

26 October 2020

Native Vegetation Clearing Branch
Department of Water and Environmental Regulation
Locked Bag 10
JOONDALUP DC WA 6919

Dear Sir / Madam,

METRONET STAGE 1: YANCHEP RAIL EXTENSION PIPIDINNY ROAD WIDENING NATIVE VEGETATION CLEARING PERMIT APPLICATION

1. Background

The Yanchep Rail Extension (YRE) project forms part of METRONET, a State government program of projects to increase the size of Perth's railway network. The project aims to support the planning of integrated station precincts and the growth of the Perth metropolitan region. The YRE project is an extension to the Northern Suburbs Railway (also known as the Joondalup line) to support existing communities with improved transport connections and create new communities through integrated station precincts. The YRE project includes 14.5 km of railway beyond the existing Butler Station, new stations at Alkimos, Eglinton and Yanchep, and associated infrastructure. NEWest Alliance (NEWest) has been appointed by the Public Transport Authority (PTA) as the head contractor for the YRE project.

The scope of this Native Vegetation Clearing Permit (NVCP) application involves the clearing of vegetation at Pipidinny Road to facilitate:

- Temporary road/service diversions;
- Road widening to facilitate traffic turning into Eglinton station; and
- Relocation of existing overhead power poles and construction of temporary sewage pipes and future road bridge.

This application will support the operation of the YRE project, however it is separate to the proposal (i.e. YRE Part 1 – Butler to Eglinton section) assessed by the Environmental Protection Authority (EPA) and approved under Ministerial Statement 1100.

The PTA commissioned GHD to undertake an additional areas biological survey in July 2020 for YRE Part 1 (**Attachment 1**), which included a survey of the Pipidinny Road widening and service relocation footprint. NEWest commissioned Natural Area Consulting Management Services (NACMS) to undertake a vegetation survey in October 2020 to close a gap in the original survey data along the Pipidinny Road reserve (**Attachment 2**). Approximately 0.59 ha is expected to be disturbed (inclusive of previously cleared areas) and has been surveyed by appropriately qualified personnel. Although vegetation clearing as part of this scope of works has been minimised where possible, native vegetation, generally in a degraded condition, is required to be cleared.

This letter provides a summary of the relevant background information associated with the attached application (**Attachment 3 – C2 application form**) for an NVCP.

2. Native Vegetation

The proposed road widening, temporary diversion and service relocation at Pipidinny Road will require clearing of native vegetation. The area of native vegetation identified to be cleared under this scope of works is up to 0.398 ha within a total disturbance area of 0.593 ha (**Figure 1**).

A description of the native vegetation at the proposed clearing area at Pipidinny Road is provided below based on the biological surveys conducted for the disturbance area (GHD, 2020; NACMS, 2020). The digital survey information has been provided in accordance with the EPA's *Instructions for the preparation of data packages for the Index of Biodiversity Surveys for Assessments (IBSA)*.

The survey recorded the following four vegetation types (as well as previously cleared areas) within the proposed disturbance area at Pipidinny Road (**Figure 2**):

- *Acacia saligna* and *Xanthorrhoea preissii* tall shrubland (0.025 ha);
- *Banksia attenuata* and *B. menziesii* low woodland (0.046 ha);
- *Banksia sessilis* and *Spyridium globulosum* tall shrubland (0.286 ha); and
- Good (0.003 ha) and completely degraded (0.038 ha) scattered natives.

The vegetation condition within the proposed clearing area ranges from Completely Degraded to Excellent (**Figure 3**). The vegetation structure within the area rated as Excellent to Very Good condition has been slightly altered from disturbances such as adjacent clearing and weed invasion. Areas rated as Good to Completely Degraded have been historically cleared/partially cleared. No Declared Plants listed under the *Biosecurity and Agriculture Management Act 2007* (BAM Act) or Weeds of National Significance (WoNS) were identified in the proposed clearing area. A breakdown of the proposed disturbance area (as shown in **Figure 1**), purpose of clearing, vegetation type and condition are summarised in **Table 1**.

Table 1: Summary of Proposed Disturbance Area, Purpose of Clearing and Vegetation Type and Condition at Pipidinny Road

Disturbance Area		Purpose of Clearing	Vegetation Type			Vegetation Condition	PEC	
Area No.	Area (ha)		Type	Code	Area (ha)		Type	Area (ha)
1	0.291	Service relocation, road widening, temporary diversion	<i>Acacia saligna</i> and <i>Xanthorrhoea preissii</i> tall shrubland	VT01	0.025	Degraded	Northern Spearwood shrublands and woodlands (FCT 24)	0.125
			<i>Banksia attenuata</i> and <i>B. menziesii</i> low woodland	VT04	0.046	Degraded		
			<i>Banksia sessilis</i> and <i>Spyridium globulosum</i> tall shrubland	VT03	0.125	Good		
			Scattered native	VT13	0.003	Good		
			Cleared	N/A	0.093	N/A		
2	0.275	Service relocation, road widening, temporary diversion	<i>Banksia sessilis</i> and <i>Spyridium globulosum</i> tall shrubland	VT03	0.150	Degraded	Northern Spearwood shrublands and woodlands (FCT 24)	0.150
			Scattered native	VT13	0.038	Completed Degraded		
			Cleared	N/A	0.087	N/A		

Disturbance Area		Purpose of Clearing	Vegetation Type			Vegetation Condition	PEC	
Area No.	Area (ha)		Type	Code	Area (ha)		Type	Area (ha)
3	0.013	Temporary road/service diversion	<i>Banksia sessilis</i> and <i>Spyridium globulosum</i> tall shrubland	VT03	0.008	Degraded	Northern Spearwood shrublands and woodlands (FCT 24)	0.008
			Cleared	N/A	0.005			
4	0.014	Temporary road/service diversion	<i>Banksia sessilis</i> and <i>Spyridium globulosum</i> tall shrubland	VT03	0.003	Excellent	Northern Spearwood shrublands and woodlands (FCT 24)	0.003
			Cleared	N/A	0.010			
Total Disturbance Area (ha)	0.593		Total Native Vegetation Clearing Area (ha)	0.398			Total PEC Clearing Area (ha)	0.286

The proposed clearing area contains 0.286 ha of Northern Spearwood shrublands and woodlands (FCT 24) - Priority 3 Priority Ecological Community (PEC) (**Figure 4**). There are no vegetation communities that are representative of a Threatened Ecological Community (TEC) within the proposed clearing area.

3. Threatened Fauna and Fauna Habitats

A Black Cockatoo habitat assessment was undertaken concurrently with the vegetation and significant flora survey for the YRE Part 1 Additional Areas 2 (GHD, 2020), including the Pipidiny Road widening footprint.

The mixed *Banksia* woodlands, and *Banksia sessilis* shrublands within the proposed clearing area provide high value foraging habitat in the form of seeds, nectar and invertebrates. These two habitat types support high densities of a variety of proteaceae species that are well known to be primary or important foraging plant species. 0.332 ha has been mapped as high value habitat for Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) (currently listed as 'Endangered' under the EPBC Act) occurs within the proposed clearing area (**Table 2** and **Figure 5**). However, it is noted that the habitat is predominately mapped as degraded roadside vegetation. Additionally, no suitable breeding or roosting habitat has been identified within the proposed clearing area.

Table 2: Black Cockatoo Foraging Habitat Area

Disturbance Area No.	Proposed Disturbance Area (ha)	Proposed Native Vegetation Clearing Area (ha)	Black Cockatoo Foraging Habitat Area (ha)	High Value Black Cockatoo Foraging Habitat Area (ha)
1	0.291	0.199	0.196	0.170
2	0.275	0.188	0.150	0.150
3	0.013	0.008	0.008	0.008
4	0.014	0.003	0.003	0.003
Total Area (ha)	0.593	0.398	0.357	0.332

No other fauna species of conservation significance was recorded during the survey.

4. Environmental Management

As part of the initial planning for road widening, temporary road/service diversions and relocation of services at Pipidiny Road, a desktop review of potential locations was undertaken, and the location was selected to avoid the clearing of high quality native vegetation, minimise the amount of vegetation to be cleared and reduce the impact of clearing on environmental values (e.g. high value

Black Cockatoo habitat). The primary clearing method undertaken will be mechanical and the extent of clearing will be limited to that required for construction and final operation.

NEWest will also ensure the following management measures are implemented to minimise impacts to environmental values during the ground disturbance and clearing works:

- Survey personnel will flag/demarcate clearing areas prior to clearing works commencing.
- NEWest will issue internal ground disturbance permits prior to any clearing works.
- Pre-start meeting to be held with machinery operators to highlight the requirements to stay within approved clearing areas and minimise impacts to vegetation. All clearing and survey works will be supervised by environmental personnel.

4.1 Flora, Vegetation and Ecological Communities

To manage the potential impacts of clearing on flora, vegetation and ecological communities (e.g. PEC identified within the proposed clearing area), the following strategies have been developed:

To avoid native vegetation clearing:

- During the initial planning phase, high quality vegetation areas were avoided and alternatives sought.

To minimise native vegetation clearing:

- Existing cleared areas will be utilised for temporary construction areas, where practicable; and
- The PTA and NEWest have further reduced the native vegetation clearing footprint during the detailed design phase, where practicable, to minimise the overall clearing impacts associated with the scope of works under this NVCP application.

4.2 Fauna

To minimise the potential impacts to clearing on fauna and fauna habitat, the following management measures will be implemented during native vegetation clearing:

- Existing cleared areas will be used for laydown and temporary construction to avoid additional clearing;
- The clearing footprint has been minimised to a relatively small amount of native vegetation clearing (maximum 0.398 ha within total 0.593 ha disturbance footprint) required to implement the scope;
- NEWest will minimise the clearing of potential Black Cockatoo foraging habitat identified by the survey, where practicable; and
- An appropriately licenced and qualified fauna spotter will be present to relocate fauna.

4.3 Weeds and Diseases

There are no declared weed/WoNS species in the surveyed area, however weed management protocols will be implemented to control any weed species within the proposed clearing areas during construction.

The clearing area is underlain by the Spearwood dunes, and Tamala limestone. The soils are shallow calcareous loams with stony calcrete rises. Such soils have a relatively high pH, which is known to be hostile to *Phytophthora cinnamomi* (DPaW, 2015), and therefore the risk of disease associated with *P. cinnamomi* occurring on these soil types is considered very low. Although a low risk,

appropriate hygiene protocols will be implemented to ensure the risk of spreading dieback is carefully managed and minimised.

4.4 Rehabilitation and Offsets

Revegetation opportunities will be investigated for select areas, such as the temporary road/service diversions disturbance areas associated with the scope of works under this NVCP application. The revegetation opportunities will be confirmed in discussion with the City of Wanneroo and relevant asset owners, and will be in accordance with their specifications. NEWest will implement revegetation/landscaping activities where these opportunities are practical, tie into existing landscaping works and meet operational safety and maintenance requirements for YRE.

Given the above proposed mitigation measures are implemented, the proposed clearing (0.398 ha) is not expected to result in significant impacts to flora, vegetation, ecological communities, fauna and fauna habitats.

5. EPBC Referral

The proposed clearing activities covered by this NVCP application were not referred to the Commonwealth Department of Agriculture, Water and the Environment (DAWE) as the action was deemed not to have a significant impact on a matter protected under the EPBC Act.

This application will not be requested to be assessed under the bilateral agreement or an accredited assessment.

6. Native Vegetation Clearing Permit

As per the attached *Application for a clearing permit (purpose permit) Form C2 (Attachment 3)*, NEWest seeks permission to clear up to 0.398 ha of native vegetation located at Pipydinny Road (**Figure 1**). The assessment of the proposed clearing against the 10 Clearing Principles is provided in **Attachment 4**.

7. Certificates of Title and Landowners Authority

The YRE project proponent, the PTA, does not currently own the parcel of land covered by this NVCP application. As all proposed clearing will be within the road reserve, which is currently managed by the City of Wanneroo, no Certificate of Title applies to this application. The City of Wanneroo has provided written authorisation (**Attachment 5**) for NEWest to undertake the proposed clearing within the portions Pipidiny Road reserve covered by this application.

This *Application for a clearing permit (purpose permit) Form C2* is enclosed (**Attachment 3**) for your consideration. Should you require any further information in regards to the above, please contact [REDACTED] in the first instance.

Yours faithfully

[REDACTED SIGNATURE]

Encl:

Figures

Figure 1:	Proposed Disturbance Footprint
Figure 2:	Vegetation Types
Figure 3:	Vegetation Conditions
Figure 4:	Priority Ecological Community
Figure 5:	Black Cockatoo High Value Foraging Habitat

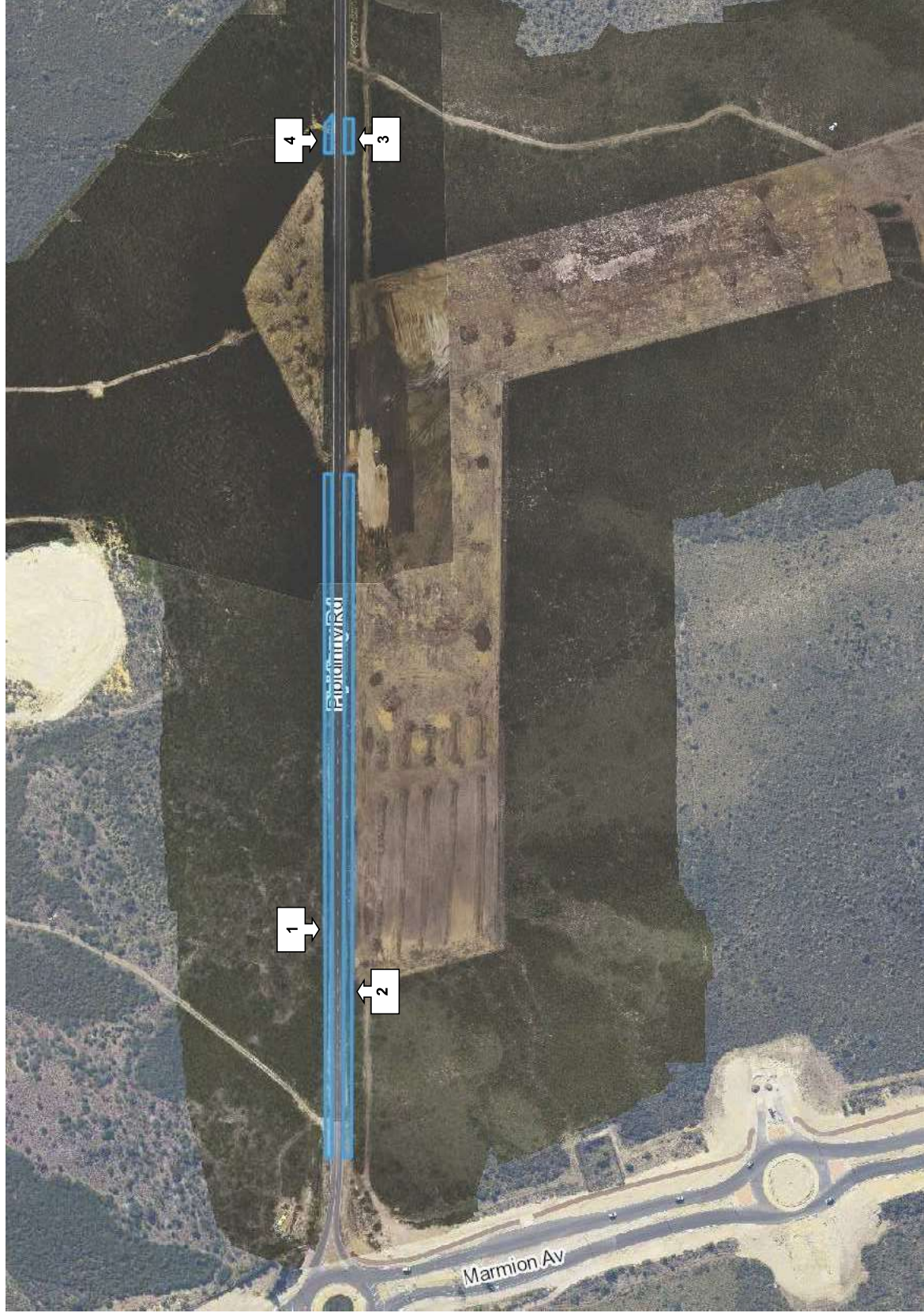
Attachments

Attachment 1:	Yanchep Rail Extension Part 1 Biological Assessment of Additional Area 2 (GHD, 2020)
Attachment 2:	Close Gap in Vegetation Survey Mapping Along Northern Pipidinny Road Verge (NACMS, 2020)
Attachment 3:	Clearing Permit Application (Form C2)
Attachment 4:	10 Clearing Principles Assessment – Pipidinny Road
Attachment 5:	City of Wanneroo Letter of Consent

References

GHD 2020. Public Transport Authority, Yanchep Rail Extension Part 1 Biological Assessment of Additional Areas 2, GHD, September 2020.

