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Anketell Road Upgrade (Leath Road to Kwinana Freeway)

EPBC Act Referral

March 2024

CONTENTS

Anketell Road Upgrade (Leith Road to Kwinana Freeway)

Application Number: **02314** Commencement Date: **21/03/2024** Status: **Locked**

1. About the project

1.1 Project details

1.1.1 Project title *

Anketell Road Upgrade (Leith Road to Kwinana Freeway)

1.1.2 Project industry type *

Transport - Land

1.1.3 Project industry sub-type

Road

1.1.4 Estimated start date *

01/01/2027

1.1.4 Estimated end date *

31/12/2030

1.2 Proposed Action details

1.2.1 Provide an overview of the proposed action, including all proposed activities. *

Main Roads is proposing to upgrade and widen Anketell Road to an Expressway Standard for approximately 7.5 km between Leath Road and Kwinana Freeway in the City of Kwinana, WA (the “Proposed Action” or “Proposal”). The Proposed Action links the Western Trade Coast (WTC), including the

Kwinana Industrial Area, Rockingham Industry Zone, Australian Marine Complex and Latitude 32 and a proposed future port (Westport), to existing and future Industrial Areas via the upgraded section of Anketell Road and the existing Kwinana Freeway and Roe Highway.

The Proposed Action (see Att 1-EPBC Supporting Document-2024, section 1, page 2, and Figure 1-1, page 3) is an upgrade of an existing road and includes:

- Approximately 7.5 km of new urban expressway standard, dual carriageway .
- Grade separated interchanges at Treeby Road and Kwinana Freeway, Mandogalup Road, Abercrombie Road, Armstrong Road and Rockingham Road.
- Grade separations of Rockingham Road and Anketell Road over rail.
- New local roads and existing road modifications, including upgrades at Rockingham Road.
- Drainage basins, drains and other associated infrastructure.
- Principle Shared Path (PSP) for the full length of the Proposal.
- Other road infrastructure, including but not limited to culverts, lighting, fencing, landscaping, road safety barriers and signs.
- Utility relocations and works to maintain access to properties.

Construction activities associated with the physical elements are likely to include:
– earthworks and site preparation, including laydown
– piling
– excavation
– dewatering
– drainage improvements, and
– landscaping.

The Proposed Action Area (PAA) (see Att 1-EPBC Supporting Document-2024, section 1 ,Figure 1-1, page 3), representing the boundary within which all development will be contained, comprises a total area of 221.09 ha, including clearing or disturbance of up to 96.20 ha of native vegetation and 47.98 ha non-native vegetation.

The PAA varies in width to accommodate intersection upgrades, drainage and vertical profile requirements and encompasses portions of the existing Anketell Road alignment. Impacts within the PAA, were assessed, on the assumption that all vegetated areas within the PAA will be disturbed for the Proposed Action activities listed above. The PAA disturbance represents the Proposed Action's direct impacts. These direct impacts to Matters of National Environmental Significance (MNES) are:

- Clearing of up to 41.65 ha of Tuart Woodlands and Forests of the SCP TEC (see Att 1-EPBC Supporting Document-2024, section 2.1.1, page 6, and Figure 2-1, page 7).
- Clearing of up to 14.26 ha of Banksia Woodlands of the SCP TEC (see Att 1-EPBC Supporting Document-2024, section 2.2.1, page 18, and Figure 2-2, pages 15,16 and 17).
- Clearing of up to 1.96 ha of *Melaleuca huegelii – Melaleuca systena* shrublands on limestone ridges TEC (see Att 1-EPBC Supporting Document-2024, section 3.1, page 45).
- Clearing of up to 16.11 ha of Carnaby’s Cockatoo core foraging habitat and 41.75 ha of secondary foraging habitat (see Att 1-EPBC Supporting Document-2024, section 2.3.1, page 36, and Figure 2-3, pages 27,28 and 29).
- Clearing of up to 7.24 ha of core foraging habitat and 31.55 ha of secondary habitat for FRTBC (see Att 1-EPBC Supporting Document-2024, section 2.3.1, page 36, and Figure 2-4, pages 30,31 and 32).
- Loss of up to 608 Black Cockatoo suitable DBH trees, of which 18 trees contained 25 hollows that were considered of suitable depth and shape for Black Cockatoo breeding (see Att 1-EPBC Supporting Document-2024, section 2.3.1, page 36, and Figure 2-5, pages 33,34 and 35). Note, although 608 suitable DBH trees will be impacted, the Proposal is unlikely to impact Black Cockatoo breeding given Black Cockatoos are not known to breed in the local area.

The Proposed Action has potential to cause indirect impacts to MNES values due to:

- Spread and/or introduction of weeds.
- Spread and/or introduction of pathogens such as Dieback.
- Changes to surface and groundwater hydrology.
- Noise and vibration.
- Dust emissions.

However, with the implementation of the management measures to be developed for the Proposed Action including the development of a Construction Environmental Management Plan (CEMP), the indirect impacts to MNES are predicted to be minor.

1.2.2 Is the project action part of a staged development or related to other actions or proposals in the region?

Yes

1.2.3 Is the proposed action the first stage of a staged development (or a larger project)?

No

1.2.4 Related referral(s)

—

1.2.5 Provide information about the staged development (or relevant larger project).

The Westport Program is the WA Government's long-term initiative to plan for a new container terminal in the Kwinana Outer Harbour, as well as the road and rail networks servicing the terminal. The upgrade of Anketell Road is a stand alone component of the Westport Program and will be delivered by Main Roads. The Anketell Road Upgrade will be delivered separately to the other components of the Westport Program, including the Westport Future Port Project (Westport Proposal).

1.2.6 What Commonwealth or state legislation, planning frameworks or policy documents are relevant to the proposed action, and how are they relevant? *

Under the EPBC Act an action will require approval from the minister if the action has, will have, or is likely to have, a significant impact on a matter of national environmental significance.

The PA is predicted to have a significant impact on the following MNES: nationally threatened species and ecological communities.

The following EPBC Act related policy / guidance are applicable to the PA:

1. DAWE (2022). Referral guideline for 3 WA threatened black Cockatoo Species Carnaby's Cockatoo (Zanda latirostris), Baudin's Cockatoo (Zanda baudinii) and the Forest Red-tailed Black-cockatoo (Calyptorhynchus banksii naso). Commonwealth of Australia, Canberra.
2. (Department of the Environment and Energy (DEE) 2019) Approved conservation advice (incorporating listing advice) for the Tuart (Eucalyptus gomphocephala) woodlands and forests of the Swan Coastal Plain (SCP) ecological community
   Canberra: Department of the Environment and Energy TSSC, Threatened Species Scientific Committee.
3. DEE (2016). Approved Conservation Advice (incorporating listing advice) for the Banksia Woodlands of the SCP
   ecological community Canberra: Department of the Environment and Energy TSSC, Threatened Species Scientific Committee.
4. DCCEEW (2023) Approved Conservation Advice for Honeymyrtle shrubland on limestone ridges of the Swan Coastal Plain Bioregion.
5. DoE (2013). Matters of National Environmental Significance, Significant Impact Guidelines 1.1, Environment Protection and Biodiversity Conservation Act 1999. Canberra, Australian Capital Territory.

Item 1. was used to assess the significance of the PA's impacts to Carnaby's or FRTBC (Att 1-EPBC Supporting Document-2024, section 2.3.1, page 36).

Item 2. was used to assess the significance of the PA's impacts to Tuart Woodlands and Forests of the SCP TEC (Att 1-EPBC Supporting Document-2024, section 2.1.1, page 8).

Item 3. was used to assess the significance of impacts to Banksia Woodlands of the SCP TEC (Att 1-EPBC Supporting Document-2024, section 2.2.2, page 18).

Item 4. was used to assess the significance of impacts to *Melaleuca huegelii – Melaleuca systena* shrublands on limestone ridges TEC (see Att 1-EPBC Supporting Document-2024, section 3.1, page 45).

Item 5. was used to assess the following MNES:

- Carnaby's Cockatoo and FRTBC: (Att 1-EPBC Supporting Document-2024, Table 2-2, page 9)
- Tuart woodlands and forests of the SCP: (Att 1-EPBC Supporting Document-2024, Table 2-4, page 20)
- Banksia Woodlands of the SCP TEC: (Att 1-EPBC Supporting Document-2024, Table 2-6, page 38)

The Proposed Action was referred on 1 March 2024 to the Western Australian (WA) Environmental Protection Authority (EPA) for assessment under Part IV of the WA *Environmental Protection Act 1986* (EP Act.

The alignment of the Proposed Action does not fully occur within land currently reserved under the Metropolitan Regional Scheme (MRS) for Primary Roads or Other Regional Roads. As such, the Proposed Action will require a Development Approval under the Planning and Development Act 2005, which will be assessed by the Western Australian Planning Commission (WAPC). Land within the proposed alignment will be acquired by Main Roads and dedicated as a road pursuant to Section 28 (1) of the Land Administration Act 1997 (LA Act). Following completion of the Proposed Action, all areas outside the existing Primary Regional Roads reservation will be incorporated into Primary Regional Roads, or zoned appropriately, through an omnibus amendment to the MRS pursuant to Section 28 (1) of the LA Act.

If groundwater abstraction / dewatering and/or bore/well construction/alteration is required for the Proposed Action, licence/s will be obtained from the Department of Water and Environmental Regulation (DWER) under the WA *Rights in Water and Irrigation Act 1914*.

If the Proposed Action disturbs Aboriginal Heritage sites listed under the WA *Aboriginal Heritage Act 1972* a Section 18 consent will be required and obtained before construction occurs.

1.2.7 Describe any public consultation that has been, is being or will be undertaken regarding the project area, including with Indigenous stakeholders. Attach any completed consultation documentations, if relevant. *

Westport has undertaken stakeholder engagement for the greater project, including the Westport Proposal and the Anketell Road Upgrade, since 2018. Westport developed a comprehensive information and engagement plan based on inputs from:

- Main Roads
- The Westport Taskforce Reference group comprising community groups, peak bodies, government agencies, universities, and research institutions
- Aboriginal groups and stakeholders
- A Westport Governance Committee
- Organisations not on the Reference group
- The broader community.

Specific engagement for the Anketell Road Upgrade Proposal commenced in August 2021, following selection of the future terminal location in Kwinana with engagement for the Proposal ongoing.

Westport has developed an engagement strategy to facilitate input from the community and stakeholders for the Westport Proposal and the Anketell Road Upgrade Proposal. Identified stakeholders include all three levels of government (federal, state and local), regulators, landowners, residents, business owners and operators, environmental groups, special interest groups, communities, and road users.

As concept design information has become available, Main Roads has been engaging with directly affected landowners regarding direct land impacts and future steps including the proposed environmental approval program. As the Proposal moves through the planning, design and environmental approval process, Main Roads, as the Proposed Action proponent, will conduct more detailed engagement and communications.

Stakeholders that have an interest in the planning and development phase of the Proposal have been consulted. These stakeholders include all three levels of government, regulators, landowners, residents, business owners and operators, environmental groups, special interest groups, communities, and road users.

Further stakeholders may be identified as the planning progresses from early concept design to detailed design and development.

Stakeholder engagement up to February 2024 is documented in Att3 - Stakeholder Engagement (pages 1 to 6).

Main Roads has recently consulted with environmental stakeholders and affected local authorities about the PA. Issues raised during these meetings included:

- avoidance of environmental values where possible.
- control of impacts to vegetation due to ground water abstraction and potential changes to surface water flows.
- other options considered.
- impacts to reserve lands.
- fauna movement.

Main Roads is committed to investigating issues raised, incorporating related investigations into project impact assessment, and providing appropriate responses to interested parties.

1.3.1 Identity: Referring party

Privacy Notice:

Personal information means information or an opinion about an identified individual, or an individual who is reasonably identifiable.

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1.3.1.1 Is Referring party an organisation or business? *

Yes

Referring party organisation details

ABN/ACN	50860676021
Organisation name	MAIN ROADS

Organisation address	Don Aitken Centre Waterloo Crescent East Perth 6004 WA Australia

Referring party details

Name	[redacted]
Job title	Environmental Contractor
Phone	[redacted]
Email	[redacted]
Address	

1.3.2 Identity: Person proposing to take the action

1.3.2.1 Are the Person proposing to take the action details the same as the Referring party details? *

No

1.3.2.2 Is Person proposing to take the action an organisation or business? *

Yes

Person proposing to take the action organisation details

ABN/ACN	50860676021
Organisation name	MAIN ROADS
Organisation address	Don Aitken Centre Waterloo Crescent East Perth 6004 WA Australia

Person proposing to take the action details

Name	[redacted]
Job title	Director Environment and Heritage

Phone	[redacted]
Email	[redacted]
Address	Don Aitken Centre Waterloo Crescent East Perth 6004 WA Australia

1.3.2.14 Are you proposing the action as part of a Joint Venture? *

No

1.3.2.15 Are you proposing the action as part of a Trust? *

No

1.3.2.17 Describe the Person proposing the action's history of responsible environmental management including details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against the Person proposing to take the action. *

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

Main Roads has no regulatory actions against EPBC conditions, or any proceedings against them under State or Commonwealth environmental legislation.

Main Roads has a strong environmental compliance record, with Main Roads remaining in compliance with all conditions of environmental approvals granted under the EPBC Act and the EP Act.

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).

Main Roads has referred several actions under the EPBC Act and these proposals were located in various regions across WA. The most recent ones are, 2022/9325, 2022/9151, 2021/8967, 2020/8833, 2020/8800, 2020/8784, 2020/8769, 2020/8746 and 2020/8725.

1.3.2.18 If the person proposing to take the action is a corporation, provide details of the corporation's environmental policy and planning framework

The intent of the Main Roads Environmental Policy is to recognise the importance of the environment and social values, foster strategic relationships and facilitate environmental governance to deliver broad community benefit. See the attached policy 'Att 2-Main Roads Western Australia Environmental Policy' for

more detail.

1.3.3 Identity: Proposed designated proponent

1.3.3.1 Are the Proposed designated proponent details the same as the Person proposing to take the action? *

Yes

Proposed designated proponent organisation details

ABN/ACN	50860676021
Organisation name	MAIN ROADS
Organisation address	Don Aitken Centre Waterloo Crescent East Perth 6004 WA Australia

Proposed designated proponent details

Name	[redacted]
Job title	Director Environment and Heritage
Phone	[redacted]
Email	[redacted]
Address	Don Aitken Centre Waterloo Crescent East Perth 6004 WA Australia

1.3.4 Identity: Summary of allocation

Confirmed Referring party's identity

The Referring party is the person preparing the information in this referral.

ABN/ACN	50860676021
Organisation name	MAIN ROADS
Organisation address	Don Aitken Centre Waterloo Crescent East Perth 6004 WA Australia
Representative's name	[redacted]
Representative's job title	Environmental Contractor
Phone	[redacted]
Email	[redacted]
Address	

Confirmed Person proposing to take the action's identity

The Person proposing to take the action is the individual, business, government agency or trustee that will be responsible for the proposed action.

ABN/ACN	50860676021
Organisation name	MAIN ROADS
Organisation address	Don Aitken Centre Waterloo Crescent East Perth 6004 WA Australia
Representative's name	[redacted]
Representative's job title	Director Environment and Heritage
Phone	[redacted]
Email	[redacted]
Address	Don Aitken Centre Waterloo Crescent East Perth 6004 WA Australia

Confirmed Proposed designated proponent's identity

The Person proposing to take the action is the individual or organisation proposed to be responsible for meeting the requirements of the EPBC Act during the assessment process, if the Minister decides that this project is a controlled action.

Same as Person proposing to take the action information.

1.4 Payment details: Payment exemption and fee waiver

1.4.1 Do you qualify for an exemption from fees under EPBC Regulation 5.23 (1) (a)? *

No

1.4.3 Have you applied for or been granted a waiver for full or partial fees under Regulation 5.21A? *

No

1.4.5 Are you going to apply for a waiver of full or partial fees under EPBC Regulation 5.21A?

No

1.4.7 Has the department issued you with a credit note? *

No

1.4.9 Would you like to add a purchase order number to your invoice? *

No

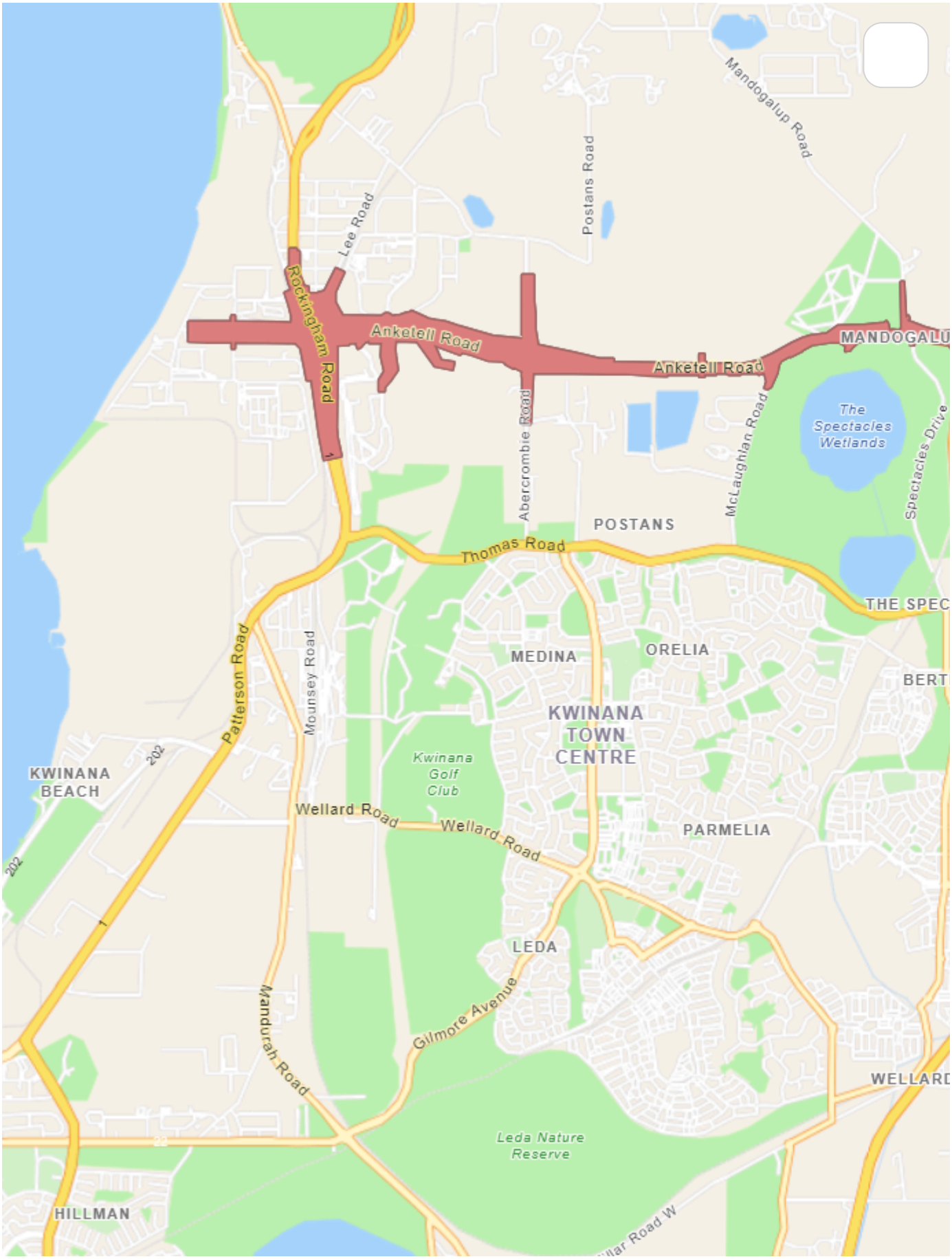
1.4 Payment details: Payment allocation

1.4.11 Who would you like to allocate as the entity responsible for payment? *

Person proposing to take the action

2. Location

2.1 Project footprint



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2.2 Footprint details

2.2.1 What is the address of the proposed action? *

Anketell Road between Leath Road and Treeby Road, Anketell

2.2.2 Where is the primary jurisdiction of the proposed action? *

Western Australia

2.2.3 Is there a secondary jurisdiction for this proposed action? *

No

2.2.5 What is the tenure of the action area relevant to the project area? *

The PAA intersects Main Roads road reserve, privately owned (freehold) land and Crown land. Where the PAA extends beyond the Main Roads road reserve, land will need to be acquired by Main Roads and transferred to road reserve.

Main Roads will undertake consultation with any affected land holders and will acquire all land required for the proposed action prior to commencement of the action through negotiated settlement, or in accordance with powers under the WA *Planning and Development Act 2005*.

Transferring land lying outside Main Roads road reserve will occur via a change to the MRS. Where construction works fall within areas zoned under the City of Kwinana Local Planning Scheme No. 2 as contrary to intended development, planning approval from the City of Kwinana will be sought. Should land within Conservation Park Reserve (R3313) be required for the Proposed Action it will be excised from the Reserve.

3. Existing environment

3.1 Physical description

3.1.1 Describe the current condition of the project area's environment.

See Att 1 - EPBC Supporting Document–2024, Appendix 1 - 2024 Biological Report section 4.4 p 75, Table 4.2, pages 75 and 76 and vegetation condition mapping in Att 1 - EPBC Supporting Document–2024, Appendix 1 - 2024 Biological Report_Appendix 8-17, Appendix 9, pages 679 to 684.

The PAA comprises cleared areas (76.91 ha or 34.8% of total), which includes the existing Anketell Road. The remainder of the PAA comprises native vegetation (96.20 ha or 43.5% of total) and non-native vegetation (47.98 ha or 21.7% of total). The PAA is substantially covered by existing road infrastructure, industrial and rural activities.

The condition of native vegetation within the PAA ranged from 'Very Good to Excellent' to 'Cleared'. No patches of vegetation within the PAA considered to have a Pristine or Excellent condition ranking. Numerous weed species were encountered across the PAA.

Condition Ranking	Survey Area (equivalent to PAA) ha (%)
Pristine	-
Excellent	0 (0)
Very Good to Excellent	4.72 (2.14)
Very Good	14.05 (6.36)
Good to Very Good	15.11 (6.84)
Good	31.12 (14.07)
Degraded to Good	8.62 (3.90)
Degraded	29.99 (13.56)
Completely Degraded	13.10 (5.93)
Cleared	104.38 (47.21)
Total	221.09 (100)

3.1.2 Describe any existing or proposed uses for the project area.

The majority of land within the PAA is zoned as 'Rural' (78.49 ha or 35.50% of total) under the MRS and reserved as 'Primary regional roads' (the existing Anketell Road) (52.27 ha or 23.64% of total) and 'Other regional roads' (38.05 ha or 17.21% of total). The majority of the PAA is located on areas reserved as Freehold Land (35.15%) and Road (28.54%), followed by Easements (20.54%), Crown Land (11.16%), and Reserves (4.63%).

3.1.3 Describe any outstanding natural features and/or any other important or unique values that applies to the project area.

The PAA lies adjacent to and includes a 3.71 ha of native vegetation within Bush Forever Sites. The PAA will clear:

- 1.28 ha of native vegetation in Good or Very Good to Excellent condition along the southern boundary of Bush Forever Site no. 268 (Mandogalup Road Bushland, Mandogalup)
- 1.93 ha of native vegetation ranging from Good to Very Good condition to Degraded to Good condition along the northern boundary of Bush Forever Site no. 269 (The Spectacles)
- 0.49 ha of native vegetation in Very Good to Good condition within Bush Forever Site no. 270 (Sandy Lake and Adjacent Bushland, Anketell).

State Planning Policy 2.8: Bushland Policy for the Perth Metropolitan Region adopted in 2010 recognises the protection and management of significant bushland areas such as Bush Forever in the planning process, as well as integrating environmental, social and economic considerations. Bush Forever identifies regionally significant bushland to be retained and protected wherever possible.

The PAA also intersects one Department of Biodiversity, Conservation and Attractions (DBCA) managed reserve, Class A Conservation Park (R 53313), south of the Kwinana Freeway / Anketell Road interchange (1.03 ha, including 0.55 ha of native vegetation). R 53313 is vested with the Conservation and Parks Commission, classified under WAPC Section 8a Lands within Beeliar Regional Park. Beeliar Regional Park encompasses two chains of wetlands and an area of coastal limestone cliff (Henderson foreshore), and has high nature conservation value due to its rich diversity, ecosystem complexity, cultural significance and amenity and recreation value. R 53313 occupies 610 ha across four separate areas, including North Lake, Farrington Road bushland, South Lake, parts of Kogolup Lake, portions of The Spectacles and Treeby Lake (Jandakot Regional Park).

3.1.4 Describe the gradient (or depth range if action is to be taken in a marine area) relevant to the project area.

The elevation within the PAA ranges from approximately 10 metres Australian height datum (mAHD) to 38 mAHD. The gradient east to west along Anketell is approximately -0.37%.

The Proposed Action may result in some localised changes to the existing gradient of the PAA to facilitate the creation of new road infrastructure, including road embankments and bridge abutments.

3.2 Flora and fauna

3.2.1 Describe the flora and fauna within the affected area and attach any investigations of surveys if applicable.

A brief description of affected flora and fauna is provided below, based on a biological survey report provided by Biota Environmental Services in 2024. Refer to Att 1 - EPBC Supporting Document–2024, Appendix 1 - 2024 Biological Report section 1.2, pages 13 and 14, section 1.4, pages 14 and 15, section 1.5, pages 15 and 16, section 4, pages 51 to 112, section 5, pages 113 to 124, and section 7, pages 129 to 157 for further information.

Flora

Diversity

Biota recorded 243 native vascular flora taxa representing 53 families and 130 genera in their survey area from surveys conducted in 2020, 2021, 2022 and 2023. The most well-represented families were Fabaceae (29 taxa) and Myrtaceae (27 taxa).

Significant flora

Desktop searches identified the presence/potential presence of 27 significant flora taxa listed as Threatened under the EPBC Act and/or WA *Biodiversity Conservation Act 2016* (BC Act) or as Priority species by DBCA, within 5 km of the PAA.

No EPBC listed Threatened flora taxa were recorded in the PAA during Winter Orchid surveys conducted in 2021, 2022 and 2023 and Spring Targeted Flora surveys conducted by Biota in 2020, 2022 and 2023. A likelihood of occurrence assessment completed by Biota post-field survey concluded four Threatened orchid species (*Caladenia huegelii*, *Diuris micrantha*, *Diuris purdiei* and *Drakaea elasticamay*) could potentially occur in the survey area (and PAA). However, despite extensive targeted searches within the survey area being conducted in accordance with the draft Survey Guidelines for Australia's Threatened Orchids (Department of the Environment 2013), these four species were not recorded during any of the surveys. It is considered unlikely these orchid species would be present within the survey area (or PAA), given that significant spatial and temporal survey effort has been allocated to their detection across a minimum of three seasons. The remainder of significant flora taxa were considered unlikely to or would not occur within the survey area (and PAA).

Introduced species

131 introduced flora species were recorded from the survey area (and PAA) by Biota. Of these, five Declared Pests (DP) listed under the WA *Biosecurity and Agriculture Management Act 2007*, including one Weed of National Significance (WoNS), were recorded within the PAA as follows:

- **Asparagus asparagoides* (Bridal Creeper) – DP and a WoNS
- **Echium plantagineum* (Paterson's Curse) – DP
- **Zantedeschia aethiopica* (Arum Lily) – DP
- **Gomphocarpus fruticosus* (Narrow-leaved Cotton Bush) – DP
- **Morea flaccida* (One-leaf Cape Tulip) – DP.

Fauna

Diversity

The Biota Anketell Road Upgrade Consolidated Biological Report identified 49 vertebrate fauna species within the survey area during the field survey, including 34 birds, 9 mammals and six reptiles. Of these, 42 fauna species are native with evidence of seven introduced mammals including the Red Fox (Vulpes vulpes), Rabbit (Oryctolagus cuniculus), Domestic Dog (*Canis familiaris*), Cat (*Felis catus*), House Mouse (*Mus musculus*), Black Rat (*Rattus rattus*) and European Cattle (*Bos primigenius taurus*) recorded during the survey. The assemblage recorded within the survey area is likely to be an adequate representation of fauna values of the survey area.

Significant fauna

Desktop searches identified 19 significant fauna taxa listed under either the EPBC Act, BC Act or as a Priority by DBCA, that may potentially occur within 5 km of the PAA. Biota also included an assessment of the likelihood of occurrence of a short-tongued bee (*Neopasiphae simplicior*), despite previous records being more than 5 km away from the survey area as little is known about the species ecology and distribution.

Of the 20 significant fauna assessed, four have been recorded in the survey area, four are considered likely to occur in the survey area, and four may occur in the survey area. The remaining are considered unlikely to or would not occur in the PAA.

