priority ecological community Hutton Road to Sabina River, Capel (Ecoedge, 2020);

Attachment 6: Bussell Highway – Hutton Road to Sabina section. Level 1 Fauna and Targeted Western Ringtail Possum Survey (360 Environmental, 2017);

Attachment 7: Targeted Fauna Survey. Bussell Highway – Hutton to Sabina Section (Harewood, 2018);



Attachment 8: Bussell Highway (Hutton to Sabina) Western Ringtail Possum Assessment (Biota, 2020a);

Attachment 9: Western Ringtail Possum *Pseudocheirus occidentalis* Regional Surveys (Biota, 2020b);

Attachment 10: Bussell Highway - Hutton to Sabina. Environmental Impact Assessment (360 Environmental, 2016);

Attachment 11: Bridge 1762 – Bussell Highway over Abba River. Geotechnical Factual, Interpretive and Design Report (AECOM, 2016a);

Attachment 12: Bridge 1761 – Bussell Highway over Ludlow River Geotechnical Factual, Interpretive and Design Report (AECOM, 2016b);

Attachment 13: Bridge 1763 – Bussell Highway over Sabina River Geotechnical Factual, Interpretive and Design Report (AECOM, 2016c);

Attachment 14: Geotechnical Investigation. Duplication of Bussell Highway Hutton Road to Sabina River (WML Consultants, 2017);

Attachment 15: Phytophthora Dieback Occurrence Survey Bussell Highway (H043) Duplication Hutton to Sabina, SLK 31.15 – 43.95 (Great Southern Bio Logic, 2020).



3 DESCRIPTION OF THE PROJECT AREA

3.1 DESCRIBE THE FLORA AND FAUNA RELEVANT TO THE PROJECT AREA

Flora

Detailed and Targeted flora surveys were undertaken by Ecoedge in 2013 and 2018 (Ecoedge, 2014 & 2019). The areas surveyed are shown in Figure 8.

A total of 281 plant species were identified of which 66 were naturalised or planted species (Ecoedge, 2014 & 2019). Representation was highest amongst *Fabaceae* with 41 taxa (including 13 introduced species) and *Myrtaceae* (32 taxa).

Twenty-one Threatened Flora species (three Critically Endangered, 12 Endangered and six Vulnerable) listed under the EPBC Act were reported by Ecoedge (2019) as occurring within 5 km of the Survey Area, however no Threatened Flora species were recorded in the Survey Area during field surveys.

Six problematic environmental weed species were identified (Ecoedge, 2019).



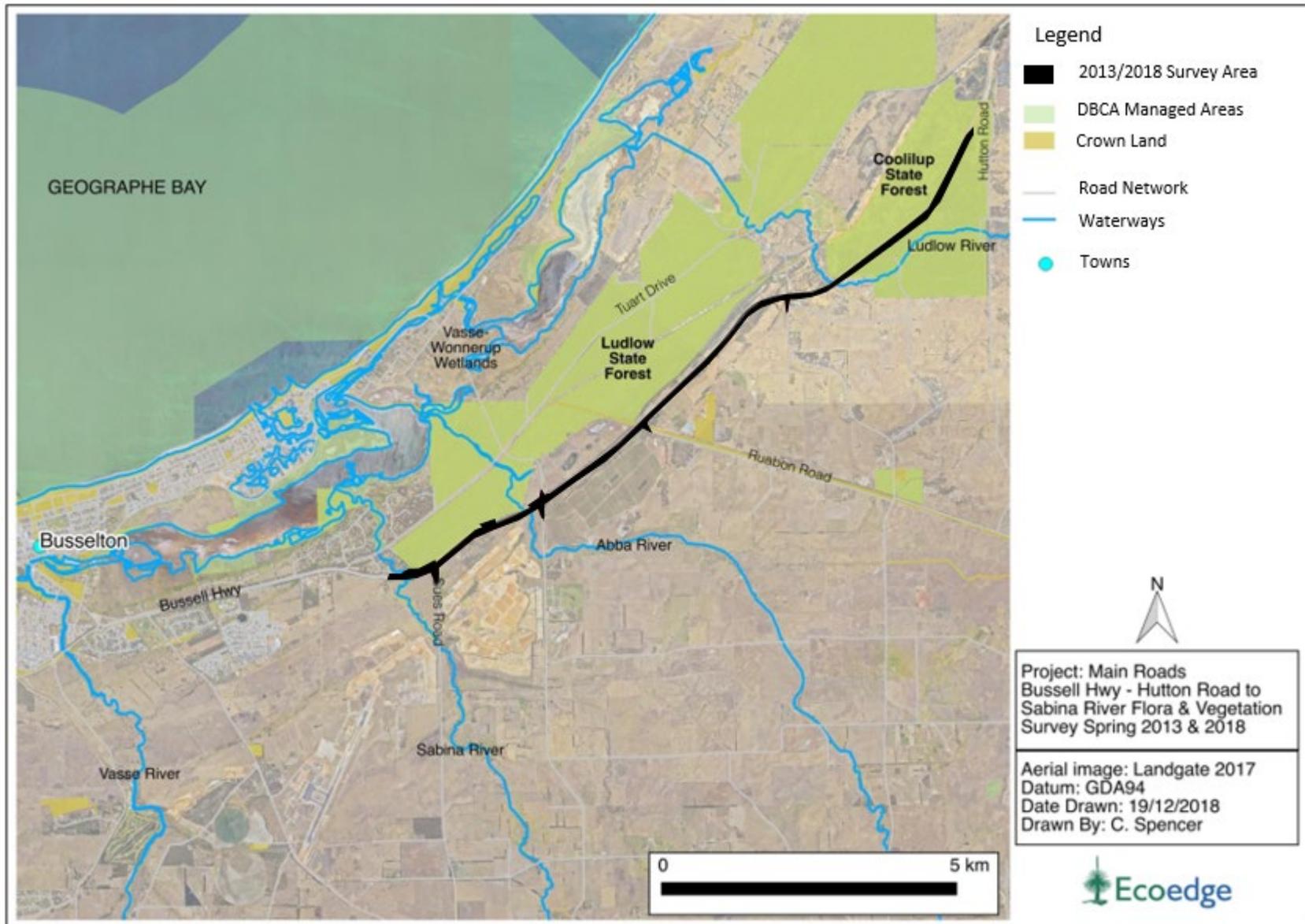


Figure 8: Flora and vegetation survey areas (2013 and 2018)

Fauna

Survey Effort

- 360 Environmental conducted a Level 1 fauna survey in 2016 (Figure 9), and a targeted survey for WRP and Black Cockatoo habitat in 2017 (360 Environmental, 2017);
- A targeted fauna survey was also undertaken by Harewood in 2018 (Attachment 7) to provide additional and updated information on the status of Black Cockatoos and WRPs in the survey area. This survey included a detailed assessment of potential Black Cockatoo nesting trees and a targeted WRP survey;
- A targeted WRP survey (within the disturbance area and Regional) of the Referral Area and surrounds was also undertaken by Biota in 2019 / 2020 (Attachment 8); and
- A regional WRP survey was undertaken by Biota in 2020 (Attachment 9).