Natural Area Consulting Management Services (NACMS) 2020. Close Gap in Vegetation Survey Mapping Along Northern Pipidinny Road Verge, NACMS, October 2020.



Legend

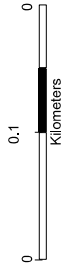


Disturbance footprint

A FOR INFORMATION

Name	Description	Date	Approved
IFI	Issued for Information	22/9/20	RB

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Metronet

Yanchep Rail Extension
Figure 1 – Proposed
Disturbance Footprint Adjacent
Pipidinnny Rd

Legend

Vegetation Types by Code

- Cleared
- VT03
- VT04
- VT05
- VT02
- VT13
- VT01
- VT08
- Disturbance footprint



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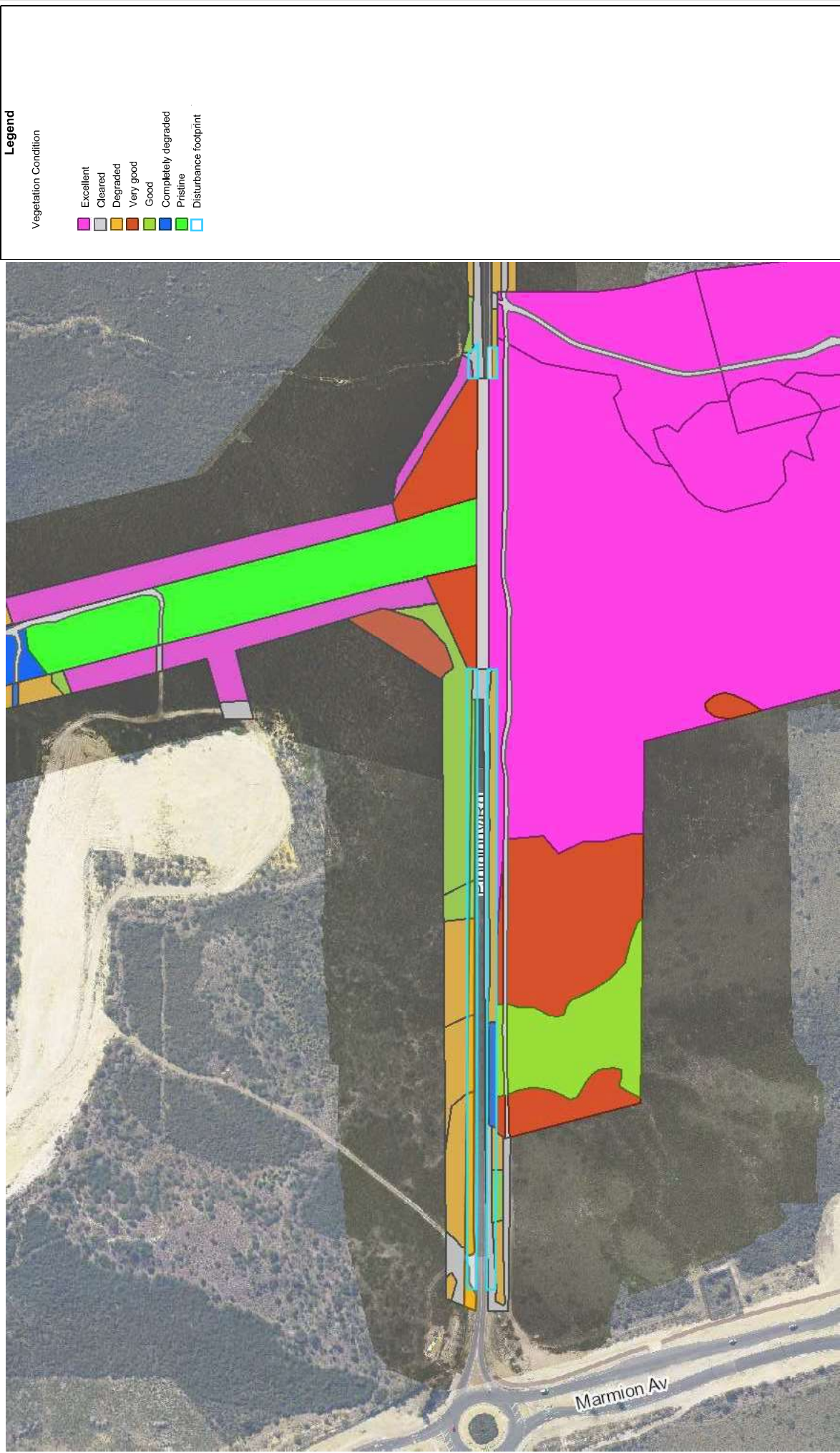
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A3	RB	Designed	9-Oct-2020
Coordinate System	PCG2020		
Height Datum	AHD		

Metronet
Yanchep Rail Extension
Figure 2 - Proposed Disturbance by
Vegetation Type Adjacent Pipidimny
Rd





Legend

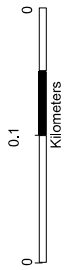
Vegetation Condition

- Excellent
- Cleared
- Degraded
- Very good
- Good
- Completely degraded
- Pristine
- Disturbance footprint

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Metronet

Yanchep Rail Extension
Figure 3 - Proposed Disturbance by Vegetation Condition Adjacent Pipidiny Rd

Legend

- Priority Ecological Community
- Disturbance footprint



Metronet

Yancheep Rail Extension
 Figure 4 - Proposed Disturbance by Priority Ecological Community Adjacent Pipiliny Rd

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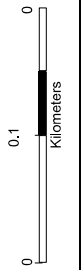


- Legend**
- High value Black Cockatoo habitat
 - Disturbance footprint

A FOR INFORMATION

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AHD		



Metronet

Yancheep Rail Extension
Figure 5 - Proposed Disturbance by Black Cockatoo High Value Habitat Adjacent Pipiliny Rd



Public Transport Authority
Yanchep Rail Extension Part 1
Biological Assessment of Additional Areas 2

September 2020

Executive summary

METRONET is the State government's program of projects to increase the size of Perth's railway network, whilst also supporting the planning of integrated station precincts, to support growth of the Perth metropolitan region. The Yanchep Rail Extension (YRE) is an extension to the Northern Suburbs Railway (also known as the Joondalup line) to support existing communities with improved transport connections and create new communities through integrated station precincts.

The YRE was split into two parts during the environmental approvals assessment, Part 1: Butler Station to Eglinton Station and Part 2: Eglinton Station to Yanchep Station.

The Public Transport Authority (PTA) commissioned GHD Pty Ltd (GHD) to undertake an ecological survey of additional areas for the YRE Part 1 project. The purpose of the survey was to delineate key flora, vegetation and fauna values within the additional areas (herein referred to as the 'survey area'). This report summarises the ecological survey results.

This report is subject to, and must be read in conjunction with, the limitations and assumptions contained throughout the report.

Survey results

Vegetation

Five vegetation types as well as cleared and planted (locally non-native) vegetation (VT12) were identified in the survey area. Four of the vegetation types comprised remnant native vegetation and one vegetation type (VT13) comprised a mix of degraded native remnant and native regrowth (>10 years).

The vegetation within the survey area was rated from Excellent to Completely Degraded condition. The vegetation structure within areas rated as Excellent to Very Good condition has been slightly altered from disturbances such as grazing, adjacent clearing and weed invasion. Areas rated as Good to Completely Degraded have been historically cleared/partially cleared, impacted by grazing or edge effects. The vegetation structure has been severely altered with an understorey dominated by introduced species (grasses and herbs).

By assessing the vegetation types described at a broad level, based on dominant species, landform features and field observations three conservation significant ecological communities were identified within the survey area:

- *Banksia* Woodlands of the SCP Endangered TEC (0.048 ha)
- Northern Spearwood shrublands and woodlands (FCT 24) Priority 3 PEC (2.66 ha)
- *Banksia* dominated woodlands of the SCP IBRA region Priority 3 PEC (0.048 ha)

Flora

No Threatened flora listed under the EPBC Act and/or BC Act or Priority flora listed by the DBCA were recorded in the survey area.

Black Cockatoo Habitat

Large flocks of the Carnaby's Cockatoo (*Calyptorhynchus latirostris*) were recorded foraging within and flying over the survey area during the field assessment.

All vegetation types recorded within the survey area, except Planted (VT12), contained species known to support foraging (noting in some vegetation types these are scattered, isolated

species). The mixed *Banksia* woodlands, and *Banksia sessilis* shrublands identified within the survey area provide high value foraging habitat in the form of seeds, nectar and invertebrates. These two habitat types support high densities of a variety of proteaceous species that are well known to be primary or important foraging plant species.

There is 3.15 ha of high value foraging habitat for Carnaby's Cockatoo within the survey area, consisting of the following:

- *Banksia sessilis* over low mixed shrubland – 2.66 ha
- Mixed *Banksia* woodland – 0.49 ha

No potential breeding habitat is present (suitable Eucalypt species with a DBH >500 mm) within the survey area. Additionally, no suitable roosting habitat is present.

Other significant fauna

No other fauna species of conservation significance was recorded during the survey. Six conservation significant fauna are considered likely to or possible to occur in the survey area, based on the habitat types available and bushland linkages present across the area:

- Quenda (Priority 4)
- Western Brush Wallaby (Priority 4)
- Jewelled South West Ctenotus (Priority 3)
- Black Striped Snake (Priority 3).
- Graceful Sun moth (Priority 4)
- The Peregrine Falcon (Other specially protected fauna).

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Appendices

Appendix A – Figures

Appendix B – Relevant legislation and conservation codes

Appendix C – Flora data

1. Introduction

1.1 Background

METRONET is the State government's program of projects to increase the size of Perth's railway network, whilst also supporting the planning of integrated station precincts, to support growth of the Perth metropolitan region. The Yanchep Rail Extension (YRE) is an extension to the Northern Suburbs Railway (also known as the Joondalup line) to support existing communities with improved transport connections and create new communities through integrated station precincts.

The YRE was split into two parts during the environmental approvals assessment, Part 1: Butler Station to Eglinton Station and Part 2: Eglinton Station to Yanchep Station. Part 1 of the project includes approximately 7.3 km of track (from Clarkson to just north of the proposed Eglinton Station) and includes two new intermodal (rail, bus, 'park and ride', 'kiss and ride', walk and cycle) transit stations at Alkimos and Eglinton.

The Public Transport Authority (PTA) has commissioned a number of biological surveys for the YRE project, including reconnaissance and detailed flora and vegetation surveys, fauna surveys, black cockatoo habitat assessment and targeted flora surveys (GHD 2018, 2019, 2020). During the design process, additional areas have been identified as requiring assessment. Consequently, further ecological surveys of these additional areas are required to support environmental approvals.

1.2 Purpose of this report

GHD Pty Ltd (GHD) was engaged by the PTA to undertake an ecological survey of additional areas for the YRE Part 1 project. The purpose of the survey was to delineate key flora, vegetation and fauna values within the additional areas. This report summarises the ecological survey results. The results will be used to identify and assess the ecological impacts of the projects and inform the environmental assessment approvals process.

1.3 Project location

The additional areas are located adjacent to the YRE Part 1 Development Envelope (DE), which extends from north of Butler Station to just north of Pipidinny Road, south of Yanchep. The additional areas (collectively referred to as the survey area) cover 4.94 hectares (ha). The survey area is mapped in Figure 1, Appendix A.

1.4 Scope of works

The scope of works included:

- An ecological survey of the survey area to identify and map:
 - Vegetation community types present, including presence of any Threatened or Priority Ecological Communities (TECs and PECs).
 - Vegetation condition, including the locations of any Weeds of National Significance (WoNS) or Declared Weeds
 - Vegetation growing in association with wetlands or watercourses
 - Significant flora
 - Black cockatoo potential (or confirmed) trees and foraging habitat
 - Significant fauna

- Preparation of an ecological survey report (this document) that includes the results and findings of the survey, including a justification of the survey methodology, and supporting maps and figures
- Provision of spatial data in GIS format.

1.5 Relevant legislation, conservation codes and background

In Western Australia (WA) significant communities, and flora and fauna are protected under both Federal and State Government legislation. In addition, regulatory bodies also provide a range of guidance and information on expected standards and protocols for environmental surveys.

An overview of key legislation and guidelines, conservation codes and background information relevant to this project and provided in Appendix B.

1.6 Limitations and assumptions

This report has been prepared by GHD for PTA and may only be used and relied on by PTA for the purpose agreed between GHD and the PTA as set out in section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than PTA arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible. The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by PTA and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Site conditions may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

This report has assessed the values within the survey area, as shown in Figure 1, Appendix A. Should the survey area change or be refined, further assessment may be required.

2. Methodology

2.1 Desktop review

Prior to the commencement of the field survey, a desktop assessment was undertaken to identify relevant ecological information pertaining to the survey area and to assist in survey design. The desktop assessment involved a review of previous reports and memorandums relevant to the project, including:

- Yanchep Rail Extension Part 1, Biological Assessment of Additional Areas (GHD 2020)
- Yanchep Rail Extension, Targeted FCT 26a Survey (GHD 2019)
- Yanchep Rail Extension Biological Assessment (GHD 2018).

2.2 Field survey

2.2.1 Vegetation and significant flora

GHD ecologists Erin Lynch (flora licence no. FB6200081-2) and Sarah Flemington (flora licence no. FB62000202) completed a vegetation and flora assessment, a targeted flora survey of the survey area on 14 and 15 July 2020. The field survey was undertaken to identify and describe the dominant vegetation units, assess vegetation condition, and search for significant flora taxa.

The survey methodology employed by GHD was undertaken with reference to the Environmental Protection Authority (EPA) Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016).