The two significant fauna species recorded based on observation or evidence are:

- Forest Red-tailed Black Cockatoo (FRTBC) *(Calyptorhynchus banksii naso)* (Vulnerable)
- Quenda *(Isoodon fusciventer)* (Priority 4).

The two significant fauna species previously recorded within the PAA based on observation or evidence are:

- Carnaby's Cockatoo (*Zanda latirostris*) (Endangered)
- Perth Lined Slider (*Lerista lineata*) (Priority 3).

The four significant fauna species considered likely to occur within the PAA are:

- Peregrine Falcon (*Falco peregrinus*) (DBCA Special Protected)
- Black-striped Snake (*Neelaps calonotos*) (Priority 3)
- Graceful Sunmoth (*Synemon gratiosa*) (Priority 4)
- Swan Coastal Plain Shield– backed Trapdoor Spider (*Idiosoma sigillatum*) (Priority 3).

Two EPBC Act-listed fauna species have been recorded form the PAA based on observation or evidence, these are:

- Carnaby's Cockatoo - The species was not seen or heard in the PAA however foraging evidence was recorded. The PAA contains 16.11 ha of core foraging habitat and 41.75 ha of secondary foraging habitat for Carnaby's Cockatoo
- FRTBC - The species was seen and heard in the PAA. The PAA includes 7.24 ha of core foraging habitat and 31.55 ha of secondary foraging habitat for FRTBC

A total of 608 Black Cockatoo suitable diameter at breast height (DBH) trees were identified, of which 18 trees contained 25 hollows that were considered of suitable depth and shape for Black Cockatoo breeding. Consistent with the position that Black Cockatoos do not breed in the area, no breeding activity nor definitive evidence of breeding was observed within the PAA during the Biota survey. No known roosting sites were recorded within the PAA, nor any evidence of roosting.

No other EPBC Act-listed fauna species are considered likely to occur within the PAA.

3.2.2 Describe the vegetation (including the status of native vegetation and soil) within the project area.

The vegetation characteristics of the area are described in Att 1-Appendix 1 - 2024 Biological Report, section 4.0, pages 51 to 112. Vegetation Floristic Community Type mapping is provided in Att 1-Appendix 1 - 2024 Biological Report, Figure 4.4, page 87. Commonwealth listed Threatened Ecological Community (TEC) mapping is provided in Att 1-Appendix 1 - 2024 Biological Report, Figure 4.5, page 89, Figure 4.6, page 92, Figure 4.7, page 96 and Figure 4.8, page 98.

Vegetation complexes and units

The broadscale vegetation complexes mapped across the PAA comprise:

- Cottesloe Complex-Central and South – Mosaic of woodland of *Eucalyptus gomphocephala* (Tuart) and open forest of *Eucalyptus gomphocephala* (Tuart) - *Eucalyptus marginata* (Jarrah) - *Corymbia calophylla* (Marri); closed heath on the Limestone outcrops. This complex covers 154.64 ha of the PAA (east of Leath Road, and south of the Anketell Road/Kwinana Freeway intersection), and intersects 78.01 ha of native vegetation
- Bassendean Complex-Central and South – Vegetation ranges from woodland of *Eucalyptus marginata* (Jarrah) - *Allocasuarina fraseriana* (Sheoak) - Banksia species to low woodland of *Melaleuca* species, and sedgelands on the moister sites. This area includes the transition of *Eucalyptus marginata* (Jarrah) to *Eucalyptus todtiana* (Pricklybark) in the vicinity of Perth. This complex covers 26.40 ha of the PAA (eastern extent of the PAA, east of Mandogalup Road), and intersects 3.60 ha of native vegetation
- Karrakatta Complex-Central and South – Predominantly open forest of *Eucalyptus gomphocephala* (Tuart) - *Eucalyptus marginata* (Jarrah) - *Corymbia calophylla* (Marri) and woodland of *Eucalyptus marginata* (Jarrah) - Banksia species. *Agonis flexuosa* (Peppermint) is co-dominant south of the Capel River. This complex covers 20.39 ha of the PAA (west of Clementi Road), and intersects 13.26 ha of native vegetation
- Herdsman Complex – Sedgelands and fringing woodland of *Eucalyptus rudis* (Flooded Gum) - *Melaleuca* species. This complex covers 15 ha of the PAA (between Clementi Road and Mandogalup Road, and the northern extent of Kwinana Freeway), and intersects 1.17 ha of native vegetation
- Quindalup Complex – Coastal dune complex consisting mainly of two alliances, the strand and fore-dune alliance, and the mobile and stable dune alliance. Local variations include the low closed forest of *Melaleuca lanceolata* (Rottnest Teatree) - *Callitris preissii* (Rottnest Island Pine), the closed scrub of *Acacia rostellifera* (Summer-scented Wattle) and the low closed Agonis flexuosa (Peppermint) forest of Geographe Bay. This complex covers 4.66 ha of the PAA (western corner of the PAA, west of Leath Road), and intersects 0.16 ha of native vegetation.

At the Swan Coastal Plain (SCP) scale, the Proposed Action will potentially reduce the remaining extent of the mapped Complexes between 0.00% and 0.18%. At the City of Kwinana scale the Proposed Action will potentially reduce the remaining extent of the mapped Complexes between 0.0% and 2.06%. However, the Proposal will not reduce any of the complexes below 10% of the pre-European extent, which is important criterion for the WA EPA on the Swan Coastal Plain.

The PAA is located along the existing Anketell Road and vegetation is limited to median areas, road reserves and adjacent remnant blocks. Biota mapped 96.20 ha (43.5%) of native vegetation mapped across 20 intact vegetation units, and 47.98 ha (21.7%) of non-native/modified vegetation across the PAA. The remainder of the PAA is cleared (76.91 ha, 34.8%), with these areas containing roads (and associated infrastructure including culverts) and tracks.

The condition of the native vegetation within the PAA ranged from ‘Very Good to Excellent’ to ‘Cleared’. No patches of vegetation within the PAA are considered to have a Pristine or Excellent condition ranking. There has been significant impact to native vegetation composition and structure as a result of human activities, including clearing and very high levels of introduced (weed) taxa. A summary of vegetation types, along with vegetation condition, is attached (refer to ‘Att 1–Supporting Document–2024 Appendix 1, section 4, pages 52 to 75).

Soils

The PAA occurs within the Bassendean and Perth Coastal Soil-Landscape Zones of the Swan Province. The Bassendean Zone consists of Mid-Pleistocene Bassendean sand, fixed dunes inland from coastal dune zone. The Bassendean Zone comprises non-calcareous sands, podsolised soils with low-lying wet areas. The Perth Coastal Zone consists of coastal sand dunes and calcarenite, late Pleistocene to Recent (Quindalup and Spearwood Systems), and calcareous and siliceous sands and calcarenite

Significant vegetation

Desktop searches identified nine Threatened Ecological Communities (TECs) and six Priority Ecological Communities (PECs) present or potentially present within a 5 km buffer of the PAA. The Biota report identified three commonwealth TECs, one state TEC and three PECs occurring within the PAA.

The PAA contains 41.65 ha of Tuart Woodlands and Forests of the Swan Coastal Plain (SCP) Threatened Ecological Community (TEC) and 14.26 ha of Banksia Woodlands of the Swan Coastal Plain TEC.

Effective from 15 November 2023 the State-listed TEC ‘Melaleuca huegelii – Melaleuca systena shrublands on limestone ridges’ was approved and listed as a Critically Endangered Commonwealth TEC under the EPBC Act. At the time of the approved conservation advice listing, this ecological community is synonymous with, and corresponds to, the Critically Endangered WA Threatened Ecological Community 'Melaleuca huegelii – M. systena shrublands of limestone ridges (floristic community type 26a) that is on the list of Threatened Ecological Communities, under the WA BC Act.

This TEC is largely restricted to massive limestone ridges within Yanchep and Neerabup National Parks. The community typically occurs on skeletal soil on ridge slopes and tops of ridges, and is dominated by Melaleuca huegelii, M. systena and M. aff. systena often over scattered limestone heath species such as Banksia sessilis and Grevillea preissii (Keighery et al. 2003).

Biota reports the PAA supports a single occurrence of this TEC (1.96 ha) situated north and south of Anketell Road, east of the Abercrombie Road intersection (existing within the mapped vegetation unit B5). The two small areas were identified to occur prior to the survey (Biota 2022) and were specifically targeted with three sampling quadrats. Biota states the mapped area is in a relatively Degraded condition and depauperate in understory species. The combined species recorded from the three quadrats included 33 introduced species, with only 13 native taxa recorded. Although the species recorded are typical of the community type 26a, PATN analysis of the site data against the 11 sites known to represent this TEC shows very little similarity in terms of vegetation composition. From the floristic analyses, these quadrats were assigned to FCT24 (aff. 29a/30b) and FCT24 (aff. 29a), reflecting the FCTs that were mapped for the surrounding vegetation.

As the FCT analysis did not confirm the presence of this TEC, Main Roads will liaise with DBCA’s Species and Communities Branch about this vegetation community and potentially undertake further vegetation community analysis to arrive at a more definitive conclusion about the presence and extent of this TEC. Given this uncertainty, this TEC is not assessed further.

Groundwater Dependent Vegetation

The Proposed Action will result in the clearing of vegetation that grows in association with seasonally inundated soils. There is 0.92 ha of vegetation type K1 (*Kunzea* tall shrubland to tall open scrub) within the PAA, of which 0.22 is mapped within the boundary of unnamed Multiple Use Wetland (MUW) (UFI 6538). Vegetation type K1 is not associated with MNES core or supporting habitat.

The Proposal avoids direct impacts on the Resource Enhancement Wetland (REW) (UFI 6379), which occurs approximately 45 m north east/east of the PAA.

The PAA also intersects part of Mandogalup Swamp South wetland, a MUW (UFI 6530); however, there is no native vegetation mapped in this area.

3.3 Heritage

3.3.1 Describe any Commonwealth heritage places overseas or other places recognised as having heritage values that apply to the project area.

No places of World, National or Commonwealth Heritage are located within the PAA or the surrounding area.

3.3.2 Describe any Indigenous heritage values that apply to the project area.

Review of the Western Australian Register of Aboriginal Heritage Places and Objects through the Department of Planning, Lands and Heritage (DPLH) Aboriginal Cultural Heritage Inquiry System (ACHIS) has identified that one Aboriginal Heritage Place is situated within the PAA: Place ID 3427, Mandogalup Swamp/Spectacles (listed as 'Historic' – previously referred to as 'Stored Data' place type by DPLH). The place type is listed as Mythological, Hunting Place and Water Source and the place intersects two locations at the PAA: the northern extent of Kwinana Freeway and east of Treeby Road.

Formal Archaeological and Ethnographic Site Identification Aboriginal heritage surveys of the PAA are scheduled to be conducted with Gnaala Karla Booja representatives in the first half of 2024. The heritage surveys will be undertaken in accordance with the Main Roads Gnaala Karla Booja Standard Heritage Agreement and will incorporate best practice heritage management, as described in the current Australian Burra Charter Practice Notes (2013).

3.4 Hydrology

3.4.1 Describe the hydrology characteristics that apply to the project area and attach any hydrological investigations or surveys if applicable. *

Groundwater hydrology and hydrogeography

The PAA occurs above three layers of aquifers, in order from topmost to bottommost layer: the unconfined Superficial Swan aquifer, the confined Leederville aquifer and the confined Yarragadee North aquifer.

The Superficial Swan aquifer receives direct recharge from groundwater infiltration and surface water. The Leederville and Yarragadee North aquifers receive direct recharge where these formations outcrop (not within the location of the Proposal). There is limited interaction between the various aquifers, in terms of water exchange, and groundwater movement and recharge is very slow in the confined aquifers (Leederville and Yarragadee North).

Review of the historical minimum and maximum groundwater contours available on the Perth Groundwater Map infers groundwater at the site flows west towards the ocean with eventual discharge to the Indian Ocean. Whilst local groundwater flows in a westerly direction toward the Indian ocean, groundwater investigations at the Kwinana Wastewater Treatment plant have inferred that mounding caused by the infiltration ponds on-site direct groundwater to flow towards the ponds and The Spectacles wetlands. Depth to groundwater across the PAA ranges from approximately 5 m to 30 m below ground level (bgl).

The PAA intersects three Groundwater Areas proclaimed under the RIWI Act:

- Cockburn Groundwater Area (170.52 ha (77.13% of PAA))
- Jandakot Groundwater Area (30.78 ha (13.92% of PAA))
- Serpentine Groundwater Area (19.79 ha (8.95% of PAA))

There are no Public Drinking Water Source Areas (PDWSAs) proclaimed under the Metropolitan Water Supply, Sewage and Drainage Act 1909 or Country Area Water Supply Act 1947 within the PAA. The closest PDWSA is the P1 and P2 Jandakot Underground Water Pollution Control Area PDWSA, located approximately 275 m east of the PAA, east of Lyon Road.

Surface water

The PAA does not intersect any Surface Water Areas or Irrigation Districts proclaimed under the RIWI Act. The PAA intersects two Drains and an inundation area (Figure 5 22). The Peel Main Drain is owned by the Water Corporation and is a tributary of the Serpentine River. It intersects the PAA on the western side of Kwinana Highway, between Clementi Road and Mandogalup Road, crossing the PAA and running through The Spectacles. The Mandogalup East Drain intersects the north eastern part of the PAA, crossing the Kwinana Freeway. It joins the Peel Main Drain within Mandogalup Swamp. The Mandogalup Swamp South and East are mapped as an inundation area that intersects the edges of the PAA along Kwinana Freeway.

Ponds operated by Alcoa are located 300m north of site at Kwinana Refinery which are expected to be lined and therefore not have direct contact with the regional aquifer. There is also a surge pond operated by Alcoa at Kwinana Motorplex which receives stormwater discharge, rainfall runoff, water from Alcoa sump pumps and recovery bores. Kwinana Wastewater Treatment Plant is located west of The Spectacles with two large ponds visible from satellite imagery, along with smaller evaporation and infiltration ponds/tanks.

International and nationally important wetlands

No internationally recognised (Ramsar) wetlands or Nationally Important Wetlands intersect the PAA. The nearest Ramsar wetland (Thompsons Lake) is approximately 5 km north of the eastern portion of the PAA. The other Ramsar listed wetland in the region, (Forrestdale Lakes) is more than 8km from the PAA.

Forrestdale and Thomsons Lakes are interdunal groundwater wetlands. Thomsons Lake is located on the western edge of the Jandakot Groundwater Mound (JGM) and Forrestdale Lake is situated on the eastern margin of the JGM (Maher and Davis, 2009). The JGM, a region of elevated groundwater table beneath the Swan Coastal Plain, discharges groundwater from the mound into low lying depressions that support groundwater dependent vegetation and wetland systems. There is no natural surface drainage to the lakes apart from direct rainfall (Maher and Davis, 2009).

As groundwater flows from east to west and the Ramsar wetlands are at least 5km north the PA is not predicted to directly or indirectly impact these Ramsar wetlands.

Surface water in the vicinity of the Proposed Action Area flows predominantly north to south in the Peel Main Drain, away from Forrestdale Lake and Thompsons Lake. The PA is not predicted to impact surface water entering either Forrestdale Lake or Thompsons Lake.

The nearest Nationally Important Wetland occurs approximately 100 m south of the PAA, west of Kwinana Freeway (Spectacles Swamp). This wetland is not expected to be directly or indirectly impacted by the Proposed Action.

The Spectacles represent the most significant permanent water source in proximity to the PAA. The Spectacles is part of Beeliar Regional Park and Bush Forever Site No. 269. It consists of two distinct swamps, the Large Eye Swamp in the north and the Small Eye Swamp in the south. The wetland is also on the City of Kwinana heritage list. Biota recorded large Tuart and Jarrah trees bordering this wetland within their survey area, that represented some of the most prospective Black Cockatoo roosting habitat in the local area; these trees do not occur within the PAA.

Geomorphic wetlands

Based on the Geomorphic Wetlands of the SCP mapping, the PAA intersects two geomorphic wetlands, Mandogalup Swamp South wetland, a MUW (UFI 6530) and an unnamed MUW (UFI 6538). A total of 9.76 ha of wetland areas occur within the PAA, with 0.22 ha mapped as native vegetation (in Completely Degraded condition), 4.53 ha mapped as modified vegetation, and the remaining 5.00 ha mapped as cleared. These wetlands are classified as MUWs, described as wetlands with few remaining important attributes and functions, whose use, development and management should be considered in the context of ecologically sustainable development and best management practice catchment planning through landcare (Hill et al. 1996 and WRC 2001). The PAA does not intersect a REW known as Conway Road Swamp (UFI 6379) but is within the REW's 50 m buffer zone.

4. Impacts and mitigation

4.1 Impact details

Potential Matters of National Environmental Significance (MNES) relevant to your proposed action area.

EPBC Act section	Controlling provision	Impacted	Reviewed
S12	World Heritage	No	Yes
S15B	National Heritage	No	Yes
S16	Ramsar Wetland	No	Yes
S18	Threatened Species and Ecological Communities	Yes	Yes
S20	Migratory Species	No	Yes
S21	Nuclear	No	Yes

EPBC Act section	Controlling provision	Impacted	Reviewed
S23	Commonwealth Marine Area	No	Yes
S24B	Great Barrier Reef	No	Yes
S24D	Water resource in relation to large coal mining development or coal seam gas	No	Yes
S26	Commonwealth Land	No	Yes
S27B	Commonwealth Heritage Places Overseas	No	Yes
S28	Commonwealth or Commonwealth Agency	No	Yes

4.1.1 World Heritage

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

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4.1.1.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.1.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

No World Heritage properties are in proximity to the Proposed Action. The nearest World Heritage place to the DE is Shark Bay, located approximately 900 km northwest of the PAA.

4.1.2 National Heritage

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

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4.1.2.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.2.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

No National Heritage places are in proximity to the Proposed Action. The closest National Heritage place is Fremantle Prison (former), located approximately 18 km northwest of the PAA

4.1.3 Ramsar Wetland

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

Direct impact	Indirect impact	Ramsar wetland
No	No	Forrestdale and Thomsons Lakes
No	No	Peel-Yalgorup System

4.1.3.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.3.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

There are no Ramsar wetlands within the PAA. The nearest Ramsar wetland (Thompsons Lake) is approximately 5km north of the eastern portion of the PAA. The Forrestdale Lake Ramsar wetland is over 8km from the PAA. The Peel-Yalgorup System is more distant and will not be affected.

As groundwater flows from east to west and the Ramsar wetlands are at least 5km north the PA is not predicted to directly or indirectly impact these Ramsar wetlands.

Surface water in the vicinity of the Proposed Action Area flows predominantly north to south in the Peel Main Drain, away from Forrestdale Lake and Thompsons Lake. The PA is not predicted to impact surface water entering either Forrestdale Lake or Thompsons Lake.

4.1.4 Threatened Species and Ecological Communities

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

Threatened species

Direct impact	Indirect impact	Species	Common name
No	No	Andersonia gracilis	Slender Andersonia
No	No	Anous tenuirostris melanops	Australian Lesser Noddy
No	No	Ardenna grisea	Sooty Shearwater
No	No	Balaenoptera musculus	Blue Whale
No	No	Banksia mimica	Summer Honeypot
No	No	Botaurus poiciloptilus	Australasian Bittern
No	No	Caladenia huegelii	King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid
No	No	Calidris acuminata	Sharp-tailed Sandpiper
No	No	Calidris canutus	Red Knot, Knot
No	No	Calidris ferruginea	Curlew Sandpiper

Direct impact	Indirect impact	Species	Common name
Yes	No	Calyptorhynchus banksii naso	Forest Red-tailed Black-Cockatoo, Karrak
No	No	Carcharias taurus (west coast population)	Grey Nurse Shark (west coast population)
No	No	Carcharodon carcharias	White Shark, Great White Shark
No	No	Caretta caretta	Loggerhead Turtle
No	No	Charadrius leschenaultii	Greater Sand Plover, Large Sand Plover
No	No	Chelonia mydas	Green Turtle
No	No	Dasyurus geoffroii	Chuditch, Western Quoll
No	No	Dermochelys coriacea	Leatherback Turtle, Leathery Turtle, Luth
No	No	Diomedea amsterdamensis	Amsterdam Albatross
No	No	Diomedea dabbenena	Tristan Albatross
No	No	Diomedea epomophora	Southern Royal Albatross
No	No	Diomedea exulans	Wandering Albatross
No	No	Diomedea sanfordi	Northern Royal Albatross
No	No	Diuris micrantha	Dwarf Bee-orchid
No	No	Diuris purdiei	Purdie's Donkey-orchid
No	No	Drakaea elastica	Glossy-leafed Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid
No	No	Drakaea micrantha	Dwarf Hammer-orchid
No	No	Eleocharis keigheryi	Keighery's Eleocharis
No	No	Eubalaena australis	Southern Right Whale
No	No	Leipoa ocellata	Malleefowl
No	No	Limosa lapponica menzbieri	Northern Siberian Bar-tailed Godwit, Russkoye Bar-tailed Godwit
No	No	Macronectes giganteus	Southern Giant-Petrel, Southern Giant Petrel
No	No	Macronectes halli	Northern Giant Petrel
No	No	Morelotia australiensis	Southern Tetraria

Direct impact	Indirect impact	Species	Common name
No	No	Natator depressus	Flatback Turtle
No	No	Neophoca cinerea	Australian Sea-lion, Australian Sea Lion
No	No	Numenius madagascariensis	Eastern Curlew, Far Eastern Curlew
No	No	Pachyptila turtur subantarctica	Fairy Prion (southern)
No	No	Phaethon rubricauda westralis	Red-tailed Tropicbird (Indian Ocean), Indian Ocean Red-tailed Tropicbird
No	No	Pristis pristis	Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish
No	No	Pseudocheirus occidentalis	Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit
No	No	Rhincodon typus	Whale Shark
No	No	Rostratula australis	Australian Painted Snipe
No	No	Sphyrna lewini	Scalloped Hammerhead
No	No	Sternula nereis nereis	Australian Fairy Tern
No	No	Thalassarche carteri	Indian Yellow-nosed Albatross
No	No	Thalassarche cauta	Shy Albatross
No	No	Thalassarche impavida	Campbell Albatross, Campbell Black-browed Albatross
No	No	Thalassarche melanophris	Black-browed Albatross
No	No	Thalassarche steadi	White-capped Albatross
No	No	Thunnus maccoyii	Southern Bluefin Tuna
No	No	Tringa nebularia	Common Greenshank, Greenshank
No	No	Westralunio carteri	Carter's Freshwater Mussel, Freshwater Mussel
No	No	Zanda baudinii	Baudin's Cockatoo, Baudin's Black-Cockatoo, Long-billed Black-cockatoo
Yes	No	Zanda latirostris	Carnaby's Black Cockatoo, Short-billed Black-cockatoo

Ecological communities

Direct impact	Indirect impact	Ecological community
Yes	Yes	Banksia Woodlands of the Swan Coastal Plain ecological community
No	No	Empodisma peatlands of southwestern Australia
Yes	Yes	Honeymyrtle shrubland on limestone ridges of the Swan Coastal Plain Bioregion
Yes	Yes	Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain ecological community

4.1.4.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

Yes

4.1.4.2 Briefly describe why your action has a direct and/or indirect impact on these protected matters. *

Ecological surveys undertaken by Biota confirmed the presence of MNES within the PAA (refer to Att 1–Supporting Document–2024-Appendix 1 2024 Biological Report, section 8.1 page 159) Intersection of the PAA with these values indicated the following potential impacts:

- Up to 41.65ha of Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the SCP TEC – Critically Endangered.
- Up to 14.26 ha of Banksia woodlands of the SCP TEC – Endangered.
- Up to 1.96 ha of *Melaleuca huegelii – Melaleuca systena* shrublands on limestone ridges TEC – Critically Endangered.
- Up to 7.24ha of core foraging and up to 31.55 ha of secondary foraging habitat of Forest Red-tailed Black Cockatoo habitat (FRTBC, *Calyptorhynchus banksii naso*) – Vulnerable.
- Up to 16.11 ha of core foraging and up to 41.75 ha of secondary foraging habitat of Carnaby's Cockatoo habitat (*Zanda latirostris*) – Endangered.
- A total of 608 Black Cockatoo suitable DBH trees, of which 18 trees contained 25 hollows that were considered of suitable depth and shape for Black Cockatoo breeding, however, these trees have not been confirmed as potential breeding trees by a Black Cockatoo specialist.

The Proposed Action may result in indirect impacts to Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the SCP TEC, Banksia Woodlands of the SCP TEC and *Melaleuca huegelii – Melaleuca systena* shrublands on limestone ridges TEC that is adjacent to the PAA including:

- Fragmenting TEC habitat, rendering the remaining adjacent patch area no longer representative of Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the SCP TEC.
- Introduction and/or spread of weeds potentially affecting all three TECs.
- Introduction and/or spread of *Phytophthora cinnamomi* dieback potentially affecting all three TECs.
- Changes to vegetation structure and floristic composition through altered surface water drainage patterns and flows, and construction dewatering potentially affecting all three TECs.

The Proposed Action has the potential to indirectly impact on significant fauna and fauna habitat through:

- Introduction and/or spread of weeds.
- Introduction and/or spread of *Phytophthora cinnamomi* dieback.

- Increased risk of vehicle strike.

4.1.4.4 Do you consider this likely direct and/or indirect impact to be a Significant Impact? *

Yes

4.1.4.5 Describe why you consider this to be a Significant Impact. *

Refer to Att 1-EPBC Supporting Document-2024, section 2, pages 5 to 36, for a full assessment of the significance of potential impacts to TECs and Black Cockatoos, arising from the Proposed Action, based on the criteria in Significant Impact Guidelines 1.1.

Tuart Woodlands and Forests of the SCP TEC

There is 41.65 ha of the Tuart woodlands and forests of the SCP TEC within the PAA, mapped as seven patches. Of these, patches TT06 and TT07 occur within/intersect Bush Forever sites. The vegetation within these patches ranging from 'Cleared' to 'Very Good to Excellent'. The PAA intersects the edges of most patches, except for patch TT02, which will be removed almost entirely. Post clearing, patches TT01, TT03, and TT04 will be greater than 5 ha and therefore meet the size threshold to be representative of the Tuart woodlands and forests of the SCP TEC. Patches TT05 and TT06 will be reduced in size but are still likely to meet the size and condition thresholds to remain a Tuart woodlands and forests of the SCP TEC patch. Patch TT07 will be less than 5 ha and is unlikely to meet size and condition thresholds and therefore will no longer represent Tuart woodlands and forests of the SCP TEC.

The Proposed Action's impact on Tuart woodlands and forests of the SCP TEC is considered likely to be significant due to the direct impact on a TEC, including important occurrences of this TEC (i.e. within Bush Forever).

Banksia Woodlands of the SCP TEC

There is 14.26 ha of Banksia Woodlands of the SCP TEC within the PAA, including 0.61 ha (4.3%) in 'Good' condition, 1.99 ha (14.0%) in 'Good to Very Good' condition, 3.99 ha (28.0%) in 'Very Good' condition, and 7.67 ha (53.7%) in 'Very Good to Excellent' condition. A patch assessment was undertaken by Biota to determine discrete and continuous areas of TEC. Within the PAA, the Banksia Woodlands of the SCP TEC occurs across nine patches, four of which intersect Bush Forever sites. Clearing for the Proposed Action will remove all of patch BT09 (0.61 ha) and the majority of patch BT08 (3.02 ha, 97.42%) and a large portion of patches BT07 (3.46 ha, 61.71%) and BT02 (2.06 ha, 42.04%). Whilst patches BT02 and BT07 will likely remain Banksia Woodlands of the SCP TEC, the integrity of the patches would be reduced, resulting in the remaining area having a higher vulnerability to indirect impacts such as weed and disease infestation and edge effects. Clearing required for the Proposed Action will increase the perimeter-to-area ratio for patches BT02 and BT07, compromising the remaining Banksia TEC vegetation within the patches.

The conservation advice (TSSC 2016) defines all patches of the Banksia Woodlands of the SCP TEC, plus a buffer of 20-50 m, as habitat critical for the survival of the TEC and therefore clearing patches within the PAA would likely result in a significant impact.

Black Cockatoos

The Proposed Action will result in the clearing of up to 16.11 ha of core foraging habitat for Carnaby's Cockatoos, and 7.24 ha of core foraging habitat for FRTBC. An assessment of available Black Cockatoo foraging habitat within 12 km of the Proposal indicates the proposed clearing represents a 0.76% and 0.36% reduction in foraging habitat for Carnaby's Cockatoo and FRTBC, respectively.

Black Cockatoos are highly mobile species and are expected to forage outside the PAA amongst foraging resources in the vicinity and are not dependent on a particular patch of foraging habitat within the PAA. Furthermore, clearing will occur over linear patches adjacent to existing cleared and disturbed areas along Anketell Road and associated connecting roads, and will not create a gap of 4 km or more between patches of habitat.