The surveys identified two MNES fauna species and their habitat within the survey area; the WRP and Carnaby's Black Cockatoo. Habitat for Baudin's Cockatoo and the FRTBC was also identified and these species were considered likely to occur within the survey area (Harewood, 2018).

Western Ringtail Possum

Most of the remnant vegetation present represents potential WRP habitat (360 Environmental, 2017) and the species was found at a number of locations within the survey area (Harewood, 2018). During the Phase 1 (spring) 2019 survey 55 individual WRPs were recorded from 41 observations and in the Phase 2 (summer) 2019 / 2020 survey 77 individuals were recorded from 74 observations (Figure 10 and Figure 11) (Biota, 2020).

The area surveyed by Biota was approximately 52 ha, located north and south of the existing Bussell Highway. The maximum number of individuals recorded within the proposed clearing area numbered 33 during the summer 2020 survey.

The sections of the Biota (2020a) study area that contained uninterrupted vegetation supported the highest abundances of WRP (Figure 5 - Figure 7). Most WRPs were observed in Jarrah, Marri, Tuart and Peppermint trees, however, the species was also observed in less typical habitat types including in *Acacia* and *Melaleuca* shrubs.

The density of WRPs in the 51.85 ha survey area (1.06 – 1.49 individuals/ha) was comparable to other sites sampled on the Swan Coastal Plain. The Tuart Forests between Busselton and Bunbury are a well-documented stronghold for the WRP and recent work in these Tuart Forests again demonstrated high densities in the area (Biota, 2020b). The highest abundances of WRP were located at its southern Sabina end, where the road reserve is continuous with large remnant areas of habitat running outside the survey area including both the Tuart Forest National Park and the riparian vegetation of the Sabina River (Biota, 2020).

Potential WRP foraging habitat is shown in detail in Figure 2 of Attachment 6 (360 Environmental, 2017).

Black Cockatoos

The detailed Black Cockatoo survey conducted by Harewood (2018) assessed all Suitable DBH Trees within the survey area. A summary of the results is provided below:



- 156 trees were identified with a Suitable DBH;
- 12 trees contained one or more unsuitable hollows;
- 2 trees contained potentially suitable hollows that have no signs of use;
- No Black Cockatoo roosting activity was observed in the survey area; and
- No known nesting hollows will be impacted.

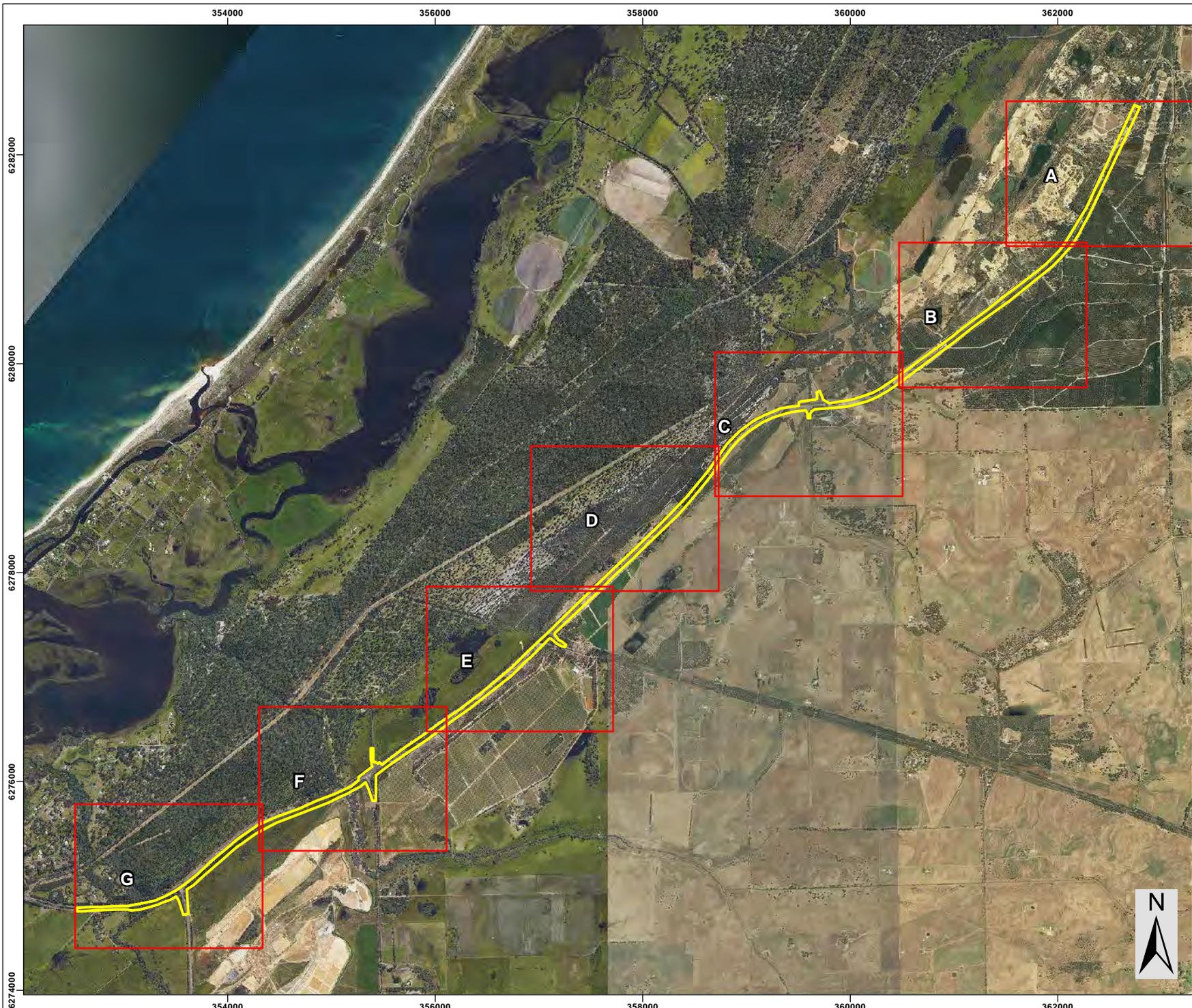
Flora species were recorded within the survey area that are known to be used as a direct food source (i.e. seeds or flowers) by one or more species of Black Cockatoo:

- Tuart;
- Marri;
- Jarrah;
- Flooded Gum;
- Pine;
- Planted non-endemic eucalypts; and
- Banksias.

