Aalga Goolil Djarindjin Community Power Project

Native Vegetation Clearing Permit

Supporting Document

Western Environmental Pty Ltd
(08) 6162 8980
PO Box 437, Leederville, WA 6903
enquiries@westenv.com.au
westenv.com.au

Aalga Goolil Djarindjin Community Power Project

Native Vegetation Clearing Permit

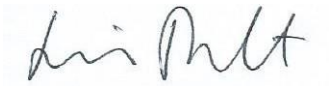
Supporting Document

Report No:
A25.029-RPT-NVCP_1
Issue Date:
1-Dec-2025
Status
FINAL

Prepared for:
RFF Australia Pty Ltd
PO Box 88
Karratha WA 6714

Prepared by
Western Environmental Pty Ltd
Unit 5, 162 Colin Street
West Perth WA 6005
westenv.com.au

Internal Review

Author	Reviewed by	Approved by
		
Lovisa Thambert Consultant	**Brianna Herden** Consultant	**Hannah Sullivan** Associate Consultant
7-Nov-2025	**7-Nov-2025**	**1-Dec-2025**

Distribution Record

Copies	Document ID / Version	Date	Received by
1 (E)	A25.029-RPT-NVCP_0_DRAFT	22-Sep-2025	T. W
1 (E)	A25.029-RPT-NVCP_1_FINAL	1-Dec-2025	T. W

Statement of Limitations

Copyright Statement

© Western Environmental Pty Ltd (WEPL). All rights reserved. No part of this work may be produced in any material form or communicated by any means without the permission of the copyright owner. The unauthorised copying or reproduction of this report or any of its contents is prohibited.

Scope of Services

This environmental report ("this report") has been prepared for the sole benefit and exclusive use of the Client for the purpose for which it was prepared in accordance with the agreement between the Client and WEPL ("the Agreement").

WEPL disclaims any and all liability with respect to any use of or reliance upon this report for any other purpose whatsoever.

In particular, it should be noted that this report is based on a scope of services defined by the Client, and is limited by budgetary and time constraints, the information supplied by the Client (and its agents) and, in some circumstances, access and/or site disturbance constraints.

The scope of services did not include any assessment of the title to or ownership of the properties, buildings and structures referred to in this report, or the application or interpretation of laws in the jurisdiction in which those properties, buildings and structures are located.

Reliance on Data

In preparing this report, WEPL has relied on data, surveys, analyses, designs, plans and other information provided by the Client (or its agents), other individuals and organisations ("the data").

Except as otherwise stated in this report, WEPL has not verified the accuracy or completeness of the data. WEPL does not represent or warrant that the data is true or accurate, and disclaims any and all responsibility or liability with respect to the use of the data.

To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in this report ("conclusions") are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data.

WEPL does not accept any responsibility or liability for any incorrect or inaccurate conclusions should any data be incorrect, inaccurate or incomplete or have been concealed, withheld, misrepresented or otherwise not fully disclosed to WEPL.

The conclusions must also be considered in light of the agreed scope of services (including any constraints or limitation therein) and the methods used to carry out those services, both of which are as stated or referred to in this report.

Environmental Conclusions

Within the limitations imposed by the scope of services, the surveying and preparation of this report have been undertaken and performed in a professional manner, in accordance with generally accepted practices and using a degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. To the maximum extent permitted by law, no other warranty, express or implied, is made.

Report for Benefit of Client

This report is confidential. Neither the whole nor any part of this report, or any copy or extract thereof, may be disclosed or otherwise made available to any third party without the prior written approval of WEPL.

WEPL accepts no liability or responsibility whatsoever in respect of any use of or reliance upon this report, by any person or organisation who is not a party to the Agreement. Reliance on this report by any person who is not a party to the Agreement is expressly prohibited. Any representation in this report is made only to the parties to the Agreement.

WEPL assumes no responsibility and disclaims any and all liability to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in this report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in this report (including without limitation matters arising from any negligent act or omission of WEPL or for any loss or damage suffered by any other party using or relying on the matters dealt with or conclusions expressed in this report, even if WEPL has been advised of the possibility of such use or reliance).

Other parties should not rely on this report or the accuracy or completeness of any conclusions contained in this report, and should make their own enquiries and obtain independent advice in relation to such matters.

If an Auditor is engaged by the Client to undertake review of this report, it shall be made available subject to the terms and conditions of the agreement between the Client and WEPL and the caveats in this statement.

Other Limitations

This report is intended to be read in its entirety, and sections or parts of this report should therefore not be read and relied on out of context.

WEPL will not be liable to update or revise this report to take into account any events or circumstances or facts becoming apparent after the date of this report.

Table of Contents

1. Introduction 5

1.1 Background 5

1.1.1 Clearing Overview 5

1.1.2 Purpose 5

1.2 Site Location and Ownership 6

2. Existing Environment 9

2.1 Climate 9

2.2 Biogeographic and Regional Setting 9

2.3 Geology, Land Systems and Soils 9

2.4 Acid Sulfate Soils 10

2.5 Hydrology 10

2.5.1 Groundwater 10

2.5.2 Surface Water 10

2.6 Pre-European Vegetation 11

2.7 Environmentally Sensitive Areas 11

2.8 Areas of Conservation Significance 11

3. Biological Environment 14

3.1 Previous Surveys 14

3.2 Flora and Vegetation 14

3.2.1 Desktop Assessment 14

3.2.2 Flora 15

3.2.3 Conservation Significant Flora 15

3.2.4 Vegetation 15

3.3 Terrestrial Fauna 17
3.3.1 Fauna assemblage 17
3.3.2 Conservation Significant Fauna 17
3.3.3 Fauna Habitat 18
4. Assessment Against the Ten Clearing Principles 20
5. Avoidance and Mitigation 25
6. Conclusion 26
References 27

Tables

Table 1: Conservation Singificant Fauna Species with High or Medium Likelihood of Occurring 17
Table 2: Assessment Against the Ten Clearing Principles 21

Figures

Figure 1: Clearing Boundary 8
Figure 2: Soils and Topography 12
Figure 3: Environmentally Sensitive Areas and Conservation Estates 13
Figure 4: Vegetation Type and Condition 16
Figure 5: Fauna Habitat 19

Appendices

Appendix A GHD (2023) Flora and Vegetation Survey
Appendix B GHD (2021) Flora and Vegetation Survey
Appendix C WEPL (2025) Fauna Survey Report
Appendix D Flora Desktop Assessment and Likelihood of Occurrence
Appendix E Fauna Desktop Assessment and Likelihood of Occurrence

1. Introduction

1.1 Background

Western Environmental Approvals Pty Ltd (WEPL) presents this document to support a Native Vegetation Clearing Permit (NVCP) for the proposed Aalga Goolil Djarindjin Community Power Project (the Project) within Lot 297 on Deposited Plan 93256 (the Site). The Site is located adjacent to the Djarindjin Community, at the intersection of Djarindjin Lombadina Road and Chile Creek Road in the Dampier Peninsula (Figure 1). Djarindjin Aboriginal Corporation (DAC) is the leaseholder of the land on which the Project will be developed. DAC has established a wholly-owned subsidiary, Aalga Goolil Djarindjin Community Power Pty Ltd, to develop and own the Project.

1.1.1 Clearing Overview

The Project involves the construction of a renewable energy facility comprising 1.6 MWp solar photovoltaic (PV) and 3.52 MWh battery energy storage system (BESS) meeting around 80% of the load on the Djarindjin Lombadina Microgrid. Adjacent to the Project Site, a diesel facility at the existing power station will supply the balance of the load. DAC has incorporated a subsidiary to develop and own the proposed power station (Aalga Goolil Power Station), with generated electricity to be sold to Hoirizon Power under a Power Purchase Agreement (PPA). Clearing for the purpose of bushfire mitigation in the form of an Asset Protection Zone (APZ) will be required within the Site boundary, to enable the Project. A Bushfire Management Plan (BMP) has been prepared for the Project based on an assessment undertaken in September 2025 to inform the extent of required clearing for bushfire mitigation.

The total area of permanent clearing is 7.54 ha, which includes clearing for construction and the establishment of APZs for bushfire risk mitigation.

1.1.2 Purpose

The Project requires an NVCP (Area Permit) to authorise the removal of vegetation. This document provides the supporting documentation to facilitate the NVCP application under Part V of the *Environmental Protection Act 1986* (EP Act).

To support the NVCP application, the following biological surveys and approval documents have been undertaken within the Site:

- Flora and vegetation survey (Detailed and Targeted post-wet season) and basic fauna survey (GHD, 2023).
- Flora and vegetation survey (Detailed and Targeted post-wet season) and basic fauna survey (GHD, 2021).
- Desktop Due diligence assessment (WEPL, 2025a).

- Basic fauna survey and targeted surveys for bilby and northern brushtail possum (WEPL, 2025b).

In addition, this NVCP supporting document provides:

- An overview of the existing physical environmental conditions of the Site.
- An evaluation of the environmental impacts associated with the Project.
- Evidence of avoidance of clearing through site selection and design, reduction of impacts to better quality vegetation or larger populations of Priority flora, and mitigation of impacts during clearing and construction through application of management plans.
- An assessment against the Ten Clearing Principles for proposed clearing within Site.

In addition to immediate impacts to native vegetation, the project planning process has considered broader impacts and approvals with complementary activities and approvals processes underway including:

- A Heritage Due Diligence Assessment undertaken by RFF.
- Engagement with key stakeholder groups in progressing designs.
- Lodgement of Development Application with Shire of Broome.
- A Glint and Glare Assessment to assess any potential visual impacts resulting from the proposed development.
- A Geotechnical investigation and stormwater monitoring to assess potential topography and groundwater constraints.
- Preparation of a Construction Environmental Management Plan (CEMP) to outline high level mitigation measures that will be implemented to incorporate suitable controls to manage the risk to environmental during both construction and operation.
- Preparation of a Bushfire Management Plan (BMP).

1.2 Site Location and Ownership

The Site is located Djarindjin Lombadina Road and Chile Creek Road in the Dampier Peninsula within the Shire of Broome, approximately 174 km north of Broome Townsite.

The Site is currently zoned as 'Settlement (Broome)' under the Shire of Broome Local Planning Scheme No. 7 (LPS 7). It is also located within Special Control Area (SCA) 8 – Aboriginal communities. As per mapping managed by Western Australian Planning Commission (WAPC), the Site is included within the Djarindjin Aboriginal Settlement Layout Plan No. 3 (Layout Plan No. 3) and is zoned as 'Public utility (Power Station)', 'Residential' and 'Open Space' (WAPC, 2008). The Site also includes Lots 1039 and 1040 on Djarindjin

Lombadina Road, as identified within Layout Plan No. 3. These lots form part of Lot 297 on Deposited Plan 93256. The zoning of the Site has been the subject of a recently approved amendment to Layout Plan 3, such that the entirety of Lot 1039 is now zoned Public Utility and previous Open Space within the Site has been rezoned Public Utility, such that all areas within the Site (Lots 1040 and amended Lot 1039) are zoned Public Utility.

DAC are the leaseholder for the above crown lease, which expires on 30 June 2041. Special Lease 3116/10633 under Section 116 of the *Land Act 1933* grants DAC the land for special purpose of 'use and benefit of Aboriginal inhabitants'. This Special Lease is subject to 12 conditions, with a term of 50 years from 1 July 1991 (WAPC, 2008).







Figure 1: Clearing Boundary

N

0 50 100 150 m

PROJECT/REPORT NAME	Djarindjin-Aalga Goolil Solar Project - Native Vegetation Clearing Permit Djarindjin Community, Dampier Peninsula
SCALE	1:2,800
SHEET SIZE	A3 COLOUR
CLIENT	RFF Pty Ltd
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
PROJECT NUMBER	A25.029
VERSION	0
DATA SOURCE	LANDGATE AERIAL IMAGERY NOW
DRAWN BY / REVIEWED BY	JP/LT
DATE	3/12/2025

Legend

- Site boundary
- Cadastre (No Attributes) (LGATE-001)

No	Description	Drawn	Approved	Date
A	Original issue	JP	LT	3/12/2025

NOTES:

Cadastral boundary (LGATE-002). Base map ESRI Topo. Townsites (LGATE-248).

WESTERN ENVIRONMENTAL

Western Environmental Pty Ltd
08 6244 2310 | enquiries@westenv.com.au
Level 3/25 Prowse St, West Perth WA 6005
westenv.com.au

G:\GIS\Project Data\2025\A25.029\3. Projects\3. NVCP\A25.029_NVCP.qgz

COPYRIGHT: This document is and shall remain the property of The Client. This document may only be used for the purpose for which it was commissioned and in accordance with the terms of engagement. The Client does not hold any responsibility for the misuse of this document

Designed and Automated by AC

2. Existing Environment

2.1 Climate

The climate of the central Kimberley region is tropical monsoonal with a warm, dry season (April to November) and a wet season (December to March) (as sited in GHD, 2023). Rainfall is generally received during the summer as a result of unpredictable tropical downpours and cyclonic low pressure systems.

The closest Bureau of Meteorology (BoM) weather station with sufficient historical data is Cygnet Bay (site number 003057), located approximately 15 km north of the survey area. Climate data from this station indicates the mean maximum temperature ranges from 35.4 °C in November to 28.1°C in July. The mean minimum temperature ranges from 14.7 °C in July to 25.7 °C in December. The mean annual rainfall is 824.2 mm (BoM, 2025).

2.2 Biogeographic and Regional Setting

The survey area is located in the Dampierland bioregion and Pindanland sub-region as described by Interim Biogeographic Regionalisation of Australia (IBRA) and mapped by the Department of Climate Change, Energy, the Environment and Water (DCCEEW; 2021).

The Dampierland bioregion is characterised by extensive plains, ranges and spectacular gorges (GHD, 2023). The vegetation is characterised by acacia thickets with scattered trees and areas of grasslands and savannas. The bioregion contains Aboriginal land, pastoral leases and some conservation reserves. The main industries are beef cattle, horticulture and tourism. Major population centres are Broome, Derby and Fitzroy Crossing.

The Pindanland subregion comprises sandplains of the Dampier Peninsular and western part of Dampier Land, including the hinterland of the Eighty Mile Beach. It is a fine-textured sand-sheet with subdued dunes and includes the paleodelta of the Fitzroy River. The vegetation is described primarily as pindan. This is the coastal, semi-arid, north-western margin of the Canning Basin (as sited in GHD, 2023).

2.3 Geology, Land Systems and Soils

The Site is situated across one land system as mapped and described in by the Department of Primary Industries and Regional Development (DPIRD; Figure 2). This is the Yeeda System (335) which is described as red sandplains supporting pindan vegetation with dense acacia shrubs, scattered bloodwood and grey box trees and curly spinifex and ribbon grass (DPIRD-027). The geomorphology of the Site comprises sandplain and dunefields with little organised drainage; sandplain up to 16 km in extent, with shallow valleys, plains with thin sand cover, and scattered pans; limited surface drainage in zones of sheet-flow up to 3.2 km wide and extending up to 8 km downslope from adjacent uplands (Payne and Schoknecht, 2011).

2.4 Acid Sulfate Soils

Acid Sulfate Soils (ASS) are naturally occurring, iron-sulphide rich soils, sediments or organic substrates formed under waterlogged conditions. If exposed to oxygen, these sulphides can oxidise and release sulphuric acid and mobilise heavy metals. This process can occur in response to drainage, dewatering or excavation.

The Australian Soil Resource Information System (ASRIS) ASS risk mapping indicates that there is a 'extremely low' risk of ASS occurring within the Site (Fitzpatrick, Powell ad Marvanek, 2011). The nearest risk of ASS occurrence is an area with 'High' risk approximately 1 km north, associated with the coastline.

2.5 Hydrology

2.5.1 Groundwater

The Site is located within the Canning-Kimberley Proclaimed Groundwater Area, and Canning-Pender subarea (DWER-034). Total salinity across the Site is broadly mapped as <500 milligrams(mg)/litre(L) total dissolved solids (TDS) (DWER-026). Layout Plan No. 3 identifies a Drinking Water Source Protection Area located approximately 60 m north of the Site (DPLH-015).

The depth to the water table in the Canning-Pender subarea is 2-120 m. Groundwater resources of the Dampier Peninsula are generally showing no signs of adverse impacts from current use, however spatial and temporal distribution of groundwater bores across the peninsula provides large gaps in the data (Searle, 2012).

No groundwater mapping dataset is available for the Site.

2.5.2 Surface Water

The nearest mapped watercourse is a river located approximately 370 m south of the Site, which connects with the ocean to the west (WAPC, 2008; DPLH-015). The coastal waterline is located 2 km south-west of the Site.

The Site is located within the Cape Leveque Coast Surface Water Management Area (DWER-041). The Site is not situated in a floodplain control area according to mapping of 1 in 100 Annual Exceedance Probability (AEP) Floodway and Flood Fringe and Floodplain Areas (DWER-014).

Wetland mapping managed by the Department of Biodiversity, attractions and Conservation (DBCA) identifies that there are no important wetlands mapped within the Site (DBCA-010; DBCA-045).

2.6 Pre-European Vegetation

Beard (1990) characterises the area as vegetation association Dampierland (750), characterised by Pindan Woodland; *Acacia* thicket with eucalypt woodland over spinifex *Acacia tumida, Eucalyptus tectifica*, *Corymbia grandifolia, Triodia pungens, T. bitextura* (DPIRD-006).

Currently, approximately 99.5% of this vegetation association remains within the Shire of Broome. The proposed clearing represents 0.0007% of the remaining extent of the vegetation association within the Shire.

2.7 Environmentally Sensitive Areas

The Site intersects one Environmentally Sensitive Area (ESA) as mapped by DWER (DWER-046; Figure 3). From the DBCA Ecological Communities database search (DBCA, 2025a), it was identified that the ESA is associated with a State and Commonwealth listed Threatened Ecological Community (TEC); Monsoon (vine) thickets on the coastal sand dunes of Dampier Peninsula TEC (Vine Thickets TEC). The Site is located within 2 km of the Vine Thickets TEC.

2.8 Areas of Conservation Significance

The Site does not intersect any other mapped area of conservation significance (DBCA-011). The closest conservation area is 1.2 km southwest of the Site which is associated with a marine park.

The Site forms part of the West Kimberley National Heritage Place, which extends across the Dampier Peninsula.

As per the mapping on the Collaborative Australian Protected Areas Database (CAPAD), the Site is also located within the Bardi Jawi Indigenous Protection Area (IPA) (DCCEEW, 2022a). IPAs are areas of land and sea that Traditional Owners have agreed to manage for conservation, with the IPA program jointly managed by DCCEEW and the National Indigenous Australians Agency.

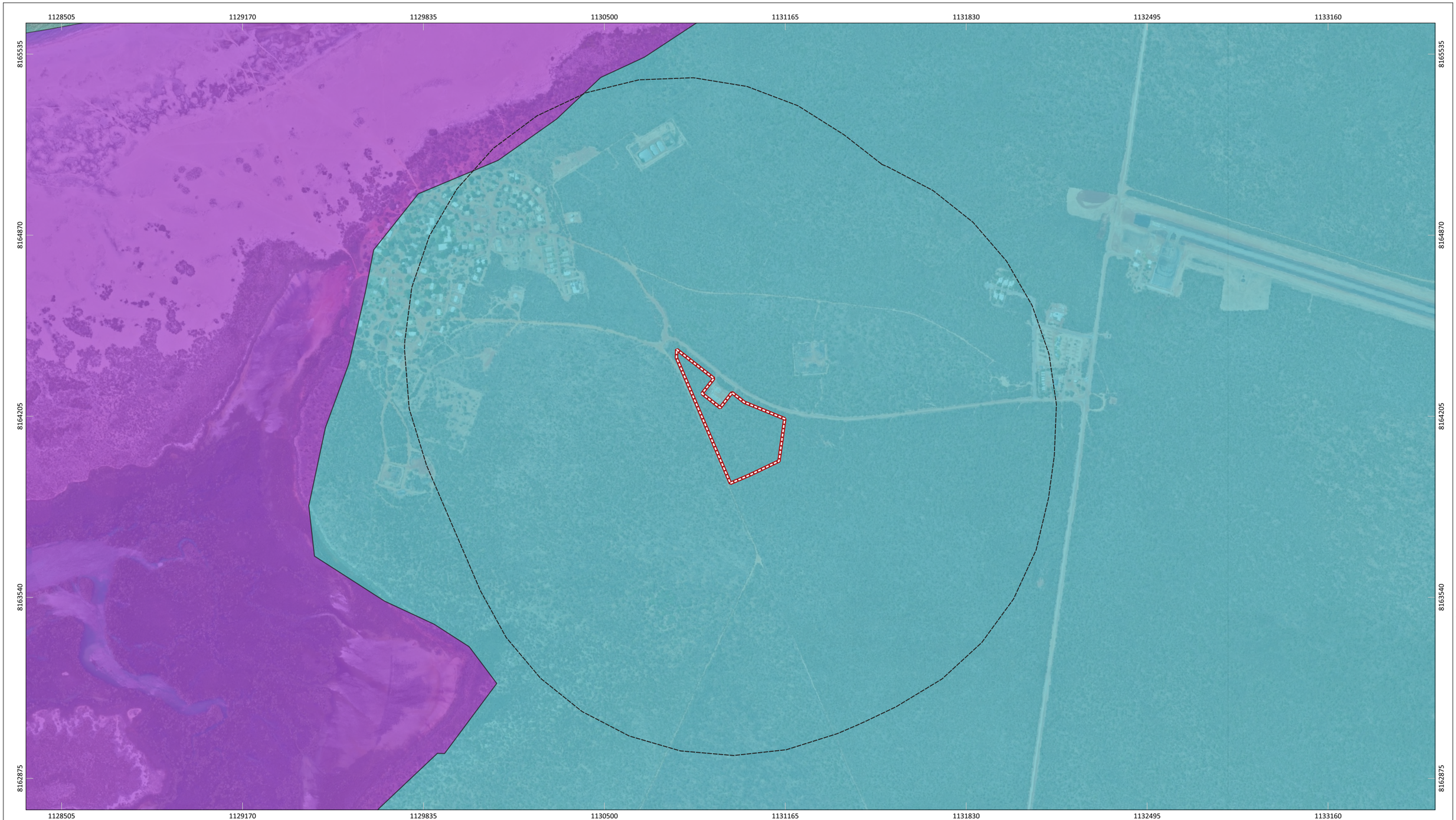


Figure 2: Soils and Topography

N

0 200 400 600 800 m

PROJECT/REPORT NAME	Djarindjin-Aalga Goolil Solar Project - Native Vegetation Clearing Permit Djarindjin Community, Dampier Peninsula
SCALE	1:13,300
SHEET SIZE	A3 COLOUR
CLIENT	RFF Pty Ltd
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
PROJECT NUMBER	A25.029
VERSION	0
DATA SOURCE	LANDGATE AERIAL IMAGERY NOW
DRAWN BY / REVIEWED BY	JP / LT
DATE	3/12/2025

Legend

- Site boundary
- 1km Buffer

Soil Landscape Mapping - Best Available (DPIRD-027)

- 335Cr_2
- 335Ye

No	Description	Drawn	Approved	Date
A	Original issue	JP	LT	3/12/2025

NOTES:

Cadastral boundary from LANDGATE 2022. UFID stands for Unique Identifier

WESTERN ENVIRONMENTAL

Western Environmental Pty Ltd
08 6244 2310 | enquiries@westenv.com.au
Level 3/25 Prowse St, West Perth WA 6005
westenv.com.au

G:\GIS\Project Data\2025\A25.029\3. Projects\3. NVCP\A25.029_NVCP.qgz

COPYRIGHT: This document is and shall remain the property of The Client. This document may only be used for the purpose for which it was commissioned and in accordance with the terms of engagement. The Client does not hold any responsibility for the misuse of this document

Designed and Automated by AC

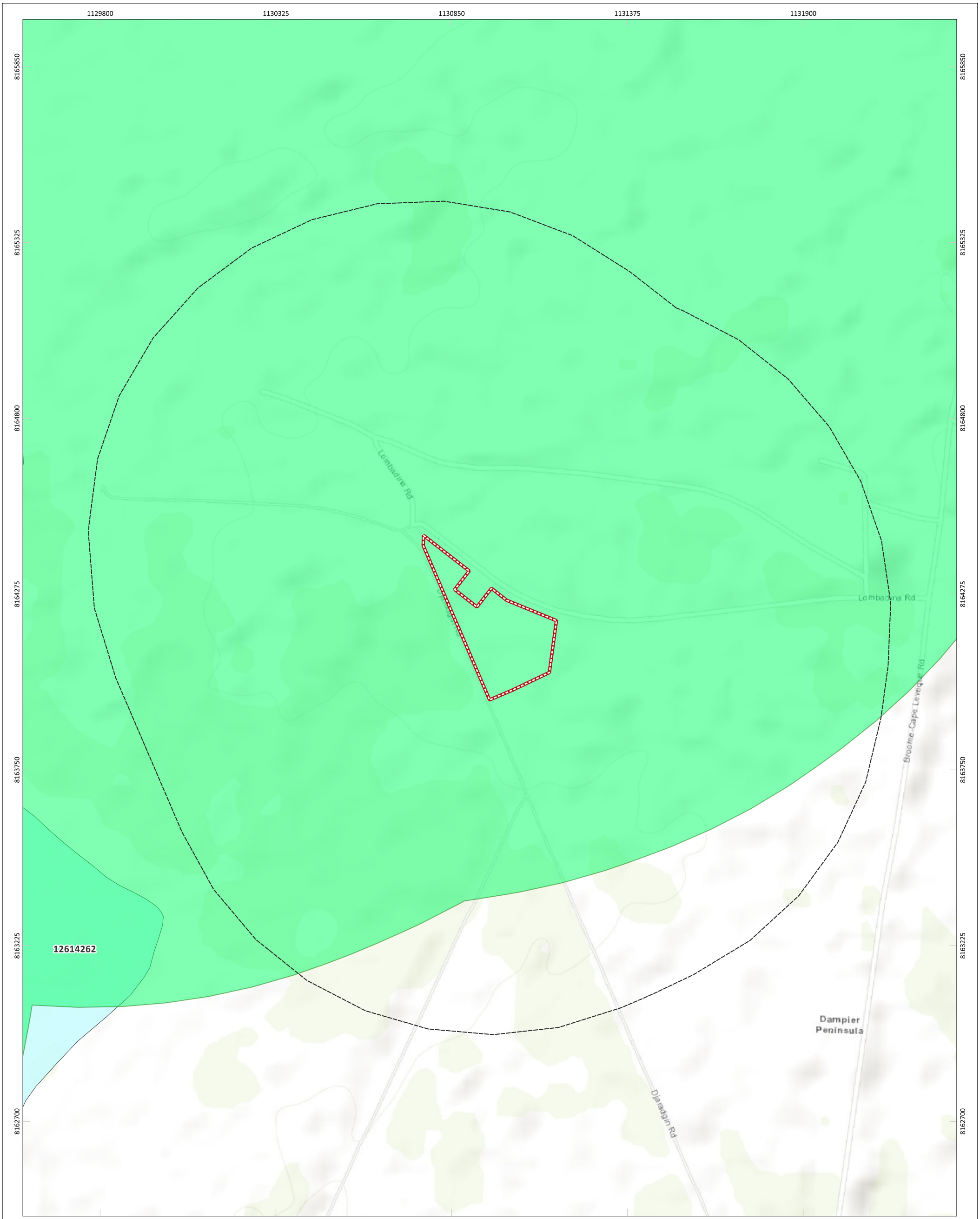


Figure 3: Environmentally Sensitive Areas, Conservation Estate and Bush Forever

0 100 200 300 400 m

N

PROJECT/REPORT NAME	Djarindjin-Aalga Goolil Solar Project - Native Vegetation Clearing Permit Djarindjin Community, Dampier Peninsula
SCALE	1:10,500
SHEET SIZE	A3 COLOUR
CLIENT	RFF Pty Ltd
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
PROJECT NUMBER	A25.029
VERSION	0
DATA SOURCE	ESRI Topographic Map
DRAWN BY / REVIEWED BY	JP/LT
DATE	3/12/2025

Legend

- Site boundary
- 1km Buffer
- Clearing Regulations - Environmentally Sensitive Areas (DWER-046)

DBCA - Legislated Lands and Waters (DBCA-011)

- Marine Park

No	Description	Drawn	Approved	Date
A	Original issue	JP	LT	3/12/2025

NOTES:

Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

WESTERN ENVIRONMENTAL

Western Environmental Pty Ltd
08 6244 2310 | enquiries@westenv.com.au
Level 3/25 Prowse St, West Perth WA 6005
westenv.com.au

G:\GIS\Project Data\2025\A25.029\3. Projects\3. NVCP\A25.029_NVCP.qgz

COPYRIGHT: This document is and shall remain the property of The Client. This document may only be used for the purpose for which it was commissioned and in accordance with the terms of engagement. The Client does not hold any responsibility for the misuse of this document

Designed and Automated by AC

3. Biological Environment

3.1 Previous Surveys

Three recent biological surveys have been undertaken within the Site, including:

- Flora and vegetation survey (Detailed and Targeted post-wet season) and basic fauna survey (GHD, 2023) (Appendix A).
- Flora and vegetation survey (Detailed and Targeted post-wet season) and basic fauna survey (GHD, 2021) (Appendix B).
- Basic fauna survey and Targeted bilby and northern brushtail possum survey (WEPL, 2025b) (Appendix C).

The surveys undertaken by GHD comprised of several individual survey sites, with one of them being a site in Djarindjin covering the same area on Lot 297 on Deposited Plan 93256 as the current Site.

3.2 Flora and Vegetation

3.2.1 Desktop Assessment

The desktop assessment undertaken by GHD (2021; 2023) identified six conservation significant species listed as Priority by DBCA within a 20 km buffer of the Site. An updated likelihood of occurrence assessment undertaken for this clearing permit application confirmed that these species are all considered 'unlikely' to occur within the Site (Appendix D).

An updated search of the DBCA flora database (07-0225FL) on 06 February 2025 indicated the following additional conservation significant species may be present within the Site or surrounding area:

- *Acacia monticola* x *tumida* var. *kulparn* - Priority 3.
- *Cupaniopsis anacardioides* - Priority 3.
- *Paranotis halfordii* - Priority 3.

These three additional species were all considered to have low likelihood of occurring within the Site due to known records being >30 years old and suitable habitat is not present (Appendix A).

One Threatened Ecological Community (TEC) and one Priority Ecological Community (PEC) was identified to occur within 20 km of the Site (GHD, 2021; 2023):

- Monsoon (vine) thickets on the coastal sand dunes of Dampier Peninsula TEC (Vine Thickets TEC) – Endangered (State and Commonwealth).

- Kimberley Association 37 –Priority 3.

Whilst the Site is within a buffer of the Vine Thickets TEC (as indicated by DBCA database records) there were no TECs or PECs identified during the 2021 survey (GHD, 2021). The TEC is not considered to occur within the Site as the landform for the TEC (coastal sand dunes) is not present. A subsequent single-season detailed flora and vegetation survey undertaken in 2023 by GHD also did not identify any TECs or PECs.

3.2.2 Flora

Field surveys undertaken by GHD in 2021 and 2023 identified a total of 47 native flora species within the Djarindjin area. Families best represented include Poaceae (7 species), Fabaceae (6 species) and Malvaceae (5 species). No flora species representing significant range extensions were recorded.

Three weed species were recorded. No declared pests or Weeds of National Significance were recorded by GHD. All introduced species identified during the survey had been previously recorded from the region and sub-region (GHD, 2021).

3.2.3 Conservation Significant Flora

GHD (2021; 2023) did not record any Threatened flora pursuant to the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or *Biodiversity Conservation Act 2016* (BC Act), or Priority flora listed by DBCA, within the Site.

No conservation significant flora species were considered likely to occur (GHD, 2021; 2023).

3.2.4 Vegetation

GHD (2021) confirmed during their field survey that one vegetation type was present within the Site (excluding cleared areas):

- VT04 - *Eucalyptus miniata* and *Corymbia greeniana* woodland to isolated clumps of trees on Pindan red sand loam on low plain.

GHD assessed the entirety of the vegetation within the Site to be in Very Good condition (Figure 4).

No TECs or PECs were identified within the Site during both surveys undertaken by GHD (2021; 2023).



Figure 4: Vegetation Type and Condition

N

0 15 30 45 60 m

PROJECT/REPORT NAME: Djarindjin-Aalga Goolil Solar Project - Native Vegetation Clearing Permit Djarindjin Community, Dampier Peninsula		
SCALE: 1:1,900	SHEET SIZE: A3 COLOUR	CLIENT: RFF Pty Ltd
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A25.029	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY NOW	DRAWN BY / REVIEWED BY: JP/LT	DATE: 3/12/2025

Legend

Site boundary

Vegetation Type

VT04 - Eucalyptus miniata and Corymbia greeniana woodland to isolated clumps of trees on Pindan red sand loam on low plain (GHD, 2023)

Vegetation Condition

VG - Very Good

No	Description	Drawn	Approved	Date
A	Original issue	JP	LT	3/12/2025

NOTES:

Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

WESTERN ENVIRONMENTAL

Western Environmental Pty Ltd
08 6244 2310 | enquiries@westenv.com.au
Level 3/25 Prowse St, West Perth WA 6005
westenv.com.au

G:\GIS\Project Data\2025\A25.029\3. Projects\3. NVCP\A25.029_NVCP.qgz

COPYRIGHT: This document is and shall remain the property of The Client. This document may only be used for the purpose for which it was commissioned and in accordance with the terms of engagement. The Client does not hold any responsibility for the misuse of this document

Designed and Automated by AC

3.3 Terrestrial Fauna

3.3.1 Fauna assemblage

A total of 44 fauna species were recorded within the Site (GHD, 2021; 2023; WEPL, 2025). This total comprised 33 birds, five mammal and six reptile species. Four introduced species (dog, cat, cow and donkey) were recorded in the GHD survey (2021) and are included in this total.

3.3.2 Conservation Significant Fauna

No BC Act or EPBC Act listed Threatened fauna or Priority listed fauna by the DBCA were recorded during the GHD surveys (2021; 2023) or by WEPL (2025).

An updated PMST search on 08 August 2025 (DCCEEW, 2022b) and DBCA fauna database search (48-0125FA) on 31/1/2025 indicated that 11 additional conservation significant fauna species may be present within 20 km of the Site. This included the Northern Blue-tongued Skink, which was recorded within the peninsula during the GHD (2023) survey, however was listed in December 2023 after the GHD (2023) report was completed. An updated likelihood of occurrence assessment was undertaken by WEPL (2025b) to include these additional species and can be found in Appendix E. The assessment identified that seven conservation significant species, listed in Table 1, have a post-survey high or medium likelihood of occurring within the Site.

Table 1: Conservation Significant Fauna Species with High or Medium Likelihood of Occurring

Scientific Name	Common Name	BC Act	EPBC Act	WEPL Likelihood of Occurrence	Justification
Erythrura gouldiae	Gouldian Finch	P4	EN	High	Species not recorded within Survey Area, however very likely to occur as habitat is suitable.
Falco peregrinus	Peregrine Falcon	OS		High	Common and widespread bird species, may perch and forage within the Site.
Lerista separanda	Dampier plain slider	P2	-	Medium	Species is a sand dune specialist, no habitat present within Survey Area
Ozimops cobourgianus	Northern coastal free-tailed bat	P1	-	Medium	Species confined to mangroves, non-present within Survey Area, mangroves occur within 1 km of Survey Area, so species may be occasional flythrough
Simoselaps minimus	Dampier burrowing snake	P2	-	Medium	Species is a sand dune specialist, no habitat present within Survey Area
Tiliqua scincoides intermedia	Northern Blue-tongued Skink	CR	CR	High	Species is widespread and has been known to associate with man-made structure (present near or in the Site, although no evidence recorded in Survey, cannot discount potential presence in large area of connected habitat).

Scientific Name	Common Name	BC Act	EPBC Act	WEPL Likelihood of Occurrence	Justification
Macrotis lagotis	Greater Bilby, Dalgyte, Ninu	VU	VU	Medium	Presence not detected during Survey but has been recorded in habitat contiguous with the Site.
Trichosurus vulpecula arnhemensis	Northern Brushtail Possum	VU	VU	Medium	Appropriate habitat present within the Site, reasonably dense *Eucalyptus* and *Corymbia* woodland with sparse tree hollows, none detected during Survey.

For possibly occurring conservation listed fauna species, habitat types are assessed as either core, supporting or non-significant habitat. As per Commonwealth *Matters of National Environmental Significance (MNES) – Significant Impact Guidelines 1.1* "core" habitat is defined as that critical to the survival of the species and considered to contain denning/ breeding sites, primary foraging areas and refuge from drought, fire and other stresses (DotE, 2013). "Supporting" habitat is defined as that which is likely used for foraging and dispersing/ connective purposes but is not essential habitat for the continuation of a local population. "Non-significant" habitat is that which would be used only very infrequently for foraging or dispersing.

It was considered unlikely that the Site provided core habitat for any species beyond temporary refuge and dispersal. The Greater Bilby was considered to have medium likelihood to occur within the Site given the presence of suitable habitat and records throughout the local and regional area, however none of the surveys undertaken within the Site has recorded Bilby presence (GHD, 2021; 2023; WEPL, 2025). The Site was considered potential burrowing habitat, however proximity to Djaridjin Community was considered to potentially impact on species presence and distribution within the Site.

3.3.3 Fauna Habitat

One fauna habitat type was identified within the Site (GHD, 2023; Figure 5) described as:

- *Eucalyptus* and *Corymbia* on Pindan red sand.

The fauna habitat tended to occur on well-draining porous sandy soil. The condition was considered generally very good to excellent condition and represented high value habitat, with some evidence of disturbance from infrequent fire, edge effects of weeds from adjacent tracks and clearings, and dumped rubbish.

The habitat is considered extensive and widespread in the surrounding bioregion and provides foraging and nesting habitat for a diverse range of insectivorous, nectar and granivore bird species, including foraging habitat for the Gouldian Finch (*Erythrura gouldiae*) and foraging and nesting habitat for the Peregrine Falcon (*Falco peregrinus*). A range of reptiles were also considered to utilise the habitat.

Figure 5: Fauna Habitat

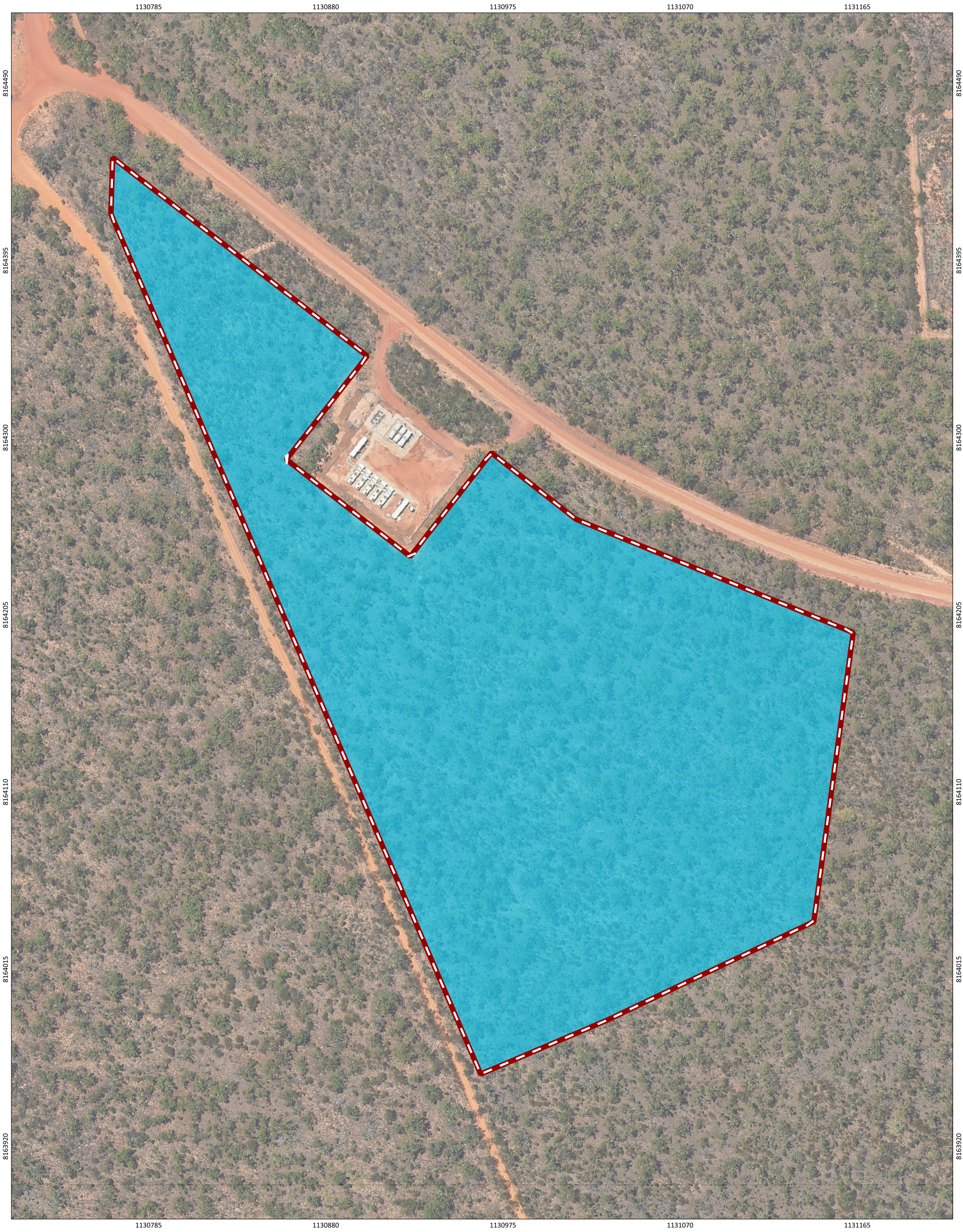


Figure 5: Fauna Habitat

N

0 15 30 45 60 m

PROJECT/REPORT NAME: Djarindjin-Aalga Goolil Solar Project - Native Vegetation Clearing Permit Djarindjin Community, Dampier Peninsula		
SCALE: 1:1,900	SHEET SIZE: A3 COLOUR	CLIENT: RFF Pty Ltd
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A25.029	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY NOW	DRAWN BY / REVIEWED BY: JP/LT	DATE: 3/12/2025

Legend

- Site boundary

Fauna Habitat

- Eucalyptus and Corymbia on Pindan red sand

No	Description	Drawn	Approved	Date
A	Original issue	JP	LT	3/12/2025

NOTES:

Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

WESTERN ENVIRONMENTAL

Western Environmental Pty Ltd
08 6244 2310 | enquiries@westenv.com.au
Level 3/25 Prowse St, West Perth WA 6005
westenv.com.au

COPYRIGHT: This document is and shall remain the property of The Client. This document may only be used for the purpose for which it was commissioned and in accordance with the terms of engagement. The Client does not hold any responsibility for the misuse of this document

Designed and Automated by AC

G:\GIS\Project Data\2025\A25.029\3. Projects\3. NVCP\A25.029_NVCP.qgz

4. Assessment Against the Ten Clearing Principles

An assessment of the proposed 7.54 ha of native vegetation clearing against the Ten Native Vegetation Clearing Principles contained in Schedule 5 of the EP Act is provided in Table 2.

The proposed clearing is unlikely to be at variance with any of the Clearing Principles.

Table 2: Assessment Against the Ten Clearing Principles

Assessment Results	Data Source/Tools for Assessment	Conclusion
Principle (a) - Native vegetation should not be cleared if it comprises a high level of biological diversity.		
The Site is mapped to occur within the Dampierland (750) vegetation association which is well represented with over 99% of the pre-European extent is remaining on a state, regional and local scale. GHD (2021, 2023) did not record any Threatened flora pursuant to the EPBC Act or BC Act, or Priority flora listed by DBCA, within the Site and no conservation significant flora species were considered likely to occur. No TECs or PECs were identified within the Site, even though it was acknowledged to be within the buffer of the Vine Thickets TEC. The TEC was not considered to occur within the Site as the landform for the TEC (coastal sand dunes) was not present (GHD; 2021, 2023). The Site does not provide core habitat for any conservation significant fauna species (GHD, 2021; 2023; WEPL, 2025). Given that the vegetation association is well-represented in the region and that no conservation significant flora or ecological community has been recorded, the proposed clearing is unlikely to be at variance with this principle.	• GHD (2021;2023). • PMST Database search (DCCEEW, 2022). • DBCA Threatened and Priority Flora Database Search (DBCA, 2025b). • GoWA (2019). • Pre-European Vegetation dataset (DPIRD-006).	Unlikely to be at variance.
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		
The survey undertaken by GHD (2021, 2023) and WEPL (2025b) did no record any Threatened and Priority fauna species within the Site pursuant to the EPBC Act or BC Act. Seven conservation significant species were considered to have 'High' or 'Medium' likelihood of occurring within the Site, including: • Gouldian Finch (*Chloebia gouldiae*) - Listed Endangered under EPBC Act and Priority 4 under BC Act. • Grey Falcon (*Falco hypoleucos*) - Listed Vulnerable under EPBC and BC Act. • Peregrine Falcon (*Falco peregrinus*) - Listed Other Specially Protected under the BC Act. • Northern Blue-tongued Skink (*Tiliqua scincoides intermedia*) - Listed Critically Endangered under EPBC and BC Act. • Masked Owl (*Tyto novaehollandiae kimberli*) - Listed Vulnerable under EPBC Act and Priority 1 under BC Act. • Greater Bilby, Dalgyte, Ninu (*Macrotis lagotis*) - Listed Vulnerable under EPBC and BC Act. • Northern Brushtail Possum (*Trichosurus vulpecula arnhemensis*) - Listed Vulnerable under EPBC and BC Act. The Site itself does not provide core habitat for any of the species listed above and the clearing will not impact the availability of suitable habitat for any of these species. To minimise the risk of fauna impact during clearing, mitigation measures such as pre-clearance surveys and directional clearing will be applied. These may be implemented through a CEMP or similar.	• WEPL (2025b). • GHD (2021; 2023). • PMST Database search (DCCEEW, 2025). • DBCA Threatened and Priority Fauna Database Search (DBCA, 2025c).	Unlikely to be at variance

<table>
<tr><th>Assessment Results</th><th>Data Source/Tools for Assessment</th><th>Conclusion</th></tr>
<tr><td colspan="3">Based on the above, the proposed clearing is unlikely to be at variance with this principle.</td></tr>
<tr><td colspan="3">Principle (c) - Native vegetation should not be cleared if it includes or is necessary for the continued existence of, rare flora</td></tr>
<tr><td>No Threatened or Priority flora were recorded during the survey (GHD, 2023) or were considered likely to occur within the Site as identified in the desktop assessment. The vegetation present is unlikely to contain suitable habitat for Threatened or Priority flora species or was not detected during suitable survey effort.
Therefore, the proposed clearing is not at variance with this principle.</td><td>• PMST Database search (DCCEEW, 2022).
• DBCA Threatened and Priority Flora Database Search (DBCA, 2025b).
• GHD (2021; 2023).</td><td>Not at variance.</td></tr>
<tr><td colspan="3">Principle (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</td></tr>
<tr><td>The Site is located within a 2 km buffer of the Vine Thickets TEC, however no TECs or PECs were identified within the Site during the two detailed flora and vegetation surveys. The TEC is not considered to occur within the Site as the landform for the TEC (coastal sand dunes) was not present.
The native vegetation present within the Site does not comprise whole or part of, nor is it likely to be necessary for the maintenance of, a TEC. Therefore, the proposed clearing is not at variance with this principle.</td><td>• GHD (2021; 2023).</td><td>Not at variance</td></tr>
<tr><td colspan="3">Principle (e) - Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been significantly cleared</td></tr>
<tr><td>The Site is not within a constrained area (Damiperland). The high-level vegetation association in this area has been mapped by Beard (1990) as the Dampierland (750) vegetation association. It is described as shrublands, pindan; Acacia tumida shrubland with grey box & cabbage gum medium woodland over ribbon grass & curly spinifex (GoWA, 2019). The extent of this vegetation association remaining at the state, regional and local scale is over 99% as displayed below.

<table><tr><th>Vegetation Association</th><th>% Remaining Western Australia</th><th>% Remaining Carnarvon IBRA Region</th><th>% Remaining Shire of Ashburton</th></tr><tr><td>Dampierland (750)</td><td>99.56</td><td>99.68</td><td>99.51</td></tr></table>
The extent of native vegetation in the local area is consistent with the national objectives and targets for biodiversity conservation in Australia and is not considered to be part of any significant linkage in the locality.
Therefore, the proposed clearing is not at variance with this principle.</td><td>• Beard (1990).
• GoWA (2019).
• Pre-European Vegetation dataset (DPIRD-006).</td><td>Not at variance.</td></tr>
<tr><td colspan="3">Principle (f) - Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or a wetland</td></tr>
</table>

Assessment Results	Data Source/Tools for Assessment	Conclusion
There is no watercourse mapped within the Site. The nearest mapped watercourse is a river located approximately 650 m south of the Site, which connects with the ocean to the west (WAPC, 2008). The coastal waterline is located 2 km south-west of the Site. There are no nationally significant wetlands within a 50 km radius of the Site. The vegetation within the Site is not considered riparian vegetation or growing in association with riparian vegetation. Therefore, the proposed clearing is not at variance to this principle.	• Hydrography (DWER-031). • Directory of Important Wetlands in Australia (DBCA-045).	Not at variance.
Principle (g) - Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation		
The Site is situated on the Yeeda System (335) which is characterised by red sandplains supporting pindan vegetation. Sandplain and dunefields with little organised drainage; sandplain up to 16 km in extent, with shallow valleys, plains with thin sand cover, and scattered pans. The limited surface drainage may result in sheet-flow and the potential for short-term water erosion may occur during the wet season (December to March) due to heavy rainfall. This is not considered to be a long-term issue due to the highly porous soils within the application area. The proposed clearing is mapped as sandy soils which may result in minor wind erosion within the locality, however the surrounding vegetation will provide some protection and limit any wind erosion. Given the nature of soils within the Site, it is unlikely that appreciable land degradation will occur and therefore the proposed clearing is unlikely to be at variance with this clearing principle.	• Australian Bureau of Meteorology (2023). • Soil Landscape Mapping Best Available dataset (DPIRD-027). • Payne and Schoknecht (2011).	Unlikely to be at variance.
Principle (h) - 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		
The Site is located within an ESA associated with the buffer of a TEC, namely Monsoon (vine) thickets on coastal sand dunes of Dampier Peninsula. As identified in the previous surveys, the TEC was not considered to occur within the Site as the landform for the TEC (coastal sand dunes) was not present. The nearest conservation area, Bardi Jawi Gaarra Marine Park, is located approximately 1.2 km west of the Site. The Site forms part of the West Kimberley National Heritage Place, which extends across the Dampier Peninsula. The Site is also located within the Bardi Jawi Indigenous Protection Area (IPA). IPAs are areas of land and sea that Traditional Owners have agreed to manage for conservation, with the IPA program jointly managed by DCCEEW and the National Indigenous Australians Agency. The IPA is designated as IUCN categories IV and VI which are identified for the following purposes: • IV: Habitat/species management area - Areas to protect particular species or habitats, where management reflects this priority. Many will need regular, active interventions to meet the needs of particular species or habitats, but this is not a requirement of the category.	• GHD (2021; 2023). • Environmentally Sensitive Areas dataset (DWER-046). • DBCA Legislated lands and Waters (DBCA-011). • DCCEEW (2022)	Unlikely to be at variance.