The Proposed Action will result in the loss of up to 608 Black Cockatoo suitable DBH trees. Of these, 18 trees contained 25 hollows that were considered of suitable depth and shape for Black Cockatoo breeding, however, these trees have not been confirmed as potential breeding trees by a Black Cockatoo specialist. The Proposed Action will not result in clearing of known breeding trees or hollows. The Proposed Action occurs approximately 5 km from the closest unconfirmed breeding area for Carnaby's Cockatoo and 11.5 km from the closest confirmed breeding area for Carnaby's Cockatoo (GoWA 2023). While the PAA is not considered breeding habitat for Carnaby's Cockatoo or FRTBC, it may provide breeding habitat at some point in the future if breeding patterns change.

No known roosting sites were recorded within the PAA, nor any evidence of roosting. The Great Cocky Count indicates that the closest roosting site occurs approximately 2.5 km south of the eastern end of the PAA in Marri Park Golf Course.

The Proposed Action's impact to Black Cockatoo foraging habitat is considered significant. The Proposed Action has the potential to impact breeding and roosting habitat, however these potential impacts require further assessment to determine if they are significant and, if so, the quantum of such impacts.

4.1.4.7 Do you think your proposed action is a controlled action? *

Yes

4.1.4.8 Please elaborate why you think your proposed action is a controlled action. *

The Proposed Action is a controlled action as it is likely to have a significant impact to the following MNES be clearing up to:

- 41.65 ha of Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the SCP TEC
- 14.26 ha of Banksia woodlands of the SCP TEC
- 7.24 ha of core foraging habitat and 31.55 ha of secondary foraging habitat for FRTBC
- 16.11 ha of core foraging habitat and 41.75 ha of secondary foraging habitat for Carnaby's Cockatoo

18 Black Cockatoo suitable DBH trees that contain 25 hollows that were considered of suitable depth and shape for Black Cockatoo breeding.

4.1.4.10 Please describe any avoidance or mitigation measures proposed for this action and attach any supporting documentation for these avoidance and mitigation measures. *

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

- The design solution is located mainly on existing roads. The positioning of the road infrastructure within the PAA will be informed by various constraints (including environment and social constraints).

Existing and future environmental data will be used to determine the environmental values and enable the design to be modified and refined, where practical to avoid and minimise MNES impacts, whilst complying with Main Roads standards for the safety of road users, reduced congestion, and ease of access.

- The widening of Anketell Road will be minimised by implementing a narrow median along Anketell Road, this has been reduced to an absolute minimum (provision for a safety barrier only). This measure reduced the footprint of the project by approximately 7.5 ha as the proposal is approximately 7.5 km long and the typical median width would be 10 m. This has minimised the impacts on TECs and Black Cockatoo Habitat.
- The interchange configuration at Anketell / Abercrombie is a compact diamond interchange. During the interchange options assessment phase, the compact diamond configuration was chosen for operational reasons and to reduce the project footprint, and consequently the PAA and vegetation clearing, TECs and Black Cockatoo Habitat loss.
- The design criteria including vertical clearances at bridges has been optimised to minimis environmental impacts. The Rockingham Road interchange layout was chosen to allow Rockingham Road to go over Anketell Road, significantly reducing the PAA and vegetation clearing, TEC and Black Cockatoo habitat loss.
- Multiple roads are required to accommodate local access and efficient regional freight movements. The separation between such roads has been minimised to reduce the PAA and vegetation clearing, TEC and Black Cockatoo habitat loss.
- The design has incorporated a deviation of the Peel Main Drain, providing improvement to the local environment including local water quality and associated habitat.
- In the area north of Anketell Road adjacent Armstrong Road retaining walls will be employed to minimise vegetation clearing and Black Cockatoo habitat loss.
- The PAA avoids additional bisection of patches of TEC.
- All infrastructure associated with the Proposed Action will be contained within the PAA, including road pavements, footpaths, noise walls, stormwater drainage, fencing, and electrical power reticulation, reducing impacts to MNES outside the PAA.
- All laydowns, stockpiles and access tracks will be constructed within existing cleared areas or within the permanent footprint of the works. No TECs or Black Cockatoo habitat will be cleared for temporary works outside the permanent footprint.
- The detailed design will seek to reduce earthworks (fill height/cut depth) in vegetated areas, reducing TEC and Black Cockatoo habitat loss.
- The use of barriers will be considered during the detailed design phase to protect high-quality vegetation, by reducing clearing requirements and potential MNES impacts. Deep cuts, cuts in rock, or cuts behind barriers might be steepened in detailed design however this is dependent on the findings of the geotechnical investigation which has not yet been carried out for the reference design. This may also impact the typical cross section if trapezoidal drains or additional drainage layers are required in sections of cut.
- Clearing and MNES impacts will be minimised during the detailed design process, by implementing measures such as the use of kerbing where appropriate to alleviate the need for table drains, that require a larger clearing footprint.
- Drainage design will seek to maintain existing flow lines/watercourses to avoid impacting existing vegetation and MNES. This will be investigated further during detailed design and hydrological assessment. A drainage plan will be progressed during the detailed design phase.

A CEMP that includes management objectives, performance criteria, actions and monitoring will be implemented to minimise risks to the surrounding environment and MNES. The CEMP will include clearing and access controls, dieback and weed management, sediment and erosion controls, soil management and revegetation and landscaping requirements.

4.1.4.11 Please describe any proposed offsets and attach any supporting documentation relevant to these measures. *

An offset strategy will be developed for the Proposed Action.

4.1.5 Migratory Species

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

Direct impact	Indirect impact	Species	Common name
No	No	Actitis hypoleucos	Common Sandpiper
No	No	Anous stolidus	Common Noddy
No	No	Apus pacificus	Fork-tailed Swift
No	No	Ardenna carneipes	Flesh-footed Shearwater, Fleshy-footed Shearwater
No	No	Ardenna grisea	Sooty Shearwater
No	No	Balaenoptera edeni	Bryde's Whale
No	No	Balaenoptera musculus	Blue Whale
No	No	Calidris acuminata	Sharp-tailed Sandpiper
No	No	Calidris canutus	Red Knot, Knot
No	No	Calidris ferruginea	Curlew Sandpiper
No	No	Calidris melanotos	Pectoral Sandpiper

Direct impact	Indirect impact	Species	Common name
No	No	Caperea marginata	Pygmy Right Whale
No	No	Carcharhinus longimanus	Oceanic Whitetip Shark
No	No	Carcharodon carcharias	White Shark, Great White Shark
No	No	Caretta caretta	Loggerhead Turtle
No	No	Charadrius leschenaultii	Greater Sand Plover, Large Sand Plover
No	No	Chelonia mydas	Green Turtle
No	No	Dermochelys coriacea	Leatherback Turtle, Leathery Turtle, Luth
No	No	Diomedea amsterdamensis	Amsterdam Albatross
No	No	Diomedea dabbenena	Tristan Albatross
No	No	Diomedea epomophora	Southern Royal Albatross
No	No	Diomedea exulans	Wandering Albatross
No	No	Diomedea sanfordi	Northern Royal Albatross
No	No	Eubalaena australis	Southern Right Whale
No	No	Hydroprogne caspia	Caspian Tern
No	No	Lamna nasus	Porbeagle, Mackerel Shark
No	No	Limosa lapponica	Bar-tailed Godwit
No	No	Macronectes giganteus	Southern Giant-Petrel, Southern Giant Petrel
No	No	Macronectes halli	Northern Giant Petrel
No	No	Megaptera novaeangliae	Humpback Whale
No	No	Mobula alfredi	Reef Manta Ray, Coastal Manta Ray
No	No	Mobula birostris	Giant Manta Ray
No	No	Motacilla cinerea	Grey Wagtail
No	No	Natator depressus	Flatback Turtle

Direct impact	Indirect impact	Species	Common name
No	No	Numenius madagascariensis	Eastern Curlew, Far Eastern Curlew
No	No	Onychoprion anaethetus	Bridled Tern
No	No	Orcinus orca	Killer Whale, Orca
No	No	Pristis pristis	Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish
No	No	Rhincodon typus	Whale Shark
No	No	Sterna dougallii	Roseate Tern
No	No	Sternula albifrons	Little Tern
No	No	Thalassarche carteri	Indian Yellow-nosed Albatross
No	No	Thalassarche cauta	Shy Albatross
No	No	Thalassarche impavida	Campbell Albatross, Campbell Black-browed Albatross
No	No	Thalassarche melanophris	Black-browed Albatross
No	No	Thalassarche steadi	White-capped Albatross
No	No	Tringa nebularia	Common Greenshank, Greenshank

4.1.5.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.5.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

The results of an assessment of likelihood of significant species (including Migratory Species) occurring within the PAA is provided in Att 1–Supporting Document–2024-Appendix 1 2024 Biological Report , section 7.4, page 150 to page 157. Note particularly section 7.4.2.6 Glossy Ibis, *Plegadis falcinellus*, on page 157, and Table 7.9 on page 151 and page 152.

Desktop searches identified migratory species potentially occurring in the within 5 km of the PAA. Migratory marine species have been discounted from the search as the Proposed Action is not located within marine habitat.

Biological surveys completed to inform the Proposed Action did not record any listed migratory species.

The likelihood of occurrence assessment completed by Biota post-field survey concluded one listed migratory species, the Glossy Ibis, , *Plegadis falcinellus,*may occur within the PAA.

The Glossy Ibis, *Plegadis falcinellus,* although having a likelihood determined as “may occur” is considered unlikely to be affected by the PA. The Sharp-tailed Sandpiper, *Calidris acuminata* has a determined likelihood of “unlikely to occur” and so was not considered to be affected by the PA.

Only two records of the Glossy Ibis, *Plegadis falcinellus,* were returned from within 5 km of the PAA: one near the Spectacles Wetlands, the other southeast of the PAA in a paddock. However, given the presence of some suitable habitat and the highly mobile nature of the species, it is considered to potentially occur.

Glossy Ibis , *Plegadis falcinellus,* are widely distributed globally. Within WA, this species is particularly concentrated in well-watered flatlands of the Kimberley and Swan Coastal Plain. It is a non-breeding visitor to the Swan Coastal Plain, where it is generally rare to uncommon but increasing in abundance.

Areas of potential secondary foraging habitat within the PAA are small and would only be suitable to the species during times of seasonal inundation of water. By contrast, the area surrounding the PAA contains more suitable habitat for this species, including freshwater wetlands and pastures.

Glossy Ibis , *Plegadis falcinellus,* are widely distributed globally and within WA, this species is a non-breeding visitor to the Swan Coastal Plain, where it is generally rare to uncommon. This species is highly mobile and the area surrounding the PAA contains more suitable habitat for this species, including freshwater wetlands and pastures. The Proposed Action is not likely to have significant direct or indirect impacts on listed migratory species because:

- The Ibis is unlikely to be a frequent visitor to the PAA. In the unlikely event an Ibis enters the PAA during construction, Main Roads will implement management actions to ensure it is not directly or impacted by construction activities.
- Main Roads is not aware of any reports of incidents involving Glossy Ibis vehicle strikes attributable to the existing road. The Proposed Action is not expected to exacerbate risks to the Glossy Ibis from vehicle strikes.

4.1.6 Nuclear

4.1.6.1 Is the proposed action likely to have any direct and/or indirect impact on this protected matter? *

No

4.1.6.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

The Proposed Action is not a nuclear action.

4.1.7 Commonwealth Marine Area

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

—

4.1.7.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.7.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

There are no direct or indirect environmental impact pathways to Commonwealth Marine Areas associated with implementing the Proposed Action.

4.1.8 Great Barrier Reef

4.1.8.1 Is the proposed action likely to have any direct and/or indirect impact on this protected matter? *

No

4.1.8.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

The Proposed Action is on the Swan Coastal Plain of WA.

4.1.9 Water resource in relation to large coal mining development or coal seam gas

4.1.9.1 Is the proposed action likely to have any direct and/or indirect impact on this protected matter? *

No

4.1.9.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

The Proposed Action does not involve coal seam gas or coal mine development.

4.1.10 Commonwealth Land

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

—

4.1.10.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.10.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

Ten Commonwealth Lands have been identified within 5 km of the PAA. The Proposed Action does not intersect Commonwealth Land.

4.1.11 Commonwealth Heritage Places Overseas

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

—

4.1.11.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.11.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

Ten Commonwealth Lands have been identified within 5 km of the PAA. The Proposed Action does not intersect Commonwealth Land.

4.1.12 Commonwealth or Commonwealth Agency

4.1.12.1 Is the proposed action to be taken by the Commonwealth or a Commonwealth Agency? *

No

4.2 Impact summary

Conclusion on the likelihood of significant impacts

You have indicated that the proposed action will likely have a significant impact on the following Matters of National Environmental Significance:

- Threatened Species and Ecological Communities (S18)

Conclusion on the likelihood of unlikely significant impacts

You have indicated that the proposed action will unlikely have a significant impact on the following Matters of National Environmental Significance:

- World Heritage (S12)
- National Heritage (S15B)
- Ramsar Wetland (S16)
- Migratory Species (S20)
- Nuclear (S21)
- Commonwealth Marine Area (S23)
- Great Barrier Reef (S24B)
- Water resource in relation to large coal mining development or coal seam gas (S24D)
- Commonwealth Land (S26)
- Commonwealth Heritage Places Overseas (S27B)
- Commonwealth or Commonwealth Agency (S28)

4.3 Alternatives

4.3.1 Do you have any possible alternatives for your proposed action to be considered as part of your referral? *

No

4.3.8 Describe why alternatives for your proposed action were not possible. *

The timing of the Anketell Road Upgrade is dependent upon the timing of Westport, local and regional growth. Various timing options are under consideration. It is unlikely differences in timing of the Anketell Road Upgrade proposal would materially affect proposal impacts or required mitigation measures.

In 2017, the Westport Taskforce (Westport) was established to provide guidance to the State Government on Perth's long-term freight infrastructure needs. Westport focused on the three existing port precincts at Fremantle, Kwinana and Bunbury. This work included developing a long list of infrastructure options which was assessed through Multi-Criteria Assessment (MCA) by members of Westport and subject matter experts drawn from consultants and Western Australian Government Agencies in May 2019. The assessment resulted in a shortlist of seven options including various Kwinana options with either Anketell Road or Rowley Road serving as the main road freight access.

In May 2019, a second stage MCA assessed the shortlist of seven options in more detail and identified a preferred port location, configuration and supporting road and rail networks. The criteria included complementary land use, social, heritage, environmental, economic and supply chain (which included road and rail). The MCA identified a land-backed port in Kwinana serviced by an upgraded Anketell Road and rail network as the preferred port and supply chain option. Government subsequently endorsed this option. Rowley Road was discounted due to a number of factors including:

- Higher noise impacts on residential land uses compared to Anketell Road
- More significant impact on vegetation and flora compared to Anketell Road
- Rowley Road would have significant impacts on Aboriginal and non-Aboriginal heritage.

Anketell Road will serve as the key freight link between the Kwinana Freeway and the commercial/industrial precincts and the port. The design for Anketell Road accommodates these consolidated functions.

Anketell Road has been identified as an "Other Regional Road" in the Metropolitan Regional Scheme for a significant period of time. This recognises the importance of an efficient road network connection to the areas of Kwinana, Rockingham and Henderson. Anketell Road currently is a single carriageway with one lane in each direction and would not accommodate the volumes of traffic forecast from the developments within Kwinana Industrial Zone, Rockingham and Henderson. An upgrade of Anketell Road is required.

The elements of the Anketell Road Upgrade do not provide opportunities for alternative options, given the all elements of the road design are subject to strict design standards. It is unlikely differences in elements of the Anketell Road Upgrade proposal would materially affect proposal impacts. Mitigation measures have been considered for each element.

5. Lodgement

5.1 Attachments

1.2.1 Overview of the proposed action

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Att 1-Appendix 1 - 2024 Biological Report.PDF A consolidate biological report prepared by Biota based on surveys conducted prior to and during 2023 for the Anketell Road Upgrade proposal,	12/02/2024	No	High
#2.	Document	Att 1-Appendix 1 - 2024 Biological Report_Appendix1-6.PDF A consolidate biological report prepared by Biota based on surveys conducted prior to and during 2023 for the Anketell Road Upgrade proposal,	12/02/2024	No	High
#3.	Document	Att 1-Appendix 1 - 2024 Biological Report_Appendix7 Part1.pdf A consolidate biological report prepared by Biota based on surveys conducted prior to and during 2023 for the Anketell Road Upgrade proposal,	12/02/2024	No	High
#4.	Document	Att 1-Appendix 1 - 2024 Biological Report_Appendix7 Part2.PDF A consolidate biological report prepared by Biota based on surveys conducted prior to and during 2023 for the Anketell Road Upgrade proposal,	12/02/2024	No	High
#5.	Document	Att 1-Appendix 1 - 2024 Biological Report_Appendix7 Part3.PDF A consolidate biological report prepared by Biota based on surveys conducted prior to and during 2023 for the Anketell Road Upgrade proposal,	12/02/2024	No	High
#6.	Document	Att 1-Appendix 1 - 2024 Biological Report_Appendix8-17.PDF A consolidate biological report prepared by Biota based on surveys conducted prior to and during 2023 for the Anketell Road Upgrade proposal,	12/02/2024	No	High
#7.	Document	Att 1-EPBC Referral Supporting Document - 2024.pdf This supporting document provides an assessment of the significance of impacts from the Proposed Action for MNES identified via a EPBC Act Protected Matters Report. Anketell Road Upgrade Consolidated Biological Report (Biota 2024) is Appendix 1(attached separately): The Protected Matters Search Tool (PMST) Report is Appendix 2. A likelihood of impact assessment the MNES identified via PMST is Appendix 3.	27/03/2024	No	High
#8.	Document	Att 2-Main Roads Environmental Policy.pdf Main Roads Western Australia Environmental Policy	01/02/2023	No	High

1.2.7 Public consultation regarding the project area

	Type	Name	Date	Sensitivity	Confidence
#1.	Document				

Att 3 - Stakeholder Engagement.docx Contains a description of stakeholder engagement for the Westport and Anketell Road Upgrade projects up until February 2024	28/02/2024	Yes	High

3.4.1 Hydrology characteristics that apply to the project area

	Type	Name	Date	Sensitive	Confidence
#1.	Link	Ecological Character Description for the Forrestdale and Thomsons Lakes Ramsar Site https://rsis.ramsar.org/RISapp/files/547/documen..			High

5.2 Declarations

Completed Referring party's declaration

The Referring party is the person preparing the information in this referral.

ABN/ACN	50860676021
Organisation name	MAIN ROADS
Organisation address	Don Aitken Centre Waterloo Crescent East Perth 6004 WA Australia
Representative's name	[redacted]
Representative's job title	Environmental Contractor
Phone	[redacted]
Email	[redacted]
Address	

☑ Check this box to indicate you have read the referral form. *

☑ I would like to receive notifications and track the referral progress through the EPBC portal. *

☑ By checking this box, I, [redacted] **of MAIN ROADS**, declare that to the best of my knowledge the information I have given on, or attached to this EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. *

☑ I would like to receive notifications and track the referral progress through the EPBC portal. *

Completed Person proposing to take the action's declaration

The Person proposing to take the action is the individual, business, government agency or trustee that will be responsible for the proposed action.

ABN/ACN	50860676021
Organisation name	MAIN ROADS
Organisation address	Don Aitken Centre Waterloo Crescent East Perth 6004 WA Australia
Representative's name	[redacted]
Representative's job title	Director Environment and Heritage
Phone	[redacted]
Email	[redacted]
Address	Don Aitken Centre Waterloo Crescent East Perth 6004 WA Australia

☑ Check this box to indicate you have read the referral form. *

☑ I would like to receive notifications and track the referral progress through the EPBC portal. *

☑ I, [redacted] **of MAIN ROADS**, declare that to the best of my knowledge the information I have given on, or attached to the EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. I declare that I am not taking the action on behalf or for the benefit of any other person or entity. *

☑ I would like to receive notifications and track the referral progress through the EPBC portal. *

Completed Proposed designated proponent's declaration

The Proposed designated proponent is the individual or organisation proposed to be responsible for meeting the requirements of the EPBC Act during the assessment process, if the Minister decides that this project is a controlled action.

Same as Person proposing to take the action information.

☑ Check this box to indicate you have read the referral form. *

☑ I would like to receive notifications and track the referral progress through the EPBC portal. *

☑ I, [redacted] **of MAIN ROADS**, the Proposed designated proponent, consent to the designation of myself as the Proposed designated proponent for the purposes of the action described in this EPBC Act Referral. *

☐ I would like to receive notifications and track the referral progress through the EPBC portal. *

ATTACHMENT 1

EPBC ACT REFERRAL SUPPORTING DOCUMENT (2024)

We're working for Western Australia.

Anketell Road Upgrade (Leath Road to Kwinana Freeway)

EPBC Act Referral Supporting Document

D24#411363
March 2024

Document Records

Revision	Date	Name	Role
0	19/03/2024	GHD	Author and reviewer
0	19/3/2024	Main Roads	Approver
1	26/03/2024	GHD	Author and reviewer
1	26/03/2024	Main Roads	Approver

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1 PURPOSE AND BACKGROUND

Main Roads Western Australia (Main Roads) is proposing to upgrade Anketell Road to an Expressway Standard between Leath Road, within the Kwinana Industrial Area (KIA) and Kwinana Freeway (the "Proposed Action" or "Proposal"). The Proposed Action also includes the upgrade of a short section of Anketell Road east of the Kwinana Freeway (to Treeby Road) to connect the Proposed Action to the existing Anketell Road. The Proposed Action is located within the City of Kwinana and approximately 28 km south of the Perth central business district (Figure 1-1).

The Proposed Action was referred to the Western Australian Environmental Protection Authority (EPA) under Part IV of the *Environmental Protection Act 1986* (EP Act) on 1 March 2024.

Main Roads is referring the Proposed Action to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as the Proposed Action is likely to have a significant impact to Matters of National Environmental Significance (MNES).

The Proposed Action is located within a Proposed Action Area (PAA), which is 221.09 hectares (ha) and represents the boundary within which all development (and direct impacts) will be contained. The PAA varies in width to accommodate intersection upgrades, drainage and vertical profile requirements and encompasses portions of the existing Anketell Road alignment.

Ecological surveys documented in the Anketell Road Upgrade Consolidated Biological Report (Biota 2024; see Appendix 1) have confirmed the presence of the following MNES within the PAA:

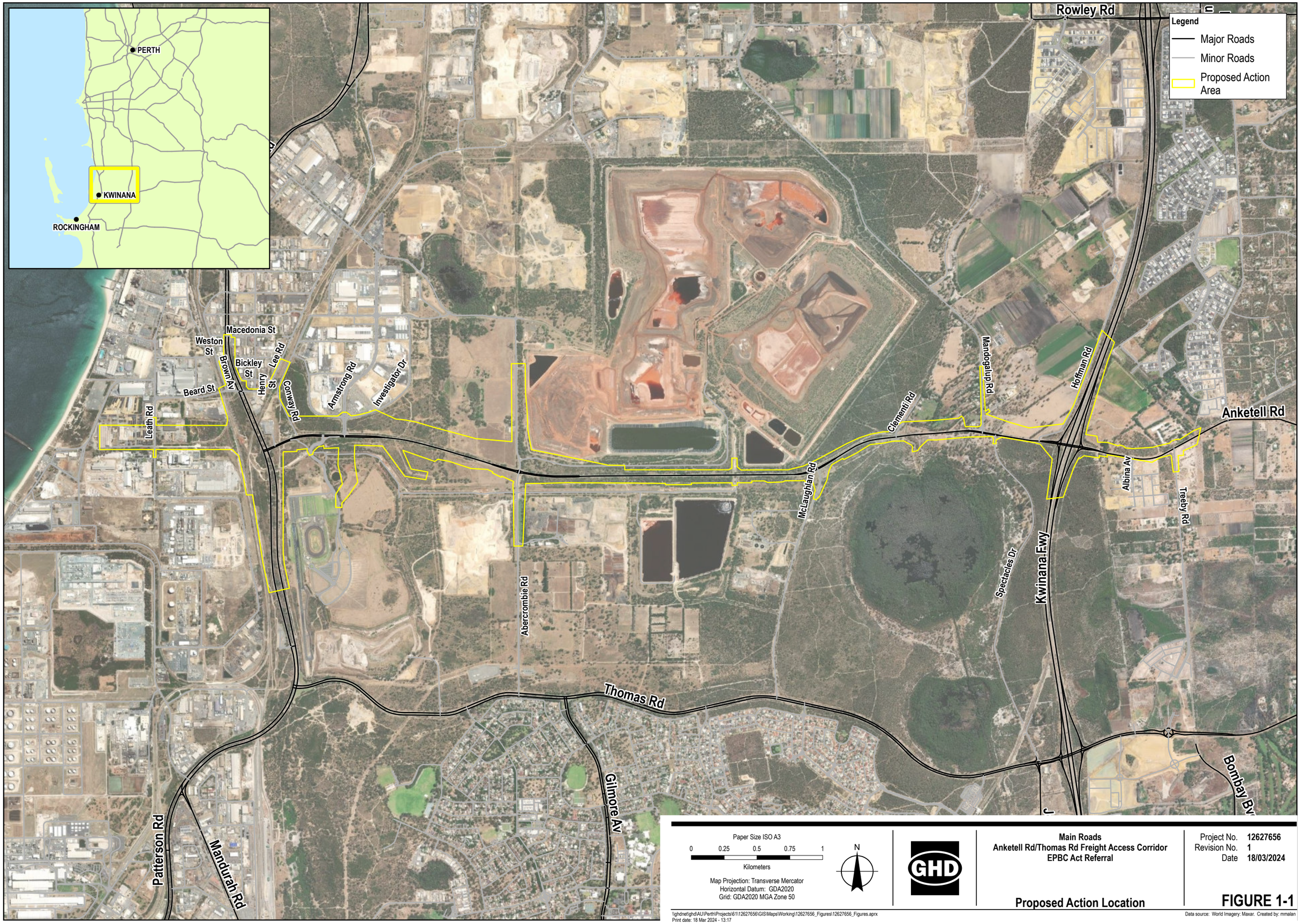
- Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain (SCP) Threatened Ecological Community (TEC) – Critically Endangered
- Banksia Woodlands of the SCP TEC – Endangered
- Carnaby's Cockatoo (*Zanda latirostris*) – Endangered
- Forest Red-tailed Black Cockatoo (FRTBC, *Calyptorhynchus banksii naso*) – Vulnerable.

Detailed flora and vegetation surveys confirmed the presence of the EPBC-listed Tuart woodlands and forests of the SCP TEC, Banksia Woodlands of the SCP TEC within the PAA (Biota 2024). Based on evidence observed during the surveys (Biota 2024) and the habitats present within the PAA, the assessment concluded two Black Cockatoo species – Carnaby's Cockatoo and FRTBC are residents/regular visitors to the PAA.

Biota (2024) concluded the PAA supports a single occurrence of *Melaleuca huegelii – Melaleuca systena* shrublands on limestone ridges TEC – Critically Endangered. However, the FCT analysis did not confirm the presence of this TEC. Main Roads will liaise with the WA Department of Biodiversity Conservation and Attractions' Species and Communities Branch regarding the potential presence of this ecological community.

No other EPBC Act MNES (including listed flora taxa, listed fauna species, and ecological communities) are considered likely to occur within the PAA (Biota 2024). The Biota (2024) Anketell Road Upgrade Consolidated Biological Report did conclude two listed fauna species may occur within the PAA:

- Baudin's Cockatoo *(Zanda baudinii*) – Endangered
- Chuditch (*Dasyurus geoffroii*) – Vulnerable.



Paper Size ISO A3

0 0.25 0.5 0.75 1

Kilometers

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

N

GHD

Main Roads
Anketell Rd/Thomas Rd Freight Access Corridor
EPBC Act Referral

Proposed Action Location

Project No. **12627656**
Revision No. **1**
Date **18/03/2024**

FIGURE 1-1

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Print date: 18 Mar 2024 - 13:17

Data source: World Imagery: Maxar. Created by: mmalan

1.1 Purpose of supporting document

This supporting document provides an assessment of the significance of impacts from the Proposed Action for MNES identified via a EPBC Act Protected Matters Report. The Protected Matters Search Tool (PMST) Report is supplied in Appendix 2. A likelihood of impact assessment was completed for the MNES identified via PMST as tabulated in Appendix 3. This assessment concluded the following MNES may be significantly impacted by the Proposed Action and therefore assessed in more detail within the body of this document against the *Significant Impact Guidelines 1.1* (DoE 2013):

- Tuart Woodlands and Forests of the SCP TEC
- Banksia Woodlands of the SCP TEC
- Carnaby's Cockatoo
- FRTBC.