Data collection

Field survey methods involved a combination of sampling quadrats and relevés located in identified vegetation units and traversing the survey area by foot. Four non-permanent quadrats (measuring 10 m x 10 m – area of 100 m²) and one relevé were located within identified vegetation units and throughout the survey area to cover geographic range. The quadrat and relevé data was supplemented by previous survey effort in adjacent areas (as part of the YRE project) to achieve three quadrats per vegetation unit. Field data at each quadrat was recorded on a proforma data sheet and included the parameters detailed in Table 1.

Table 1 Quadrat data collection

Aspect	Measurement
Collection attributes	Site code, personnel/recorder, quadrat dimensions and photograph of the quadrat
Physical features	Landform, slope, aspect, soil attributes, ground surface cover, leaf and wood litter
Location	Coordinate recorded in GDA94 using a hand-held Global Positioning System (GPS) tool to an accuracy approximately ± 5 m.
Vegetation condition	Vegetation condition using the condition rating scale adapted by EPA (2016) for the South West Botanical Province.
Disturbance	Level and nature of disturbance (e.g. weed presence, fire and time since last fire, impacts from grazing, anthropogenic impacts)
Flora	List of dominant flora from each structural layer, list of all species within the quadrat including stratum, average height and cover (using National Vegetation Information System (NVIS)).

Vegetation units and mapping

Vegetation units were identified and boundaries mapped using a combination of aerial photography, field data/ observations and previous vegetation mapping. The vegetation units were aligned to previously described vegetation units (e.g. GHD 2018, 2020) where possible. The vegetation units were described based on structure, dominant taxa and cover characteristics as defined by quadrat data and field observations. Vegetation unit descriptions followed NVIS and were consistent with NVIS level V (Association) (NVIS Technical Working Group 2017).

Identification of vegetation growing in association with wetlands or watercourses

Vegetation growing in association with wetlands or watercourses was identified based on field observations (e.g. vegetation structure, typical and common species, soils and landforms).

Vegetation condition

The vegetation condition was assessed and mapped in accordance with the vegetation condition rating scale for the South West and Interzone Botanical Provinces of WA (devised by Keighery (1994) and adapted by EPA (2016)). The scale recognises the intactness of vegetation and consists of six rating levels. The vegetation condition rating scale is outlined in Appendix B.

Targeted flora searches

Significant flora identified as part of database searches completed for GHD (2020) were targeted during the field survey. Within the survey area, potential habitats and locations of previous records were searched by opportunistic sampling. Where individuals were identified, the location and number of plants present was recorded using a handheld GPS. Additional data was also recorded to support the lodgement of a Threatened and Priority Flora Report Form.

Flora identification and nomenclature

Species well known to the survey botanist were identified in the field; all other species were collected and assigned a unique collection number to facilitate tracking. All specimens collected during the field assessment were dried and processed in accordance with the requirements of the WA Herbarium. Species were identified by the use of taxonomic literature, electronic keys and online electronic databases.

The conservation status of recorded flora was compared against the current lists available on FloraBase (WA Herbarium 1998–) and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Threatened species database provided by the Department of Agriculture, Water and the Environment (DAWE). Nomenclature used in this report follows that used by the WA Herbarium as reported on FloraBase.

2.2.2 Black cockatoo and significant fauna

A black cockatoo habitat assessment of the survey area was undertaken concurrently with the vegetation and significant flora survey. The survey area was traversed on foot to identify and map suitable black cockatoo habitat. An assessment of the likelihood of occurrence of significant fauna was also undertaken based on database searches results (completed for GHD (2020)) and previous local studies in consideration of fauna habitats occurring within the survey area.

The survey methodology employed by GHD was undertaken with reference to the EPA Technical Guidance – Terrestrial Fauna Surveys (EPA 2020)

Black cockatoo habitat assessment

The black cockatoo habitat assessment was undertaken in accordance with the EPBC Act referral guidelines for three threatened black cockatoo species: Carnaby's Cockatoo (endangered) *Calyptorhynchus latirostris*, Baudin's Cockatoo (vulnerable) *Calyptorhynchus baudinii*, Forest Red Tailed Black Cockatoo (vulnerable) *Calyptorhynchus banksii naso* (Department of Sustainability, Environment, Water, Populations and Communities (DSEWPaC) 2012). The assessment included:

- The identification and recording (via GPS) of the locations of potential and actual breeding habitat within the survey area (relevant tree species with a diameter at breast height (DBH) of >500 millimetres (mm) for Jarrah, Marri and Tuart or DBH of >300 mm for Wandoo or Salmon Gum)
- Identifying, describing and recording the size of existing tree hollows and any evidence of use by black cockatoos within the survey area
- Identifying, recording and describing the locations of potential night roosting habitat
- Identifying, recording and describing the locations of potential foraging habitat.

The survey distinguished between actual and potential breeding habitat as per the following:

- Actual nest trees: Evidenced as currently being used or have been used in the past
- Potential breeding habitat: trees with available hollows that do not show evidence of use now or in the past. Trees with hollows that do not show evidence of use now or in the past where the hollow is not available (e.g. hollows are occupied by bees or galahs); and those trees without hollows but which have the potential to develop hollows in the future, and which have DBH >500 mm or 300 mm for different species. This was a ground based assessment using binoculars to identify potential and/or actual breeding hollows.

Fauna species identification

Identification of fauna species was made in the field using available field guides and electronic guides. Nomenclature used in this report follows that used by the WA Museum and the DBCA NatureMap (DBCA 2007–) with the exception of birds, where by Christidis and Boles (2008) was used.

2.3 Limitations

2.3.1 Field survey limitations

The EPA (2016, 2020) Technical Guide states flora and vegetation and fauna survey reports for environmental impact assessment in WA should contain a section describing the limitations of the survey methods used. The limitations and constraints associated with this field survey are discussed in Table 2. Based on this assessment, the present survey effort has not been subject to any constraints which affect the thoroughness of the assessment and the conclusions which have been formed.

Table 2 Field survey limitations

Aspect	Constraint	Comment
Sources of information and availability of contextual information.	Nil	Adequate information is available for the survey area, which included <i>Yanchep Rail Extension, Biological Assessment</i> (GHD 2018), <i>Yanchep Rail Extension, Targeted FCT 26a Survey</i> (GHD 2019) and <i>Yanchep Rail Extension Part 1, Biological Assessment of Additional Areas</i> (GHD 2020).
Scope (what life forms were sampled etc.)	Nil	Vascular flora and terrestrial vertebrate fauna were sampled during the survey. Non-vascular flora, invertebrate and aquatic fauna were not surveyed.
Proportion of flora collected and identified (based on sampling, timing and intensity)	Minor	The vegetation and targeted flora searches were undertaken in winter 2020. The flora recorded from the field survey are limited to dominant flora only identified as part of describing vegetation types. As with any biological survey, ephemeral species such as orchids are not always present in each year/season or at the particular time a single botanical survey is conducted.
Proportion of fauna identified, recorded and/or collected		The black cockatoo habitat assessment was undertaken in winter 2020. The assessment was limited to identifying habitat types for black cockatoos and other significant fauna utilising the survey area. No sampling for invertebrates or aquatic species occurred.
Flora determination	Minor	Flora determination was undertaken by the GHD botanist in the field. The flora recorded from the field survey are limited to dominant flora only identified as part of describing vegetation types. A number of dominant grasses, annuals and herbs were unable to be identified due to the timing of the survey and lack of plant and flowering material. The taxonomy and conservation status of the WA flora is dynamic. This report was prepared with reliance on taxonomy and conservation status current at the time report development, but it should be noted this may change in response to ongoing research and review of International Union for Conservation Nature criteria.
Completeness and further work which might be needed (e.g. was the relevant area fully surveyed)	Minor	All areas were adequately surveyed during the field survey in line with the scope except one small triangular shaped area south of Bainbridge Avenue. The area was completely fenced off with no access however the area was able to be assessed from a distance.
Mapping reliability	Minor	The vegetation was mapped using high-resolution ESRI aerial imagery obtained from Landgate, topographical features, previous broad scale mapping (GHD 2018, 2019, 2020) and field data. Data was recorded in the field using hand-held GPS tools (e.g. Samsung S2 Tablets and Garmin GPS). Certain atmospheric factors and other sources can affect the accuracy of GPS receivers. The Garmin GPS units used for this survey are accurate to within ± 5 metres on average. Therefore the data points consisting of coordinates recorded from the GPS may contain inaccuracies.
Timing/weather/season/cycle	Minor	The vegetation field survey and black cockatoo habitat assessment were conducted during winter (14-15 July 2020). This timing is outside of the recommended survey timing for vegetation surveys on the Swan Coastal Plain (optimal timing spring – September to November; EPA 2016).

Aspect	Constraint	Comment
		<p>In the three months prior to the ecological survey (April - June), the Gingin weather recording station (Site No. 9018) recorded a total of 197.8 mm of rainfall. This total is lower than the average for this period, which is 271.6 mm (BoM 2020).</p> <p>The weather conditions recorded during the survey period are considered unlikely to have impacted upon the vegetation and black cockatoo habitat assessment survey. The survey timing was not considered optimal for the vegetation field survey. However, the survey was focused on identifying and mapping vegetation types and condition and did not involve compiling a detailed inventory of flora species for the survey area.</p>
Disturbances (e.g. fire, flood, accidental human intervention)	Nil	Parts of the survey area has been subjected to historical disturbances (e.g. anthropogenic); however, these disturbances did not impact the survey.
Intensity (in retrospect, was the intensity adequate)	Minor	The vegetation of the survey area was sampled with reference to EPA (2016). The quadrat and relevé data was supplemented by previous survey effort in adjacent areas (as part of the YRE project) to achieve three quadrats per vegetation unit. However, due to the linear nature of the survey areas, and where vegetation units were restricted, less than three quadrats per vegetation unit were described. The survey area was sufficiently covered by the GHD ecologists during the survey.
Resources	Nil	Adequate resources were employed during the field survey: 4 person days were spent undertaking the surveys using two ecologists.
Access restrictions	Minor	The survey area was accessed on foot and traversed by vehicle. One small triangular shaped area south of Bainbridge Avenue was unable to be accessed as the area was completely fenced off due to current construction works in the area.
Experience levels	Nil	The ecologists who executed the survey are practitioners suitably qualified and experienced in their respective fields. Erin Lynch (Senior ecologist) has over 12 years' experience undertaking flora and fauna surveys within WA. Sarah Flemington (Ecologist) has over 4 years' experience undertaking flora and fauna surveys within WA.

3. Field survey results

3.1 Vegetation types

Five vegetation types as well as cleared and planted (locally non-native) vegetation (VT12) were identified and described for the survey area (Table 3 and Figure 2, Appendix A). Four of the vegetation types comprised remnant native vegetation and one vegetation type (VT13) comprised a mix of degraded native remnant and native regrowth (>10 years). The vegetation types primarily aligned with those previously described in GHD (2018, 2019, 2020).

The vegetation types were distributed in a broad mosaic pattern within the survey area as the soil landscapes and dune landforms changed. Three vegetation types (VT02, VT03 and VT04) described *Banksia* shrublands/woodland, which comprised approximately 64% of the survey area. *Acacia* tall shrublands (VT01) occurred in small patches along sloped of dunes and scattered natives (VT13) occurred in previously disturbed areas.

Areas identified as cleared are devoid of native vegetation. These areas primarily occur within infrastructure corridors, vehicle tracks and housing development.

Within the northern section of the survey area (north of Pipindinny Road), the vegetation types formed mosaics across the landscape and transitioned from one to another with boundaries blurred. The area shows evidence of previous disturbances and clearing which has impacted on the vegetation structure in the area.

No vegetation growing in association with wetlands or watercourses was identified during the field survey.

3.2 Vegetation condition

The vegetation within the survey area was rated from Excellent to Completely Degraded condition. The extents of the vegetation condition ratings mapped within the survey area are detailed in Table 4 and mapped in Figure 3, Appendix A.

Cleared areas associated with roads, tracks etc. comprised approximately 0.70 ha (14% of the survey area). Vegetation comprising of *Banksia sessilis* shrublands were generally in Good to Excellent condition. The thick vegetation associated with these areas inhibits weed growth and vehicle and grazing animal access. Areas which have been rated as Good to Degraded or worse have been historically cleared or impacted by grazing or soil/geotechnical investigations and were dominated by a ground cover of introduced species (grasses, herbs and low shrubs).



The southern most survey area, along Charlbury Drive, has been completely cleared with a section between the verge and the PTA boundary fenceline planted with a mix of locally non-native species.

No Declared Plants listed under the *Biosecurity and Agriculture Management Act 2007* (BAM Act) or WoNS were identified in the survey area.

Table 3 Vegetation types recorded in the survey area

Vegetation type	Vegetation type description	Landform and Substrate	Extent (ha)	Notes and sample locations	Representative photograph
<i>Acacia saligna</i> and <i>Xanthorrhoea preissii</i> tall shrubland (VT01)	<i>Acacia saligna</i> , <i>Xanthorrhoea preissii</i> tall shrubland over mixed introduced sparse herbland/grassland.	Slopes of dunes with brown sandy soils	0.10 ha	Releve 4	
<i>Banksia sessilis</i> and <i>Melaleuca systena</i> mid-shrubland (VT02)	<i>Banksia sessilis</i> , <i>Melaleuca systena</i> , <i>Calothamnus quadrifidus</i> , <i>Hakea lissocarpa</i> mid-shrubland over <i>Hibbertia hypericoides</i> low open shrubland over mixed sparse herbland.	Slopes of dunes with yellow sandy soils	0.07 ha	Quadrat 1 Likely to represent Northern Spearwood shrublands and woodlands (FCT 24) (PEC)	

Vegetation type	Vegetation type description	Landform and Substrate	Extent (ha)	Notes and sample locations	Representative photograph
<i>Banksia sessilis</i> and <i>Spyridium globulosum</i> tall shrubland (VT03)	<i>Banksia sessilis</i> , <i>Spyridium globulosum</i> tall shrubland over <i>Calothamnus quadrifidus</i> , <i>Melaleuca systena</i> low shrubland over open sedgeland <i>Mesomelaena pseudostygia</i> , <i>Desmocladius flexuosus</i> .	Dune swales with brown sandy soils	2.59 ha	Quadrats 3 and 7. Likely to represent Northern Spearwood shrublands and woodlands (FCT 24) (PEC)	
<i>Banksia attenuata</i> , <i>B. menziesii</i> low woodland (VT04)	<i>Banksia attenuata</i> , <i>B. menziesii</i> low woodland over shrubland <i>Calothamnus quadrifidus</i> , <i>Hakea trifurcata</i> , <i>Hibbertia hypericoides</i> , <i>Xanthorrhoea preissii</i> over sparse sedgeland <i>Mesomelaena pseudostygia</i> , <i>Desmocladius flexuosus</i> .	Undulating plain with brown-yellow sandy soils	0.49 ha	Quadrats 2 Represents <i>Banksia</i> woodlands (TEC) / <i>Banksia</i> dominated woodlands (PEC)	

Vegetation type	Vegetation type description	Landform and Substrate	Extent (ha)	Notes and sample locations	Representative photograph
Scattered Natives (VT13)	Areas with isolated native shrubs, normally <i>Acacia</i> spp., over mixed introduced grasses and herbs.	Undulating plain and dune slopes with sandy soils	0.93 ha	-	
Planted (VT12)	Planted locally non-native trees and shrubs.		0.07 ha	-	


Vegetation type	Vegetation type description	Landform and Substrate	Extent (ha)	Notes and sample locations	Representative photograph
Cleared	Cleared areas, tracks etc.		0.70 ha	-	

Table 4 Extent of vegetation condition ratings mapped within the survey area

Condition rating	Extent (ha)
Excellent	1.19
Very Good	0.16
Good	0.92
Degraded	1.68
Completely Degraded	0.29
Cleared	0.70
Total	4.94

3.3 Conservation significant ecological communities

By assessing the vegetation types described at a broad level, based on dominant species, landform features and field observations three conservation significant ecological communities were identified to occur within the survey area. These conservation significant ecological communities are:

- *Banksia* Woodlands of the SCP Endangered TEC
- Northern Spearwood shrublands and woodlands (FCT 24) Priority 3 PEC
- *Banksia* dominated woodlands of the SCP IBRA region Priority 3 PEC.