Assessment Results	Data Source/Tools for Assessment	Conclusion
• VI: Protected areas with sustainable use of natural resources - Areas which conserve ecosystems, together with associated cultural values and traditional natural resource management systems. Generally large, mainly in a natural condition, with a proportion under sustainable natural resource management and where low-level non-industrial natural resource use compatible with nature conservation is seen as one of the main aims. The use of the Site for renewable energy infrastructure which will service DAC is not considered to be inconsistent with the management categories above. The clearing will not impact flora, fauna, or ecological communities that are of conservation significance, and the end use of the Site will balance ecological impacts with infrastructure that will benefit the community. Given the distance from the nearest conservation area, and that the use of the Site is consistent with the management purposes of the Bardi Jawi IPA, the proposed clearing is unlikely to be at variance with this principle.		
Principle (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		
Layout Plan No. 3 identifies a Drinking Water Source Protection Area located approximately 60 m north of the Site and the nearest mapped watercourse is a river located approximately 650 m south of the Site. The vegetation type within the Site is not associated with riparian vegetation. It is unlikely the proposed clearing will result in significant changes to the water table and there for the Proposed Clearing is unlikely to be at variance with this principle.	• Hydrography (DWER-031) • WAPC (2008).	Unlikely to be at variance.
Principle (j) - Native vegetation should not be cleared if the clearing of the vegetation is likely to cause or exacerbate the incidence or intensity of flooding.		
The proposed clearing may increase the risk of localised flooding following periods of heavy rainfall, which is commonly experienced by the region. Given the soil within the Site is sandy, which is highly permeable, it is considered that the soils and conditions onsite are not prone to waterlogging or generating surface water run-off and any potential waterlogging would be short-term. The *A Guide to the Assessment of Applications to Clear Native Vegetation* (DER, 2014) states the following for Principle (j): "Consideration of this principle may require extensive modelling of the whole catchment and should only be considered for large clearing projects. For smaller applications, clearing should not cause waterlogging (localised flooding)." Given no watercourses, wetlands or vegetation associated with watercourses are recorded within the Site, and the Site is not situated in a floodplain control area, the proposed clearing is unlikely to contribute to waterlogging and exacerbate flooding. The proposed clearing is therefore unlikely to be at variance with this principle.	• FPM 1 in 100 (1%) AEP Floodway and Flood Fringe Area (DWER-014). • Soil Landscape Mapping Best Available dataset (DPIRD-027). • A guide to the assessment of applications to clear native vegetation (DER, 2014). • GHD (2021; 2023).	Unlikely to be at variance.

5. Avoidance and Mitigation

The extent of proposed clearing has been minimised as far as possible to provide adequate space for the necessary infrastructure as well as mitigation of bushfire risks. Any mitigation measures or onsite management deemed necessary through the complementary approvals processes will be applied. Opportunities to minimise the clearing footprint and avoid impacts were limited given the asset protection zones required to reduce bushfire risk.

Methods that will be used during construction to minimise impacts on surrounding vegetation include:

- Utilisation of existing cleared land for the storage of materials.
- Using existing track and road systems for access.
- Prune rather than clearing where possible.

The assessment against the ten clearing principles identified the need for a CEMP to be prepared prior to construction. This will detail the high-level management measures that will be implemented to minimise impacts to environmental values during clearing and construction works and minimise risk of indirect impacts to adjacent vegetation. The CEMP will include, but is not limited to, mitigation measures to the following risks:

- Unauthorized clearing.
- Fauna injury or death.
- Wind/air dispersal of noise, vibration and dust.
- Water and soil contamination.
- Spread of soil pathogens and weeds.
- Inappropriate waste management.
- Dewatering.

6. Conclusion

Based on the assessment above, the proposed clearing is considered unlikely to be at variance with any clearing principles.

The environmental impacts resulting from the proposed works can be effectively minimised through the preparation and implementation of a CEMP with standard best practice mitigation measures. Further mitigation measures and onsite management deemed necessary through the complementary approvals processes will be applied.

References

Beard, J. S. (1976). *Vegetation Survey of Western Australia. Western Australia 1: 1 000 000 Vegetation Series*. Department of Geography, University of Western Australia.

Bureau of Meteorology. (2025). *Monthly Climate Data Statistics*. Retrieved from https://www.bom.gov.au/climate/data.

Department of Climate Change, Energy, Environment and Water (DCCEEW). (2021). *Australia's bioregions (IBRA).* Retrieved on 12 August 2025 from https://www.environment.gov.au/land/nrs/science/ibra.

Department of Climate Change, Energy, the Environment and Water (DCCEEW). (2022a). *Protected Matters Search Tool*. Canberra, Australia. Retrieved on 15 August 2025 from https://www.dcceew.gov.au/environment/epbc/protected-matters-search-tool.

Department of Climate Change, Energy, the Environment and Water (DCCEEW). (2022b). Collaborative Australian Protected Areas Database (CAPAD). Retrieved on 28 August 2025 from https://www.dcceew.gov.au/environment/land/nrs/science/capad/2022.

Department of the Environment (DotE). (2013). *Matters of National Environmental Significance: Significant Impact Guidelines 1.1.* Canberra, Australia.

Department of Environment Regulation. (2014). *A Guide to the Assessment of Applications to Clear Native Vegetation - Under Part V Division 2 of the Environmental Protection Act 1986.* Retrieved on 19 August 2025 from https://www.der.wa.gov.au/images/documents/your-environment/native vegetation/Guidelines/Guide2_assessment_native_veg.pdf.

Fitzpatrick, R., Powell, B. and Marvanek, S. (2011). *Atlas of Australian Acid Sulfate Soils version 4*. CSIRO Data Collection. Retrieved on 12 August 2025 from https://data.csiro.au/collection/csiro:6181.

GHD (2021). *283 - West Kimberley Solar Flora and Fauna Assessment.* Unpublished report for Horizon Power.

GHD (2023). *Future Energy Systems: Dampier Peninsula and Warmum. Biological Survey.* Unpublished report for Horizon Power.

Government of Western Australia. (2019). *2018 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report).* Current as of March 2019. WA Department of Biodiversity, Conservation and Attractions, Perth.

Payne, A., L. and Schoknecht, N. (2011). *Land systems of the Kimberley region, Western Australia, Technical Bulletin 98.* Department of Agriculture and Food, Western Australia, Perth.

Searle, J. A. (2012). *Groundwater resource review, Dampier Peninsula. Hydrogeological record series, report no. HG57*. Department of Water, Perth. https://www.wa.gov.au/system/files/2022-04/Groundwater-resource-review-Dampier-Peninsula.pdf.

Western Environmental Approvals Pty Ltd (WEPL) (2025a). *Djarindjin-Aala Goolil Solar Project - Environmental Due Diligence.* Unpublished report prepared for RFF Australia Pty Ltd.

Western Environmental Approvals Pty Ltd (WEPL) (2025b). *Djarindjin-Aala Goolil Solar Project - Basic fauna survey and Targeted bilby and northern brushtail possum survey*. Unpublished report prepared for RFF Australia Pty Ltd.

Western Australian Planning Commission (WAPC). (2008). *Djarindjin Layout Plan 3 - Background Report*. Department of Planning.

Datasets Used

Department of Biodiversity, Conservation and Attractions (DBCA). (2018). *Directory of Important Wetlands in Australia - Western Australia (DBCA-045).* Retrieved on 12 August 2025 from https://catalogue.data.wa.gov.au/dataset/directory-of-important-wetlands-in-western-australia.

Department of Biodiversity, Conservation and Attractions (DBCA). (2017). *Ramsar Sites (DBCA-010).* Retrieved on 12 August 2025 from https://catalogue.data.wa.gov.au/dataset/ramsar-sites.

Department of Primary Industries and Regional Development (DPIRD). (2019). *Pre-European Vegetation (DPIRD-006*). Retrieved on 12 August 2025 from https://catalogue.data.wa.gov.au/dataset/pre-european-dpird-006.

Department of Primary Industries and Regional Development (DPIRD). (2022). *Soil Landscape Mapping-Best Available (DPIRD-027).* Retrieved on 12 August 2025 from https://catalogue.data.wa.gov.au/dataset/soil-landscape-mapping-best-available.

Department of Planning, Lands and Heritage (DPLH) (2019). *Aboriginal Settlements - Land Use (DPLH-015).* Retrieved on 12 August 2025 from https://catalogue.data.wa.gov.au/dataset/aboriginal-settlements-land-use-dop-048.

Department of Water and Environmental Regulation (DWER). (2018a). *RIWI Act, Groundwater Areas (DWER-034).* Retrieved on 12 August 2025 from https://catalogue.data.wa.gov.au/dataset/riwi-act-groundwater-areas.

Department of Water and Environmental Regulation (DWER). (2018b). *Groundwater Salinity Statewide (DWER-026).* Retrieved on 12 August 2025 from https://catalogue.data.wa.gov.au/dataset/groundwater-salinity-statewide.

Department of Water and Environmental Regulation (DWER). (2018c) *Surface Water Management Areas (DWER-041)*. Retrieved on 12 August 2025 from https://catalogue.data.wa.gov.au/dataset/surface-water-management-areas.

Department of Water and Environmental Regulation (DWER). (2018d). *FPM 1 in 100 (1%) AEP Floodway and Flood Fringe Area (DWER-014).* Retrieved on 12 August 2025 from https://catalogue.data.wa.gov.au/dataset/fpm-100-year-ari-floodway-and-flood-fringe-areas.

Department of Water and Environmental Regulation (DWER). (2018e). *Hydrography, Linear (Hierarchy) (DWER-031).* Retrieved on 12 August 2025 from https://catalogue.data.wa.gov.au/dataset/hydrography-linear-hierarchy.

Appendix A
GHD (2023) Flora and Vegetation Survey

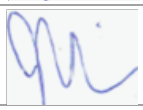
Future Energy Systems: Dampier Peninsula and Warmun

Biological survey

Horizon Power

19 May 2023



Project name		Future Energy Systems					
Document title		Future Energy Systems: Dampier Peninsula and Warmun | Biological survey					
Project number		12598389					
File name		12598389-REV-A_Dampier Peninsular and Warmun Biological Assessment					
Status Code	Revision	Author	Reviewer		Approved for issue		
			Name	Signature	Name	Signature	Date
S3	Rev A	E Lynch, S Flemington, L Hurst	J Collins		J Collins		24/04/23
S4	Rev 0	E Lynch, S Flemington, L Hurst	J Collins		J Collins		19/05/23

GHD Pty Ltd | ABN 39 008 488 373

999 Hay Street, Level 10

Perth, Western Australia 6000, Australia

T +61 8 6222 8222 | **F** +61 8 6222 8555 | **E** permail@ghd.com | **ghd.com**

© GHD 2023

This document is and shall remain the property of GHD. The document may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

Executive Summary

Horizon Power is proposing Future Energy Systems for five communities in the Kimberley region, Western Australia (WA). There are a total of seven individual sites (survey areas):

– Warmun (north and south)
– Ardyaloon (north and south)
– Beagle Bay
– Bidyadanga
– Djarindjin

GHD have been commissioned to undertake a detailed (single season) flora and vegetation survey and a basic and targeted fauna survey of the proposed survey areas. The total area of each survey area is:

– Warmun (north), approximately 5 ha
– Warmun (south), 4.25 ha
– Beagle Bay, 11.49 ha
– Ardyaloon (north), 10.08 ha
– Ardyaloon (south), 37.17 ha
– Djarindjin, 10.32 ha
– Bidyadanga, 28.19 ha.

The outcomes of the assessment will be used to inform the project design and provide information to support a native vegetation clearing permit application under Part V of the *Environmental Protection Act 1986*.

Key findings

Flora and vegetation

Seven vegetation types aligning with broad landforms were identified and described in the survey areas, not including cleared tracks. These have been summarised in the below table.

Survey Area	Vegetation Type
Warmun	VT01 – *Corymbia* Open Woodland on stony undulating plains VT02 – *Corymbia* /Terminalia Open Woodland on rocky hills and ridges VT03 - *Lophostemon* Open Woodland on minor drainage areas
Djarindjin	VT04 - *Eucalyptus miniata* and *Corymbia greeniana* woodland to isolated clumps of trees on Pindan red sand loam on low plain
Beagle Bay	VT04 - *Eucalyptus miniata* and *Corymbia greeniana* woodland to isolated clumps of trees on Pindan red sand loam on low plain VT05 - *Corymbia greeniana* and *Corymbia bella* isolated clumps of trees over *Melaleuca nervosa* subsp *crosslandiana* open woodland on silty loam over clay on drainage flats/floodplain
Ardyaloon	VT04 - *Eucalyptus miniata* and *Corymbia greeniana* woodland to isolated clumps of trees on Pindan red sand loam on low plain VT06 - *Corymbia greeniana* and *Corymbia* sp open woodland on sandy Pindan plain with occasional rocky outcrops.
Bidyadanga	VT07 - *Corymbia hamersleyana* and *Corymbia flavescens* open woodland on red brown sandplain

No TEC's listed under the *Environment Protection and Biodiversity Conservation Act 1999* or *Biodiversity Conservation Act 2016* were identified within the survey areas during the field survey. VT05 within the Beagle Bay survey area represents the Priority Ecological Community Kimberley Vegetation Association 67. VT05 is analogous with the Vegetation Association 67 based on species present, type and landform.

The condition of the vegetation within the survey area ranged from Excellent to Good. The vegetation structure was intact with limited signs of cattle/donkey activity and a low number of introduced flora were recorded for most of the survey areas. There are some tracks present, such as tracks along fencelines. The Warmun survey area recorded signs of previous clearing, edge effects, rubbish, fire and weeds.

One hundred and thirty-one flora taxa (including subspecies and varieties) representing 37 families and 97 genera were recorded from the Ardyaloon, Beagle Bay, Djarindjin and Bidyadanga survey areas during the field survey. One hundred and twenty flora taxa (including subspecies and varieties) representing 33 families and 87 genera were recorded from the Warmun survey areas during the field survey. None of the introduced/naturalised flora taxa identified during the survey are listed as a Declared Pest under the *Biosecurity and Management Act 2007* or a Weed of National Significance. All of the introduced flora have been previously recorded from the Dampierland and Central Kimberley bioregions.

No *Environment Protection and Biodiversity Conservation Act 1999* or *Biodiversity Conservation Act 2016* listed flora were recorded from the survey areas.

Three Department of Biodiversity, Conservation and Attractions Priority three listed taxa were recorded from the following survey areas:

– *Goodenia byrnesii* (Priority 3) – Warmun survey area
– *Triodia acutispicula* (Priority 3) – Ardyaloon survey area
– *Tephrosia andrewii* (Priority 3) – Bidyadanga survey area

The Priority three species *Goodenia byrnesii* was recorded from the Warmun survey area. This species was recorded opportunistically from five individuals in the southern survey area and represents a range extension. The Priority three species *Triodia acutispicula* was recorded from the north and south Ardyaloon survey areas. This species was recorded from 17 locations with a total of 149 individuals and ranged in percentage cover between 1 – 60% within VT06. The Priority three species *Tephrosia andrewii* was recorded from the Bidyadanga survey area. This species was recorded from 10 locations with a total of 121 individuals.

All other potential significant flora for all survey areas are considered unlikely to occur.

The following common species represent flora of interest as they represent range extensions recorded within the Warmun survey area:

– *Goodenia heterochila* – significant range extension of approximately 450 km north and first record within the Central Kimberley bioregions
– *Euphorbia drummondii* – significant range extension of approximately 350 km east and first record within the Central Kimberley bioregions
– *Pterocaulon verbascifolium* – range extension of approximately 150 km east and south

Fauna

Six broad fauna habitat types (not including cleared) were identified within the survey area based on the predominant landforms, soil and vegetation structure in the area. In total across all sites/regions 47 fauna species were identified, which included 24 birds, 10 reptiles, three mammals and two amphibians. Two of the species are introduced (Dog and Donkey).

No *Environment Protection and Biodiversity Conservation Act 1999* or *Biodiversity Conservation Act 2016* listed Threatened fauna or Priority listed fauna by the DBCA were recorded during the survey. One Marine listed species under the *Environment Protection and Biodiversity Conservation Act 1999*, the Rainbow Bee-eater (*Merops ornatus*), was recorded at the Ardyaloon site. This species is widespread across Australia and WA and occupies a wide variety of habitats. It is likely this species would be present across all the survey sites on the Dampier Peninsula and at Warmun.

No evidence of Greater Bilby (*Macrotis lagotis*) (Vulnerable) activity (footprints, foraging holes, burrows or scats) was recorded within the Dampier Peninsula survey areas.

The likelihood of occurrence of significant fauna species has been separated by each survey site:

Beagle Bay

– Five fauna species are considered likely to occur due to potentially suitable foraging and/or breeding habitat in the survey area and close proximity of previous records. These include Gouldian Finch (*Erythrura gouldiae*) (P4), Grey Falcon (*Falco hypoleucos*) (OS), Peregrine Falcon (*Falco peregrinus*) (OS), Oriental pratincole (*Glareola maldivarum*) (MI) and Greater Bilby (*Macrotis lagotis*) (VU).
– 15 species are considered unlikely to occur and 9 species are considered highly unlikely to occur.

Bidyadanga

– Four fauna taxa are considered Likely to occur due to potentially suitable foraging and/or breeding habitat in the survey area and close proximity of previous records. These include Oriental Pratincole (*Glareola maldivarum*) (MI), Grey Falcon (*Falco hypoleucos*) (VU), Rainbow Bee-eater (*Merops ornatus*) (MA) and Greater Bilby (*Macrotis lagotis*) (VU)
– Thirty-eight fauna taxa are considered Unlikely to occur
– Twenty fauna taxa are considered Highly Unlikely to occur

Ardyaloon

– Six fauna are considered likely to occur due to potentially suitable foraging and/or breeding habitat in the survey area and close proximity of previous records. These include Gouldian Finch (*Erythrura gouldiae*) (P4), Grey Falcon (*Falco hypoleucos*) (VU), Peregrine Falcon (*Falco peregrinus*) (OS), Greater Bilby (*Macrotis lagotis*) (VU), Dampierland Burrowing snake (*Simoselaps minimus*) (P2), and Dampierland plain slider (*Lerista separanda*) (P2)
– Forty six (46) fauna considered unlikely or highly unlikely to occur.

Djarindjin

– Gouldian Finch (*Erythrura gouldiae*) (P4), Peregrine Falcon (*Falco peregrinus*) (OS), Dampierland Burrowing snake (*Simoselaps minimus*) (P4), Dampierland plain slider (*Lerista separanda*) (P2) and Greater Bilby (*Macrotis lagotis*) (VU) are likely to occur,
– 14 unlikely to occur and
– 30 highly unlikely to occur.

Warmun

– Three species are Likely to occur: Gouldian Finch (*Erythrura gouldiae*) (P4), Peregrine Falcon (*Falco peregrinus*) (OS) and Grey Falcon *(Falco hypoleucos*) (VU)
– One is Highly Unlikely to occur
– 23 are Unlikely to occur

Contents

1. Introduction **1**
1.1 Project background 1
1.2 Purpose of this report 1
1.3 Location 1
1.3.1 Survey area 1
1.3.2 Study area 2
1.4 Scope of works 2
1.5 Relevant legislation, conservation codes and background information 2
1.6 Report limitations and assumptions 2

2. Methodology **4**
2.1 Desktop assessment 4
2.1.1 Flora and vegetation 4
2.1.2 Fauna 5
2.2 Field survey 5
2.2.1 Survey timing and personnel 5
2.2.2 Guiding documents 5
2.2.3 Data collection and storage 6
2.2.4 Detailed and targeted flora and vegetation survey 6
2.2.5 Basic and targeted fauna survey 7

3. Desktop assessment – Warmun **9**
3.1 Location 9
3.2 Physical environment 9
3.2.1 Climate 9
3.2.2 Land systems and soil 9
3.3 Land use 9
3.3.1 Conservation reserves and estates 9
3.3.2 Environmentally sensitive areas 10
3.4 Hydrology 10
3.4.1 Wetlands 10
3.5 Vegetation and flora 10
3.5.1 Regional biogeography 10
3.5.2 Broad vegetation mapping and extent 10
3.5.3 Significant ecological communities 11
3.5.4 Flora diversity 11
3.5.5 Significant flora 11
3.6 Fauna 12
3.6.1 Fauna diversity 12
3.6.2 Significant fauna 12

4. Desktop Assessment – Beagle Bay **13**
4.1 Location 13
4.2 Physical environment 13
4.2.1 Climate 13
4.2.2 Land systems and soil 13
4.3 Land use 13

4.3.1 Conservation reserves and estates 13
4.3.2 Environmentally sensitive areas 13
4.4 Hydrology 14
4.4.1 Wetlands 14
4.5 Vegetation and flora 14
4.5.1 Regional biogeography 14
4.5.2 Broad vegetation mapping and extent 14
4.5.3 Significant ecological communities 15
4.5.4 Flora diversity 16
4.5.5 Significant flora 16
4.6 Fauna 16
4.6.1 Fauna diversity 16
4.6.2 Significant fauna 16
5. Desktop Assessment – Ardyaloon 17
5.1 Location 17
5.2 Physical environment 17
5.2.1 Climate 17
5.2.2 Land systems and soil 17
5.3 Land use 17
5.3.1 Conservation reserves and estates 17
5.3.2 Environmentally sensitive areas 18
5.4 Hydrology 18
5.4.1 Wetlands 18
5.5 Vegetation and flora 18
5.5.1 Regional biogeography 18
5.5.2 Broad vegetation mapping and extent 18
5.5.3 Significant ecological communities 19
5.5.4 Flora diversity 19
5.5.5 Significant flora 20
5.6 Fauna 20
5.6.1 Fauna diversity 20
5.6.2 Significant fauna 20
6. Desktop assessment – Djarindjin 21
6.1 Location 21
6.2 Physical environment 21
6.2.1 Climate 21
6.2.2 Land systems and soil 21
6.3 Land use 21
6.3.1 Conservation reserves and estates 21
6.3.2 Environmentally sensitive areas 21
6.4 Hydrology 22
6.4.1 Wetlands 22
6.5 Vegetation and flora 22
6.5.1 Regional biogeography 22
6.5.2 Broad vegetation mapping and extent 22
6.5.3 Significant ecological communities 23
6.5.4 Flora diversity 23
6.5.5 Significant flora 23
6.6 Fauna 24

6.6.1 Fauna diversity 24
6.6.2 Significant fauna 24
7. Desktop assessment – Bidyadanga 25
7.1 Location 25
7.2 Physical environment 25
7.2.1 Climate 25
7.2.2 Land systems and soil 25
7.3 Land use 25
7.3.1 Conservation reserves and estates 25
7.3.2 Environmentally sensitive areas 25
7.4 Hydrology 26
7.4.1 Wetlands 26
7.5 Vegetation and flora 26
7.5.1 Regional biogeography 26
7.5.2 Broad vegetation mapping and extent 26
7.5.3 Significant ecological communities 27
7.5.4 Flora diversity 27
7.5.5 Significant flora 28
7.6 Fauna 28
7.6.1 Fauna diversity 28
7.6.2 Significant fauna 28
9. Field survey results 29
9.1 Flora and vegetation 29
9.1.1 Vegetation types 29
9.1.2 Significant vegetation communities 29
9.1.3 Vegetation condition 36
9.1.4 Flora diversity 36
9.1.5 Introduced flora 36
9.1.6 Significant flora 37
9.1.7 Flora of interest 39
9.2 Fauna 39
9.2.1 Fauna habitats 39
9.2.2 Fauna diversity 45
9.2.3 Significant fauna 45
10. Conclusion 48
11. References 49

Table index

Table 1 Desktop information sources 4
Table 2 Fauna references 8
Table 3 Land systems within the survey area 9
Table 4 Hydrology aspects within the study area 10
Table 5 Extent of pre-European vegetation association mapped within the survey area (DBCA 2019) 11
Table 6 Land systems within the survey area 13

Table 7	Hydrology aspects within the study area	14
Table 8	Extent of pre-European vegetation association mapped within the survey area (DBCA 2019)	15
Table 9	Threatened and Priority Ecological Communities identified in the desktop searches	15
Table 10	Land systems within the survey area	17
Table 11	Hydrology aspects within the study area	18
Table 12	Extent of pre-European vegetation association mapped within the survey area (DBCA 2019)	19
Table 13	Threatened and Priority Ecological Communities identified in the desktop searches	19
Table 14	Land system within the survey area	21
Table 15	Hydrology aspects within the study area	22
Table 16	Extent of pre-European vegetation association mapped within the survey area (DBCA 2019)	23
Table 17	Threatened and Priority Ecological Communities identified in the desktop searches	23
Table 18	Land system within the survey area	25
Table 19	Hydrology aspects within the study area	26
Table 20	Extent of pre-European vegetation association mapped within the survey area (DBCA 2019)	27
Table 21	Threatened and Priority Ecological Communities identified in the desktop searches	27
Table 22	Vegetation types within the survey area	30
Table 23	Vegetation condition extent in the survey areas	36
Table 24	Fauna habitat types within the survey area	40
Table 25	Bilby plot trackability scores	45

Appendices

Appendix A	Figures
Appendix B	Relevant legislation, conservation codes and background information
Appendix C	Desktop searches
Appendix D	Flora survey results
Appendix E	Fauna survey results

1. Introduction

1.1 Project background

Horizon Power is proposing Future Energy Systems (FES) for five communities in the Kimberley region, Western Australia (WA). Each site is proposed to have solar/battery energy storage system and small thermal generators to achieve high renewable energy penetration. These areas need to be cleared of native vegetation plus connection to existing distribution lines. The land is to be secured via Lease from the Crown after extensive negotiation with Traditional Owners and Community councils. The subject land cannot be developed without obtaining native vegetation clearing permits (NVCP) that will be supported by detailed flora and fauna surveys and assessments.

There are a total of seven individual sites (survey areas):

– Warmun (two separate sites)
– Ardyaloon (north and south)
– Beagle Bay
– Bidyadanga
– Djarindjin

GHD Pty Ltd (GHD) has previously completed the following flora and fauna assessment at a site in Warmun, relevant to the project:

– GHD (2019) Horizon Power Site assessment for the proposed Warmun Solar Area, unpublished report prepared for Horizon Power, Western Australia.

GHD have also previously completed the following flora and fauna assessment at Ardyaloon, Beagle Bay, Bidyadanga and Djarindjin, relevant to the project:

– GHD (2021) Horizon Power 283 – West Kimberley Solar flora and fauna assessment, unpublished report prepared for Horizon Power, Western Australia.

GHD have been commissioned to undertake a detailed (single season) flora and vegetation survey and a basic and targeted fauna survey of the proposed sites (the survey area).

1.2 Purpose of this report

GHD Pty Ltd (GHD) was commissioned by Horizon Power to undertake a detailed and targeted flora and vegetation survey and a basic and targeted fauna survey for seven separate locations (survey areas) at Warmun, Ardyaloon, Beagle Bay, Bidyadanga and Djarindjin to support the environmental assessment and approval process. The purpose of the assessment is to define sensitive environmental values, in particular their spatial location and conservation significance, so the impacts of the proposed works can be managed to inform subsequent approvals and works to be undertaken. The outcomes of the assessment will be used to inform the project design and provide information to support a native vegetation clearing permit application under Part V of the *Environmental Protection Act 1986* (EP Act).

1.3 Location

1.3.1 Survey area

Five of the survey areas, Ardyaloon north, Ardyaloon south, Beagle Bay, Bidyadanga and Djarindjin, are located within the West Kimberley region of WA. The Warmun survey areas are located in the east Kimberley region of WA.

The total area of each survey area is:

– Warmun (north), approximately 5 ha
– Warmun (south), 4.25 ha

– Beagle Bay, 11.49 ha
– Ardyaloon (north), 10.08 ha
– Ardyaloon (south), 37.17 ha
– Djarindjin, 10.32 ha
– Bidyadanga, 28.19 ha.

The locations of each of the seven survey areas is shown on Figure 1, Figure 7, Figure 13, Figure 19 and Figure 25 (Appendix A).

1.3.2 Study area

A study area was defined for the desktop-based searches of the assessment and consists of a 20 km buffer of the survey areas.

1.4 Scope of works

The scope of works included the following:

– A desktop assessment of relevant literature, databases and spatial datasets to determine the environmental values that may be present within or in close proximity to the seven survey areas
– A detailed and targeted flora and vegetation survey
– A basic and targeted fauna survey
– A concise technical report (this document) outlining the method and compiling the results of the assessment

1.5 Relevant legislation, conservation codes and background information

In Western Australia (WA) significant communities, and flora and fauna are protected under both Federal and State Government legislation, including the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), *Environmental Protection Act 1986* (EP Act), *Biodiversity Conservation Act 2016* (BC Act) and the *Biosecurity and Agriculture Management Act 2007* (BAM Act).

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 are provided in Appendix B.

1.6 Report limitations and assumptions

This report has been prepared by GHD for Horizon Power and may only be used and relied on by Horizon Power for the purpose agreed between GHD and Horizon Power as set out in section 1.4 of this report.

GHD otherwise disclaims responsibility to any person other than Horizon Power 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 Horizon Power 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 flora and fauna values within the survey area, as shown in the Locality figures in Appendix A for each location. Should the survey area change or be refined, further assessment may be required.

2. Methodology

2.1 Desktop assessment

A desktop assessment of the project areas to identify environmental values and constraints was undertaken by viewing geographic information system (GIS) spatial files largely sourced from Government of Western Australia (GoWA) (2022a) and reviewing publicly available, government managed databases. The information sources utilised in this assessment are presented in Table 1.

Table 1 Desktop information sources

Aspect	Information source
Climate	Bureau of Meteorology (BoM) Climate Data Online (2023)
Geology, landforms and soil	1:500 000 State linear structures layer (DMIRS-015) Soil Landscape Mapping – Systems (DPIRD-064) (GoWA 2022a)
Environmentally Sensitive Areas (ESAs)	Clearing Regulations - Environmentally Sensitive Areas (DWER-046) (GoWA 2022a)
Conservation reserves and areas	Department of Biodiversity, Conservation and Attractions (DBCA) – Legislated Lands and Waters (DBCA-011) DBCA – Lands of Interest (DBCA-012) (GoWA 2022a)
Hydrology	Public Drinking Water Source Areas (DWER-033) RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037) RIWI Act, Groundwater Areas (DWER-034) RIWI Act, Rivers (DWER-036) Waterways Conservation Act Management Areas (DWER-072) Ramsar Sites (DBCA-010) Directory of Important Wetlands in Australia - Western Australia (DBCA-045) (GoWA 2022a)
Vegetation	Pre-European Vegetation (DPIRD-006) Native Vegetation Extent (DPIRD-005) (GoWA 2022b) Statewide Vegetation Statistics (GoWA 2022b)
Threatened and Priority Ecological Communities (TECs and PECs)	DBCA Threatened Ecological Community (TEC) and Priority Ecological Community (PEC) spatial dataset Priority Ecological Communities for Western Australia Version 28 (DBCA 2023a)
Conservation significant flora and fauna	DBCA NatureMap database (DBCA 2007–) DBCA Threatened and Priority Flora database (TPFL) WA Herbarium database (WAHERB) (DBCA 2023b,c)
Matters of National Environmental Significance	EPBC Act Protected Matters Search Tool (PMST) (Department of Agriculture, Water and the Environment (DAWE 2023)

2.1.1 Flora and vegetation

Prior to the commencement of the field survey, a desktop assessment was undertaken to identify relevant environmental information pertaining to the survey areas and within 20 km (desktop study area). The flora and vegetation desktop assessment included a review of:

– The Department of Climate Change, Energy, the Environment and Water (DCCEEW) Protected Matters Search Tool (PMST) to identify communities and species listed under the EPBC Act potentially occurring within the study area (DCCEEW 2023). (Appendix C)

– The Department of Biodiversity Conservation and Attractions (DBCA) Threatened and Priority Ecological Community (TECs and PECs) database for conservation significant communities present in the desktop study area (DBCA 2023a)

– The DBCA Threatened and Priority Flora and WA Herbarium databases for Threatened flora listed under the BC Act and listed Priority by the DBCA previously recorded in the desktop study area (DBCA 2023b)
– The DBCA NatureMap database for flora and fauna species previously recorded within the desktop study area (DBCA 2007-) (Appendix C)
– Aerial photography, geology/soils, land systems and hydrology information to provide background information on the variability of the environment and likely vegetation and habitat types present
– A flora likelihood of occurrence assessment (Appendix D).

2.1.2 Fauna

The fauna desktop assessment included a review of:

– DCCEEW PMST database to identify fauna species listed under the EPBC Act potentially occurring within the desktop study area (DCCEEW 2023) (Appendix C)
– The DBCA Threatened and Priority Fauna database for the study area (DBCA 2023c)
– The DBCA NatureMap (DBCA 2007–) database for fauna species previously recorded within the study area (Appendix C). This database comprises the following composite datasets:
  - Atlas of Australian birds
  - Bird data – Birdlife Australia
  - Fauna Survey Returns Database
  - WA Museum (WAM) databases (mammals, birds, reptiles)
– Aerial photography, geology/soils, land systems and hydrology information to provide background information on the variability of the environment and likely habitat types present
– A fauna likelihood of occurrence assessment. For the purpose of this study, exclusively marine animals (fish, whales, turtles etc.) were excluded from the likelihood of occurrence assessment as they are not expected to interact with the project areas (Appendix E).

2.2 Field survey

2.2.1 Survey timing and personnel

The post-wet single season detailed and targeted flora and vegetation survey and basic and targeted fauna survey was undertaken from 20 - 24 February 2023 (Ardyaloon, Beagle Bay, Bidyadanga and Djarindjin survey areas) by GHD senior botanist/ecologist Joel Collins (flora licence no. FB62000200-2) and GHD zoologist Sarah Flemington.

The post-wet single season detailed and targeted flora and vegetation survey and basic and targeted fauna survey was undertaken from 20 - 22 February 2023 (Warmun survey areas) by GHD senior botanist Angela Benkovic (flora licence no. FB62000080-2) and GHD senior ecologist Erin Lynch (flora licence no. FB62000081-2).

2.2.2 Guiding documents

The survey methodology and data collection that GHD employed was consistent with:

– EPA Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016)
– EPA Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment (EPA 2020)
– DAWE (2011a) Survey Guidelines for Australia's Threatened Mammals
– DAWE (2011b) Survey Guidelines for Australia's Threatened Reptiles
– DBCA Guidelines for surveys to detect the presence of bilbies, and assess the importance of habitat in Western Australia (DBCA 2017)
– Verifying Bilby presence and the systematic sampling of wild populations using sign based protocols – with notes on aerial and ground based techniques and asserting absence (Southgate et al 2018).

2.2.3 Data collection and storage

Field data collection for the flora, vegetation and fauna survey was undertaken using GPS enabled Samsung tablets using electronic forms in Collector and tailored to IBSA spatial data requirements. Data was synced to the cloud at the conclusion of each field day. Field photographs were stored and where applicable have been provided as part of the Project deliverables.

2.2.4 Detailed and targeted flora and vegetation survey

The field survey was undertaken to identify and describe the broad dominant vegetation types, assess vegetation condition, and high intensity sampling of vascular flora taxa present at the time of survey. Searches for significant ecological communities and flora species were also undertaken during the field survey.

Field survey methods involved a combination of high intensity quadrat sampling and traversing the survey area by foot. Quadrats were conducted with each survey area to describe the broad-scale vegetation and physical features. Existing quadrats from the previous survey (GHD 2021) that overlap with the survey areas were also incorporated. In total 17 quadrats and three relevé's were conducted throughout the survey areas with the locations of each quadrat presented in Appendix A.

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 2016a).

Data collection

Field data at each quadrat site was recorded on a pro-forma data sheet. Survey and quadrat data are provided in Appendix D. A flora inventory was compiled from taxa listed in the quadrats and from opportunistic floristic records throughout the survey areas.

The following information was recorded from each quadrat and relevé:

– Location – coordinates measured using a handheld Global Position Systems (GPS) (Map Grid of Australia (MGA) zone 50, Geocentric Datum of Australia (GDA) 94). One set of coordinates was taken from the centre of each relevé
– Recorder and date – personnel involved in sampling that location and the survey date
– Species – dominant vascular plant species present, including weed species
– Foliar cover – the estimated percentage cover for each dominant flora species
– Vegetation description – vegetation types were described according to level V of the National Vegetation Information System (NVIS) using NVIS sub-association level for structural descriptions (NVIS Technical Working Group 2017)
– Vegetation condition –as adapted in Environmental Protection Authority (EPA) for the Northern Botanical Province (EPA 2016a)
– Habitat – a broad description of the surrounding landscape based on landform, topography and soil
– Disturbance – records of any obvious disturbances such as fire, tracks, weed infestation, or grazing
– Photographs – a photograph was taken of each quadrat and relevé.

Vegetation units

Vegetation types were identified, and boundaries delineated using a combination of aerial photography, topographical features, and field data/observations.

Vegetation types were described based on structure, dominant taxa and cover characteristics as defined by quadrat data, relevé data and field observations. Vegetation type descriptions followed NVIS and consistent with NVIS level V (Association). At Level V up to three taxa per stratum are used to describe the association (NVIS Technical Working Group 2017).

Vegetation condition

The vegetation condition was assessed and mapped in accordance with the vegetation condition rating scale for the Northern Botanical Provinces (adapted by EPA (2016a). The scale recognises the intactness of vegetation and consists of six rating levels. The vegetation condition rating scale is outlined in Appendix B.

2.2.5 Basic and targeted fauna survey

The Basic fauna and Targeted Bilby survey was completed in association with the flora and vegetation survey. The survey area was traversed by foot to identify and describe dominant fauna habitat types present, and their condition, assess habitat for significant fauna, and undertake Targeted Bilby assessment, and identify and record fauna occurring in the area.

Habitat assessment

A fauna habitat assessment was undertaken to document the type, value and extent of habitats within the survey area. The following information was recorded:

– Habitat structure (e.g. vegetation type, presence/absence of structural layers such as ground cover and midstorey
– Presence/absence of refuge including density of ground covers, fallen timber (course woody debris), hollow-bearing trees and stags and rocks/boulder piles, and the type and extent of each refuge
– Presence/absence of waterways including type, extent and habitat quality within waterway
– Location of the habitat within the survey area in comparison to the habitat within the surrounding landscape
– Habitat connectivity and identification of wildlife corridors within and immediately adjacent to the survey area
– Current land use and disturbance history
– Evaluation of key habitat features and types identified during the desktop assessment relevant to significant fauna
– Evaluation of the likelihood of occurrence of significant fauna within the habitat (based on presence of suitable habitat)
– A presentative photograph of each habitat-type.

Opportunistic fauna searches

Opportunistic fauna searches were conducted across the survey area. This included:

– Searching the survey area for tracks, scats, bones, diggings and feeding areas for native and feral species
– Searching through microhabitats including examining termite mounds, tree hollows and hollow logs and turning over leaf litter
– Visual and aural surveys, which accounted for all the bird species recorded utilising the habitats of the survey area at that time
– Recording GPS locations of significant fauna species.

Targeted Bilby searches

The Greater Bilby is recognised as a locally and regionally significant species in the Dampier Peninsula and wider area, that requires Targeted surveys. The sampling technique endorsed by the DAWE, references Southgate's methods of Greater Bilby Plot Assessments (Southgate et al. 2005), and the DBCA guidelines (DBCA 2017), which involves an assessment of 2 ha plots as a method of sampling a proportion of a given survey area.

Given the varying sizes of the survey sites, the approach for the survey was to undertake a combination of transects and plots, that would cover majority of the area, to detect any Greater Bilby activity, particularly any burrows of resident animals, but also secondary signs including tracks, scats and foraging digs.

The survey area was traversed on foot to detect signs of Greater Bilby activity that would indicate its presence, and other information that assesses the detectability of Greater Bilby in an area (Southgate method). Searching was undertaken by GHD ecologist Sarah Flemington. Linear transects were walked across the entirety of the

survey sites where vegetation density permitted, with space between transects approximately 30-50 m apart. The plot size was decided to be 50 by 400 meters (2 ha), so that two transects could be walked within a plot, across the survey area length to adequately search for Bilby and confirm habitat types. The transects are presented in Appendix A.

During the traverses, various information on the habitat characteristics was recorded in an excel spreadsheet on the handheld Tablet device to complete the Plot Assessments. The Plot Assessments when completed, provide two values that assess the trackability of Bilby, and the availability of Other Determining Signs (ODS), which will reflect if Bilby were able to be detected (if they were present) in the area. The plots provide an overall assessment of each of the survey sites.

The results and the information recorded for the Plot Assessments during the survey, is provided in Appendix E.

Fauna species identification

Identification of fauna species were made in the field using available field guides and electronic guides (e.g. Morcombe 2004). Nomenclature used in this report follows WAM as reported on NatureMap (DBCA 2021). This nomenclature is considered the most up to date species information for WA groups: reptiles, amphibians, invertebrates and mammals (including bats). All bird nomenclature follows Christidis and Boles (2008). Other reference materials used are presented in Table 2.

Table 2 Fauna references

Fauna group	Field Guide
Mammals	Menkhorst and Knight (2010), Van Dyck and Strahan (2008), Churchill (2008)
Birds	Christidis and Boles (2008), Morcombe (2004), Pizzey and Knight (2012)
Reptiles	Wilson and Swan (2020)
Amphibians	Tyler and Doughty (2009)

3. Desktop assessment – Warmun

3.1 Location

The Warmun survey area consists of two areas approximately 600 m apart located on the western side of the Great Northern Highway in Warmun. The northern survey area is approximately 5 ha and the southern survey area is approximately 4.25 ha (Figure 1, Appendix A).

3.2 Physical environment

Ecological and land use constraints for the Warmun survey area are presented on Figure 2, Appendix A.

3.2.1 Climate

The climate of the central Kimberley region is tropical monsoonal with a warm, dry season (April to November) and a wet season (December to March) (Graham 2001). Rainfall is generally received during the summer as a result of unpredictable tropical downpours and cyclonic low pressure systems. The closest BoM weather station with sufficient historical data is in Warmun (site number 002032).

Climate data from this station indicates the mean maximum temperature ranges from 29.2 °C in November to 29.6 °C in June/July. The mean minimum temperature ranges from 12.8 °C in July to 25.2 °C in December. The mean annual rainfall is 721.5 mm, with approximately 42.3 rain days a year (BoM 2023).

3.2.2 Land systems and soil

The Kimberley region has been surveyed by the Department of Primary Industries and Regional Development (DPIRD) and others for the purposes of land classification, mapping and resource evaluation. One hundred and eleven land systems have been described for the region, which are distinguished on the basis of topography, geology, soils and vegetation (Payne and Schoknecht 2011). The survey area intersects two land systems, predominantly the O'Donnell Land System, with a small area of the northern survey area intersecting the Richenda Land System. A brief description of the land systems is provided in Table 3.

Table 3 Land systems within the survey area

Land system	Description	Geology	Geomorphology
O'Donnell	Stony undulating country with scattered hills, loamy skeletal soils, open woodlands with short grasses and restricted cracking clay plains.	Gneiss, granite, and schist of Lower Proterozoic or Archaeozoic age.	Formed by partial dissection of the Fitzroy surface – undulating terrain: gently sloping low interfluves, scattered, rocky hills and ridges with restricted hill-footslopes, and local cracking clay plains; moderately dense rectangular pattern incised drainage; relief mainly less than 9 m.
Richenda	Inaccessible mountainous country, open stunted woodlands with curly spinifex, and grassy woodlands.	Granite, gneiss, and schist of lower Proterozoic or Archaeozoic age.	Mountain and hill ranges eroded below the Kimberley surface: mountain ranges in strike belts up to 26 km wide; with elongated gneiss hills, narrow schist ridges, and granite domes; dense rectangular pattern of incised tributary drainage and through-going strike-aligned alluvial floors; relief up to 150 m.

3.3 Land use

3.3.1 Conservation reserves and estates

No DBCA managed conservation areas occur within the survey area. The closest DBCA managed area is the Purnululu National Park, located approximately 30 km south/south-east.

3.3.2 Environmentally sensitive areas

No ESAs occur within or in the immediate vicinity of the survey area. The closest ESA is located approximately 5 km south-east of the survey area, which is likely to be associated with Purnululu National Park.

3.4 Hydrology

The GoWA (2022a) data layers identified the water resource aspects present in the survey area. These are detailed below in Table 4.

Table 4 Hydrology aspects within the study area

Aspect	Details	Results
Groundwater Areas	Groundwater areas proclaimed under the RIWI Act	Canning-Kimberley
Surface Water Areas	Surface water areas proclaimed under the RIWI Act	Ord River and Tributaries
Irrigation District	Irrigation Districts proclaimed under the RIWI Act	Ord Irrigation District
Rivers	Rivers proclaimed under the Rights in RIWI Act	None present
Public Drinking Water Source Areas (PDWSA)	PDWSA is a collective term used for the description of Water Reserves, Catchment Areas and Underground Pollution Control Areas declared (gazetted) under the provisions of the *Country Area Water Supply Act 1947*	None present
Waterways Management Areas	Areas proclaimed under *the Waterway Conservation Act 1976*	None present

3.4.1 Wetlands

There are no wetlands of significance located within or in close vicinity to the survey area. The closest significant wetlands are Lakes Argyle and Kununurra which area listed Wetlands of International Importance (Ramsar Wetlands). Both lakes are located more than 50 km downstream (NNE) of the survey area.

3.5 Vegetation and flora

3.5.1 Regional biogeography

The project area is located in the Central Kimberley bioregion and Hart sub-region as described by Interim Biogeographic Regionalisation of Australia (IBRA). The Central Kimberley bioregion comprises hilly to mountainous country with parallel siliceous ranges of Proterozoic sedimentary rocks with skeletal sandy soils supporting *Triodia* spp. hummock grasses with scattered tees, and with earths on Proterozoic volcanics in valleys supporting ribbon grass (*Chrysopogon* spp.) with scattered trees. Open forests of river gum (*Eucalyptus camaldulensis*) and *Pandanus* spp. occur along drainage lines (Graham 2001).

The subregion has a rugged topography dominated by Hart dolerite exposed along the eastern edge of the Kimberley Craton, where its basement members are folded and exposed. This is the driest part of the Central Kimberley bioregion with an annual rainfall of 600 to 700 mm. The vegetation is primarily savannah woodland over *Triodia* spp. and/or bunch grasses (Graham 2022).

3.5.2 Broad vegetation mapping and extent

Broad scale (1:1,000,000) pre-European vegetation mapping of the area was completed by Beard (1977) at an association level. The mapping indicates that one vegetation association is present across the survey area:

– Grasslands, tall bunch-grass savanna, Mitchell (*Astrebla* spp.) and blue grass (*Bothriochloa* spp.) (vegetation association 834).

The pre-European mapping has been adapted and digitised by Shepherd et al. (2002). The extent of vegetation associations have been determined by the state-wide vegetation remaining extent calculations maintained by DBCA (latest update March 2019 – GoWA 2022b). As shown in Table 5. The current extent remaining of vegetation association 834 is greater than 99% of their calculated pre-European extents at all scales (e.g. State, IBRA bioregion, IBRA subregion and Local Government Area (LGA)).

Table 5 Extent of pre-European vegetation association mapped within the survey area (DBCA 2019)

Vegetation association	Scale	Pre-European extent (ha)	Current extent (ha)	Remaining (%)	% Current extent in all DBCA managed land (proportion of Current Extent)
834	State: Western Australia	32,597.17	32,588.83	99.97	16.70
	IBRA bioregion: Central Kimberley	24,391.01	24,382.67	99.97	
	IBRA Subregion: Hart (CEK02)	24,391.01	24,382.67	99.97	
	LGA: Shire of Halls Creek	27,748.71	27,740.37	99.97	19.62

3.5.3 Significant ecological communities

The EPBC Act PMST did not identify any EPBC Act listed TECs within 20 km of the survey area. The DBCA TEC and PEC database identified two Priority 3 PECs occurring within 20 km of the survey area:

– Kimberley Vegetation Association 833 – Grasslands, short bunch grass savanna sparse low tree; scattered snappy gum over arid short grass on plains.
– Vegetation Association 834 – Grasslands, tall bunch grass savanna, mitchell and blue grass.

The survey area is located within the area mapped as the Priority 3 Kimberley Vegetation Association 834 PEC (Figure 2, Appendix A).

3.5.4 Flora diversity

The *NatureMap* database identified 449 flora taxa previously recorded within the study area (DBCA 2007-). The NatureMap database search for flora is provided in Appendix C.

3.5.5 Significant flora

The EPBC Act PMST and DBCA NatureMap, WAHERB and TPFL databases identified the presence/potential presence of 24 significant taxa within a 20 km buffer of the survey area. The desktop searches recorded:

– Nine Priority 1 taxa
– Eight Priority 2 taxa
– Six Priority 3 taxa
– One Priority 4 taxa

The locations of conservation significant flora registered on the DBCA databases are mapped in Figure 2, Appendix A.

3.6 Fauna

3.6.1 Fauna diversity

The *NatureMap* database identified 280 fauna species previously recorded within 20 km of the project area. This total comprised 172 birds, 75 reptiles, 22 mammals and 11 amphibians. The *NatureMap* database search is provided in Appendix C.

3.6.2 Significant fauna

The EPBC Act PMST and *NatureMap* database identified the presence/potential presence of 26 conservation significance fauna within the study area.

4. Desktop Assessment – Beagle Bay

4.1 Location

The Beagle Bay survey area is located on the Dampier Peninsula, adjacent to Beagle Bay Road. The survey area is approximately 0.6 km south west of the Beagle Bay community. The survey area is approximately 11.49 ha (Figure 7, Appendix A).

4.2 Physical environment

Ecological and land use constraints for the Beagle Bay survey area are presented on Figure 8, Appendix A.

4.2.1 Climate

The climate of the central Kimberley region is tropical monsoonal with a warm, dry season (April to November) and a wet season (December to March) (Graham 2001). Rainfall is generally received during the summer as a result of unpredictable tropical downpours and cyclonic low pressure systems. The closest BoM weather station with sufficient historical data is Cygnet Bay (site number 003057), located approximately 50 km north of the survey area.

Climate data from this station indicates the mean maximum temperature ranges from 35.3 °C in November to 28.2 °C in July. The mean minimum temperature ranges from 14.9 °C in July to 25.6 °C in December. The mean annual rainfall is 794.0 mm (BoM 2023).

4.2.2 Land systems and soil

The Kimberley region has been surveyed by the Department of Primary Industries and Regional Development (DPIRD) and others for the purposes of land classification, mapping and resource evaluation. One hundred and eleven land systems have been described for the region, which are distinguished on the basis of topography, geology, soils and vegetation (Payne and Schoknecht 2011). One land system is relevant within the survey area (Table 6).

Table 6 Land systems within the survey area

Land system	Description	Geology	Geomorphology
Wanganut	Low lying sandplains and dune fields with through going drainage supporting pindan acacia shrublands with emergent eucalypt trees	Quaternary aeolian	Sandplain and dunefields with through-going drainage: sandplain, mainly in the upper parts, with stable dunefields, low lying sandplain, and scattered pans and depressions; sparse to moderately dense branching drainage pattern; relief up to 9 m.

4.3 Land use

4.3.1 Conservation reserves and estates

No DBCA managed conservation areas occur within the survey area or wider study area.

4.3.2 Environmentally sensitive areas

No ESAs are located within the survey area. The closest ESA is located approximately 10 km north west; no.7278 and associated with the buffer for Monsoon thickets on coastal sand dunes Threatened Ecological Community (TEC) (Figure 8, Appendix A).

4.4 Hydrology

The GoWA (2022a) data layers identified the water resource aspects present in the survey area. These are detailed below in Table 7.