Black Cockatoo foraging debris observed within the survey area was relatively sparse. The most common evidence observed was chewed pine cones presumably left by foraging Carnaby's Cockatoo. 360 Environmental (2017) found foraging evidence in the form of "chewed Marri nuts and to a much lesser extent on banksia and pine cones".

Suitable DBH Trees are shown in Figure 12 (Harewood, 2018), and potential foraging habitat is shown in detail in Figure 3 of Attachment 6 (360 Environmental, 2017).



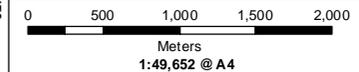


- Legend**
- Survey Area (Hutton to Sabina; 72.42 ha)
 - Map Index

NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
 SURVEY AREA PROVIDED BY MRWA 2016
 LOCALITY MAP SOURCED LANDGATE 2006
 AERIAL PHOTOGRAPHY SOURCED LANDGATE 2014
 (© Western Australian Land Information Authority 2016)

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LOCALITY MAP



PROJECT ID 1687		DATE 7/07/2016	
HORIZONTAL DATUM AND PROJECTION GDA 1994 MGA Zone 50			
CREATED JJ	CHECKED RF	APPROVED RF	REVISION 0

**Main Roads Western Australia
 Bussel Highway Expansion**

Fauna Habitat Assessment

**Figure 1
 Survey Area**

Figure 9: Fauna survey area

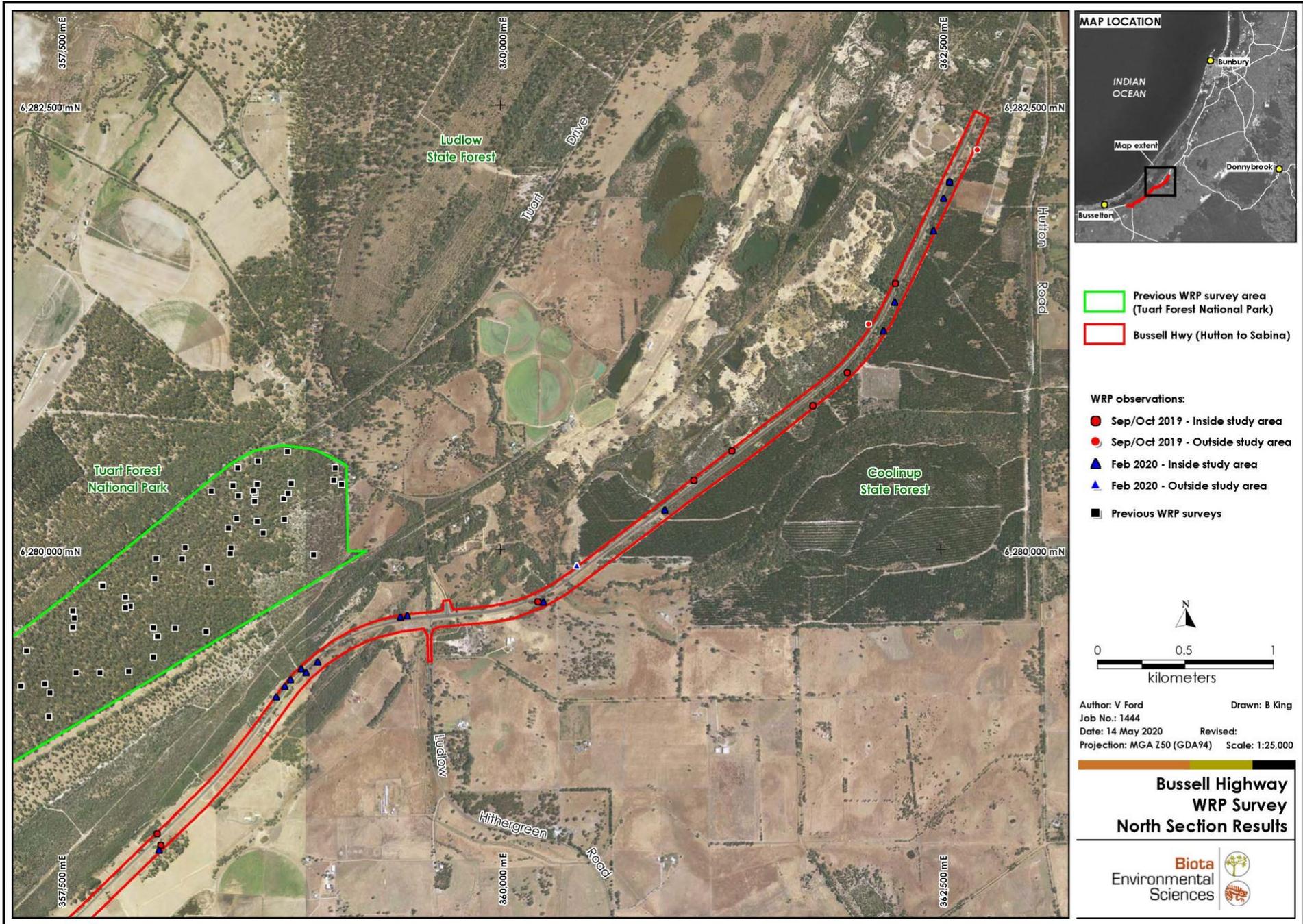


Figure 10: WRP observations within north section

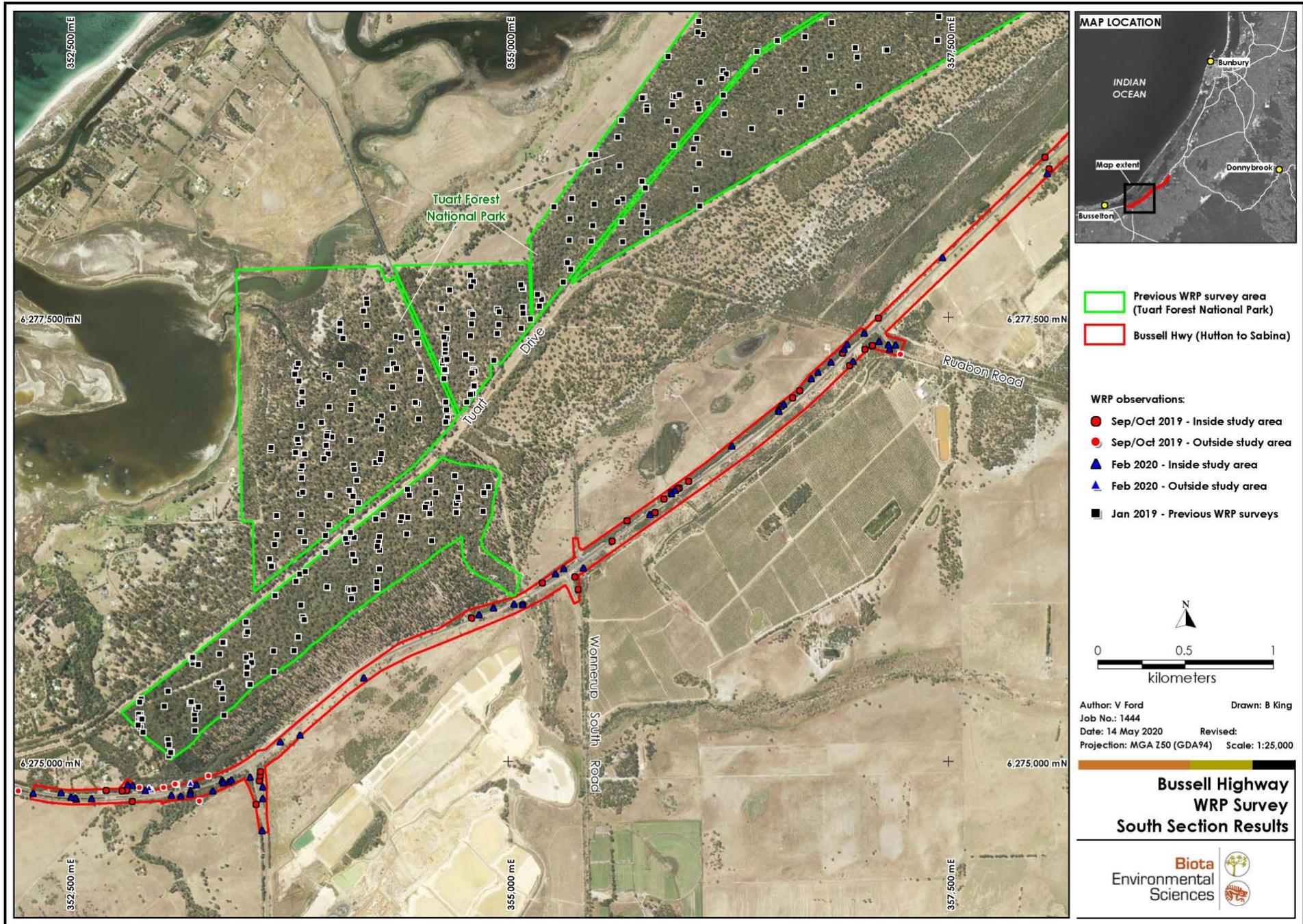


Figure 11: WRP observations within south section

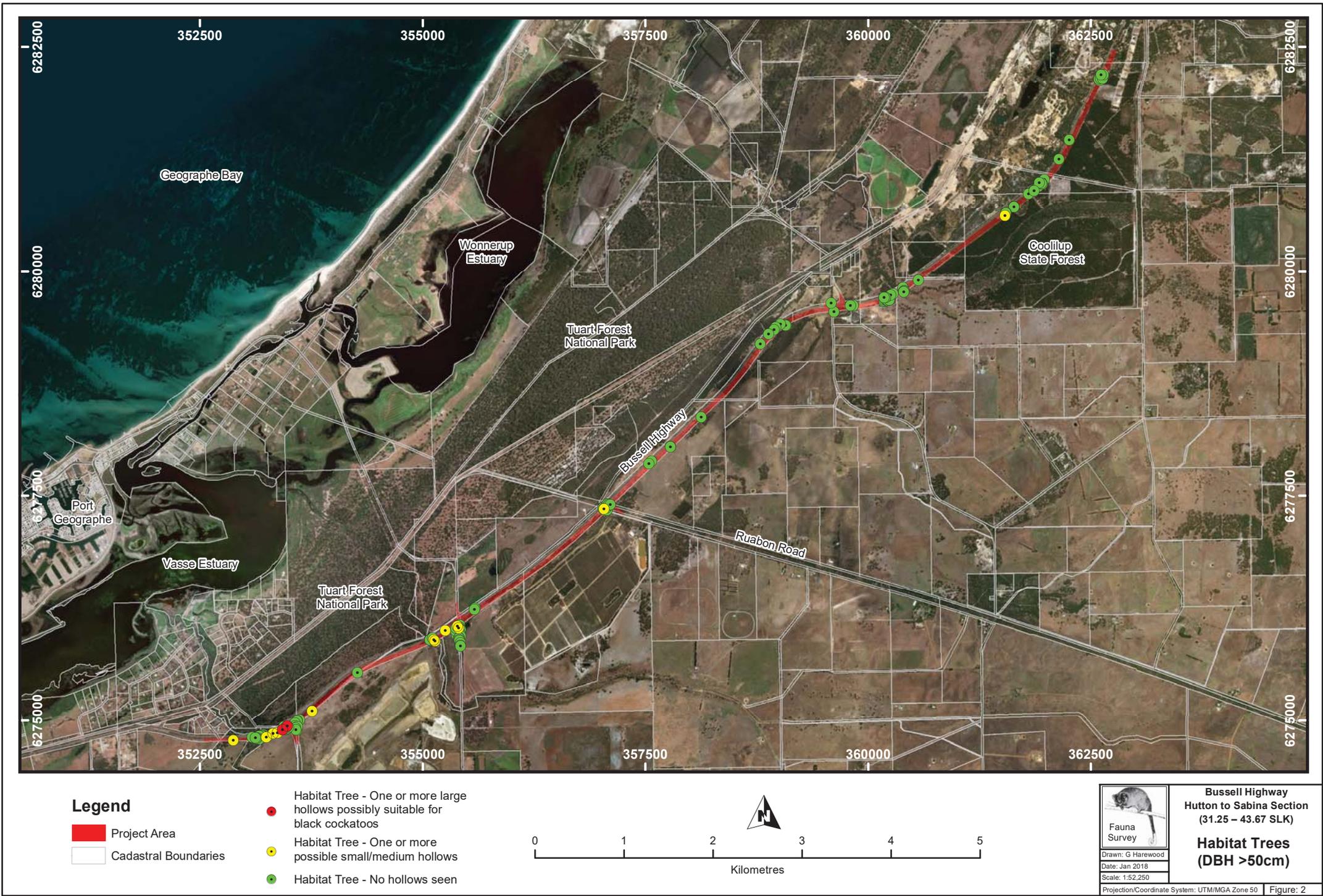


Figure 12: Suitable DBH trees within survey area (Harewood, 2018)

3.1.1 ATTACH COPIES OF ANY FLORA AND FAUNA INVESTIGATIONS AND SURVEYS (IF APPLICABLE)

Refer to Attachments 2 - 10.

3.2 DESCRIBE THE HYDROLOGY RELEVANT TO THE PROJECT AREA (INCLUDING WATER FLOWS)

Hydrological studies have been conducted as part of geotechnical (WML, 2017) and vegetation studies (Ecoedge, 2019).