The spatial distributions of these conservation significant ecological communities are presented in Figure 4, Appendix A.

Banksia Woodlands of the SCP TEC

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 (Department of the Environment and Energy (DEE) 2016). The ecological 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).

During the field survey one vegetation type, VT04 was assessed as meeting the key diagnostic characteristics for the *Banksia* Woodlands of the SCP TEC, as outlined in DEE (2016).

Specifically:

- The survey area occurs in the SCP IBRA bioregion
- The survey area occurs on sandplain landform, notably Bassendean sands
- The vegetation type has a low woodland structure and the upper sclerophyllous layer dominated or co-dominated by *Banksia attenuata* and/or *B. menziesii*. The understorey consists of a mid-ground sclerophyllous shrub layer and/or a herbaceous ground layer of cord rushes, sedges and perennial and ephemeral forbs that sometimes includes grasses.

Further assessment of this vegetation type identified one patch within the survey area that meets the minimum condition criteria outlined in DEE (2016). The patch within the survey area forms part of a larger patch that was previously described by GHD (2018, 2020). Details of the mapped TEC patch (by vegetation type, condition and extent) is detailed in Table 5 and mapped in Figure 4, Appendix A. Patch numbering follows that previously reported in GHD (2018, 2020) and other environmental approval documents. There is 0.048 ha of vegetation in the survey area representative of the *Banksia* Woodlands of the SCP TEC.

Table 5 Extent of *Banksia* Woodlands of the SCP TEC within the survey area

Patch ID	Vegetation Type	Vegetation Condition and Extent	Comments
Patch 12	VT04	0.048 ha in Excellent condition.	This patch is part of area of vegetation located north of the Alkimos PRR. The patch extends east and west of the survey area and is likely to be in Excellent to Very Good condition (based on aerial imagery). It is estimated the patch covers approximately 8-10 ha. Approximately 1.14 ha of this patch was reported as occurring within the YRE Part 1 additional areas (GHD 2020).

Northern Spearwood shrublands and woodlands PEC

The Northern Spearwood shrublands and woodlands (FCT24) PEC occurs as heaths or heaths with scattered *Eucalyptus gomphocephala* occurring on deeper soils north from Woodman Point. *Banksias* found in this community include *Banksia attenuata* and *B. menziesii*. The heathlands in this group typically include *Banksia sessilis*, *Calothamnus quadrifidus* and *Schoenus grandiflorus*, with other common species including *Hardenbergia comptoniana*, *Melaleuca systema* and *Xanthorrhoea preissii*.

The key characteristics of Northern Spearwood shrublands and woodlands PEC met by VT03 were:

- Occurs on the western SCP on the Cottesloe units of the Spearwood system
- Vegetation structure of mid to tall shrubland
- Typical and common species including *Banksia menziesii*, *B. sessilis*, *Melaleuca systema*, *Calothamnus quadrifidus*, *Xanthorrhoea preissii*, *Lepidosperma squamatum*, *Hardenbergia comptoniana*, *Phyllanthus calycinus*, *Conostylis aculeata*, *Dianella revoluta*, *Lomandra maritima*, *Schoenus grandiflorus*, *Desmocladius flexuosa* and *Austrostipa flavescens*.

There is 2.66 ha of the Northern Spearwood shrublands and woodlands PEC within the survey area, represented by GHD vegetation type VT02 and VT03.

***Banksia* dominated woodlands of the SCP IBRA region PEC**

Banksia dominated woodlands of the SCP IBRA region is a Priority 3 PEC listed by DBCA. DBCA (2019) describes the *Banksia* PEC as having a canopy that is most commonly dominated or co-dominated by *Banksia attenuata* and/or *B. menziesii*. Other *Banksia* species that can dominate in the community are *B. prionotes* or *B. ilicifolia*. This PEC is analogous with the TEC condition and patch size thresholds.

Vegetation type VT04 is representative of the *Banksia* dominated woodlands of the SCP IBRA region PEC. There is 0.048 ha of the *Banksia* dominated woodlands of the SCP IBRA region PEC present within the survey area, in Excellent condition.

3.4 Conservation significant flora

No Threatened flora listed under the EPBC Act and/or BC Act or Priority flora listed by the DBCA were recorded in the survey area.

Likelihood of occurrence

A likelihood of occurrence assessment was conducted post-field surveys for all conservation significant flora taxa identified in the desktop and field assessments undertaken by GHD (2018) and GHD (2020). This assessment took into account previous and closest records, habitat requirements, efficacy of the survey, intensity of the survey, flowering times and the cryptic nature of species. The likelihood of occurrence assessment presented in GHD (2020) are also applicable to this survey and survey area. This assessment post-field survey concluded that nine taxa may possibly occur in the survey area and the remaining nine taxa are considered unlikely to occur within the survey area. For the nine taxa considered possible, there is suitable habitat present within the survey area.

3.5 Black cockatoo habitat

Large flocks of the Carnaby's Cockatoo (*Calyptorhynchus latirostris*) were recorded foraging within and flying over the survey area during the field assessment.

3.5.1 Carnaby's Cockatoo

Foraging habitat

The survey area is located within the modelled feeding and breeding distribution for Carnaby's Cockatoo (DSEWPaC 2012) and the current estimated distribution (EPA 2019). There are numerous records of this species occurring within and around the survey area. Foraging and roosting behaviour of this species is well known and documented extensively across the northern Swan Coastal Plain.

The mixed *Banksia* woodlands, and *Banksia sessilis* shrublands provide high value foraging habitat in the form of seeds, nectar and invertebrates. These two habitat types support high densities of a variety of proteaceous species that are well known to be primary or important foraging plant species.

Table 6 and Table 7 provide a summary of the quantity and value of habitat types for black cockatoos within the survey area. Foraging habitat value is calculated based on the Revised Draft Referral Guidelines (Commonwealth of Australia 2017).

All vegetation types recorded within the survey area, except Planted (VT12), contained species known to support foraging (noting in some vegetation types these are scattered, isolated species). Those habitat types considered to have a low foraging value have been excluded from foraging calculations. Foraging habitat and recorded observations are shown in Figure 5, Appendix A and Plates 1 and 2.

Breeding and roosting habitat

No suitable breeding or roosting habitat is present within the survey area.

Table 6 Extent of Black Cockatoo habitat within the survey area

Habitat type	Details
Foraging habitat	There is 3.15 ha of high value foraging habitat for Carnaby's Cockatoo within the survey area, consisting of the following: <ul style="list-style-type: none">• <i>Banksia sessilis</i> over low mixed shrubland – 2.66 ha• Mixed <i>Banksia</i> woodland – 0.49 ha
Actual breeding habitat	No breeding events of any species of black cockatoo was recorded within the survey area.
Potential breeding habitat	No potential breeding habitat present (suitable Eucalypt species with a DBH >500 mm).

Habitat type	Details
Roosting habitat	No suitable roosting trees or evidence noted.

Table 7 Black Cockatoo habitat values

Habitat type	Area (ha)	Foraging value	Breeding value	Roosting value
<i>Banksia sessilis</i> over low mixed shrubland (VT02, VT03)	2.66	High	-	-
Mixed Banksia woodland (VT04)	0.49	High	-	-
Acacia tall shrubland (VT01)	0.10	Low	-	-



Plate 1 Carnaby's Cockatoo foraging on *Banksia sessilis* shrublands



Plate 2 Large flock (>100 birds) of Carnaby's Cockatoo flying over the survey area

3.6 Other conservation significant fauna

No other fauna species of significance was recorded during the survey. However five significant fauna are considered likely to occur in the survey area, based on the habitat types available and bushland linkages present across the area:

- Quenda (listed as Priority 4 by DBCA)
- Western Brush Wallaby (listed as Priority 4 by DBCA)
- Jewelled South West Ctenotus (listed as Priority 3 by DBCA)
- Black Striped Snake (listed as Priority 3 by DBCA)
- Graceful Sun moth (listed as Priority 4 by DBCA).

The Peregrine Falcon (listed as Other specially protected fauna by DBCA) is also considered as possibly occurring within the survey area.