Table 7 Hydrology aspects within the study area

Aspect	Details	Results
Groundwater Areas	Groundwater areas proclaimed under the RIWI Act	Canning-Kimberley
Surface Water Areas	Surface water areas proclaimed under the RIWI Act	None present
Irrigation District	Irrigation Districts proclaimed under the RIWI Act	None present
Rivers	Rivers proclaimed under the Rights in RIWI Act	None present
Public Drinking Water Source Areas (PDWSA)	PDWSA is a collective term used for the description of Water Reserves, Catchment Areas and Underground Pollution Control Areas declared (gazetted) under the provisions of the *Country Area Water Supply Act 1947*	None present
Waterways Management Areas	Areas proclaimed under *the Waterway Conservation Act 1976*	None present

4.4.1 Wetlands

No Internationally (Ramsar) or nationally important wetlands are located within 20 km of the survey area.

4.5 Vegetation and flora

4.5.1 Regional biogeography

The survey area is located in the Dampierland bioregion and Pindanland sub-region as described by Interim Biogeographic Regionalisation of Australia (IBRA).

The Dampierland bioregion is characterised by extensive plains, ranges and spectacular gorges. The vegetation is characterised by acacia thickets with scattered trees and areas of grasslands and savannas. The bioregion contains Aboriginal land, pastoral leases and some conservation reserves. The main industries are beef cattle, horticulture and tourism. Major population centres are Broome, Derby and Fitzroy Crossing.

The Pindanland subregion comprises sandplains of the Dampier Peninsular and western part of Dampier Land, including the hinterland of the Eighty Mile Beach. It is a fine-textured sand-sheet with subdued dunes and includes the paleodelta of the Fitzroy River. The vegetation is described primarily as pindan. This is the coastal, semi-arid, north-western margin of the Canning Basin (Graham 2001).

4.5.2 Broad vegetation mapping and extent

Broad scale (1:1,000,000) pre-European vegetation mapping of the area was completed by Beard (1977) at an association level. The mapping indicates that two vegetation association is present across the survey area:

– Shrublands, pindan; *Acacia tumida* shrubland with grey box & cabbage gum medium woodland over ribbon grass & curly spinifex (association 750)
– Grasslands, tall bunch grass savanna, sparse low tree; ribbon grass & paperbarks (association 67).

The pre-European mapping has been adapted and digitised by Shepherd et al. (2002). The extent of vegetation associations have been determined by the state-wide vegetation remaining extent calculations maintained by

DBCA (latest update March 2019 – GoWA 2022b). As shown in The current extents remaining of all vegetation associations are greater than 99% of their calculated pre-European extents at all scales (e.g. State, IBRA bioregion, IBRA subregion and Local Government Area (LGA)).

The Native Vegetation Extent data layer indicates there has been no previous clearing within the survey area.

The current extents remaining of all vegetation associations are greater than 99% of their calculated pre-European extents at all scales (e.g. State, IBRA bioregion, IBRA subregion and Local Government Area (LGA)).

The Native Vegetation Extent data layer indicates there has been no previous clearing within the survey area.

Table 8 Extent of pre-European vegetation association mapped within the survey area (DBCA 2019)

Vegetation association	Scale	Pre-European extent (ha)	Current extent (ha)	Remaining (%)	%current extent in all DBCA managed land (proportion of current extent)
750	State: Western Australia	1,231,155.50	1,225,687.52	99.56	
	IBRA bioregion: Dampierland	1,229,182.16	1,225,280.52	99.68	2.78
	IBRA sub-region: Pindanland	1,221,734.45	1,217,843.72	99.68	2.80
	LGA: Shire of Broome	1,115,559.36	1,110,131.18	99.51	3.07
67	State: Western Australia	27,285.40	27,240.50	99.84	-
	IBRA bioregion: Dampierland	27,285.40	27,240.50	99.84	-
	IBRA sub-region: Pindanland	27,285.40	27,240.50	99.84	-
	LGA: Shire of Broome	23,775.29	23,730.39	99.81	-

4.5.3 Significant ecological communities

The DBCA TEC and PEC database identified one TEC and three State-listed PECs within the study area. The survey area is within the buffer of the PEC Kimberley Vegetation Association 67 as defined by John Beard's Vegetation mapping for the Kimberley. Details on these communities are provided in Table 9 and mapped on Figure 8, Appendix A.

Table 9 Threatened and Priority Ecological Communities identified in the desktop searches

Community type	EPBC Act	BC Act/DBCA	Description (DBCA 2021a)
Assemblages of Lolly Well Springs wetland complex (PEC)		P3	Wetland complex containing numerous low organic mound springs with moats. Threats: recreational use, potential tourism developments, weed invasion, rubbish dumping, grazing and trampling (cattle).
Monsoon (vine) thickets on coastal sand dunes of Dampier Peninsula (TEC)	Endangered	Vulnerable	Unusual vine thicket community and Camaenid land snails assemblage located on Napier Range. Threats: frequent fires leading to vegetation changes; loss of vine thickets and leaf litter.
Kimberley Vegetation Association 37 (PEC)		P3	Shrublands; teatree thicket Threats: extensive threatening processes acting at landscape scales, namely altered fire regimes, over grazing, and weed invasion.

Community type	EPBC Act	BC Act/DBCA	Description (DBCA 2021a)
Kimberley Vegetation Association 67 (PEC)		P3	Grasslands, tall bunch grass savanna, sparse low tree; ribbon grass & paperbarks Threats: extensive threatening processes acting at landscape scales, namely altered fire regimes, over grazing, and weed invasion.

4.5.4 Flora diversity

The *NatureMap* database identified 220 flora taxa, representing 156 genera, previously recorded within the study area (DBCA 2007-). The most common genus's include *Melaleuca* (seven species), *Acacia* (six species), *Cyperus* (five species) and *Fimbristylis* (five species).

The *NatureMap* database search for flora is provided in Appendix C.

4.5.5 Significant flora

The EPBC Act PMST and DBCA NatureMap databases identified the presence/potential presence of 14 conservation significant taxa within a 20 km buffer of the survey area. The desktop searches recorded:

– Seven Priority 1 taxa
– Seven Priority 3 taxa

The locations of conservation significant flora registered on the DBCA databases are mapped in Figure 16, Appendix A.

4.6 Fauna

4.6.1 Fauna diversity

The *NatureMap* database identified 307 fauna species previously recorded within 20 km of the survey area. This total comprised 132 birds, 36 reptiles, 10 mammals, seven amphibians, 55 invertebrates and 67 fish.

The *NatureMap* database search is provided in Appendix C.

4.6.2 Significant fauna

The EPBC Act PMST, DBCA database and *NatureMap* database identified the presence/potential presence of 29 significant fauna within the study area. This total does not include those species that are exclusively marine as no marine habitat is present within the survey area or indirectly impacted by the project. The desktop searches recorded:

– Eighteen EPBC and/or DBCA (BC Act)- listed Threatened fauna taxa
– Nine EPBC-listed Migratory and/or Marine fauna taxa
– One DBCA Other Specially Protected (OS) fauna taxon
– One DBCA Priority 2 fauna taxon.

5. Desktop Assessment – Ardyaloon

5.1 Location

The Ardyaloon survey area consists of two areas. The Ardyaloon north survey area is located near the northern extent of the Dampier Peninsula, adjacent to One Arm Point Road. The survey area is approximately 2 km west of the One Arm Point community. The Ardyaloon south survey area is located near the northern extent of the Dampier Peninsula. The survey area is approximately 2 km west of the One Arm Point community and 0.5 km south west of One Arm Point Road. The northern survey area is approximately 10.08 ha and the southern survey area is approximately 37.17 ha (Figure 13, Appendix A).

5.2 Physical environment

Ecological and land use constraints for the Ardyaloon survey areas are presented on Figure 14, Appendix A.

5.2.1 Climate

The climate of the central Kimberley region is tropical monsoonal with a warm, dry season (April to November) and a wet season (December to March) (Graham 2001). Rainfall is generally received during the summer as a result of unpredictable tropical downpours and cyclonic low pressure systems. The closest BoM weather station with sufficient historical data is Cygnet Bay (site number 003057), located approximately 2 km west of the survey area.

Climate data from this station indicates the mean maximum temperature ranges from 35.3 °C in November to 28.2 °C in July. The mean minimum temperature ranges from 14.9 °C in July to 25.6 °C in December. The mean annual rainfall is 794.0 mm (BoM 2023).

5.2.2 Land systems and soil

The Kimberley region has been surveyed by the Department of Primary Industries and Regional Development (DPIRD) and others for the purposes of land classification, mapping and resource evaluation. One hundred and eleven land systems have been described for the region, which are distinguished on the basis of topography, geology, soils and vegetation (Payne and Schoknecht 2011). One land system is relevant within the survey areas (Table 10).

Table 10 Land systems within the survey area

Land system	Description	Geology	Geomorphology
Reeves	Sand plain with scattered hills and minor plateaux, reddish sandy soils, pindan.	Subhorizontal or gently dipping sandstone, sandy siltstone, and silicified quartz sandstone of Cretaceous age; Quaternary aeolian sand.	Formed by dissection of the Kimberley surface - hill lands: strike belts up to 4.8 km wide, with scattered hills, dip slopes with thin sand cover and local outcrop, and sandplain; sparse, branching drainage pattern; relief up to 60 m.

5.3 Land use

5.3.1 Conservation reserves and estates

No DBCA managed conservation area occur within the survey area. The closest is located approximately 9 km north; Swan Island Nature Reserve (Class A R 34257).

5.3.2 Environmentally sensitive areas

The northern and southern survey areas are located within ESA no. 7286, within the buffer for Monsoon thickets on coastal sand dunes TEC (Figure 14, Appendix A).

5.4 Hydrology

The GoWA (2022a) data layers identified the water resource aspects present in the survey area. These are detailed below in Table 11.

Table 11 Hydrology aspects within the study area

Aspect	Details	Results
Groundwater Areas	Groundwater areas proclaimed under the RIWI Act	Canning-Kimberley
Surface Water Areas	Surface water areas proclaimed under the RIWI Act	None present
Irrigation District	Irrigation Districts proclaimed under the RIWI Act	None present
Rivers	Rivers proclaimed under the Rights in RIWI Act	None present
Public Drinking Water Source Areas (PDWSA)	PDWSA is a collective term used for the description of Water Reserves, Catchment Areas and Underground Pollution Control Areas declared (gazetted) under the provisions of the *Country Area Water Supply Act 1947*	None present
Waterways Management Areas	Areas proclaimed under *the Waterway Conservation Act 1976*	None present

5.4.1 Wetlands

No Internationally (Ramsar) or nationally important wetlands are located within 20 km of the survey area.

5.5 Vegetation and flora

5.5.1 Regional biogeography

The survey area is located in the Dampierland bioregion and Pindanland sub-region as described by Interim Biogeographic Regionalisation of Australia (IBRA).

The Dampierland bioregion is characterised by extensive plains, ranges and spectacular gorges. The vegetation is characterised by acacia thickets with scattered trees and areas of grasslands and savannas. The bioregion contains Aboriginal land, pastoral leases and some conservation reserves. The main industries are beef cattle, horticulture and tourism. Major population centres are Broome, Derby and Fitzroy Crossing.

The Pindanland subregion comprises sandplains of the Dampier Peninsular and western part of Dampier Land, including the hinterland of the Eighty Mile Beach. It is a fine-textured sand-sheet with subdued dunes and includes the paleodelta of the Fitzroy River. The vegetation is described primarily as pindan. This is the coastal, semi-arid, north-western margin of the Canning Basin (Graham 2001).

5.5.2 Broad vegetation mapping and extent

Broad scale (1:1,000,000) pre-European vegetation mapping of the area was completed by Beard (1977) at an association level. The mapping indicates that one vegetation association is present across the two survey areas:

– Shrublands, pindan; *Acacia tumida* shrubland with ghost gum (*Eucalyptus papuana*) & *E. setosa* medium woodland over curly spinifex (association 771).

The pre-European mapping has been adapted and digitised by Shepherd et al. (2002). The extent of vegetation associations have been determined by the state-wide vegetation remaining extent calculations maintained by DBCA (latest update March 2019 – GoWA 2022b). As shown in Table 12. The current extents remaining of all vegetation associations are greater than 95% of their calculated pre-European extents at all scales (e.g. State, IBRA bioregion, IBRA subregion and Local Government Area (LGA)).

The Native Vegetation Extent data layer indicates there has been no previous clearing within the survey area.

Table 12 Extent of pre-European vegetation association mapped within the survey area (DBCA 2019)

Vegetation association	Scale	Pre-European extent (ha)	Current extent (ha)	Remaining (%)	%current extent in all DBCA managed land (proportion of current extent)
771	State: Western Australia	35,671.30	34,884.39	97.79	-
	IBRA bioregion: Dampierland	34,907.23	34,672.53	99.33	-
	IBRA sub-region: Pindanland	34,907.23	34,672.53	99.33	-
	LGA: Shire of Broome	35,671.30	34,884.39	97.79	-

5.5.3 Significant ecological communities

The DBCA TEC and PEC database identified one TEC within the study area. The survey area is within the buffer of the TEC Monsoon (vine) thickets on coastal sand dunes of Dampier Peninsula. One PEC was identified within the study area, Vegetation Association 37 as defined by John Beard's Vegetation mapping for the Kimberly. Details on these communities are provided in Table 13 and mapped on Figure 14, Appendix A.

Table 13 Threatened and Priority Ecological Communities identified in the desktop searches

Community type	EPBC Act	DBCA	Description (DBCA 2021a)
Monsoon (vine) thickets on coastal sand dunes of Dampier Peninsula (TEC)	Endangered	Vulnerable	Unusual vine thicket community and Camaenid land snails assemblage located on Napier Range. Threats: frequent fires leading to vegetation changes; loss of vine thickets and leaf litter.
Vegetation Association 37 as defined by John Beard's vegetation mapping for the Kimberley	-	Priority 3	Shrublands: teatree thicket Threats: extensive threatening processes acting at landscape scales, namely altered fire regimes, over grazing, and weed invasion

5.5.4 Flora diversity

The *NatureMap* database identified 495 flora taxa previously recorded within the study area (DBCA 2007-). The most common genus's include *Acacia* (14 species), *Tephrosia* (11 species) and *Cyperus* (nine species).

The *NatureMap* database search for flora is provided in Appendix C.

5.5.5 Significant flora

The EPBC Act PMST and DBCA NatureMap databases identified the presence/potential presence of 12 conservation significant taxa within a 20 km buffer of the survey area. The desktop searches recorded:

– Four Priority 1 taxa
– One Priority 2 taxa
– Seven Priority 3 taxa.

The locations of conservation significant flora registered on the DBCA databases are mapped in Figure 8, Appendix A.

5.6 Fauna

5.6.1 Fauna diversity

The *NatureMap* database identified 391 fauna species previously recorded within 20 km of the survey area. This total comprised 225 birds, 41 reptiles, 29 mammals, two amphibians, one invertebrate and 93 fish.

The *NatureMap* database search is provided in Appendix C.

5.6.2 Significant fauna

The EPBC Act PMST and *NatureMap* database identified the presence/potential presence of 52 conservation significance fauna within the study area. This total does not include those species that are exclusively marine as no marine habitat is present within the survey area or indirectly impacted by the project.

6. Desktop assessment – Djarindjin

6.1 Location

The Djarindjin survey area is located near the northern extent of the Dampier Peninsula. The survey area is approximately 0.52 km east of the Djarindjin community. The survey area is approximately 10.32 ha (Figure 19, Appendix A).

6.2 Physical environment

Ecological and land use constraints for the Djarindjin survey area is presented on Figure 20, Appendix A.

6.2.1 Climate

The climate of the central Kimberley region is tropical monsoonal with a warm, dry season (April to November) and a wet season (December to March) (Graham 2001). Rainfall is generally received during the summer as a result of unpredictable tropical downpours and cyclonic low pressure systems. The closest BoM weather station with sufficient historical data is Cygnet Bay (site number 003057), located approximately 15 km north of the survey area.

Climate data from this station indicates the mean maximum temperature ranges from 35.3 °C in November to 28.2 °C in July. The mean minimum temperature ranges from 14.9 °C in July to 25.6 °C in December. The mean annual rainfall is 794.0 mm (BoM 2023).

6.2.2 Land systems and soil

The Kimberley region has been surveyed by the Department of Primary Industries and Regional Development (DPIRD) and others for the purposes of land classification, mapping and resource evaluation. One hundred and eleven land systems have been described for the region, which are distinguished on the basis of topography, geology, soils and vegetation (Payne and Schoknecht 2011). One land system is relevant within the survey area (Table 14).

Table 14 Land system within the survey area

Land system	Description	Geology	Geomorphology
Yeeda	Sandplains with red and yellow sands supporting pindan acacia shrublands with emergent eucalypt trees	Quaternary aeolian sands	Sandplain and dunefields with little organised drainage; sandplain up to 16 km in extent, with shallow valleys, plains with thin sand cover, and scattered pans; limited surface drainage in zones of sheet-flow up to 3.2 km wide and extending up to 8 km downslope from adjacent uplands.

6.3 Land use

6.3.1 Conservation reserves and estates

No DBCA managed conservation area occur within the survey area or wider study area.

6.3.2 Environmentally sensitive areas

The survey area is located within ESA no. 7290, within the buffer for Monsoon thickets on coastal sand dunes TEC (Figure 20, Appendix A).

6.4 Hydrology

The GoWA (2022a) data layers identified the water resource aspects present in the survey area. These are detailed below in Table 15.

Table 15 Hydrology aspects within the study area

Aspect	Details	Results
Groundwater Areas	Groundwater areas proclaimed under the RIWI Act	Canning-Kimberley
Surface Water Areas	Surface water areas proclaimed under the RIWI Act	None present
Irrigation District	Irrigation Districts proclaimed under the RIWI Act	None present
Rivers	Rivers proclaimed under the Rights in RIWI Act	None present
Public Drinking Water Source Areas (PDWSA)	PDWSA is a collective term used for the description of Water Reserves, Catchment Areas and Underground Pollution Control Areas declared (gazetted) under the provisions of the *Country Area Water Supply Act 1947*	None present
Waterways Management Areas	Areas proclaimed under *the Waterway Conservation Act 1976*	None present

6.4.1 Wetlands

No Internationally (Ramsar) or nationally important wetlands are located within 20 km of the survey area.

6.5 Vegetation and flora

6.5.1 Regional biogeography

The survey area is located in the Dampierland bioregion and Pindanland sub-region as described by Interim Biogeographic Regionalisation of Australia (IBRA).

The Dampierland bioregion is characterised by extensive plains, ranges and spectacular gorges. The vegetation is characterised by acacia thickets with scattered trees and areas of grasslands and savannas. The bioregion contains Aboriginal land, pastoral leases and some conservation reserves. The main industries are beef cattle, horticulture and tourism. Major population centres are Broome, Derby and Fitzroy Crossing.

The Pindanland subregion comprises sandplains of the Dampier Peninsular and western part of Dampier Land, including the hinterland of the Eighty Mile Beach. It is a fine-textured sand-sheet with subdued dunes and includes the paleodelta of the Fitzroy River. The vegetation is described primarily as pindan. This is the coastal, semi-arid, north-western margin of the Canning Basin (Graham 2001).

6.5.2 Broad vegetation mapping and extent

Broad scale (1:1,000,000) pre-European vegetation mapping of the area was completed by Beard (1977) at an association level. The mapping indicates that one vegetation association is present within the survey area:

– Shrublands, pindan; Acacia tumida shrubland with grey box & cabbage gum medium woodland over ribbon grass & curly spinifex (association 750).

The pre-European mapping has been adapted and digitised by Shepherd et al. (2002). The extent of vegetation associations have been determined by the state-wide vegetation remaining extent calculations maintained by DBCA (latest update March 2019 – GoWA 2022b). As shown in Table 16. The current extents remaining of all

vegetation associations are greater than 99% of their calculated pre-European extents at all scales (e.g. State, IBRA bioregion, IBRA subregion and Local Government Area (LGA)).

The Native Vegetation Extent data layer indicates there has been no previous clearing within the survey area.

Table 16 Extent of pre-European vegetation association mapped within the survey area (DBCA 2019)

Vegetation association	Scale	Pre-European extent (ha)	Current extent (ha)	Remaining (%)	%current extent in all DBCA managed land (proportion of current extent)
750	State: Western Australia	1,231,155.50	1,225,687.52	99.56	
	IBRA bioregion: Dampierland	1,229,182.16	1,225,280.52	99.68	2.78
	IBRA sub-region: Pindanland	1,221,734.45	1,217,843.72	99.68	2.80
	LGA: Shire of Broome	1,115,559.36	1,110,131.18	99.51	3.07

6.5.3 Significant ecological communities

The DBCA TEC and PEC database identified one TEC within the study area. The survey area is within the buffer of the TEC Monsoon (vine) thickets on coastal sand dunes of Dampier Peninsula. One PEC was identified within the study area, Vegetation Association 37 as defined by John Beard's Vegetation mapping for the Kimberly. Details on these communities are provided in Table 17 and mapped on Figure 20, Appendix A.

Table 17 Threatened and Priority Ecological Communities identified in the desktop searches

Community type	EPBC Act	DBCA	Description (DBCA 2021a)
Monsoon (vine) thickets on coastal sand dunes of Dampier Peninsula (TEC)	Endangered	Vulnerable	Unusual vine thicket community and Camaenid land snails assemblage located on Napier Range. Threats: frequent fires leading to vegetation changes; loss of vine thickets and leaf litter.
Vegetation Association 37 as defined by John Beard's vegetation mapping for the Kimberley	-	Priority 3	Shrublands: teatree thicket Threats: extensive threatening processes acting at landscape scales, namely altered fire regimes, over grazing, and weed invasion

6.5.4 Flora diversity

The *NatureMap* database identified 454 flora taxa previously recorded within the study area (DBCA 2007-). The most common genus's include Fabaceae (54 taxa), Poaceae (44 taxa) and Malvaceae (26 taxa).

The *NatureMap* database search for flora is provided in Appendix C.

6.5.5 Significant flora

The EPBC Act PMST and DBCA NatureMap databases identified the presence/potential presence of six conservation significant taxa within a 20 km buffer of the survey area. The desktop searches recorded:

– Two Priority 1 taxa
– Four Priority 3 taxa.

The locations of conservation significant flora registered on the DBCA databases are mapped in Figure 20, Appendix A.

6.6 Fauna

6.6.1 Fauna diversity

The *NatureMap* database identified 248 fauna species previously recorded within 20 km of the survey area. This total comprised 178 birds, 39 reptiles, 21 mammals, four amphibians, one invertebrate and five fish.

The *NatureMap* database search is provided in Appendix C.

6.6.2 Significant fauna

The EPBC Act PMST and *NatureMap* database identified the presence/potential presence of 58 conservation significance fauna within the study area. This total does not include those species that are exclusively marine as no marine habitat is present within the survey area or indirectly impacted by the project.

7. Desktop assessment – Bidyadanga

7.1 Location

The Bidyadanga survey area is located approximately 90 km south west of Broome. The survey area is approximately 500 m north west of the Bidyadanga community. The survey area is approximately 28.19 ha (Figure 25, Appendix A).

7.2 Physical environment

Ecological and land use constraints for the Bidyadanga survey area is presented on Figure 26, Appendix A.

7.2.1 Climate

The climate of the central Kimberley region is tropical monsoonal with a warm, dry season (April to November) and a wet season (December to March) (Graham 2001). Rainfall is generally received during the summer as a result of unpredictable tropical downpours and cyclonic low pressure systems. The closest BoM weather station with sufficient historical data is Bidyadanga (site number 003030), located approximately 5 km east of the survey area.

Climate data from this station indicates. The mean maximum temperature ranges from 35.8 °C in April to 29.7 °C in July. Mean minimum temperature ranges from 14.2 °C in July to 26.0 °C in January. The mean annual rainfall is 484.2 mm (BoM 2023).

7.2.2 Land systems and soil

The Kimberley region has been surveyed by the Department of Primary Industries and Regional Development (DPIRD) and others for the purposes of land classification, mapping and resource evaluation. One hundred and eleven land systems have been described for the region, which are distinguished on the basis of topography, geology, soils and vegetation (Payne and Schoknecht 2011). One land system is relevant within the survey area (Table 18).

Table 18 Land system within the survey area

Land system	Description	Geology	Geomorphology
Yeeda	Sandplains with red and yellow sands supporting pindan acacia shrublands with emergent eucalypt trees	Quaternary aeolian sands	Sandplain and dunefields with little organised drainage; sandplain up to 16 km in extent, with shallow valleys, plains with thin sand cover, and scattered pans; limited surface drainage in zones of sheet-flow up to 3.2 km wide and extending up to 8 km downslope from adjacent uplands.

7.3 Land use

7.3.1 Conservation reserves and estates

No DBCA managed conservation area occur within the survey area or wider study area.

7.3.2 Environmentally sensitive areas

No ESAs are located within the survey or wider study area.

7.4 Hydrology

The GoWA (2022a) data layers identified the water resource aspects present in the survey area. These are detailed below in Table 19.

Table 19 Hydrology aspects within the study area

Aspect	Details	Results
Groundwater Areas	Groundwater areas proclaimed under the RIWI Act	Canning-Kimberley
Surface Water Areas	Surface water areas proclaimed under the RIWI Act	None present
Irrigation District	Irrigation Districts proclaimed under the RIWI Act	None present
Rivers	Rivers proclaimed under the Rights in RIWI Act	None present
Public Drinking Water Source Areas (PDWSA)	PDWSA is a collective term used for the description of Water Reserves, Catchment Areas and Underground Pollution Control Areas declared (gazetted) under the provisions of the *Country Area Water Supply Act 1947*	None present
Waterways Management Areas	Areas proclaimed under *the Waterway Conservation Act 1976*	None present

7.4.1 Wetlands

No Internationally (Ramsar) or nationally important wetlands are located within 20 km of the survey area.

7.5 Vegetation and flora

7.5.1 Regional biogeography

The survey area is located in the Dampierland bioregion and Pindanland sub-region as described by Interim Biogeographic Regionalisation of Australia (IBRA).

The Dampierland bioregion is characterised by extensive plains, ranges and spectacular gorges. The vegetation is characterised by acacia thickets with scattered trees and areas of grasslands and savannas. The bioregion contains Aboriginal land, pastoral leases and some conservation reserves. The main industries are beef cattle, horticulture and tourism. Major population centres are Broome, Derby and Fitzroy Crossing.

The Pindanland subregion comprises sandplains of the Dampier Peninsular and western part of Dampier Land, including the hinterland of the Eighty Mile Beach. It is a fine-textured sand-sheet with subdued dunes and includes the paleodelta of the Fitzroy River. The vegetation is described primarily as pindan. This is the coastal, semi-arid, north-western margin of the Canning Basin (Graham 2001).

7.5.2 Broad vegetation mapping and extent

Broad scale (1:1,000,000) pre-European vegetation mapping of the area was completed by Beard (1977) at an association level. The mapping indicates that one vegetation association is present within the survey area:

– Shrublands, pindan; *Acacia eripoda* shrubland with scattered low bloodwood (*Eucalyptus dicromophloia*) & *E. setosa* over soft & curly spinifex on sandplain (association 699).

The pre-European mapping has been adapted and digitised by Shepherd et al. (2002). The extent of vegetation associations have been determined by the state-wide vegetation remaining extent calculations maintained by DBCA (latest update March 2019 – GoWA 2022b). As shown in Table 20. The current extents remaining of all

vegetation associations are greater than 95% of their calculated pre-European extents at all scales (e.g. State, IBRA bioregion, IBRA subregion and Local Government Area (LGA)).

The Native Vegetation Extent data layer indicates there has been no previous clearing within the survey area.

Table 20 Extent of pre-European vegetation association mapped within the survey area (DBCA 2019)

Vegetation association	Scale	Pre-European extent (ha)	Current extent (ha)	Remaining (%)	%current extent in all DBCA managed land (proportion of current extent)
699	State: Western Australia	1,986,450.05	1,984,438.78	99.90	0.47
	IBRA bioregion: Dampierland	1,976,313.50	1,974,958.06	99.93	0.48
	IBRA sub-region: Pindanland	1,796,194.92	1,794,994.17	99.93	0.52
	LGA: Shire of Broome	1,628,642.72	1,626,791.54	99.89	0.58

7.5.3 Significant ecological communities

The DBCA TEC and PEC database identified no TECs within the study area. Three state listed PECs were identified within the study area. Details on these communities are provided in. Details on these communities are provided in Table 21 and mapped on Figure 26, Appendix A.

Table 21 Threatened and Priority Ecological Communities identified in the desktop searches

Community type	EPBC Act	DBCA	Description (DBCA 2021a)
Roebuck Land System	-	P3	Paleo-tidal coastal plains and tidal flats with saline soil supporting salt-water couch grasslands, samphire low shrublands, melaleuca thickets and mangroves. Threats: extensive threatening processes acting at landscape scales, namely frequent fires leading to loss of trees and shrubs, over grazing, and weed invasion (buffel grass).
Eighty Mile Land System	-	P3	Beach foredunes, longitudinal coastal dunes and sandy plains with tussock grasslands and spinifex grasslands. Threats: extensive threatening processes acting at landscape scales, namely altered fire regimes, over grazing, erosion, and weed invasion (buffel grass).
Vegetation Association 37 as defined by John Beard's vegetation mapping for the Kimberley	-	P3	Shrublands: teatree thicket Threats: extensive threatening processes acting at landscape scales, namely altered fire regimes, over grazing, and weed invasion

7.5.4 Flora diversity

The *NatureMap* database identified 82 flora taxa previously recorded within the study area (DBCA 2007-). The most common genus's include *Acacia* (12 species), *Heliotropium* (three species) and *Ptilotus* (three species).

The *NatureMap* database search for flora is provided in Appendix C.

7.5.5 Significant flora

The EPBC Act PMST and DBCA NatureMap databases identified the presence/potential presence of four conservation significant taxa within a 20 km buffer of the survey area. The desktop searches recorded:

– Four Priority 3 taxa

The locations of conservation significant flora registered on the DBCA databases are mapped in Figure 26, Appendix A.

7.6 Fauna

7.6.1 Fauna diversity

The *NatureMap* database identified 267 fauna species previously recorded within 20 km of the survey area. This total comprised 177 birds, 34 reptiles, 23 mammals, 3 amphibians, one invertebrate and 29 fish.

The *NatureMap* database search is provided in Appendix C.

7.6.2 Significant fauna

The EPBC Act PMST, DBCA database and *NatureMap* database identified the presence/potential presence of 62 significant fauna within the study area. This total does not include those species that are exclusively marine as no marine habitat is present within the survey area or indirectly impacted by the project. The database searches recorded:

– Twenty Threatened fauna taxa
– Forty Migratory and/or Marine- listed fauna taxa
– One Priority 1 taxon
– One Priority 4 taxon.

9. Field survey results

9.1 Flora and vegetation

9.1.1 Vegetation types

Seven vegetation types aligning with broad landforms were identified and described in the survey areas, not including cleared tracks:

Warmun survey area:

– VT01 – *Corymbia* Open Woodland on stony undulating plains
– VT02 – *Corymbia*/*Terminalia* Open Woodland on rocky hills and ridges
– VT03 – *Lophostemon* Open Woodland on minor drainage areas

Djarindjin, Beagle Bay and Ardyaloon survey area:

– VT04 - *Eucalyptus miniata* and *Corymbia greeniana* woodland to isolated clumps of trees on Pindan red sand loam on low plain

Beagle Bay survey area:

– VT05 - *Corymbia greeniana* and *Corymbia bella* isolated clumps of trees over *Melaleuca nervosa* subsp *crosslandiana* open woodland on silty loam over clay on drainage flats/floodplain. Analogous to PEC Kimberley Vegetation Association 67

Ardyaloon survey area:

– VT06 - *Corymbia greeniana* and *Corymbia sp* open woodland on sandy Pindan plain with occasional rocky outcrops.

Bidyadanga project area:

– VT07 - *Corymbia hamersleyana* and *Corymbia flavescens* open woodland on red brown sandplain.

The vegetation types are described in further detail in Table 22 and mapped in Figure 4, Figure 10, Figure 16, Figure 22 and Figure 28 (Appendix A).

9.1.2 Significant vegetation communities

No TEC's listed under the EPBC Act or BC Act were identified within the survey areas during the field survey. VT05 within the Beagle Bay survey area represents the PEC Kimberley Vegetation Association 67, with this pre-European association previously mapped within the survey area. VT05 is analogous with the Vegetation Association 67 based on species present, type and landform. The location of PEC Kimberley Vegetation Association 67 is shown on Figure 10, Appendix A.

The Ardyaloon and Djarindjin survey areas occur within the buffer of the TEC Monsoon (vine) thickets on coastal sand dunes of Dampier Peninsula, however, this TEC was not recorded as the landform (within or near coastal sand dunes) did not occur and many of the dominant species that represent the TEC Monsoon (vine) thickets did not occur.

The vegetation types recorded at the Warmun survey area did not represent the PEC Vegetation Association 834 as the dominant species that represent this PEC, such as Mitchell grass (*Astrebla* sp.) and Blue grass (*Bothriochloa* sp.), were not recorded in the survey area.

Table 22 Vegetation types within the survey area

Vegetation type	Vegetation Type Description	Extent (ha) and proportion of individual survey area (%)	Sampling sites	Photograph
VT01	*Corymbia ?greeniana* open woodland over *Acacia leptophleba* and *Hakea arborescens* isolated shrubs over *Triodia ?epactia*, *Eragrostis ?desertorum*, *Enneapogon ?purpurascens* and *Heteropogon contortus* tussock grassland over *Gomphrena canescens* subsp. *canescens* and *Indigofera colutea* sparse forbland on stony undulating plains.	6.73 ha (71.2%)	War02, War04, War05 (Warmun)	

Vegetation type	Vegetation Type Description	Extent (ha) and proportion of individual survey area (%)	Sampling sites	Photograph
VT02	*Corymbia ?greeniana, Eucalyptus brevifolia* and *Terminalia canescens* open woodland over *Acacia leptophleba*, *Grevillea pyramidalis* subsp. *leucadendron* and *Flueggea virosa* subsp. *melanthesoides* isolated shrubs over *Triodia ?epactia*, *Sehima nervosum* and *Eriachne ciliata* tussock grassland over *Gomphrena canescens* subsp. *canescens*, *Tephrosia phaeosperma* and *Euphorbia ?trigonosperma* sparse forbland on skeletal soils on rocky hills and ridges.	2.21 ha (23.4%)	War01, War03, War06 (Warmun)	
VT03	*Lophostemon grandifloras* subsp. *riparius* and *Lysiphyllum cunninghamii* scattered trees to open woodland over *Acacia leptophleba* and/or *Sesbania cannabina* scattered shrubs over **Cenchrus ciliaris*, *Heteropogon contortus* and *Dichanthium fecundum* open tussock grassland over *Ammannia multiflora*, *Crotularia medicarginea* var. *neglecta* and *Alternanthera nodiflora* forbland to open forbland on minor drainage lines/floodplain.	0.51 ha (5.4%)	RA1 and RA2 (Warmun)	

Vegetation type	Vegetation Type Description	Extent (ha) and proportion of individual survey area (%)	Sampling sites	Photograph
VT04	*Eucalyptus miniata* and *Corymbia greeniana* open woodland to isolated clumps of trees over *Acacia tumida* var. *kulparn* shrubland to open shrubland over *Wrightia saligna, Grevillea pyramidalis* subsp. *pyramidalis* and *Bauhinia cunninghamii* sparse shrubland over *Corchorus sidoides* subsp. *sidoides* and *Dodonaea hispidula* var. *arida* sparse shrubland over *Sorghum plumosum* and *Chrysopogon pallidus* tussock grassland over *Waltheria indica, Calandrinia strophiolata* and *Heliotropium leptaleum* open forbland on Pindan red sand loam on low plain.	Beagle Bay – 9.74 ha (84.77%) Ardyaloon north – 10.08 ha (100%) Djarindjin – 10.21 ha (99.90%)	Ard01-23, Beag_HP-05, Dja-HP-01, Dja_HP-02, Dja01-23 (Djarindjin, Beagle Bay and Ardyaloon)	

Vegetation type	Vegetation Type Description	Extent (ha) and proportion of individual survey area (%)	Sampling sites	Photograph
VT05	*Corymbia greeniana* and *Corymbia bella* isolated clumps of trees over *Melaleuca nervosa* subsp *crosslandiana* open woodland over *Chrysopogon pallidus* open tussock grassland over *Fimbristylis rara, Fimbristylis cardiocarpa* and *Cyperus pulchellus* sparse sedgeland over *Scleromitrion sclerantholdes, Buchnera linearis* and *Indigofera hirsuta* open forbland on silty loam over clay on drainage flats/floodplain. Represents DBCA P3 PEC Kimberley Vegetation Association 67.	1.62 ha (14.10%)	BB01-23 (Beagle Bay)	

Vegetation type	Vegetation Type Description	Extent (ha) and proportion of individual survey area (%)	Sampling sites	Photograph
VT06	*Corymbia greeniana* and *Corymbia sp* open woodland over *Acacia tumida* var. *kulparn, Acacia monticola* and *Brachychiton diversifolius* subsp. *diversifolius* shrubland over *Ehretia saligna* var. *saligna, Grevillea pyramidalis* subsp. *Pyramidalis* and *Santalum lanceolata* open shrubland over *Chrysopogon pallidus* and *Sorghum plumosum* open tussock grassland over *Triodia acutispicula* (P3) isolated hummocks over *Zornia albiflora*, *Corchorus sidoides* subsp. *sidoides* and *Bonamia linearis* open forbland on sandy Pindan plain with occasional rocky outcrops.	37.08 ha (99.76%)	Ard02-23, Ard03-23, Ard04-23 (Ardyaloon - south)	

Vegetation type	Vegetation Type Description	Extent (ha) and proportion of individual survey area (%)	Sampling sites	Photograph
VT07	*Corymbia hamersleyana* and *Corymbia flavescens* open woodland over *Grevillea pyramidalis* subsp. *pyramidalis* and *Acacia colei* var. *colei* sparse shrubland over *Indigofera monophylla, Acacia arida* and *Acacia adoxa* var. *subglabra* shrubland over *Triodia epactia* open hummock grassland over *Stylosanthes hamata, Indigofera linnaei* and *Calandrinia strophiolata* sparse forbland on red brown sandplain.	28.09 ha (99.64%)	Bid01-23, Bid02-23, Bid03-23 (Bidyadanga)	
Cleared	Areas devoid of native vegetation, such as cleared tracks	Beagle Bay – 0.12 ha (1.04%) Ardyaloon south – 0.09 ha (0.24%) Djarindjin – 0.01 ha (0.10%) Bidyadanga – 0.10 ha (%)	-	Photo not available

9.1.3 Vegetation condition

The condition of the vegetation within all of the survey area ranged from Excellent to Good. The majority of the survey areas are in Excellent or Very Good condition. The extents of the vegetation condition within the survey areas are detailed in Table 23 and mapped in Figure 5, Figure 11, Figure 17, Figure 23 and Figure 29 (Appendix A). The vegetation structure was intact with limited signs of cattle/donkey activity and a low number of introduced flora were recorded for most of the survey areas. There are some tracks present, such as tracks along fencelines. The Warmun survey area recorded some signs of previous clearing, edge effects, rubbish, fire and weeds.

Table 23 Vegetation condition extent in the survey areas

Vegetation Condition	Extent in survey area (ha)	% within the survey area
Excellent	66.49	78.52
Very Good	4.13	4.88
Good to Very Good	3.34	3.95
Good	10.40	12.28
Cleared	0.32	0.37
Total	84.68	100.00

9.1.4 Flora diversity

One hundred and thirty-one flora taxa (including subspecies and varieties) representing 37 families and 97 genera were recorded from the Ardyaloon, Beagle Bay, Djarindjin and Bidyadanga survey areas during the field survey. This total comprised 126 native taxa and five introduced flora taxa.

Dominant families recorded from the survey area included:

— Fabaceae (20 taxa)

— Poaceae (20 taxa)

— Malvaceae (12 taxa).

One hundred and twenty flora taxa (including subspecies and varieties) representing 33 families and 87 genera were recorded from the Warmun survey areas during the field survey. This total comprised 124 native taxa and six introduced flora taxa.

Dominant families recorded from the survey area included:

— Fabaceae (21 taxa)

— Poaceae (22 taxa)

— Amaranthaceae and Malvaceae (8 taxa).

The full list of flora identified within the Ardyaloon, Beagle Bay, Djarindjin and Bidyadanga and Warmun survey areas complied by site and species list by family is provided in Appendix D.

9.1.5 Introduced flora

Five introduced flora taxa were recorded in the Ardyaloon, Beagle Bay, Djarindjin and Bidyadanga survey areas:

– **Calotropis gigantea*
– **Cenchrus setiger*
– **Cyanthillium cinereum*
– **Passiflora foetida*
– **Stylosanthes hamata*

Six introduced flora taxa were recorded in the Warmun survey areas:

– **Aerva javanica*
– **Azadirachta indica*
– **Cenchrus ciliaris*
– **Clitoria ternatea*
– **Echinochloa colona*
– **Euphorbia heterophylla*

None of the introduced/naturalised flora taxa identified during the survey are listed as a Declared Pest under the *Biosecurity and Management Act 2007* or a Weed of National Significance. All of the introduced flora have been previously recorded from the Dampierland and Central Kimberley bioregions.

9.1.6 Significant flora

No EPBC Act or BC Act listed flora were recorded from the survey areas.

Three DBCA Priority three listed taxa were recorded from the following survey areas:

– *Goodenia byrnesii* (Priority 3) – Warmun survey area
– *Triodia acutispicula* (Priority 3) – Ardyaloon survey area
– *Tephrosia andrewii* (Priority 3) – Bidyadanga survey area

The Priority three species *Goodenia byrnesii* (Plate 1) was recorded from the Warmun survey area. This species was recorded opportunistically from five individuals in the southern survey area. This species was not identified in the desktop searches. The closest known record of this species is from the Argyle Downs Station (over 70 km north-east of Warmun) with this record representing a range extension. The species location is shown in Figure 4, Appendix A.



Plate 1 ***Goodenia byrnesii* (P3)**

The Priority three species *Triodia acutispicula* was recorded from the north and south Ardyaloon survey areas (Plate 2). This species was recorded from 17 locations with a total of 149 individuals and ranged in percentage cover between 1 – 60% within VT06. The species location is shown in Figure 16, Appendix A.



Plate 2 ***Triodia acutispicula* (P3)**

The Priority three species *Tephrosia andrewii* was recorded from the Bidyadanga survey area (Plate 3). This species was recorded from 10 locations with a total of 121 individuals. The species location is shown in Figure 28, Appendix A.



Plate 3 ***Tephrosia andrewii* (P3)**

The species raw data and co-ordinates are provided in Appendix D.

Likelihood of occurrence

A likelihood of occurrence assessment was conducted for all significant flora taxa identified in the desktop assessment (Appendix D). Of the identified Priority species for the survey areas the following assessment on likelihood post-survey is as follows:

– Warmun, one taxa *Goodenia byrnesii* (P3) was recorded and all other taxa are considered unlikely to occur
– Beagle Bay – all taxa are considered unlikely to occur
– Ardyaloon – one taxa, *Triodia acutispicula* (P3), was recorded and all other species are considered unlikely to occur

– Djarindjijn – all taxa are considered unlikely to occur.
– Bidyadanga – one taxa *Tephrosia andrewii* (P3) was recorded and all other taxa are considered unlikely to occur.

9.1.7 Flora of interest

The following common species represent flora of interest as they represent range extensions recorded within the Warmun survey area:

- *Goodenia heterochila* – significant range extension of approximately 450 km north and first record within the Central Kimberley bioregions
- *Euphorbia drummondii* – significant range extension of approximately 350 km east and first record within the Central Kimberley bioregions
- *Pterocaulon verbascifolium* – range extension of approximately 150 km east and south

9.2 Fauna

9.2.1 Fauna habitats

Six broad fauna habitat types (not including cleared) were identified within the survey area based on the predominant landforms, soil and vegetation structure in the area. The habitat types identified include Open woodlands on stony plains, Mixed woodlands on rocky hills and Minor drainage, *Eucalyptus* and *Corymbia* on Pindan red sand, *Corymbia* over *Melaleuca* on silty clay loam on drainage flats/floodplain and *Corymbia* over *Acacia* over tussock grasses over hummock grassland on red brown sandplain. These fauna habitats generally align with the mapped vegetation types, with one grouping of similar *Eucalyptus* and *Corymbia* vegetation types (VT04 and VT06).

The Open woodlands on stony plains, Mixed woodlands on rocky hills and Minor drainage was recorded from the Warmun survey area. The *Eucalyptus* and *Corymbia* on Pindan red sand habitat type is largely homogeneous throughout the Djarindjin, Beagle Bay and Ardyaloon project areas with minor variation in vegetation density across strata. The vegetation condition is considered to be very good to excellent having negligible disturbance of weeds or ground disturbance, with the exception of tracks. The *Corymbia* over *Melaleuca* on silty loam over clay on drainage flats/floodplain was only recorded in the Beagle Bay survey area. The *Corymbia* over *Acacia* over tussock grasses over hummock grassland on red brown sandplain was recorded from the Bidyadanga survey area.

There is a low proportion, approximately 5-10 percent of bare ground over most of the survey area due to a high density of ground cover vegetation leaf litter and other fallen dead vegetation. Leaf litter and other ground debris provides habitat and shelter for a range of small terrestrial vertebrates, especially fossorial reptiles. The tall shrubland provides suitable foraging and nesting habitat for a range of shrubland and woodland birds particularly insectivorous and nectar-feeding birds, terrestrial and arboreal reptiles, and large grazing mammals such as Agile Wallaby.

Sparse emergent trees provide some limited tree hollows for nesting and shelter, and there are very few moderate to large fallen logs suitable as shelter or den sites due to the low tree density. Most shelter habitat is in the form of dense shrub foliage and ground leaf litter. There are occasional large termite mounds that provide shelter, breeding sites and food source for a range of reptiles and mammals.

The survey areas are part of a larger continuous area of tall shrubland plain and drainage system habitats throughout the surrounding area as it has a high degree of habitat connectivity with surrounding vegetation having similar or better condition vegetation.

Table 24 Fauna habitat types within the survey area

Habitat Type	Habitat Description	Extent (ha) and proportion of survey area (%)	Representative photograph
Stony Plains (VT01)	*Corymbia ?greeniana* open woodland over *Acacia leptophleba* over Triodia and tussock grassland on stony undulating plains. This habitat is widespread in the region, and most represented in the survey area. The diverse and dense grassy understorey provides suitable foraging and nesting for various bird species such as doves, pigeons and quail, and insectivorous and granivore bird species. The habitat would be utilised by wallaby (such as Agile Wallaby) and Euro for foraging. Several birds of prey would utilise this habitat as it provides an open plain for foraging. As the Eucalypt trees are not tall/mature it would not provide breeding habitat for birds of prey. **Conservation significant fauna** Gouldian Finch (*Erythrura gouldiae*) (P4/EN) may utilise this habitat, foraging on seed of grasses when seasonally available. The Grey Falcon (*Falco hypoleucos*) (VU) has the potential to utilise this habitat as it contains suitable foraging opportunity. The survey area is within the known distribution of the Grey Falcon. The Peregrine Falcon (*Falco peregrinus*) (OS) is likely to utilise this habitat for foraging. This species is known to occur locally. **Habitat value** High	6.73 ha (71.2%)	

Habitat Type	Habitat Description	Extent (ha) and proportion of survey area (%)	Representative photograph
Rocky Hills (VT02)	*Corymbia ?greeniana, Eucalyptus brevifolia* and *Terminalia canescens* open woodland over Triodia and tussock grassland on skeletal soils on rocky hills and ridges. This habitat type lacks large bisected rocky gorges with deep crevices or caves that are suitable for rock wallaby spp, bats, possums and rodents. The habitat in the survey area provides looser rocky boulders on hilltops which is suitable for certain reptiles seeking shelter in the Triodia and foraging on the rocky hills, such as several species of dragon, geckos, Spiny-tailed Monitor and whip-snakes. This habitat would attract Woodswallows and other arid land species such as Rufous Songlark and Rufous Whistler. Several birds of prey would utilise this habitat also for foraging and using tall trees as a vantage. **Conservation significant fauna** Gouldian Finch (*Erythrura gouldiae*) (P4/EN) may utilise this habitat, foraging on seed of grasses when seasonally available, and has the potential to utilise hollow-bearing Eucalypts in this habitat-type for breeding, although mature hollow-bearing trees were scant in the survey area. The Grey Falcon (*Falco hypoleucos*) (VU) has the potential to utilise this habitat as it contains suitable foraging opportunity. The survey area is within the known distribution of the Grey Falcon. The Eucalypts in the survey area are not mature enough to provide suitable breeding habitat. The Peregrine Falcon (*Falco peregrinus*) (OS) is likely to utilise this habitat for foraging. This species is known to occur locally. The rocky habitat is not suitable for breeding as no large open shelf rock or large mature Eucalypts with hollows. **Habitat value** High	2.21 ha (23.4%)	

Habitat Type	Habitat Description	Extent (ha) and proportion of survey area (%)	Representative photograph
Minor Drainage (VT03)	*Lophostemon grandifloras* subsp. *riparius* and *Lysiphyllum cunninghamii* scattered trees over open tussock grassland on minor drainage lines/floodplain. This habitat would attract honeyeaters and granivores for foraging on the grasses and shrubs, such as Yellow-tinted honeyeater, Yellow Throated minor and Friarbird spp. Wallaby (such as Agile wallaby) and Euro would utilise this habitat type for foraging and shelter under trees. Several species of frog may utilise this habitat such as Green Tree Frog, Ornate Burrowing Frog and Northern Spadefoot. **Conservation significant fauna** Gouldian Finch (*Erythrura gouldiae*) (P4/EN) may be attracted to the water in the drainage lines but this would be an opportunistic occurrence. Habitat may be suitable for foraging as well. **Habitat value** Medium	0.51 ha (5.4%)	
Eucalyptus and *Corymbia* on Pindan red sand (VT04 and VT06)	*Eucalyptus* and *Corymbia* woodland to isolated clumps of trees over tussock grasses and herbs on Pindan red sand loam on low plain. This habitat type generally corresponds with vegetation type VT04 and VT06. It tends to occur on well draining porous sandy soil. Habitat condition is generally very good to excellent; however some disturbance includes frequent fire, edge effects of weeds from adjacent tracks and clearings, and dumped rubbish. This habitat is extensive and widespread within the Pindanland bioregion of the Dampier Peninsular and occurs within Ardyaloon, Djarindjin and Beagle Bay survey areas. It is foraging and nesting habitat for a diverse range of insectivorous, nectar and granivore bird species including common resident and nomadic woodland bird species such as DollarBird. Rainbow Bee-eater, Little Friarbird, Peaceful Dove, Grey-crowned Babbler and Double-barred Finch. A range of reptiles utilise this habitat including arboreal species: Stimson's Python, Black-tailed Monitor, and Tree Dtella. Borrowing and		

Habitat Type	Habitat Description	Extent (ha) and proportion of survey area (%)	Representative photograph
	fossorial reptiles include Griffin's Slider, Dampierland Limbless Slider and Gould's Monitor. **Conservation significant fauna** Foraging habitat Gouldian Finch (*Erythrura gouldiae*), Foraging and nesting habitat for Peregrine Falcon (*Falco peregrinus*), habitat for Dampierland Burrowing snake (*Simoselaps minimus*), and Dampierland plain slider (*Lerista separanda*) and Greater Bilby (*Macrotis lagotis*). **Habitat value** High value		
Corymbia over *Melaleuca* on silty clay loam on drainage flats/floodplain (VT05)	*Corymbia* isolated clumps of trees over *Melaleuca* open woodland over mixed sedges and herbs on silty loam over clay on drainage flats/floodplain This habitat tyre generally corresponds with vegetation type VT05. Habitat condition is generally very good to excellent; however some disturbance includes frequent fire, dumped rubbish, and ground disturbance from adjacent infrastructure. This habitat is restricted to the Beagle Bay survey area in the eastern portion that encroaches into poor-draining lower elevation floodplain. It is foraging and nesting habitat for a diverse range of insectivorous, nectar and granivore bird species including common resident woodland bird species such as Black-faced Cuckoo-shrike, Blue-winged Kookaburra, Collared Sparrowhawk, Long-tailed Finch, and Sacred Kingfisher. A range of frogs and reptiles utilise this habitat including. Desert Tree Frog, Greet Tree Frog, Ornate Burrowing Frog, Long-snouted Water Dragon and Plains Ctenotus (Skink). **Conservation significant fauna** Foraging habitat for Gouldian Finch (*Erythrura gouldiae*), Peregrine Falcon (*Falco peregrinus*), Dampierland Burrowing snake (*Simoselaps minimus*), Dampierland plain slider (*Lerista separanda*) and Greater Bilby (*Macrotis lagotis*) **Habitat value** High value		

Habitat Type	Habitat Description	Extent (ha) and proportion of survey area (%)	Representative photograph
Corymbia over *Acacia* over tussock grasses over hummock grassland on red brown sandplain (VT07)	*Corymbia* open woodland over *Acacia* shrubs over tussock grasses over *Triodia* hummock grassland over herbs on red brown sandplain. This habitat tyre generally corresponds with vegetation type VT07. Habitat condition ranges from good to very good with some cleared areas. Disturbance includes weed invasion, dumped rubbish, ground disturbance, cattle grazing and recent fire (0-2 years). Soils are moderately well drained sandy clay. This habitat is restricted to the Bidyadanga survey area where it extends throughout. It is foraging habitat for a diverse range of regionally widespread and common bird species such as Australian Bustard, Brown Falcon, Red-browed Pardalote, and Variegated Fairy-wren. Budgerigar, Several large termite mounds within the survey area provide sheltering habitat for many reptile species. **Conservation significant fauna** Nil **Habitat value** Moderate value		
Cleared areas	Unmapped areas that include roads and tracks.		Photo not available

9.2.2 Fauna diversity

Dampier Peninsula survey

A fauna species list has been compiled for each survey area and is presented in Appendix E. In total across all sites/regions 47 fauna species were identified, which included 24 birds, 10 reptiles, three mammals and two amphibians. Two of the species are introduced (Dog and Donkey). The species recorded at each site have been listed below.