For assessment of significance against the listed Black Cockatoo species specifically, the *Significant Impact Guidelines 1.1* adopts criteria for assessment of impact to listed threatened species relating to 'populations' and / or 'important populations' (DoE 2013). However, these terms have not been defined for Black Cockatoos, due to the mobile and widely distributed nature of these species, and the variation in flock compositions (e.g. between breeding and non-breeding seasons). For Black Cockatoos, it is more appropriate to consider significance in terms of impacts on habitat rather than a resident population (DAWE 2022). Since EPBC Act referral guidelines for three threatened Black Cockatoo species: Carnaby's Cockatoo, Baudin's Cockatoo and FRTBC provide guidance on the risk of significant impacts on Black Cockatoos in terms of habitat rather than populations, this supporting document assesses the significance of the impacts resulting from the Proposed Action to Black Cockatoos against the *Significant Impact Guidelines 1.1* (DoE 2013) as well as the *Referral Guidelines for the three Black Cockatoo species* (DAWE 2022).

The three MNES (two listed Threatened Fauna Species and one listed Migratory Species) that may occur in the PAA are discussed, but are not assessed in this document as the Proposed Action is unlikely to have a significant impact on these matters.

2 SIGNIFICANT IMPACTS ASSESSMENT

2.1 Tuart Woodlands of the Swan Coastal Plain Threatened Ecological Community

The Tuart woodlands and forests of the SCP TEC occurs on the SCP in WA, from Jurien, approximately 200 km north of Perth, to the Sabina River, near Busselton, 225 km south of Perth (DEE 2019). The community is strongly associated with calcareous soils of the western part of the plain, including those very close to the coast. Currently the Tuart woodlands and forests of the SCP TEC occurs as a thin strip within the SCP. DEE (2019) estimates the Tuart woodlands and forests of the SCP TEC area of occupancy as 17,070 ha as of 2015.

The primary defining feature of the community is the presence of *Eucalyptus gomphocephala* (Tuart) in the uppermost canopy, although this may co-occur with various other tree species. The ecological community varies in structure, with variable height and canopy closure across its range. The understorey is often relatively open, including many non-woody species from the Asteraceae, Cyperaceae, Restionaceae and Orchidaceae families as well as lilies (DEE 2019).

Key threats to the Tuart woodlands and forests of the SCP TEC include land clearing, phytophthora dieback, novel biota, introduced fauna and flora, and anthropogenic greenhouse gas emissions (DEE 2019). With many of the occurrences occurring within the greater Perth metropolitan area, the frequency of fires, impact of recreational users, weed invasion and incidence of illegal rubbish dumping are generally increased. These factors can all lead to degradation of vegetation and alteration of structure, species composition or loss of component taxa.

Biota (2024) mapped 114.21 ha of this TEC in eleven remnant vegetation patches wholly, partially or immediately adjacent to the survey contextual area. Details on each TEC patch is provided in Table 2-1. The PAA intersects seven remnant patches with an extent of 41.65 ha (Figure 2-1). The vegetation within these patches ranges from 'Cleared' to 'Very Good to Excellent' (Biota 2024). A further nineteen patches were assessed, but did not meet the diagnostic criteria to be recognised as the TEC.

Table 2-1: Tuart woodlands and forests of the SCP TEC patch details

Patch ID	Size of patch (ha)	Extent within PAA (ha) (%)	Condition rating	Comments
TT01	8.42	2.14 (25.42)	Very Good to Excellent to Cleared	
TT02	1.03	0.98 (95.15)	Very Good to Excellent to Cleared	
TT03	29.40	6.04 (20.54)	Very Good to Excellent to Cleared	
TT04	6.34	1.00 (15.77)	Good to Very Good to Cleared	
TT05	18.70	11.23 (60.05)	Good to Cleared	
TT06	35.70	17.57 (49.22)	Very Good to Excellent to Cleared	Intersects Bush Forever Site No 268 and 269
TT07	5.74	1.95 (33.97)	Good to Cleared	Intersects Bush Forever Site No 269
TT08	2.36	-	Degraded to Cleared	
TT09	2.75	-	Degraded to Cleared	

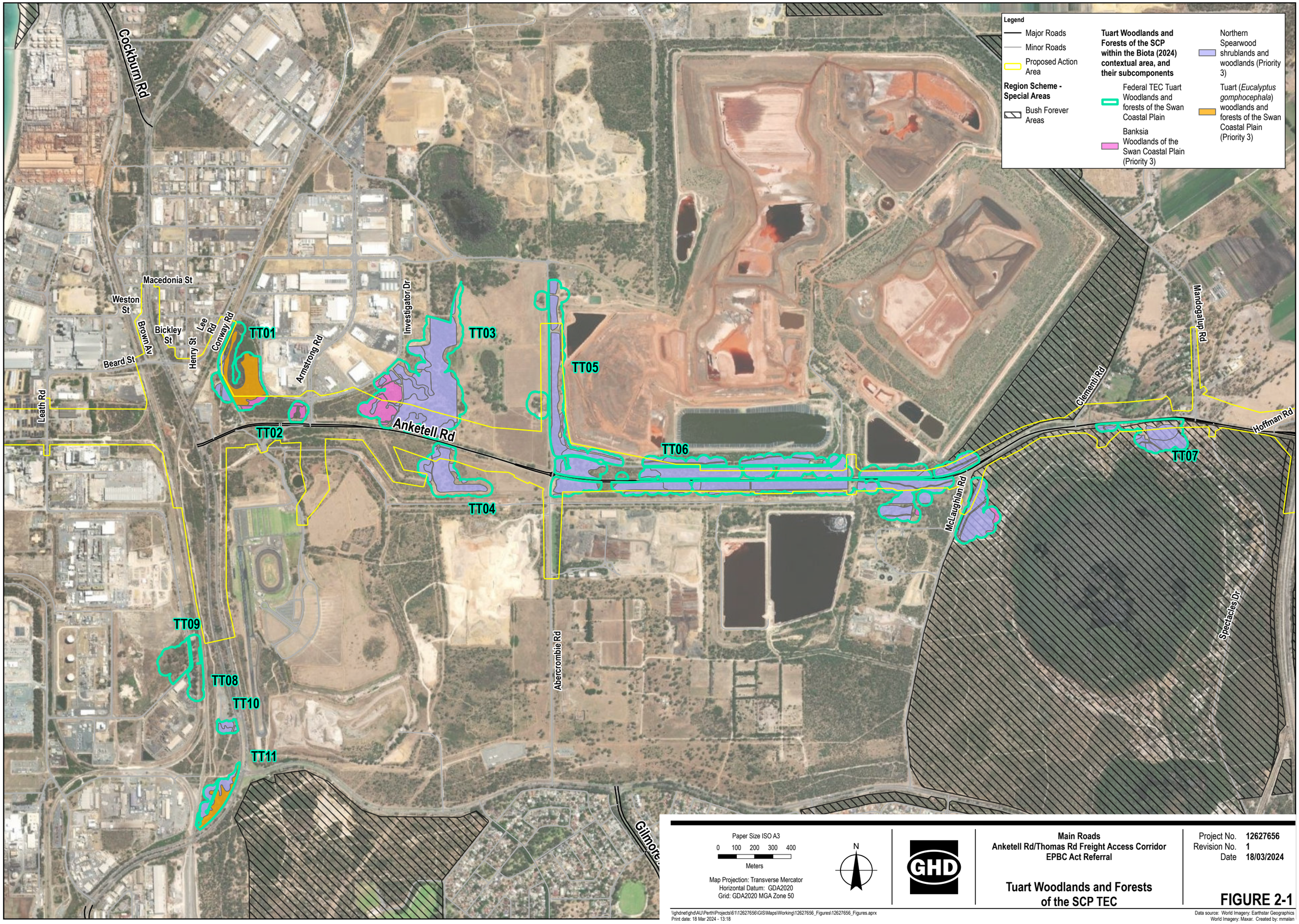
Patch ID	Size of patch (ha)	Extent within PAA (ha) (%)	Condition rating	Comments
TT10	0.74	-	Very Good to Cleared	
TT11	3.03	-	Degraded to Cleared	

2.1.1 Overview of impact

The Proposed Action will result in the following impacts to the Tuart Woodlands and Forests of the SCP TEC, listed as Critically Endangered under the EPBC Act:

- Clearing of up to 41.65 ha of Tuart Woodlands and Forests of the SCP TEC (Figure 2-1).

The PAA intersects the edges of most patches, except for patch TT02, which will be removed almost entirely. Post clearing, patches TT01, TT03, and TT04 will be greater than 5 ha and therefore meet the size threshold to be representative of the Tuart woodlands and forests of the SCP TEC. Patches TT05 and TT06 will be reduced in size but are still likely to meet the size and condition thresholds to remain a Tuart woodlands and forests of the SCP TEC patch. Patch TT07 will be less than 5 ha and is unlikely to meet size and condition thresholds and therefore will no longer represent Tuart woodlands and forests of the SCP TEC.


Legend
Major Roads
Minor Roads
Proposed Action Area
Region Scheme - Special Areas
Bush Forever Areas
Tuart Woodlands and Forests of the SCP within the Biota (2024) contextual area, and their subcomponents
Federal TEC Tuart Woodlands and forests of the Swan Coastal Plain
Banksia Woodlands of the Swan Coastal Plain (Priority 3)
Northern Spearwood shrublands and woodlands (Priority 3)
Tuart (Eucalyptus gomphocephala) woodlands and forests of the Swan Coastal Plain (Priority 3)
Cockburn Rd
Macedonia St
Weston St
Bickley St
Brown Av
Henry St
Lee Rd
Conway Rd
Beard St
Leath Rd
Armstrong Rd
Investigator Dr
Anketell Rd
TT01
TT02
TT03
TT04
TT05
TT06
TT07
TT08
TT09
TT10
TT11
Abercrombie Rd
McLaughlan Rd
Clementi Rd
Mandogalup Rd
Hoffman Rd
Spectacles Dr
Glimpse
Paper Size ISO A3
0 100 200 300 400
Meters
Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 50
N
GHD
Main Roads
Anketell Rd/Thomas Rd Freight Access Corridor
EPBC Act Referral
Tuart Woodlands and Forests of the SCP TEC
Project No. 12627656
Revision No. 1
Date 18/03/2024
FIGURE 2-1
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Data source: World Imagery: Earthstar Geographics
World Imagery: Maxar. Created by: mmalan

2.1.2 Assessment of significance

Table 2-2 presents an assessment of the potential impacts of the Proposed Action on the Tuart Woodlands and Forests of the SCP TEC, against the significant impact criteria for endangered ecological communities in the *Significant Impact Guidelines 1.1* (DoE 2013). The Guidelines state that an action is likely to have a significant impact on a critically endangered ecological community if there is a real chance or possibility that it will:

- Reduce the extent of an ecological community
- Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines
- Adversely affect habitat critical to the survival of an ecological community
- Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns
- Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting
- Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:
    - Assisting invasive species, that are harmful to the listed ecological community, to become established
    - Causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community
- Interfere with the recovery of an ecological community.

As presented in Table 2-2, the Proposed Action is likely to result in a significant impact to Tuart Woodlands and Forests of the SCP TEC, specifically in relation to the reduction in Patches TT02 from 1.03 ha to 0.05 ha (loss of 0.98 ha (95.15%) of the patch), TT05 from 18.70 ha to 7.47 ha (loss of 11.23 ha (60.05%) of the patch) and TT06 from 35.70 ha to 18.31 ha (loss of 17.57 ha (49.22%) of the patch) (Figure 2-1) and reduced integrity (increased perimeter-area ratio) of the remaining patches by clearing 11.87 ha. The Proposed Action will also require the clearing of habitat critical to the survival of the Tuart Woodlands and Forests of the SCP TEC.

Indirect impacts will be avoided through standard construction management practices when implementing the Proposed Action, so as to prevent significant impacts outside the PAA.

Table 2-2: Assessment of significant impact criteria for Tuart Woodlands of the SCP TEC

Criteria	Assessment	Significance
Reduce the extent of an ecological community	The Proposed Action will result in the clearing of up to 41.65 ha of Tuart Woodlands and Forests of the SCP TEC, (Figure 2-1). At a local context the Proposed Action occurs within the range of the TEC with extensive areas of potential TEC lying to the north, south and east of the PAA. The PAA is located adjacent and parallel to existing cleared corridors and will not disrupt linkages between the TEC and adjacent green corridors. The Proposed Action will result in the clearing of up to 41.65 ha of Tuart Woodlands and Forests of the SCP TEC which will affect 0.24% of the total area of occupancy of this TEC across the SCP (17,070 ha as at 2015) (DEE 2019). Desktop investigations undertaken to identify the likely extent of the TEC within a 12 km radius of the PAA, based on the vegetation complexes identified in the Conservation Advice (DEE 2019), identified 3,275.54 ha of vegetation complexes (Cottesloe Complex-Central and South (2,612.45 ha), Karakatta Complex-Central and South (663.09 ha)) that have a 20% and 50% association with the Tuart Woodlands and Forests of the SCP TEC respectively (GoWA 2024). Clearing of 41.65 ha required for the Proposed Action will reduce the extent of the TEC within a 12 km locality by approximately 4.88%. Biota (2024) mapped 114.21 ha of this TEC in eleven remnant vegetation patches either intersecting or adjacent to the PAA. The PAA intersects seven remnant patches and avoids four patches. A further nineteen patches were assessed, but did not meet the diagnostic criteria to be recognised as the TEC. Overall, the Proposed Action will impact up to 41.65 ha of Tuart Woodlands and Forests of the SCP TEC, which represents approximately 4.88% of the 3,201.70 ha of remnant vegetation identified within 12 km of the PAA that is associated with the TEC. At a local and regional context, clearing of 41.65 ha Tuart Woodlands and Forests of the SCP TEC is not expected to significantly reduce the extent of the ecological community.	Unlikely to be significant
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	The Proposed Action will increase fragmentation of the Tuart Woodlands and Forests of the SCP TEC. As presented in Figure 2-1, clearing will occur on the edges of most patches of the TEC identified in the PAA, except for patch TT02, which will be removed almost entirely. Patches TT05 and TT06 are currently fragmented by the existing Anketell Road and fragmentation of these patches will further increase as a result of the Proposed Action. As a result, the remaining patches will have increased distance between patches, with increased fragmentation of the TEC along Anketell Road, with patches TT02 and TT07 and parts of patches TT05 and TT06 no longer meeting the size and condition thresholds to remain Tuart Woodlands and Forests of the SCP TEC.	Likely to be significant
Adversely affect habitat critical to the survival of an ecological community	Clearing of Tuart Woodlands and Forests of the SCP TEC within the PAA is likely to significantly impact habitat critical to the survival of the ecological community. The Proposed Action involves the clearing of up to 41.65 ha of Tuart Woodlands and Forests of the SCP TEC (Figure 2-1). The Proposed Action will reduce Patches TT02 from 1.03 ha to 0.05 ha (loss of 0.98 ha (95.15%) of the patch),	Likely to be significant

Criteria	Assessment	Significance
	TT05 from 18.70 ha to 7.47 ha (loss of 11.23 ha (60.05%) of the patch) and TT06 from 35.70 ha to 18.31 ha (loss of 17.57 ha (49.22%) of the patch) (Figure 2-1) and reduced integrity (increased perimeter-area ratio) of the remaining 11.87 ha. Although the Proposed Action will incorporate environmental management during construction to protect the integrity of the Tuart Woodlands and Forests of the SCP TEC critical habitat within the vicinity of the PAA, the impact resulting from the Proposed Action to the TEC critical habitat is likely to be significant.	
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	The Proposed Action may alter non-living factors including modification of drainage patterns, increased run-off due to increased area of bitumen required. However, this will not substantially modify or destroy abiotic factors necessary for the survival of the Tuart Woodlands and Forests of the SCP TEC, including hydrology, nutrients and soil resources. It is unlikely the implementation of the Proposed Action will impact local or regional hydrology to the extent that it adversely impacts the Tuart Woodlands and Forests of the SCP TEC. The existing Anketell Road and interchanges have already modified surface water flows and construction of the Proposed Action may alter these previously modified surface water flows. The Proposed Action will incorporate infiltration basins and/or swales to capture, treat and infiltrate surface water runoff. The Proposed Action will minimise runoff outside the PAA that could impact adjacent TEC patches. The clearing of native vegetation within the PAA will not be of sufficient scale to cause substantial hydrological changes in the local area. The infiltration of surface water runoff within the PAA will maintain the existing hydrological regime, predominantly within the Spearwood System (characterised by sand dunes and plains), and the Quindalup South System (characterised by coastal dunes and yellow sands). The Proposed Action includes construction of bridge piers, abutment footings and drainage structures. Based on historical records contained within the Perth Groundwater Map, depth to groundwater across the PAA ranges from approximately 5 m to 30 m (DWER 2023). The Proposed Action will require construction water, although the source of this is yet to be determined, and dewatering is likely to be required to install some road structures such as bridges and underpasses. Dewatering, if required, will cause temporary and localised groundwater drawdown and is not expected to cause significant or long term, irreversible impacts to TEC patches adjacent to the PAA. The Proposed Action will use native species on local topsoil for landscaping, restrict the use of fertilisers to the establishment phase of landscaping on a case-by-case basis, and incorporate treatment of stormwater during infiltration. Accordingly, the Proposed Action is not expected to result in a substantial change in nutrient cycles that could impact TEC patches within or adjacent to the PAA.	Unlikely to be significant

Criteria	Assessment	Significance
	The Proposed Action will incorporate harvesting and reuse of topsoil within the PAA to ensure that local soil resources are maintained and support buffers of native vegetation within the road reserve, to enhance protection of adjacent TEC patches. The Construction Environmental Management Plan (CEMP) to be prepared for the Proposed Action will include erosion and sediment controls to maintain the quality of soil within the PAA and adjacent areas. Accordingly, the Proposed Action is not expected to substantially modify or destroy soil resources that could impact adjacent TEC patches.	
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	The Proposed Action has the potential to cause edge effects on TEC patches remaining, including within Bush Forever Sites no. 268 and 269 adjacent to the PAA. This may include loss of understorey diversity through weed invasion and loss of species that are vulnerable to *Phytophthora* Dieback (dieback). No burning will be undertaken on the road reserve and no flora/fauna harvesting will occur following completion of clearing activities for the Proposed Action. One hundred and thirty-one (131) introduced flora species were recorded during the Biota (2024) survey across the PAA. Of these, five Declared Plants (DP) listed under the *Biosecurity and Agriculture Management Act 2007* (BAM Act) and one Weed of National Significance (WoNS) occurs within the PAA as follows: • **Asparagus asparagoides* (Bridal Creeper) – DP and a WoNS • **Echium plantagineum* (Paterson's Curse) – DP • **Zantedeschia aethiopica* (Arum Lily) – DP • **Gomphocarpus fruticosus* (Narrow-leaved Cotton Bush) – DP • **Morea flaccida* (One-leaf Cape Tulip) – DP. Records of *Asparagus asparagoides* were located in Patches TT01, TT03, TT05 and TT06. Patch TT05 also contained records of *Zantedeschia aethiopica* and *Gomphocarpus fruticosus*. Weed management will be undertaken through the CEMP. The control of weeds and planting of native vegetation within the road reserve will provide a buffer for adjacent TEC patches, reducing edge effects as a result of the Proposed Action. The PAA has not been assessed for dieback infestation. However, it is located within a dieback risk area as it receives more than 400 mm of average annual rainfall and is south of the 26˚ parallel. Historic dieback mapping available from dieback Information Delivery and Management System (DIDMS) indicates areas of Low Confidence Uninfested, Moderate Confidence Uninfested, High Confidence Uninfested and Uninterpretable along Anketell Road in the vicinity of the PAA (South Coast NRM 2023). The Proposed Action will implement dieback hygiene to prevent the	Unlikely to be significant

Criteria	Assessment	Significance
	introduction or spread of dieback into uninfested areas of Tuart Woodlands and Forests of the SCP TEC patches within and adjacent to the PAA.	
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: • Assisting invasive species, that are harmful to the listed ecological community, to become established, or • Causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community	Clearing of Tuart Woodlands and Forests of the SCP TEC required for the Proposed Action will reduce the remaining extents of patches TT01, TT02, TT03, TT04, TT05, TT06 and TT07 (Figure 2-1) and likely be significant. Post clearing, patches TT01, TT03, and TT04 will be greater than 5 ha and therefore meet the size threshold to be representative of the Tuart woodlands and forests of the SCP TEC. Patches TT05 and TT06 will be reduced in size but are still likely to meet the size and condition thresholds to remain a Tuart woodlands and forests of the SCP TEC patch. Patch TT07 will be less than 5 ha and is unlikely to meet size and condition thresholds and therefore will no longer represent Tuart woodlands and forests of the SCP TEC. As buffering vegetation is removed edge effects are likely to increase. The Proposed Action will require the clearing of most of Patch TT02 (0.98 ha, 95.15%), and large portions of Patches TT05 (11.23 ha, 60.05%) and TT06 (17.57 ha, 49.22%) which will reduce the integrity of these patches, resulting in the remaining area having a higher vulnerability to indirect impacts such as weed and disease infestation and edge effects. Whilst it is noted that Patches TT02, TT05 and TT06 already experience edge effects due to the presence of the existing Anketell Road and interchanges, the impacts from edge effects are expected to increase. Clearing required for the Proposed Action will increase the perimeter-to-area ratio for the Patches, compromising the remaining Tuart Woodlands and Forests of the SCP TEC vegetation. As a result, the remaining TEC vegetation may be subjected to increased weed and dieback (if present) infestation, which can outcompete TEC understorey species, therefore resulting in reduced species composition. To reduce indirect impacts, the Proposed Action will incorporate design and construction measures that will minimise the spread of weeds and dieback. Construction management will include weed treatment and hygiene, and landscaping with native species on local harvested topsoil with restricted use of fertiliser. The Proposed Action will incorporate design measures to ensure the maintenance of existing drainage patterns and local hydrology. Proposed drainage infrastructure will avoid and minimise mobilisation of fertilisers, herbicides or other chemicals or pollutants from the Proposed Action into the TEC. This includes use of stormwater drainage and treatment involving biofiltration areas and infiltration basins designed to maintain existing hydrology through the implementation of best practice consistent with the WA Better Urban Water Management (BUWM) Framework and WA Stormwater Management Manual (WASMM). No stormwater runoff generated within the PAA will be discharged into TEC patches. The Proposed Action does not involve the regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the Tuart Woodlands and Forests of the SCP TEC patches which could kill or inhibit the growth of species within the community.	Likely to be significant

Criteria	Assessment	Significance
Interfere with the recovery of an ecological community	Currently there is no recovery plan in place for the Tuart Woodlands and Forests of the SCP TEC. The conservation advice instead outlines priority research and conservation actions (DEE 2019). Priority protection and restoration actions outlined in the conservation advice report includes the protection of the Tuart Woodlands and Forests of the SCP TEC from further loss of extent and condition particularly in high conservation value areas, the restoration of the TEC within the species' original range and the communication with and support of researchers and other personnel considered important to the recovery of the species (DEE 2019). The Proposed Action will not interfere with restoration and communication efforts implemented to aid the recovery of the TEC. The Proposed Action will result in a loss of the extent of the TEC, comprising of 0.24% of the TEC remaining on the SCP and approximately 4.88%of the TEC estimated to occur within 12 km of the PAA.	Unlikely to be significant
Conclusion	Based on the above assessment against the *Significant Impact Guidelines 1.1* (DoE 2013), the Proposed Action is likely to result in a significant impact to Tuart Woodlands and Forests of the SCP TEC, specifically in relation to the reduction in Patches TT02 by 0.98 ha (95.15%), TT05 by 11.23 ha (60.05%) TT06 by 17.57 (49.22%) and reduced integrity (increased perimeter-area ratio) of the remaining 11.87 ha. Indirect impacts will be avoided through standard construction management practices when implementing the Proposed Action, to prevent significant impacts outside the PAA.	

2.2 Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community

The Banksia Woodlands of the SCP TEC is restricted to the SCP IBRA bioregion and immediately adjacent areas, including the Dandaragan Plateau, from Jurien Bay in the north, to Dunsborough in the south, and northwest on the Whicher and Darling escarpments. The community typically occurs on well drained, low nutrient soils on sandplain landforms, particularly deep Bassendean and Spearwood sands and occasionally on Quindalup sands (DEE 2016).

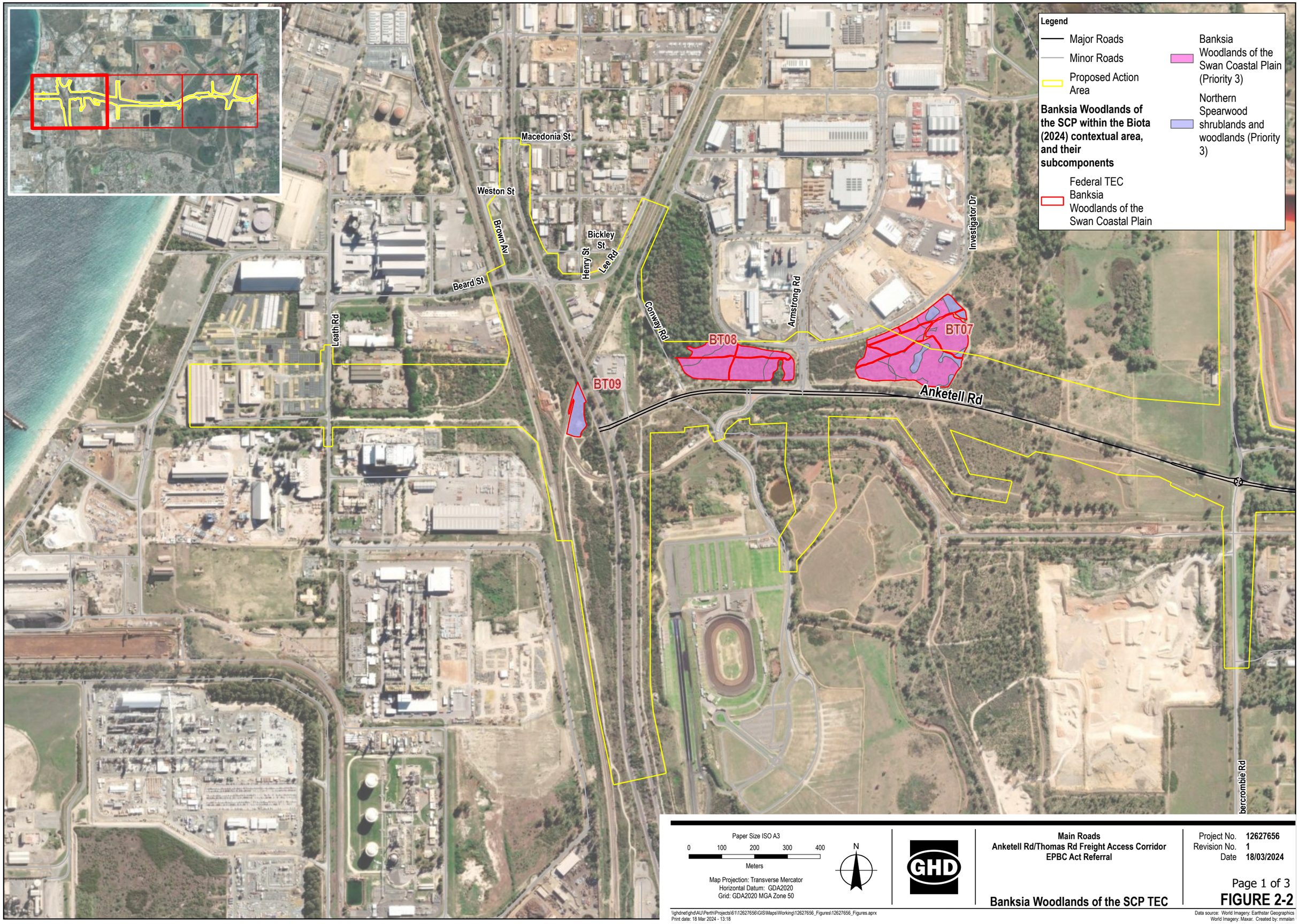
A key diagnostic feature of this TEC is a prominent tree layer of Banksia, with scattered eucalypts and other tree species often present among or emerging above the Banksia canopy. The understory is a species rich mix of sclerophyllous shrubs, graminoids and forbs. The community is characterised by a high endemism and considerable localised variation in species composition across its range (DEE 2016).

Key threats to the Banksia Woodlands of the SCP include land clearing, phytophthora dieback, novel biota, introduced fauna and anthropogenic greenhouse gas emissions (DEE 2016). With many of the occurrences occurring within the greater Perth metropolitan area, the frequency of fires, impact of recreational users, weed invasion and incidence of illegal rubbish dumping are generally increased. These factors can all lead to degradation of vegetation and alteration of structure, species composition or loss of component taxa.