4. References

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Appendices

Appendix A – Figures

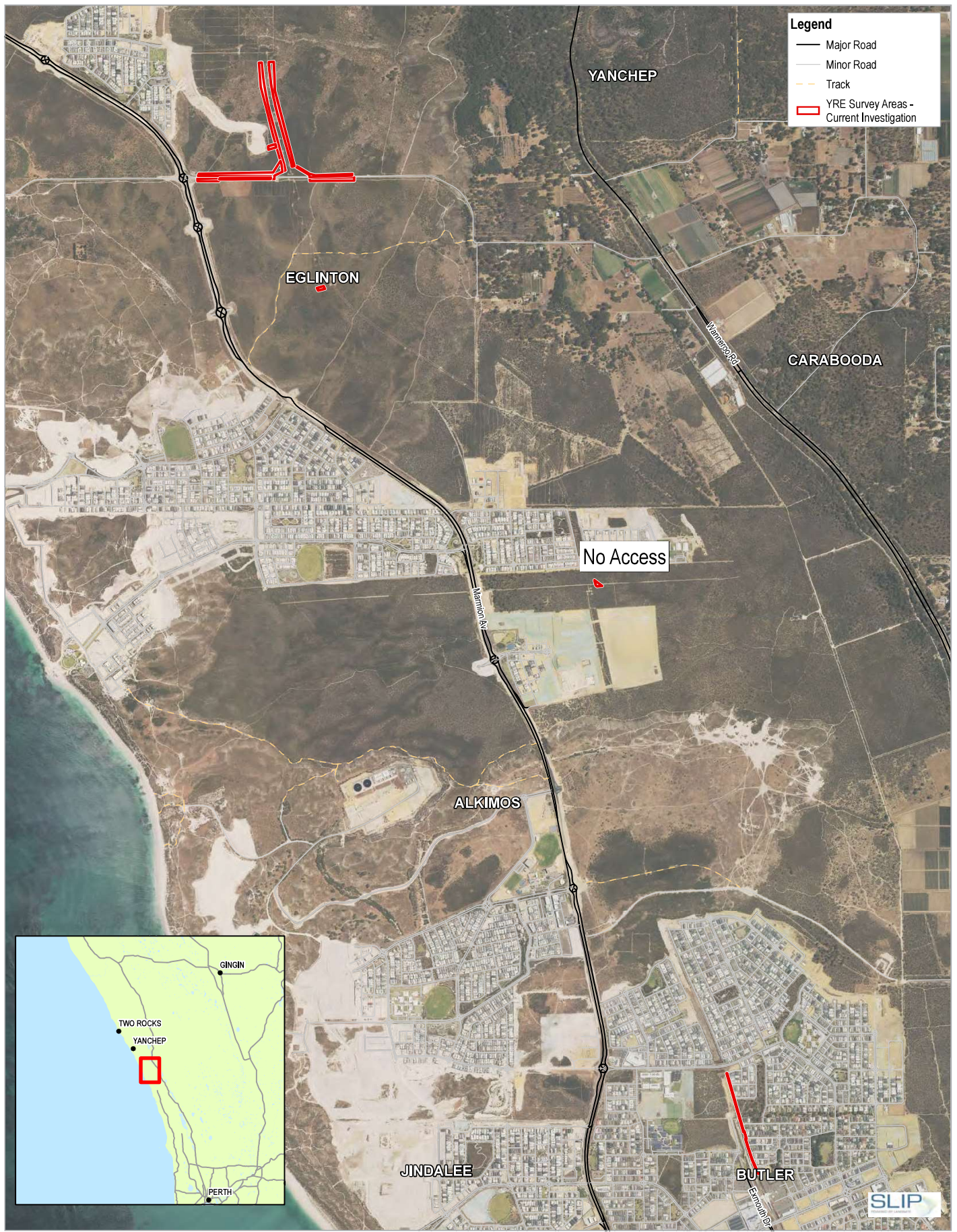
Figure 1 Project locality

Figure 2 Vegetation type

Figure 3 Vegetation condition

Figure 4 Conservation significant ecological communities

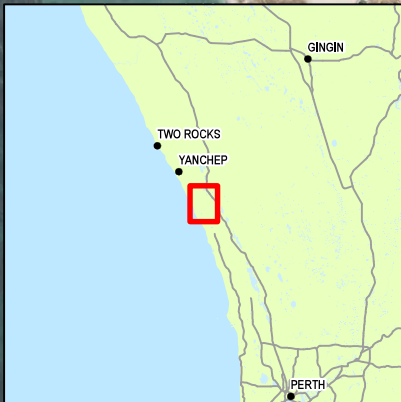
Figure 5 Black cockatoo habitat



Legend

- Major Road
- Minor Road
- Track
- ▭ YRE Survey Areas - Current Investigation

No Access



Paper Size ISO A3

0 250 500 750 1,000 N

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50



PTA
Yanchep Rail Extension Part 1

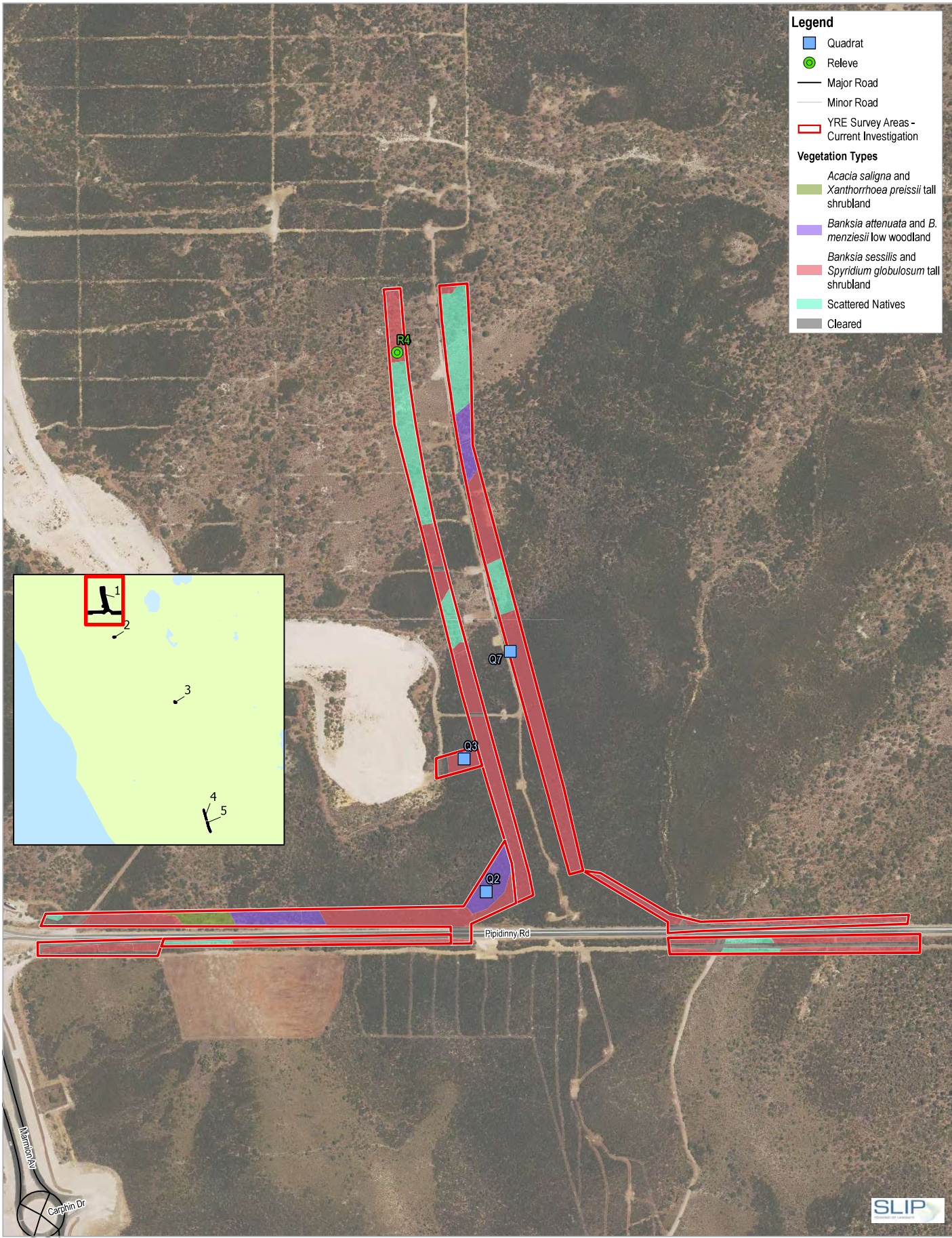
Locality Map

Project No. 12533618
Revision No. 0
Date 2/09/2020

FIGURE 1

G:\112533618\Map\Working\YRE Part 1\YRE Part 1\YRE Part 1\ppt\12533618_YREP_L01_SurveyArea_Rev
Print date: 02 Sep 2020 - 12:47

Data source: Landgate_Subscription_Imagery\ANow Landgate / SLIP Landgate: Roads, Suburbs • 2020; PTA: Survey area • 2020; Geosource Australia: Geodetic Topo 250k • 2006, Created by: mmiklanen

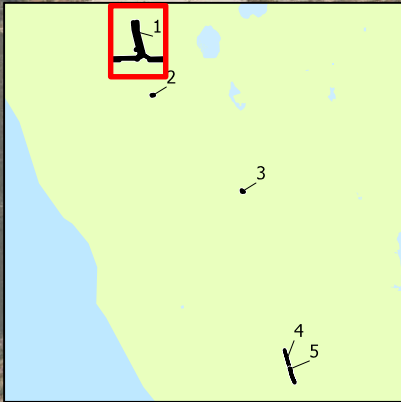


Legend

- Quadrat
- Releve
- Major Road
- Minor Road
- YRE Survey Areas - Current Investigation

Vegetation Types

- Acacia saligna* and *Xanthorrhoea preissii* tall shrubland
- Banksia attenuata* and *B. menziesii* low woodland
- Banksia sessilis* and *Spyridium globulosum* tall shrubland
- Scattered Natives
- Cleared



Paper Size ISO A3

0 40 80 120 160

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50



PTA
Yanchep Rail Extension Part 1

Vegetation Types and Sample Sites

Project No. 12533618
Revision No. 0
Date 7/09/2020

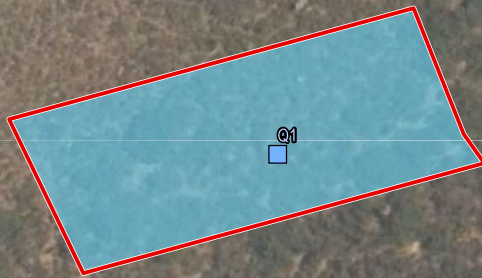
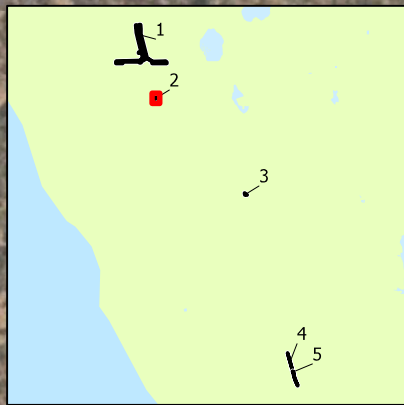
FIGURE 2-1

Legend

- Quadrat
- YRE Survey Areas - Current Investigation

Vegetation Types

- Banksia sessilis* and *Melaleuca systema* mid-shrubland



Paper Size ISO A3

0 6 12 18 24

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

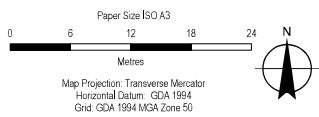


PTA
Yanchep Rail Extension Part 1

**Vegetation Types and
Sample Sites**

Project No. 12533618
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Date 7/09/2020

FIGURE 2-2



PTA
Yanchep Rail Extension Part 1

Vegetation Types and Sample Sites

Project No. 12533618
Revision No. 0
Date 7/09/2020

FIGURE 2-3

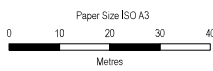
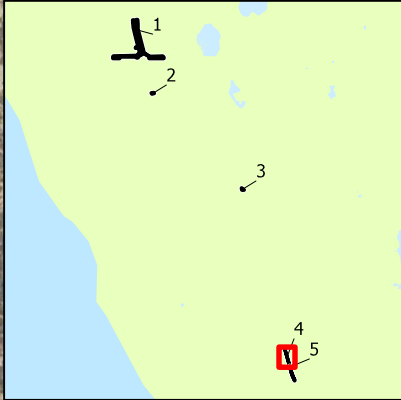


Legend

- Minor Road
- ▭ YRE Survey Areas - Current Investigation

Vegetation Types

- ▭ Planted
- ▭ Cleared



Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 50



PTA
 Yanchep Rail Extension Part 1
**Vegetation Types and
 Sample Sites**

Project No. 12533618
 Revision No. 0
 Date 7/09/2020

FIGURE 2-4

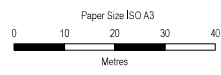
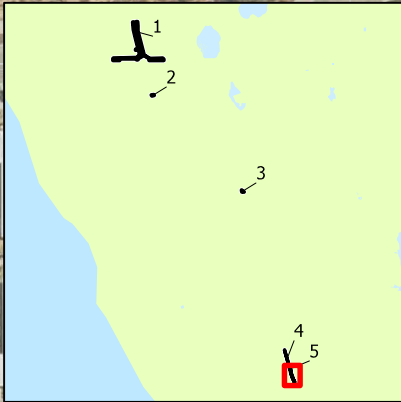


Legend

- Major Road
- Minor Road
- YRE Survey Areas - Current Investigation

Vegetation Types

- Planted
- Cleared



Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 50

PTA
 Yancheep Rail Extension Part 1
Vegetation Types and Sample Sites

Project No. 12533618
 Revision No. 0
 Date 7/09/2020

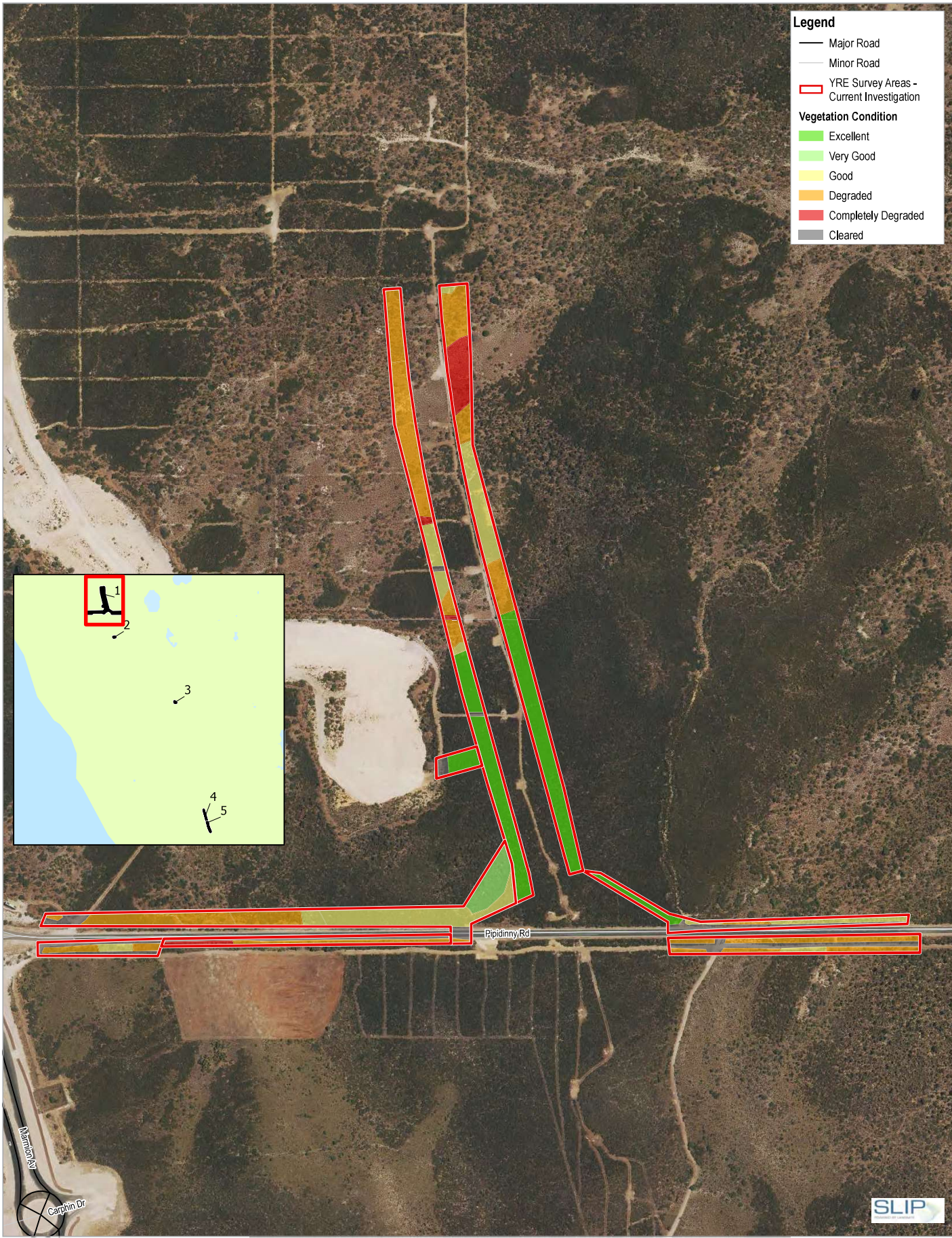
FIGURE 2-5

Legend

- Major Road
- Minor Road
- ▭ YRE Survey Areas - Current Investigation

Vegetation Condition

- Excellent
- Very Good
- Good
- Degraded
- Completely Degraded
- Cleared



Paper Size ISO A3

0 40 80 120 160

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50



PTA
Yancheep Rail Extension Part 1

Vegetation Condition

Project No. 12533618
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Date 7/09/2020

FIGURE 3-1

Legend

- YRE Survey Areas - Current Investigation
- Vegetation Condition**
- Excellent



Paper Size ISO A3

0 6 12 18 24

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50






PTA
Yanhep Rail Extension Part 1

Vegetation Condition

Project No. 12533618
Revision No. 0
Date 7/09/2020

FIGURE 3-2

Legend

-  YRE Survey Areas - No Access
- Vegetation Condition**
-  Excellent
-  Cleared




Paper Size ISO A3

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50




PTA
Yanchep Rail Extension Part 1

Vegetation Condition

Project No. 12533618
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Date 7/09/2020

FIGURE 3-3

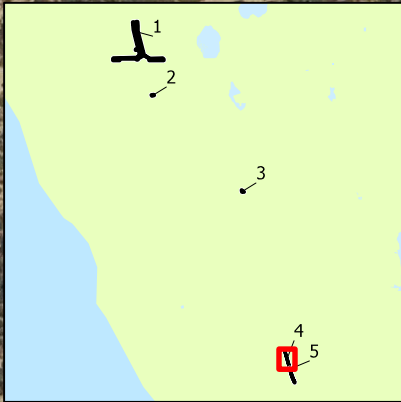


Legend

- Minor Road
- ▭ YRE Survey Areas - Current Investigation

Vegetation Condition

- ▭ Completely Degraded
- ▭ Cleared



Paper Size ISO A3

0 10 20 30 40

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50



PTA
Yanchep Rail Extension Part 1

Vegetation Condition

Project No. 12533618
Revision No. 0
Date 7/09/2020

FIGURE 3-4

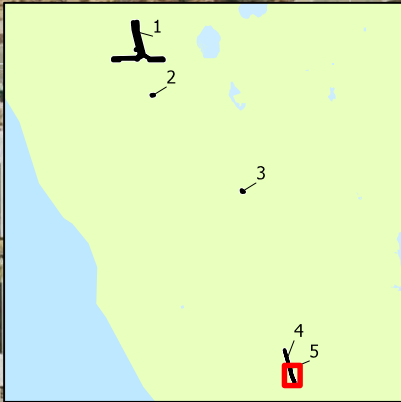
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Print date: 07 Sep 2020 15:44

Data source: Landgate_Subscription_Imagery\MA\Now: Landgate / SLIP; GHD: Vegetation condition=2020G0, Created by: mmiksanen



Legend

- Major Road
- Minor Road
- ▭ YRE Survey Areas - Current Investigation
- ▭ Vegetation Condition
- Red: Completely Degraded
- Grey: Cleared