Ardyaloon survey area

A total of 23 fauna species were identified in the Ardyaloon survey area. This total comprised 18 birds, 2 mammals, 2 reptiles and one amphibian. Two introduced species (Donkey and Dog) were recorded and are included in this total.

Bidyadanga survey area

A total of 20 fauna species were identified in the Bidyadanga survey area. This total comprised 14 birds, 2 mammals and 4 reptiles. One introduced species (Dog) was recorded and is included in this total.

Djarindjin survey area

A total of 12 fauna species were identified in the Djarindjin survey area. This total comprised 10 birds, one mammal and one reptile. One introduced species (Dog) was recorded and is included in this total.

Beagle Bay survey area

A total of 12 fauna species were identified in the Beagle Bay survey area. This total comprised 10 birds, one mammal, and one amphibian.

Warmun survey

A fauna species list has been compiled for the Warmun survey area and is presented in Appendix E.

A total of 30 fauna species were identified in the Warmun site. This total comprised 23 birds, 3 mammals, 3 reptiles and one amphibian. Two species are introduced (Dog and Feral Cat).

9.2.3 Significant fauna

No BC Act or EPBC Act listed Threatened fauna or Priority listed fauna by the DBCA were recorded during the survey. One Marine listed species under the EPBC Act, the Rainbow Bee-eater (*Merops ornatus*), was recorded at the Ardyaloon site. This species is widespread across Australia and WA and occupies a wide variety of habitats. It is likely this species would be present across all the survey sites on the Dampier Peninsula and at Warmun.

Targeted survey for Greater Bilby (Macrotis lagotis)

No evidence of Greater Bilby (*Macrotis lagotis*) (VU) activity (footprints, foraging holes, burrows or scats) was recorded within the Dampier Peninsula survey areas. The targeted Bilby survey assessed a total of 7 plots/transects across the sites. Four plots were conducted across the Ardyaloon sites (3 at the large south site and 1 at the small north site), and one plot at each of the other survey sites, due to their size. The results of the plot data collected is presented in Appendix E as a composite summary. The method allows for assessment of each plot trackability of Bilby as well as plot ODS (other determining signs). The mean plot trackability score was identified for Ardyaloon as 3 plots were conducted for the south (large) site. The plot trackability scores have been presented in Table 25 below.

Table 25 Bilby plot trackability scores

Site	Plot trackability score
Djarandjin	3.2
Ardyaloon small (north) site	4.0

Site	Plot trackability score
Ardyaloon big (south) site plot 1	3.9 (mean)
Ardyaloon big (south) site plot 2	
Ardyaloon big (south) site plot 3	
Beagle bay Plot 1	3.6
Bidyadanga Plot 1	3.7

A higher score depicts a higher degree of difficulty in the detectability of the Bilby. The scores equate to low trackability. Various factors contributed to this, with rain splatter removing animal tracks in the substrate at the sites, and the density of ground cover vegetation was high for most of the sites.

For the Dampier Peninsula survey, the Bilby is considered Likely to occur as the species has been well-recorded across the local and regional area prior, and suitable habitat is present. The Bilby is a mobile species and may occupy various areas over time within the habitat, particularly in areas away from the Aboriginal communities due to presence of dogs. This species is likely to forage or move through the areas, but unlikely to burrow.

The Bilby is not known to occur locally in Warmun, and the habitats in the survey area are not suitable for the species. It is considered Unlikely to occur at Warmun.

Likelihood of occurrence

A likelihood of occurrence assessment was conducted for significant fauna species identified in the desktop assessment. This assessment was based on species biology, habitat requirements, the quality and availability of suitable habitat (based on vegetation types present within the survey area) and previous records of species in the study area. No assumptions were made on the transient potential of these species. The complete likelihood of assessment is provided in Appendix E.

The likelihood of occurrence of significant fauna species has been separated by each survey site:

Beagle Bay

– Five fauna species are considered likely to occur due to potentially suitable foraging and/or breeding habitat in the survey area and close proximity of previous records. These include Gouldian Finch (*Erythrura gouldiae*) (P4), Grey Falcon (*Falco hypoleucos*) (OS), Peregrine Falcon (*Falco peregrinus*) (OS), Oriental pratincole (*Glareola maldivarum*) (MI) and Greater Bilby (*Macrotis lagotis*) (VU).
– 15 species are considered unlikely to occur and 9 species are considered highly unlikely to occur.

Bidyadanga

– Four fauna taxa are considered Likely to occur due to potentially suitable foraging and/or breeding habitat in the survey area and close proximity of previous records. These include Oriental Pratincole (*Glareola maldivarum*) (MI), Grey Falcon (*Falco hypoleucos*) (VU), Rainbow Bee-eater (*Merops ornatus*) (MA) and Greater Bilby (*Macrotis lagotis*) (VU)
– Thirty-eight fauna taxa are considered Unlikely to occur
– Twenty fauna taxa are considered Highly Unlikely to occur

Ardyaloon

– Six fauna are considered likely to occur due to potentially suitable foraging and/or breeding habitat in the survey area and close proximity of previous records. These include Gouldian Finch (*Erythrura gouldiae*), Grey Falcon (*Falco hypoleucos*), Peregrine Falcon (*Falco peregrinus*), Greater Bilby (*Macrotis lagotis*), Dampierland Burrowing snake (*Simoselaps minimus*), and Dampierland plain slider (*Lerista separanda*)
– Forty six (46) fauna considered unlikely or highly unlikely to occur.

Djarindjin

– Gouldian Finch (*Erythrura gouldiae*) (P4), Peregrine Falcon (*Falco peregrinus*) (OS), Dampierland Burrowing snake (*Simoselaps minimus*) (P4), Dampierland plain slider (*Lerista separanda*) (P2) and Greater Bilby (*Macrotis lagotis*) (V) are likely to occur,
– 14 unlikely to occur and

– 30 highly unlikely to occur.

Warmun

– Three species are Likely to occur: Gouldian Finch (*Erythrura gouldiae*) (P4), Peregrine Falcon (*Falco peregrinus)* and Grey Falcon *(Falco hypoleucos).*
– One is Highly Unlikely to occur
– 23 are Unlikely to occur

10. Conclusion

The proposed development of the centralised solar generation is considered not to have a significant impact on the flora, vegetation and fauna values at a local and regional scale due to the high representation and continuation of vegetation in the region outside of the project areas. No TEC's listed under the EPBC Act or BC Act were identified within the survey areas during the field survey. VT05 within the Beagle Bay project area represents the PEC Kimberley Vegetation Association 67 and is considered significant.

The survey areas are part of a larger continuous area of tall shrubland plain, rocky and drainage system habitats throughout the surrounding area as it has a high degree of habitat connectivity with surrounding vegetation having similar or better condition vegetation.

No EPBC Act or BC Act listed flora were recorded from the survey areas. Three DBCA Priority three listed taxa were recorded from the following survey areas:

– *Goodenia byrnesii* (Priority 3) – Warmun survey area
– *Triodia acutispicula* (Priority 3) – Ardyaloon survey area
– *Tephrosia andrewii* (Priority 3) – Bidyadanga survey area

No EPBC Act or BC Act listed Threatened fauna or Priority listed fauna by the DBCA were recorded during the survey. One Marine listed species under the EPBC, the Rainbow Bee-eater (*Merops ornatus*), was recorded at the Ardyaloon site. No evidence of Greater Bilby (*Macrotis lagotis*) (Vulnerable) activity (footprints, foraging holes, burrows or scats) was recorded within the Dampier Peninsula survey areas.

11. References

Beard, J.S 1977, Vegetation Survey of Western Australia: Kimberley, map and explanatory memoir, 1:1,000,000 series, Nedlands, University of Western Australia Press.

Birdlife Australia. 2019. Website https://birdlife.org.au/projects/bittern-project, assessed January 2023.

Bureau of Meteorology (BoM) 2023, Climate Data Online, retrieved April 2023, from http://www.bom.gov.au/climate/data/.

Christidis & Boles (2008). Systematics and Taxonomy of Australian Birds. CSIRO Publishing.

Churchill, S 2008, *Australian Bats*, second edition, Milton, Australia, Allen & Unwin

Commonwealth of Australia. 2012. Interim Biogeographic Regionalisation for Australia, Version 7.

Department of Biodiversity, Conservation and Attractions. (DBCA 2007-). NatureMap: Mapping Western Australia's Biodiversity. http://naturemap.dpaw.wa.gov.au/default.aspx/.

Department of Biodiversity, Conservation and Attractions (DBCA) 2017. Guidelines for surveys to detect the presence of bilbies, and assess the importance of habitat in Western Australia

Department of Biodiversity, Conservation and Attractions. 2017. Ramsar Sites (DBCA-010).

Department of Biodiversity, Conservation and Attractions. 2018b. Directory of Important Wetlands in Australia - Western Australia (DBCA-045).

Department of Biodiversity Conservation and Attractions. 2019. DBCA Statewide Vegetation Statistics.

Department of Biodiversity Conservation and Attractions. 2021. DBCA - Legislated Lands and Waters (DBCA-011).

Department of Biodiversity, Conservation and Attractions. 2021. Priority Ecological Communities for Western Australia Version 32. Species and Communities Program.

Department of Biodiversity, Conservation and Attractions. 2022. DBCA - Legislated Lands and Waters (DBCA-011).

Department of Biodiversity, Conservation and Attractions. 2023a. Threatened Ecological Community (TEC) and Priority Ecological Community (PEC) database search.

Department of Biodiversity, Conservation and Attractions. 2023b. Threatened and Priority Flora (DBCA-036).

Department of Biodiversity, Conservation and Attractions. 2023c. Threatened and Priority Fauna (DBCA-037).

Department of Climate Change, Energy, the Environment and Water. 2023. Environmental Protection and Biodiversity Conservation Act 1999 Protected Matters Search Tool. http://www.environment.gov.au/epbc/pmst/index.html.

Department of Environment and Energy. 2022. Australian Faunal Directory.

DAWE 2011a. Survey Guidelines for Australia's threatened Mammals. Guidelines for detecting mammals listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999.

DAWE 2011b. Survey guidelines for Australia's threatened reptiles: Guidelines for detecting reptiles listed as threatened under the EPBC Act.

Department of Primary Industries and Regional Development. 2022. Soil Landscape Mapping - Systems (DPIRD-064).

Department of Water and Environmental Regulation. 2020. Clearing Regulations - Environmentally Sensitive Areas (DWER-046).

Department of Water and Environmental Regulation. 2023. Department of Water and Environmental Regulation - Datasets. https://catalogue.data.wa.gov.au/org/department-of-water-and-environmental-regulation.

Environmental Protection Authority. 2016a. Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment. https://www.epa.wa.gov.au/policies-guidance/technical-guidance-flora-and-vegetation-surveys-environmental-impact-assessment.

Environmental Protection Authority. 2016b. Environmental Factor Guideline - Flora and Vegetation.

Environmental Protection Authority. 2020. Technical guidance - terrestrial vertebrate fauna surveys for environmental impact assessment.

GHD (2019) Horizon Power Site assessment for the proposed Warmun Solar Area, unpublished report prepared for Horizon Power, Western Australia

GHD (2021) Horizon Power 283 – West Kimberley Solar flora and fauna assessment, unpublished report prepared for Horizon Power, Western Australia

Government of Western Australia (GoWA) 2022a, data.wa.gov.au, accessed December 2022, from https://data.wa.gov.au/.

Government of Western Australia (GoWA) 2022b, 2019 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full report), Current as of March 2019, Perth, Australia, Department of Biodiversity, Conservation and Attractions, retrieved December 2022, from https://catalogue.data.wa.gov.au/dataset/dbca-statewide-vegetation-statistics.

Graham G 2001a. Central Kimberley 2 (CK2 – Hart subregion), A biodiversity Audit of Western Australia's 52 Biogeographical Subregions in 2002, Department of Conservation and Land Management.

Graham, G 2001b, Dampierland (DL2 – Pindanland subregion), A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002, Department of Conservation and Land Management.

Menkhorst, P., and Knight, F. 2010. A field Guide to the Mammals or Australia. Oxford University Press.

Morcombe, M, 2004, Field Guide to Australian Birds. Steve Parish Publishing Archer Field Queensland Australia.

NVIS Technical Working Group. 2017. Australian Vegetation Attribute Manual: National Vegetation Information System, Version 7.0. Department of the Environment and Energy, Canberra.

Payne, A and Schoknecht, N 2011, Land Systems of the Kimberley Region, Western Australia, Technical Bulletin No. 98, Perth, DAFWA.

Pizzey, G and Knight, F 2012, *The Field Guide to the Birds of Australia*, Sydney, Australia, Harper Collins Publishers.

Shepherd, D., G. Beeston, and A. Hopkins. 2002. Native Vegetation in Western Australia – Extent, Type and Status, Resource Management Technical Report 249. Department of Agriculture, Western Australia.

Southgate, R., Paltridge, R. Masters, P, Nano, T. 2005. An evaluation of transect, plot and aerial survey techniques to monitor the spatial pattern and status of the bilby (*Macrotis lagotis*) in the Tanami Desert. Wildlife Research 32(1).

Southgate, R., Dziminski, M., Paltridge, R., Schubert, A., & Gaikhorst, G. (2018). Verifying bilby presence and the systematic sampling of wild populations using sign-based protocols – with notes on aerial and ground survey techniques and asserting absence. Journal of the Australian Mammal Society

Tyler & Doughty. 2009. Field Guide to Frogs of Western Australia. WA Museum.

Van Dyck, S. and Strahan R, 2008, The mammals of Australia. New Holland Publishers. Sydney.

Western Australia Museum. 2021. Checklist of the Terrestrial Vertebrate Fauna of Western Australia.

Western Australian Herbarium. 1998-. Florabase—the Western Australian Flora. Western Australian Herbarium, Biodiversity and Conservation Science, Department of Biodiversity, Conservation and Attractions. https://florabase.dpaw.wa.gov.au/.

Wilson, S., and Swan, J. 2017. A Complete Guide to the Reptiles of Australia. Hew Holland Publishers

Appendices

Appendix A

Figures

Warmun survey area

Figure 1 *Locality*

Figure 2 *Environmental constraints*

Figure 3 *Survey effort*

Figure 4 *Vegetation types and conservation listed flora location*

Figure 5 *Vegetation condition*

Figure 6 *Fauna habitat*

Beagle Bay

Figure 7 *Locality*

Figure 8 *Environmental constraints*

Figure 9 *Survey effort*

Figure 10 *Vegetation types and significant vegetation communities*

Figure 11 *Vegetation condition*

Figure 12 *Fauna habitat*

Ardyaloon

Figure 13 *Locality*

Figure 14 *Environmental constraints*

Figure 15 *Survey effort*

Figure 16 *Vegetation types and conservation listed flora records*

Figure 17 *Vegetation condition*

Figure 18 *Fauna habitat*

Djarindjin

Figure 19 *Locality*

Figure 20 *Environmental constraints*

Figure 21 *Survey effort*

Figure 22 *Vegetation types*

Figure 23 *Vegetation condition*

Figure 24 *Fauna habitat*

Bidyadanga

Figure 25 *Locality*

Figure 26 *Environmental constraints*

Figure 27 *Survey effort*

Figure 28 *Vegetation types and conservation listed flora records*

Figure 29 *Vegetation condition*

Figure 30 *Fauna habitat*



Paper Size ISO A3
at Scale: 1:4,500

0 50 100 150 200

Meters

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 52

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

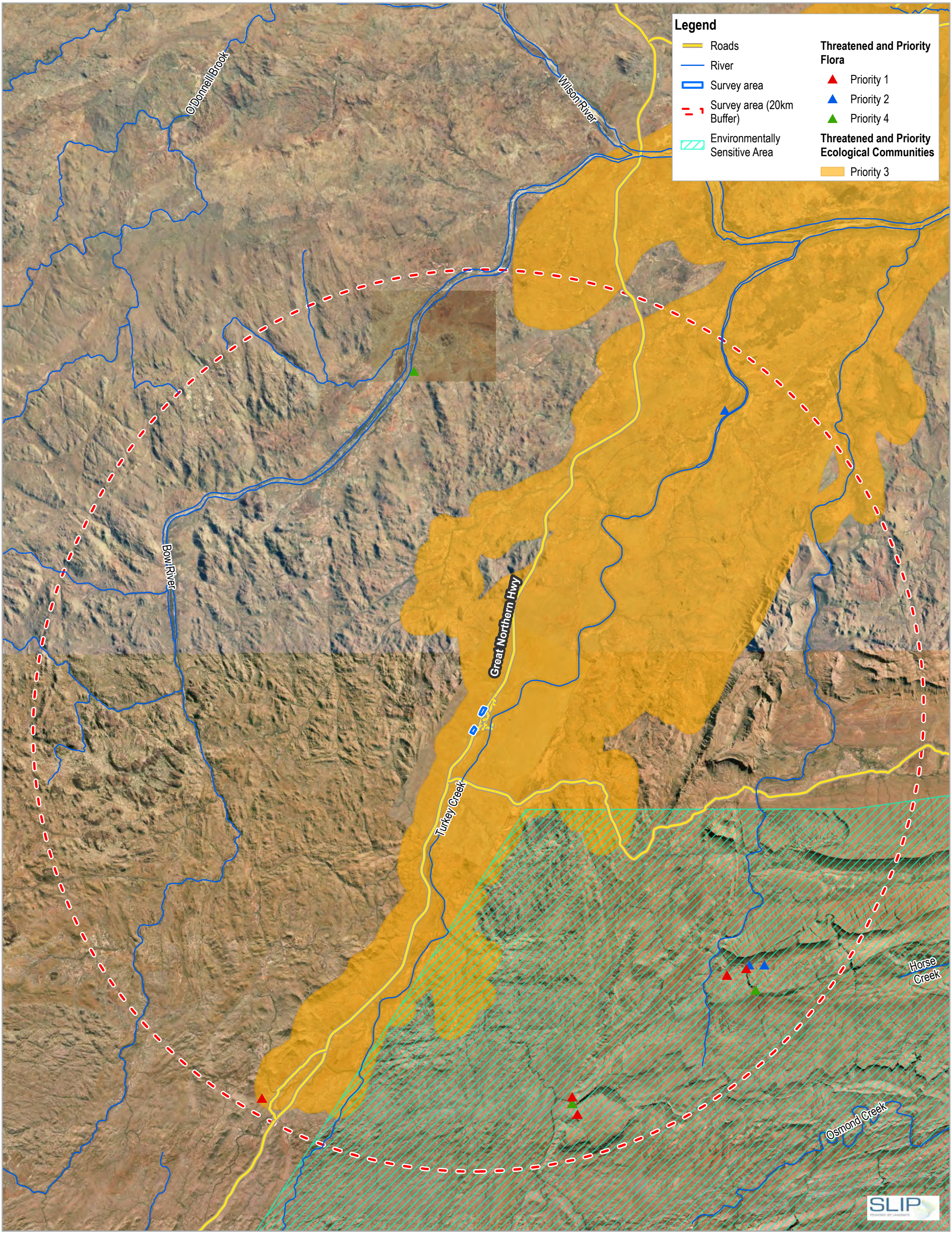
Locality

Project No. **12598389**
Revision No. **0**
Date **17/05/2023**

FIGURE 1

\\ghdnet\ghd\AU\Perth\Projects\61\12598389\GIS\Maps\Working\12598389_WarmunFigures\12598389_WarmunFigures.aprx\12598389_01_Warmun_Locality_Rev0
Print date: 19 May 2023 - 13:06

Data source: Landgate_Subscription_Imagery\WANow: . Created by: klabez



Paper Size ISO A3
at Scale: 1:155,000

0 1,500 3,000 4,500 6,000

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 52

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

Environmental Constraints

Project No. **12598389**
Revision No. **0**
Date **17/05/2023**

FIGURE 2

\\ghdnet\ghd\AU\Perth\Projects\61\12598389\GIS\Maps\Working\12598389_WarmunFigures\12598389_WarmunFigures.aprx\12598389_02_Warmun_EnvironmentalConstraints_Rev0
Print date: 19 May 2023 - 13:09

Data source: Landgate_Subscription_Imagery\WANow: . Created by: klabez

Legend
Quadrat
Releve
Tracklogs
Major Roads
Survey area
Q1
Q2
Q3
Q4
R1
Q5
Q6
R2
Great Northern Hwy
Warmun Rd
SLIP

Paper Size ISO A3
at Scale: 1:3,500
0 30 60 90 120
Meters
Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 52
N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

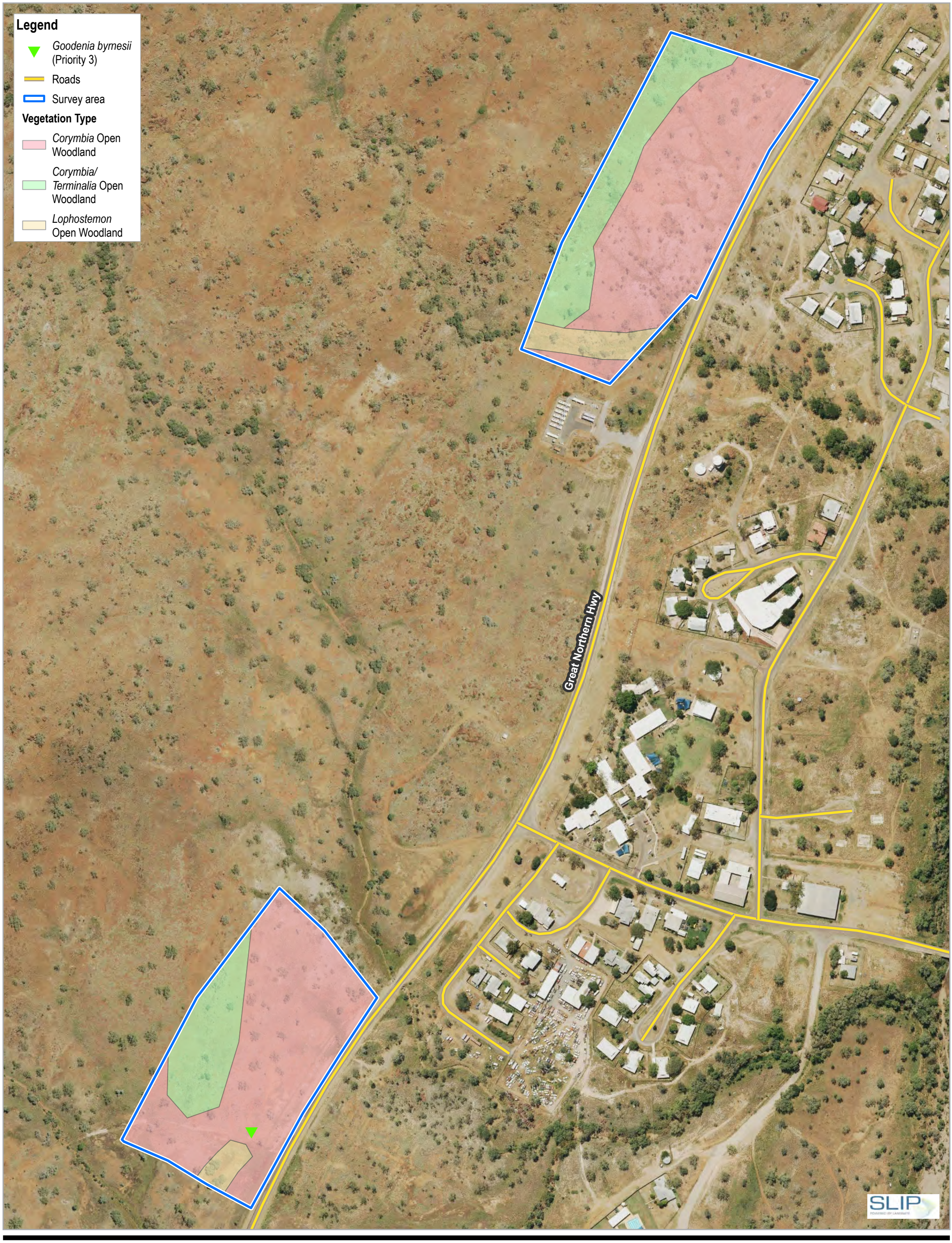
Survey Effort

Project No. **12598389**
Revision No. **0**
Date **17/05/2023**

FIGURE 3

\\ghdnet\ghd\AU\Perth\Projects\61\12598389\GIS\Maps\Working\12598389_WarmunFigures\12598389_WarmunFigures.aprx\12598389_03_Warmun_SurveyEffort_Rev0
Print date: 19 May 2023 - 13:10

Data source: Landgate_Subscription_Imagery\WANow: . Created by: klabez



Paper Size ISO A3
at Scale: 1:3,500

0 30 60 90 120
Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 52

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

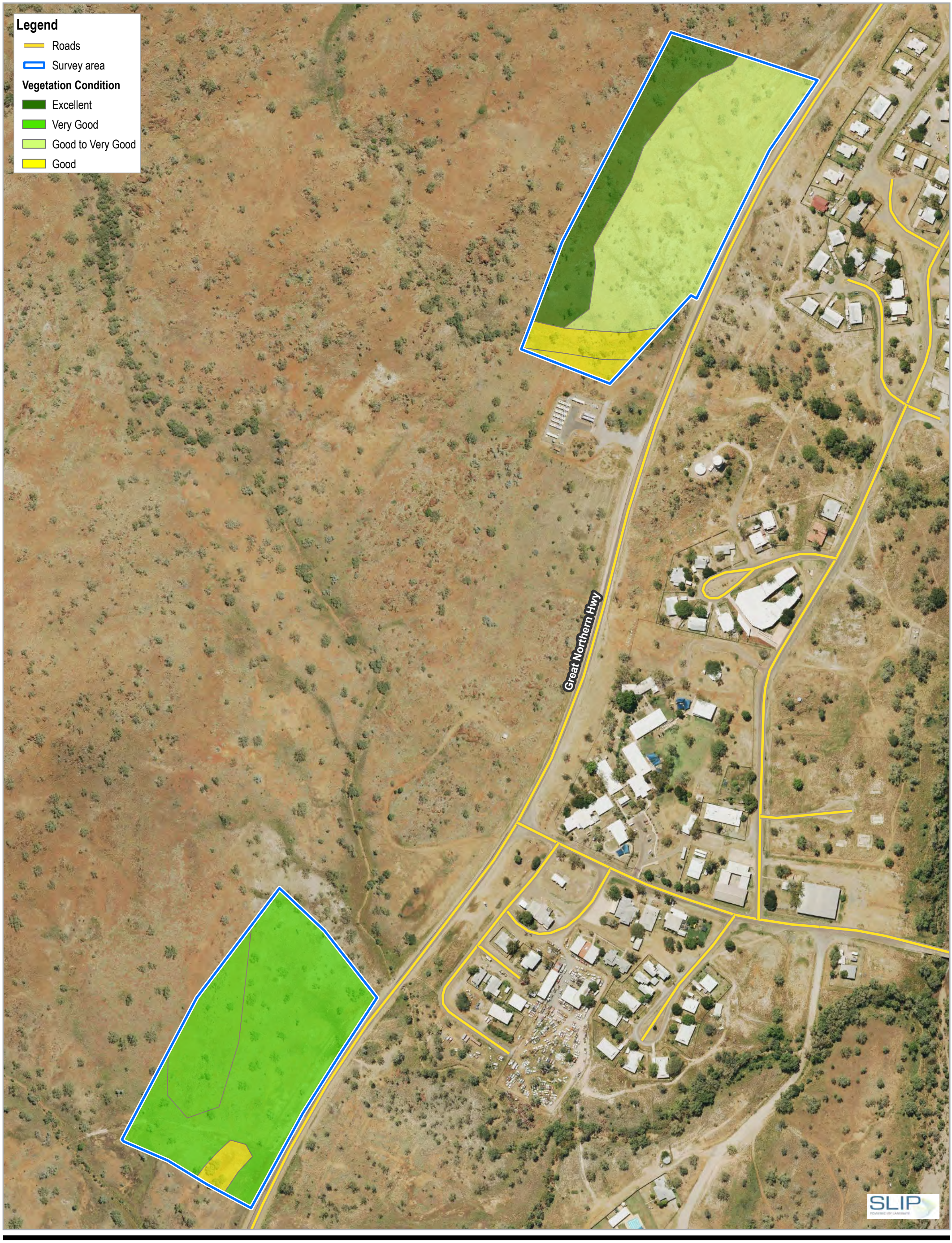
Project No. **12598389**
Revision No. **0**
Date **17/05/2023**

Vegetation Type and Significant Flora

FIGURE 4

\\ghdnet\ghd\AU\Perth\Projects\61\12598389\GIS\Maps\Working\12598389_WarmunFigures\12598389_WarmunFigures.aprx\12598389_04_Warmun_VegetationTypeSigFlora_Rev0
Print date: 19 May 2023 - 13:13

Data source: Landgate_Subscription_Imagery\WANow: . Created by: klabez



Paper Size ISO A3
at Scale: 1:3,500

0 30 60 90 120

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 52

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

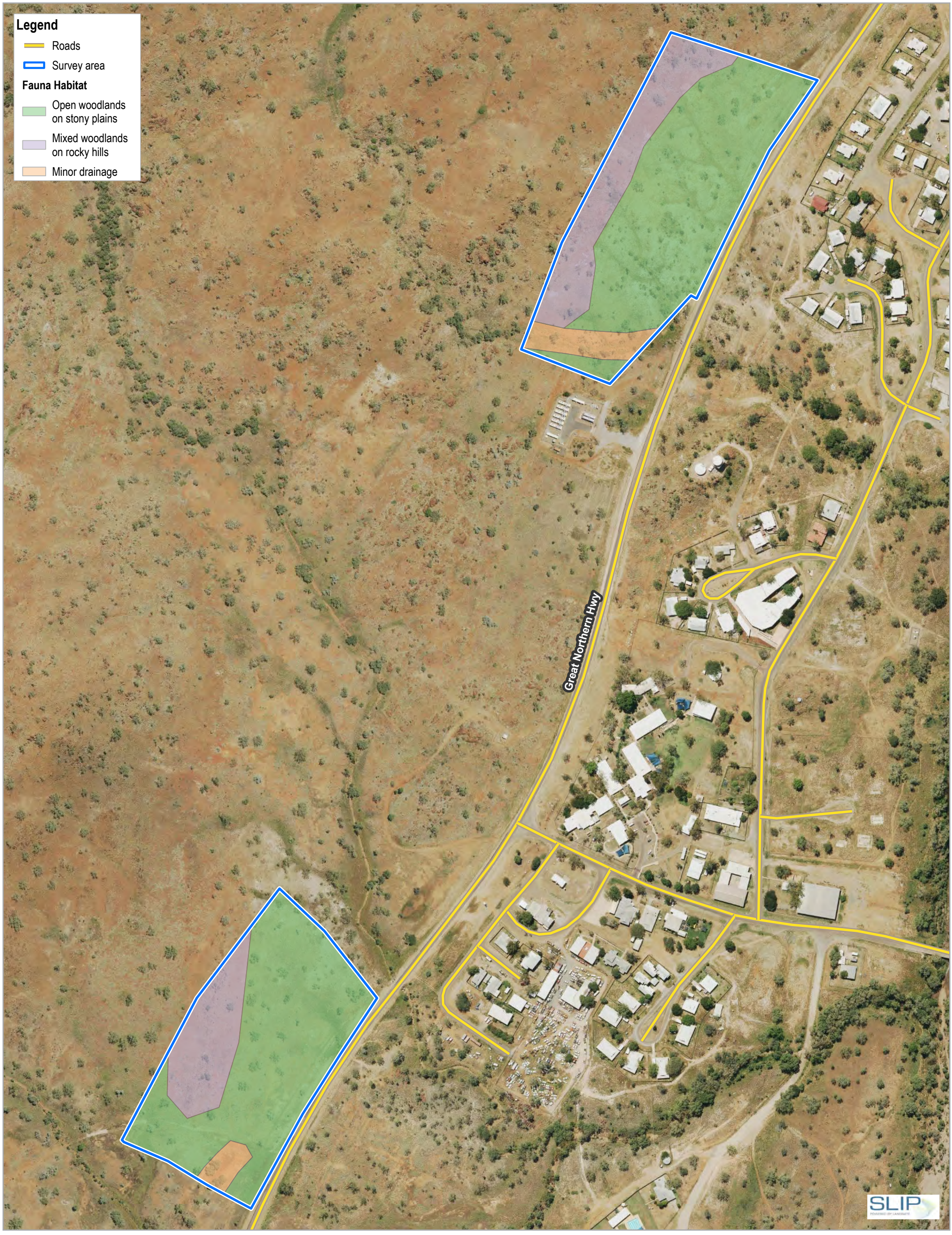
Vegetation Condition

Project No. **12598389**
Revision No. **0**
Date **17/05/2023**

FIGURE 5

\\ghdnet\ghd\AU\Perth\Projects\61\12598389\GIS\Maps\Working\12598389_WarmunFigures\12598389_WarmunFigures.aprx\12598389_05_Warmun_VegetationCondition_Rev0
Print date: 19 May 2023 - 13:13

Data source: Landgate_Subscription_Imagery\WANow: . Created by: klabez



Paper Size ISO A3
at Scale: 1:3,500

0 30 60 90 120

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 52

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

Fauna Habitat

Project No. **12598389**
Revision No. **0**
Date **17/05/2023**

FIGURE 6

\\ghdnet\ghd\AU\Perth\Projects\61\12598389\GIS\Maps\Working\12598389_WarmunFigures\12598389_WarmunFigures.aprx\12598389_06_Warmun_FaunaHabitat_Rev0
Print date: 19 May 2023 - 13:14

Data source: Landgate_Subscription_Imagery\WANow: . Created by: klabez



Paper Size ISO A3
at Scale: 1:3,000

0 30 60 90 120

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 52

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

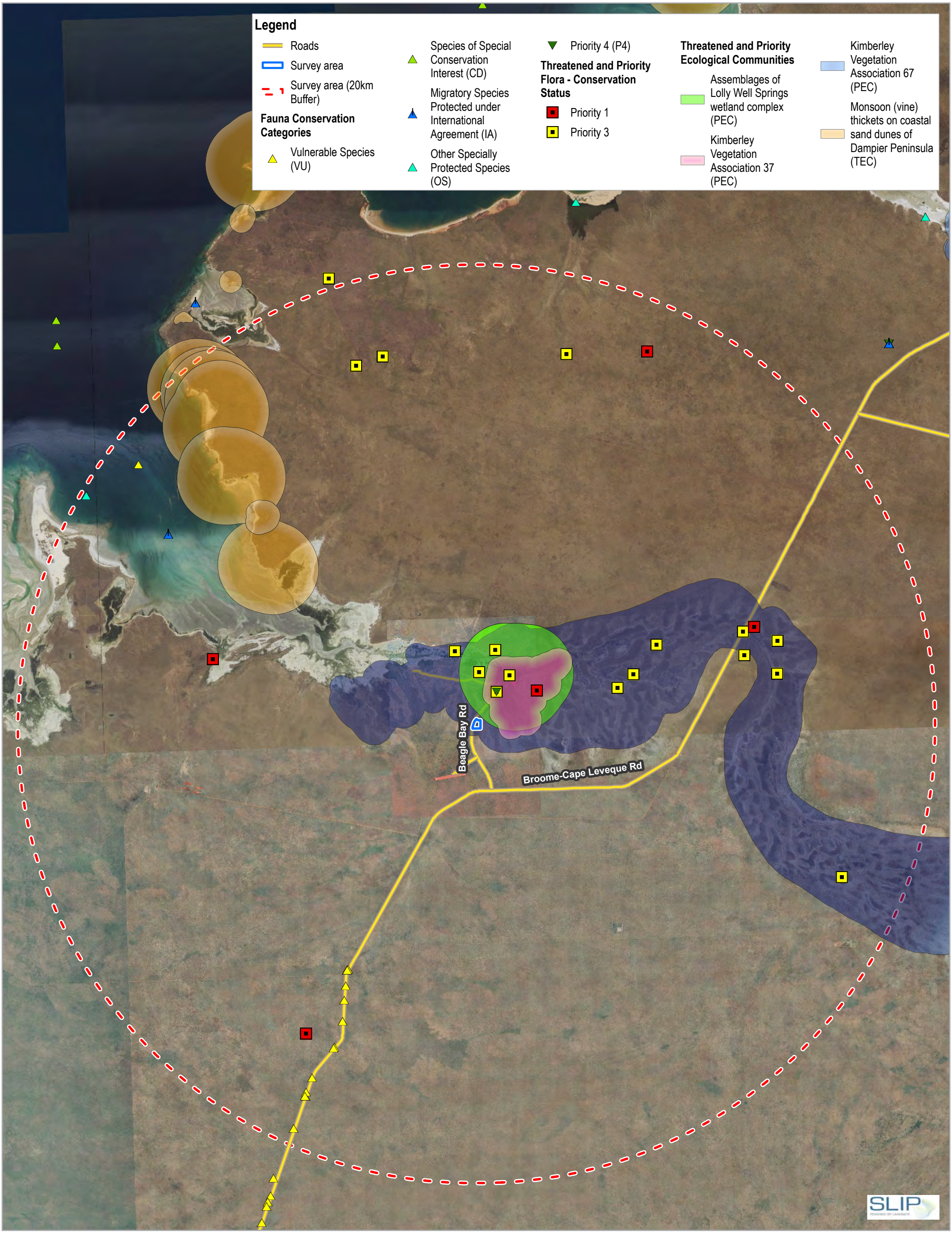
Locality

Project No. **12598389**
Revision No. **0**
Date **17/05/2023**

FIGURE 7

\\ghdnet\ghd\AU\Perth\Projects\61\12598389\GIS\Maps\Working\12598389\12598389.aprx\12598389_07_BeagleBay_Locality_Rev0
Print date: 19 May 2023 - 13:19

Data source: Landgate_Subscription_Imagery\WANow: . Created by: klabez



Paper Size ISO A3
at Scale: 1:150,000

0 1,500 3,000 4,500 6,000

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 52

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

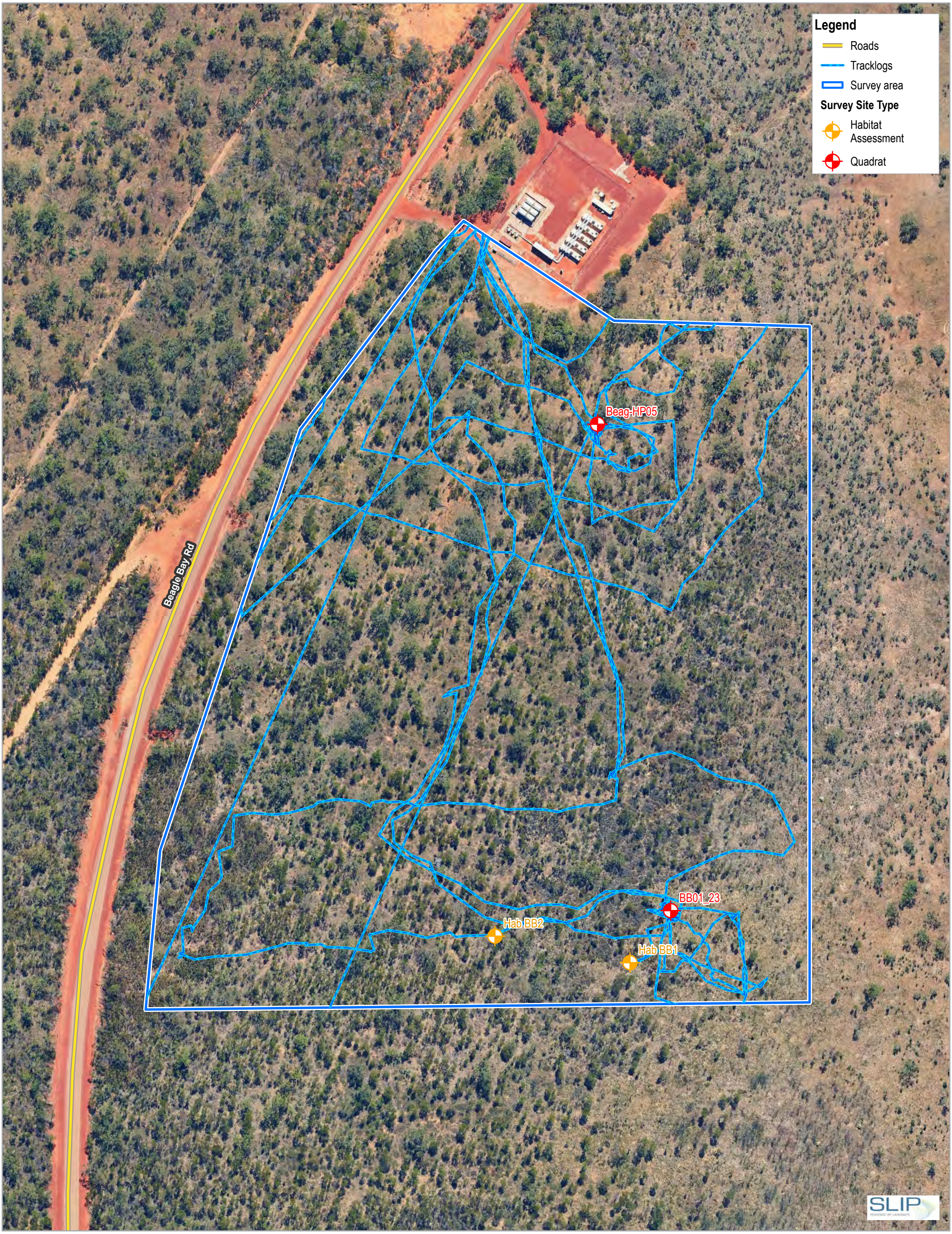
Environmental Constraints

Project No. **12598389**
Revision No. **0**
Date **17/05/2023**

FIGURE 8

\\ghdnet\ghd\AU\Perth\Projects\61\12598389\GIS\Maps\Working\12598389\12598389.aprx\12598389_08_BeagleBay_EnvironmentalConstraints_Rev0
Print date: 19 May 2023 - 13:20

Data source: Landgate_Subscription_Imagery\WANow: . Created by: klabez



Paper Size ISO A3
at Scale: 1:1,800

0 20 40 60 80

Meters

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 52

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

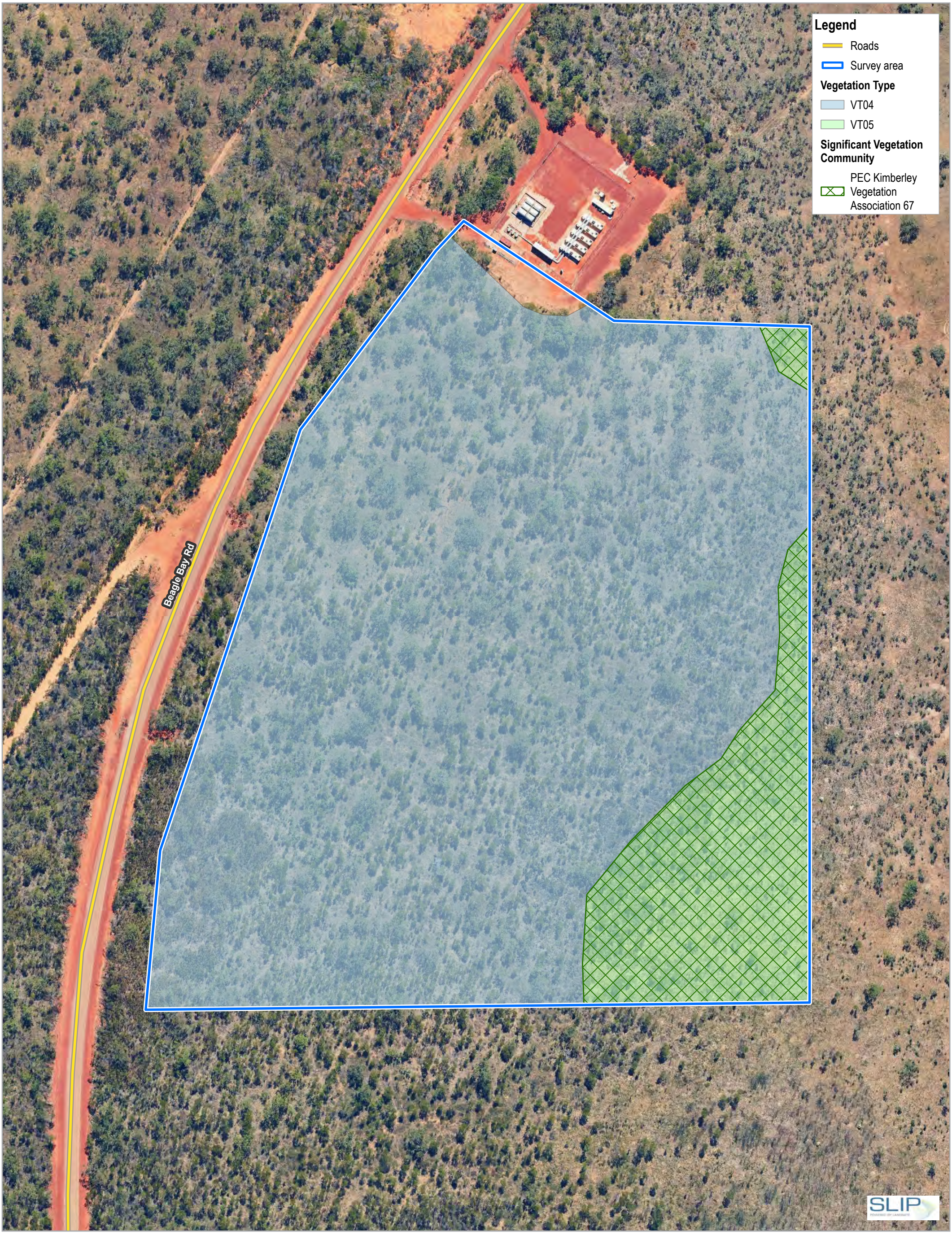
Survey Effort

Project No. **12598389**
Revision No. **0**
Date **17/05/2023**

FIGURE 9

\\ghdnet\ghd\AU\Perth\Projects\61\12598389\GIS\Maps\Working\12598389\12598389.aprx\12598389_09_BeagleBay_SurveyEffort_Rev0
Print date: 19 May 2023 - 13:20

Data source: Landgate_Subscription_Imagery\WANow: . Created by: klabez



Paper Size ISO A3
at Scale: 1:1,800

0 20 40 60 80

Meters

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 52

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

Vegetation Types and Significant Vegetation Communities

Project No. **12598389**
Revision No. **0**
Date **17/05/2023**

FIGURE 10

\\ghdnet\ghd\AU\Perth\Projects\61\12598389\GIS\Maps\Working\12598389\12598389.aprx\12598389_10_BeagleBay_VegTypeSigCommunity_Rev0
Print date: 19 May 2023 - 13:22

Data source: Landgate_Subscription_Imagery\WANow: . Created by: klabez



Paper Size ISO A3
at Scale: 1:1,800

0 20 40 60 80

Meters

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 52

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

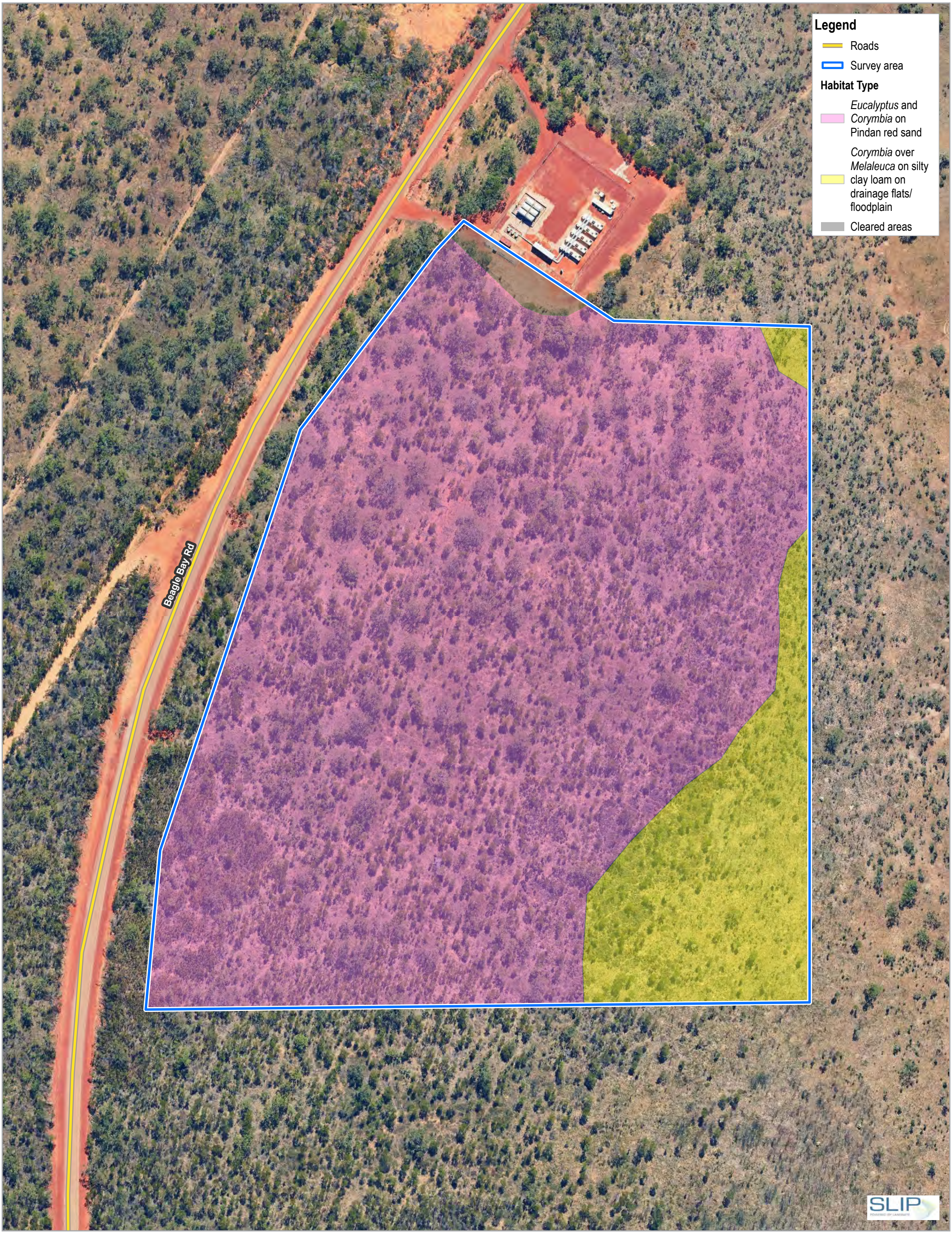
Vegetation Condition

Project No. **12598389**
Revision No. **0**
Date **17/05/2023**

FIGURE 11

\\ghdnet\ghd\AU\Perth\Projects\61\12598389\GIS\Maps\Working\12598389\12598389.aprx\12598389_11_BeagleBay_VegetationCondition_Rev0
Print date: 19 May 2023 - 13:23