Groundwater

Using the borehole left open from a geotechnical study (WML, 2017), a slotted 20 mm PVC pipe was inserted as deep as possible for use as a temporary monitoring well. The target depth was 5 m however shallow groundwater or dry sand sometimes collapsed the open borehole before allowing the full depth well to be placed.

Groundwater was present during the investigation in a number of boreholes, typically 2 - 3 m below the surface. These levels were monitored with temporary monitoring wells that were installed over the route. The majority of the drains contain flowing water throughout winter resulting in groundwater typically within 1 m of the surface (WML, 2017).

Surface water

Three rivers pass through the boundary of the Survey Area, the Ludlow, Abba and Sabina River. These rivers flow into the Conservation Category Vasse - Wonnerup Wetland System which are located approximately 2 km north of the Survey Area (Ecoedge, 2019).

The boundary of a Conservation-category palusplain wetland (State-listed) crosses the Survey Area approximately 360 m WSW of the Ludlow Hithergreen Road intersection. This wetland runs parallel to the Survey Area with its boundary for the most part about 50 m SE of the Survey Area boundary. Two other Conservation-category wetlands occur near the Survey Area. The closest boundary of these wetlands is about 75 m away from the Survey Area (Figure 13; Ecoedge, 2019; Attachment 4).

Multiple-use wetlands also intersects within the western and northern portions of the Survey Area. These wetlands are mostly associated with degraded, mostly cleared landscapes (Figure 13; Ecoedge, 2019; Attachment 4).



3.2.1 ATTACH COPIES OF ANY HYDROLOGICAL INVESTIGATIONS

Attachment 14: Geotechnical investigation. Duplication of Bussell Highway Hutton Road to Sabina River (WML, 2017).

Refer to Ecoedge, 2019 (Attachment 5).

3.3 DESCRIBE THE SOIL AND VEGETATION CHARACTERISTICS RELEVANT TO THE PROJECT AREA

Soil

The existing highway and proposed alignment generally follow the Bassendean Sand ridge that has been mined and rehabilitated. There are also small 'marsh' areas comprising Peaty Clay (Cps1) - dark grey and soft, variable organic content, variable quartz sand content, of lacustrine origin dark grey and soft, variable organic (WML, 2017).

The sub-surface profile generally comprised undulating sand dunes to the northern third of the route that transitioned to gentle, more low-lying topography and consistent soil profiles. The southern third was more variable with occasional clayey sands at depth. The majority of the boreholes comprised:

- Orange (occasionally pale grey overlying), fine to medium grained, medium dense occasionally loose, sand with a trace of silt. (Bassendean Sand); overlying
- Occasionally dark red mottled brown, very dense, variably iron-cemented sand, gravel (Coffee Rock) at variable depths. Often causing refusal with a hand-auger. Occasionally fine to coarse gravel within the sand matrix of the above layer.

Based on the test results from the investigation (WML, 2017), only one sample returned confirmation of Acid Sulphate Soils (ASS). ASS remediation measures will be undertaken should any excavation be required for the installation of a culvert in this location. No other areas show evidence of ASS or require remediation.

Vegetation

Vegetation Units

Six vegetation units were identified and mapped within the Survey Area (Figure 23 - Figure 27 of Ecoedge, 2019; Attachment 4). Other areas are comprised of roadway, bare ground and annual grasses with scattered native and exotic trees (designated 'CL').

Unit A: - A1. Peppermint – Tuart Woodland.

- A2. Yate-Tuart-Peppermint Woodland.

Unit B: Flooded Gum-Marri Woodland.

Unit C: Marri Woodland.

Unit D: Acacia-Kunzea Tall Shrubland.



Unit E: - E1. Marri-Jarrah-Nuytsia Open Forest.

- E2. Marri-Jarrah Open Forest.
- E3. Peppermint Woodland.
- E4. Marri-Bull Banksia Open Forest.

Unit F: Melaleuca Low Open Forest.

Vegetation Complexes

Five vegetation complexes occur within the Survey Area: the Abba Complex, the Cokelup Complex, the Karrakatta Complex – Central and South Complex and the Southern River and the Yoongarillup Complexes. Of these the Southern River Complex is dominant across the Survey Area (and clearing area) (Ecoedge, 2019; Attachment 4).

Six Beard vegetation associations occur within the Survey Area (Ecoedge, 2019).

Dieback

Most of the assessable vegetation was classified as uninterpretable, due to the lack of component susceptible species. In the interpretable infested vegetation, the disease was identified through recent fresh deaths of *B. grandis* and *X. gracilis*. All identified deaths were fresh and there was limited historic evidence of infestation.

Infested vegetation was identified at the junction of Ruabon Road and the Bussell Highway, and the eastern end of the Study Area. A small uninfested area was identified south of the highway and west of the infested vegetation at the junction of Ruabon Road and the Bussell Highway. The remainder of the assessable vegetation within the Study Area has been classified as uninterpretable.

The uninfested vegetation is only 0.3 ha in size and therefore does not meet the minimum size requirement to be considered protectable. While the uninterpretable areas are of sufficient size, most receive direct drainage from the highway and are also influenced by adjoining infested areas. It is therefore considered likely that the disease is present within the uninterpretable vegetation but cannot be detected due to the lack of indicator species. Therefore the uninterpretable vegetation has all been classified as unprotectable (Great Southern Bio Logic, 2020).

3.4 DESCRIBE ANY OUTSTANDING NATURAL FEATURES AND/OR ANY OTHER IMPORTANT OR UNIQUE VALUES RELEVANT TO THE PROJECT AREA

The South West Regional Ecological Linkages Technical Report (Ecoedge, 2019; Molloy et al., 2009) identifies three regional ecological linkage axis lines passing through the Study Area. As a result of the location of these, different patches of remnant vegetation within the Study Area are assigned to proximity categories '1a', '1b', '1c', '2a', '2b' and '2c' which are the highest to sixth highest categories (Ecoedge, 2019; Attachment 4). This means that a small portion of the



vegetation within the Survey Area directly forms part of an identified regional ecological linkage while the majority is within varying degrees of proximity to those linkages.

3.5 DESCRIBE THE STATUS OF NATIVE VEGETATION RELEVANT TO THE PROJECT AREA

Five vegetation complexes occur within the Survey Area: the Abba Complex, the Cokelup Complex, the Karrakatta Complex – Central and South Complex and the Southern River and the Yoongarillup Complexes (Ecoedge, 2019; Attachment 4). Only the Yoongarillup Complex meets the Commonwealth 30% retention target and is comparatively well reserved in DBCA managed lands. The remaining complexes are significantly diminished across the landscape and are poorly represented in conservation estate.