Paper Size ISO A3
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 Metres

Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 50



**PTA
 Yanchep Rail Extension Part 1**

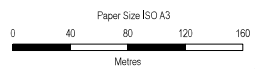
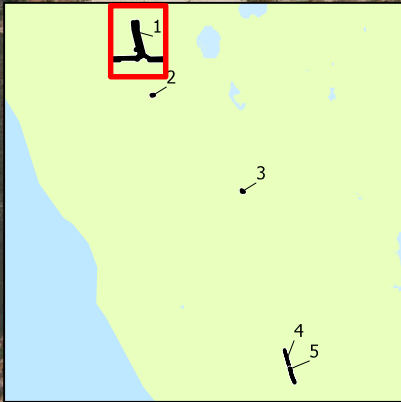
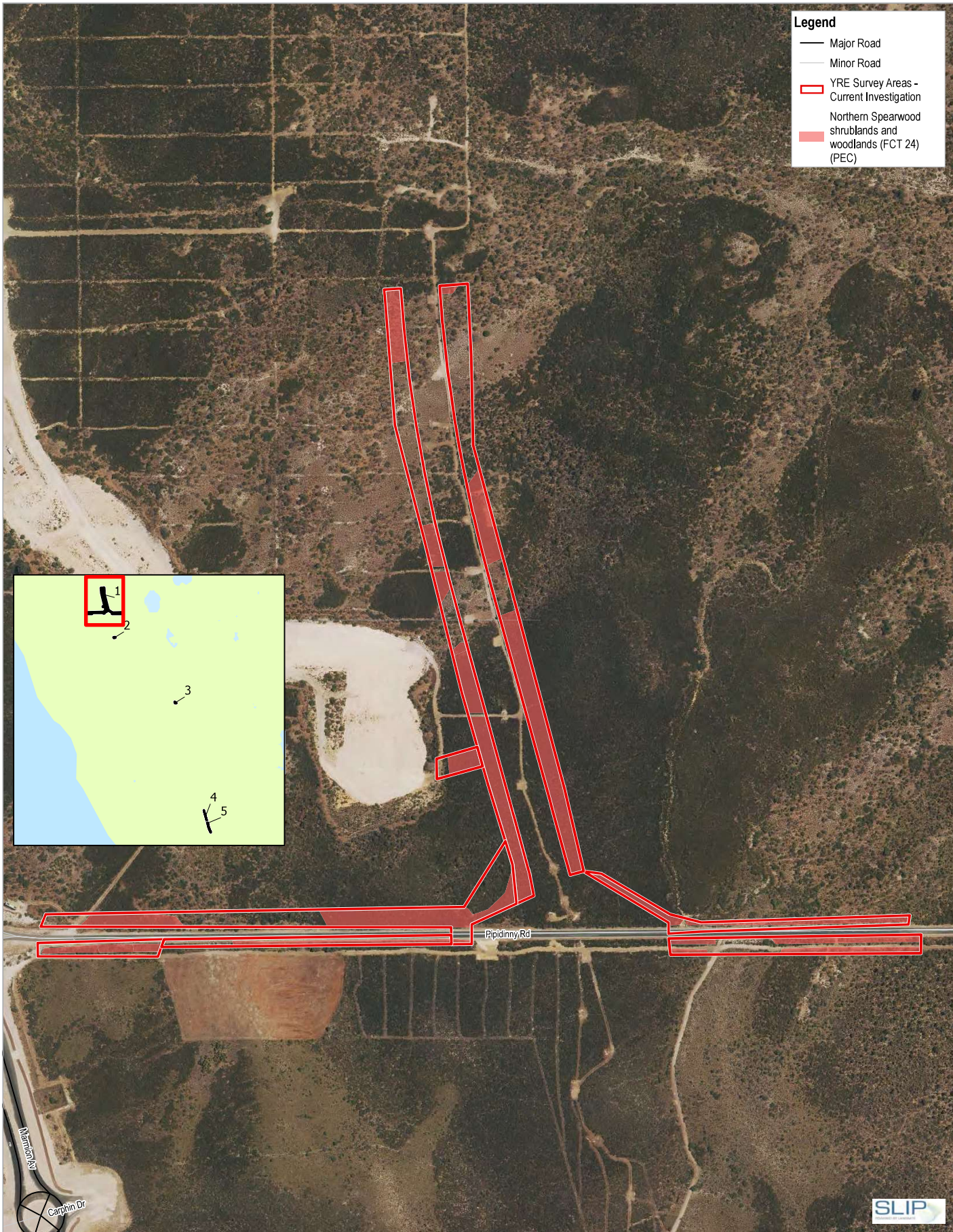
Vegetation Condition

Project No. 12533618
 Revision No. 0
 Date 7/09/2020

FIGURE 3-5

Legend

- Major Road
- Minor Road
- YRE Survey Areas - Current Investigation
- Northern Spearwood shrublands and woodlands (FCT 24) (PEC)





PTA
Yancheep Rail Extension Part 1

**Conservation Significant
Ecological Communities**

Project No. 12533618
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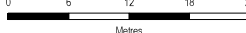
FIGURE 4-1

Legend


-  YRE Survey Areas - Current Investigation
-  Northern Spearwood shrublands and woodlands (FCT 24) (PEC)



Paper Size ISO A3



Metres



Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50






PTA
Yanchep Rail Extension Part 1

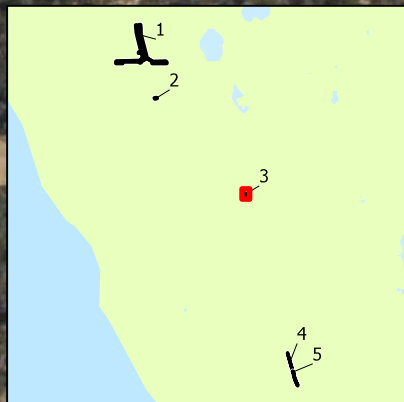
**Conservation Significant
Ecological Communities**

Project No. 12533618
Revision No. 0
Date 7/09/2020

FIGURE 4-2


Legend

-  YRE Survey Areas - No Access
-  *Banksia* woodlands of the SCP (TEC)
-  *Banksia* dominated woodlands of the SCP IBRA region (PEC)



Paper Size ISO A3
 0 6 12 18 24
 Metres

Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 50




PTA
 Yanchep Rail Extension Part 1

**Conservation Significant
 Ecological Communities**

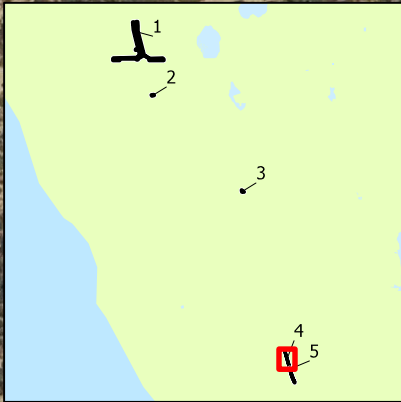
Project No. 12533618
 Revision No. 0
 Date 7/09/2020

FIGURE 4-3



Legend

- Minor Road
- ▭ YRE Survey Areas - Current Investigation



Paper Size ISO A3

0 10 20 30 40

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50



PTA
Yanchep Rail Extension Part 1

**Conservation Significant
Ecological Communities**

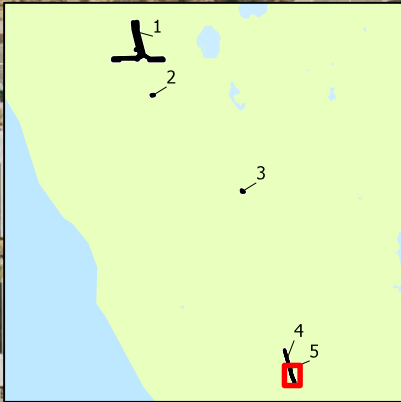
Project No. 12533618
Revision No. 0
Date 7/09/2020

FIGURE 4-4



Legend

- Major Road
- Minor Road
- ▭ YRE Survey Areas - Current Investigation



Paper Size ISO A3

0 10 20 30 40

Meters

Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 50



PTA
 Yancheep Rail Extension Part 1

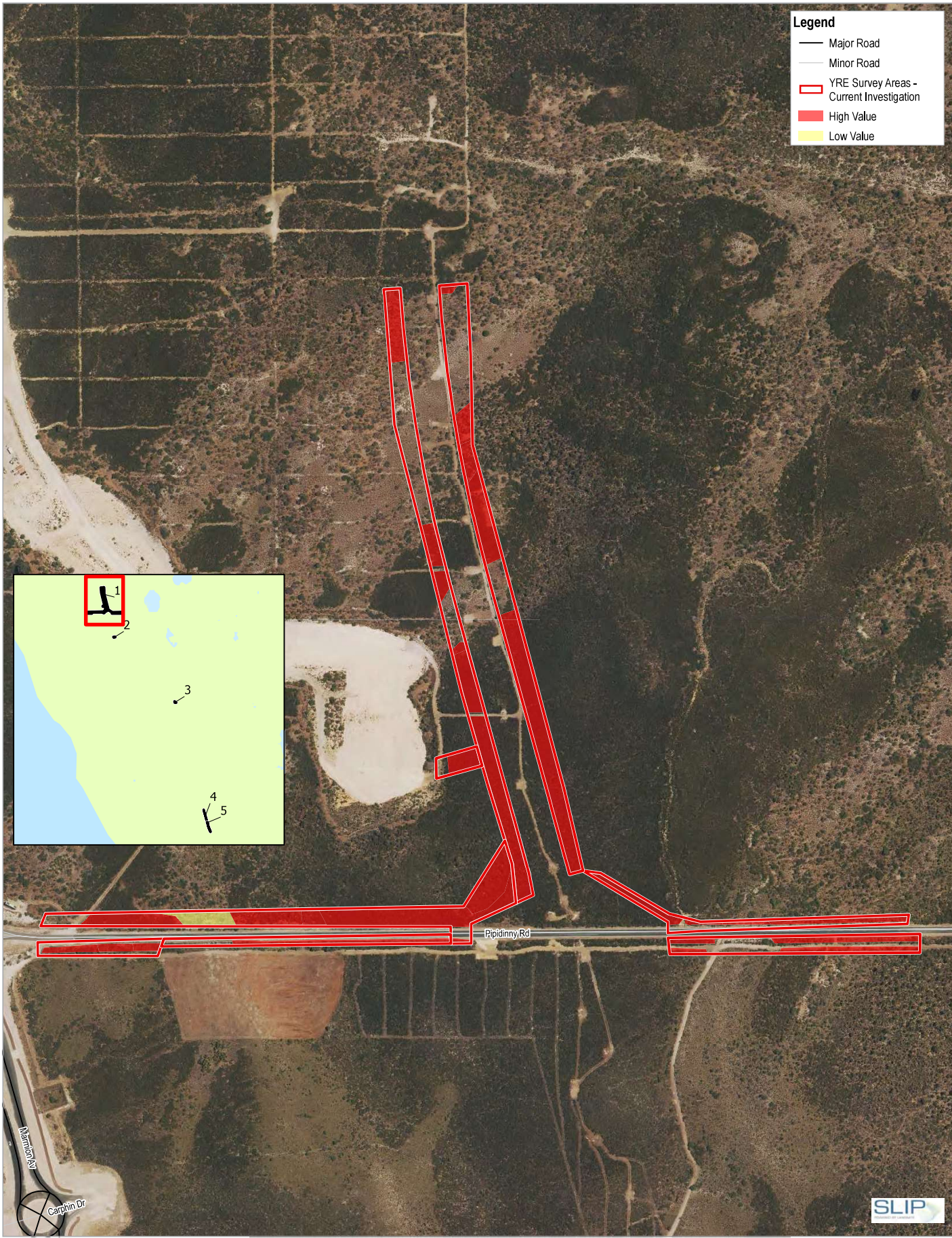
**Conservation Significant
 Ecological Communities**

Project No. 12533618
 Revision No. 0
 Date 7/09/2020

FIGURE 4-5

Legend

- Major Road
- Minor Road
- ▭ YRE Survey Areas - Current Investigation
- High Value
- Low Value



Paper Size ISO A3

0 40 80 120 160

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50



PTA
Yanchep Rail Extension Part 1

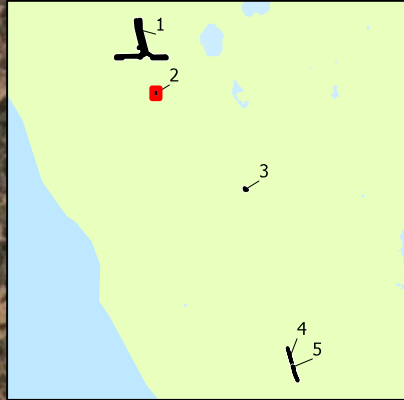
Black Cockatoo Habitat

Project No. 12533618
Revision No. 0
Date 7/09/2020

FIGURE 5-1

Legend

-  YRE Survey Areas - Current Investigation
-  High Value




Paper Size ISO A3

0 6 12 18 24

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50






PTA
Yanchep Rail Extension Part 1

Black Cockatoo Habitat

Project No. 12533618
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Date 7/09/2020

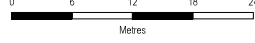
FIGURE 5-2

Legend


-  YRE Survey Areas - No Access
-  High Value



Paper Size ISO A3



Metres



Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50



PTA
Yanchep Rail Extension Part 1

Black Cockatoo Habitat

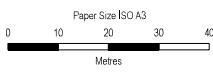
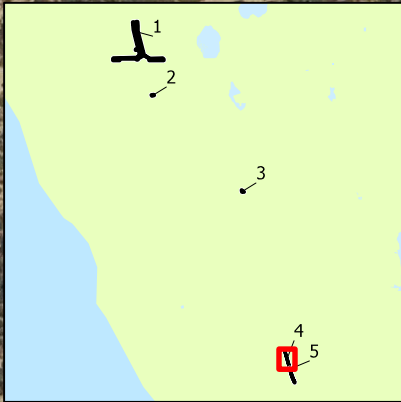
Project No. 12533618
Revision No. 0
Date 7/09/2020

FIGURE 5-3



Legend

- Minor Road
- ▭ YRE Survey Areas - Current Investigation

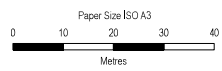


PTA
Yanchep Rail Extension Part 1

Black Cockatoo Habitat

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Date 7/09/2020

FIGURE 5-4



PTA
Yanchep Rail Extension Part 1

Black Cockatoo Habitat

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Date 7/09/2020

FIGURE 5-5

Appendix B – Relevant legislation and conservation codes

Relevant legislation

Federal *Environment Protection and Biodiversity Conservation Act 1999*

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Federal Government's central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places, which are defined in the EPBC Act as Matters of National Environmental Significance (MNES).

The biological aspects listed as MNES include:

- Nationally threatened flora and fauna species and ecological communities
- Migratory species

A person must not undertake an action that has, will have, or is likely to have a significant impact (direct or indirect) on MNES, without approval from the Federal Minister for the Environment.

The EPBC Act is administered by the Department of Agriculture, Water and Environment (DAWE).

State *Environmental Protection Act 1986*

The *Environmental Protection Act 1986* (EP Act) is the primary legislative Act dealing with the protection of the environment in Western Australia. The Act allows the Environmental Protection Authority (EPA), to prevent, control and abate pollution and environmental harm, for the conservation, preservation, protection, enhancement and management of the environment and for matters incidental to or connected with the foregoing. Part IV of the EP Act is administered by the EPA and makes provisions for the EPA to undertake environmental impact assessment of significant proposals, strategic proposals and land use planning schemes.

The Department of Water and Environment Regulation (DWER) is responsible for administering the clearing provisions of the EP Act (Part V). Clearing of native vegetation in Western Australia requires a permit from the DWER, unless exemptions apply. Applications for clearing permits are assessed by the Department and decisions are made to grant or refuse the application in accordance with the Act. When making a decision the assessment considers clearing against the ten clearing principles as specified in Schedule 5 of the EP Act:

- a) Native vegetation should not be cleared if it comprises a high level of biodiversity.
- b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a significance habitat for fauna indigenous to Western Australia.
- c) Native vegetation should not be cleared if it includes, or is necessary, for the continued existence of rare flora.
- d) Native vegetation should not be cleared if it comprises the whole or part of native vegetation in an area that has been extensively cleared.
- e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.
- f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.
- g) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.
- h) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

- i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.
- j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.