Data source: Landgate_Subscription_Imagery\WANow: . Created by: klabez



Paper Size ISO A3
at Scale: 1:1,800

0 20 40 60 80

Meters

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 52

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

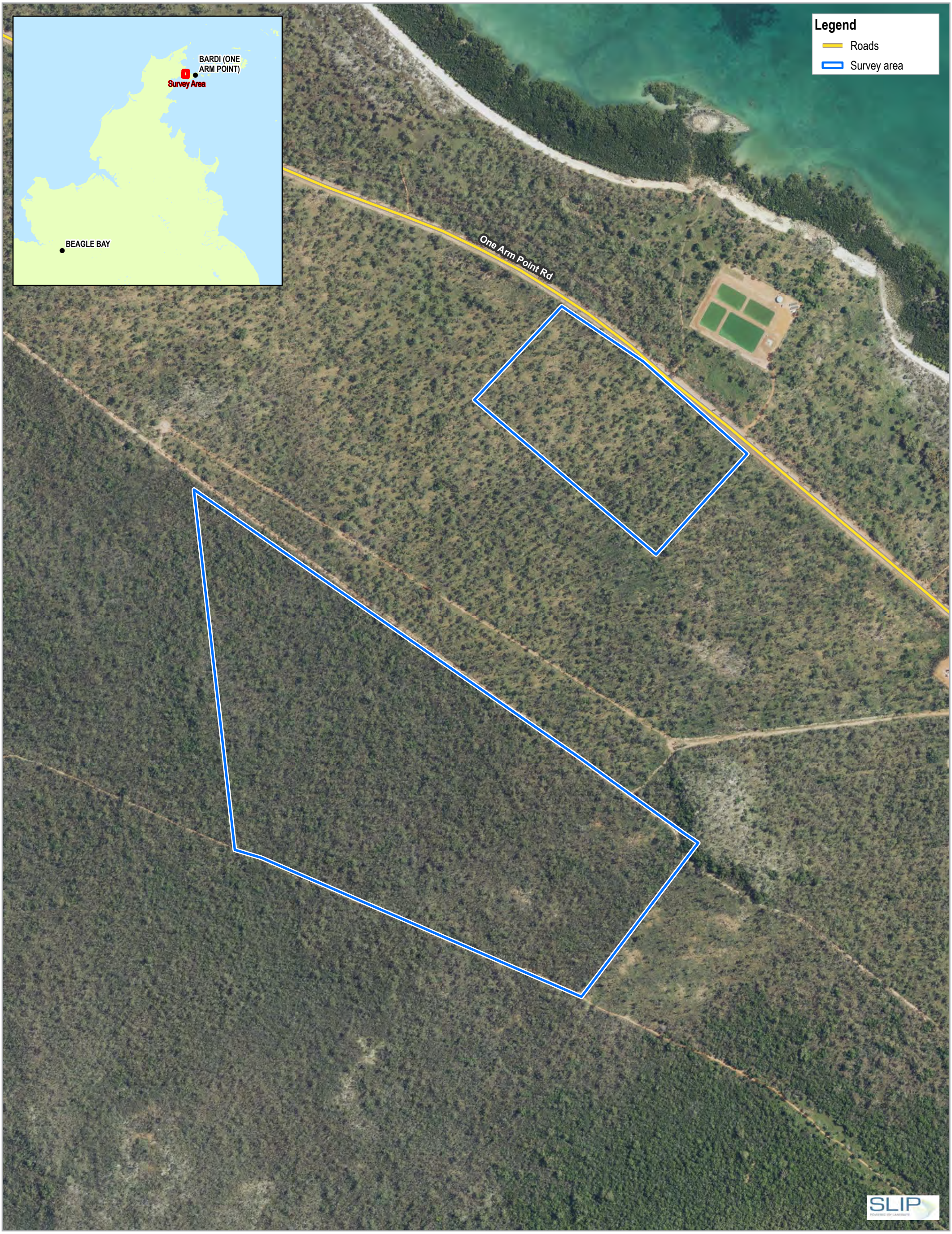
Fauna Habitat

Project No. **12598389**
Revision No. **0**
Date **17/05/2023**

FIGURE 12

\\ghdnet\ghd\AU\Perth\Projects\61\12598389\GIS\Maps\Working\12598389\12598389.aprx\12598389_12_BeagleBay_FaunaHabitat_Rev0
Print date: 19 May 2023 - 13:24

Data source: Landgate_Subscription_Imagery\WANow: . Created by: klabez



Paper Size ISO A3
at Scale: 1:6,000

0 50 100 150 200

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 52

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

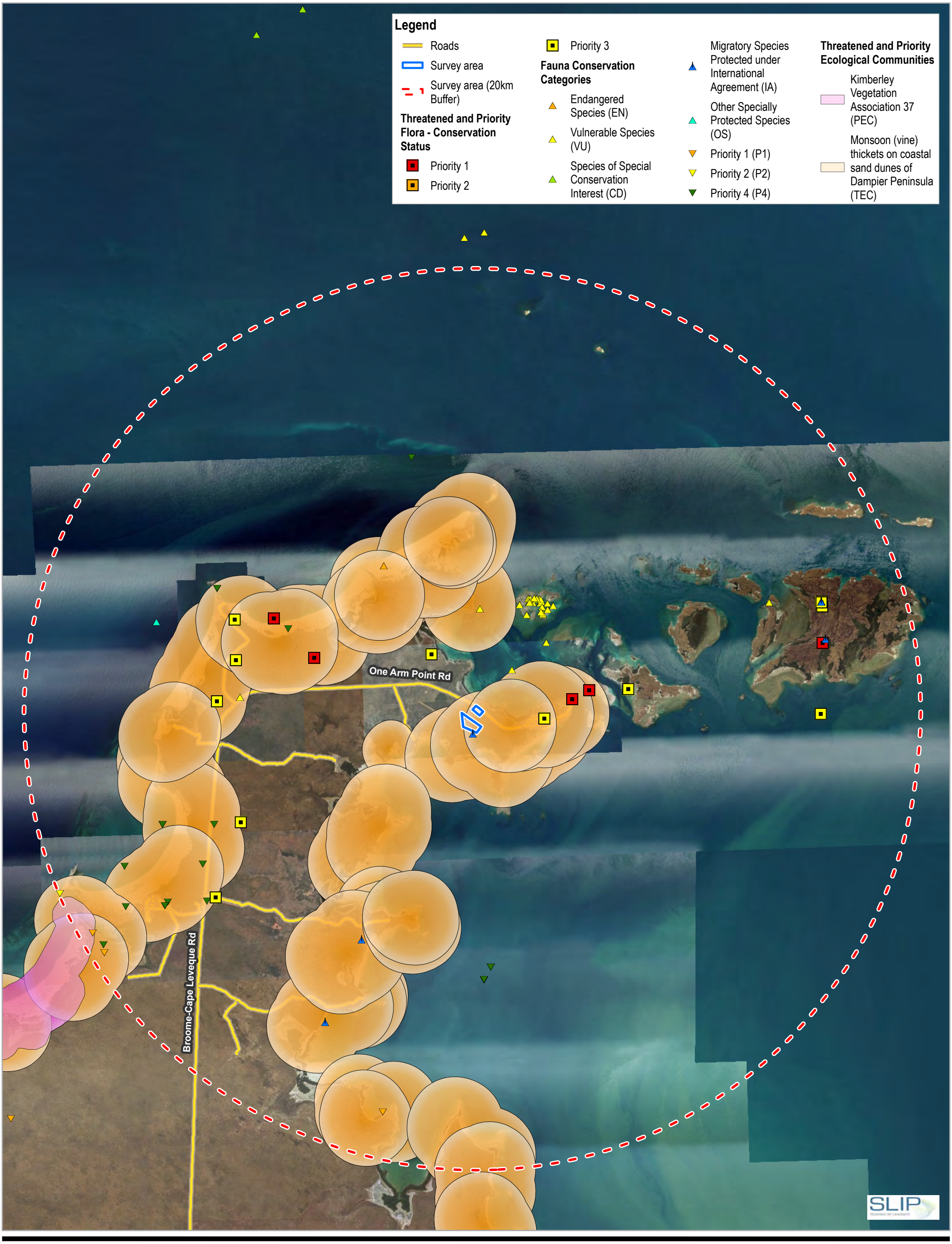
Locality

Project No. **12598389**
Revision No. **0**
Date **17/05/2023**

FIGURE 13

\\ghdnet\ghd\AU\Perth\Projects\61\12598389\GIS\Maps\Working\12598389\12598389.aprx\12598389_13_Ardyaloon_Locality_Rev0
Print date: 19 May 2023 - 13:26

Data source: Landgate_Subscription_Imagery\WANow: . Created by: klabez



Paper Size ISO A3
at Scale: 1:155,000

0 1,500 3,000 4,500 6,000
Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 52

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

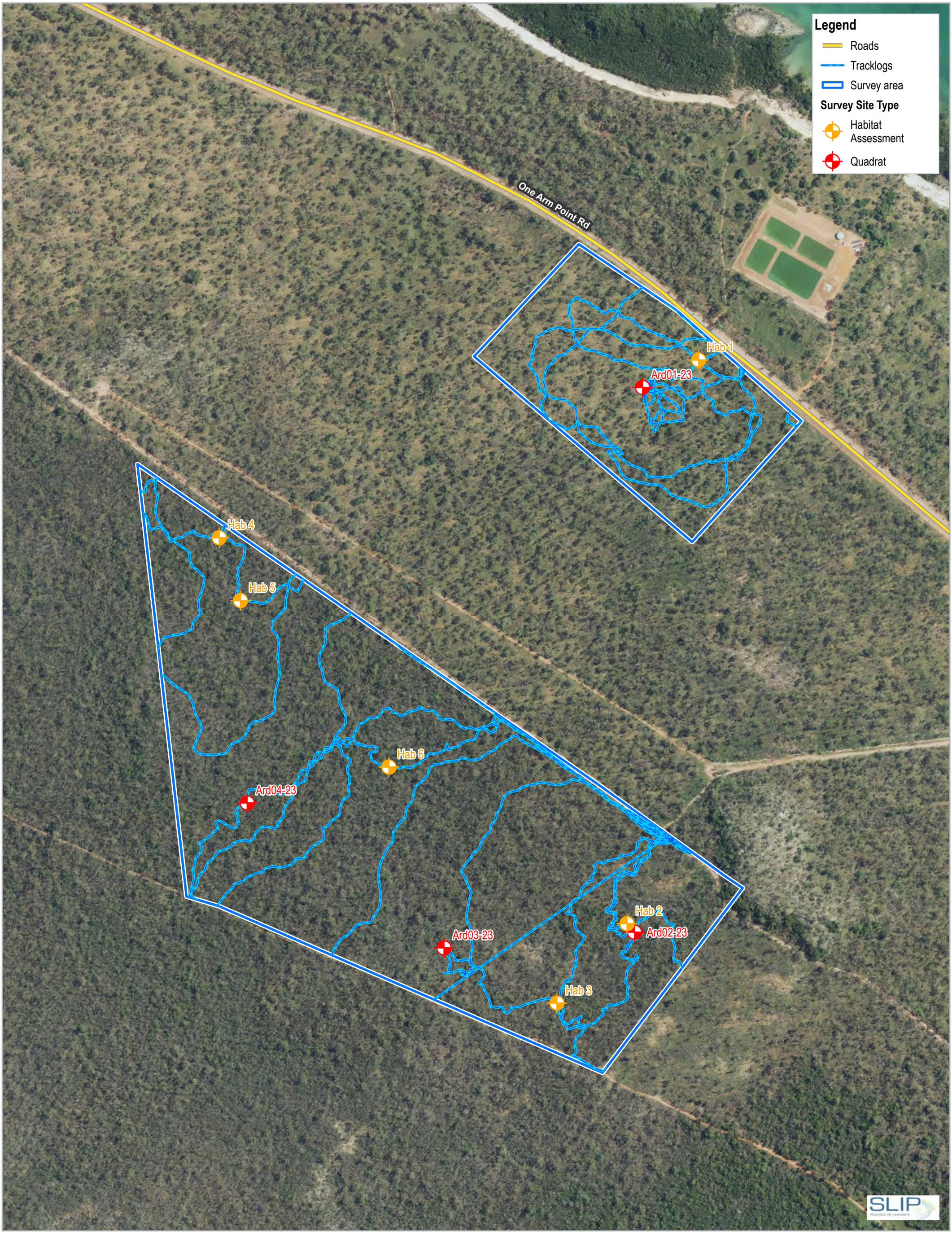
Environmental Constraints

Project No. **12598389**
Revision No. **0**
Date **17/05/2023**

FIGURE 14

\\ghdnet\ghd\AU\Perth\Projects\61\12598389\GIS\Maps\Working\12598389\12598389.aprx\12598389_14_Ardyaloon_EnvironmentalConstraints_Rev0
Print date: 19 May 2023 - 13:27

Data source: Landgate_Subscription_Imagery\WANow: . Created by: klabez



Paper Size ISO A3
at Scale: 1:5,000

0 50 100 150 200

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 52

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

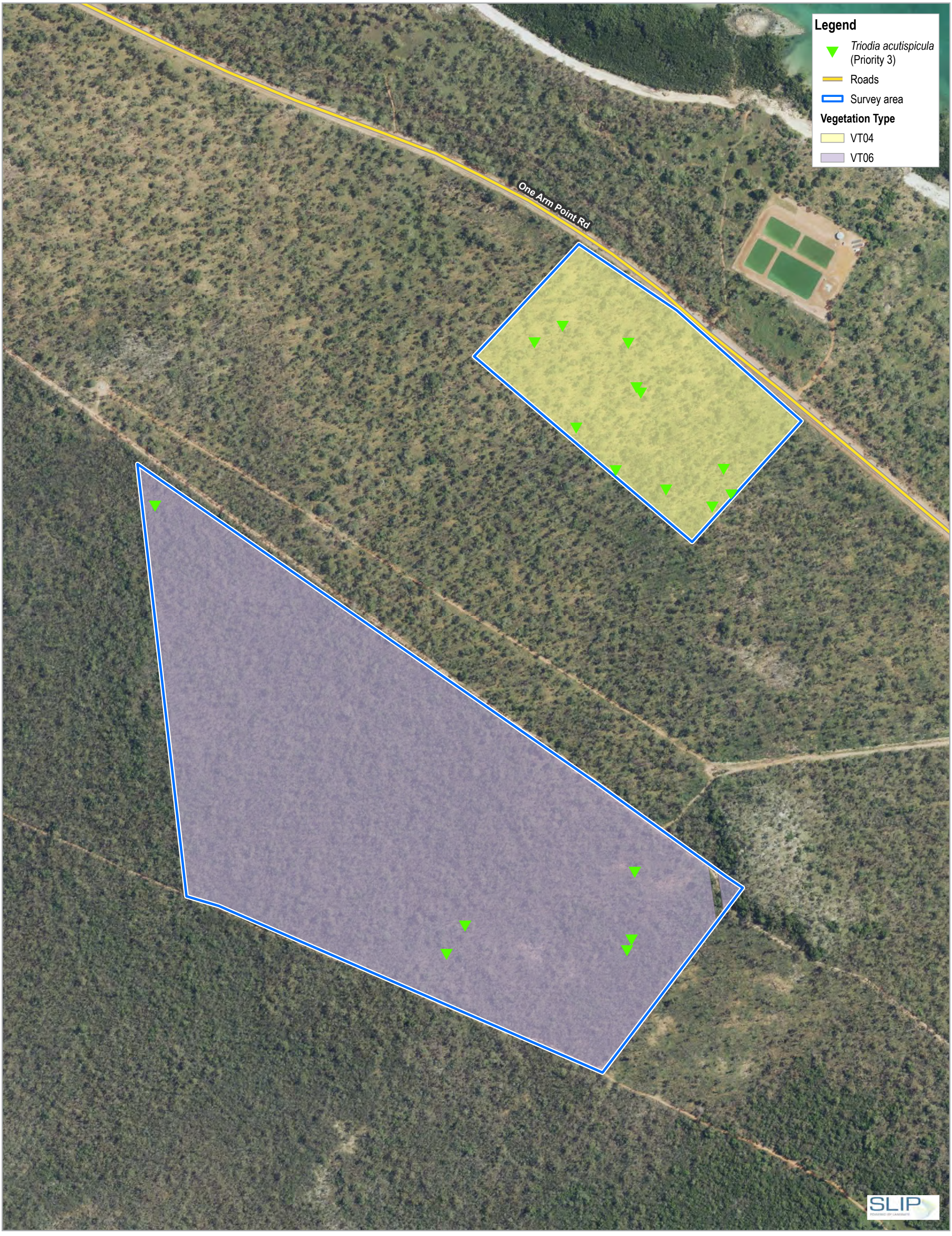
Survey Effort

Project No. **12598389**
Revision No. **0**
Date **17/05/2023**

FIGURE 15

\\ghdnet\ghd\AU\Perth\Projects\61\12598389\GIS\Maps\Working\12598389\12598389.aprx\12598389_15_Ardyaloon_SurveyEffort_Rev0
Print date: 19 May 2023 - 13:27

Data source: Landgate_Subscription_Imagery\WANow: . Created by: klabez



Paper Size ISO A3
at Scale: 1:5,000

0 50 100 150 200

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 52

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

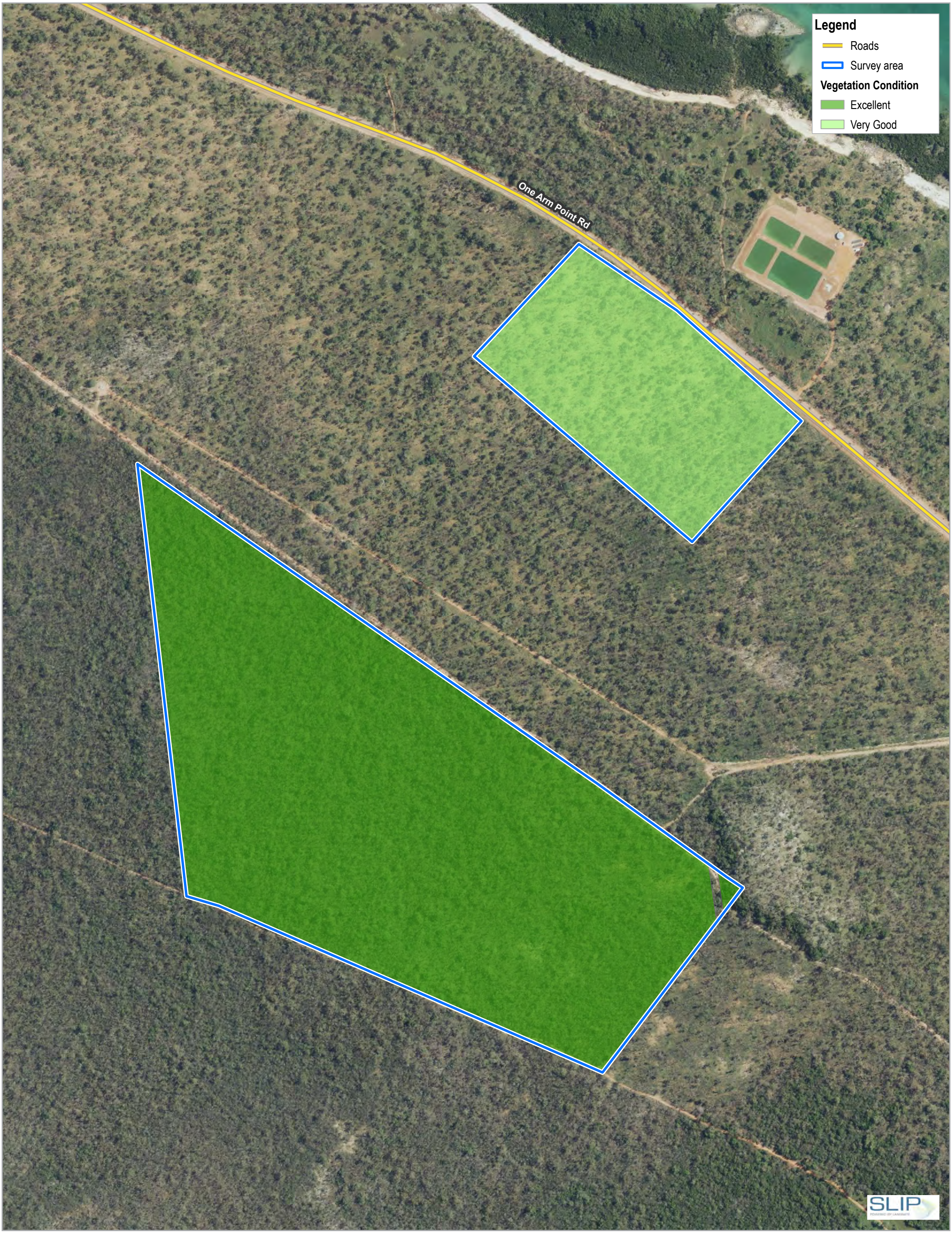
Vegetation Types and Conservation Listed Flora Records

Project No. **12598389**
Revision No. **0**
Date **17/05/2023**

FIGURE 16

\\ghdnet\ghd\AU\Perth\Projects\61\12598389\GIS\Maps\Working\12598389\12598389.aprx\12598389_16_Ardyaloon_VegTypesAndFlora_Rev0
Print date: 19 May 2023 - 13:29

Data source: Landgate_Subscription_Imagery\WANow: . Created by: klabez



Paper Size ISO A3
at Scale: 1:5,000

0 50 100 150 200

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 52

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

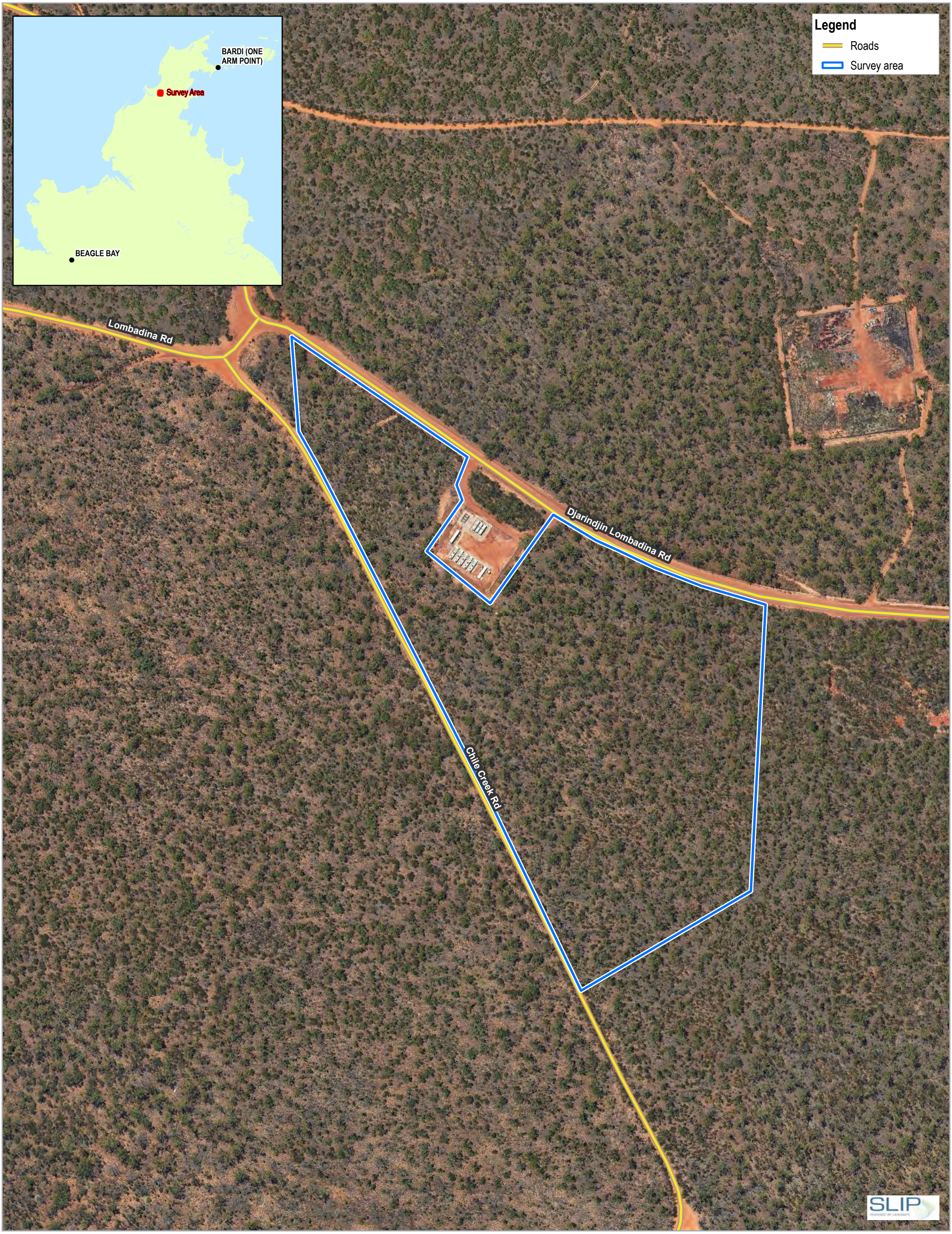
Vegetation Condition

Project No. **12598389**
Revision No. **0**
Date **17/05/2023**

FIGURE 17

\\ghdnet\ghd\AU\Perth\Projects\61\12598389\GIS\Maps\Working\12598389\12598389.aprx\12598389_17_Ardyaloon_VegetationCondition_Rev0
Print date: 19 May 2023 - 13:29

Data source: Landgate_Subscription_Imagery\WANow: . Created by: klabez



Paper Size ISO A3
at Scale: 1:3,000

0 30 60 90 120

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 52

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

Locality

Project No. **12598389**
Revision No. **0**
Date **17/05/2023**

FIGURE 19

\\ghdnet\ghd\AU\Perth\Projects\61\12598389\GIS\Maps\Working\12598389\12598389.aprx\12598389_19_Djarindjin_Locality_Rev0
Print date: 19 May 2023 - 13:32

Data source: Landgate_Subscription_Imagery\WANow: . Created by: klabez

Legend

- Roads
- Survey area
- Survey area (20km Buffer)

Threatened and Priority Flora - Conservation Status

- Priority 1
- Priority 3

Fauna Conservation Categories

- Endangered Species (EN)
- Vulnerable Species (VU)
- Species of Special Conservation Interest (CD)

- Migratory Species Protected under International Agreement (IA)
- Other Specially Protected Species (OS)
- Priority 1 (P1)
- Priority 2 (P2)
- Priority 4 (P4)

Threatened and Priority Ecological Communities

- Kimberley Vegetation Association 37 (PEC)
- Monsoon (vine) thickets on coastal sand dunes of Dampier Peninsula (TEC)

One Arm Point Rd

Broome-Cape Leveque Rd

SLIP

Paper Size ISO A3
at Scale: 1:155,000

0 1,500 3,000 4,500 6,000
Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 52

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

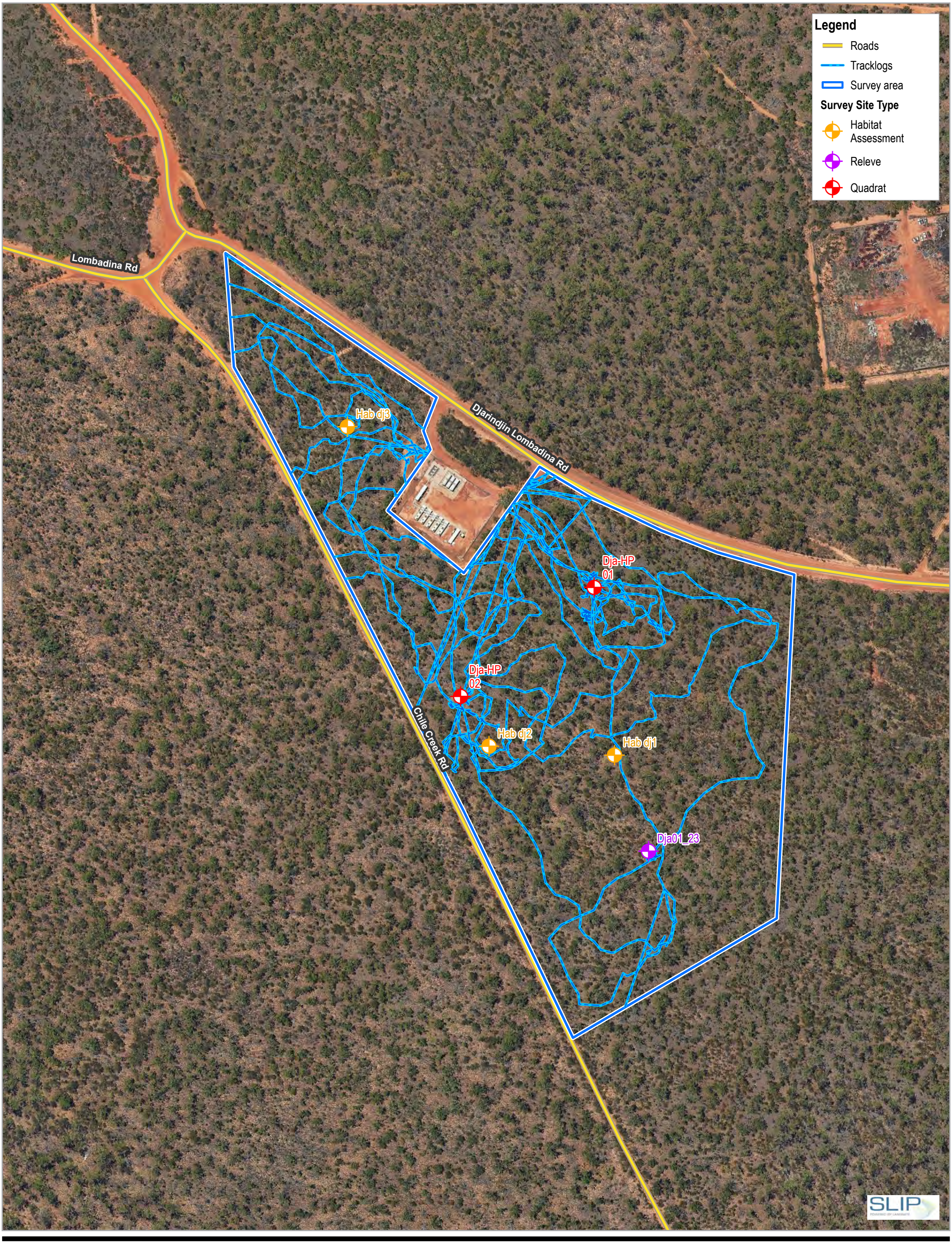
Environmental Constraints

Project No. **12598389**
Revision No. **0**
Date **17/05/2023**

FIGURE 20

\\ghdnet\ghd\AU\Perth\Projects\61\12598389\GIS\Maps\Working\12598389\12598389.aprx\12598389_20_Djarindjin_EnvironmentalConstraints_Rev0
Print date: 19 May 2023 - 13:33

Data source: Landgate_Subscription_Imagery\WANow: . Created by: klabez



Paper Size ISO A3
at Scale: 1:2,500

0 30 60 90 120

Meters

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 52

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

Survey Effort

Project No. **12598389**
Revision No. **0**
Date **17/05/2023**

FIGURE 21

\\ghdnet\ghd\AU\Perth\Projects\61\12598389\GIS\Maps\Working\12598389\12598389.aprx\12598389_21_Djarindjin_SurveyEffort_Rev0
Print date: 19 May 2023 - 13:34

Data source: Landgate_Subscription_Imagery\WANow: . Created by: klabez



Paper Size ISO A3
at Scale: 1:2,500

0 30 60 90 120

Meters

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 52

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

Vegetation Types

Project No. **12598389**
Revision No. **0**
Date **17/05/2023**

FIGURE 22

\\ghdnet\ghd\AU\Perth\Projects\61\12598389\GIS\Maps\Working\12598389\12598389.aprx\12598389_22_Djarindjin_VegetationTypes_Rev0
Print date: 19 May 2023 - 13:36

Data source: Landgate_Subscription_Imagery\WANow: . Created by: klabez



Paper Size ISO A3
at Scale: 1:2,500

0 30 60 90 120 N

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 52

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

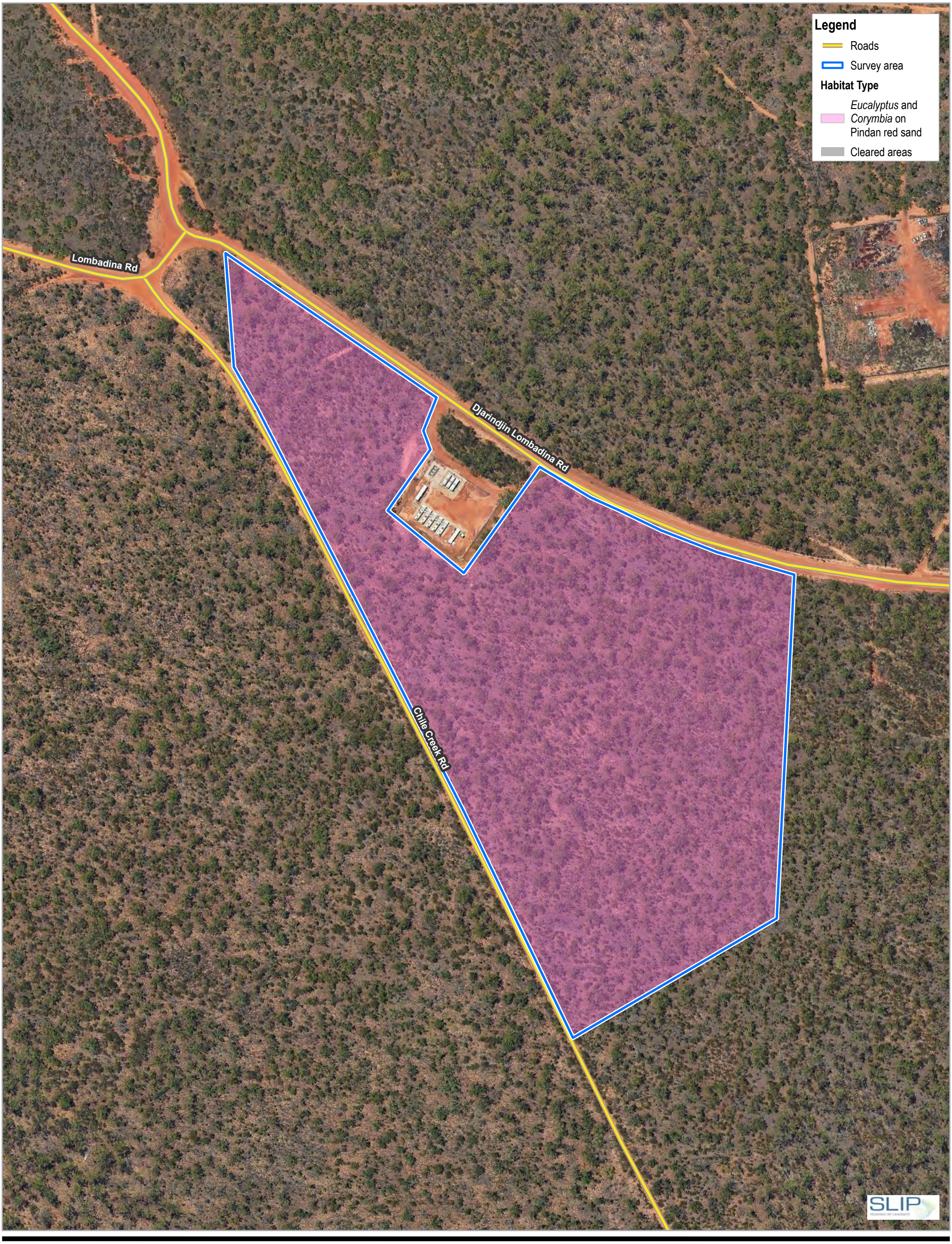
Project No. **12598389**
Revision No. **0**
Date **17/05/2023**

Vegetation Condition

FIGURE 23

\\ghdnet\ghd\AU\Perth\Projects\61\12598389\GIS\Maps\Working\12598389\12598389.aprx\12598389_23_Djarindjin_VegetationCondition_Rev0
Print date: 19 May 2023 - 13:36

Data source: Landgate_Subscription_Imagery\WANow: . Created by: klabez



Paper Size ISO A3
at Scale: 1:2,500

0 30 60 90 120 N

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 52

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

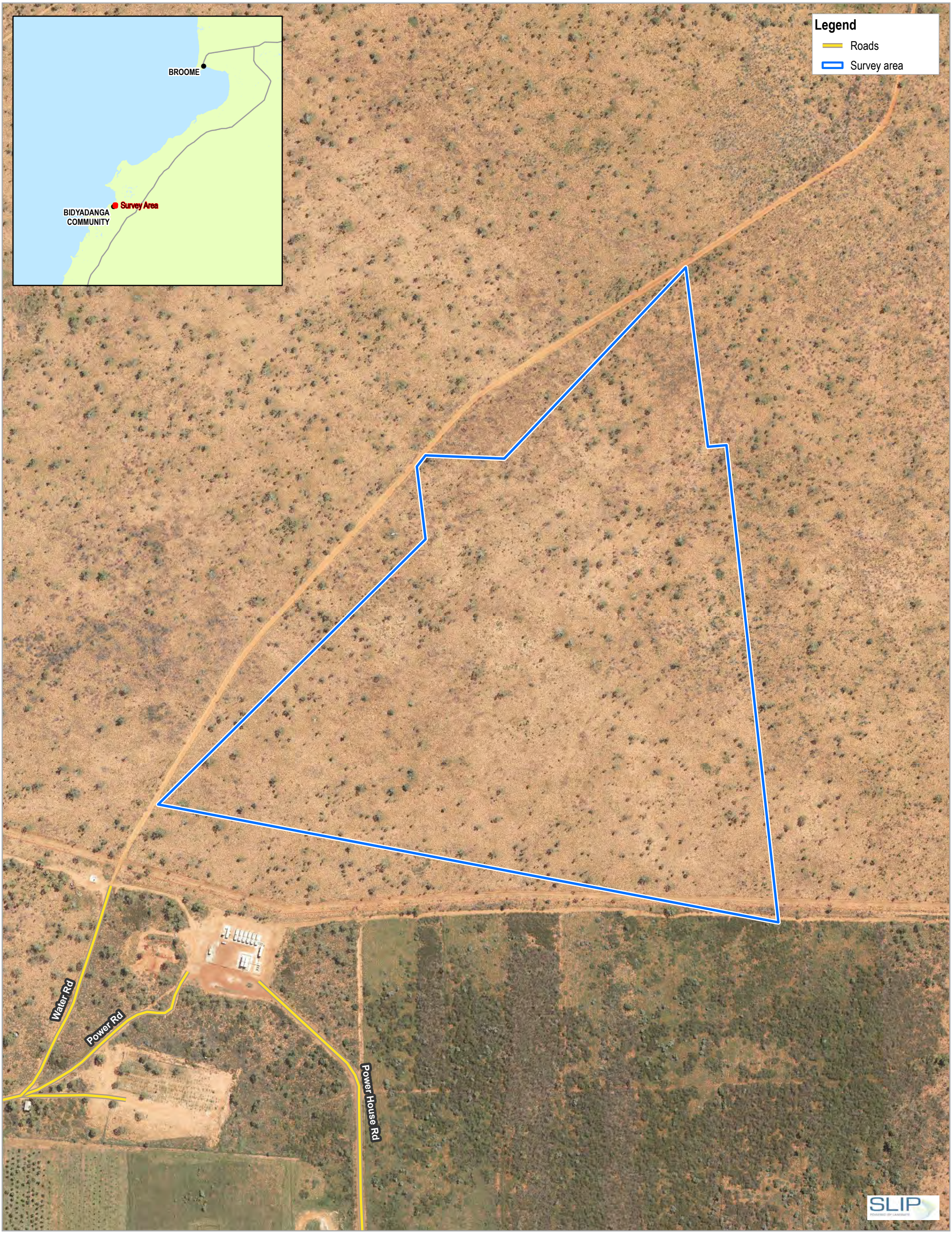
Fauna Habitat

Project No. **12598389**
Revision No. **0**
Date **17/05/2023**

FIGURE 24

\\ghdnet\ghd\AU\Perth\Projects\61\12598389\GIS\Maps\Working\12598389\12598389.aprx\12598389_24_Djarindjin_FaunaHabitat_Rev0
Print date: 19 May 2023 - 13:37

Data source: Landgate_Subscription_Imagery\WANow: . Created by: klabez



Paper Size ISO A3
at Scale: 1:4,000

0 30 60 90 120

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 52

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

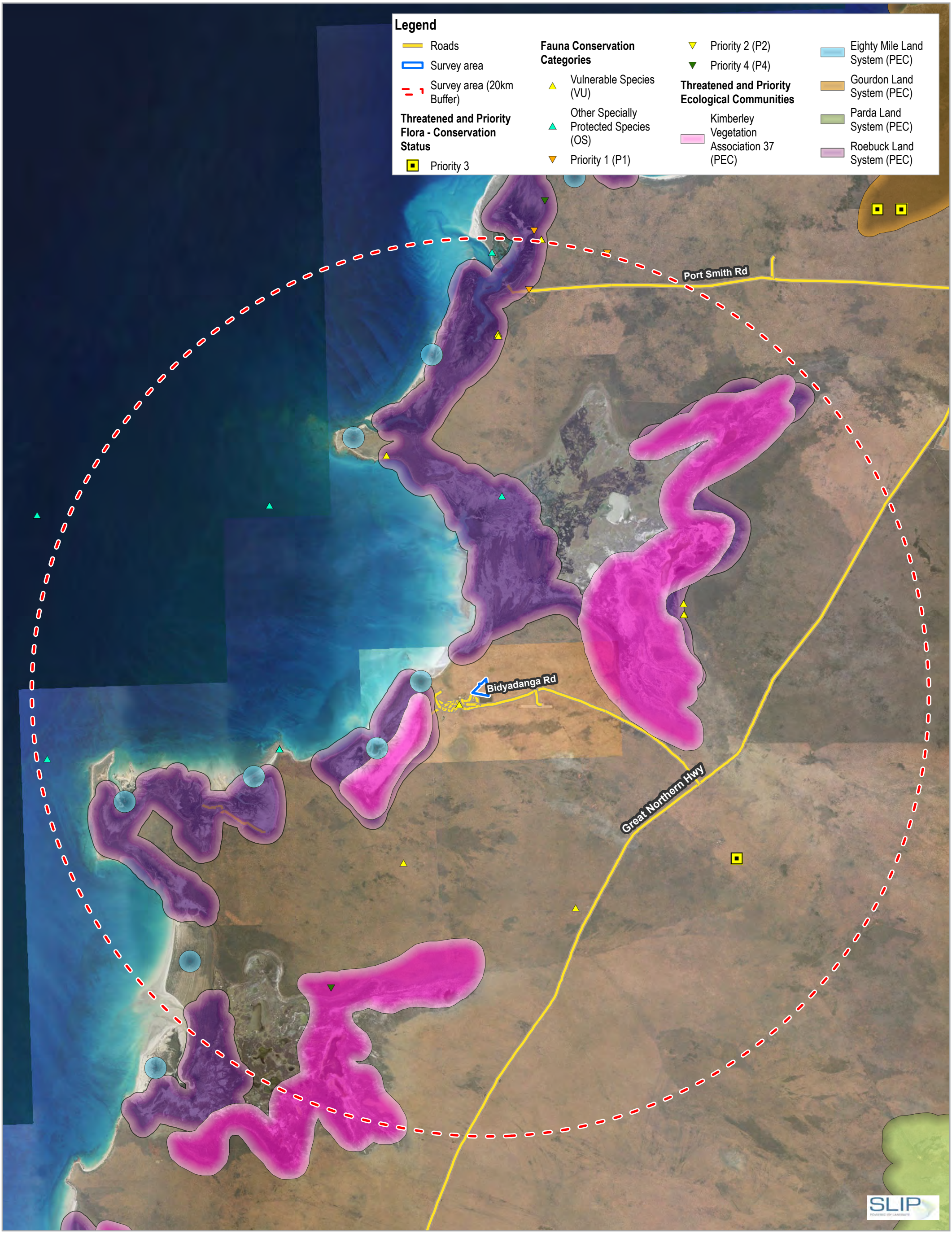
Locality

Project No. **12598389**
Revision No. **0**
Date **17/05/2023**

FIGURE 25

\\ghdnet\ghd\AU\Perth\Projects\61\12598389\GIS\Maps\Working\12598389\12598389.aprx\12598389_25_Bidyadanga_Locality_Rev0
Print date: 19 May 2023 - 13:39

Data source: Landgate_Subscription_Imagery\WANow: . Created by: klabez



Paper Size ISO A3
at Scale: 1:155,000

0 1,500 3,000 4,500 6,000
Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 52

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

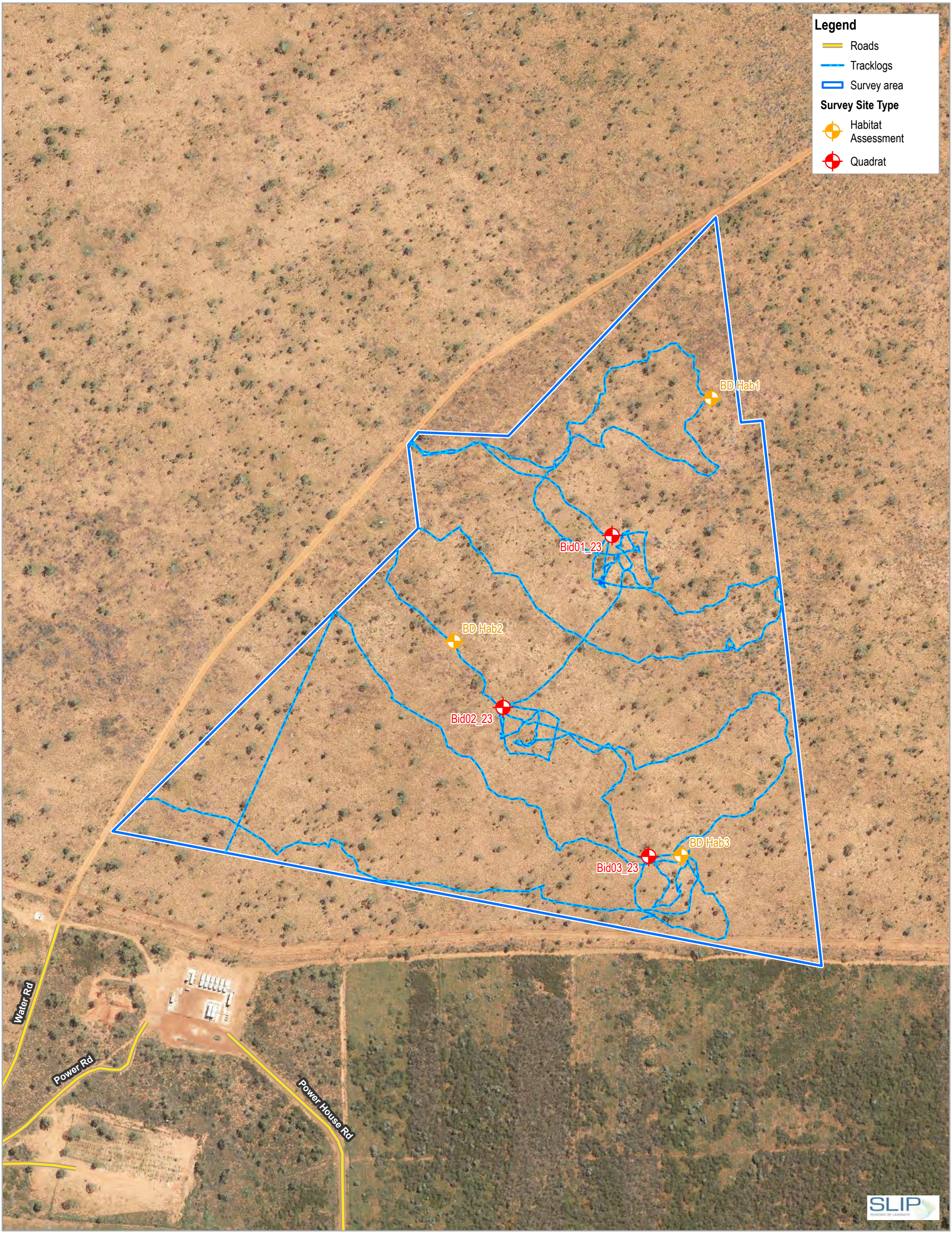
Project No. **12598389**
Revision No. **0**
Date **17/05/2023**

Environmental Constraints

FIGURE 26

\\ghdnet\ghd\AU\Perth\Projects\61\12598389\GIS\Maps\Working\12598389\12598389.aprx\12598389_26_Bidyadanga_EnvironmentalConstraints_Rev0
Print date: 19 May 2023 - 13:40