Six Beard Vegetation Associations are mapped within the study area and their percentage of pre-European extent remaining in the IBRA region are listed below:

- **2** (59.04%): Tall woodland; Tuart;
- **4** (18.89%): Medium woodland; Marri & Wandoo;
- **949** (57.22%): Low woodland; Banksia;
- **990** (16.38%): Low forest: Peppermint;
- **1000** (26.34%): Mosaic: Medium forest; Jarrah - Marri / Low woodland; banksia / Low forest; Teatree (*Melaleuca* Spp.); and
- **1136** (6.94%): Medium woodland; Marri with some Jarrah, Wandoo, River Gum and Casuarina.

Two associations exceed the 30% retention threshold and are both well represented in conservation estate. The remaining Associations fall short of the threshold. Association 1136 has less than 10% of its vegetation remaining in the SWA IBRA Region and only 3.86% of this occurs in DBCA-managed estate (Ecoedge, 2019).

Two hundred and eighty-one plant species were identified within the Survey Area of which 66 were naturalized or planted species.

The total area of remnant native vegetation in the Survey Area was approximately 28 ha. The results of the multivariate analysis (MVA) did not provide a clear indication about which floristic community type (FCT) best fitted several of the vegetation units. This is partly because of the level of weed invasion and lack of native species in some of the quadrats. This was particularly the case for quadrat WONS01 which had only 16 species in all, of which only five were native species. Furthermore, two of the quadrats (MINE01, MINE02) were sited in vegetation which was partly revegetated mineral sands mine and partly naturally regenerating locally native taxa. Vegetation unit D, which ranges from Degraded to Good condition, and is partly a 'reconstructed' community sited on old mineral sands mining areas can be assigned to FCT 4 (*Melaleuca preissiana* damplands) based on the results of the MVA (EcoEdge, 2019).



3.6 DESCRIBE THE GRADIENT (OR DEPTH RANGE IF ACTION IS TO BE TAKEN IN A MARINE AREA) RELEVANT TO THE PROJECT AREA

There are no significant gradients, apart from the banks of the Ludlow, Abba and Sabina Rivers.

3.7 DESCRIBE THE CURRENT CONDITION OF THE ENVIRONMENT RELEVANT TO THE PROJECT AREA

Vegetation Condition

Only 12.2% of the Survey Area was rated as “Good” or “Very Good” condition – where the original vegetation structure is intact and native plant species predominate. Areas categorized as “Degraded” were largely revegetated mining areas or embankments. These have a mix of planted species, many of which are not locally native and regeneration of locally native species, notably the shrub *Kunzea glabrescens*. About half (50.4%) of the Survey Area is cleared, with little or no native vegetation remaining. Areas and proportion of the total Survey Area for the various classes of vegetation condition in the Survey Area (Ecoedge, 2019; Attachment 4).

Vegetation condition – Area – Percentage

Very Good	1.71 ha	2.28%
Good	7.59 ha	10.12%
Degraded	18.8 ha	25.06%
Completely Degraded	8.64 ha	11.52%
Cleared	38.29 ha	51.03%

Weeds

Two pest plants, Arum Lily (*Zantedeschia aethiopica*) and Bridal Creeper (*Asparagus asparagoides*) listed under BAM Act, were found within the Survey Area (Attachment 4). Neither of these weeds have been assigned a management category under the BAM Act so there is currently no legal requirement to manage these weeds. *Acacia iteaphylla*, *A. podalyriifolia* and *Leptospermum laevigatum* are woody weeds that have the potential to invade and significantly alter intact bushland, especially after fire. These species can be logistically challenging and expensive to remove once established. *Zantedeschia aethiopica*, *Watsonia meriana* (watsonia) and *Asparagus asparagoides* are perennial renewed geophytes. They are commonly spread by birds and can rapidly invade and alter intact bushland.



3.8 DESCRIBE ANY COMMONWEALTH HERITAGE PLACES OR OTHER PLACES RECOGNISED AS HAVING HERITAGE VALUES RELEVANT TO THE PROJECT AREA

Not applicable.

3.9 DESCRIBE ANY INDIGENOUS HERITAGE VALUES RELEVANT TO THE PROJECT AREA

A search of the Department of Planning, Lands and Heritage (DPLH) Aboriginal Heritage Sites Register was conducted on 27th January 2016 for the road reserve survey corridor. Two Registered Sites (Site ID 17354 Abba River and Site ID 30946 RGC Sues Road A1) and seven Other Heritage Places are located within or adjacent to the survey corridor.

Both Registered Sites and two of the Other Heritage Places were identified to be located within the disturbance footprint. The remaining Other Heritage Places will not be affected by the works.

Ministerial consent under section 18 of the *Aboriginal Heritage Act 1978* was obtained in June 2016 to undertake works within these Aboriginal heritage sites.

3.10 DESCRIBE THE TENURE OF THE ACTION AREA (E.G. FREEHOLD, LEASEHOLD) RELEVANT TO THE PROJECT AREA

The action area will be conducted within the Bussell Highway Road Reserve held by the Government of WA.

3.11 DESCRIBE ANY EXISTING OR ANY PROPOSED USES RELEVANT TO THE PROJECT AREA

The Proposed Action will be conducted within a Road Reserve held by the Government of WA. The current surrounding land uses are vested as both private and public lands. The Tuart Forest National Park lies to the north, while land uses to the south are either agricultural, horticultural or industrial.



4 MEASURES TO AVOID OR REDUCE IMPACTS

4.1 DESCRIBE THE MEASURES YOU WILL UNDERTAKE TO AVOID OR REDUCE IMPACT FROM YOUR PROPOSED ACTION

The Proposed Action is currently in the detailed design stage and as such measures to avoid or reduce the potential impacts to MNES have been fully investigated and assessed. Five different design concepts were considered, with key selection criteria used in the assessment, including, amount of vegetation clearing/habitat loss, amount of fill material required, closeness to the existing carriageway, and compliance with design standards.

There are some specific key measures that have been incorporated into the design to avoid or reduce potential impacts on MNES:

- The disturbance of WRP and Black Cockatoo foraging habitat has been minimised as far as practicable; and
- The disturbance of Suitable DBH Trees has been minimised as far as practicable.

An EMP will be prepared to minimise the environmental impacts associated with the Proposed Action as well as identifying areas of responsibilities required for the implementation of management strategies. The EMP will be implemented prior to construction, during construction and post-construction works.

Main Roads has revegetated approximately 30 ha of suitable Black Cockatoo and WRP habitat adjacent to the Referral Area. This habitat will support fauna affected from the Proposed Action clearing.

Main Roads is also working with DBCA on the purchase / revegetation of several hundred hectares of land within the City of Bunbury and Shires of Capel and Busselton.