Exemptions for clearing include clearing that is a requirement of a written law or authorised under certain statutory processes (listed in Schedule 6 of the EP Act) and exemptions for prescribed low impact day-to-day activities (prescribed in the Environmental Protection (Clearing of Native Vegetation) Regulations 2004); these exemptions do not apply in environmentally sensitive areas (ESAs).

State Biodiversity and Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) provides for the conservation and protection of biodiversity and biodiversity components, as well as the promotion of the ecologically sustainable use of biodiversity components in Western Australia. The BC Act replaces both the repealed *Wildlife Conservation Act 1950* (WC Act) and the *Sandalwood Act 1929* (Sandalwood Act), as well as their associated regulations. To attain the objectives of the BC Act, principles of ecological sustainable development have been established:

- Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations
- If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation
- The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations
- The conservation of biodiversity and ecological integrity should be a fundamental consideration in decision-making
- Improved valuation, pricing and incentive mechanisms should be promoted.

The BC Act is administered by the Department of Biodiversity Conservation and Attractions (DBCA).

State Biosecurity and Agriculture Management Act 2007

The *Biosecurity and Agriculture Management Act 2007* (BAM Act) and associated regulations are administered by the Department of Primary Industries and Regional Development (DPIRD) and replace the repealed *Agriculture and Related Resources Protection Act 1976*. The main purposes of the BAM Act and its regulations are to:

- Prevent new animal and plant pests (vermin and weeds) and diseases from entering WA
- Manage the impact and spread of those pests already present in the state
- Safely manage the use of agricultural and veterinary chemicals
- Increased control over the sale of agricultural products that contain violative chemical residues.

The Western Australian Organism List (WAOL) provides the status of organisms which have been categorised under the BAM Act. A Declared Pest is a prohibited organism or an organism for which a declaration under Section 22(2) of the Act is in force. Declared Pests may be assigned a control category including: C1 (exclusion), C2 (eradication) and C3 (management). The category may apply to the whole of the State, LGAs, districts, individual properties or even paddocks, and all landholders are obliged to comply with the specific category of control. Categories of control are defined below.

DPIRD Categories for Declared Pests under the BAM Act

Control class code	Description
C1 (Exclusion)	Pests will be assigned to this category if they are not established in Western Australia and control measures are to be taken, including border checks, in order to prevent them entering and establishing in the State.
C2 (Eradication)	Pests will be assigned to this category if they are present in Western Australia in low enough numbers or in sufficiently limited areas that their eradication is still a possibility.
C3 (Management)	Pests will be assigned to this category if they are established in Western Australia but it is feasible, or desirable, to manage them in order to limit their damage. Control measures can prevent a C3 pest from increasing in population size or density or moving from an area in which it is established into an area which currently is free of that pest.

Conservation codes

Species of significant flora, fauna and communities are protected under both Federal and State Acts. The Federal EPBC Act provides a legal framework to protect and manage nationally important flora and communities. The State BC Act is the primary wildlife conservation legislation in Western Australia. Information on the conservation codes is summarised in the following sections.

Ecological communities

Conservation significant communities

Ecological communities are defined as naturally occurring biological assemblages that occur in a particular type of habitat (English and Blyth 1997). Federally listed Threatened Ecological Communities (TECs) are protected under the EPBC Act. The BC Act provides for the statutory listing of State TECs by the Minister. The legislation also describes statutory processes for preparing recovery plans for TECs, the registration of their critical habitat, and penalties for unauthorised modification of TECs. Prior to the BC Act, the DBCA has been identifying and listing TECs to one of four categories (Presumed Totally Destroyed, Critically Endangered, Endangered and Vulnerable) through a non-statutory process.

Possible TECs that do not meet survey criteria are added to the DBCA Priority Ecological Community (PEC) List under Priorities 1, 2 and 3. These are ecological communities that are adequately known; are rare but not threatened, or meet criteria for Near Threatened. PECs that have been recently removed from the threatened list are placed in Priority 4. These ecological communities require regular monitoring. Conservation dependent ecological communities are placed in Priority 5. PECs are not listed under any formal Federal or State legislation, however, may be listed as TECs under the EPBC Act.

Conservation codes and definitions for TECs listed under the EPBC Act and/ or BC Act

Categories	Definition
Federal Government Conservation Categories (EPBC Act)	
Critically Endangered (CR)	An ecological community if, at that time, is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria (as outlined in Environment Protection and Biodiversity Conservation Regulations 2000)
Endangered (EN)	An ecological community if, at that time: A) is not critically endangered; and B) is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria (as outlined in Environment Protection and Biodiversity Conservation Regulations 2000)
Vulnerable (VU)	An ecological community if, at that time: A) is not critically endangered or endangered; and B) is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria (as outlined in Environment Protection and Biodiversity Conservation Regulations 2000)
Western Australia Conservation Categories (BC Act)	
<u>Threatened Ecological Communities</u>	

Categories	Definition
Critically Endangered (CR)	An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated.
Endangered (EN)	An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.
Vulnerable (VU)	An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.

Collapsed ecological communities

An ecological community is eligible for listing as a collapsed ecological community at a particular time if, at that time –

- (a) there is no reasonable doubt that the last occurrence of the ecological community has collapsed); or
- (b) the ecological community has been so extensively modified throughout its range that no occurrence of it is likely to recover –
 - (i) its species composition or structure; or
 - (ii) its species composition and structure.

Section 33 of the BC Act provides for a collapsed ecological community to be regarded as a threatened ecological community if it is discovered in a state that no longer makes it eligible for listing as a collapsed ecological community.

Conservation categories and definitions for PECS as listed by the DBCA

Category	Description
Priority 1	<p>Poorly known ecological communities.</p> <p>Ecological communities that are known from very few occurrences with a very restricted distribution (generally ≤ 5 occurrences or a total area of ≤ 100 ha). Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) or for which current threats exist. May include communities with occurrences on protected lands. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.</p>
Priority 2	<p>Poorly known ecological communities.</p> <p>Communities that are known from few occurrences with a restricted distribution (generally ≤ 10 occurrences or a total area of ≤ 200 ha). At least some occurrences are not believed to be under immediate threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.</p>

Category	Description
Priority 3	<p>Poorly known ecological communities.</p> <p>(i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or:</p> <p>(ii) communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or;</p> <p>(iii) communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes.</p> <p>Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.</p>
Priority 4	<p>Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring.</p> <p>(i) Rare. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These communities are usually represented on conservation lands.</p> <p>(ii) Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.</p> <p>(iii) Ecological communities that have been removed from the list of threatened communities during the past five years.</p>
Priority 5	<p>Conservation Dependent ecological communities.</p> <p>Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.</p>

Other significant vegetation

Vegetation may be significant for a range of reasons other than a statutory listing. The EPA (2016b) states that significant vegetation may include vegetation that includes the following:

- Restricted distribution
- Degree of historical impact from threatening processes
- Local endemism in restricted habitats
- Novel combinations of taxa
- A role as a refuge
- A role as a key habitat for Threatened species or large population representing a significant proportion of the local to regional total population of a species
- Being representative of a vegetation unit in 'pristine' condition in a highly cleared landscape, recently discovered range extensions, or isolated outliers of the main range)
- Being poorly reserved.

This may apply at a number of levels, so the unit may be significant when considered at the fine-scale (intra-locality), intermediate-scale (locality or inter-locality) or broad-scale (local to region).

Flora and fauna

Conservation significant flora and fauna

Species of significant flora are protected under both Federal and State legislation. Any activities that are deemed to have a significant impact on species that are recognised by the EPBC Act, and/or the BC Act can warrant referral to the DAWE and/or the EPA.

The Federal conservation level of flora and fauna species and their significance status is assessed under the EPBC Act. The significance levels for flora and fauna used in the EPBC Act align with the International Union for Conservation of Nature (IUCN) Red List criteria, which are internationally recognised as providing best practice for assigning the conservation status of species. The EPBC Act also protects land and migratory species that are listed under International Agreements. The list of migratory species established under section 209 of the EPBC Act comprises:

- Migratory species which are native to Australia and are included in the appendices to the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals Appendices I and II)
- Migratory species included in annexes established under the Japan-Australia Migratory Bird Agreement (JAMBA) and the China–Australia Migratory Bird Agreement (CAMBA)
- Native, migratory species identified in a list established under, or an instrument made under, an international agreement approved by the Minister, such as the Republic of Korea–Australia Migratory Bird Agreement (ROKAMBA)

The State conservation level of flora and fauna species and their significance status also follows the IUCN Red List criteria. Under the BC Act flora and fauna can be listed as Threatened, Extinct and as Specially Protected species.

Threatened species are those species which have been adequately searched for and are deemed to be, in the wild, either rare, under identifiable threat of extinction, or otherwise in need of special protection, and have been gazetted as such. The assessment of the conservation status of Threatened species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria. Specially protected species meet one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection. Species that are listed as Threatened or Extinct species under the BC Act cannot also be listed as Specially Protected species.

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened flora or fauna.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

For the purposes of this assessment, all species listed under the EPBC Act, BC Act and DBCA Priority species are considered conservation significant.

Conservation categories and definitions for EPBC Act and BC Act listed flora and fauna species

Conservation category	Definition
Threatened species	
Critically Endangered (CR)	<p>Threatened species considered to be “facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines”.</p> <p>Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines.</p>
Endangered (EN)	<p>Threatened species considered to be “facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines”.</p> <p>Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines</p>
Vulnerable (VU)	<p>Threatened species considered to be “facing a high risk of extinction in the wild in the medium term future, as determined in accordance with criteria set out in the ministerial guidelines”.</p> <p>Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines.</p>
Extinct species	
Extinct (EX)	Species where “there is no reasonable doubt that the last member of the species has died”, and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).
Extinct in the Wild (EW)	Species that “is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form”, and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).
Specially protected species	
Migratory (MI)	<p>Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).</p> <p>Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species</p>

Conservation category	Definition
Species of special conservation interest (conservation dependent fauna) (CD)	Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened.
Other specially protected fauna (OS)	Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

Conservation codes for DBCA listed Priority flora and fauna

Priority category	Definition
Priority 1	<p>Poorly-known taxa</p> <p>Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.</p>
Priority 2	<p>Poorly-known taxa</p> <p>Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.</p>
Priority 3	<p>Poorly-known taxa</p> <p>Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.</p>
Priority 4	<p>Rare, Near Threatened and other taxa in need of monitoring</p> <p>A. Rare: Taxa that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands.</p> <p>B. Near Threatened. Taxa that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.</p> <p>C. Taxa that have been removed from the list of threatened taxa during the past five years for reasons other than taxonomy.</p>

Other significant flora

Flora species, subspecies, varieties, hybrids and ecotypes may be significant for a range of reasons, other than a statutory listing. The EPA (2016a, b) states that significant flora may include taxa that have:

- A keystone role in a particular habitat for threatened or Priority flora or fauna species, or large populations representing a considerable proportion of the local or regional total population of a species
- Relictual status, being representation of taxonomic or physiognomic groups that no longer occur widely in the broader landscape
- Anomalous features that indicate a potential new discovery
- Being representative of the range of a species (particularly, at the extremes of range, recently discovered range extensions, or isolated outliers of the main range)
- The presence of restricted subspecies, varieties, or naturally occurring hybrids
- Local endemism (a restricted distribution) or association with a restricted habitat type (e.g. surface water or groundwater dependent ecosystems)
- Being poorly reserved

Other significant fauna

Fauna species may be significant for a range of reasons other than those protected by international agreement or treaty, Specially Protected or Priority Fauna. Significant fauna may include short-range endemic species, species that have declining populations or declining distributions, species at the extremes of their range, or isolated outlying populations, or species which may be undescribed (EPA 2020).

Introduced plants (weeds)

Declared Pests

Information on species considered to be Declared Pests is provided under *State Biosecurity and Agriculture Management Act 2007*.

Weeds of National Significance

The spread of weeds across a range of land uses or ecosystems is important in the context of socio-economic and environmental values. The assessment of Weeds of National Significance (WoNS) is based on four major criteria:

- Invasiveness
- Impacts
- Potential for spread
- Socio-economic and environmental values

Australian state and territory governments have identified thirty-two Weeds of National Significance (WoNS); a list of 20 WoNS was endorsed in 1999 and a further 12 were added in 2012.

References

English, V and Blyth, J 1997, *Identifying and Conserving Threatened Ecological Communities in the South West Botanical Province*, Perth, Department of Conservation and Land Management.

EPA 2016a, *Technical Guide – Flora and Vegetation Surveys for Environmental Impact Assessment*, EPA, Perth, WA.

EPA 2016b, *Environmental Factor Guideline - Flora and Vegetation*, EPA, Perth, WA.

EPA 2020, *Technical Guide – Terrestrial Fauna Surveys*, EPA, Perth, WA.

Appendix C – Flora data

Quadrat and releve data

Quadrat and Releve data – YRE Part 1 survey areas

Site ID	Q1	Project	12533618
Type:	Quadrat	Size:	10 x 10 m
Date:	14/07/2020	Described by:	GHD
Co-ordinates:			
Landform and slope:	Sand dune, gentle		
Drainage:	Good		
Soil colour and type:	Brown sand		
Surface component:	Loose soil 10%		
Vegetation type:	<i>Banksia sessilis</i> shrubland		
Vegetation condition:	Excellent		
Fire age and intensity:	Old (>6 yr)		
Disturbances:	Clearing nearby, weeds		
Leaf litter:	11-30%		
Wood Litter:	2-10%		

Species List:

Family	Taxon	Status	Stratum	Cover (%)	Height (m)
Proteaceae	<i>Banksia sessilis</i>		M1	30-70	2
Myrtaceae	<i>Calothamnus quadrifidus</i>		M1	30-70	2.2
Rhamnaceae	<i>Spyridium globulosum</i>		M1	10-30	2
Xanthorrhoeaceae	<i>Xanthorrhoea preissii</i>		M1	2-10	1.8
Chenopodiaceae	<i>Rhagodia baccata</i>		M2	<2	1
Restionaceae	<i>Desmocladus flexuosus</i>		G	30-70	0.4
Dilleniaceae	<i>Hibbertia hypericoides</i>		M2	2-10	1.1
Phyllanthaceae	<i>Phyllanthus calycinus</i>		G	<2	0.4
Fabaceae	<i>Acacia lasiocarpa</i>		M2	<2	1.1
Cyperaceae	<i>Lepidosperma calcicola</i>		G	<2	0.7
Droseraceae	<i>Drosera erythrorhiza</i>		G	<2 N	-
Orchidaceae	<i>Caladenia</i> sp.		G	<2	-
Araliaceae	<i>Trachymene pilosa</i>		G	<2 N	0.05
Poaceae	sp.	*	G	2-10	0.1
Euphorbiaceae	<i>Euphorbia</i> sp.	*	G	<2	0.1
Asteraceae	<i>Sonchus</i> sp.	*	G	<2 N	0.05
Droseraceae	<i>Drosera</i> sp.		G	<2	0.3
Asparagaceae	<i>Lomandra maritima</i>		G	10-30	0.3
Fabaceae	<i>Hardenbergia comptoniana</i>		G	<2	-
Ericaceae	<i>Leucopogon</i> sp.		M2	<2	0.3
Hemerocallidaceae	<i>Dianella revoluta</i>		G	<2	0.4
Myrtaceae	<i>Melaleuca systema</i>		M2	2-10	1
Lauraceae	<i>Cassytha</i> sp.		G	<2	-
Proteaceae	<i>Banksia dallanneyi</i> var. <i>dallanneyi</i>		G	<2	0.2
Asteraceae	<i>Olearia axillaris</i>		M2	<2	1.7
Cyperaceae	<i>Mesomelaena pseudostygia</i>		G	<2	0.5