Data source: Landgate_Subscription_Imagery\WANow: . Created by: klabez



Paper Size ISO A3
at Scale: 1:3,500

0 30 60 90 120

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 52

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

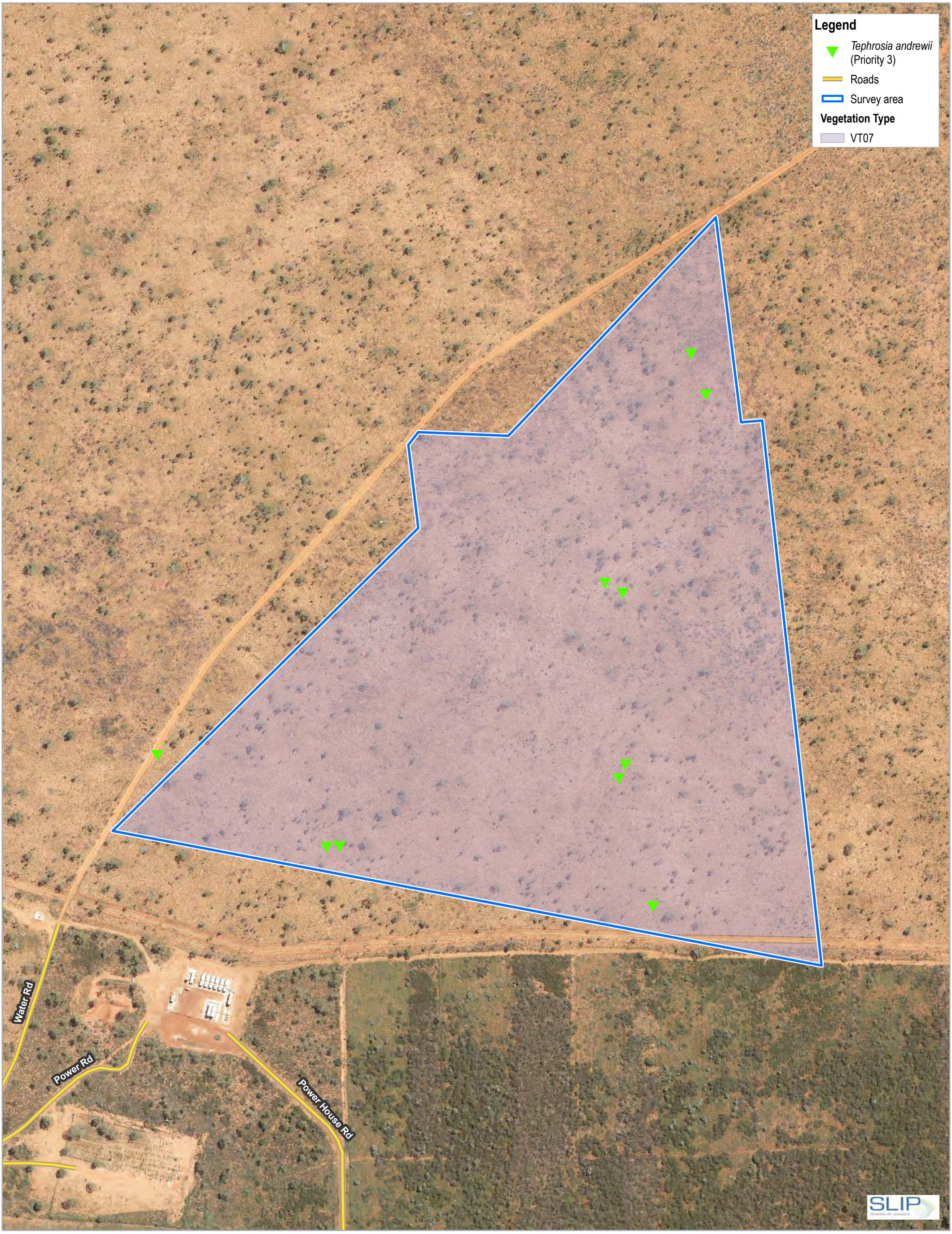
Survey Effort

Project No. **12598389**
Revision No. **0**
Date **17/05/2023**

FIGURE 27

\\ghdnet\ghd\AU\Perth\Projects\61\12598389\GIS\Maps\Working\12598389\12598389.aprx\12598389_27_Bidyadanga_SurveyEffort_Rev0
Print date: 19 May 2023 - 13:41

Data source: Landgate_Subscription_Imagery\WANow: . Created by: klabez



Paper Size ISO A3
at Scale: 1:3,500

0 30 60 90 120

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 52

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

Vegetation Types and Conservation Listed Flora Records

Project No. **12598389**
Revision No. **0**
Date **17/05/2023**

FIGURE 28

\\ghdnet\ghd\AU\Perth\Projects\61\12598389\GIS\Maps\Working\12598389\12598389.aprx\12598389_28_Bidyadanga_VegetationTypesAndFlora_Rev0
Print date: 19 May 2023 - 13:42

Data source: Landgate_Subscription_Imagery\WANow: . Created by: klabez



Paper Size ISO A3
at Scale: 1:3,500

0 30 60 90 120

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 52

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

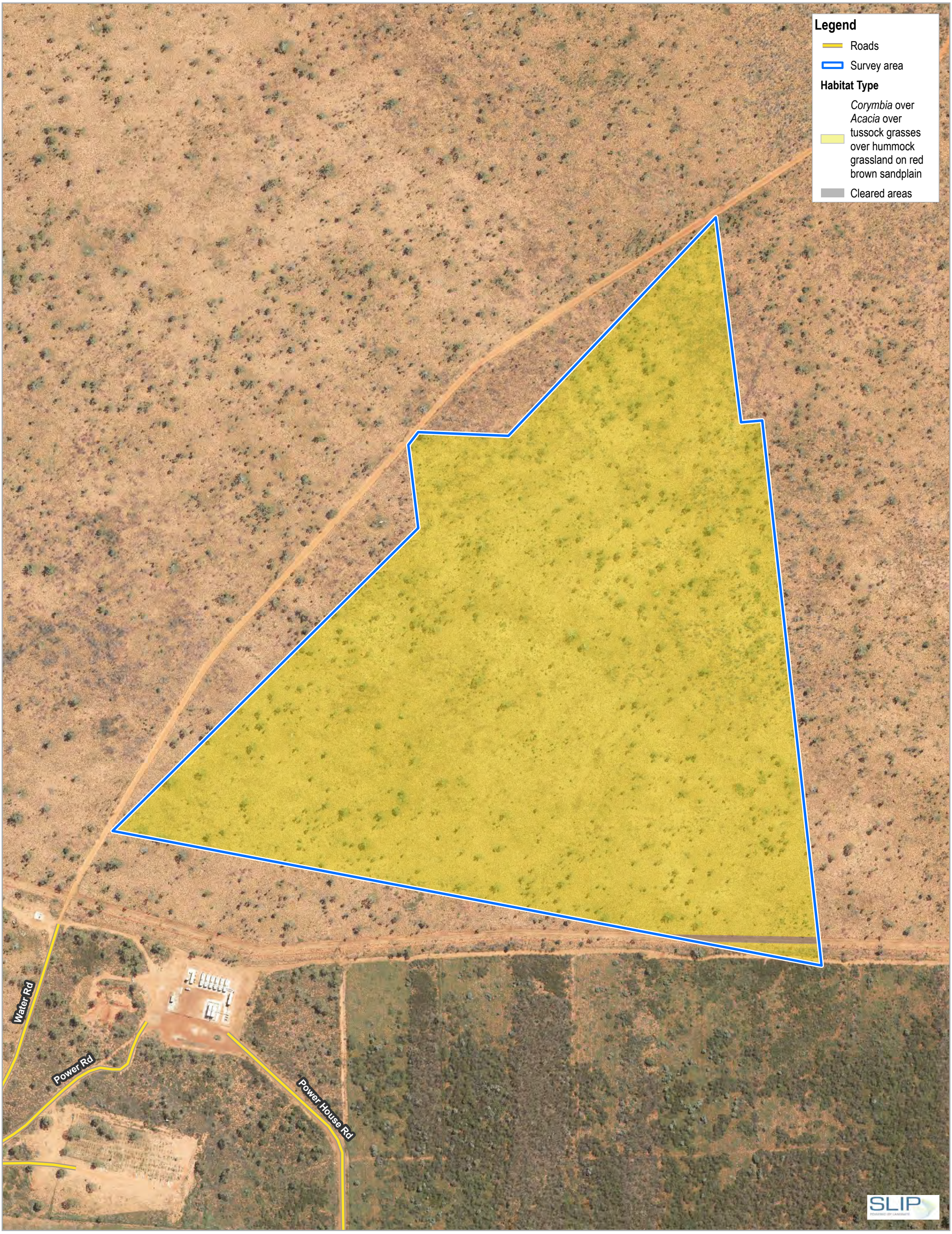
Vegetation Condition

Project No. **12598389**
Revision No. **0**
Date **17/05/2023**

FIGURE 29

\\ghdnet\ghd\AU\Perth\Projects\61\12598389\GIS\Maps\Working\12598389\12598389.aprx\12598389_29_Bidyadanga_VegetationCondition_Rev0
Print date: 19 May 2023 - 13:43

Data source: Landgate_Subscription_Imagery\WANow: . Created by: klabez



Paper Size ISO A3
at Scale: 1:3,500

0 30 60 90 120

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 52

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

Fauna Habitat

Project No. **12598389**
Revision No. **0**
Date **17/05/2023**

FIGURE 30

\\ghdnet\ghd\AU\Perth\Projects\61\12598389\GIS\Maps\Working\12598389\12598389.aprx\12598389_30_Bidyadanga_FaunaHabitat_Rev0
Print date: 19 May 2023 - 13:43

Data source: Landgate_Subscription_Imagery\WANow: . Created by: klabez



ghd.com

The Power of Commitment

Appendix B
GHD (2021) Flora and Vegetation Survey









Horizon Power

283- West Kimberley Solar
Flora and fauna assessment

July 2021

Executive summary

Horizon Power is proposing to install centralised solar generation at Ardyaloon, Beagle Bay, Bidyadanga and Djarindjin communities in the West Kimberley, Western Australia. GHD was commissioned by Horizon Power to undertake a detailed and targeted flora and vegetation survey and basic and targeted fauna survey within the four separate development (project) areas. The four project areas are located within the West Kimberley bioregion. The total area is approximately 27.4 ha. The survey was undertaken from 1 - 5 March 2021. The outcomes of the assessment will be used to inform the project design and provide information to support a native vegetation clearing permit application under Part V of the *Environmental Protection Act 1986*.

Key findings

Flora and vegetation

Three vegetation types aligning with broad landforms were identified and described in the project areas, not including cleared tracks. The vegetation has been mapped as: *Eucalyptus miniata* and *Corymbia greeniana* woodland to isolated clumps of trees on Pindan red sand loam on low plain (VT01), *Corymbia greeniana* and *Corymbia bella* isolated clumps of trees over *Melaleuca nervosa* subsp *crosslandiana* open woodland on silty loam over clay on drainage flats/floodplain (VT02), and *Corymbia hamersleyana* and *Corymbia flavescens* open woodland on red brown sandplain (VT03).

No TEC's listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or *Biodiversity Conservation Act 2016* (BC Act) were identified within the project areas during the field survey. VT02 within the Beagle Bay project area represents the PEC Kimberley Vegetation Association 67, with this pre-European association previously mapped within the project area. VT02 is analogous with the Vegetation Association based on species present, type and landform.

The condition of the vegetation within the survey area ranged from Excellent to Good. The vegetation structure was intact with limited signs of cattle activity and a low number of introduced flora were recorded for most of the project areas except Bidyadanga, where higher introduced species cover was recorded and previous disturbance.

One hundred and thirty-seven flora taxa (including subspecies and varieties) representing 38 families and 90 genera were recorded from the survey area during the field survey. This total comprised 128 native taxa and nine introduced flora taxa. None of the nine introduced/naturalised flora taxa identified during the survey are listed as a Declared Pest under the *Biosecurity and Management Act 2007* or a Weed of National Significance.

No EPBC Act or BC Act listed flora were recorded from the project areas. A tentative record of the Priority three (P3) taxa *Triodia ?acutispicula* was recorded within the Ardyaloon project area within VT01. This taxon could not be confidently confirmed as no fruiting material was available to correctly separate this species from other similar *Triodia* taxa, so the precautionary principle was applied given the nearby records of *Triodia acutispicula*. This species was recorded with a cover of 20%. The Priority three taxa *Tephrosia andrewii* was recorded within the Bidyadanga project area. A total of two individuals were recorded from one location.

Fauna

Three broad fauna habitat types were described and mapped during the field survey. These comprise *Eucalyptus* and *Corymbia* on Pindan red sand, *Corymbia* over *Melaleuca* on silty loam over clay on drainage flats/floodplain and *Corymbia* over *Acacia* over tussock grasses over

hummock grassland on red brown sandplain. These fauna habitats align with the mapped vegetation types.

A total of 47 fauna species were recorded within the survey area, including 33 birds, five mammals and nine reptiles. No conservation listed species were recorded during the survey. No evidence of Greater Bilby activity (footprints, foraging holes, burrows of scat) was recorded within the project areas.

Of the identified conservation listed fauna species for the project areas the following species are considered likely to occur:

- Ardyaloon – Gouldian Finch (*Erythrura gouldiae*) (P4), Peregrine Falcon (*Falco peregrinus*) (S), Dampierland Burrowing snake (*Simoselaps minimus*) (P2), Dampierland plain slider (*Lerista separanda)* (P2) and Greater Bilby (*Macrotis lagotis*) (V)
- Beagle Bay – Gouldian Finch (*Erythrura gouldiae*) (P4), Peregrine Falcon (*Falco peregrinus*) (S), and Greater Bilby (*Macrotis lagotis*) (V)
- Djarindjijn – Gouldian Finch (*Erythrura gouldiae*) (P4), Peregrine Falcon (*Falco peregrinus*) (S), Dampierland Burrowing snake (*Simoselaps minimus*) (P4), Dampierland plain slider (*Lerista separanda)* (P2) and Greater Bilby (*Macrotis lagotis*) (V)
- Bidyadanga – no conservation listed fauna species are considered likely to occur.

Table of contents

Executive summary i

1. Introduction 1
   - 1.1 Background 1
   - 1.2 Purpose of this report 1
   - 1.3 Location 1
   - 1.4 Scope of works 2
   - 1.5 Relevant legislation and background information 2
   - 1.6 Report limitations and assumptions 2
2. Methodology 3
   - 2.1 Desktop assessment 3
   - 2.2 Field survey 4
   - 2.3 Limitations 8
3. Desktop assessment – Ardyaloon 11
   - 3.1 Location 11
   - 3.2 Physical environment 11
   - 3.3 Land use 12
   - 3.4 Hydrology 12
   - 3.5 Vegetation and flora 12
   - 3.6 Fauna 15
4. Desktop assessment – Beagle Bay 16
   - 4.1 Location 16
   - 4.2 Physical environment 16
   - 4.3 Land use 17
   - 4.4 Hydrology 17
   - 4.5 Vegetation and flora 17
   - 4.6 Fauna 21
5. Desktop assessment – Bidyadanga 22
   - 5.1 Location 22
   - 5.2 Physical environment 22
   - 5.3 Land use 23
   - 5.4 Hydrology 23
   - 5.5 Vegetation and flora 23
   - 5.6 Fauna 26
6. Desktop assessment – Djarindjin 27
   - 6.1 Location 27
   - 6.2 Physical environment 27
   - 6.3 Land use 28
   - 6.4 Hydrology 28

6.5 Vegetation and flora 28
6.6 Fauna 31
7. Field survey results 32
7.1 Flora and vegetation 32
7.2 Fauna 36
8. Conclusion/Summary 42
9. References 43

Table index

Table 1 Information sources 3
Table 2 Flora and vegetation data collected during the field survey 5
Table 3 Fauna references 8
Table 4 Field survey limitations 8
Table 5 Land systems within the project area 11
Table 6 Hydrology aspects within the project area 12
Table 7 Extent of pre-European vegetation associations mapped within the project area (Beard 1975, GoWA 2021b) 14
Table 8 Threatened and Priority Ecological Communities identified in the desktop searches 14
Table 9 Land systems within the project area 16
Table 10 Hydrology aspects within the project area 17
Table 11 Extent of pre-European vegetation associations mapped within the project area (Beard 1975, GoWA 2021b) 19
Table 12 Threatened and Priority Ecological Communities identified in the desktop searches 19
Table 13 Land systems within the project area 22
Table 14 Hydrology aspects within the project area 23
Table 15 Extent of pre-European vegetation associations mapped within the project area (Beard 1975, GoWA 2021b) 25
Table 16 Threatened and Priority Ecological Communities identified in the desktop searches 25
Table 17 Land systems within the project area 27
Table 18 Hydrology aspects within the project area 28
Table 19 Extent of pre-European vegetation associations mapped within the project area (Beard 1975, GoWA 2021b) 30
Table 20 Threatened and Priority Ecological Communities identified in the desktop searches 30
Table 21 Recorded vegetation types 33
Table 22 Vegetation condition 35
Table 23 Fauna habitats types within the survey area 38

Appendices

Appendix A Figures

Appendix B Relevant legislation and background information

Appendix C Desktop searches

Appendix D Flora data

Appendix E Fauna data

Note: Ardyaloon – Figure 1 to 6, Beagle Bay – Figure 7 to 12, Bidyadanga – Figure 13 to 18, Djarindjin – Figure 19 to 24

1. Introduction

1.1 Background

Horizon Power is proposing to install centralised solar generation for the following communities in the West Kimberley, Western Australia (WA):

- Ardyaloon
- Beagle Bay
- Bidyadanga
- Djarindjin.

Construction of the centralised solar generation will require the clearing of native vegetation for the required construction footprint and any related activities including fire breaks. The clearing footprint will be required to remain clear of vegetation for the duration of the operational life of the projects. Any surplus laydown areas or access tracks may be allowed to re-vegetate following the successful commissioning of the solar generation.

1.2 Purpose of this report

GHD Pty Ltd (GHD) was commissioned by Horizon Power to undertake a detailed and targeted flora and vegetation survey and a basic and targeted fauna survey for four separate development (project) areas at Ardyaloon, Beagle Bay, Bidyadanga and Djarindjin to support the environmental assessment and approval process. The purpose of the assessment is to define sensitive environmental values, in particular their spatial location and conservation significance, so the impacts of the proposed works can be managed to inform subsequent approvals and works to be undertaken. The outcomes of the assessment will be used to inform the project design and provide information to support a native vegetation clearing permit application under Part V of the *Environmental Protection Act 1986* (EP Act).

1.3 Location

The four project areas are located within the West Kimberley bioregion. The total area is approximately 24.84 hectares (ha) within the following land parcels:

- Ardyaloon - Part Reserve 20927 (being part of Lot 89 on Plan 91011, C/T: LR3128/867), area: 8.1 ha
- Beagle Bay - Part Reserve 1834 (being part of Lot 246 on Plan 91725, C/T: LR3055/241), area: 8.2 ha
- Bidyadanga - Part Reserve 9697 (being Lot 500 on Plan 52629, C/T: LR3139/426), area: 2.04 Ha
- Djarindjin - Part Crown Lease I26915 (being part of Lot 297 on Plan 93256, C/T: LR3123/260), area: 6.5 Ha.

The locations of each of the four areas is shown on Figure 1, Appendix A.

A desktop study area (study area) was defined for the desktop based searches of the assessment and includes a 20 km buffer of each of the four project areas.

1.4 Scope of works

The scope of works include:

- A desktop assessment of relevant literature, databases and spatial datasets to determine the environmental values that may be present within or in close proximity to the four project areas
- A detailed and targeted flora and vegetation survey
- A basic and targeted fauna survey
- A concise technical report (this document) outlining the method and compiling the results of the assessment

1.5 Relevant legislation and background information

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

1.6 Report limitations and assumptions

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

GHD otherwise disclaims responsibility to any person other than Horizon Power 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 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 Horizon Power 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.

This report has assessed desktop environmental aspects and biological factors in the field for the separate project areas. Should these areas change or be refined, further assessment may be required.

2. Methodology

2.1 Desktop assessment

A desktop assessment of the project areas to identify environmental values and constraints was undertaken by viewing geographic information system (GIS) spatial files largely sourced from Government of Western Australia (GoWA) (2021a) and reviewing publicly available, government managed databases. The information sources utilised in this assessment are presented in Table 1.

Table 1 Information sources

Aspect	Information source
Climate	Bureau of Meteorology (BoM) Climate Data Online (2021)
Geology, landforms and soil	1:500 000 State linear structures layer (DMIRS-015) Soil Landscape Mapping – Systems (DPIRD-064) (GoWA 2021a)
Acid Sulphate Soils (ASS)	Acid Sulfate Soil Risk Map, Kimberley Coastline (DWER-053) (GoWA 2021a)
Environmentally Sensitive Areas (ESAs)	Clearing Regulations - Environmentally Sensitive Areas (DWER-046) (GoWA 2021a)
Conservation reserves and areas	DBCA – Legislated Lands and Waters (DBCA-011) DBCA – Lands of Interest (DBCA-012) (GoWA 2021a)
Hydrology	Public Drinking Water Source Areas (DWER-033) RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037) RIWI Act, Groundwater Areas (DWER-034) RIWI Act, Rivers (DWER-036) Waterways Conservation Act Management Areas (DWER-072) Ramsar Sites (DBCA-010) Directory of Important Wetlands in Australia - Western Australia (DBCA-045) (GoWA 2021a)
Vegetation	Pre-European Vegetation (DPIRD-006) Native Vegetation Extent (DPIRD-005) (GoWA 2021a) Statewide Vegetation Statistics (GoWA 2021b)
Threatened and Priority Ecological Communities (TECs and PECs)	DBCA Threatened Ecological Community (TEC) and Priority Ecological Community (PEC) spatial dataset Priority Ecological Communities for Western Australia Version 28 (DBCA 2021a)
Conservation significant flora and fauna	DBCA NatureMap database (DBCA 2007–) DBCA Threatened and Priority Flora database (TPFL) WA Herbarium database (WAHERB) (DBCA 2021b, c)
Matters of National Environmental Significance	EPBC Act Protected Matters Search Tool (PMST) (Department of Agriculture, Water and the Environment (DAWE 2021)

2.1.1 Flora and vegetation

Prior to the commencement of the field survey, a desktop assessment was undertaken to identify relevant environmental information pertaining to the project areas and within 20 km (desktop study area). The flora and vegetation desktop assessment included a review of:

- The Department of Agriculture, Water and the Environment (DAWE) Protected Matters Search Tool (PMST) for Matters of National Environmental Significance (MNES) and

species listed under the *Environment, Protection and Biodiversity Conservation Act 1999* (EPBC Act) potentially occurring within the desktop study area (DAWE 2021). (Appendix C)

- The Department of Biodiversity Conservation and Attractions (DBCA) Threatened and Priority Ecological Community (TECs and PECs) database for conservation significant communities present in the desktop study area (DBCA 2021a)
- The DBCA Threatened and Priority Flora and WA Herbarium databases for Threatened flora listed under the BC Act and listed Priority by the DBCA previously recorded in the desktop study area (DBCA 2021b)
- The DBCA *NatureMap* database for flora and fauna species previously recorded within the desktop study area (DBCA 2007-) (Appendix C)
- Aerial photography, geology/soils, land systems and hydrology information to provide background information on the variability of the environment and likely vegetation and habitat types present
- A flora likelihood of occurrence assessment (Appendix D).

2.1.2 Basic and targeted fauna

The fauna desktop assessment included a review of:

- DAWE PMST database to identify fauna species listed under the EPBC Act potentially occurring within the desktop study area (DAWE 2021) (Appendix C)
- The DBCA Threatened and Priority Fauna database for the study area (DBCA 2021c) (Appendix C).
- The DBCA *NatureMap* database for fauna species previously recorded within the study area (Appendix C). This database comprises the following composite datasets:
    - Atlas of Australian birds
    - Bird data -Birdlife Australia
    - Fauna Survey Returns Database (New)
    - WA Museum (WAM) databases (mammals, birds, reptiles)
- Aerial photography, geology/soils, land systems and hydrology information to provide background information on the variability of the environment and likely habitat types present
- A fauna likelihood of occurrence assessment. For the purpose of this study, exclusively marine animals (fish, wales, turtles etc.) were excluded from the likelihood of occurrence assessment as they are not expected to interact with the project areas (Appendix E).

2.2 Field survey

2.2.1 Survey timing and personnel

The post-wet single season detailed and targeted flora and vegetation survey and basic and targeted fauna survey was undertaken from 1 - 5 March 2021 by GHD senior botanist/ecologist Joel Collins (flora licence no. FB62000200-2) and GHD senior zoologist Robert Browne-Cooper.

2.2.2 Guiding documents

The survey methodology and data collection that GHD employed was consistent with:

- EPA Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016)

- EPA Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment (EPA 2020)
- DAWE (2011a) Survey Guidelines for Australia's Threatened Mammals
- DAWE (2011b) Survey Guidelines for Australia's Threatened Reptiles
- DBCA Guidelines for surveys to detect the presence of bilbies, and assess the importance of habitat in Western Australia (DBCA 2017)
- Verifying Bilby presence and the systematic sampling of wild populations using sign based protocols – with notes on aerial and ground based techniques and asserting absence (Southgate et al 2018).

2.2.3 Data collection and storage

Field data collection for the flora, vegetation and fauna survey was undertaken using GPS enabled Samsung tablets using electronic forms in Collector and tailored to IBSA spatial data requirements. Data was synced to the cloud at the conclusion of each field day. Field photographs were stored and where applicable have been provided as part of the Project deliverables.

2.2.4 Detailed and targeted flora and vegetation

The field survey was undertaken to identify and describe the broad dominant vegetation types, assess vegetation condition, and high intensity sampling of vascular flora taxa present at the time of survey. Searches for significant ecological communities and flora species were also undertaken during the field survey.

Field survey methods involved a combination of high intensity quadrat sampling and traversing the survey area by foot. Quadrats were conducted with each project area to describe the broad-scale vegetation and physical features. Seven quadrats were conducted throughout the project areas with the locations of each quadrat presented in Appendix A.

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).

Field data at each quadrat site was recorded on a pro-forma data sheet and included the parameters detailed in Table 2. Survey and quadrat data are provided in Appendix D. A flora inventory was compiled from taxa listed in the quadrats and from opportunistic floristic records throughout the project areas.

Table 2 Flora and vegetation data collected during the field survey

Aspect	Measurement
Collection attributes	Site code, personnel/recorder, date, photograph of the site.
Physical features	Landform, slope, aspect, soil attributes, ground surface cover
Location	Coordinates recorded in GDA94 datum using a hand-held Global Positioning System (GPS) tool to accuracy approximately ± 5 m.
Vegetation condition	Broad-scale vegetation condition using the condition rating scale adapted by EPA (2016) for the Northern Botanical Province.
Disturbance	Level and nature of disturbances (e.g. weed presence, fire and time since last fire, impacts from grazing, infrastructure development activities).
Flora	List of dominant flora from each structural layer, list of all species at each quadrat including stratum, average height and cover using National Vegetation Information System (NVIS 2017).

Vegetation types

Vegetation types were identified and boundaries delineated using a combination of aerial photography, topographical features and field data/observations.

Vegetation types were described based on structure, dominant taxa and cover characteristics as defined by quadrat data and field observations. Vegetation unit descriptions follow the NVIS and are consistent with NVIS Level V (Association) and are grouped within NVIS Level III (Broad Floristic Formation). At Level V up to three taxa per stratum are used to describe the association (NVIS 2017).

Vegetation condition

The vegetation condition was assessed and mapped in accordance with the vegetation condition rating scale for the Northern Botanical Provinces devised by Trudgen (1988) 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.

Flora inventory, identification and nomenclature

A flora inventory was compiled from taxa listed in described quadrats and from opportunistic floristic records throughout the survey area.

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 with reference to specimens at the WA Herbarium. Relevant taxonomic experts were also consulted where required.

The conservation status of all recorded flora was compared against the current lists available on *FloraBase* (WA Herbarium 1998–) and the EPBC Act Threatened species database provided by DAWE (2021).

Nomenclature used in this report follows that used by the WA Herbarium as reported on *FloraBase* (WA Herbarium 1998–).

Targeted flora searches

The results of the desktop assessment were reviewed, and a target list of significant flora taxa compiled. Ecological information (e.g. habitat, associated flora taxa and phenology) was sourced from *FloraBase* (WA Herbarium 1998–) and other relevant publications where available.

The targeted flora survey was completed con-currently with the vegetation and flora assessment, with timing occurring in early March 2021 to coincide with the flowering period of the majority of the target taxa for the bioregion. Appropriate habitat for significant flora taxa in the survey area was traversed on foot. Locations within the survey area with differing hydrology, fire or disturbance history to the surrounding areas were also searched where identified. Where significant flora taxa were identified the locations and number of plants present were recorded using handheld GPS units. A representative collection was also made for confirmation by the WA Herbarium.

2.2.5 Basic and targeted fauna

The post-wet season single phase basic and targeted assessment including a targeted Bilby assessment of the project areas was completed in association with the vegetation and flora suvey. The project areas were traversed by foot to identify and describe the dominant fauna

habitat types present and their condition, assess habitat for conservation listed species, undertake targeted Bilby assessment, and identify and record fauna species within the project areas. An assessment of the likelihood of conservation significant fauna and their habitats occurring within the project areas were also undertaken.

The fauna survey methodology and fauna data collection was undertaken with reference to the EPA *Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA 2020).

Habitat assessment

A fauna habitat assessment was undertaken to document the type, value and extent of habitats within the project areas. The following information was recorded:

- Habitat structure (e.g. vegetation type, presence/absence of structural layers such as ground cover and mid storey
- Presence/absence of refuge including density of ground covers, fallen timber (coarse woody debris), hollow-bearing trees and stags and rocks/boulder piles, and the type and extent of each refuge
- Presence/absence of waterways including type, extent and habitat quality within waterway
- Location of the habitat within the survey area in comparison to the habitat within the surrounding landscape
- Habitat connectivity and identification of wildlife corridors within and immediately adjacent to the survey area
- Current land use and disturbance history
- Evaluation of key habitat features and types identified during the desktop assessment relevant to fauna of conservation significance
- Evaluation of the likelihood of occurrence of conservation significant fauna within the habitat (based on presence of suitable habitat)
- A representative photograph of each habitat type.

Opportunistic fauna observations

Opportunistic fauna searches were also conducted across the survey area. Opportunistic searches involved:

- Searching the survey area for tracks, scats, bones, diggings and feeding areas for both native and feral species
- Searching through microhabitats including turning over logs or rocks, turning over leaf litter and examining tree hollows and hollow logs
- Visual and aural surveys, which accounted for many bird species potentially utilising the survey area
- Recording GPS locations of any conservation significant fauna species.

Targeted Greater Bilby assessment

The Greater Bilby is recognised as a locally and regionally significant species that requires targeted survey in the Dampier Peninsular area. The sampling technique endorsed by the DEE references Southgate's methods of Greater Bilby Plot Assessments (Southgate et al. 2005) and by the DBCA guidelines (DBCA 2017), which involves an assessment of 2 ha plots as a method of sampling a proportion of a given survey area. Given the small size of the project areas, the

approach for the current survey was to extend the plot assessment method throughout the project area to detect Greater Bilby activity and specifically to detect burrows of resident animals if present. By extending the plot assessment method to cover the entire project area, the target survey provided complete coverage.

The survey area was traversed on foot for evidence of Greater Bilby activity indicating recent presence. Searching was carried out by GHD senior zoologist Robert Browne-Cooper and senior botanist/ecologist Joel Collins. Personnel walked in a line spaced approximately 20 - 30 metres apart providing adequate on-ground coverage to target Greater Bilby. During the traverses, if present, evidence of the species was recorded including burrows, foot prints, foraging signs, and scats. GPS devises were used during traversing to log search track to inform on site coverage (Figure 4, Figure 10, Figure 16, Figure 22).

Fauna species identification

Identification of fauna species was made in the field using available field guides and electronic guides (e.g. Morcombe 2004).

Nomenclature used in this report follows WAM as reported on NatureMap (DBCA 2007–). This nomenclature is considered the most up-to-date species information for WA groups: reptiles, amphibians, invertebrates and mammals (including bats). All bird nomenclature follows Christidis and Boles (2008). Other reference materials used are presented in Table 3.

Table 3 Fauna references

Fauna Group	Field Guide
Mammals	Menkhorst and Knight (2010), Van Dyck and Strahan (2008)
Birds	Christidis and Boles (2008), Morcombe (2004)
Reptiles	Wilson and Swan (2017)
Amphibians	Tyler and Doughty (2009)

2.3 Limitations

2.3.1 Desktop limitations

The EPBC Act PMST is based on bioclimatic modelling for the potential presence of species. As such, this does not represent actual records of the species within the project area. The records from the DBCA searches of Threatened and Priority flora and fauna provide more accurate information for the general area and local occurrence. However, some collections, sighting or trapping records cannot be dated and often misrepresent the current range of Threatened and Priority species.

2.3.2 Field survey limitations

The EPA (2016, 2020) Technical Guides states that flora 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 4. Based on this assessment, the survey effort has not been subject to any constraints, which affect the thoroughness of the assessment and the conclusions were formed.

Table 4 Field survey limitations

Aspect	Constraint	Comment
Sources of information and availability of	Nil	Adequate information is available for the survey area, this includes broadscale (1:1,000,000) mapping by Beard (1977) and digitised by

Aspect	Constraint	Comment
contextual information.		Shepherd et al. (2002) and database searches (DBCA and *NatureMap*).
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) Proportion of fauna identified, recorded and/or collected	Nil	The detailed and targeted vegetation and flora survey was undertaken in early March, which is within the recommended timing for flora surveys in the Northern Botanical Province region. The recommended timing is during the wet season (January-March) (EPA 2016). The flora recorded from the field is detailed in section 7 and a full flora species list is provided in Appendix D. The portion of flora collected and identified was considered representative for the survey area. The basic and targeted fauna survey was also undertaken in early March 2021. The fauna assessment sampled those species that can be easily seen, heard or have distinctive signs, such as tracks, scats, diggings, etc. Many cryptic species would not have been identified during a basic survey and seasonal variation within species often requires targeted surveys at a particular time of the year. Of the fauna species recorded during the survey, all were identified to species level. The fauna assessment was aimed at identifying habitat types and terrestrial vertebrate fauna utilising the survey area. No sampling for invertebrates or aquatic species occurred. The information available on the identification, distribution and conservation status of invertebrates is generally less extensive than vertebrate species.
Flora determination	Nil	Flora determination was undertaken by the survey botanist in the field. Species that could not be identified in the field were collected and identified at the WA Herbarium by the experienced taxonomic botanist Sharnya Thomas and Pali Jayasekara (GHD). Eight taxa were uncertain at a species level due to lack of flowering/fruiting material. These collections are not similar to known conservation significant flora (as identified in the desktop searches). 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)	Nil	The whole of the project areas was accessed on foot. The project area was adequately surveyed during the field survey in line with the scope. Adequate number of floristic sampling was done for a detailed flora survey. Where possible three quadrats were sampled per vegetation type, however, one quadrat was deemed appropriate for VT02 and two quadrats for VT03 due to the small geographical area these vegetation types covered. Additional opportunistic sampling was undertaken through all the project areas to develop a comprehensive species inventory.
Mapping reliability	Nil	The vegetation and fauna habitats were mapped using high-resolution ESRI aerial imagery obtained from Landgate, topographical features, previous broad scale mapping (Beard 1977) and field data. Data was recorded in the field using hand-held GPS tools. Certain atmospheric factors and other sources of error can affect the accuracy of GPS receivers. The Garmin GPS units and GPS enabled tablets used for this survey are accurate to within ±5 metres on average.
Timing/weather/ season/cycle	Nil	The field surveys were conducted during autumn (1 - 5 March 2021 for flora and vegetation survey and for the fauna survey). In the three months prior to the survey (December-February), the Cygnet Bay station No. 003004 (BoM 2021) recorded a total of

Aspect	Constraint	Comment
		1,017 mm of rainfall. This is well above the recorded long-term average for the same period (December-February; 536.8 mm) (BoM 2021). The weather conditions recorded during the survey were generally dry, hot and high humidity with light winds. A summary of the climatic conditions are provided: • Daily maximum temperature 34.5 °C • Daily minimum temperature 26.0 °C • Daily rainfall 0 mm. The weather conditions recorded during the survey periods are considered unlikely to have impacted upon the flora and fauna survey. The survey timing was considered appropriate for the flora and fauna field survey.
Disturbances (e.g. fire, flood, accidental human intervention)	Nil	Some of the survey area has been subjected to historical disturbance events (e.g. clearing, weeds); however, these disturbances did not affect the survey.
Intensity (in retrospect, was the intensity adequate)	Nil	The vascular flora of the survey area was sampled in accordance with EPA (2016) and terrestrial fauna sampled in accordance with EPA (2020). The survey area was sufficiently covered by the field botanist and zoologist during the survey.
Resources	Nil	Adequate resources were employed during the field survey. Ten person days were spent undertaking the survey using one botanist and one zoologist.
Access restrictions	Nil	The survey area was accessed on foot. There were no access restrictions.
Experience levels	Nil	The botanist and zoologist who executed the survey are practitioners suitably qualified and experienced in their respective fields. The field team lead, Joel Collins (flora licence no. FB62000081-2) is a senior botanist with more than 17 years' experience leading and conducting vegetation and flora surveys (detailed, basic and targeted) in the northern bioregion, including undertaking numerous flora and fauna surveys in the Pindanland sub-region. Senior Zoologist Robert Browne-Cooper has over 17 years' experience undertaking fauna surveys (detailed, basic and targeted) within the northern bioregion of WA, including undertaking numerous surveys in the Pindanland sub-region including targeted surveys for Bilby.

3. Desktop assessment – Ardyaloon

3.1 Location

The Ardyaloon project area is located near the northern extent of the Dampier Peninsula, adjacent to One Arm Point Road. The project area is approximately 1.5 km west of the One Arm community (Figure 1, Appendix A).

3.2 Physical environment

Ecological and land use constraints for Ardyaloon project area are presented on Figure 2, Appendix A.

3.2.1 Climate

The Dampier Peninsula has a tropical climate and is characterised by hot wet summer (December to March) and a dry season (April to November). Rainfall is generally received during the summer as a result of unpredictable tropical downpours and cyclonic low pressure systems. The closest BoM weather station with sufficient historical data is Cygnet Bay (site number 003057), located approximately 2 km east of the project area.

Climate data from this station indicates the mean maximum temperature ranges from 35.3 °C in November to 28.2 °C in July. The mean minimum temperature ranges from 14.8 °C in July to 25.6 °C in December. The mean annual rainfall is 781.0 mm, with approximately 56 rain days a year (BoM 2021).

3.2.2 Land systems and soil

The Kimberley region has been surveyed by the Department of Primary Industries and Regional Development (DPIRD) and others for the purposes of land classification, mapping and resource evaluation. One hundred and eleven land systems have been described for the region, which are distinguished on the basis of topography, geology, soils and vegetation (Payne and Schoknecht 2011). One land system is relevant within the project area Table 5.

Table 5 Land systems within the project area

Land system	Description	Geology	Geomorphology
Reeves	Sand plain with scattered hills and minor plateaux, reddish sandy soils, pindan.	Subhorizontal or gently dipping sandstone, sandy siltstone, and silicified quartz sandstone of Cretaceous age; Quaternary aeolian sand.	Formed by dissection of the Kimberley surface - hill lands: strike belts up to 4.8 km wide, with scattered hills, dip slopes with thin sand cover and local outcrop, and sandplain; sparse, branching drainage pattern; relief up to 60 m.

3.2.3 Acid sulphate soils

A review of the ASS risk mapping indicates the soil under the project area has ‘moderate to low’ risk of containing ASS. The ‘moderate to low’ risk rating indicates the risk of ASS occurring within 3 m of natural soil surface however this rating indicates a high to moderate risk of ASS beyond 3 m of natural soil surface.

The wider study area records as both a ‘high to moderate’ and ‘moderate to low’ risk of containing ASS. The ‘high to moderate’ risk rating indicates the risk of ASS occurring within 3 m of the natural soil surface.

3.3 Land use

3.3.1 Conservation reserves and estates

No DBCA managed conservation area occur within the project area. The closest is located approximately 9 km north; Swan Island Nature Reserve (Class A R 34257).

3.3.2 Environmentally sensitive areas

The project area is located within ESA no. 7286, within the buffer for Monsoon thickets on coastal sand dunes TEC.

3.4 Hydrology

The GoWA (2021a) data layers identified the water resource aspects present in the project area. These are detailed below in Table 6.

Table 6 Hydrology aspects within the project area

Aspect	Details	Results
Groundwater Areas	Groundwater areas proclaimed under the RIWI Act	Canning-Kimberley
Surface Water Areas	Surface water areas proclaimed under the RIWI Act	None present
Irrigation District	Irrigation Districts proclaimed under the RIWI Act	None present
Rivers	Rivers proclaimed under the Rights in RIWI Act	None present
Public Drinking Water Source Areas (PDWSA)	PDWSA is a collective term used for the description of Water Reserves, Catchment Areas and Underground Pollution Control Areas declared (gazetted) under the provisions of the *Country Area Water Supply Act 1947*	None present
Waterways Management Areas	Areas proclaimed under *the Waterway Conservation Act 1976*	None present

3.4.1 Wetlands

No Internationally (Ramsar) or nationally important wetlands are located within 20 km of the project area.

3.5 Vegetation and flora

3.5.1 Regional biogeography

The project area is located in the Dampierland bioregion and Pindanland sub-region as described by Interim Biogeographic Regionalisation of Australia (IBRA).

The Dampierland bioregion is characterised by extensive plains, ranges and spectacular gorges. The vegetation is characterised by acacia thickets with scattered trees and areas of

grasslands and savannas. The bioregion contains Aboriginal land, pastoral leases and some conservation reserves. The main industries are beef cattle, horticulture and tourism. Major population centres are Broome, Derby and Fitzroy Crossing.

The Pindanland subregion comprises sandplains of the Dampier Peninsular and western part of Dampier Land, including the hinterland of the Eighty Mile Beach. It is a fine-textured sand-sheet with subdued dunes and includes the paleodelta of the Fitzroy River. The vegetation is described primarily as pindan. This is the coastal, semi-arid, north-western margin of the Canning Basin (Graham 2001).

3.5.2 Broad vegetation mapping and extent

Broad scale (1:1,000,000) pre-European vegetation mapping of the area was completed by Beard (1977) at an association level. The mapping indicates that one vegetation association is present within the project area:

- Shrublands, pindan; *Acacia tumida* shrubland with ghost gum (*Eucalyptus papuana*) & *E. setosa* medium woodland over curly spinifex (association 771).

The pre-European mapping has been adapted and digitised by Shepherd et al. (2002). The extent of vegetation associations have been determined by the state-wide vegetation remaining extent calculations maintained by DBCA (latest update March 2019 – GoWA 2021b). As shown in Table 7. The current extents remaining of all vegetation associations are greater than 95% of their calculated pre European extents at all scales (e.g. State, IBRA bioregion, IBRA subregion and Local Government Area (LGA)).

The Native Vegetation Extent data layer indicates there has been no previous clearing within the project area.

3.5.3 Conservation significant ecological communities

The DBCA TEC and PEC database identified one TEC within the study area. The project area is within the buffer of the TEC Monsoon (vine) thickets on coastal sand dunes of Dampier Peninsula. Details on these communities are provided in Table 8.

Table 7 Extent of pre-European vegetation associations mapped within the project area (Beard 1975, GoWA 2021b)

Vegetation association	Scale	Pre-European extent (ha)	Current extent (ha)	Remaining (%)	%current extent in all DBCA managed land (proportion of current extent)
771	State: Western Australia	35,671.30	34,884.39	97.79	-
	IBRA bioregion: Dampierland	34,907.23	34,672.53	99.33	-
	IBRA sub-region: Pindanland	34,907.23	34,672.53	99.33	-
	LGA: Shire of Broome	35,671.30	34,884.39	97.79	-

Table 8 Threatened and Priority Ecological Communities identified in the desktop searches

Community type	EPBC Act	DBCA	Description (DBCA 2021a)
Monsoon (vine) thickets on coastal sand dunes of Dampier Peninsula (TEC)	Endangered	Vulnerable	Unusual vine thicket community and Camaenid land snails assemblage located on Napier Range. Threats: frequent fires leading to vegetation changes; loss of vine thickets and leaf litter.

3.5.4 Flora diversity

The *NatureMap* database identified 520 flora taxa previously recorded within the study area (DBCA 2007-). This total includes 515 native and 5 naturalised (weed) species. The most common families include Fabaceae (78 species) and Poaceae (50 species).

The NatureMap database search for flora is provided in Appendix C.

3.5.5 Conservation significant flora

The EPBC Act PMST and DBCA NatureMap, WAHERB and TPFL databases identified the presence/potential presence of ten conservation significant taxa within a 20 km buffer of the project area. The desktop searches recorded:

- Four Priority 1 taxa
- One Priority 2 taxa
- Five Priority 3 taxa

The locations of conservation significant flora registered on the DBCA databases are mapped in Figure 2, Appendix A.

3.6 Fauna

3.6.1 Fauna diversity

The *NatureMap* database identified 369 fauna species previously recorded within 20 km of the project area. This total comprised 209 birds, 38 reptiles, 25 mammals, 2 amphibians, and 1 invertebrate and 94 fish. Of the 369 fauna species previously recorded 365 were native species and 4 were naturalised (introduced) species.

The *NatureMap* database search is provided in Appendix C.

3.6.2 Conservation significant fauna

The EPBC Act PMST and *NatureMap* database identified the presence/potential presence of 54 conservation significance fauna within the study area. This total does not include those species that are exclusively marine as no marine habitat is present within the project area or indirectly impacted by the project.

4. Desktop assessment – Beagle Bay

4.1 Location

The Beagle Bay project area is located towards the northern extent of the Dampier Peninsula, approximately 115 km north east of Broome. The project area is approximately 1 km south from Beagle Bay community (Figure 7, Appendix A).

4.2 Physical environment

Ecological and land use constraints for Beagle Bay project area are presented on Figure 8, Appendix A.

4.2.1 Climate

The Dampier Peninsula has a tropical climate and is characterised by hot wet summer (December to March) and a dry season (April to November). Rainfall is generally received during the summer as a result of unpredictable tropical downpours and cyclonic low pressure systems. The closest BoM weather station with sufficient historical data is Cygnet Bay (site number 003057), located approximately 50 km north of the project area.

Climate data from this station indicates the mean maximum temperature ranges from 35.3 °C in November l to 28.2 °C in July. The mean minimum temperature ranges from 14.8 °C in July to 25.6 °C in December. The mean annual rainfall is 781.0 mm, with approximately 56 rain days a year (BoM 2021).

4.2.2 Land systems and soils

The Kimberley region has been surveyed by DPIRD and others for the purposes of land classification, mapping and resource evaluation. One hundred and eleven land systems have been described for the region, which are distinguished on the basis of topography, geology, soils and vegetation (Payne and Schoknecht 2011). One land system is relevant within the project area as shown in Table 9.

Table 9 Land systems within the project area

Land system	Description	Geology	Geomorphology
Wanganut	Low lying sandplains and dune fields with through going drainage supporting pindan acacia shrublands with emergent eucalypt trees	Quaternary aeolian soils	Sandplain and dunefields with through-going drainage: sandplain, mainly in the upper parts, with stable dunefields, low lying sandplain, and scattered pans and depressions; sparse to moderately dense branching drainage pattern; relief up to 9 m.

4.2.3 Acid sulphate soils

A review of the ASS risk mapping indicates the soil under the project area has ‘moderate to low’ risk of containing ASS. The ‘moderate to low’ risk rating indicates the risk of ASS occurring

within 3 m of natural soil surface however this rating indicates a high to moderate risk of ASS beyond 3 m of natural soil surface.

The wider study area records as both a 'high to moderate' and 'moderate to low' risk of containing ASS. The 'high to moderate' risk rating indicates the risk of ASS occurring within 3 m of the natural soil surface.

4.3 Land use

4.3.1 Conservation reserves and areas

No DBCA managed areas are located within the project area or wider study area.

4.3.2 Environmentally sensitive areas

No ESAs are located within the project area. The closest ESA is located approximately 10 km north west; no.7278.

4.4 Hydrology

The GoWA (2021a) data layers identified the water resource aspects present in the project area. These are detailed below in Table 10.

Table 10 Hydrology aspects within the project area

Aspect	Details	Results
Groundwater Areas	Groundwater areas proclaimed under the RIWI Act	Canning-Kimberley
Surface Water Areas	Surface water areas proclaimed under the RIWI Act	None present
Irrigation District	Irrigation Districts proclaimed under the RIWI Act	None present
Rivers	Rivers proclaimed under the Rights in RIWI Act	None present
Public Drinking Water Source Areas (PDWSA)	PDWSA is a collective term used for the description of Water Reserves, Catchment Areas and Underground Pollution Control Areas declared (gazetted) under the provisions of the *Country Area Water Supply Act 1947*	None present
Waterways Management Areas	Areas proclaimed under *the Waterway Conservation Act 1976*	None present

4.4.1 Wetlands

No Internationally (Ramsar) or nationally important wetlands are located within 20 km of the project area.

4.5 Vegetation and flora

4.5.1 Regional biogeography

The project area is located in the Dampierland bioregion and Pindanland sub-region as described by IBRA.

The Dampierland bioregion is characterised by extensive plains, ranges and spectacular gorges. The vegetation is characterised by acacia thickets with scattered trees and areas of grasslands and savannas. The bioregion contains Aboriginal land, pastoral leases and some

conservation reserves. The main industries are beef cattle, horticulture and tourism. Major population centres are Broome, Derby and Fitzroy Crossing.

The Pindanland subregion comprises sandplains of the Dampier Peninsular and western part of Dampier Land, including the hinterland of the Eighty Mile Beach. It is a fine-textured sand-sheet with subdued dunes and includes the paleodelta of the Fitzroy River. The vegetation is described primarily as pindan. This is the coastal, semi-arid, north-western margin of the Canning Basin (Graham 2001).

4.5.2 Broad vegetation mapping and extent

Broad scale (1:1,000,000) pre-European vegetation mapping of the area was completed by Beard (1977) at an association level. The mapping indicates that two vegetation associations are present within the project area:

- Shrublands, pindan; *Acacia tumida* shrubland with grey box & cabbage gum medium woodland over ribbon grass & curly spinifex (association 750)
- Grasslands, tall bunch grass savanna, sparse low tree; ribbon grass & paperbarks (association 67).

The pre-European mapping has been adapted and digitised by Shepherd et al. (2002). The extent of vegetation associations have been determined by the state-wide vegetation remaining extent calculations maintained by DBCA (latest update March 2019 – GoWA 2021b). As shown in Table 11. The current extents remaining of all vegetation associations are greater than 99% of their calculated pre European extents at all scales (e.g. State, IBRA bioregion, IBRA subregion and LGA).

The Native Vegetation Extent data layer indicates that there has been no previous clearing within the project area.

4.5.3 Conservation significant ecological communities

The DBCA TEC and PEC database identified one TEC and three State-listed PECs within the study area. The project area is within the buffer of the PEC Kimberley Vegetation Association 67. Details on these communities are provided in Table 12.

Table 11 Extent of pre-European vegetation associations mapped within the project area (Beard 1975, GoWA 2021b)

Vegetation association	Scale	Pre-European extent (ha)	Current extent (ha)	Remaining (%)	%current extent in all DBCA managed land (proportion of current extent)
750	State: Western Australia	1,231,155.50	1,225,687.52	99.56	
	IBRA bioregion: Dampierland	1,229,182.16	1,225,280.52	99.68	2.78
	IBRA sub-region: Pindanland	1,221,734.45	1,217,843.72	99.68	2.80
	LGA: Shire of Broome	1,115,559.36	1,110,131.18	99.51	3.07
67	State: Western Australia	27,285.40	27,240.50	99.84	-
	IBRA bioregion: Dampierland	27,285.40	27,240.50	99.84	-
	IBRA sub-region: Pindanland	27,285.40	27,240.50	99.84	-
	LGA: Shire of Broome	23,775.29	23,730.39	99.81	-

Table 12 Threatened and Priority Ecological Communities identified in the desktop searches

Community type	EPBC Act	BC Act/DBCA	Description (DBCA 2021a)
Assemblages of Lolly Well Springs wetland complex (PEC)		P3	Wetland complex containing numerous low organic mound springs with moats. Threats: recreational use, potential tourism developments, weed invasion, rubbish dumping, grazing and trampling (cattle).
Monsoon (vine) thickets on coastal sand dunes of Dampier Peninsula (TEC)	Endangered	Vulnerable	Unusual vine thicket community and Camaenid land snails assemblage located on Napier Range. Threats: frequent fires leading to vegetation changes; loss of vine thickets and leaf litter.