Biota (2024) mapped 330.2 ha of this TEC in 9 remnant vegetation patches wholly or partially within the survey contextual area. The PAA intersects all nine patches with an extent of 14.26 ha (Table 2-3 and Figure 2-2).

Table 2-3: Banksia Woodlands of the SCP TEC patch details

Patch ID	Size of patch (ha)	Extent within the PAA (ha) (%)	Condition rating	Comments
BT01	2.2	0.19 (8.64)	Very Good	
BT02	4.9	2.06 (42.04)	Very Good	
BT03	76.1	1.20 (1.58)	Very Good to Excellent	Intersects Bush Forever Site No 270
BT04	32.7	0.87 (2.66)	Very Good	Intersects Bush Forever Site No 269
BT05	159.6	1.99 (1.25)	Good to Very Good	Intersects Bush Forever Site No 269
BT06	45.4	0.87 (1.92)	Very Good	Intersects Bush Forever Site No 268
BT07	5.6	3.46 (61.71)	Very Good to Excellent	
BT08	3.1	3.02 (97.42)	Very Good to Excellent	
BT09	0.61	0.61 (100)	Good	



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Meters

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N

GHD

Main Roads
Anketell Rd/Thomas Rd Freight Access Corridor
EPBC Act Referral

Banksia Woodlands of the SCP TEC

Project No. **12627656**
Revision No. **1**
Date **18/03/2024**

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FIGURE 2-2

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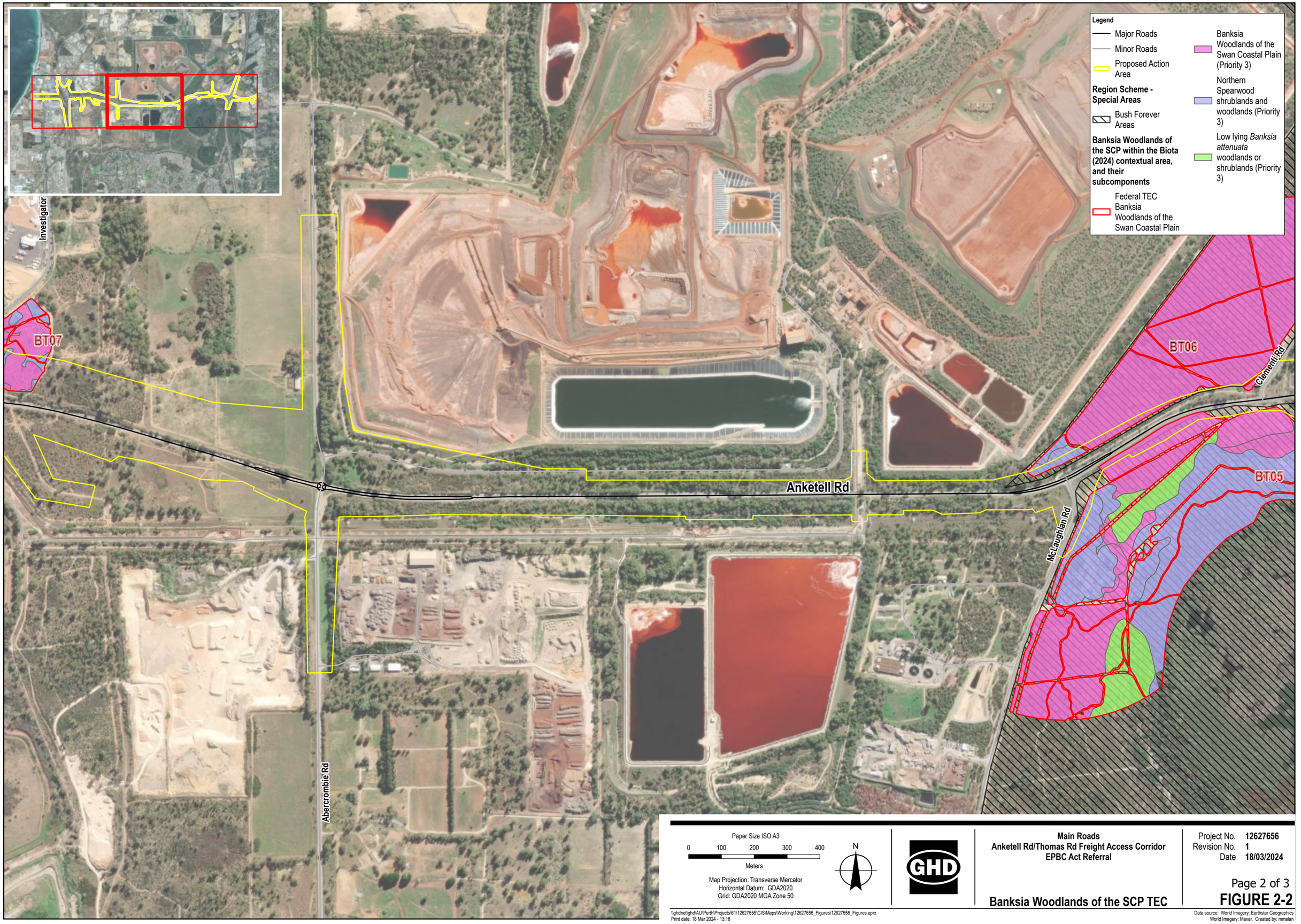
Legend
Major Roads
Minor Roads
Proposed Action Area
Region Scheme - Special Areas
Bush Forever Areas
Banksia Woodlands of the SCP within the Biota (2024) contextual area, and their subcomponents
Federal TEC Banksia Woodlands of the Swan Coastal Plain
Banksia Woodlands of the Swan Coastal Plain (Priority 3)
Northern Spearwood shrublands and woodlands (Priority 3)
Low lying Banksia attenuata woodlands or shrublands (Priority 3)
Investigator
BT07
BT06
BT05
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Anketell Rd
McLaughlan Rd
Abercrombie Rd
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Meters
Map Projection: Transverse Mercator
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Grid: GDA2020 MGA Zone 50
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GHD
Main Roads
Anketell Rd/Thomas Rd Freight Access Corridor
EPBC Act Referral
Banksia Woodlands of the SCP TEC
Project No. 12627656
Revision No. 1
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Page 2 of 3
FIGURE 2-2
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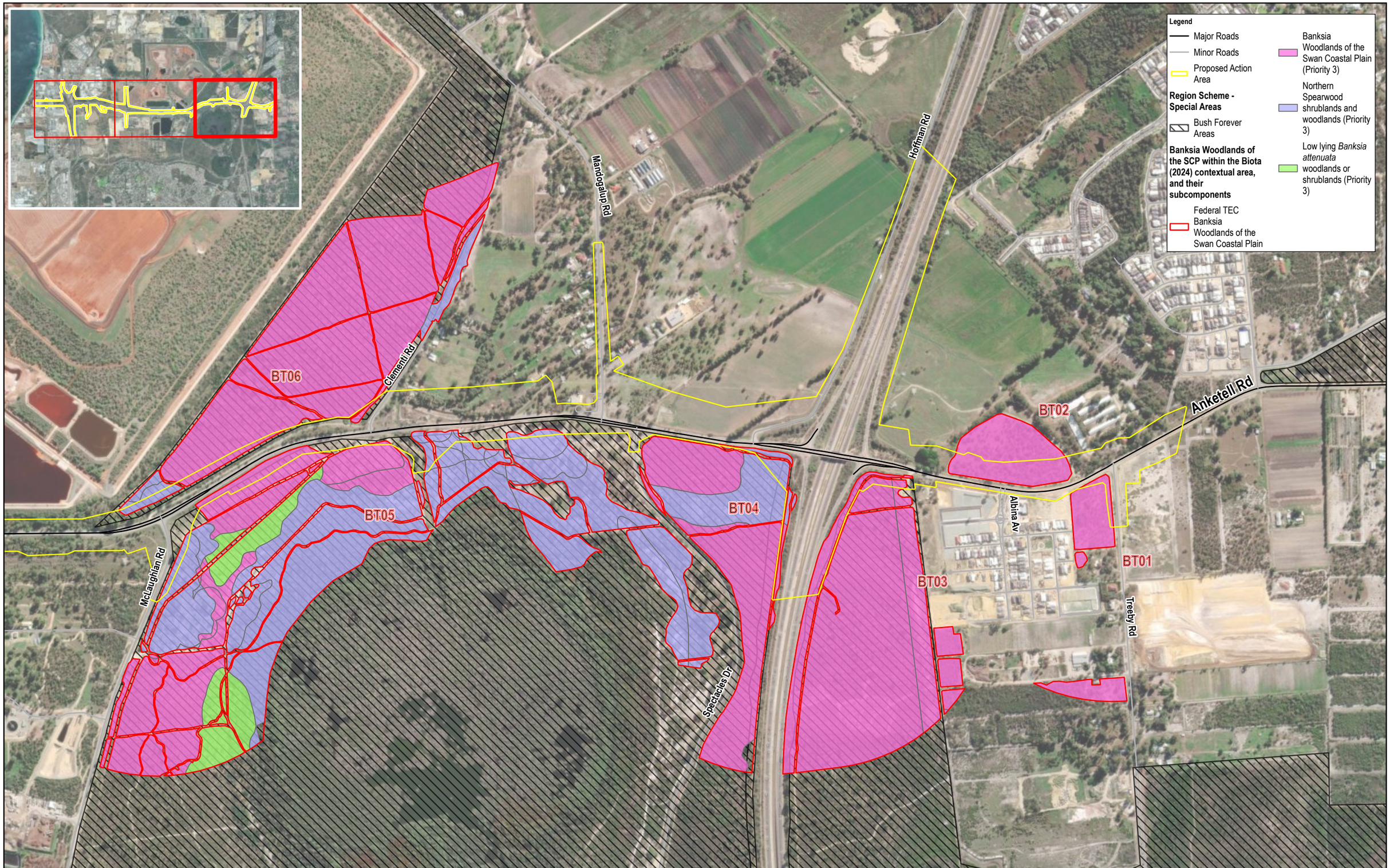

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Meters

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

N

GHD

Main Roads
Anketell Rd/Thomas Rd Freight Access Corridor
EPBC Act Referral

Banksia Woodlands of the SCP TEC

Project No. **12627656**
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Date **18/03/2024**

Page 3 of 3
FIGURE 2-2

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Data source: World Imagery: Earthstar Geographics
World Imagery: Maxar. Created by: mmalan

2.2.1 Overview of impact

The Proposed Action will result in the following impacts to the Banksia Woodlands of the SCP TEC, listed as Endangered under the EPBC Act:

- Clearing of up to 14.26 ha of Banksia Woodlands of the SCP TEC (Figure 2-2).

Within the PAA, the Banksia Woodlands of the SCP TEC occurs across nine patches, four of which intersect Bush Forever sites. Clearing for the Proposed Action will remove all of patch BT09 (0.61 ha) and the majority of patch BT08 (3.02 ha, 97.42%) and a large portion of patches BT07 (3.46 ha, 61.71%) and BT02 (2.06 ha, 42.04%). Whilst patches BT02 and BT07 will likely remain Banksia Woodlands of the SCP TEC, the integrity of the patches would be reduced, resulting in the remaining area having a higher vulnerability to indirect impacts such as weed and disease infestation, edge effects. Clearing required for the Proposed Action will increase the perimeter-to-area ratio for patches BT02 and BT07, compromising the remaining Banksia TEC vegetation within those patches.

2.2.2 Assessment of significance

Table 2-4 presents an assessment of the potential impacts of the Proposed Action on the Banksia Woodlands of the SCP TEC, against the significant impact criteria for endangered ecological communities in the *Significant Impact Guidelines 1.1* (DoE 2013). The Guidelines state that an action is likely to have a significant impact on an endangered ecological community if there is a real chance or possibility that it will:

- Reduce the extent of an ecological community
- Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines
- Adversely affect habitat critical to the survival of an ecological community
- Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns
- Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting
- Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:
    - Assisting invasive species, that are harmful to the listed ecological community, to become established
    - Causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community
- Interfere with the recovery of an ecological community.

As presented in Table 2-4, the Proposed Action is likely to result in a significant impact to Banksia Woodlands of the SCP TEC. This is specifically in relation to the large reduction in Patches BT02, BT07 and, BT08, with complete removal of Patch BT09 (Figure 2-2). In addition, there is likely to be a reduced integrity (increased perimeter-area ratio) of the remaining 5.12 ha. The Proposed Action

will also require the clearing of habitat critical to the survival of the Banksia Woodlands of the SCP TEC.

Indirect impacts will be avoided through standard construction management practices when implementing the Proposed Action, so as to prevent significant impacts outside the PAA.

Table 2-4: Assessment of significant impact criteria for Banksia Woodlands of the SCP TEC

Criteria	Assessment	Significance
Reduce the extent of an ecological community	The Proposed Action will result in the clearing of up to 14.26 ha of Banksia Woodlands of the SCP TEC (Figure 2-2), including 0.61 ha (4.3%) in 'Good' condition, 1.99 ha (14.0%) in 'Good to Very Good' condition, 3.99 ha (28.0%) in 'Very Good' condition, and 7.67 ha (53.7%) in 'Very Good to Excellent' condition. The Proposed Action will result in the clearing of up to 14.26 ha of Banksia Woodlands of the SCP TEC which will affect less than 0.01% of the estimated total extent of this TEC across the SCP (336,489.9 ha) (DEE 2016). Desktop investigations undertaken to identify the likely extent of the TEC within a 12 km radius of the PAA, based on the vegetation complexes identified in the Conservation Advice (DEE 2016), identified 663.09 ha of vegetation complexes (Karrakatta Complex-Central and South) that have a moderate association with the Banksia Woodlands of the SCP TEC and 7,517.67 ha of vegetation complexes (Cottesloe Complex-Central and South and Bassendean Complex-Central and South) with a minor association with the Banksia Woodlands of the SCP TEC (GoWA 2023). To enable quantification, it has been assumed the Karrakatta Complex-Central and South, and Cottesloe Complex-Central and South and Bassendean Complex-Central and South has a 50% and 20% association with the Banksia Woodlands of the SCP TEC respectively. Clearing of 14.26 ha required for the Proposed Action will reduce the extent of the TEC within a 12 km locality by approximately 0.78%. A patch assessment was undertaken by Biota (2024) to determine discrete and continuous areas of TEC. The Biota (2024) Anketell Road Upgrade Consolidated Biological Report identified nine patches of Banksia Woodlands of the SCP TEC, all of which intersect the PAA, including four which intersect Bush Forever sites. Clearing will occur on the edges of most patches, with the exception of patches BT08 and BT09, which will be removed almost entirely. Post clearing, patches BT02, BT03, BT04, BT05, and BT06 will remain greater than 2 ha with vegetation in Good or better condition and be representative of the Banksia woodlands of the SCP TEC. Patch BT01 and BT07 will be reduced in size nearing the 2 ha extent, however, will likely meet condition thresholds to remain a Banksia woodlands of the SCP TEC patch. Overall, the Proposed Action will impact up to 14.26 ha of Banksia Woodlands of the SCP TEC, which represents approximately 0.78% of the potential remnant vegetation that may represent the TEC identified within 12 km of the PAA and 0.01% of the total estimated extent. At a local and regional context, clearing the Banksia Woodlands of the SCP TEC in the PAA is not expected to significantly reduce the extent of the ecological community.	Unlikely to be significant
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	The Proposed Action avoids bisection of patches of native vegetation. Clearing will occur on the edges of most patches, with the exception of patches BT08 and BT09, which will be removed almost entirely. The Proposed Action will increase the distance between TEC patches intersected by the PAA along Anketell Road, and Kwinana Freeway. However, the Proposed Action will not fragment or increase fragmentation of the Banksia Woodlands of the SCP TEC patches, as presented in Figure 2-2.	Unlikely to be significant

Criteria	Assessment	Significance
Adversely affect habitat critical to the survival of an ecological community	Clearing of Banksia Woodlands of the SCP TEC within the PAA is likely to significantly impact habitat critical to the survival of the ecological community. The PAA will result in the clearing of up to 14.26 ha of Banksia Woodlands of the SCP TEC, including 0.61 ha (4.3%) in 'Good' condition, 1.99 ha (14.0%) in 'Good to Very Good' condition, 3.99 ha (28.0%) in 'Very Good' condition, and 7.67 ha (53.7%) in 'Very Good to Excellent' condition. Clearing for the Proposed Action will remove all of patch BT09 (0.61 ha) and the majority of patch BT08 (3.02 ha, 97.42%) and a large portion of patches BT07 (3.46 ha, 61.71%) and BT02 (2.06 ha, 42.04%). Whilst patches BT02 and BT07 will likely remain Banksia Woodlands of the SCP TEC, the integrity of the patches would be reduced, resulting in the remaining area having a higher vulnerability to indirect impacts such as weed and disease infestation and edge effects. Patches BT03, BT04, BT05 and BT06 are consider important occurrences of this TEC as they occur within Bush Forever areas. Although the Proposed Action will incorporate environmental management during construction to protect the integrity of the Banksia Woodlands of the SCP TEC critical habitat within the vicinity of the PAA, the impact resulting from the Proposed Action to the TEC critical habitat is likely to be significant.	Likely to be significant
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	The Proposed Action may alter non-living factors including modification of drainage patterns and increased run-off due to the greater area of bitumen required. However, this will not substantially modify or destroy abiotic factors necessary for the survival of the Banksia Woodlands of the SCP TEC, including hydrology, nutrients and soil resources. It is unlikely that the implementation of the Proposed Action will impact local or regional hydrology to the extent that it adversely impacts the Banksia Woodlands of the SCP TEC. The existing Anketell Road and interchanges have already modified surface water flows and construction of the Proposed Action may alter these previously modified surface water flows. The Proposed Action will incorporate infiltration basins and/or swales to capture, treat and infiltrate surface water runoff. The Proposed Action will minimise runoff outside the PAA that could impact adjacent TEC patches. The clearing of native vegetation within the PAA will not be of sufficient scale to cause substantial hydrological changes in the local area. The infiltration of surface water runoff within the PAA will maintain the existing hydrological regime, predominantly within the Spearwood System (characterised by sand dunes and plains), and the Quindalup South System (characterised by coastal dunes and yellow sands). The Proposed Action includes construction of bridge piers, abutment footings and drainage structures. Based on historical records contained within the Perth Groundwater Map, depth to groundwater across the PAA ranges from approximately 5 m to 30 m (DWER 2023). The Proposed Action will require construction water, although the source of this is yet to be determined, and dewatering is likely to be required to install some road structures such as bridges and underpasses.	Unlikely to be significant

Criteria	Assessment	Significance
	Dewatering, if required, will cause temporary and localised groundwater drawdown and is not expected to cause significant or long term, irreversible impacts to TEC patches adjacent to the PAA. The Proposed Action will use native species on local topsoil for landscaping, restrict the use of fertilisers to the establishment phase of landscaping on a case-by-case basis, and incorporate treatment of stormwater during infiltration. Accordingly, the Proposed Action is not expected to result in a substantial change in nutrient cycles that could impact TEC patches within or adjacent to the PAA. The Proposed Action will incorporate harvesting and reuse of topsoil within the PAA to ensure that local soil resources are maintained and support buffers of native vegetation within the road reserve, to enhance protection of adjacent TEC patches. The CEMP to be prepared for the Proposed Action will include erosion and sediment controls to maintain the quality of soil within the PAA and adjacent areas. Accordingly, the Proposed Action is not expected to substantially modify or destroy soil resources that could impact adjacent TEC patches.	
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	The Proposed Action has the potential to cause edge effects on TEC patches remaining, including within Bush Forever Sites no. 268, 269 and 270. This may include loss of understorey diversity through weed invasion and loss of species that are vulnerable to dieback and/or groundwater dependent. No burning will be undertaken on the road reserve and no flora/fauna harvesting will occur following completion of clearing activities for the Proposed Action. One hundred and thirty-one (131) introduced flora species were recorded during the Biota (2024) survey across the survey area. Of these, five Declared Plants (DP) listed under the *Biosecurity and Agriculture Management Act 2007* (BAM Act) and one Weed of National Significance (WoNS) occurs within the PAA as follows: • **Asparagus asparagoides* (Bridal Creeper) – DP and a WoNS • **Echium plantagineum* (Paterson's Curse) – DP • **Zantedeschia aethiopica* (Arum Lily) – DP • **Gomphocarpus fruticosus* (Narrow-leaved Cotton Bush) – DP • **Morea flaccida* (One-leaf Cape Tulip) – DP. Records of *Asparagus asparagoides* were located in Patches BT04, BT07, BT08 and BT09. Patch BT08 also contained records of *Morea flaccida* and *Zantedeschia aethiopica* was recorded in Patch BT05. Weed management will be undertaken through the CEMP. The control of weeds and planting of native vegetation within the road reserve will provide a buffer for adjacent TEC patches, reducing edge effects as a result of the Proposed Action. The PAA has not been assessed for dieback infestation. However, it is located within a dieback risk area as it receives more than 400 mm of average annual rainfall and is south of the 26˚ parallel. Historic dieback mapping available	Unlikely to be significant

Criteria	Assessment	Significance
	from dieback Information Delivery and Management System (DIDMS) indicates areas of Low Confidence Uninfested, Moderate Confidence Uninfested, High Confidence Uninfested and Uninterpretable along Anketell Road in the vicinity of the PAA (South Coast NRM 2023). The Proposed Action will implement dieback hygiene to prevent the introduction or spread of dieback into uninfested areas of Banksia Woodlands of the SCP TEC patches within and adjacent to the PAA.	
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: • Assisting invasive species, that are harmful to the listed ecological community, to become established, or • Causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community	Clearing of Banksia woodlands of the SCP TEC required for the Proposed Action will likely have varying impacts on the remaining patch extents, some that may be significant, whereas others less so. Given the small extent of patches BT01 (0.19 ha, 8.64% of total), BT03 (1.20 ha, 1.58% of total), BT04 (0.87 ha, 2.66% of total), BT05 (1.99 ha, 1.25% of total) and BT06 (0.87 ha, 1.92% of total) to be cleared for the Proposed Action, the remaining patches are not likely to be subjected to increased indirect impacts that could cause a substantial change in the species composition. Patches BT01, BT03, BT04, BT05 and BT06 already experiences edge effects due to the presence of the existing Anketell Road, Kwinana Freeway and interchanges, which remain in a Very Good condition rating. As buffering vegetation is removed edge effects are likely to increase, but not be significant. The Proposed Action will remove all of patch BT09 (0.61 ha), the majority of patch BT08 (3.02 ha, 97.42%), a large portion of patches BT07 (3.46 ha, 61.71%) and BT02 (2.06 ha, 42.04%). which will reduce the integrity of these patches, resulting in the remaining area having a higher vulnerability to indirect impacts such as weed and disease infestation and edge effects. Whilst it is noted all patches of Banksia Woodland of the SCP TEC already experience edge effects due to the presence of the existing Anketell Road, Kwinana Freeway and interchanges, the impacts from edge effects are expected to increase for patches where the clearing is a higher proportion of the total patch. Clearing required for the Proposed Action will increase the perimeter-to-area ratio most notably for Patches BT07 and BT02, potentially compromising the remaining Banksia TEC vegetation within these patches. As a result, the remaining TEC vegetation may be subjected to increased weed and dieback (if present) infestation, which can outcompete TEC understorey species, therefore resulting in reduced species composition. To reduce impacts, the Proposed Action will incorporate design and construction measures that will minimise the spread of weeds and dieback. Construction management will include weed treatment and hygiene, and landscaping with native species on local harvested topsoil with restricted use of fertiliser. The Proposed Action will incorporate design measures to ensure the maintenance of existing drainage patterns and local hydrology. Proposed drainage infrastructure (including vegetated basins) will avoid and minimise mobilisation of fertilisers, herbicides or other chemicals or pollutants from the Proposed Action into the TEC. This includes use of stormwater drainage and treatment involving biofiltration areas and infiltration basins designed to maintain existing hydrology through the implementation of best practice consistent with the WA BUWM Framework and WA WASMM. No stormwater runoff generated within the PAA will be discharged into TEC patches.	May be significant

Criteria	Assessment	Significance
	The Proposed Action does not involve the regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the Banksia Woodlands of the SCP TEC patches which could kill or inhibit the growth of species within the community.	
Interfere with the recovery of an ecological community	Currently there is no recovery plan in place for the Banksia Woodlands of the SCP TEC. The conservation advice instead outlines priority research and conservation actions (DEE 2016). Priority protection and restoration actions outlined in the conservation advice report includes the protection of the Banksia Woodlands of the SCP TEC from further loss of extent and condition particularly in high conservation value areas, the restoration of the TEC within the species' original range and the communication with and support of researchers and other personnel considered important to the recovery of the species (DEE 2016). The Proposed Action will not interfere with restoration and communication efforts implemented to aid the recovery of the TEC. The Proposed Action will result in a loss of the extent of the TEC, comprising less than 0.01% of the TEC remaining on the SCP and approximately 0.78% of the TEC estimated to occur within 12 km of the PAA.	Unlikely to be significant
Conclusion	Based on the above assessment against the *Significant Impact Guidelines 1.1* (DoE 2013), the Proposed Action is likely to result in a significant impact to Banksia Woodlands of the SCP TEC, specifically in relation to the removal of all of patch BT09 (0.61 ha), the majority of patch BT08 (3.02 ha, 97.42%), and a large portion of patches BT07 (3.46 ha, 61.71%) and BT02 (2.06 ha, 42.04%) and reduced integrity (increased perimeter-area ratio) of the remaining 5.12 ha. Indirect impacts will be avoided through standard construction management practices when implementing the Proposed Action, to prevent significant impacts outside the PAA, and in particular the adjacent TEC within Bush Forever Sites no. 268, 269 and 270.	

2.3 Black Cockatoos

During the Biota (2024) survey, no individuals from any of the three Black Cockatoo species were recorded within the survey. However, foraging evidence for FRTBC was recorded within the PAA and Carnaby's were previously recorded. The Proposed Action is located within the mapped distribution of Carnaby's Cockatoo and FRTBC (DAWE 2022).

The PAA contains 16.11 ha of core foraging habitat for Carnaby's Cockatoos, and 7.24 ha of core foraging habitat for FRTBC. The PAA also contains secondary foraging habitat for both Black Cockatoo species. Carnaby's Cockatoos and FRTBC foraging habitat extents are summarised in Table 2-5 and mapped in Figure 2-3 and Figure 2-4, respectively.

Table 2-5: Vegetation units within the PAA Black Cockatoo foraging habitat scoring.