Photo – Quadrat 1

Site ID	Q2	Project	12533618
Type:	Quadrat	Size:	10 x 10 m
Date:	15/07/2020	Described by:	GHD
Co-ordinates:			
Landform and slope:	Dune swale, negligible		
Drainage:	Good		
Soil colour and type:	Grey/white/brown sand		
Surface component:	Loose soil 10%		
Vegetation type:	<i>Banksia</i> open woodland		
Vegetation condition:	Very Good-Excellent		
Fire age and intensity:	Old (>6yr)		
Disturbances:	Weeds, tracks		
Leaf litter:	<2%		
Wood Litter:	2-10%		

Species List:

Family	Taxon	Status	Stratum	Cover (%)	Height (m)
Proteaceae	<i>Banksia attenuata</i>		M1	<2	1.8
Myrtaceae	<i>Calothamnus quadrifidus</i>		M1	30-70	1.6
Proteaceae	<i>Banksia sessilis</i>		M1	2-10	2
Proteaceae	<i>Jacksonia furcellata</i>		M1	<2	1.9
Dilleniaceae	<i>Hibbertia hypericoides</i>		M2	10-30	1
Droseraceae	<i>Drosera erythrorhiza</i>		G	<2 N	-
Orchidaceae	<i>Caladenia</i> sp.		G	<2	0.2
Cyperaceae	<i>Mesomelaena pseudostygia</i>		G	2-10	0.4
Goodeniaceae	<i>Scaevola canescens</i>		G	<2	0.1
Poaceae	<i>Briza maxima</i>	*	G	<2 N	0.2
Restionaceae	<i>Desmocladius flexuosus</i>		G	<2	0.3
Hemerocallidaceae	<i>Corynotheca micrantha</i>		G	2-10	0.4
Hemerocallidaceae	<i>Dianella revoluta</i>		G	<2	1
Fabaceae	<i>Acacia saligna</i>		M1	<2	0.3
Araliaceae	<i>Trachymene pilosa</i>		G	<2 N	0.2
Zamiaceae	<i>Macrozamia riedlei</i>		M2	<2	1.5
Proteaceae	<i>Petrophile macrostachya</i>		G	<2	0.2
Asparagaceae	<i>Thysanotus</i> sp.		G	<2	-
Droseraceae	<i>Drosera</i> sp.		G	<2	-
Poaceae	sp.	*	G	2-10	0.3
Xanthorrhoeaceae	<i>Xanthorrhoea preissii</i>		M2	<2	1.6
Asteraceae	<i>Sonchus</i> sp.	*	G	<2 N	-



Photo – Quadrat 2

Site ID	Q3	Project	12533618
Type:	Quadrat	Size:	10 x 10 m
Date:	15/07/2020	Described by:	GHD
Co-ordinates:			
Landform and slope:	Sand dune, mid slope, gentle		
Drainage:	Good		
Soil colour and type:	Brown sand		
Surface component:	Loose soil <2%		
Vegetation type:	<i>Banksia sessilis</i> shrubland		
Vegetation condition:	Excellent		
Fire age and intensity:	Old (>6yr)		
Disturbances:	Tracks, weeds		
Leaf litter:	2-10%		
Wood Litter:	<2%		

Species List:

Family	Taxon	Status	Stratum	Cover (%)	Height
Proteaceae	<i>Banksia sessilis</i>		M1	30-70	1.9
Rhamnaceae	<i>Spyridium globulosum</i>		M1	10-30	1.9
Proteaceae	<i>Hakea trifurcata</i>		M1	10-30	1.8
Xanthorrhoeaceae	<i>Xanthorrhoea preissii</i>		M1	<2	1.2
Dilleniaceae	<i>Hibbertia hypericoides</i>		M2	30-70	1.2
Orchidaceae	<i>Caladenia</i> sp.		G	<2	0.3
Hemerocallidaceae	<i>Dianella revoluta</i>		G	<2	0.8
Myrtaceae	<i>Melaleuca systema</i>		M2	2-10	0.5
Myrtaceae	<i>Calothamnus quadrifidus</i>		M1	2-10	1.4
Fabaceae	<i>Hovea trisperma</i>		G	<2	0.3
Droseraceae	<i>Drosera erythrorhiza</i>		G	<2 N	-
Cyperaceae	<i>Mesomelaena pseudostygia</i>		G	2-10	0.4
Poaceae	sp.	*	G	2-10	0.2
Proteaceae	<i>Hakea lissocarpa</i>		M2	10-30	1
Restionaceae	<i>Desmocladus flexuosus</i>		G	2-10	0.3
Casuarinaceae	<i>Allocasuarina humilis</i>		M2	<2	1.4
Fabaceae	<i>Acacia lasiocarpa</i>		M2	<2	1.2
Araliaceae	<i>Trachymene pilosa</i>		G	<2 N	0.02
Droseraceae	<i>Drosera</i> sp.		G	<2	0.3
Phyllanthaceae	<i>Phyllanthus calycinus</i>		G	<2	0.5
Asparagaceae	<i>Lomandra maritima</i>		G	2-10	0.4
Orchidaceae	<i>Pyrorchis nigricans</i>		G	<2	-
Fabaceae	<i>Bossiaea eriocarpa</i>		G	<2	0.3



Photo – Quadrat 3

Site ID	Q7	Project	12533618
Type:	Quadrat	Size:	10 x 10 m
Date:	15/07/2020	Described by:	GHD
Co-ordinates:			
Landform and slope:	Sand dune, mid-slope, gentle		
Drainage:	Good		
Soil colour and type:	Grey/brown sand		
Surface component:	Loose soil 2-10%		
Vegetation type:	<i>Banksia sessilis</i> shrubland		
Vegetation condition:	Excellent		
Fire age and intensity:	Old (>6yr)		
Disturbances:	Tracks, weeds		
Leaf litter:	2-10%		
Wood Litter:	<2%		


Species List:

Family	Taxon	Status	Stratum	Cover (%)	Height (m)
Proteaceae	<i>Banksia sessilis</i>		M1	>70	2
Casuarinaceae	<i>Allocasuarina humilis</i>		M1	<2	2.1
Myrtaceae	<i>Calothamnus quadrifidus</i>		M1	2-10	1.4
Cyperaceae	<i>Mesomelaena pseudostygia</i>		G	30-70	0.6
Proteaceae	<i>Hakea trifurcata</i>		M1	30-70	1.9
Droseraceae	<i>Drosera erythrorhiza</i>		G	<2 N	-
Dilleniaceae	<i>Hibbertia hypericoides</i>		M2	30-70	1
Fabaceae	<i>Bossiaea eriocarpa</i>		G	2-10	0.4
Fabaceae	<i>Acacia lasiocarpa</i>		M2	<2	0.5
Asparagaceae	<i>Lomandra maritima</i>		G	2-10	0.4
Asteraceae	<i>Ursinia anthemoides</i>	*	G	<2 N	0.1
Proteaceae	<i>Conospermum triplinervium</i>		M2	<2	1.5
Myrtaceae	<i>Melaleuca systena</i>		M2	2-10	1.2
Iridaceae	<i>Gladiolus caryophyllaceus</i>	*	G	<2	0.3
Rhamnaceae	<i>Spyridium globulosum</i>		M1	<2	0.9
Fabaceae	<i>Hovea trisperma</i>		G	<2	0.3
Proteaceae	<i>Banksia dallanneyi</i> var. <i>dallanneyi</i>		G	<2	0.2
Orchidaceae	<i>Pyrorchis nigricans</i>		G	<2	-
Cyperaceae	<i>Lepidosperma</i> sp.		G	<2	0.3



Photo – Quadrat 7

Releve data

No.	Description
R4	<p>Vegetation code: VT01</p> <p>Vegetation description: <i>Acacia saligna</i> tall open shrubland over <i>Spyridium globulosum</i> scattered shrubs over weeds</p> <p>Soil and landform: Sandy dune slopes</p> <p>Cover: <i>Acacia saligna</i> 30-70% >2 m over <i>Spyridium globulosum</i> <2% 1.8 m, <i>Olearia axillaris</i> <2% 2 m and <i>Banksia sessilis</i> <2% 1.8m over *<i>Pelargonium capitatum</i> 10-30% 0.6m, *<i>Carpobrotus edulis</i> 2-10% 0.2m and <i>Conostylis</i> sp. <2% 0.2m,</p> <p>Condition: Degraded</p> 

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Document Status

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Introduction

Natural Area Consulting Management Services (Natural Area) was commissioned by NEWest Alliance to undertake a flora survey of remnant vegetation along the northern road verge between Pipidiny Road north to the previously mapped vegetation boundaries, that were omitted during the baseline vegetation mapping due to development boundary variations. The vegetation type present, vegetation condition, habitat condition and cockatoo habitat value were recorded to complete the vegetation mapping in accordance with baseline mapping methodology.

Flora Survey Results

The flora survey undertaken on the 30 September 2020 to fill the gap in vegetation between previous mapping and Pipidiny Road determined that the vegetation was consistent with previous mapping undertaken by GHD to the north of the survey area. These areas were able to be extended south to the road, with cleared areas along the verge and along a track at the west of the survey area (mapped separately).

Four vegetation types or units were recorded and were matched to the vegetation descriptions and codes used by GHD for the remainder of the YRE alignment and are described below in Table 1 and illustrated in Figure 1. These were split into six areas based on their vegetation unit and vegetation condition, with the cleared areas shown separately. Cockatoo foraging habitat was recorded in all vegetation types except for Scattered Natives. The vegetation units that were dominated by Banksia (VT03 and VT04) were of high habitat value, as Banksias are a preferred food source for threatened Carnaby's Cockatoo (*Calyptorhynchus latirostris*).

Table 1: Vegetation Units and their descriptions mapped north of Pipidiny Road

Vegetation Code	Vegetation Unit	Condition	Priority Ecological Community	Black Cockatoo Habitat
VT13	Scattered Natives	Degraded		
CL	Cleared	Completely Degraded		
VT03	Banksia sessilis and Spyridium globulosum tall shrubland	Degraded	Northern Spearwood shrublands and woodlands (FCT24) (WA PEC)	Foraging (high value)
VT01	Acacia saligna and Xanthorrhoea preissii tall shrubland	Degraded		Foraging (low value)
VT04	Banksia attenuata and B. menziesii low woodland	Degraded		Foraging (high value)
VT04	Banksia attenuata and B. menziesii low woodland	Good		Foraging (high value)
VT03	Banksia sessilis and Spyridium globulosum tall shrubland	Good	Northern Spearwood shrublands and woodlands (FCT24) (WA PEC)	Foraging (high value)



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Attachment 4: 10 Clearing Principles Assessment – Pipidinny Road

Principle	Assessment	Outcome
(a) Native vegetation should not be cleared if it comprises a high level of biological diversity.	<p>The proposed clearing area is located within the Swan Coastal Plain IBRA bioregion, and Perth IBRA sub-region.</p> <p>The proposed clearing area at Pipidinny Road consists of following isolated trees and shrubs:</p> <ul style="list-style-type: none"> • <i>Acacia saligna</i> and <i>Xanthorrhoea preissii</i> tall shrubland; • <i>Banksia attenuata</i> and <i>B. menziesii</i> low woodland; • <i>Banksia sessilis</i> and <i>Spyridium globulosum</i> tall shrubland; and • Good to Completely Degraded scattered natives. <p>The above species are commonly found in other surrounding areas.</p> <p>No priority flora species were recorded.</p> <p>The proposed clearing area is unlikely to support a high level of biological diversity due to its generally degraded condition and historic clearing and impacts from operation of the road.</p>	Unlikely to be at variance of this Principle
(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.	<p>The proposed clearing area contains 0.332 ha high value habitat for Carnaby's Black-Cockatoo (<i>Calyptorhynchus latirostris</i>). However, no Black Cockatoo was observed during the field survey and the vegetation condition is predominately Degraded or worse.</p> <p>No suitable breeding or roosting habitat has been identified within the proposed clearing area.</p> <p>This area is unlikely to be significant for Black Cockatoo as there are nearby areas of Excellent condition <i>Banksia</i> woodland and of larger area.</p>	Unlikely to be at variance of this Principle
(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.	No Threatened flora listed under the EPBC Act and/or BC Act or Priority flora listed by the DBCA were recorded in the proposed clearing area.	Unlikely to be at variance of this Principle

Principle	Assessment	Outcome
(d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.	The proposed clearing area contains 0.286 ha Northern Spearwood shrublands and woodlands (FCT 24) - Priority 3 PEC (Figure 4). There are no vegetation communities that are representative of a TEC within the proposed clearing area.	Unlikely to be at variance of this Principle
(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.	The proposed clearing area contains remnant <i>Banksia</i> vegetation. However, the vegetation in this area is unlikely to be considered significant due to the Good to Completely Degraded condition of the vegetation and as it is a narrow corridor with evidence of edge effects.	Unlikely to be at variance of this Principle
(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.	Vegetation present would not be considered as growing in association with wetlands or watercourses as identified in the field survey of the proposed clearing area (GHD, 2020).	Unlikely to be at variance of this Principle
(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	<p>A review of Acid Sulfate Soils (ASS) risk mapping provided by DWER indicates that the survey area is mapped as having 'no known risk' of ASS occurring within 3 m of natural soil surface.</p> <p>Any clearing of native vegetation within the survey area has the potential to cause water and wind erosion in areas with lighter-texture soils (e.g. sandy soils).</p> <p>However, given these soils are porous and well-drained, the risk of water erosion is low. Clearing is unlikely to cause substantial land degradation. Controls will be in place during clearing through standard environmental management measures to reduce the risk of wind erosion (water carts). The area will not be left cleared for a long period of time prior to works. If required stabilisation measures such as the application of hydromulch will be applied.</p>	Unlikely to be at variance of this Principle
(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to	No DBCA-managed estates are located within or in the vicinity of the proposed clearing footprint. Construction impacts shall be managed through environmental	Unlikely to be at variance of this Principle

Principle	Assessment	Outcome
<p>have an impact on the environmental values of any adjacent or nearby conservation area.</p>	<p>management measures to reduce any potential impact on surrounding areas, including dust, litter and spread of weeds and diseases.</p>	
<p>(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.</p>	<p>The survey area is located in the RIWI Act listed Yanchep Groundwater Area and the Perth Coastal and Gwelup Underground Water Pollution Control Area Public Drinking Water Source Area (PDWSA), which is a Priority 3 Protection Zone. Priority 3 areas are declared over land where water supply sources need to coexist with other land uses such as residential, commercial and light industrial developments. Vegetation clearing for the project is considered unlikely to impact upon groundwater quality (GHD, 2020).</p> <p>There are no watercourses or wetlands within the clearing area.</p>	<p>Unlikely to be at variance of this Principle</p>
<p>(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.</p>	<p>It is considered unlikely that clearing of vegetation associated with the Pipidinny road widening would cause or exacerbate the incidence or intensity of flooding. Drainage will be considered in the design (in line with water sensitive urban design principles) to ensure runoff is appropriately captured on site and not discharging into the surrounding landscape.</p>	<p>Unlikely to be at variance of this Principle</p>