Community type	EPBC Act	BC Act/DBCA	Description (DBCA 2021a)
Kimberley Vegetation Association 37 (PEC)		P3	Shrublands; teatree thicket Threats: extensive threatening processes acting at landscape scales, namely altered fire regimes, over grazing, and weed invasion.
Kimberley Vegetation Association 67 (PEC)		P3	Grasslands, tall bunch grass savanna, sparse low tree; ribbon grass & paperbarks Threats: extensive threatening processes acting at landscape scales, namely altered fire regimes, over grazing, and weed invasion.

4.5.4 Flora diversity

The *NatureMap* database identified 206 flora taxa, representing 67 families and 151 genera previously recorded within the project area. This total comprised 190 native taxa and 16 naturalised (introduced) taxa. Dominant families recorded included Fabaceae (28 taxa), Poaceae (25 taxa) and Cyperaceae (16 taxa). The *NatureMap* database search is provided in Appendix C.

4.5.5 Conservation significant flora

The EPBC Act PMST, *NatureMap* database and DBCA TPFL and WAHERB databases identified the presence/potential presence of 12 significant flora taxa within the study area. The desktop searches recorded:

- Six Priority 1 taxa
- Six Priority 3 taxa.

The locations of conservation significant flora registered on the DBCA databases are mapped in Figure 14, Appendix A.

4.6 Fauna

4.6.1 Fauna diversity

The *NatureMap* database identified 286 fauna species previously recorded within 20 km of the project area. This total comprised 115 birds, 33 reptiles, 10 mammals, 7 amphibians, and 55 invertebrates and 66 fish. Of the fauna species previously recorded were native. The *NatureMap* database search is provided in Appendix C.

4.6.2 Conservation significant fauna

The EPBC Act PMST and *NatureMap* database identified the presence/potential presence of 25 conservation significance fauna within the study area. This total does not include those species that are exclusively marine as no marine habitat is present within the project area or indirectly impacted by the project.

5. Desktop assessment – Bidyadanga

5.1 Location

The Bidyadanga project area is located on the Dampier Peninsular, approximately 93 km south east from Broome. The project area is approximately 0.85 km west from Bidyadanga community (Figure 13, Appendix A).

5.2 Physical environment

Ecological and land use constraints for Bidyadanga project area are presented on Figure 14, Appendix A.

5.2.1 Climate

The Dampier Peninsula has a tropical climate and is characterised by hot wet summer (December to March) and a dry season (April to November). Rainfall is generally received during the summer as a result of unpredictable tropical downpours and cyclonic low pressure systems. The closest BoM weather station with sufficient historical data is Bidyadanga (site number 003030), located approximately 5 km east of the project area.

Climate data from this station indicates. The mean maximum temperature ranges from 35.8 °C in April to 29.7 °C in July. Mean minimum temperature ranges from 14.1 °C in July to 26.0 °C in January. The mean annual rainfall is 513.5 mm, with approximately 116 rain days a year (BoM 2021).

5.2.2 Land systems and soils

The Kimberley region has been surveyed by the DPIRD and others for the purposes of land classification, mapping and resource evaluation. One hundred and eleven land systems have been described for the region, which are distinguished on the basis of topography, geology, soils and vegetation (Payne and Schoknecht 2011). One land system is relevant within the project area as shown in Table 13.

Table 13 Land systems within the project area

Land system	Description	Geology	Geomorphology
Yeeda	Sandplains with red and yellow sands supporting pindan acacia shrublands with emergent eucalypt trees	Quaternary aeolian sands	Sandplain and dunefields with little organised drainage; sandplain up to 16 km in extent, with shallow valleys, plains with thin sand cover, and scattered pans; limited surface drainage in zones of sheet-flow up to 3.2 km wide and extending up to 8 km downslope from adjacent uplands.

5.2.3 Acid sulphate soils

A review of the ASS risk mapping indicates the soil under the project area has ‘moderate to low’ risk of containing ASS. The ‘moderate to low’ risk rating indicates the risk of ASS occurring within 3 m of natural soil surface however this rating indicates a high to moderate risk of ASS beyond 3 m of natural soil surface.

5.3 Land use

5.3.1 Conservation reserves and areas

No DBCA managed areas are located within the survey or wider study area.

5.3.2 Environmentally sensitive areas

No ESAs are located within the survey or wider study area.

5.4 Hydrology

Desktop searches of the GoWA (2021a) data layers identified the water resource aspects present in the project area. These are detailed below in Table 14.

Table 14 Hydrology aspects within the project area

Aspect	Details	Results
Groundwater Areas	Groundwater areas proclaimed under the RIWI Act	Canning - Kimberley
Surface Water Areas	Surface water areas proclaimed under the RIWI Act	None present
Irrigation District	Irrigation Districts proclaimed under the RIWI Act	None present
Rivers	Rivers proclaimed under the Rights in RIWI Act	None present
Public Drinking Water Source Areas (PDWSA)	PDWSA is a collective term used for the description of Water Reserves, Catchment Areas and Underground Pollution Control Areas declared (gazetted) under the provisions of the Metropolitan Water Supply, Sewage and Drainage Act 1909 or the Country Area Water Supply Act 1947.	None present
Waterways Management Areas	Areas proclaimed under the Waterway Conservation Act 1976	None present

5.4.1 Wetlands

No Internationally (Ramsar) or nationally important wetlands are located within 20 km of the project area.

5.5 Vegetation and flora

The project area is located in the Dampierland bioregion and Pindanland sub-region as described by IBRA.

The Dampierland bioregion is characterised by extensive plains, ranges and spectacular gorges. The vegetation is characterised by acacia thickets with scattered trees and areas of grasslands and savannas. The bioregion contains Aboriginal land, pastoral leases and some conservation reserves. The main industries are beef cattle, horticulture and tourism. Major population centres are Broome, Derby and Fitzroy Crossing.

The Pindanland subregion comprises sandplains of the Dampier Peninsular and western part of Dampier Land, including the hinterland of the Eighty Mile Beach. It is a fine-textured sand-sheet with subdued dunes and includes the paleodelta of the Fitzroy River. The vegetation is described primarily as pindan. This is the coastal, semi-arid, north-western margin of the Canning Basin (Graham 2001).

5.5.1 Broad vegetation mapping and extent

Broad scale (1:1,00,000) pre-European vegetation mapping of the area was completed by Beard (1977) at an association level. The mapping indicates that one vegetation association is present within the project area:

- Shrublands, pindan; *Acacia eripoda* shrubland with scattered low bloodwood (*Eucalyptus dicromophloia*) & *E. setosa* over soft & curly spinifex on sandplain (association 699).

The pre-European mapping has been adapted and digitised by Shepherd et al. (2002). The extent of vegetation associations have been determined by the state-wide vegetation remaining extent calculations maintained by DBCA (latest update March 2019 – GoWA 2021b). As shown in Table 15. The current extents remaining of all vegetation associations are greater than 99% of their calculated pre-European extents at all scales (e.g. State, IBRA bioregion, IBRA subregion and LGA).

The Native Vegetation Extent data layer indicates that majority of the project area has undergone no clearing. A small section on the eastern edge of the project area has been previously cleared.

5.5.2 Conservation significant ecological communities

The DBCA TEC and PEC database identified two State-listed PECs within the study area. Details on these communities are provided in Table 16.

Table 15 Extent of pre-European vegetation associations mapped within the project area (Beard 1975, GoWA 2021b)

Vegetation association	Scale	Pre-European extent (ha)	Current extent (ha)	Remaining (%)	%current extent in all DBCA managed land (proportion of current extent)
699	State: Western Australia	1,986,450.05	1,984,438.78	99.90	0.47
	IBRA bioregion: Dampierland	1,976,313.50	1,974,958.06	99.93	0.48
	IBRA sub-region: Pindanland	1,796,194.92	1,794,994.17	99.93	0.52
	LGA: Shire of Broome	1,628,642.72	1,626,791.54	99.89	0.58

Table 16 Threatened and Priority Ecological Communities identified in the desktop searches

Community type	EPBC Act	DBCA	Description (DBCA 2021)
Roebuck Land System		P3	Paleo-tidal coastal plains and tidal flats with saline soil supporting salt-water couch grasslands, samphire low shrublands, melaleuca thickets and mangroves. Threats: extensive threatening processes acting at landscape scales, namely frequent fires leading to loss of trees and shrubs, over grazing, and weed invasion (buffel grass).
Eighty Mile Land System		P3	Beach foredunes, longitudinal coastal dunes and sandy plains with tussock grasslands and spinifex grasslands. Threats: extensive threatening processes acting at landscape scales, namely altered fire regimes, over grazing, erosion, and weed invasion (buffel grass).

5.5.3 Flora diversity

The *NatureMap* database identified 99 flora taxa, representing 41 families and 65 genera previously recorded within the project area. This total comprised 97 native taxa and 2 naturalised (introduced) taxa. Dominant families recorded included Fabaceae (22 taxa), Caulerpaceae (6 taxa) and Malvaceae (6 taxa).

The *NatureMap* database search is provided in Appendix C.

5.5.4 Conservation significant flora

The EPBC Act PMST, *NatureMap* database and DBCA TPFL and WAHERB databases identified the presence/potential presence of one conservation significance flora (Priority 3) taxa within the study area.

5.6 Fauna

5.6.1 Fauna diversity

The *NatureMap* database identified 250 fauna species previously recorded within 10 km of the project area. This total comprised 163 birds, 33 reptiles, 21 mammals, 3 amphibians, and 1 invertebrates and 29 fish. Of the 250 fauna species previously recorded 247 were native species and 3 were naturalised (introduced) species. The *NatureMap* database search is provided in Appendix C.

5.6.2 Conservation significant fauna

The EPBC Act PMST and *NatureMap* database identified the presence/potential presence of 50 conservation significance fauna within the study area. This total does not include those species that are exclusively marine as no marine habitat is present within the project area or indirectly impacted by the project.

6. Desktop assessment – Djarindjin

6.1 Location

The Djarindjin project area is located near the northern extent of the Dampier Peninsular, approximately 175 km north east of Broome. The project area is approximately 0.52 km east from Djarindjin community (Figure 19, Appendix A).

6.2 Physical environment

Ecological and land use constraints for Djarindjin project area are presented on Figure 20, Appendix A.

6.2.1 Climate

The Dampier Peninsula has a tropical climate and is characterised by hot wet summer (December to March) and a dry season (April to November). Rainfall is generally received during the summer as a result of unpredictable tropical downpours and cyclonic low pressure systems. The closest BoM weather station with sufficient historical data is Cygnet Bay (site number 003057), located approximately 15 km north of the project area.

Climate data from this station indicates the mean maximum temperature ranges from 35.3 °C in November l to 28.2 °C in July. The mean minimum temperature ranges from 14.8 °C in July to 25.6 °C in December. The mean annual rainfall is 781.0 mm, with approximately 56 rain days a year (BoM 2021).

6.2.2 Land systems and soils

The Kimberley region has been surveyed by DPIRD and others for the purposes of land classification, mapping and resource evaluation. One hundred and eleven land systems have been described for the region, which are distinguished on the basis of topography, geology, soils and vegetation (Payne and Schoknecht 2011). One land system is relevant within the Broome region and the project area as shown in Table 17.

Table 17 Land systems within the project area

Land system	Description	Geology	Geomorphology
Yeeda	Sandplains with red and yellow sands supporting pindan acacia shrublands with emergent eucalypt trees	Quaternary aeolian sands	Sandplain and dunefields with little organised drainage; sandplain up to 16 km in extent, with shallow valleys, plains with thin sand cover, and scattered pans; limited surface drainage in zones of sheet-flow up to 3.2 km wide and extending up to 8 km downslope from adjacent uplands.

6.2.3 Acid sulphate soils

A review of the ASS risk mapping indicates the soil under the project area has ‘moderate to low’ risk of containing ASS. The ‘moderate to low’ risk rating indicates the risk of ASS occurring within 3 m of natural soil surface however this rating indicates a high to moderate risk of ASS beyond 3 m of natural soil surface.

The wider study area records as both a ‘high to moderate’ and ‘moderate to low’ risk of containing ASS. The ‘high to moderate’ risk rating indicates the risk of ASS occurring within 3 m of the natural soil surface.

6.3 Land use

6.3.1 Conservation reserves and areas

No DBCA managed areas are located within the survey or wider study area.

6.3.2 Environmentally sensitive areas

The project area is located within ESA no. 7290, which is within the buffer for the TEC Monsoon (vine) thickets on coastal sand dunes of Dampier Peninsula.

6.4 Hydrology

The GoWA (2021a) data layers identified the water resource aspects present in the project area. These are detailed below in Table 18.

Table 18 Hydrology aspects within the project area

Aspect	Details	Results
Groundwater Areas	Groundwater areas proclaimed under the RIWI Act	Canning-Kimberley
Surface Water Areas	Surface water areas proclaimed under the RIWI Act	None present
Irrigation District	Irrigation Districts proclaimed under the RIWI Act	None present
Rivers	Rivers proclaimed under the Rights in RIWI Act	None present
Public Drinking Water Source Areas (PDWSA)	PDWSA is a collective term used for the description of Water Reserves, Catchment Areas and Underground Pollution Control Areas declared (gazetted) under the provisions of the *Country Area Water Supply Act 1947*	None present
Waterways Management Areas	Areas proclaimed under *the Waterway Conservation Act 1976*	None present

6.4.1 Wetlands

No Internationally (Ramsar) or nationally important wetlands are located within 20 km of the project area.

6.5 Vegetation and flora

6.5.1 Regional biogeography

The project area is located in the Dampierland bioregion and Pindanland sub-region as described by IBRA.

The Dampierland bioregion is characterised by extensive plains, ranges and spectacular gorges. The vegetation is characterised by acacia thickets with scattered trees and areas of grasslands and savannas. The bioregion contains Aboriginal land, pastoral leases and some conservation reserves. The main industries are beef cattle, horticulture and tourism. Major population centres are Broome, Derby and Fitzroy Crossing.

The Pindanland subregion comprises sandplains of the Dampier Peninsular and western part of Dampier Land, including the hinterland of the Eighty Mile Beach. It is a fine-textured sand-sheet with subdued dunes and includes the paleodelta of the Fitzroy River. The vegetation is described primarily as pindan. This is the coastal, semi-arid, north-western margin of the Canning Basin (Graham 2001).

6.5.2 Broad vegetation mapping and extent

Broad scale (1:1,000,000) pre-European vegetation mapping of the area was completed by Beard (1977) at an association level. The mapping indicates that one vegetation association is present within the project area:

- Shrublands, pindan; *Acacia tumida* shrubland with grey box & cabbage gum medium woodland over ribbon grass & curly spinifex (association 750).

The pre-European mapping has been adapted and digitised by Shepherd et al. (2002). The extent of vegetation associations have been determined by the state-wide vegetation remaining extent calculations maintained by DBCA (latest update March 2019 – GoWA 2021b). As shown in Table 19. The current extents remaining of all vegetation associations are greater than 99% of their calculated pre European extents at all scales (e.g. State, IBRA bioregion, IBRA subregion and LGA).

The Native Vegetation Extent data layer indicates that there has been no previous clearing within the project area.

6.5.3 Conservation significant ecological communities

The DBCA TEC and PEC database identified one TEC and one State-listed PEC within the study area. The project area is within the buffer for the TEC Monsoon (vine) thickets on coastal sand dunes of Dampier Peninsula. Details on these communities are provided in Table 20.

Table 19 Extent of pre-European vegetation associations mapped within the project area (Beard 1975, GoWA 2021b)

Vegetation association	Scale	Pre-European extent (ha)	Current extent (ha)	Remaining (%)	%current extent in all DBCA managed land (proportion of current extent)
750	State: Western Australia	1,231,155.50	1,225,687.52	99.56	
	IBRA bioregion: Dampierland	1,229,182.16	1,225,280.52	99.68	2.78
	IBRA sub-region: Pindanland	1,221,734.45	1,217,843.72	99.68	2.80
	LGA: Shire of Broome	1,115,559.36	1,110,131.18	99.51	3.07

Table 20 Threatened and Priority Ecological Communities identified in the desktop searches

Community type	EPBC Act	DBCA	Description (DBCA 2021)
Monsoon (vine) thickets on coastal sand dunes of Dampier Peninsula	Endangered	Vulnerable	Unusual vine thicket community and Camaenid land snails assemblage located on Napier Range. Threats: frequent fires leading to vegetation changes; loss of vine thickets and leaf litter
Kimberley Vegetation Association 37		P3	Shrublands; teatree thicket. Threats: extensive threatening processes acting at landscape scales, namely altered fire regimes, over grazing, and weed invasion

6.5.4 Flora diversity

The *NatureMap* database identified 454 flora taxa, representing 111 families and 265 genera previously recorded within the study area. This total comprised 426 native taxa and 28 naturalised (introduced) taxa. Dominant families recorded included Fabaceae (54 taxa), Poaceae (44 taxa) and Malvaceae (26 taxa). The *NatureMap* database search is provided in Appendix C.

6.5.5 Conservation significant flora

Searches of the EPBC Act PMST, *NatureMap* database and DBCA TPFL and WAHERB databases identified the presence/potential presence of six conservation significance flora taxa within the study area. The desktop searches recorded:

- Two Priority 1 taxa
- Four Priority 3 taxa.

The locations of conservation significant flora registered on the DBCA databases are mapped in Figure 20, Appendix A.

6.6 Fauna

6.6.1 Fauna diversity

The *NatureMap* database identified 248 fauna species previously recorded within 10 km of the project area. This total comprised 178 birds, 39 reptiles, 21 mammals, 4 amphibians, and 1 invertebrates and 5 fish. Of the 248 fauna species previously recorded 247 were native species and 1 were naturalised (introduced) species.

The *NatureMap* database search is provided in Appendix C.

6.6.2 Conservation significant fauna

Searches of the EPBC Act PMST and *NatureMap* database identified the presence/potential presence of 58 conservation significance fauna within the study area. This total does not include those species that are exclusively marine as no marine habitat is present within the project area or indirectly impacted by the project.

7. Field survey results

7.1 Flora and vegetation

7.1.1 Vegetation types

Three vegetation types aligning with broad landforms were identified and described in the project areas, not including cleared tracks:

Djarindjin, Beagle Bay and Ardyaloon project areas:

- VT01 - *Eucalyptus miniata* and *Corymbia greeniana* woodland to isolated clumps of trees on Pindan red sand loam on low plain

Beagle Bay project area:

- VT02 - *Corymbia greeniana* and *Corymbia bella* isolated clumps of trees over *Melaleuca nervosa* subsp *crosslandiana* open woodland on silty loam over clay on drainage flats/floodplain

Bidyadanga project area:

- VT03 - *Corymbia hamersleyana* and *Corymbia flavescens* open woodland on red brown sandplain.

The vegetation types are described in further detail in Table 21 and mapped in Figure 5, Figure 11, Figure 17 and Figure 23 (Appendix A).

7.1.1 Conservation significant vegetation communities

No TEC's listed under the EPBC Act or BC Act were identified within the project areas during the field survey. VT02 within the Beagle Bay project area represents the PEC Kimberley Vegetation Association 67, with this pre-European association previously mapped within the project area (Figure 11, Appendix A). VT02 is analogous with the Vegetation Association based on species present, type and landform.

The Ardyaloon and Djarindjin project areas occur within the buffer of the TEC Monsoon (vine) thickets on coastal sand dunes of Dampier Peninsula, however, this TEC was not recorded as the landform (coastal sand dunes) did not occur.

Table 21 Recorded vegetation types

Vegetation type	Vegetation Type Description	Condition and extent (ha)	Sampling sites	Photograph
VT01	*Eucalyptus miniata* and *Corymbia greeniana* open woodland to isolated clumps of trees over *Acacia tumida* var. *kulparn* shrubland to open shrubland over *Wrightia saligna, Grevillea pyramidalis* subsp. *pyramidalis* and *Bauhinia cunninghamii* sparse shrubland over *Corchorus sidoides* subsp. *sidoides* and *Dodonaea hispidula* var. *arida* sparse shrubland over *Sorghum plumosum* and *Chrysopogon pallidus* tussock grassland over *Waltheria indica, Calandrinia strophiolata* and *Heliotropium leptaleum* open forbland on Pindan red sand loam on low plain.	18.29 ha	Dja_HP_01, Dja_HP_02, Ard_HP_03, Beag_HP_05	
VT02	*Corymbia greeniana* and *Corymbia bella* isolated clumps of trees over *Melaleuca nervosa* subsp *crosslandiana* open woodland over *Chrysopogon pallidus* open tussock grassland over *Fimbristylis rara, Fimbristylis cardiocarpa* and *Cyperus pulchellus* sparse sedgeland over *Scleromitrion scleranthoides, Buchnera linearis* and *Indigofera hirsuta* open forbland on silty loam over clay on drainage flats/floodplain. Represents DBCA P3 PEC Kimberley Vegetation Association 67.	3.21 ha	Beag_HP_04,	

Vegetation type	Vegetation Type Description	Condition and extent (ha)	Sampling sites	Photograph
VT03	*Corymbia hamersleyana* and *Corymbia flavescens* open woodland over *Grevillea pyramidalis* subsp. *pyramidalis* and *Acacia colei* var. *colei* sparse shrubland over *Indigofera monophylla, Acacia arida* and *Acacia adoxa* var. *subglabra* shrubland over *Triodia epactia* open hummock grassland over *Stylosanthes hamata, Indigofera linnaei* and *Calandrinia strophiolata* sparse forbland on red brown sandplain.	1.83 ha	Bid_HP_06, Bid_HP_07	
Cleared	Cleared areas devoid of native vegetation	4.07 ha		

7.1.1 Vegetation condition

The condition of the vegetation within the survey area ranged from Excellent to Good. Native vegetation covered 23.33 ha and cleared areas 4.07 ha. The extents of the vegetation condition within the survey area are detailed in Table 22 and mapped in Figure 5, Figure 11, Figure 17 and Figure 23 (Appendix A). The vegetation structure was intact with limited signs of cattle activity and a low number of introduced flora were recorded for most of the project areas except Bidyadanga where higher introduced species cover was recorded and previous disturbance. There were areas of previous disturbance through clearing and soil movement adjacent to the existing power infrastructure. Bidyadanga project area had previous soil disturbance with the presence of a large sump being previously constructed. There are some tracks present, in particular at the Bidyadanga project area.

Table 22 Vegetation condition

Vegetation Condition	Extent in survey area (ha)	%
Excellent	3.21	13.8
Very Good	15.31	65.6
Good	4.81	4.81
Degraded	0	0
Completely Degraded	0	0
Total	23.33	100

7.1.2 Flora diversity

One hundred and thirty-seven flora taxa (including subspecies and varieties) representing 38 families and 90 genera were recorded from the survey area during the field survey. This total comprised 128 native taxa and nine introduced flora taxa.

Dominant families recorded from the survey area included:

- Fabaceae (26 taxa)
- Poaceae (20 taxa)
- Cyperaceae and Malvaceae (10 taxa).

The full list of flora identified within the survey area complied by site and species list by family is provided in Appendix D.

7.1.3 Introduced flora

Nine introduced flora taxa were recorded in the project areas:

- **Azadirachta indica*
- **Cenchrus ciliaris*
- **Cenchrus setiger*
- **Clitoria ternatea*
- **Passiflora foetida*
- **Cyanthillium cinereum*
- **Stylosanthes hamata*
- **Stylosanthes humilis*
- **Stylosanthes scabra.*

None of the six introduced/naturalised flora taxa identified during the survey are listed as a Declared Pest under the *Biosecurity and Management Act 2007* or a Weed of National Significance.

**Azadirachta indica, *Cenchrus ciliaris, *Passiflora foetida* and **Stylosanthes scabra* were the most common introduced species recorded across the project areas. All of the introduced flora have been previously recorded from the Dampierland bioregion and Pindanland sub-region.

7.1.4 Significant flora

No EPBC Act or BC Act listed flora were recorded from the project areas. A tentative record of the Priority three taxa *Triodia ?acutispicula* was recorded within the Ardyaloon project area within VT01. This taxon could not be confidently confirmed as no fruiting material was available to correctly separate this species from other similar *Triodia* taxa, so the precautionary principle was applied given the nearby records of *Triodia acutispicula* (P3). This species was recorded with a cover of 20% with the location shown in Figure 5, Appendix A.

The Priority three taxa *Tephrosia andrewii* was recorded within the Bidyadanga project area. *Tephrosia andrewii* is an erect shrub or spindly shrub (broom-like) to 0.8 m high, flowering in April and October preferring Pindan red sand (WA Herbarium 1998-). A total of two individuals were recorded from one location as shown in Figure 17, Appendix A.

Likelihood of occurrence

A likelihood of occurrence assessment was conducted for all conservation significant flora taxa identified in the desktop assessment (Appendix D). Of the identified Priority species for the project areas the following assessment on likelihood post-survey is as follows:

- Ardyaloon – one taxa, *Triodia ?acutispicula,* was tentatively recorded and nine species are considered unlikely to occur
- Beagle Bay – 11 taxa are unlikely to occur and one taxon is highly unlikely to occur
- Bidyadanga – one taxa *Tephrosia andrewii* (P3) was recorded and one taxon is considered unlikely to occur
- Djarindjin – six taxa are considered unlikely to occur.

7.1.5 Flora of interest

No collections were made of species considered to be flora of interest from the project areas, such as significant range extensions or collections of taxonomic interest representing potential new species.

7.2 Fauna

7.2.1 Fauna habitats

Three broad fauna habitat types were described and mapped during the field survey as described in Table 23 and shown in Figure 6, Figure 12, Figure 18, Figure 24 (Appendix A). These comprise *Eucalyptus* and *Corymbia* on Pindan red sand, *Corymbia* over *Melaleuca* on silty clay loam on drainage flats/floodplain and *Corymbia* over *Acacia* over tussock grasses over hummock grassland on red brown sandplain. These fauna habitats align with the mapped vegetation types. Fauna habitats covered 23.33 ha and cleared areas 4.07 ha.

The *Eucalyptus* and *Corymbia* on Pindan red sand habitat type is largely homogeneous throughout the Djarindjin, Beagle Bay and Ardyaloon project areas with minor variation in vegetation density across strata. The vegetation condition is considered to be excellent having negligible disturbance of weeds or ground disturbance, with the exception of tracks and

previous soil movement adjacent to the existing power infrastructure. The *Corymbia* over *Melaleuca* on silty loam over clay on drainage flats/floodplain was only recorded in the Beagle Bay project area. The *Corymbia* over *Acacia* over tussock grasses over hummock grassland on red brown sandplain was recorded from the Bidyadanga project area.

There is a low proportion, approximately 5-10 percent of bare ground over most of the survey area due to a high density of ground cover vegetation leaf litter and other fallen dead vegetation. Leaf litter and other ground debris provides habitat and shelter for a range of small terrestrial vertebrates, especially fossorial reptiles. The tall shrubland provides suitable foraging and nesting habitat for a range of shrubland and woodland birds particularly insectivorous and nectar-feeding birds, terrestrial and arboreal reptiles, and large grazing mammals such as Agile Wallaby.

Sparse emergent trees provide some limited tree hollows for nesting and shelter, and there are very few moderate to large fallen logs suitable as shelter or den sites due to the low tree density. Most shelter habitat is in the form of dense shrub foliage and ground leaf litter. There are occasional large termite mounds that provide shelter, breeding sites and food source for a range of reptiles and mammals.

The project areas are part of a larger continuous area of tall shrubland plain and drainage system habitats throughout the surrounding area as it has a high degree of habitat connectivity with surrounding vegetation having similar or better condition vegetation.

Table 23 Fauna habitats types within the survey area

Habitat type	Photograph	Extent within the survey area (ha)
Eucalyptus and *Corymbia* woodland to isolated clumps of trees over tussock grasses and herbs on Pindan red sand loam on low plain. This habitat type generally corresponds with vegetation type VT01. It tends to occur on well draining porous sandy soil. Habitat condition is generally very good to excellent; however some disturbance includes frequent fire, edge effects of weeds from adjacent tracks and clearings, and dumped rubbish. This habitat is extensive and widespread within the Pindanland bioregion of the Dampier Peninsular and occurs within Ardyaloon, Djarindjin and Beagle Bay survey areas. It is foraging and nesting habitat for a diverse range of insectivorous, nectar and granivore bird species including common resident and nomadic woodland bird species such as DollarBird. Rainbow Bee-eater, Little Friarbird, Peaceful Dove, Grey-crowned Babbler and Double-barred Finch. A range of reptiles utilise this habitat including arboreal species: Stimson's Python, Black-tailed Monitor, and Tree Dtella. Borrowing and fossorial reptiles include Griffin's Slider, Dampierland Limbless Slider and Gould's Monitor. **Conservation significant fauna** Foraging habitat Gouldian Finch (*Erythrura gouldiae*), Foraging and nesting habitat for Peregrine Falcon (*Falco peregrinus*), habitat for Dampierland Burrowing snake (*Simoselaps minimus*), and Dampierland plain slider (*Lerista separanda)* and Greater Bilby (*Macrotis lagotis*) **Habitat value** High value		18.29 ha (Djarindjin, Beagle Bay and Ardyaloon)

Habitat type	Photograph	Extent within the survey area (ha)
Corymbia isolated clumps of trees over *Melaleuca* open woodland over mixed sedges and herbs on silty loam over clay on drainage flats/floodplain This habitat tyre generally corresponds with vegetation type VT02. Habitat condition is generally very good to excellent; however some disturbance includes frequent fire, dumped rubbish, and ground disturbance from adjacent infrastructure. This habitat is restricted to the Beagle Bay survey area in the eastern portion that encroaches into poor-draining lower elevation floodplain. It is foraging and nesting habitat for a diverse range of insectivorous, nectar and granivore bird species including common resident woodland bird species such as Black-faced Cuckoo-shrike, Blue-winged Kookaburra, Collared Sparrowhawk, Long-tailed Finch, and Sacred Kingfisher. A range of frogs and reptiles utilise this habitat including. Desert Tree Frog, Greet Tree Frog, Ornate Burrowing Frog, Long-snouted Water Dragon and Plains Ctenotus (Skink). **Conservation significant fauna** Foraging habitat for Gouldian Finch (*Erythrura gouldiae*), Peregrine Falcon (*Falco peregrinus*), Dampierland Burrowing snake (*Simoselaps minimus*), Dampierland plain slider (*Lerista separanda)* and Greater Bilby (*Macrotis lagotis*) **Habitat value** High value		3.21 ha (Beagle Bay)

Habitat type	Photograph	Extent within the survey area (ha)
Corymbia open woodland over *Acacia* shrubs over tussock grasses over Triodia hummock grassland over herbs on red brown sandplain. This habitat tyre generally corresponds with vegetation type VT03. Habitat condition ranges from good to very good with some cleared areas. Disturbance includes weed invasion, dumped rubbish, ground disturbance, cattle grazing and recent fire (0-2 years). Soils are moderately well drained sandy clay. This habitat is restricted to the Bidyadanga survey area where it extends throughout. It is foraging habitat for a diverse range of regionally widespread and common bird species such as Australian Bustard, Brown Falcon, Red-browed Pardalote, and Variegated Fairy-wren. Budgerigar, Several large termite mounds within the survey area provide sheltering habitat for many reptile species **Conservation significant fauna** Nil **Habitat value** Moderate value		1.83 ha (Bidyadanga)

7.2.2 Fauna diversity

A total of 47 fauna species were recorded within the survey area, including 33 birds, five mammals and nine reptiles. Most species recorded were opportunistic observations of active fauna or bird calls identified while traversing the project areas during targeted fauna search. All fauna species recorded are generally widespread and abundant within habitat of the local area and wider region. Three introduced fauna species were recorded including Cattle (*Bos taurus*) from old scat, Dog (*Canus domesticus*) and Feral Cat (*Felis catus*). A list of fauna species identified during the field survey is provided in Appendix E.

7.2.3 Conservation significant fauna

No conservation listed species were recorded during the survey.

Targeted survey for Greater Bilby (Macrotis lagotis)

No evidence of Greater Bilby activity (footprints, foraging holes, burrows of scat) was recorded within the project areas. The targeted Bilby survey assessed three plots. The results of the data collected is presented in Appendix E as a composite summary. The method allows for assessment of each transect/plots trackability of Bilby as well as plot ODS (other determining signs). For plot trackability the mean score was 3.5. This equates to a moderately high degree of difficulty in the detectability of the bilby within the plots and transects.

Likelihood of occurrence

A likelihood of occurrence assessment was conducted for significant fauna species identified in the desktop assessment. This assessment was based on species biology, habitat requirements, the likely quality and availability of suitable habitat (based on vegetation types present within the survey area) and records of the species in the vicinity. No assumptions were made on the transient potential of these species. The complete likelihood assessment is provided in Appendix E.

Of the identified conservation listed fauna species for the project areas the following assessment on likelihood post-survey is as follows:

- Ardyaloon – Gouldian Finch (*Erythrura gouldiae*) (P4), Peregrine Falcon (*Falco peregrinus*) (S), Dampierland Burrowing snake (*Simoselaps minimus*) (P2), Dampierland plain slider (*Lerista separanda)* (P2) and Greater Bilby (*Macrotis lagotis*) (V) are likely to occur, 13 unlikely to occur and 31 highly unlikely to occur
- Beagle Bay – Gouldian Finch (*Erythrura gouldiae*) (P4), Peregrine Falcon (*Falco peregrinus*) (S), and Greater Bilby (*Macrotis lagotis*) (V) are likely to occur, 15 unlikely to occur and six highly unlikely to occur
- Bidyadanga – 34 species are considered unlikely to occur and 15 highly unlikely to occur
- Djarindjijn – Gouldian Finch (*Erythrura gouldiae*) (P4), Peregrine Falcon (*Falco peregrinus*) (S), Dampierland Burrowing snake (*Simoselaps minimus*) (P4), Dampierland plain slider (*Lerista separanda)* (P2) and Greater Bilby (*Macrotis lagotis*) (V) are likely to occur, 13 unlikely to occur and 30 highly unlikely to occur.

The likelihood of occurrence assessment identified other fauna species of conservation significance could occasionally occur within the habitats of the survey area (e.g. species deemed unlikely). However, it is considered unlikely the survey area provides important habitat (e.g. breeding habitat or key foraging habitat) for any of these species and that these other species may occasional use the habitats of the survey area for temporary refuge and dispersal between other areas of habitat.

8. Conclusion/Summary

The proposed development of the centralised solar generation is considered not to have a significant impact on the flora, vegetation and fauna values at a local and regional scale due to the high representation and continuation of vegetation in the region outside of the project areas. No TEC's listed under the EPBC Act or BC Act were identified within the project areas during the field survey. VT02 within the Beagle Bay project area represents the PEC Kimberley Vegetation Association 67 and is considered significant.

The project areas are part of a larger continuous area of tall shrubland plain and drainage system habitats throughout the surrounding area as it has a high degree of habitat connectivity with surrounding vegetation having similar or better condition vegetation.

No EPBC Act or BC Act listed flora were recorded from the project areas. A tentative record of the Priority three (P3) taxa *Triodia ?acutispicula* was recorded within the Ardyaloon project area This species was recorded with a cover of 20%. The Priority three taxa *Tephrosia andrewii* was recorded within the Bidyadanga project area. A total of two individuals were recorded from one location.

No conservation listed fauna species were recorded during the survey. No evidence of Greater Bilby activity (footprints, foraging holes, burrows of scat) was recorded within the project areas.

Of the identified conservation listed fauna species for the project areas the following species are considered likely to occur:

- Ardyaloon – Gouldian Finch (*Erythrura gouldiae*) (P4), Peregrine Falcon (*Falco peregrinus*) (S), Dampierland Burrowing snake (*Simoselaps minimus*) (P2), Dampierland plain slider (*Lerista separanda)* (P2) and Greater Bilby (*Macrotis lagotis*) (V)
- Beagle Bay – Gouldian Finch (*Erythrura gouldiae*) (P4), Peregrine Falcon (*Falco peregrinus*) (S), and Greater Bilby (*Macrotis lagotis*) (V)
- Djarindjijn – Gouldian Finch (*Erythrura gouldiae*) (P4), Peregrine Falcon (*Falco peregrinus*) (S), Dampierland Burrowing snake (*Simoselaps minimus*) (P4), Dampierland plain slider (*Lerista separanda)* (P2) and Greater Bilby (*Macrotis lagotis*) (V)
- Bidyadanga – no conservation listed fauna species are considered likely to occur.

9. References

Beard, J.S. (1975). Vegetation Survey of Western Australia. 1:1 000 000 Vegetation Series sheet 5 - Pilbara. Map and explanatory notes. University of Western Australia Press: Nedlands, Western Australia

Beard, J.S 1977, Vegetation Survey of Western Australia: Kimberley, map and explanatory memoir, 1:1,000,000 series, Nedlands, University of Western Australia Press.

Birdlife Australia. 2019. Website https://birdlife.org.au/projects/bittern-project, assessed May 2020.

Bureau of Meteorology (BoM) 2021, Climate Data Online, retrieved May 2021, from http://www.bom.gov.au/climate/data/

Christidis & Boles (2008). Systematics and Taxonomy of Australian Birds. CSIRO Publishing.

Department of the Agriculture, Water and the Environment (DAWE) 2021, Environment Protection and Biodiversity Conservation Act 1999 Protected Matters Search Tool Results, retrieved May 2021, from http://www.environment.gov.au/epbc/pmst/index.html

Department of Biodiversity, Conservation and Attractions (DBCA) 2007–, *NatureMap*: Mapping Western Australia's Biodiversity, retrieved May 2021, from https://naturemap.dpaw.wa.gov.au/default.aspx

Department of Biodiversity, Conservation and Attractions (DBCA) 2017. Guidelines for surveys to detect the presence of bilbies, and assess the importance of habitat in Western Australia.

Department of Biodiversity, Conservation and Attractions (DBCA) 2021a, Threatened Ecological Community (TEC) and Priority Ecological Community (PEC) database search.

Department of Biodiversity, Conservation and Attractions (DBCA) 2021b, DBCA Threatened (Declared Rare) and Priority Flora (TPFL) database and the WA Herbarium database searches

Department of Biodiversity, Conservation and Attractions (DBCA) 2021c, DBCA Threatened and Priority Fauna database search

Department of the Environment and Energy (DEE) 2019, Species Profile and Threats Database (SPRAT), retrieved May 2020, from http://www.environment.gov.au/cgi-bin/sprat/public/

DAWE 2011a. Survey Guidelines for Australia's threatened Mammals. Guidelines for detecting mammals listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999.

DAWE 2011b. Survey guidelines for Australia's threatened reptiles: Guidelines for detecting reptiles listed as threatened under the EPBC Act.

Environmental Protection Authority (EPA), 2016. *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment,* EPA, Western Australia

Environmental Protection Authority (EPA) 2020. *Technical Guidance Terrestrial vertebrate fauna surveys for environmental impact assessment*, EPA, Western Australia.

Government of Western Australia (GoWA) 2021a, data.wa.gov.au, accessed May 2021, from https://data.wa.gov.au/.

Government of Western Australia (GoWA) 2021b, 2019 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full report), Current as of March 2019, Perth, Australia, Department of Biodiversity, Conservation and Attractions, retrieved March 2021, from https://catalogue.data.wa.gov.au/dataset/dbca-statewide-vegetation-statistics.

Graham, G 2001, Dampierland (DL2 – Pindanland subregion), A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002, Department of Conservation and Land Management.

Menkhorst, P., and Knight, F. 2010. A field Guide to the Mammals or Australia. Oxford University Press.

Morcombe, M, 2004, Field Guide to Australian Birds. Steve Parish Publishing Archer Field Queensland Australia.

NVIS Technical Working Group 2017, Australian Vegetation Attribute Manual: National Vegetation Information System, Version 7.0, Department of the Environment and Energy, Canberra.

Payne, A and Schoknecht, N 2011, Land Systems of the Kimberley Region, Western Australia, Technical Bulletin No. 98, Perth, DAFWA.

Shepherd, D.P, Beeston, G.R, and Hopkins, A.J.M 2002, Native Vegetation in Western Australia –Extent, Type and Status, Resource Management Technical Report 249, Department of Primary Industries and Regional Development.

Southgate, R., Paltridge, R. Masters, P, Nano, T. 2005. *An evaluation of transect, plot and aerial survey techniques to monitor the spatial pattern and status of the bilby (Macrotis lagotis) in the Tanami Desert*. Wildlife Research 32(1).

Southgate, R., Dziminski, M., Paltridge, R., Schubert, A., & Gaikhorst, G. (2018). Verifying bilby presence and the systematic sampling of wild populations using sign-based protocols – with notes on aerial and ground survey techniques and asserting absence. Journal of the Australian Mammal Society

Trudgen, M.E, 1988, A report on the Flora and Vegetation of the Port Kennedy Area, unpublished report prepared for Bowman Bishaw and Associates, West Perth.

Tyler & Doughty. 2009. Field Guide to Frogs of Western Australia. WA Museum.

Van Dyck, S. and Strahan R, 2008, The mammals of Australia. New Holland Publishers. Sydney.

Western Australian (WA) Herbarium 1998–, *FloraBase* – the Western Australian Flora, Biodiversity, Conservation and Attractions, retrieved March 2021, from http://florabase.dpaw.wa.gov.au/

Wilson, S., and Swan, J. 2017. A Complete Guide to the Reptiles of Australia. Hew Holland Publishers

Appendices

Appendix A Figures

Ardyaloon

Figure 1 Study and project area boundary

Figure 2 Ecological constraints

Figure 3 Land use and hydrological constraints

Figure 4 Sample locations and tracks

Figure 5 Vegetation types, condition and conservation listed flora

Figure 6 Fauna habitats

Beagle Bay

Figure 7 Study and project area boundary

Figure 8 Ecological constraints

Figure 9 Land use and hydrological constraints

Figure 10 Sample locations and tracks

Figure 11 Vegetation types, condition and conservation listed communities

Figure 12 Fauna habitats

Bidyadanga

Figure 13 Study and project area boundary

Figure 14 Ecological constraints

Figure 15 Land use and hydrological constraints

Figure 16 Sample locations and tracks

Figure 17 Vegetation types and condition

Figure 18 Fauna habitats

Djarindjin

Figure 19 Study and project area boundary

Figure 20 Ecological constraints

Figure 21 Land use and hydrological constraints

Figure 22 Sample locations and tracks

Figure 23 Vegetation types and condition

Figure 24 Fauna habitats



Paper Size ISO A3

0 2 4 6

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

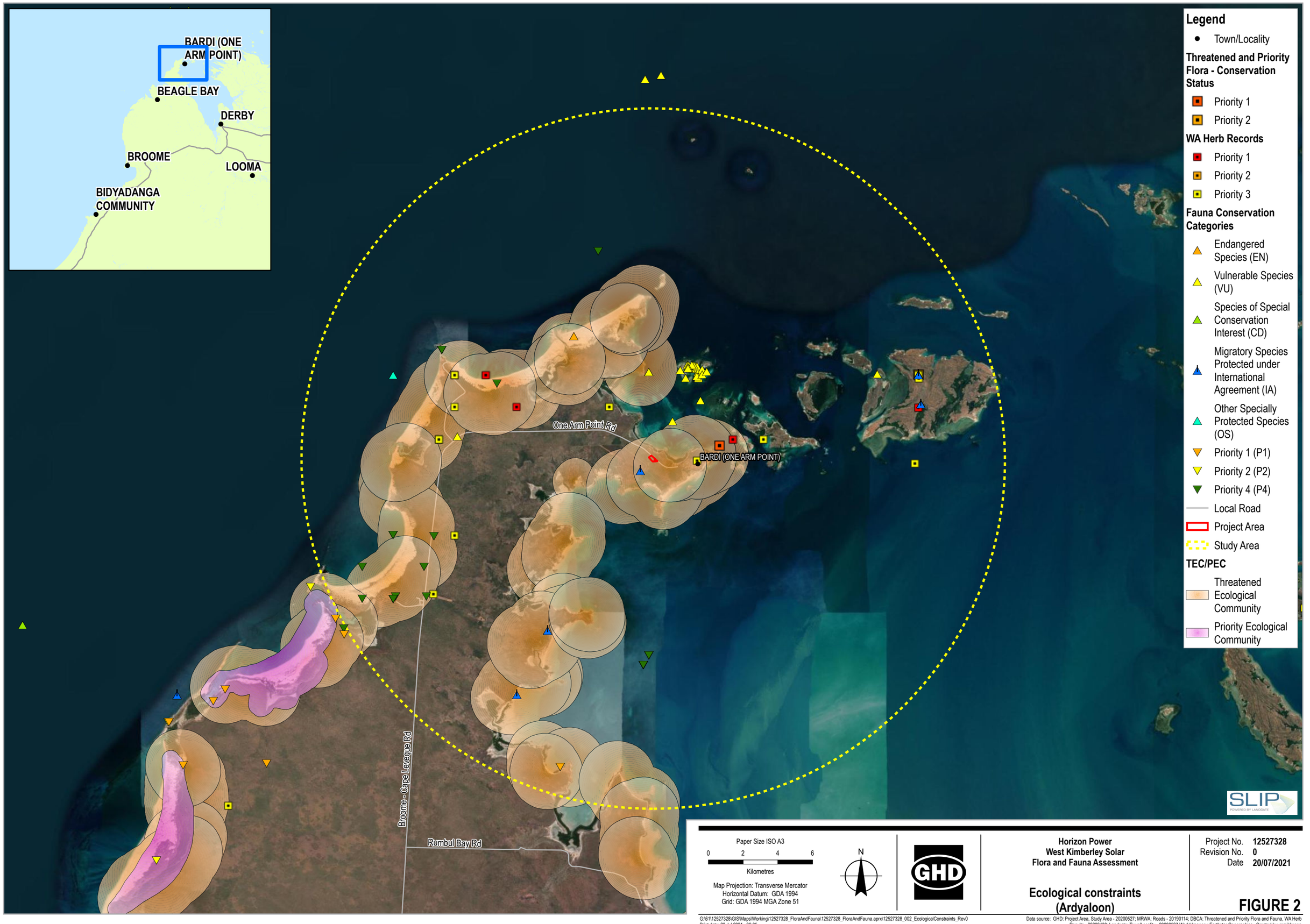
Study and project area boundary (Ardyaloon)

Project No. **12527328**
Revision No. **0**
Date **19/07/2021**

FIGURE 1

G:\61\12527328\GIS\Maps\Working\12527328_FloraAndFauna\12527328_FloraAndFauna.aprx\12527328_001_StudyArea_Rev0
Print date: 19 Jul 2021 - 14:42

Data source: World Imagery: Earthstar Geographics. GHD: Study Area - 20200527, Project Area - 20200527. Created by: mmikkonen



Paper Size ISO A3

0 2 4 6

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

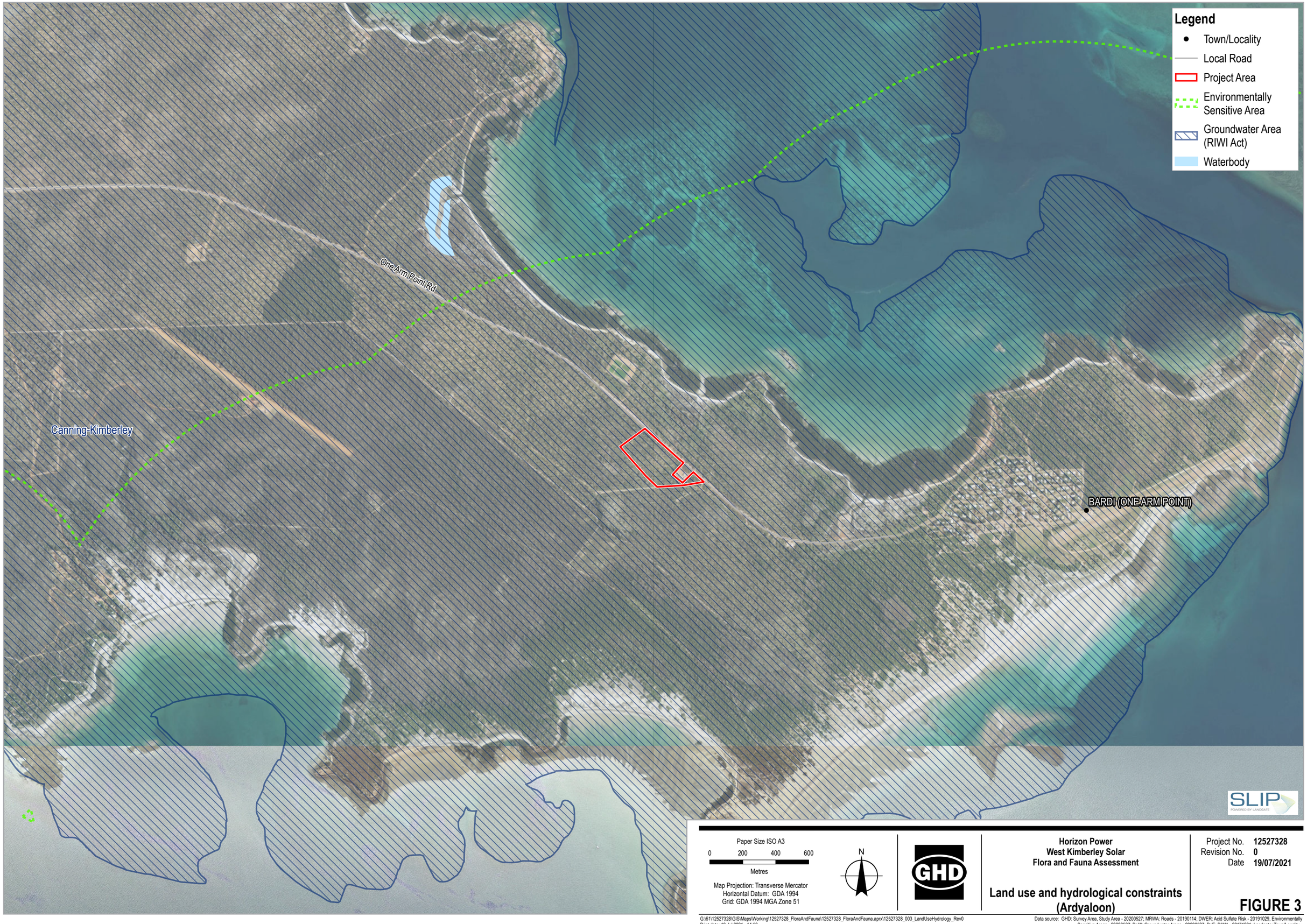
Ecological constraints (Ardyaloon)

Project No. **12527328**
Revision No. **0**
Date **20/07/2021**

FIGURE 2

G:\61\12527328\GIS\Maps\Working\12527328_FloraAndFauna\12527328_FloraAndFauna.aprx\12527328_002_EcologicalConstraints_Rev0
Print date: 20 Jul 2021 - 09:05

Data source: GHD: Project Area, Study Area - 20200527; MRWA: Roads - 20190114; DBCA: Threatened and Priority Flora and Fauna, WA Herb Results - 20200430; Landgate: Town/Locality - 20200527,World Imagery: Earthstar Geographics. Created by: mmikkonen