Vegetation Unit	Extent within PAA (ha)	Carnaby's Cockatoo	FRTBC
B2 *Banksia menziesii* (*B. attenuata*) over *Xanthorrhoea* spp. with *Hibbertia* and *Conostylis*	6.93	Core Habitat (4 - Moderate)	
B3 *Banksia menziesii, B. ilicifolia* (*B. attenuata)* over *Kunzea* with occasional *Xanthorrhoea* spp. and *Scholtzia*	0.53	Core Habitat (4 - Moderate)	
B4 *Banksia attenuata* over *Hibbertia* and *Allocasuarina humilis* on limestone	4.22	Secondary Habitat (2 - Low)	
B5 *Banksia sessilis* over *Melaleuca huegelii - M. systena* shrubland on limestone	3.72	Secondary Habitat (2 - Low)	
B6 *Banksia sessilis* with mixed *Acacia*	1.87	Secondary Habitat (2 - Low)	
E1 *Eucalyptus gomphocephala* with occasional *E. marginata, Banksia* spp. Over *Acacia rostellifera over Xanthorrhoea*	31.55	Secondary Habitat (2 - Low)	Secondary Habitat (2 - Low)
E5 *Eucalyptus decipiens* over *Banksia sessilis* with *Melaleuca systena* and mixed *Acacia* spp. over *Hardenbergia comptoniana*	0.39	Secondary Habitat (2 - Low)	
EB1 *Eucalyptus marginata* (*Banksia* spp.) over *Kunzea* and *Acacia* with *Xanthorrhoea* spp. over *Hibbertia*	7.24	Core Habitat (7 - Very High)	Core Habitat (7 - Very High)
R3 Modified/revegetated/planted mosaic of B1 and B2 vegetation	1.41	Core Habitat (4 - Moderate)	

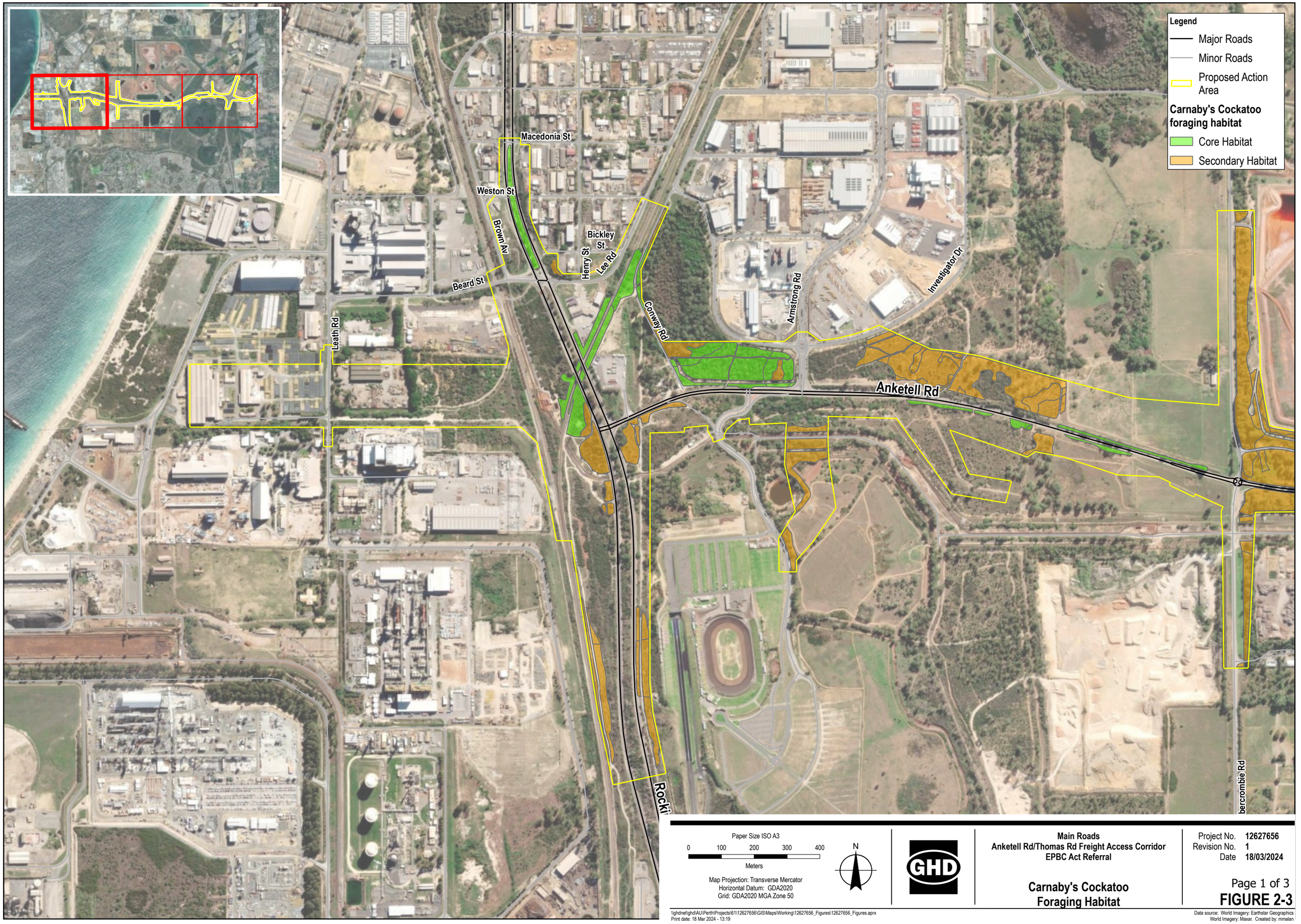
Vegetation Unit	Extent within PAA (ha)	Carnaby's Cockatoo	FRTBC
Total (ha)		**16.11 ha Core Habitat** **41.75 ha Secondary Habitat**	**7.24 ha Core Habitat** **31.55 ha Secondary Habitat**

Black Cockatoo breeding habitat is considered to consist of a tree species known to support breeding within the range of the species, which either have a suitable nest hollow or are of a suitable diameter at breast height (DBH) to develop a nest hollow (being greater than 500 mm DBH for most Eucalypts or 300 mm DBH for Wandoo and Salmon Gum) (DAWE 2022).

Whilst Carnaby's Cockatoo are likely to forage within the PAA, they are unlikely to breed within it, with the species current breeding range not extending north of Rockingham or west of the Darling Scarp in more northerly areas of the Swan Coastal Plain (Johnstone et al. 2010, DAWE 2022). The PAA occurs approximately 5 km from the closest unconfirmed breeding area for Carnaby's Cockatoo and 11.5 km from the closest confirmed breeding area for Carnaby's Cockatoo (GoWA 2023).

A total of 608 suitable DBH trees were recorded within the PAA (Figure 2-5) and assigned to a Category description. Of these, 18 trees contained 25 hollows that were considered potentially suitable for Black Cockatoo breeding. Hollow containing trees were assessed using a pole-mounted camera. Consistent with the position that Black Cockatoos do not breed in the area, no breeding activity nor definitive evidence of breeding was observed within the PAA during the Biota (2024) survey.

No known roosting sites were recorded within the PAA, nor any evidence of roosting (Biota 2024). The Great Cocky Count (Peck et al., 2019) indicates that the closest roosting site occurs approximately 2.5 km south of the eastern end of the PAA in Marri Park Golf Course.



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Grid: GDA2020 MGA Zone 50

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Main Roads
Anketell Rd/Thomas Rd Freight Access Corridor
EPBC Act Referral

Carnaby's Cockatoo Foraging Habitat

Project No. **12627656**
Revision No. **1**
Date **18/03/2024**

FIGURE 2-3

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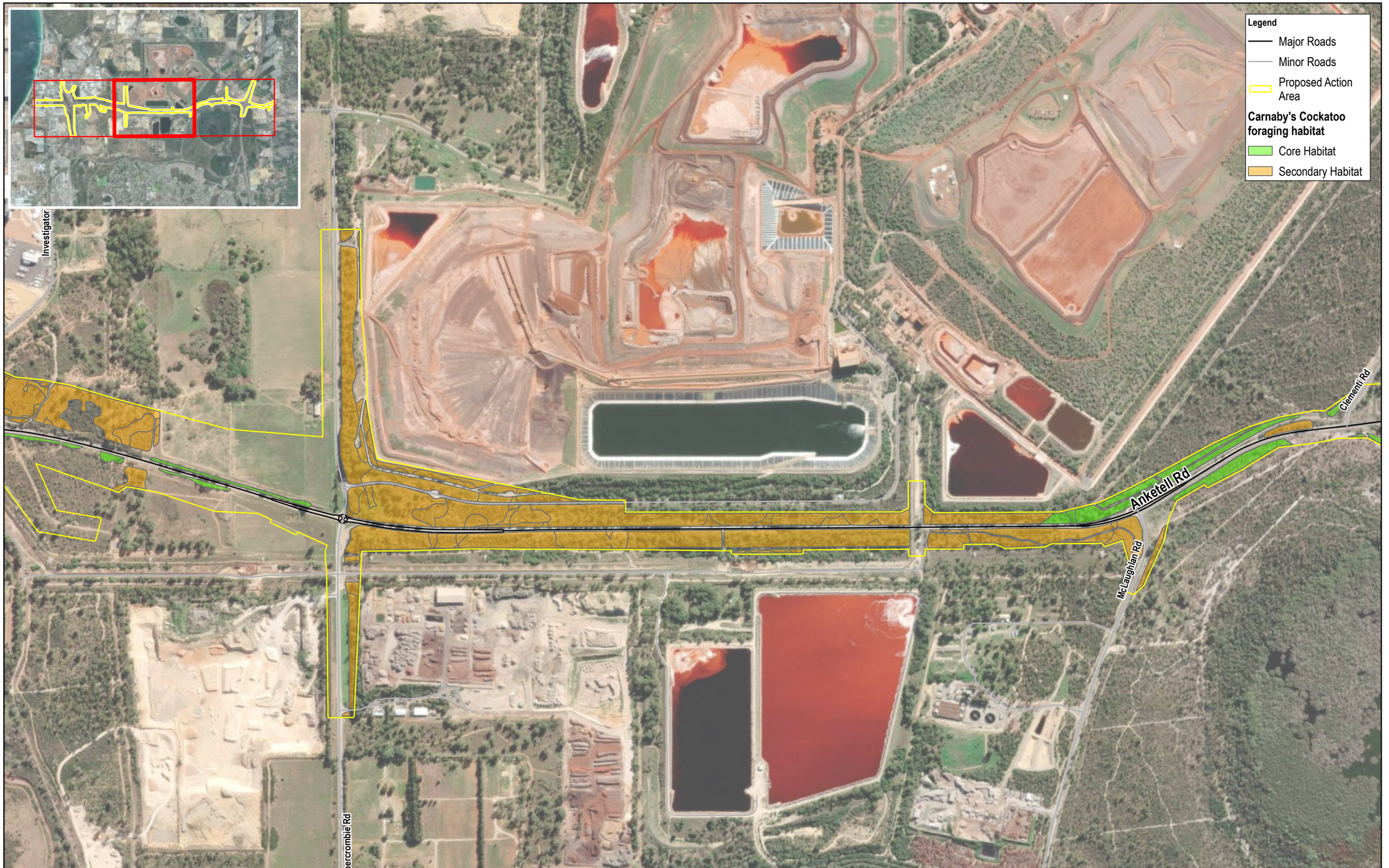

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Carnaby's Cockatoo Foraging Habitat

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FIGURE 2-3

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Main Roads
Anketell Rd/Thomas Rd Freight Access Corridor
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Carnaby's Cockatoo Foraging Habitat

Project No. **12627656**
Revision No. **1**
Date **18/03/2024**

FIGURE 2-3

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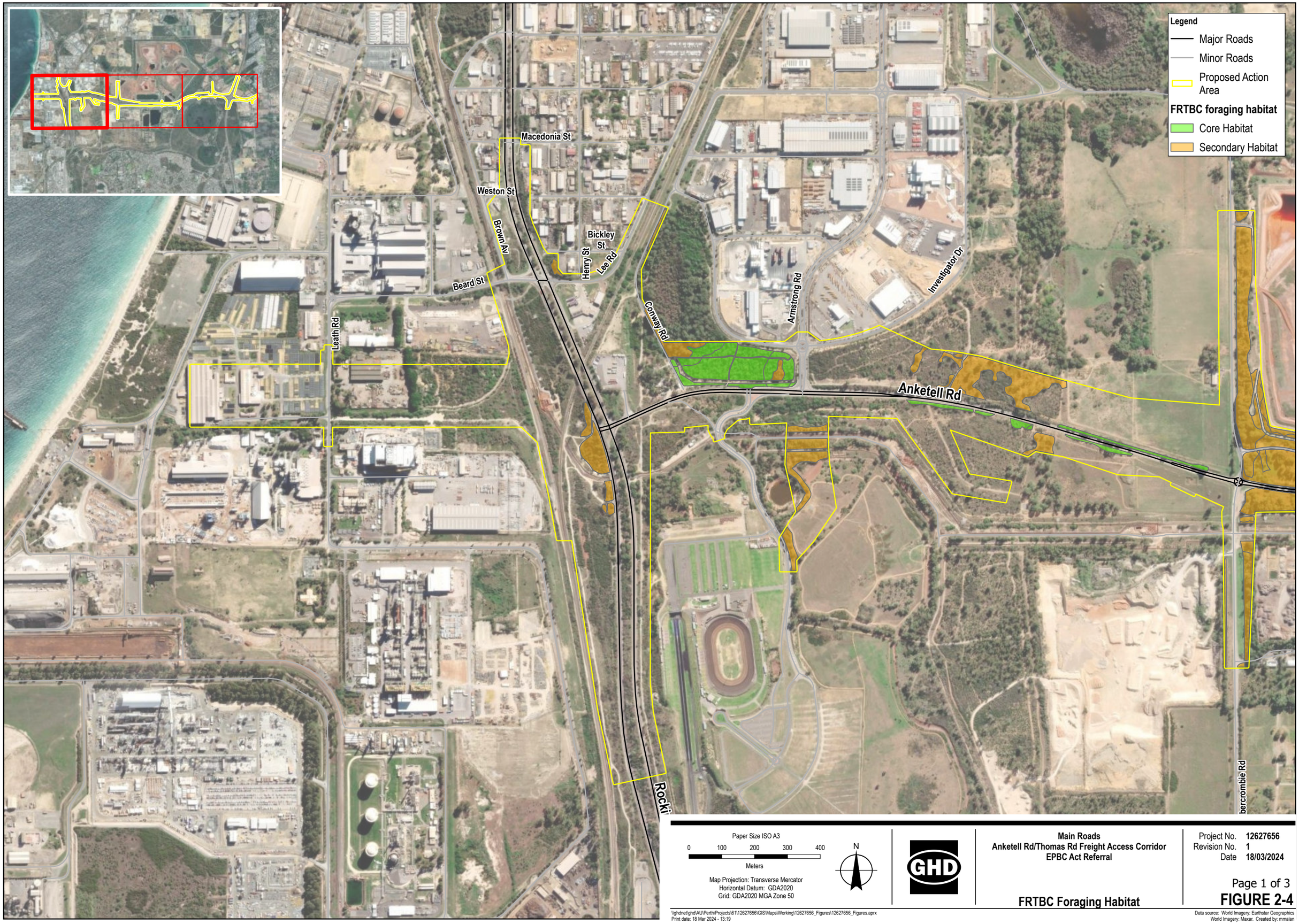

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Main Roads
Anketell Rd/Thomas Rd Freight Access Corridor
EPBC Act Referral

FRTBC Foraging Habitat

Project No. **12627656**
Revision No. **1**
Date **18/03/2024**

FIGURE 2-4

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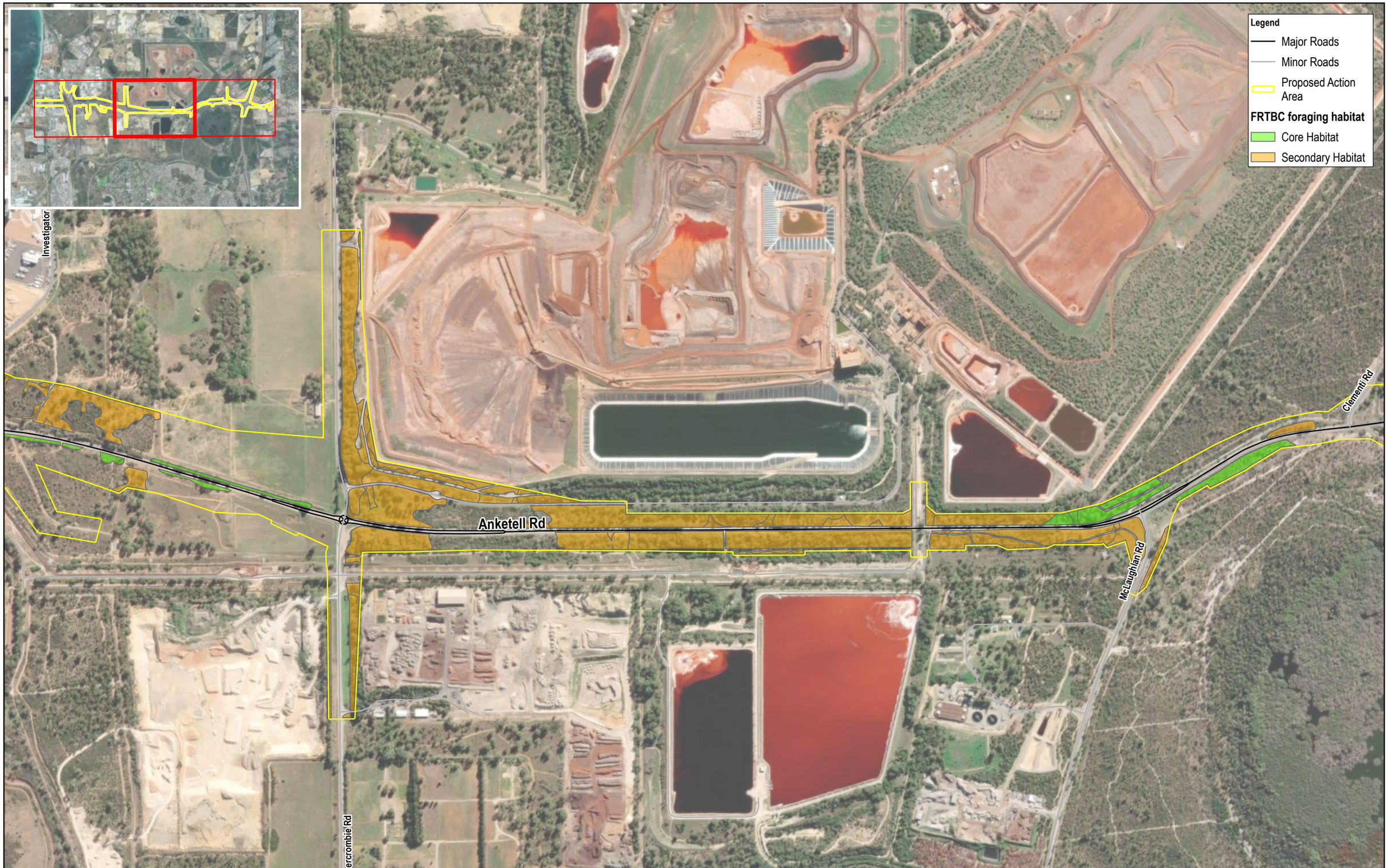

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Main Roads
Anketell Rd/Thomas Rd Freight Access Corridor
EPBC Act Referral

FRTBC Foraging Habitat

Project No. **12627656**
Revision No. **1**
Date **18/03/2024**

FIGURE 2-4

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Main Roads
Anketell Rd/Thomas Rd Freight Access Corridor
EPBC Act Referral

FRTBC Foraging Habitat

Project No. **12627656**
Revision No. **1**
Date **18/03/2024**

FIGURE 2-4

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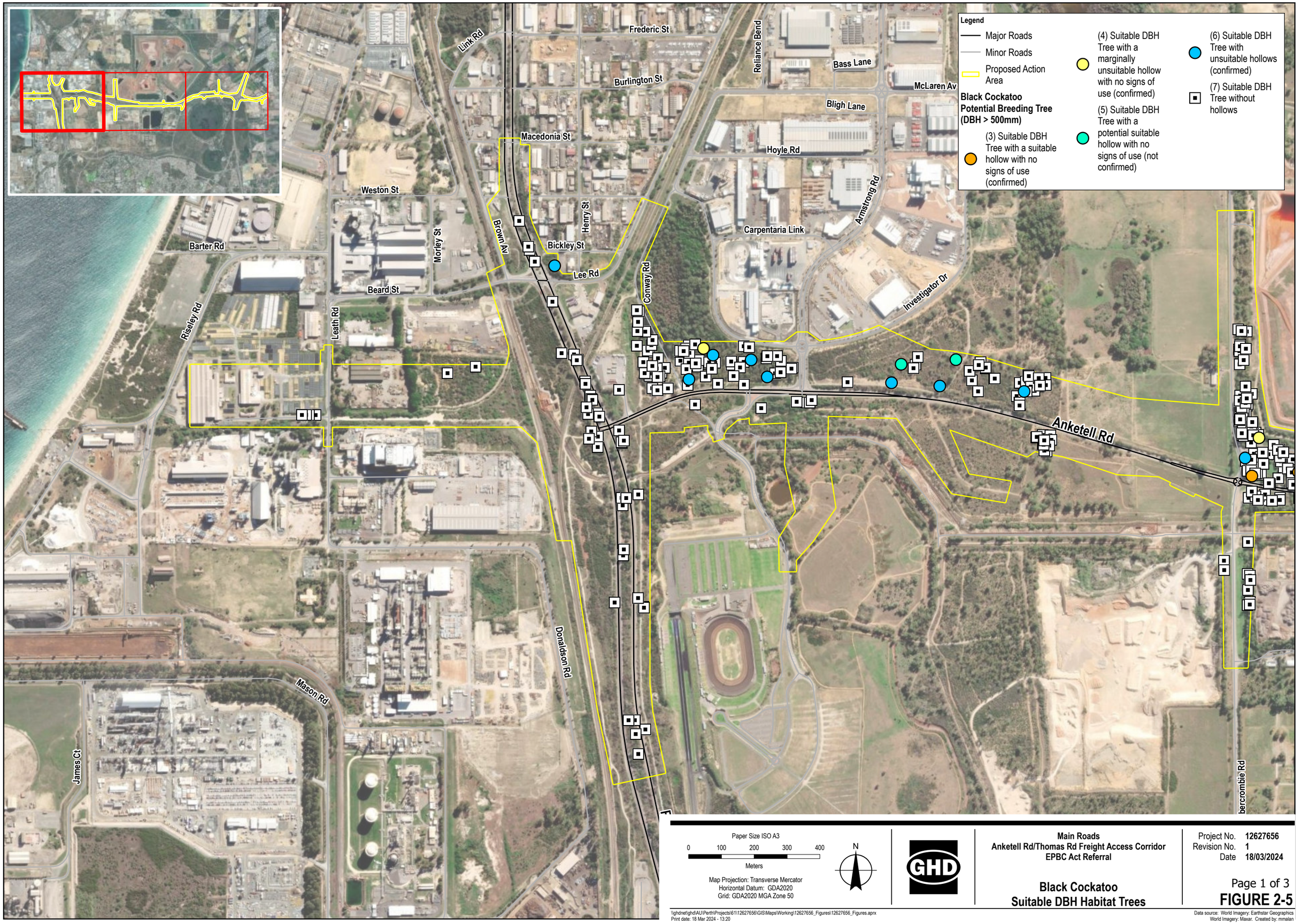

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Main Roads
Anketell Rd/Thomas Rd Freight Access Corridor
EPBC Act Referral

Black Cockatoo
Suitable DBH Habitat Trees

Project No. **12627656**
Revision No. **1**
Date **18/03/2024**

Page 1 of 3
FIGURE 2-5

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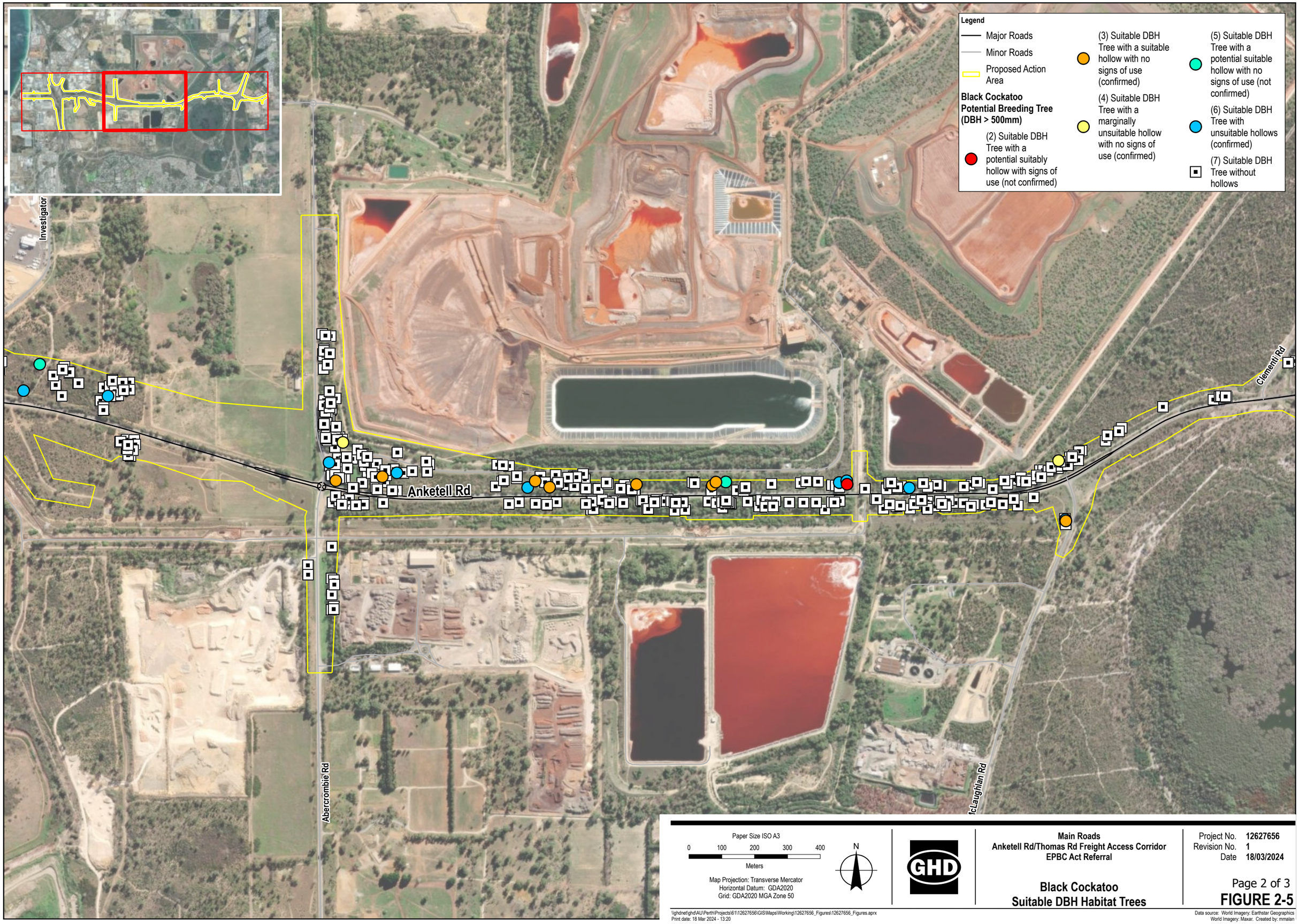

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Main Roads
Anketell Rd/Thomas Rd Freight Access Corridor
EPBC Act Referral

Black Cockatoo
Suitable DBH Habitat Trees

Project No. **12627656**
Revision No. **1**
Date **18/03/2024**

FIGURE 2-5

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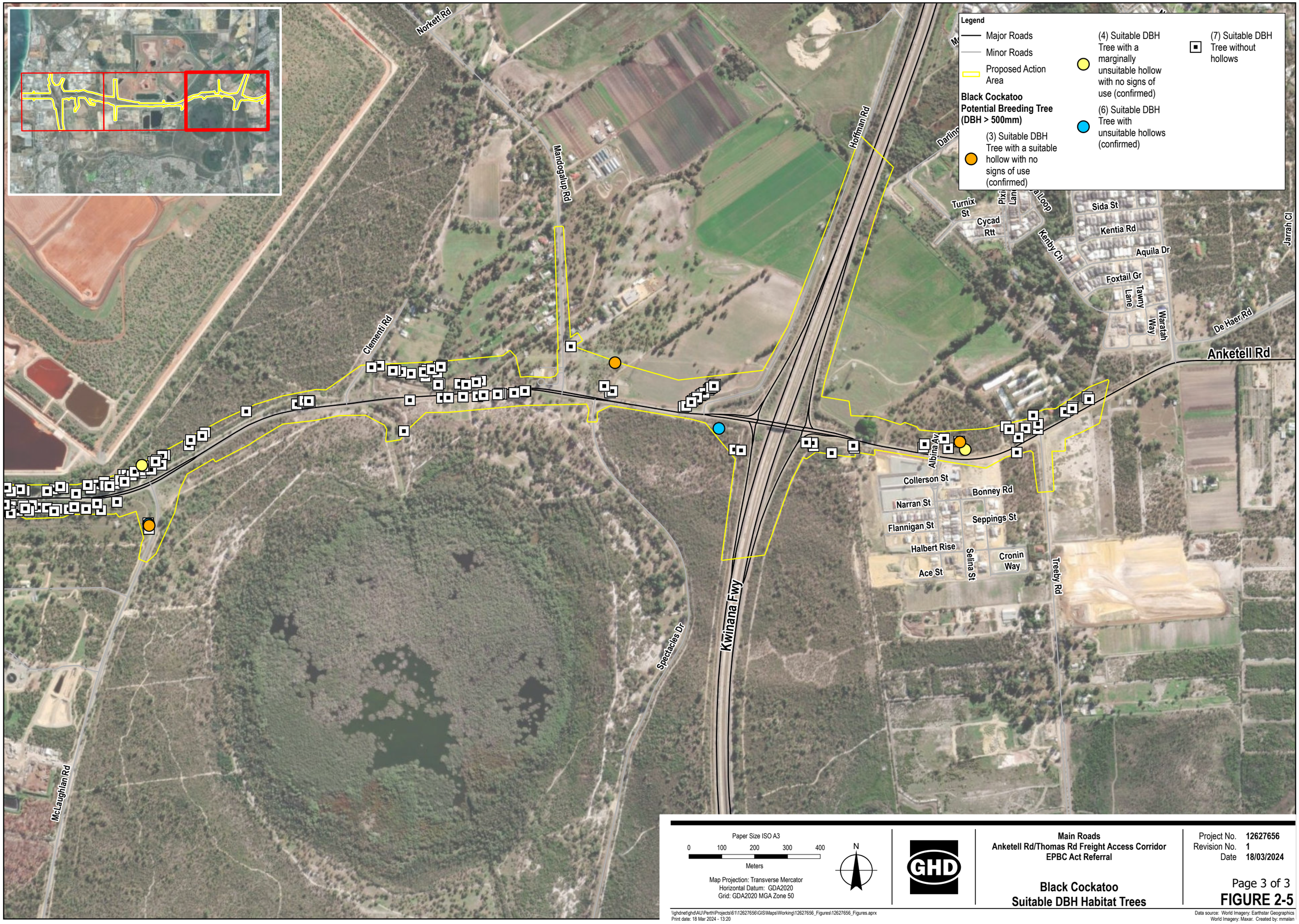

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Main Roads
Anketell Rd/Thomas Rd Freight Access Corridor
EPBC Act Referral

Black Cockatoo
Suitable DBH Habitat Trees

Project No. **12627656**
Revision No. **1**
Date **18/03/2024**

Page 3 of 3
FIGURE 2-5

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2.3.1 Overview of impact

The Proposed Action will cause impacts to two threatened Black Cockatoo species:

- Carnaby's Cockatoo (*Zanda latirostris*) – Endangered
- FRTBC (*Calyptorhynchus banksii naso*) – Vulnerable.