4.2 FOR MATTERS PROTECTED BY THE EPBC ACT THAT MAY BE AFFECTED BY THE PROPOSED ACTION, DESCRIBE THE PROPOSED ENVIRONMENTAL OUTCOMES TO BE ACHIEVED

Table 2: Proposed Environmental Outcomes

Species or threatened ecological community	Outcomes
Baudin's Cockatoo (<i>Calyptorhynchus baudinii</i>)	Loss of two trees with hollows that are suitable for breeding by Black Cockatoos (no evidence of previous use).
Carnaby's Cockatoo (<i>Calyptorhynchus latirostris</i>)	Loss of 118 Suitable DBH Trees without hollows Loss of 18.0 ha of vegetation representing foraging habitat for Black Cockatoos, with foraging quality being quite variable depending on the density of favoured plant species (representing less than 1% of potential habitat in the immediate area).
FRTBC (<i>Calyptorhynchus banksii naso</i>)	



Species or threatened ecological community	Outcomes
WRP (<i>Pseudocheirus occidentalis</i>)	Loss of 20.3 ha of potential WRP habitat that supports an estimated, 33 individual WRPs (representing approximately 0.9% of the immediate population)

4.3 ATTACH COPIES OF ANY SUPPORTING DOCUMENTS

Documents have previously been uploaded online (refer to Section 2.14).



5 CONCLUSION ON THE LIKELIHOOD OF SIGNIFICANT IMPACTS

5.1 YOU INDICATED THE BELOW TICKED ITEMS TO BE OF SIGNIFICANT IMPACT AND THEREFORE YOU CONSIDER THE ACTION TO BE A CONTROLLED ACTION

No significant impacts.

5.2 IF NO SIGNIFICANT MATTERS ARE IDENTIFIED, PROVIDE THE KEY REASONS WHY YOU THINK THE PROPOSED ACTION IS NOT LIKELY TO HAVE A SIGNIFICANT IMPACT ON A MATTER PROTECTED UNDER THE EPBC ACT AND THEREFORE NOT A CONTROLLED ACTION

Four MNES species were identified as occurring or likely to occur within the Referral Area; Baudin's Cockatoo, Carnaby's Cockatoo, FRTBC and WRP.

The Proposed Action is predicted to disturb 18.0 ha of Black Cockatoo foraging habitat, and 120 Suitable DBH Trees, two of which contain suitable nesting hollows that are not currently utilised by Black Cockatoos. The Proposed Action will therefore not result in the loss of any trees currently being utilised by Black Cockatoos for breeding. The Proposed Action will result in an 18.0 ha reduction in potential foraging habitat for Black Cockatoos, however this habitat is mostly degraded, is a mix of remnant and regrowth vegetation interspersed with larger portions of cleared land, within a narrow strip alongside an existing road corridor. An estimated 7,500 ha of remnant vegetation (likely foraging habitat) is located within 10 km of the Proposed Action. Large areas of suitable and higher value foraging habitat are located within the immediate area, including approximately 2,000 ha of remnant vegetation within the Tuart Forest National Park and 300 ha of pine plantation within the Coolilup State Forest. The loss of 18.0 ha of foraging habitat therefore represents less than 1% of the extent of protected foraging habitat in the immediate area based only on habitat within the Tuart Forest National Park and 0.25% at a local level. Given the presence of large areas of suitable foraging habitat in the area, the linear nature of clearing, the range of Black Cockatoos and the lack of known nesting hollows that will be disturbed, the Proposed Action is unlikely to lead to a significant impact to Black Cockatoo individuals or populations.

The Proposed Action is predicted to disturb 20.3 ha of WRP habitat, utilised by an estimated 33 individuals (representing approximately 0.9% of the adjacent population). The habitat to be disturbed is however a mix of remnant, non-native and regrowth vegetation interspersed with larger portions of cleared land, within a narrow strip alongside an existing road corridor. Over 7,500 ha of remnant bush expected to contain equal or better quality habitat is located within 10 km of the Proposed Action, including approximately 1,079 ha of suitable habitat within "Tuart



Forest Central' located immediately north-west of the Proposed Action, and 630 ha within 'Tuart Forest South' (Biota, 2020b). The loss of 20.3 ha of potential habitat equates to approximately 1% of the extent of habitat in these areas immediately adjacent to the Referral Area and approximately 0.25% at a local level (within 10 km of the Referral Area).

Up to 33 WRP individuals were recorded within the proposed clearing area. These individuals represent approximately 1% of the estimated population (3,565 individuals) in the area immediately adjacent to the Referral Area. 'Tuart Forest Central' has an estimated density of 1.32 individuals per hectare, which is lower than the other Tuart Forest sites (North and South), both of which had populations densities above 3.4 individuals per hectare, indicating that there is capacity within the 'Tuart Forest Central' mapped area (Biota, 2020b) for additional individuals. It is therefore likely that any individuals that have had their home ranges affected will be able to move to other areas within their home range or re-establish within adjacent and surrounding habitat.

Based on the above, the Proposed Action is unlikely to result in the loss of any Black Cockatoos or WRP individuals or the viability of local or regional populations. The Proposed Action is therefore considered unlikely to have a significant impact on MNES.



6 ENVIRONMENTAL RECORD OF THE PERSON PROPOSING TO TAKE THE ACTION

6.1 DOES THE PERSON TAKING THE ACTION HAVE A SATISFACTORY RECORD OF RESPONSIBLE ENVIRONMENTAL MANAGEMENT? EXPLAIN IN FURTHER DETAIL

Main Roads is a State Government agency with an assured record of responsible environmental management and performance.

Main Roads has a strong environmental compliance record with the conditions of environmental approvals granted under the EPBC Act and EP Act (WA).

Main Roads operations are undertaken in accordance with an Environmental Policy, which outlines Main Roads overarching objectives for environmental protection, sustainability and continual improvement in environmental performance.

The Environmental Policy is implemented through Main Roads international standard AS/NZS ISO 14001:2015-certified Environmental Management System (EMS). Main Roads EMS provides a formalised systematic approach to environmental management for all aspects of the operations (road planning, construction and maintenance).

6.2 PROVIDE DETAILS OF ANY PAST OR PRESENT PROCEEDINGS UNDER A COMMONWEALTH, STATE OR TERRITORY LAW FOR THE PROTECTION OF THE ENVIRONMENT OR THE CONSERVATION AND SUSTAINABLE USE OF NATURAL RESOURCES AGAINST EITHER (A) THE PERSON PROPOSING TO TAKE THE ACTION OR, (B) IF A PERMIT HAS BEEN APPLIED FOR IN RELATION TO THE ACTION – THE PERSON MAKING THE APPLICATION

Not applicable.