The impacts from the Proposed Action include the following:

- Clearing of up to 16.11 ha of core foraging habitat and 41.75 ha of secondary foraging habitat for Carnaby's Cockatoo (Figure 2-3)
- Clearing of up to 7.24 ha of core foraging habitat and 31.55 ha of secondary habitat for FRTBC (Figure 2-4)
- Loss of up to 608 Black Cockatoo suitable DBH trees, of which 18 trees contained 25 hollows that were considered of suitable depth and shape for Black Cockatoo breeding (Figure 2-5). Although 608 suitable DBH trees will be impacted, the Proposal is unlikely to impact Black Cockatoo breeding given Black Cockatoos are not known to breed in the local area.

2.3.2 Assessment of significance

Table 2-6 presents an assessment of the potential impacts of the Proposed Action on Black Cockatoos against the significant impact criteria for endangered and vulnerable species in the *Significant Impact Guidelines 1.1* (DoE 2013). The Guidelines state that an action is likely to have a significant impact on an endangered species if there is a real chance or possibility that it will:

- Lead to a long-term decrease in the size of a population (or important population, for FRTBC)
- Reduce the area of occupancy of the species
- Fragment an existing population (or important population, for FRTBC) into two or more populations
- Adversely affect habitat critical to the survival of a species
- Disrupt the breeding cycle of a population (or important population, for FRTBC)
- Modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline
- Result in invasive species that are harmful to an endangered species becoming established in the endangered (or vulnerable, for FRTBC) species' habitat
- Introduce disease that may cause the species to decline
- Interfere with the recovery of the species.

The criteria in the significant impact guidelines refer to 'populations' and 'important populations'. The 'population of a species' is defined under the EPBC Act as an occurrence of the species in a particular area (DoE 2013). An 'important population' is defined as population that is necessary for the species' long-term survival and recovery (DoE 2013).

'Populations' and 'important populations' have not been defined for Black Cockatoos, due to the mobile and widely-distributed nature of these species, and the variation in flock compositions (for example, between breeding and non-breeding seasons). For Black Cockatoos, it is more appropriate to consider significance in terms of impacts on habitat and individuals rather than a population (DAWE 2022).

The DAWE (2022) guidelines list referral thresholds, which if exceeded by a Proposed Action, indicate the action will have or likely have a significant impact on Black Cockatoos. Therefore, an assessment against the DAWE (2022) referral thresholds is additionally provided in Table 2-7.

As presented in Table 2-6 and Table 2-7, the Proposed Action is likely to result in significant impacts to two species of Black Cockatoos (Carnaby's Cockatoo and FRTBC), due to the direct impact of clearing more than 1 ha of quality foraging habitat (up to 16.11 ha core foraging habitat for Carnaby's Cockatoo and 7.24 ha of core foraging habitat for FRTBC).

Indirect impacts will be avoided through standard construction management practices when implementing the Proposed Action, so as to prevent significant impacts within and outside the PAA. The landscaping and roadside vegetation species selection will be designed as to avoid unintended impacts to Black Cockatoos during operation.

Table 2-6: Assessment against Significant Impact Guidelines 1.1 for Black Cockatoos

Criteria	Assessment	Significance
Lead to a long-term decrease in the size of a population (or important population, for FRTBC)	The Proposed Action is not expected to lead to a long-term decrease in the size of a Black Cockatoo population, given the lack of roosting habitat, no known breeding activity and relative local and regional extent of foraging habitat within the PAA. The Proposed Action will not result in clearing of known roosting trees, the closest roosting site is approximately 2.5km south of the eastern end of the PAA in Marri Park Golf Course. No Black Cockatoo breeding activity nor definitive evidence of breeding was observed within the PAA (Biota 2024). The nearest confirmed and unconfirmed breeding area for Carnaby's Cockatoo is approximately 11.5 km and 5 km from the PAA, respectively (GoWA 2023). The proposed Action will clear up to 16.11 ha of core foraging habitat (7.24 ha very high value, 8.87 ha moderate value) and 41.75 ha low value secondary foraging habitat for Carnaby's Cockatoo and 7.24 ha of 'very high' value core foraging habitat and 31.55 ha of low quality secondary habitat for FRTBC. The PAA is surrounded by approximately 12,214 ha of potential Black Cockatoo foraging habitat within 12 km of the PAA. Of the 12,214 ha of potential Black Cockatoo foraging habitat mapped within 12 km of the PAA, 6,209 ha (50.83%) lies within reserved lands (in Bush Forever and/or DBCA managed lands). An assessment of available Black Cockatoo foraging habitat within 12 km of the Proposal indicates the proposed clearing represents a 0.47 % and 0.32 % reduction in foraging habitat for Carnaby's Cockatoo and FRTBC, respectively. The Department of Parks and Wildlife (now DBCA) mapped potential Black Cockatoo habitat on the SCP as part of the Strategic Assessment of Perth and Peel Regions (SAPPR) (DPC 2015). The mapping for SAAPR identified Black Cockatoo habitat over the SCP as follows (DPC 2015): • The Carnaby's Cockatoo foraging habitat in the PAA represents approximately 0.01% of potential foraging habitat within the SCP, estimated at 528,893 ha as part of the Strategic Assessment of Perth and Peel Regions (SAPPR) (DPC 2015) • The FRTBC foraging habitat in the PAA represents approximately 0.02% of potential foraging habitat within the SCP, estimated at 205,647 ha (DPC 2015). FRTBC have their core (and extensive) foraging habitat in the Jarrah Forest bioregion rather than the SCP. Black Cockatoos are highly mobile species and are expected to forage outside the PAA amongst foraging resources in the vicinity (12,214 ha within 12 km) and are not dependent on a particular patch of foraging habitat within the PAA. Furthermore, the Proposed Action will not result in the clearing of important roosting or breeding habitat nor does the Proposed Action lie adjacent to important roosting or breeding habitat. The Proposed Action incorporates construction management to protect the integrity of Black Cockatoo habitat in the adjacent remnant vegetation, including Bush Forever Sites 268, 269 and 270. Implementation of the CEMP includes management objectives, performance criteria, actions and monitoring to minimise risks to the surrounding	Unlikely to be significant

Criteria	Assessment	Significance
	environment. The CEMP will include clearing and access controls, vehicle movement restrictions, preventing indirect habitat degradation via edge effects, weeds, dieback and rubbish, light and noise measures and revegetation requirements. A project specific Landscape and Revegetation Management Plan will specify landscaping within the road reserve will use local native species in accordance with Main Roads Specification 304 (Revegetation and Landscaping) and Main Roads Environmental Guideline Revegetation Planning and Techniques and Vegetation Places within the Road Reserve, which will avoid the inappropriate placement of Black Cockatoo foraging species in proximity to the road.	
Reduce the area of occupancy of the species	The Proposed Action requires the clearing of 16.11 ha of core foraging habitat (7.24 ha very high value, 8.87 ha moderate value) and 41.75 ha low value secondary foraging habitat for Carnaby's Cockatoo and 7.24 ha of 'very high' value core foraging habitat 31.55 ha of low quality secondary habitat for FRTBC, which represents 0.47 % and 0.32 % local habitat within 12 km of PAA, and 0.01% and 0.02% of regional habitat within the Perth and Peel Regions, respectively. There is 12,214 ha of potential Black Cockatoo foraging habitat located within 12 km of the Proposed Action. Of the 12,214 ha of Black Cockatoo habitat mapped within 12 km of the PAA, approximately 6,209 ha (50.83%) lies within reserved lands (in Bush Forever or DBCA managed lands). Black Cockatoos are highly mobile species and are expected to forage outside the PAA amongst foraging resources in the vicinity. Black Cockatoos and are not dependent on a particular patch of foraging habitat within the PAA. Furthermore, clearing will occur over linear patches adjacent to existing cleared and disturbed areas along Anketell Road. On this basis the Proposed Action is unlikely to significantly reduce the area of occupancy of this species, which will continue to utilise the immediate area.	Unlikely to be significant
Fragment an existing population (or important population, for FRTBC) into two or more populations	The Proposed Action is not expected to fragment populations of Black Cockatoos, as clearing will occur over linear patches adjacent to existing cleared and disturbed areas along Anketell Road. Black Cockatoos are highly mobile species and are expected to forage outside the PAA amongst foraging resources in the vicinity (12,214 ha within 12 km) and are not dependent on a particular patch of foraging habitat within the PAA. Furthermore, the Proposed Action does not fragment important breeding habitat from foraging resources. The PAA does not contain known roosting or breeding habitat nor does the PAA lie adjacent to important roosting or breeding habitat.	Unlikely to be significant
Adversely affect habitat critical to the survival of a species	Habitat critical to survival for Carnaby's Cockatoo (DPaW 2013) includes: • 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.	Likely to be significant

Criteria	Assessment	Significance
	Habitat critical for the survival of populations of FRTBC comprises 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 (DEC 2008). The PAA comprises suitable foraging habitat and will result in the removal of up to 16.11 ha of core foraging habitat (7.24 ha very high value, 8.87 ha moderate value) and 41.75 ha low value secondary foraging habitat for Carnaby's Cockatoo. While the PAA does not comprise known or former breeding habitat, the Proposed Action may impact habitat critical to the survival of Carnaby's Cockatoo, as the PAA does contain vegetation that provides food resources and there are water bodies (both natural and anthropogenic) located adjacent and to the PAA. The Proposed Action will remove up to 7.24 ha of 'very high' value core foraging habitat 31.55 ha of low quality secondary habitat for FRTBC. Areas of the Banksia Woodland habitat, and smaller areas of Jarrah/Banksia woodland habitat, represent potential core foraging habitat for Carnaby's Cockatoo in particular within the PAA (Biota 2024). Although it is noted the general lack of Marri within the EB1 vegetation complex mapped by Biota (2024) is likely to reduce foraging quality, particularly for Carnaby's Cockatoo for which Jarrah is of much lower foraging preference than Marri, the additional presence of Banksia contributes to quality. For the FRTBC, Jarrah represents a primary food resource. The clearing of critical foraging habitat for Carnaby's Cockatoo and FRTBC in the PAA, which is on the SCP is likely to be significant.	
Disrupt the breeding cycle of a population (or important population, for FRTBC)	The Proposed Action is not expected to disrupt the breeding cycle of a population of Black Cockatoos as no known breeding of Black Cockatoos occurs in the PAA or the vicinity. The Proposed Action will not result in clearing of any known breeding tree or hollow, nor any known important roosting tree. The Proposed Action occurs approximately 5 km from the closest unconfirmed breeding area for Carnaby's Cockatoo and 11.5 km from the closest confirmed breeding area for Carnaby's Cockatoo (GoWA 2023).	Unlikely to be significant
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The Proposed Action is not expected to impact the availability or quality of habitat to the extent that Black Cockatoos are likely to decline, as: • The Proposed Action will not result in the clearing of important roosting or breeding habitat nor does the PAA lie adjacent to important roosting or breeding habitat • The Proposed Action will result in a maximum clearing of 16.11 ha of core foraging habitat (7.24 ha very high value, 8.87 ha moderate value) and 41.75 ha low value secondary foraging habitat for Carnaby's Cockatoo, which represents approximately 0.47% local habitat (within 12 km of the PAA) and 0.01% of regional habitat within the SCP • The Proposed Action will result in a maximum clearing of 7.24 ha of 'very high' value core foraging habitat and 31.55 ha of low quality secondary foraging habitat for FRTBC, which represents approximately 0.32% local habitat (within 12 km of the PAA) and 0.02% of regional habitat within the SCP	Unlikely to be significant

Criteria	Assessment	Significance
	• The Proposed Action is surrounded by 12,214 ha of potential foraging habitat within 12 km, with approximately 50.83% of habitat reserved in Bush Forever or DBCA managed lands • The Proposed Action will incorporate harvesting and reuse of topsoil within the PAA to ensure that local soil resources are maintained and support buffers of native vegetation within the road reserve. Furthermore, the Proposed Action will use native species on local topsoil for landscaping, restrict the use of fertilisers to the establishment phase and a case-by-case basis, and incorporate treatment of stormwater during infiltration. This will be specified in a project specific Landscape and Revegetation Management Plan • The CEMP will include clearing and access controls, vehicle movement restrictions, preventing indirect habitat degradation via edge effects, weeds, dieback and rubbish, light and noise measures and revegetation requirements.	
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species habitat	The Proposed Action is not expected to introduce or spread invasive species into Black Cockatoo habitat. Although there are 18 suitable DBH trees that contain 25 hollows considered of suitable depth and shape for Black Cockatoo breeding, it is unlikely breeding or nesting of Black Cockatoos occurs within the PAA, based on known distribution. Four of the trees with potentially suitable hollows were observed to be infested with European honeybee. The Proposed Action does not involve any actions which could potentially introduce the European honeybee into the PAA or surrounds. Existing biosecurity measures and protocols within the freight industry will also minimise the risk of invasive species introduction in the PAA from vehicle traffic. The PAA has existing weed infestation associated with urban development. The Proposed Action is not expected to result in the introduction or spread of weeds that will result in significant impacts to Black Cockatoo habitat. This is due to construction management (via the CEMP) including weed and hygiene management, and landscaping with native species on local harvested topsoil. Weed management will be undertaken along road verges and in road drainage basins/swales to prevent the spread of weeds into adjacent habitat. The Proposed Action is not expected to introduce any predator species (e.g., foxes, feral cats or rabbits) into the PAA. Feral cats may be vagrant visitors to the area; however, the Proposed Action will not create a destination or facilitate access for predator species into surrounding areas of native vegetation. The CEMP will include waste and rubbish controls to prevent attracting animals to construction areas.	Unlikely to be significant
Introduce disease that may cause the species to decline	The Proposed Action is not expected to introduce or spread disease that could cause Black Cockatoo populations to decline. 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	Unlikely to be significant

Criteria	Assessment	Significance
	and free-living psittacine species. The Proposed Action does not involve any actions which could potentially introduce infectious diseases within Black Cockatoo populations which could cause the species to decline. The Proposed Action will include dieback hygiene during construction to protect adjacent Black Cockatoo habitat. The Proposed Action will establish protectable areas along sections of the PAA boundary and incorporate access controls, equipment and vehicle washing/segregation, soil movement controls, and monitoring during construction. The Proposed Action is not expected to spread dieback through sediment in stormwater runoff, as stormwater will be captured and infiltrated within basins/swales in the road reserve and will not discharge into Black Cockatoo habitat adjacent to the Proposed Action.	
Interfere with the recovery of the species	The Proposed Action is unlikely to significantly interfere with the recovery of the Black Cockatoos. Carnaby's Cockatoo recovery, as defined by the Recovery Plan (DPaW 2013), is dependent upon stopping the further decline in the distribution and abundance of Carnaby's Cockatoo by protecting the species throughout their life stages and enhancing habitat critical for survival throughout their breeding and non-breeding range. Forest Red-tailed Black Cockatoo recovery, as defined by the Recovery Plan (DEC 2008), is dependent on stopping further decline in the breeding populations of FRTBC and to ensure their persistence throughout their current range in the south-west of Western Australia. The Proposed Action is consistent with the Black Cockatoo recovery, as it does not involve clearing of known breeding and roosting habitat and it minimises clearing of foraging habitat through Proposed Action placement and use of an existing road and protects adjacent patches of Black Cockatoo habitat from indirect impacts through the commitment to develop and implement a CEMP and project specific Landscape and Revegetation Management Plan.	Unlikely to be significant
Conclusion	Based on the above assessment against the *Significant Impact Guidelines 1.1* (DoE 2013), the Proposed Action is likely to result in a significant impact to Black Cockatoos, specifically in relation to the direct impact of clearing of up to: • 16.11 ha of core foraging habitat and 41.75 ha of secondary foraging habitat for Carnaby's Cockatoo • 7.24 ha of core foraging habitat and 31.55 ha of secondary habitat for FRTBC.	

Table 2-7: Assessment against the referral thresholds for Black Cockatoos

Attribute	Referral threshold	Assessment	Significance
Breeding	Any loss of / impact upon known, suitable or potential nesting trees, and the habitat around these trees, is highly likely to require a referral to the minister. Loss of any potential nesting habitat is likely to require a referral to the minister.	The PAA is located approximately 5 km from the closest unconfirmed breeding area for Carnaby's Cockatoo and 11.5 km from the closest confirmed breeding area for Carnaby's Cockatoo (GoWA 2023). No Black Cockatoo breeding activity nor definitive evidence of breeding was observed within the PAA during the Biota (2024) survey, noting that Carnaby's Cockatoo or FRTBC are not known to breed in the area.	Unlikely to be significant
High-quality native foraging habitat	Loss of greater than or equal to 1 ha of foraging habitat scoring 5-10 using the foraging quality scoring tool is likely to require referral to the minister.	The Proposed Action comprises strips of clearing over linear patches adjacent to existing cleared and disturbed areas along Anketell Road and associated connecting roads, with patches of Black Cockatoo habitat remaining on either side of the PAA. The Proposed Action will result in clearing of up to 16.11 ha of core foraging habitat (7.24 ha very high value, 8.87 ha moderate value) for Carnaby's Cockatoo and 7.24 ha of 'very high' value core foraging habitat for FRTBC. The Proposed Action design and construction will aim to avoid and minimise direct and indirect impacts to high-quality native Black Cockatoo foraging habitat within and adjacent to the PAA, respectively: • The PAA has existing weed infestation associated with urban development. The Proposed Action is not expected to result in the introduction or spread of weeds that results in significant impacts to Black Cockatoo habitat. This is due to construction management including weed treatment and hygiene, and landscaping with native species on local harvested topsoil. Weed management will be undertaken in road drainage basins/swales to prevent spread of weeds into adjacent habitat • The Proposed Action will facilitate flow of traffic from surrounding suburbs through the PAA, and will not create a destination or facilitate access into surrounding areas of native vegetation • Dewatering, if required, will cause temporary and localised groundwater drawdown during construction and is not expected to cause significant impacts to adjacent Black Cockatoo habitat • The Proposed Action is not expected to alter the fire regime of the area. The Proposed Action involves an upgrade to an existing road and landscaping with local, native species	Likely to be significant

Attribute	Referral threshold	Assessment	Significance
		• The Proposed Action is not expected to spread dieback through sediment in stormwater runoff, as stormwater will be captured and infiltrated within basins/swales in the road reserve and will not discharge into Black Cockatoo habitat outside the Proposed Action. The Proposed Action will also include dieback hygiene during construction to protect adjacent Black Cockatoo habitat. The Proposed Action will establish protectable areas along sections of the PAA boundary and incorporate access controls, equipment and vehicle washing/segregation, soil movement controls, and monitoring during construction.	
Lower-quality native foraging habitat	Loss of greater than or equal to 10 ha of foraging habitat scoring 0-4 using the foraging quality scoring tool is likely to require referral to the minister.	The Proposed Action will result in clearing of up to 41.75 ha low value secondary foraging habitat for Carnaby's Cockatoo and 31.55 ha of low quality secondary habitat for FRTBC. The Proposed Action design and construction will aim to avoid and minimise direct and indirect impacts to lower-quality native Black Cockatoo foraging habitat within and adjacent to the PAA, in a consistent manner to that mentioned above for High-quality native foraging habitat.	Likely to have significant
Exotic foraging habitat	Loss of greater than or equal to 1 ha of predominantly exotic habitat (e.g. Cape Lilac trees and pine trees) known to be utilised by black cockatoos is likely to require a referral to the minister.	The foraging habitat present in the PAA consists of predominantly native remnant vegetation. There is 1.41 ha of modified/revegetated/planted vegetation, however this is a mosaic of (B1) *Banksia attenuata* (*B. menziesii*) over *Adenanthos, Jacksonia, Kunzea* with mixed low shrubland over mixed perennial herbland and (B2) *Banksia menziesii* (*B. attenuata*) over *Xanthorrhoea* spp. with *Hibbertia* and *Conostylis*; rather than exotic species.	Unlikely to be significant
Night roosting habitat	Removal of any part of a known night roosting site is likely to require referral to the minister.	The Proposed Action will not result in the clearing of any known night roosting trees. The PAA does not contain a known night roosting habitat. The Great Cocky Count (Peck et al., 2019) indicates that the closest roosting site occurs approximately 2.5 km south of the eastern end of the PAA in Marri Park Golf Course.	Unlikely to be significant
Conclusion		Based on the above assessment against the Referral thresholds (DAWE 2022), the Proposed Action is likely to have a significant impact to Black Cockatoos, by clearing up to: • 16.11 ha of core foraging habitat and 41.75 ha of secondary foraging habitat for Carnaby's Cockatoo • 7.24 ha of core foraging habitat and 31.55 ha of secondary habitat for FRTBC.	

3 OTHER THREATENED ECOLOGICAL COMMUNITIES AND SPECIES

3.1 *Melaleuca huegelii – Melaleuca systena* shrublands on limestone ridges TEC

Effective from 15 November 2023 the State-listed TEC '*Melaleuca huegelii – Melaleuca systena* shrublands on limestone ridges' was approved and listed as a Critically Endangered Commonwealth TEC under the EPBC Act. At the time of the approved conservation advice listing, this ecological community is synonymous with, and corresponds to, the Critically Endangered WA Threatened Ecological Community '*Melaleuca huegelii – M. systena* shrublands of limestone ridges (floristic community type 26a as originally described in Gibson et al. 1994)' that is on the list of Threatened Ecological Communities, under the WA BC Act.

This TEC is largely restricted to massive limestone ridges within Yanchep and Neerabup National Parks. The community typically occurs on skeletal soil on ridge slopes and tops of ridges, and is dominated by *Melaleuca huegelii*, *M. systena* and *M.* aff. *systena* often over scattered limestone heath species such as *Banksia sessilis* and *Grevillea preissii* (Keighery et al. 2003).

Biota (2024) reports the PAA supports a single occurrence of this TEC (1.96 ha) situated north and south of Anketell Road, east of the Abercrombie Road intersection (existing within the mapped vegetation unit B5). The two small areas were identified to occur prior to the survey (Biota 2022) and were specifically targeted with three sampling quadrats. Biota (2024) states the mapped area is in a relatively Degraded condition and depauperate in understory species. The combined species recorded from the three quadrats included 33 introduced species, with only 13 native taxa recorded. Although the species recorded are typical of the Gibson et al (1994) community type 26a, PATN analysis of the site data against the 11 sites known to represent this TEC sampled on the SCP by Gibson et al (1994) shows very little similarity in terms of vegetation composition. From the floristic analyses, these quadrats were assigned to FCT24 (aff. 29a/30b) and FCT24 (aff. 29a), reflecting the FCTs that were mapped for the surrounding vegetation.

As the FCT analysis did not confirm the presence of this TEC, Main Roads will liaise with DBCA's Species and Communities Branch about this vegetation community and potentially undertake further vegetation community analysis to arrive at a more definitive conclusion about the presence and extent of this TEC. Given this uncertainty, the TEC is not assessed further in this document.

3.2 Baudin's Cockatoo (*Zanda baudinii*)

Baudin's Cockatoo (*Zanda baudinii*) was identified in the desktop searches, but there are no confirmed records of the species within the study area and the PAA is outside of the species' currently modelled distribution (DAWE 2022). Baudin's Cockatoos are uncommon on the northern Swan Coastal Plain, anywhere north of Rockingham, and in these more northerly areas, records generally occur at the eastern fringe of the Swan Coastal Plain (Johnstone et al. 2010, DAWE 2022). At the latitude of the survey area, Baudin's have rarely been recorded west of Byford (Biota 2024). Accordingly, Baudin's Cockatoo are not considered further in this assessment.

3.3 Chuditch

The Chuditch formerly occurred over much of the Australian continent, across a wide range of habitats including woodlands, dry sclerophyll forests and desert areas, but is now restricted to south-western Australia (Woinarski et al. 2014). Isolated subpopulations of the species are still present in the Avon Wheatbelt, eastern Goldfields woodlands, and near Fitzgerald River National Park and Ravensthorpe Range (Woinarski et al. 2014).

The species has been previously recorded in 2009 at the Wandi Nature Reserve, approximately 2.4 km east-northeast of the PAA and in 2013 at The Spectacles, located south adjacent the eastern extent of the PAA. As such, Biota (2024) assessed the Chuditch as having some potential, albeit low, to occur within their survey area at its eastern extent on a transitory basis particularly in areas adjacent to The Spectacles. The Chuditch is considered unlikely to occur in the survey area west of the Kwinana Freeway due to the prevalence of highly modified and cleared areas between suitable habitat fragments (Biota 2024). It was noted that east of the freeway, due to patches being isolated, Chuditch may only be present within the PAA within the vegetation that runs alongside the freeway. However, given this strip occurs immediately adjacent to a freeway, the noise may deter individuals from using this area. Although habitat also exists in the area north of Anketell Road, east of the freeway, it is considered too small to provide viable Chuditch habitat as it is isolated and doesn't adjoin a larger patch of habitat.

Eucalypt Woodland/Forest represent favourable habitat for this species while Banksia Woodland and Jarrah/Banksia Woodland represent habitat also (Biota 2024). Whilst the Eucalypt Woodland/Forest habitat with in the PAA is geographically constrained and isolated, there is potential for the species to occur on a secondary transitory basis, and it may represent a linkage to larger habitat areas particularly in reserves adjacent the survey area (Biota 2024).

On the eastern side of the Kwinana Freeway there is less than 5ha of secondary habitat for the Chuditch present in the PAA. As Chuditch are considered unlikely to occur on the western side of the Kwinana Freeway there is no suitable habitat there.

It is not expected that the Proposal will have a significant impact on this species.