6.3 IF IT IS A CORPORATION UNDERTAKING THE ACTION WILL THE ACTION BE TAKEN IN ACCORDANCE WITH THE CORPORATION'S ENVIRONMENTAL POLICY AND FRAMEWORK?

Yes.

6.3.1 IF THE PERSON TAKING THE ACTION IS A CORPORATION, PROVIDE DETAILS OF THE CORPORATION'S ENVIRONMENTAL POLICY AND PLANNING FRAMEWORK

The Main Roads EMS is independently certified and covers the processes and activities that have the potential to impact the environment. The EMS facilitates compliance with Main Roads environment and heritage compliance obligations, providing the framework for driving environmental requirements through leadership, planning, support, operation, performance evaluation and improvement actions. The action, therefore, will be undertaken, monitored and measured in accordance with the Main Roads EMS.

The Main Roads Environmental Policy commits to protecting and enhancing the natural environmental and social values in all Main Roads activities. The Main Roads Environment Policy and EMS certificate is publicly accessible from: www.mainroads.wa.gov.au/OurRoads/Environment/Pages/environmentalmanagement.aspx.

6.3.2 ATTACH COPIES OF ANY ENVIRONMENTAL POLICY AND PLANNING FRAMEWORK (IF APPLICABLE)

Environmental Policy uploaded.

6.4 HAS THE PERSON TAKING THE ACTION PREVIOUSLY REFERRED AN ACTION UNDER THE EPBC ACT, OR BEEN RESPONSIBLE FOR UNDERTAKING AN ACTION REFERRED UNDER THE EPBC ACT?

Yes.

6.4.1 EPBC ACT REFERENCE NUMBER AND/OR NAME OF PROPOSAL

Main Roads has referred numerous projects under the EPBC Act. A list of recent Projects (2019 - 2020) referred to DAWE is provided below:

- 2020/8784;
- 2020/8769;
- 2020/8746;
- 2020/8725;
- 2019/8608;



- 2019/8545;
- 2019/8543;
- 2019/8529;
- 2019/8477; and
- 2019/8471.



7 INFORMATION SOURCES

7.1 LIST REFERENCES USED IN PREPARING THE REFERRAL

Reference	Reliability	Uncertainties
360 Environmental (2016). Bussell Highway - Hutton to Sabina (31.25 to 43.67 SLK) Environmental Impact Assessment (EIA). Prepared for: Main Roads Western Australia. September 2016	Reliable	None
360 Environmental (2017). Bussell Highway - Hutton to Sabina (31.25 to 43.67 SLK) Level 1 Fauna and Targeted Western Ringtail Possum Survey	Reliable	None
Biota Environmental Sciences (2020a). Bussell Highway (Hutton to Sabina) Western Ringtail Possum Assessment. Prepared for Main Roads Western Australia. May 2020	Reliable	None
Biota Environmental Sciences (2020b). Western Ringtail Possum <i>Pseudocheirus occidentalis</i> Regional Surveys. Prepared for Main Roads Western Australia. May 2020	Reliable	None
Brad Goode & Associates Consulting Anthropologists & Archaeologists (2016). Report of an Ethnographic Aboriginal Heritage Survey of the Bussell Highway (H036) SLK 26.1 to SLK 44.1, Capel To Sabina, Western Australia. March 2016	Reliable	None
Ecoedge, (2014) Level 1 Flora and Vegetation Survey – Bussell Highway, Hutton Rd to Sabina River (322.10 – 43.92 SLK). Prepared for Fulton Hogan Services (Main Roads WA). January 2014	Reliable	None
Ecoedge (2019). Detailed and Targeted Flora and Vegetation Survey along Bussell Highway, Hutton Road to Sabina River (32.10 – 43.92 SLK). Prepared for Main Roads WA. March 2019	Reliable	None
Great Southern Bio Logic (2020). Phytophthora Dieback Occurrence Survey. Bussell Highway (H043) Duplication Hutton to Sabina, SLK 31.15 – 43.95. Prepared for: Main Roads WA. March 2020	Reliable	None
Harewood, G. (2018). Targeted Fauna Survey. Bussell Highway – Hutton to Sabina Section (31.25 – 43.67 SLK). Version 2. March 2018	Reliable	<p>No seasonal sampling has been carried out as part of this fauna assessment.</p> <p>Generally the full characteristics of any hollow seen are not fully evident (e.g. internal dimensions). It is also difficult to locate all hollows within all trees as some are not observable from ground level.</p> <p>Some of the bushland with the Project area is extremely thick which limits the effectiveness of WRP survey work due to access difficulties and lack of light penetration when spotlighting.</p>
WML Consultants (2017). Geotechnical Investigation Duplication of Bussell Highway Hutton Road to Sabina River. February 2017	Reliable	None



8 PROPOSED ALTERNATIVES

8.1 DO YOU HAVE ANY FEASIBLE ALTERNATIVES TO TAKING THE PROPOSED ACTION?

No

9 CONTACTS, SIGNATURES AND DECLARATIONS

9.1 PERSON PROPOSING THE ACTION

9.1.1 IS THE PERSON PROPOSING THE ACTION A MEMBER OF AN ORGANISATION?

Yes

9.1.2 WOULD YOU LIKE TO USE A SAVED ORGANISATION FROM YOUR ACCOUNT?

Organisation name

Main Roads Western Australia

Organisation type

Australian

ABN

50 860 676 021

Business name

Main Roads Western Australia

Primary address

Don Aitken Centre

Waterloo Crescent

East Perth WA 6004

Main phone number

(08) 138 138

Primary email address

guy.watson@mainroads.wa.gov.au



9.1.3 I QUALIFY FOR EXEMPTION FROM FEES UNDER SECTION 520(4C)(E)(V) OF THE EPBC ACT BECAUSE I AM:

Not applicable

IF YOU ARE A TRUSTEE (EITHER BEING AN INDIVIDUAL OR A BODY CORPORATE) ACTING ON BEHALF OF A TRUST FOR WHICH THEY HAVE RESPONSIBILITY THEN YOU MUST ATTACH A TRUST DEED

Not applicable.

9.1.4 CONTACT

First name

Guy

Last name

Watson

Job title

Senior Environmental Scientist

Phone

08 9323 4999

Mobile

0488 775 464

Email

guy.watson@mainroads.wa.gov.au

Address

Don Aitken Centre

Waterloo Crescent

East Perth WA 6004

9.2 PROPOSED DESIGNATED PROPONENT

First name

Martine

Last name

Scheltema



Job title

Manager Environment

Phone

08 9323 4614

Mobile

0429 004 980

Email

martine.scheltema@mainroads.wa.gov.au

Address

Don Aitken Centre

Waterloo Crescent

East Perth WA 6004

9.3 REFERRING PARTY (PERSON PREPARING THE INFORMATION)

Details as above.