4 REFERENCES

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5 ADDITIONAL INFORMATION

5.1 Appendices

Appendix	Title
Appendix 1	Anketell Road Upgrade Consolidated Biological Report (Biota 2024)
Appendix 2	EPBC Act Protected Matters Report (21 March 2024)
Appendix 3	MNES identified via PMST likelihood of impact assessment

Appendix 1: Anketell Road Upgrade Consolidated Biological Report (Biota 2024)

Appendix 2: EPBC Act Protected Matters Report (21 March 2024)

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 21-Mar-2024

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	2
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	55
Listed Migratory Species:	47

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	69
Whales and Other Cetaceans:	12
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	2
Regional Forest Agreements:	None
Nationally Important Wetlands:	1
EPBC Act Referrals:	22
Key Ecological Features (Marine):	None
Biologically Important Areas:	10
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity
Forrestdale and thomsons lakes	Within 10km of Ramsar site
Peel-yalgorup system	30 - 40km upstream from Ramsar site

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community likely to occur within area
Empodisma peatlands of southwestern Australia	Endangered	Community may occur within area
Honeymyrtle shrubland on limestone ridges of the Swan Coastal Plain Bioregion	Critically Endangered	Community likely to occur within area
Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain ecological community	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Anous tenuirostris melanops		
Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Ardenna grisea		
Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Russkoye Bar-tailed Godwit [86432]	Endangered	Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area
Phaethon rubricauda westralis Red-tailed Tropicbird (Indian Ocean), Indian Ocean Red-tailed Tropicbird [91824]	Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area
Zanda baudinii listed as Calyptorhynchus baudinii		
Baudin's Cockatoo, Baudin's Black-Cockatoo, Long-billed Black-cockatoo [87736]	Endangered	Species or species habitat likely to occur within area
Zanda latirostris listed as Calyptorhynchus latirostris		
Carnaby's Black Cockatoo, Short-billed Black-cockatoo [87737]	Endangered	Breeding known to occur within area
FISH		
Thunnus maccoyii		
Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat known to occur within area
MAMMAL		
Balaenoptera musculus		
Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Dasyurus geoffroii		
Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area
Eubalaena australis		
Southern Right Whale [40]	Endangered	Breeding known to occur within area
Neophoca cinerea		
Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
[Pseudocheirus occidentalis](#) Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Species or species habitat likely to occur within area
OTHER		
[Westralunio carteri](#) Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat likely to occur within area
PLANT		
[Andersonia gracilis](#) Slender Andersonia [14470]	Endangered	Species or species habitat may occur within area
[Banksia mimica](#) Summer Honeypot [82765]	Endangered	Species or species habitat may occur within area
[Caladenia huegelii](#) King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat known to occur within area
[Diuris micrantha](#) Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat known to occur within area
[Diuris purdiei](#) Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat likely to occur within area
[Drakaea elastica](#) Glossy-leafed Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat likely to occur within area
[Drakaea micrantha](#) Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat likely to occur within area
[Eleocharis keigheryi](#) Keighery's Eleocharis [64893]	Vulnerable	Species or species habitat may occur within area
[Morelotia australiensis listed as Tetraria australiensis](#) Southern Tetraria [92784]	Vulnerable	Species or species habitat may occur within area
REPTILE		

Scientific Name	Threatened Category	Presence Text
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
SHARK		
Carcharias taurus (west coast population)		
Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat likely to occur within area
Carcharodon carcharias		
White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Pristis pristis		
Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area
Rhincodon typus		
Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Sphyrna lewini		
Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Anous stolidus		
Common Noddy [825]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area
Hydroprogne caspia Caspian Tern [808]		Foraging, feeding or related behaviour known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Onychoprion anaethetus		
Bridled Tern [82845]		Foraging, feeding or related behaviour likely to occur within area
Sterna dougallii		
Roseate Tern [817]		Foraging, feeding or related behaviour likely to occur within area
Sternula albifrons		
Little Tern [82849]		Species or species habitat may occur within area
Thalassarche carteri		
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta		
Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area
Migratory Marine Species		
Balaenoptera edeni		
Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus		
Blue Whale [36]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
[Caperea marginata](#) Pygmy Right Whale [39]		Species or species habitat may occur within area
[Carcharhinus longimanus](#) Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area
[Carcharodon carcharias](#) White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
[Eubalaena australis as Balaena glacialis australis](#) Southern Right Whale [40]	Endangered	Breeding known to occur within area
[Lamna nasus](#) Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area
[Megaptera novaeangliae](#) Humpback Whale [38]		Species or species habitat known to occur within area
[Mobula alfredi as Manta alfredi](#) Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat may occur within area
[Mobula birostris as Manta birostris](#) Giant Manta Ray [90034]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
[Natator depressus](#)		
Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
[Orcinus orca](#)		
Killer Whale, Orca [46]		Species or species habitat may occur within area
[Pristis pristis](#)		
Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area
[Rhincodon typus](#)		
Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Migratory Terrestrial Species		
[Motacilla cinerea](#)		
Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
[Actitis hypoleucos](#)		
Common Sandpiper [59309]		Species or species habitat likely to occur within area
[Calidris acuminata](#)		
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat likely to occur within area
[Calidris canutus](#)		
Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area
[Calidris ferruginea](#)		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
[Calidris melanotos](#)		
Pectoral Sandpiper [858]		Species or species habitat likely to occur within area
[Charadrius leschenaultii](#)		
Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Limosa lapponica		
Bar-tailed Godwit [844]		Species or species habitat likely to occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat likely to occur within area
Anous stolidus		
Common Noddy [825]		Species or species habitat may occur within area
Anous tenuirostris melanops		
Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Ardenna carneipes as Puffinus carneipes		
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area
Ardenna grisea as Puffinus griseus		
Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat likely to occur within area overfly marine area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hydroprogne caspia as Sterna caspia Caspian Tern [808]		Foraging, feeding or related behaviour known to occur within area
Larus pacificus Pacific Gull [811]		Foraging, feeding or related behaviour may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Onychoprion anaethetus as Sterna anaethetus		
Bridled Tern [82845]		Foraging, feeding or related behaviour likely to occur within area
Pachyptila turtur		
Fairy Prion [1066]		Species or species habitat likely to occur within area
Puffinus assimilis		
Little Shearwater [59363]		Foraging, feeding or related behaviour known to occur within area
Rostratula australis as Rostratula benghalensis (sensu lato)		
Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area
Sterna dougallii		
Roseate Tern [817]		Foraging, feeding or related behaviour likely to occur within area
Sternula albifrons as Sterna albifrons		
Little Tern [82849]		Species or species habitat may occur within area
Thalassarche carteri		
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta		
Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area
Thinornis cucullatus as Thinornis rubricollis		
Hooded Plover, Hooded Dotterel [87735]		Species or species habitat may occur within area overfly marine area
Tringa nebularia		
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area overfly marine area
Fish		
Acentronura australe		
Southern Pygmy Pipehorse [66185]		Species or species habitat may occur within area
Campichthys galei		
Gale's Pipefish [66191]		Species or species habitat may occur within area
Heraldia nocturna		
Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippocampus angustus		
Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area
Hippocampus breviceps		
Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Hippocampus subelongatus		
West Australian Seahorse [66722]		Species or species habitat may occur within area
Histiogamphelus cristatus		
Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
Lissocampus caudalis		
Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Lissocampus fatiloquus Prophet's Pipefish [66250]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Mitotichthys meraculus Western Crested Pipefish [66259]		Species or species habitat may occur within area
Nannocampus subosseus Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Urocampus carinirostris		
Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer		
Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi		
Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus		
Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Mammal		
Arctocephalus forsteri		
Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Neophoca cinerea		
Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat likely to occur within area
Reptile		
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Hydrophis kingii as Disteira kingii		
Spectacled Sea Snake [93511]		Species or species habitat may occur within area
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area

Whales and Other Cetaceans		[Resource Information]
Current Scientific Name	Status	Type of Presence
Mammal		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area

Current Scientific Name	Status	Type of Presence
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves		[Resource Information]
Protected Area Name	Reserve Type	State
Unnamed WA53313	Conservation Park	WA
Wandi	Nature Reserve	WA

Nationally Important Wetlands	[Resource Information]
Wetland Name	State
Spectacles Swamp	WA

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Abercrombie Road Quarry	2023/09465		Assessment
Kwinana Alumina Refinery ? Future Residue Storage Area	2023/09454		Referral Decision
Controlled action			
Alcoa Bauxite Residue Storage Area Extension	2011/5878	Controlled Action	Further Information Request
Development of Kwinana Quay port facility	2008/4387	Controlled Action	Completed
Honeywood Estate Development	2010/5476	Controlled Action	Post-Approval
Natural Gas Pipeline Expansion	2006/2813	Controlled Action	Post-Approval
Not controlled action			
'Looping 10' gas transmission pipeline from Kwinana to Hopelands	2005/2212	Not Controlled Action	Completed
Expansion of existing Ammonium Nitrate Production Facility	2005/1941	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Gas-fired Power Station	2005/2213	Not Controlled Action	Completed
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed
Kwinana Gas-Fired Power Station	2005/2101	Not Controlled Action	Completed
Lot 170 Hope Valley Road, Hope Valley	2020/8830	Not Controlled Action	Completed
Perth Desalination Plant 2	2019/8454	Not Controlled Action	Completed
Residential development, Lots 1 and 7-11 Lyon Rd and Lot 88 De Haer Rd, Wandi, WA	2017/7908	Not Controlled Action	Completed
Residential development of Lot 7 Anketell Rd, Anketell, WA	2018/8281	Not Controlled Action	Completed
Residential estate, multiple lots, Mandogalup, WA	2018/8264	Not Controlled Action	Completed
Subdivision, Lot 4 Anketell Road, Anketell, WA	2018/8145	Not Controlled Action	Completed
Wandi South residential development Kenby Close & Lyon Rd, Wandi, WA	2014/7198	Not Controlled Action	Completed
Not controlled action (particular manner)			
City of Cockburn Sporting Facilties	2005/2139	Not Controlled Action (Particular Manner)	Post-Approval
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
South West Metropolitan Railway Project	2003/1175	Not Controlled Action (Particular Manner)	Post-Approval

Biologically Important Areas		[Resource Information]
Scientific Name	Behaviour	Presence
Seabirds		

Scientific Name	Behaviour	Presence
Ardenna pacifica		
Wedge-tailed Shearwater [84292]	Foraging (in high numbers)	Known to occur
Eudyptula minor		
Little Penguin [1085]	Foraging (provisioning young)	Known to occur
Hydroprogne caspia		
Caspian Tern [808]	Foraging (provisioning young)	Known to occur
Larus pacificus		
Pacific Gull [811]	Foraging (in high numbers)	Former Range
Onychoprion anaethetus		
Bridled Tern [82845]	Foraging (in high numbers)	Known to occur
Puffinus assimilis tunneyi		
Little Shearwater [59363]	Foraging (in high numbers)	Known to occur
Sterna dougallii		
Roseate Tern [817]	Foraging	Known to occur
Sternula nereis		
Fairy Tern [82949]	Foraging (in high numbers)	Known to occur
Seals		
Neophoca cinerea		
Australian Sea Lion [22]	Foraging (male)	Likely to occur
Whales		
Megaptera novaeangliae		
Humpback Whale [38]	Migration (north and south)	Known to occur

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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Appendix 3: MNES identified via PMST likelihood of impact assessment

Threatened and Migratory MNES species which are Marine have been removed from the assessment as the Proposed Action and PAA does not intersect marine waters, and there are no likely impact pathways for indirect impacts to this habitat.

MNES	EPBC Act	Likelihood of Occurrence	Potential Impacts
Wetlands of International Importance			
Forrestdale and Thomsons Lakes	Ramsar Wetland	Forrestdale and Thomsons Lakes do not intersect the PAA and are located 3.7 km north of the eastern portion. The scale and nature of the Proposed Action will not foreseeably result in indirect impacts to these lakes given the separation distance.	No significant impacts expected
Peel-Yalgorup System	Upstream from Ramsar Wetland	There are no Ramsar wetlands within the PAA. The nearest Ramsar wetland is approximately 3.7 km north of the eastern portion of the PAA, Forrestdale & Thomsons Lakes. The Peel-Yalgorup System is more distant and will not be affected.	No significant impacts expected
Threatened Ecological Communities			
Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain ecological community	CE	Biota (2024) mapped 114.21 ha of this TEC in eleven remnant vegetation patches wholly, partially or immediately adjacent to the survey contextual area. The PAA intersects seven of the patches with an extent of 41.65 ha.	**Impacts have been further detailed in Table 2-2 above.**
Banksia Woodlands of the Swan Coastal Plain ecological community	EN	Biota (2024) mapped 330.2 ha of this TEC in 9 remnant vegetation patches wholly or partially within the survey contextual area. The PAA intersects all nine patches with an extent of 14.26 ha.	**Impacts have been further detailed in Table 2-4 above.**
Honeymyrtle shrubland on limestone ridges of the Swan Coastal Plain Bioregion	CE	Biota (2024) reports the PAA supports a single occurrence of this TEC (1.96 ha) and states the mapped area is in a Degraded condition and depauperate in understory species. The combined species recorded from the three quadrats included 33 introduced species, with only 13 native taxa recorded. Although the species recorded are typical of the Gibson et al (1994) community type 26a, PATN analysis of the site data against the 11 sites known to represent this TEC sampled on the SCP by Gibson et al (1994) shows very little similarity in terms of vegetation composition. From the floristic analyses, these quadrats were assigned to FCT24 (aff. 29a/30b) and FCT24 (aff. 29a), reflecting the FCTs that were mapped for the surrounding vegetation.	No significant impacts expected

MNES	EPBC Act	Likelihood of Occurrence	Potential Impacts
		As the FCT analysis did not confirm the presence of this TEC, Main Roads will liaise with DBCA's Species and Communities Branch about this vegetation community and potentially undertake further vegetation community analysis to arrive at a more definitive conclusion about the presence and extent of this TEC. It is considered unlikely the TEC is present in the PAA, given the degraded nature of the mapped vegetation that is dominated by weeds and the FCT analysis does not support its occurrence.	
Empodisma peatlands of southwestern Australia	EN	Empodisma peatlands of southwestern Australia were not identified during the Biota surveys consolidated within the Biota (2024) report and therefore are unlikely to occur within the PAA.	No significant impacts expected
Threatened Species - Fauna			
Western Ringtail Possum (*Pseudocheirus occidentalis*)	CE	Biota undertook a biological survey in 2023 and did not record occurrence of the Western Ringtail Possum.	No significant impacts expected
Chuditch, Western Quoll (*Dasyurus geoffroii*)	V	The Chuditch is considered unlikely to occur in the PAA as on the eastern side of the Kwinana Freeway there is less than 5ha of secondary habitat for the Chuditch present and Chuditch are considered unlikely to occur on the western side of the Kwinana Freeway there is no suitable habitat there (Biota 2024).	No significant impacts expected
Indian Ocean Red-tailed Tropicbird (*Phaethon rubricauda westralis*)	EN	Indian Ocean Red-Tailed Tropicbird was not identified in the Biota (2024) report and is therefore considered unlikely to occur within the PAA.	No significant impacts expected
Northern Siberian Bar-tailed Godwit (*Limosa lapponica menzbieri*)	EN	Northern Siberian Bar-Tailed Godwit was not identified in the Biota (2024) report and is therefore considered unlikely to occur within the PAA.	No significant impacts expected
Australasian Bittern (*Botaurus poiciloptilus*)	EN	Australiasian Bittern was not identified in the Biota (2024) report and is therefore considered unlikely to occur within the PAA.	No significant impacts expected
Baudin's Cockatoo, Baudin's Black-Cockatoo, Long-billed Black-cockatoo (*Zanda baudinii*)	EN	During the Biota (2024) survey, no individuals from any of the three Black Cockatoo species were recorded within the survey. There are no confirmed records of Baudin's Cockatoo within the study area and the Proposed Action occurs outside of the species' current modelled distribution (DAWE 2022).	No significant impacts expected

MNES	EPBC Act	Likelihood of Occurrence	Potential Impacts
Carnaby's Black Cockatoo, Short-billed Black-cockatoo (*Zanda latirostris*)	EN	During the Biota (2024) survey, no individuals from any of the three Black Cockatoo species were recorded within the survey. However, the PAA is within the mapped distribution for Carnaby's Cockatoo and is considered likely to occur.	**Impacts have been further detailed in Table 2-6 and Table 2-7 above.**
Fairy Prion (southern) (*Pachyptila turtur subantarctica*)	V	Fairy Prion (sothern) was not identified in the Biota (2024) report and is therefore considered unlikely to occur within the PAA.	No significant impacts expected
Malleefowl (*Leipoa ocellata*)	V	Malleefowl was not identified in the Biota (2024) report and is therefore considered unlikely to occur within the PAA.	No significant impacts expected
Forest Red-tailed Black-Cockatoo, Karrak (*Calyptorhynchus banksii naso*)	V	During the Biota (2024) survey, no individuals from any of the three Black Cockatoo species were recorded within the survey. However, foraging evidence for FRTBC was recorded.	**Impacts have been further detailed in Table 2-6 and Table 2-7 above.**
Australian Fairy Tern (*Sternula nereis nereis*)	V	Australian Fairy Tern was not identified in the Biota (2024) report and is therefore considered unlikely to occur within the PAA.	No significant impacts expected
Carter's Freshwater Mussel (*Westralunio carteri*)	V	Biota (2024) found no suitable habitats for Carters Freshwater Mussel and therefore is unlikely to occur within the PAA.	No significant impacts expected
Threatened Species - Flora			
Summer Honeypot (*Banksia mimica*)	EN	Summer Honeypot was not identified in the Biota (2024) report and is therefore considered unlikely to occur within the PAA.	No significant impacts expected
King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid (*Caladenia huegelii*)	EN	Despite extensive targeted searches within the survey area being conducted in accordance with the draft *Survey Guidelines for Australia's Threatened Orchids* (Department of the Environment 2013a), the four species of Threatened orchid that were identified in the desktop study, including *Caladenia huegelii* were not recorded during any of the surveys. It is considered unlikely that these orchid species would be present within the survey area, given that significant spatial and temporal survey effort has been allocated to their detection across a minimum of three seasons (Biota 2024).	No significant impacts expected

MNES	EPBC Act	Likelihood of Occurrence	Potential Impacts
Slender Andersonia (*Andersonia gracilis*)	EN	Biota (2024) consider the species would not occur within the PAA, given the survey effort across five phases of sampling. Despite target searches, no instances of Slender Andersonia were recorded in the survey area.	No significant impacts expected
Purdie's Donkey-orchid (*Diuris purdiei*)	EN	Despite extensive targeted searches within the survey area being conducted in accordance with the draft *Survey Guidelines for Australia's Threatened Orchids* (Department of the Environment 2013a), the four species of Threatened orchid that were identified in the desktop study, including *Diuris purdiei* were not recorded during any of the surveys. It is considered unlikely that these orchid species would be present within the survey area, given that significant spatial and temporal survey effort has been allocated to their detection across a minimum of three seasons (Biota 2024).	No significant impacts expected
Glossy-leafed Hammer Orchid (*Drakaea elastica*)	EN	Despite extensive targeted searches within the survey area being conducted in accordance with the draft *Survey Guidelines for Australia's Threatened Orchids* (Department of the Environment 2013a), the four species of Threatened orchid that were identified in the desktop study, including *Drakaea elastica* were not recorded during any of the surveys. It is considered unlikely that these orchid species would be present within the survey area, given that significant spatial and temporal survey effort has been allocated to their detection across a minimum of three seasons (Biota 2024).	No significant impacts expected
Dwarf Hammer-orchid (*Drakaea micrantha*)	V	Biota (2024) concluded the Drwarf Hammer-orchid would not occur within the PAA, no individuals were identified during the Biota surveys (2021, 2024).	No significant impacts expected
Keighery's Eleocharis (*Eleocharis keigheryi*)	V	Biota (2024) consider the species would not occur within the PAA, given the survey effort across five phases of sampling. Despite target searches, no instances of Keighery's Eleocharis were recorded in the survey area.	No significant impacts expected
Dwarf Bee-orchid (*Diuris micrantha*)	V	Despite extensive targeted searches within the survey area being conducted in accordance with the draft *Survey Guidelines for Australia's Threatened Orchids* (Department of the Environment 2013a), the four species of Threatened orchid that were identified in the desktop study, including *Diuris micrantha* were not recorded during any of the surveys. It is considered unlikely that these orchid species would be present within the survey area, given that significant spatial and temporal survey effort has been allocated to their detection across a minimum of three seasons (Biota 2024).	No significant impacts expected
Southern Tetraria (*Morelotia australiensis*)	V	Biota (2024) consider the species unlikely to occur within the PAA, given the survey effort across five phases of sampling. Despite target searches, none of these significant flora species were recorded in the survey area.	No significant impacts expected

ATTACHMENT 2

MAIN ROADS WESTERN AUSTRALIA ENVIRONMENTAL POLICY (2023)

FEBRUARY 2023

Environmental Policy

We are committed to protecting and enhancing the environmental, including heritage, and social values in all of our activities, products and services.

Intent

All Main Roads staff and others working on Main Roads behalf will:

- Recognise the importance of the environmental and social values and the broader benefits that these values provide to the community.
- Foster strategic relationships with community and other stakeholders to contribute to the management of environmental values.
- Facilitate environmental governance of our activities to deliver broad community benefit through the inclusion of environmental requirements in planning, programming, construction and maintenance practices.
- Communicate this policy and our environmental performance publicly.

John Erceg
Managing Director of Main Roads

Objectives

To ensure we achieve this policy our objectives are to:

- Deliver our services in full compliance with environmental legislation, regulation and policy, and with agreed environmental commitments as a minimum standard.
- Manage the environmental impacts of our activities through the hierarchy of 'avoid, minimise, rehabilitate and offset'.
- Contribute to a sustainable transport system through the delivery of products and services that minimise environmental impacts, conserve natural resources, minimise the creation and emission of wastes and achieves positive social and economic outcomes.
- Implement, maintain and continually improve an effective environmental management system compliant with ISO14001:2015 across Main Roads activities to enhance our environmental performance.

This policy forms part of the Integrated Management System (IMS) and is reviewed every two years or as required to ensure it complies and is relevant to legislative and business obligations.

ATTACHMENT 3

STAKEHOLDER ENGAGEMENT SUMMARY

STAKEHOLDER ENGAGEMENT

Westport has undertaken stakeholder engagement for the greater project, including the Westport Proposal and the Anketell Road Upgrade, since 2018. Westport developed a comprehensive information and engagement plan based on inputs from:

- Main Roads.
- The Westport Taskforce Reference group comprising community groups, peak bodies, government agencies, universities, and research institutions.
- Aboriginal groups and stakeholders.
- A Westport Governance Committee.
- Organisations not on the Reference group.
- The broader community.

Specific engagement for the Anketell Road Upgrade Proposal commenced in August 2021, following selection of the future terminal location in Kwinana. Engagement for the Proposal is ongoing.

Main Roads engagement to date has included discussions about the Proposal and associated field surveys and approvals.

Stakeholders

Stakeholders that have an interest in the planning and development phase of the Proposal are listed in the table below. The stakeholders include all three levels of government, regulators, landowners, residents, business owners and operators, environmental groups, special interest groups, communities, and road users.

Further stakeholders may be identified as the planning progresses from early concept design to detailed design and development.

Stakeholders

Stakeholder group	Stakeholder	Project influence
State Government	Main Roads	Leading project concept design development, as well as landowner engagement throughout environmental referral and future planning and development of road corridor.
	Department of Planning, Lands and Heritage (DPLH)	Program partner Managing land protection and acquisition process during planning
	Western Australian Planning Commission (WAPC)	Program partner Decision maker for land protection and acquisition during the planning process.
	Department of Biodiversity, Conservation and Attractions (DBCA)	Program partner involved in the environmental referral process and land management in the project area
	Department of Water and Environmental Regulation (DWER)	Manage the environmental referral process (State)
	Department of Transport, Public Transport Authority (PTA) and METRONET	Program partners
	Department of Primary Industries and Regional Development	Program partner
	Environmental Protection Authority	Provides advice regarding environmental impact assessments and approvals to the Minister for Environment
	Member for Kwinana	Premier of Western Australia, Roger Cook, MLA is the key sponsor for the project.
Traditional landowners	Westport's Noongar Advisory Group	Key stakeholder can influence Aboriginal heritage approvals
	South West Land and Sea Council (SWALSC)	Key stakeholder can influence Aboriginal heritage approvals
Federal Government	DCCEEW	Provide approvals under the EPBC Act
Local Government	City of Kwinana	LGA directly affected by the road corridor
	Shire of Serpentine-Jarrahdale (neighbour)	LGA - project neighbour
	City of Cockburn (neighbour)	LGA - project neighbour
	Westport LGA Reference group	Members include: – City of Armadale – City of Belmont – City of Canning – City of Cockburn – City of East Fremantle – City of Kalamunda – City of Kwinana – City of Melville – City of Rockingham – City of Swan – PEEL Alliance – Shire of Serpentine Jarrahdale – Southwest Group
Business	– Bunbury Dampier Gas Pipeline – Motorplex – Alcoa – Wider Kwinana Industrial Area, – Anketell and Wandi commercial centres – Services Authorities (Water Corp, ATCO, Western Power) – Freight and logistics industry – Land Developers	External stakeholder groups affected directly or indirectly by the Proposal's development and access changes.
Landowners	Directly impacted landowners/ residents	External stakeholder groups directly impacted by the Proposal's development and access changes.
Community/ interest/ environmental groups	– Wandi Progress Association – Medina Residents Group – Honeywood Residents' Group – Casuarina Wellard Progress Association – Conservation Groups – Mandogalup Volunteer Bush Fire Brigade	External stakeholder groups interested in the Proposal's development and access changes.

Stakeholder group	Stakeholder	Project influence
	– Beeliar Regional Park Community Advisory Committee – BirdLife Australia (member of Westport reference group) – Conservation Council WA – Friends of Kwinana Bushland – Friends of The Spectacles – Greening Australia ((member of Westport reference group) – Kwinana in Transition KiT Community Group – Kaarakin Black Cockatoo Conservation Centre – Naragebup - Rockingham Regional Environment Centre – Perth NRM (member of Westport reference group) – Sustainable Built Environment National Research Centre – The Beeliar Group – The Wetlands Centre, Cockburn – The Wilderness Society – Trillion Trees - Rockingham Kwinana – Urban Bushland Council (member of Westport reference group) – WA Wildlife – previously known as Native Ark – WA Naturalists' Club Kwinana Rockingham Mandurah Branch – Wetlands Research Association – Wetlands Conservation Society – Wildflower Society of WA – World Wildlife Fund – Wellard Village People – Medina Residents' Group – Homestead ridge progress association	
General community	Residents, businesses and road users not directly affected by the project but who are neighbours and may have indirect impacts like travel times and methods etc. People who have attended previous project engagement event/ participated in My Say Survey	External stakeholder groups affected by the Proposal's development and access changes.

Stakeholder engagement process

Westport has developed an engagement strategy to facilitate input from the community and stakeholders for the Westport Proposal and the Anketell Road Upgrade Proposal. A summary of community consultation undertaken to inform the Proposal's planning and development is provided in the table below.

Community Consultation Strategy Summary – Westport

Audience/Stakeholders	Engagement Medium	Timing
All community and stakeholders	Website updates	2021 onwards
Email subscribers	Monthly project newsletter updates	November 2021 onwards
Residents in the City of Kwinana and Shire of Serpentine-Jarrahdale (12,000 letters)	Letterbox drop – Westport Navigate newsletter with project information	March 2021
Shire of Serpentine-Jarrahdale and City of Cockburn, targeting people near Anketell Road	Community pop-up events at shopping centres and local markets	March 2022
All community and stakeholders	Community Survey on the Anketell-Thomas Road Freight Corridor, via My Say Transport.	July 2022
All community and stakeholders	Social media advertising via Department of Transport Facebook page	2022 onwards
Sample of 805 residents from Perth and Peel metropolitan area (including Kwinana and Fremantle)	Biannual community perceptions surveys to determine sentiment / understanding of Westport and preferences for engagement.	March 2022 July 2022 May 2023
Residents in Kwinana and Cockburn	Community pop-up events at local shopping centres to provide project information and answer questions.	September and October 2023
Residents in City of Cockburn, City of Kwinana, City of Rockingham, and Shire of Serpentine-Jarrahdale (110,000 letters)	Letterbox drop – letter and flyer outlining Westport preferred design.	December 2023
All community and stakeholders	Community survey seeking broad feedback on the Westport project, via My Say Transport	September 2023 – January 2024
Horse owners who visit the Naval Base horse beach	Community pop-up events at the Naval Base horse beach to provide project information and answer questions	December 2023
Recreational fishers who access Cockburn Sound	Community pop-up events at various fishing locations to provide project information and answer questions	January – March 2024
Community in Cockburn and surrounding areas	Westport marquee at Coogee Live community event	March 2023

Preliminary results from Westport's community survey that ran from September 2023 to January 2024 indicate the Proposal's impacts on the nearby residents are a key area of interest, however this may be more related to the Westport Proposal, rather than the proposal to upgrade Anketell Road. The final report from this survey is in development and will be finalized during 2024.

Communication and Stakeholder Engagement Methodology

Stakeholder and community engagement will be ongoing as shown in the figure below:

- Planning assessment following corridor selection, develop early concept design to confirm corridor alignment, land requirements and proposed access strategy and inform a business case for the Westport Program
- Planning and development – identify issues and constraints, develop a shared understanding of constraints, and develop solutions and scope and undertake more refined concept design work including environmental studies for noise, visual amenity etc.
- Procurement – secure a contractor and undertake detailed design
- Construction – inform the community about construction requirements and build understanding of the implications on them.

Stakeholder engagement in the road planning process

Proposal Design

As concept design information has become available, Main Roads has been engaging with directly affected landowners regarding direct land impacts and future steps including the proposed environmental approval program.

As the Proposal moves through the planning, design and environmental approval process, Main Roads, as the Proposal proponent, will conduct more detailed engagement and communications.

Targeted Stakeholder Engagement – November and December 2023 – Westport

Stakeholder engagement for the Westport Program increased following the Premier of Western Australia's announcement of the Westport's preferred design on 29 November 2023. This included a letter and flyer

sent to 110,000 residents and businesses near the project area in December 2023, to provide information on the preferred design for the port and freight network, including the Proposal (see Table 3-2 above).

Main Roads' Future engagement (2024 onward)

Main Roads as a program partner, contributes to Westport's governance via the Project's Steering Group and Control Group, a mechanism for integrated management of infrastructure development.

In the first quarter of 2024, Main Roads will lead a stakeholder briefing regarding the Proposal's potential environmental impacts and management strategies.

Main Roads will engage with directly impacted property owners regarding design and environmental approval process during 2024. Further engagement relating to design refinement is proposed when the planning transitions from the business case submission to more detailed planning and development, subject to any statutory requirements including requirements arising from environmental approvals.

It is also noted that the Western Australian EP Act provides targeted opportunities for stakeholders and the community to provide submissions during the environmental approval process.

A Proposal specific stakeholder engagement plan will be implemented during the planning and development phase of the project.