Paper Size ISO A3

0 200 400 600

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

Land use and hydrological constraints (Ardyaloon)

Project No. **12527328**
Revision No. **0**
Date **19/07/2021**

FIGURE 3

G:\61\12527328\GIS\Maps\Working\12527328_FloraAndFauna\12527328_FloraAndFauna.aprx\12527328_003_LandUseHydrology_Rev0
Print date: 19 Jul 2021 - 14:58

Data source: GHD: Survey Area, Study Area - 20200527; MRWA: Roads - 20190114; DWER: Acid Sulfate Risk - 20191029, Environmentally Sensitive Areas - 20200527; DoW: Groundwater Areas - 20200527; DoE: DIWA - 20171201; Landgate: Town/Locality - 20200527,Landgate_Subscription_Imagery\WANow: Landgate / SLIP. Created by: mmikkonen



Paper Size ISO A3

0 25 50 75

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

Sample locations and tracks (Ardyaloon)

Project No. **12527328**
Revision No. **0**
Date **19/07/2021**

FIGURE 4

G:\61\12527328\GIS\Maps\Working\12527328_FloraAndFauna\12527328_FloraAndFauna.aprx\12527328_004_SampleLocsTracks_Rev0
Print date: 19 Jul 2021 - 15:02

Data source: Landgate_Subscription_Imagery\WANow: Landgate / SLIP. GHD: Sample Locations - 20210507, Vegetation Survey - 20210506.
Created by: nmikkonen



Paper Size ISO A3

0 25 50 75

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

Vegetation types, condition and conservation listed flora (Ardyaloon)

Project No. **12527328**
Revision No. **0**
Date **19/07/2021**

FIGURE 5

G:\61\12527328\GIS\Maps\Working\12527328_FloraAndFauna\12527328_FloraAndFauna.aprx\12527328_005_VegTypeCondition_Rev0
Print date: 19 Jul 2021 - 15:15

Data source: Landgate_Subscription_Imagery\WANow: Landgate / SLIP. GHD: Sample Locations - 20210507, Vegetation Survey - 20210506. Created by: mmikkonen



Paper Size ISO A3

0 25 50 75

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

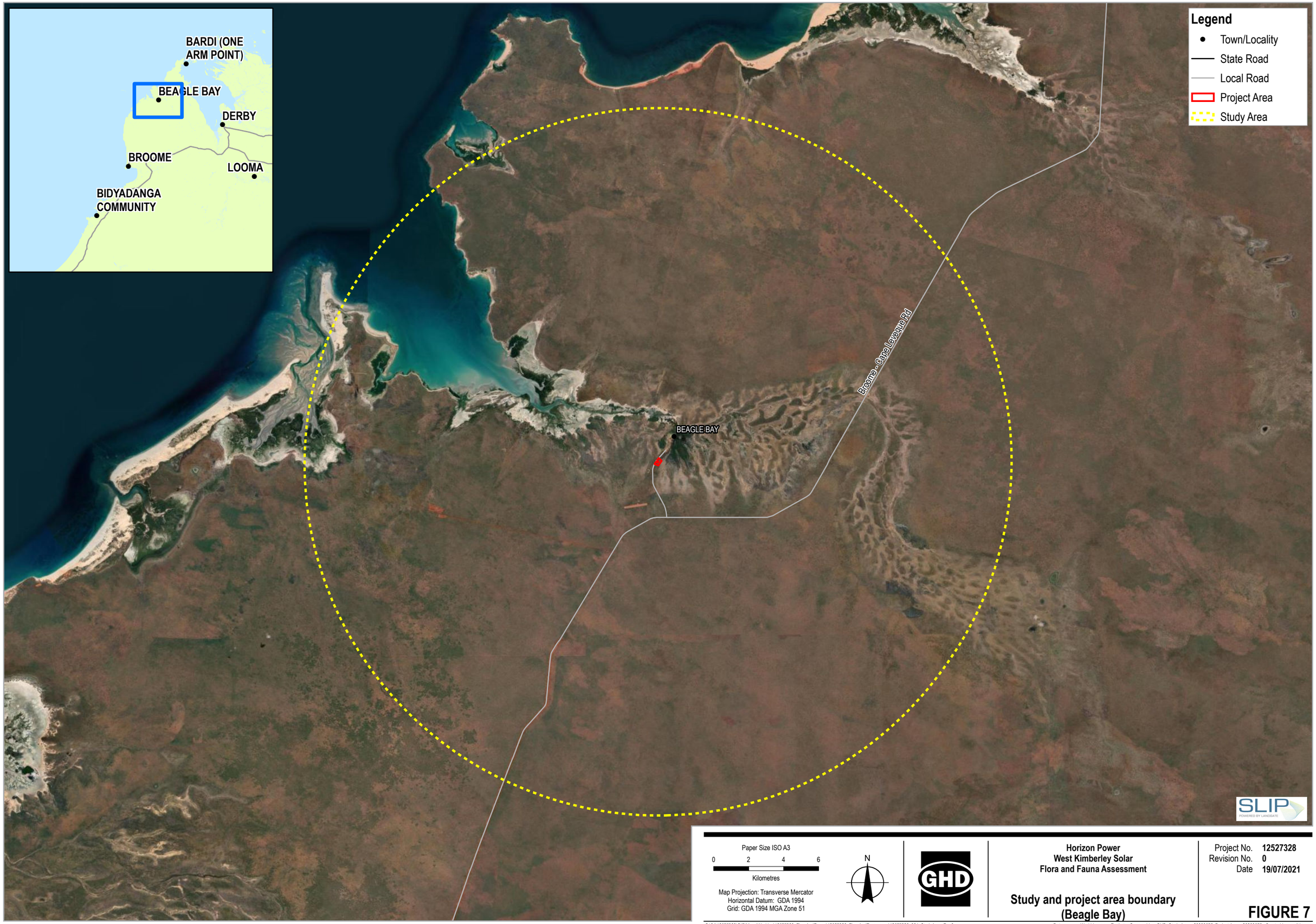
Fauna habitats (Ardyaloon)

Project No. **12527328**
Revision No. **0**
Date **19/07/2021**

FIGURE 6

G:\61\12527328\GIS\Maps\Working\12527328_FloraAndFauna\12527328_FloraAndFauna.aprx\12527328_006_FaunaHabitats_Rev0
Print date: 19 Jul 2021 - 15:24

Data source: Landgate_Subscription_Imagery\WANow: Landgate / SLIP. GHD: Sample Locations - 20210507, Vegetation Survey - 20210506. Created by: mmikkonen



Paper Size ISO A3

0 2 4 6

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

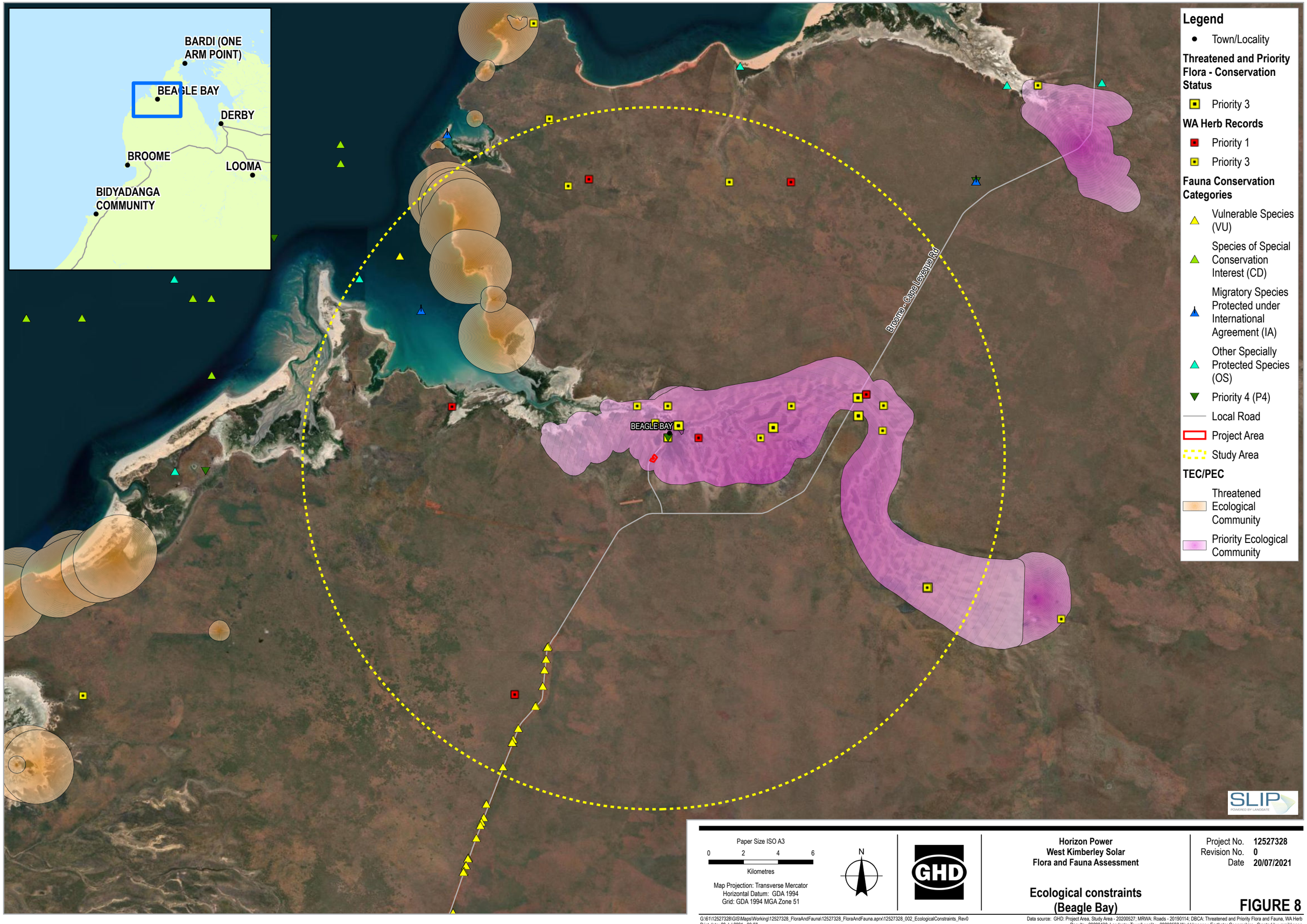
Study and project area boundary (Beagle Bay)

Project No. **12527328**
Revision No. **0**
Date **19/07/2021**

FIGURE 7

G:\61\12527328\GIS\Maps\Working\12527328_FloraAndFauna\12527328_FloraAndFauna.aprx\12527328_001_StudyArea_Rev0
Print date: 19 Jul 2021 - 15:32

Data source: World Imagery: Earthstar Geographics. GHD: Study Area - 20200527, Project Area - 20200527. Created by: mmikkonen



Paper Size ISO A3

0 2 4 6

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

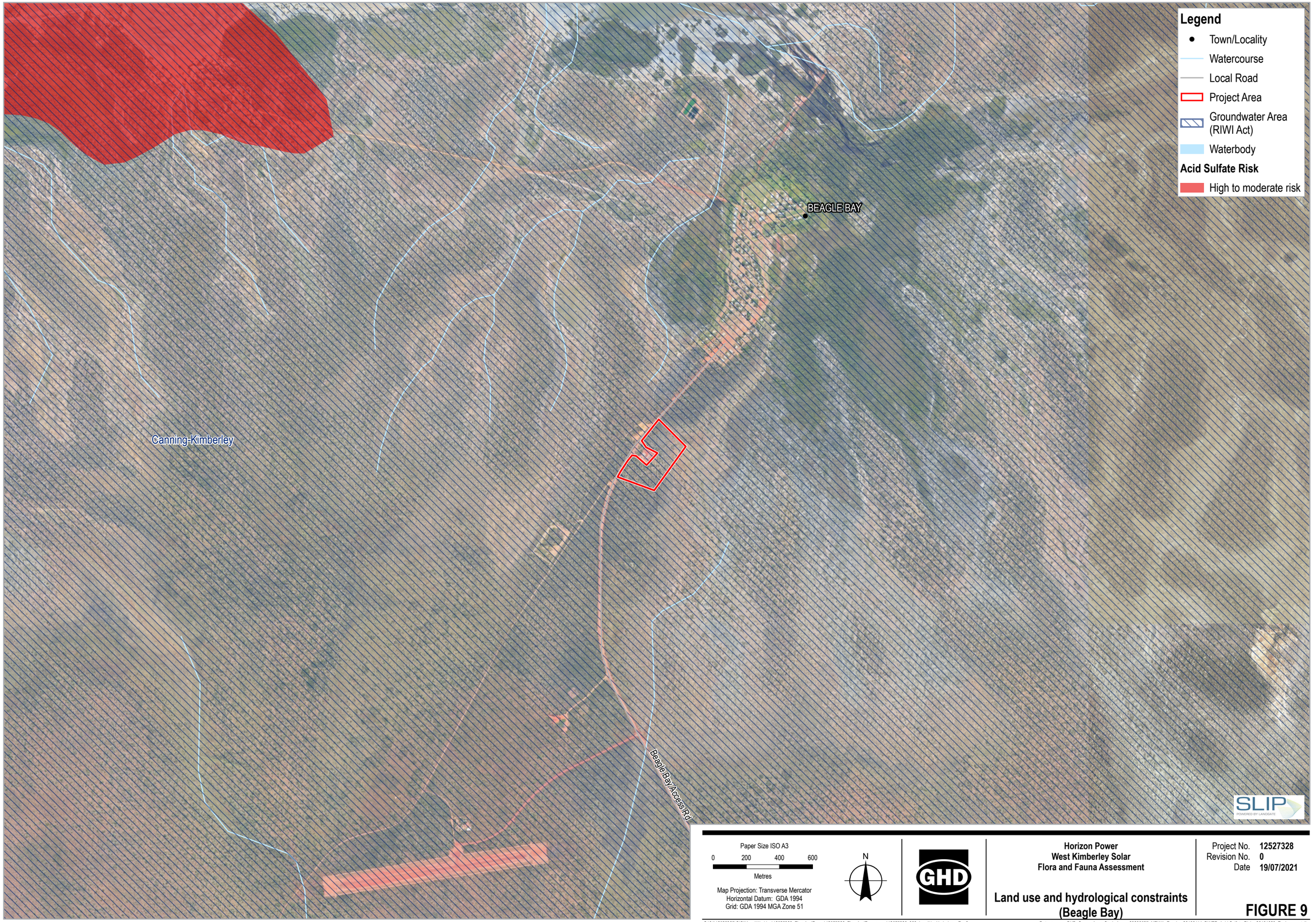
Ecological constraints (Beagle Bay)

Project No. **12527328**
Revision No. **0**
Date **20/07/2021**

FIGURE 8

G:\61\12527328\GIS\Maps\Working\12527328_FloraAndFauna\12527328_FloraAndFauna.aprx\12527328_002_EcologicalConstraints_Rev0
Print date: 20 Jul 2021 - 09:07

Data source: GHD: Project Area, Study Area - 20200527; MRWA: Roads - 20190114; DBCA: Threatened and Priority Flora and Fauna, WA Herb Results - 20200430; Landgate: Town/Locality - 20200527,World Imagery: Earthstar Geographics. Created by: mmikkonen



Paper Size ISO A3

0 200 400 600

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

Land use and hydrological constraints (Beagle Bay)

Project No. **12527328**
Revision No. **0**
Date **19/07/2021**

FIGURE 9

G:\61\12527328\GIS\Maps\Working\12527328_FloraAndFauna\12527328_FloraAndFauna.aprx\12527328_003_LandUseHydrology_Rev0
Print date: 19 Jul 2021 - 15:37

Data source: GHD: Survey Area, Study Area - 20200527; MRWA: Roads - 20190114; DWER: Acid Sulfate Risk - 20191029, Environmentally Sensitive Areas - 20200527; DoW: Groundwater Areas - 20200527; DoE: DIWA - 20171201; Landgate: Town/Locality - 20200527,Landgate_Subscription_Imagery\WANow: Landgate / SLIP. Created by: mmikkonen



Paper Size ISO A3

0 25 50 75

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

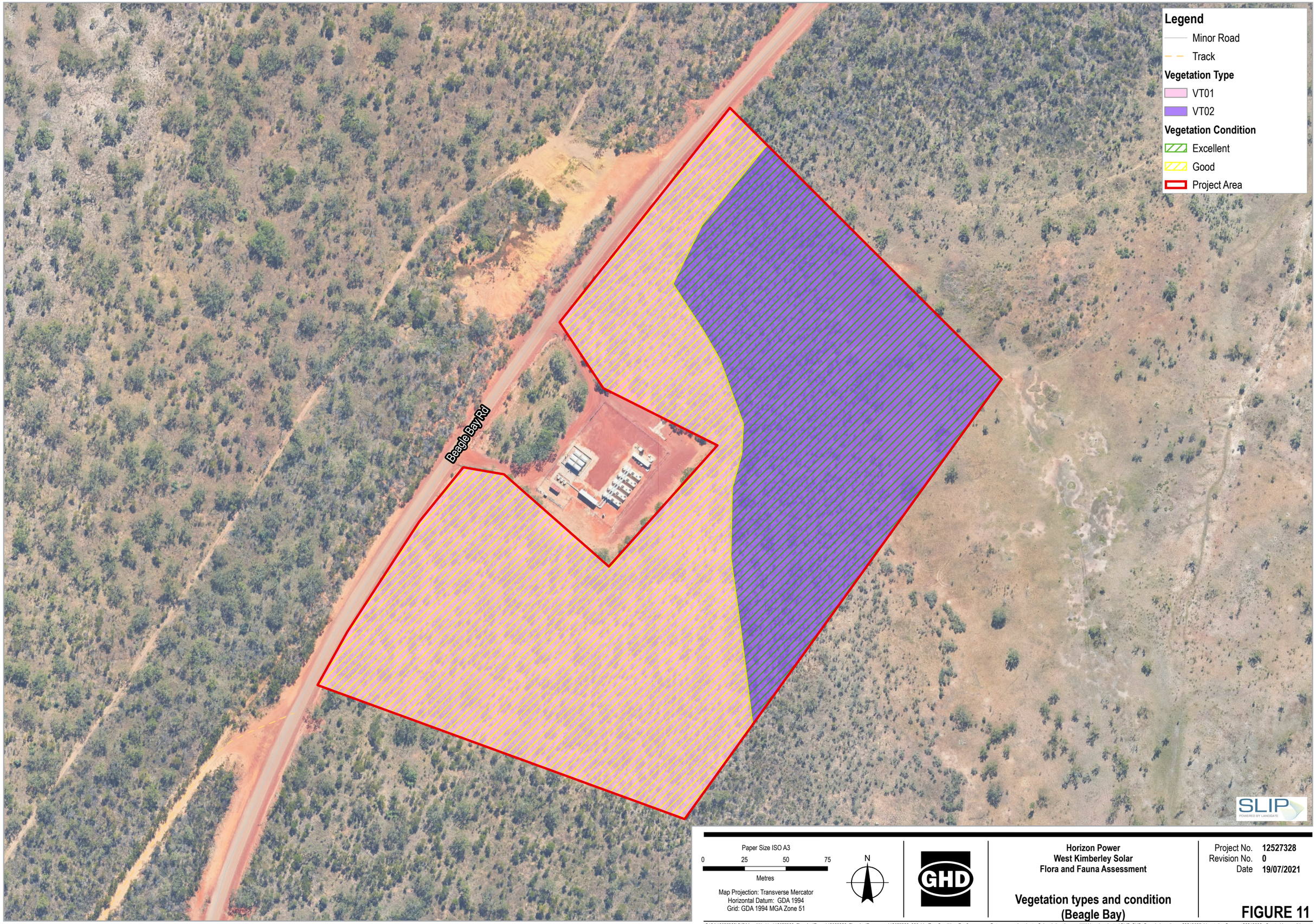
Sample locations and tracks (Beagle Bay)

Project No. **12527328**
Revision No. **0**
Date **19/07/2021**

FIGURE 10

G:\61\12527328\GIS\Maps\Working\12527328_FloraAndFauna\12527328_FloraAndFauna.aprx\12527328_004_SampleLocsTracks_Rev0
Print date: 19 Jul 2021 - 15:42

Data source: Landgate_Subscription_Imagery\WANow: Landgate / SLIP. GHD: Sample Locations - 20210507, Vegetation Survey - 20210506.
Created by: mmikkonen



Paper Size ISO A3

0 25 50 75

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

Vegetation types and condition (Beagle Bay)

Project No. **12527328**
Revision No. **0**
Date **19/07/2021**

FIGURE 11

G:\61\12527328\GIS\Maps\Working\12527328_FloraAndFauna\12527328_FloraAndFauna.aprx\12527328_005_VegTypeCondition_Rev0
Print date: 19 Jul 2021 - 15:45

Data source: Landgate_Subscription_Imagery\WANow: Landgate / SLIP. GHD: Sample Locations - 20210507, Vegetation Survey - 20210506. Created by: mmikkonen



Paper Size ISO A3

0 25 50 75

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

Fauna habitats
(Beagle Bay)

Project No. **12527328**
Revision No. **0**
Date **19/07/2021**

FIGURE 12

G:\61\12527328\GIS\Maps\Working\12527328_FloraAndFauna\12527328_FloraAndFauna.aprx\12527328_006_FaunaHabitats_Rev0
Print date: 19 Jul 2021 - 15:47

Data source: Landgate_Subscription_Imagery\WANow: Landgate / SLIP. GHD: Sample Locations - 20210507, Vegetation Survey - 20210506. Created by: mmikkonen



Paper Size ISO A3

0 2 4 6

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

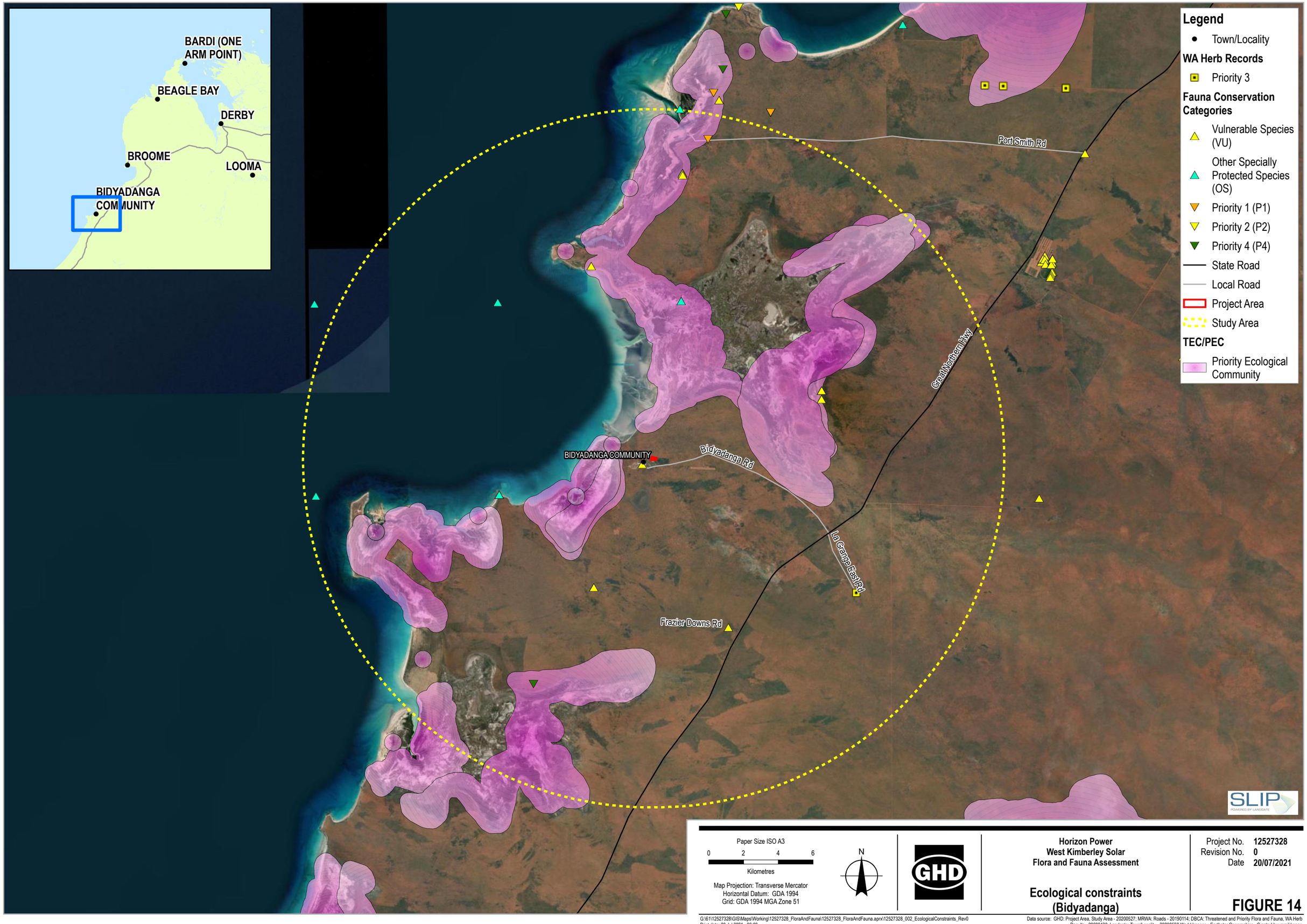
Study and project area boundary (Bidyadanga)

Project No. **12527328**
Revision No. **0**
Date **19/07/2021**

FIGURE 13

G:\61\12527328\GIS\Maps\Working\12527328_FloraAndFauna\12527328_FloraAndFauna.aprx\12527328_001_StudyArea_Rev0
Print date: 19 Jul 2021 - 15:49

Data source: World Imagery: Earthstar Geographics. GHD: Study Area - 20200527, Project Area - 20200527. Created by: mmikkonen



Paper Size ISO A3

0 2 4 6

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

Project No. **12527328**
Revision No. **0**
Date **20/07/2021**

Ecological constraints (Bidyadanga)

FIGURE 14

G:\61\12527328\GIS\Maps\Working\12527328_FloraAndFauna\12527328_FloraAndFauna.aprx\12527328_002_EcologicalConstraints_Rev0
Print date: 20 Jul 2021 - 09:09

Data source: GHD: Project Area, Study Area - 20200527; MRWA: Roads - 20190114; DBCA: Threatened and Priority Flora and Fauna, WA Herb Results - 20200430; Landgate: Town/Locality - 20200527,World Imagery: Earthstar Geographics. Created by: mmikkonen



Paper Size ISO A3

0 200 400 600

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

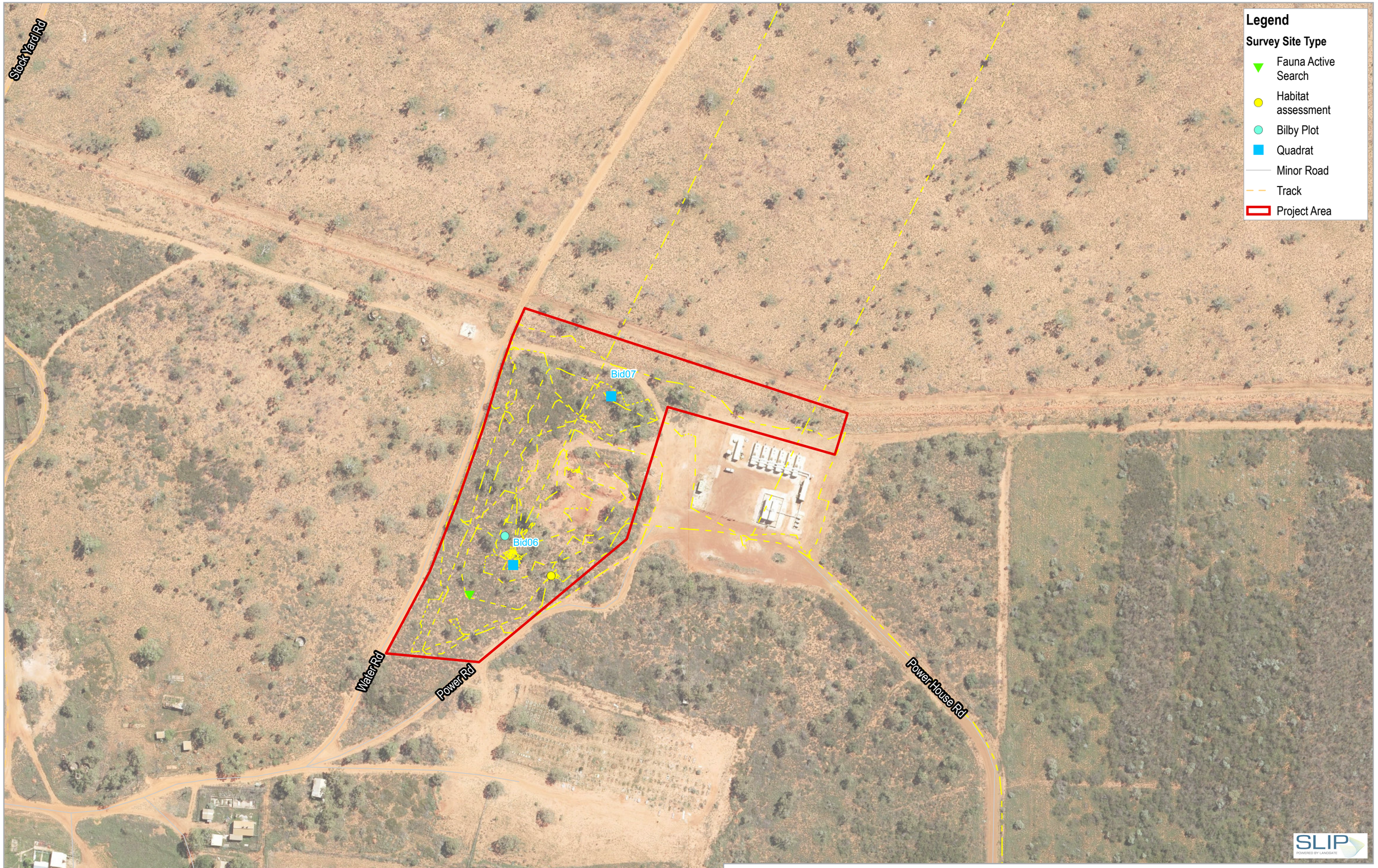
Project No. **12527328**
Revision No. **0**
Date **19/07/2021**

Land use and hydrological constraints (Bidyadanga)

FIGURE 15

G:\61\12527328\GIS\Maps\Working\12527328_FloraAndFauna\12527328_FloraAndFauna.aprx\12527328_003_LandUseHydrology_Rev0
Print date: 19 Jul 2021 - 16:28

Data source: GHD: Survey Area, Study Area - 20200527; MRWA: Roads - 20190114; DWER: Acid Sulfate Risk - 20191029, Environmentally Sensitive Areas - 20200527; DoW: Groundwater Areas - 20200527; DoE: DIWA - 20171201; Landgate: Town/Locality - 20200527,Landgate_Subscription_Imagery\WANow: Landgate / SLIP. Created by: mmikkonen



Paper Size ISO A3

0 25 50 75

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

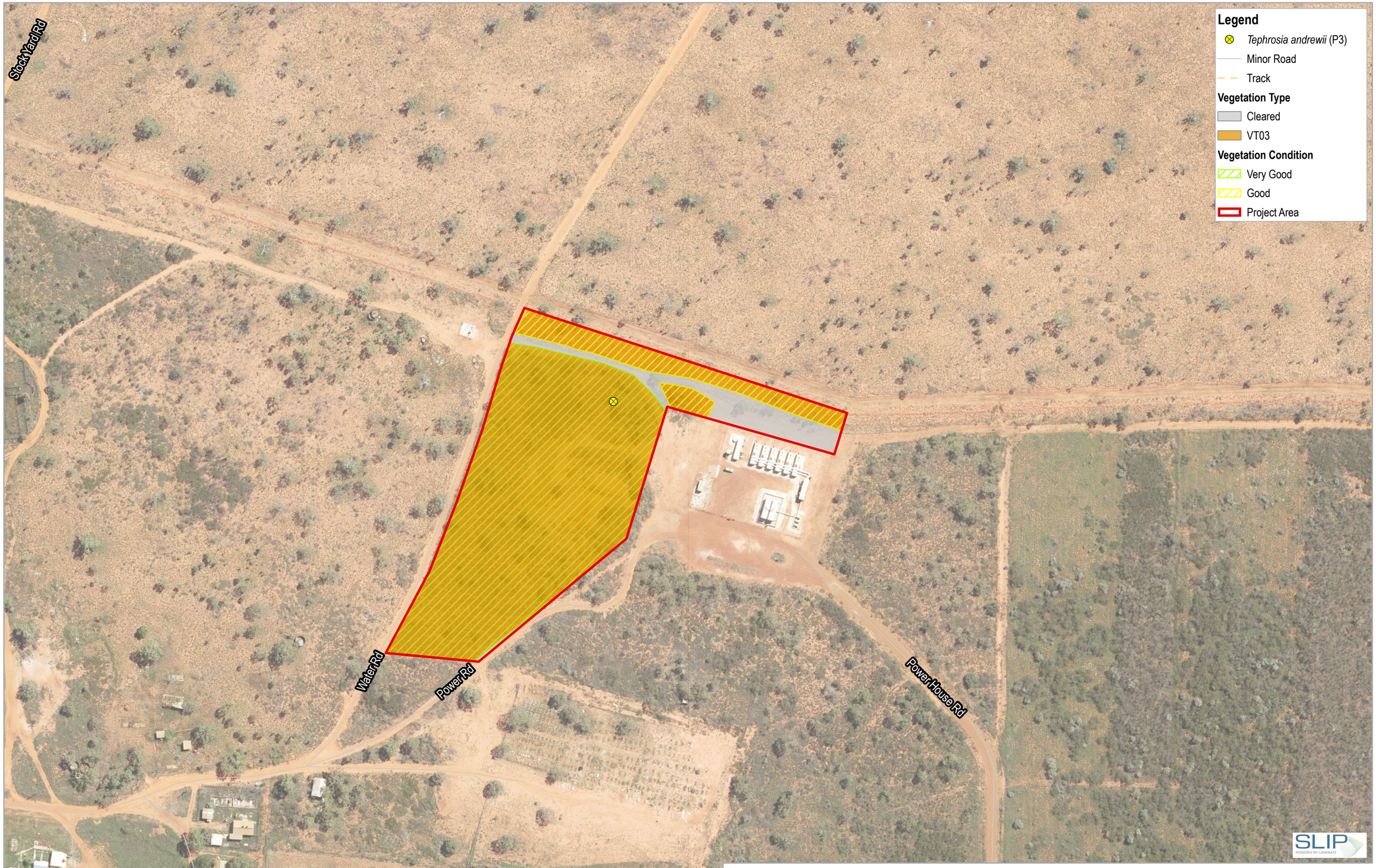
Sample locations and tracks (Bidyadanga)

Project No. **12527328**
Revision No. **0**
Date **19/07/2021**

FIGURE 16

G:\61\12527328\GIS\Maps\Working\12527328_FloraAndFauna\12527328_FloraAndFauna.aprx\12527328_004_SampleLocsTracks_Rev0
Print date: 19 Jul 2021 - 15:58

Data source: Landgate_Subscription_Imagery\WANow: Landgate / SLIP. GHD: Sample Locations - 20210507, Vegetation Survey - 20210506.
Created by: mmikkonen



Paper Size ISO A3

0 25 50 75

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

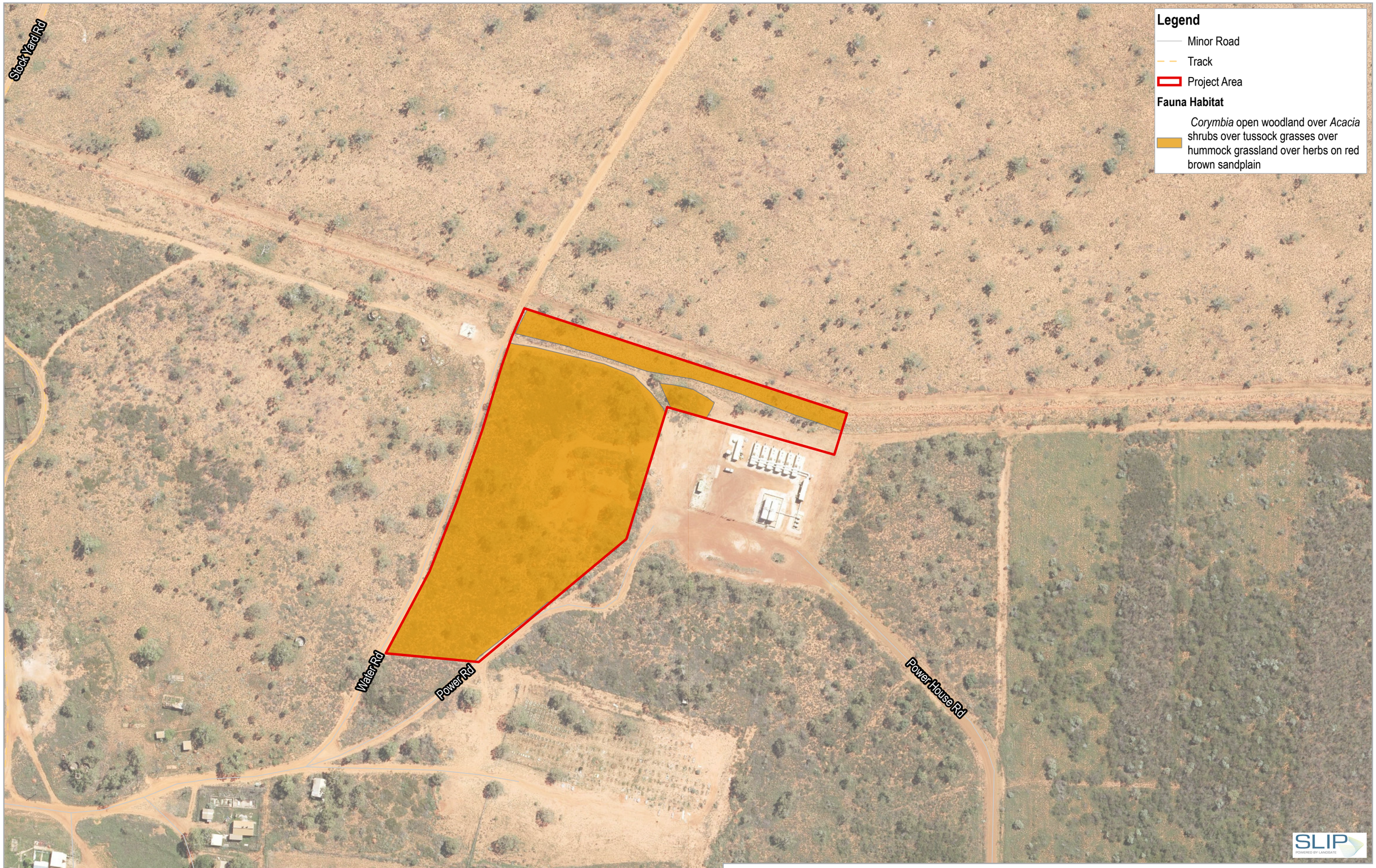
Vegetation types, condition and conservation listed flora (Bidyadanga)

Project No. **12527328**
Revision No. **0**
Date **19/07/2021**

FIGURE 17

G:\61\12527328\GIS\Maps\Working\12527328_FloraAndFauna\12527328_FloraAndFauna.aprx\12527328_005_VegTypeCondition_Rev0
Print date: 19 Jul 2021 - 16:21

Data source: Landgate_Subscription_Imagery\WANow: Landgate / SLIP. GHD: Sample Locations - 20210507, Vegetation Survey - 20210506. Created by: mmikkonen



Paper Size ISO A3

0 25 50 75

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

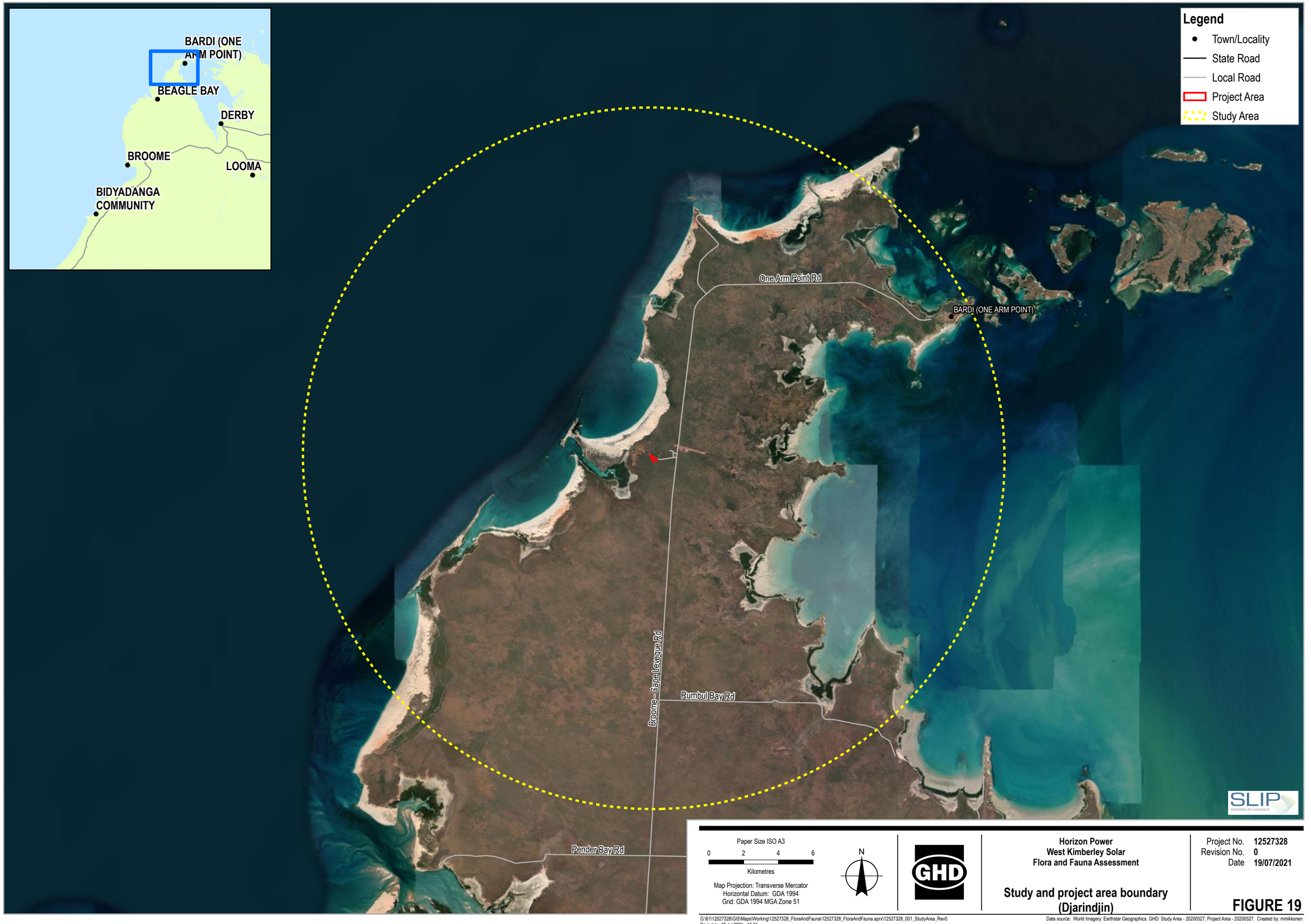
Fauna habitats (Bidyadanga)

Project No. **12527328**
Revision No. **0**
Date **19/07/2021**

FIGURE 18

G:\61\12527328\GIS\Maps\Working\12527328_FloraAndFauna\12527328_FloraAndFauna.aprx\12527328_006_FaunaHabitats_Rev0
Print date: 19 Jul 2021 - 16:30

Data source: Landgate_Subscription_Imagery\WANow: Landgate / SLIP. GHD: Sample Locations - 20210507, Vegetation Survey - 20210506. Created by: mmikkonen



Paper Size ISO A3

0 2 4 6

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

Study and project area boundary (Djarindjin)

Project No. **12527328**
Revision No. **0**
Date **19/07/2021**

FIGURE 19

G:\61\12527328\GIS\Maps\Working\12527328_FloraAndFauna\12527328_FloraAndFauna.aprx\12527328_001_StudyArea_Rev0
Print date: 19 Jul 2021 - 16:35

Data source: World Imagery: Earthstar Geographics. GHD: Study Area - 20200527, Project Area - 20200527. Created by: mmikkonen



One Arm Point Rd

BARDI (ONE ARM POINT)

Broome - Cape Leveque Rd

Rumbul Bay Rd

Pender Bay Rd

Legend

- Town/Locality

Threatened and Priority Flora - Conservation Status

- Priority 1
- Priority 2

WA Herb Records

- Priority 1
- Priority 2
- Priority 3

Fauna Conservation Categories

- Endangered Species (EN)
- Vulnerable Species (VU)
- Species of Special Conservation Interest (CD)
- Migratory Species Protected under International Agreement (IA)
- Other Specially Protected Species (OS)
- Priority 1 (P1)
- Priority 2 (P2)
- Priority 4 (P4)
- Local Road
- Project Area
- Study Area

TEC/PEC

- Threatened Ecological Community
- Priority Ecological Community

SLIP POWERED BY LANDGATE

Paper Size ISO A3

0 2 4 6

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

Ecological constraints (Djarindjin)

Project No. **12527328**
Revision No. **0**
Date **20/07/2021**

FIGURE 20

G:\61\12527328\GIS\Maps\Working\12527328_FloraAndFauna\12527328_FloraAndFauna.aprx\12527328_002_EcologicalConstraints_Rev0
Print date: 20 Jul 2021 - 09:11

Data source: GHD: Project Area, Study Area - 20200527; MRWA: Roads - 20190114; DBCA: Threatened and Priority Flora and Fauna, WA Herb Results - 20200430; Landgate: Town/Locality - 20200527,World Imagery: Earthstar Geographics. Created by: mmikkonen



Paper Size ISO A3

0 200 400 600

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

Project No. **12527328**
Revision No. **0**
Date **20/07/2021**

Land use and hydrological constraints (Djarindjin)

FIGURE 21

G:\61\12527328\GIS\Maps\Working\12527328_FloraAndFauna\12527328_FloraAndFauna.aprx\12527328_003_LandUseHydrology_Rev0
Print date: 20 Jul 2021 - 09:48

Data source: GHD: Survey Area, Study Area - 20200527; MRWA: Roads - 20190114; DWER: Acid Sulfate Risk - 20191029, Environmentally Sensitive Areas - 20200527; DoW: Groundwater Areas - 20200527; DoE: DIWA - 20171201; Landgate: Town/Locality - 20200527,Landgate_Subscription_Imagery\WANow: Landgate / SLIP. Created by: mmikkonen



Paper Size ISO A3

0 25 50 75

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

Sample locations and tracks (Djarindjin)

Project No. **12527328**
Revision No. **0**
Date **20/07/2021**

FIGURE 22

G:\61\12527328\GIS\Maps\Working\12527328_FloraAndFauna\12527328_FloraAndFauna.aprx\12527328_004_SampleLocsTracks_Rev0
Print date: 20 Jul 2021 - 09:55

Data source: Landgate_Subscription_Imagery\WANow: Landgate / SLIP. GHD: Sample Locations - 20210507, Vegetation Survey - 20210506.
Created by: mmikkonen



Paper Size ISO A3

0 25 50 75

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

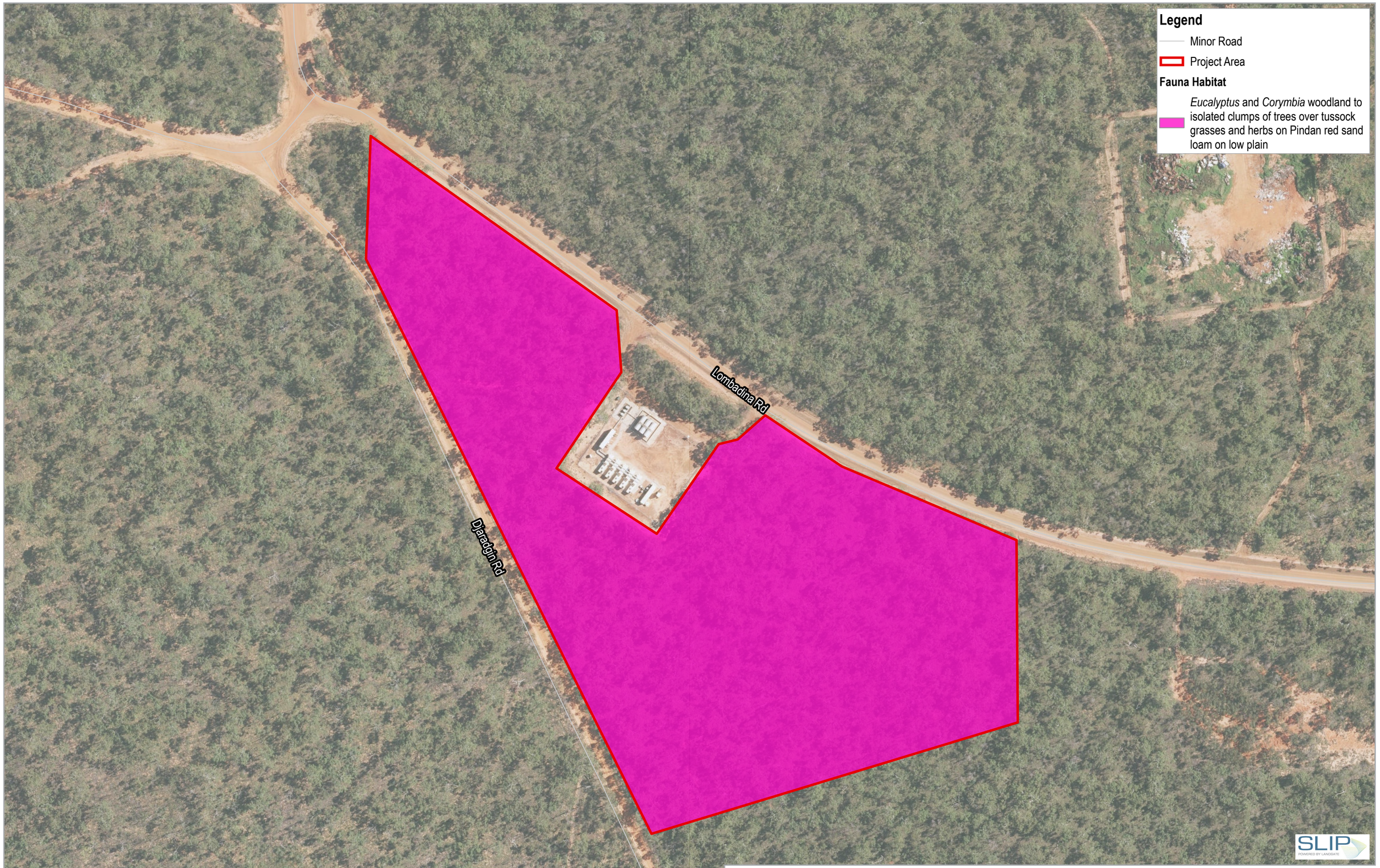
Vegetation types and condition (Djarindjin)

Project No. **12527328**
Revision No. **0**
Date **20/07/2021**

FIGURE 23

G:\61\12527328\GIS\Maps\Working\12527328_FloraAndFauna\12527328_FloraAndFauna.aprx\12527328_005_VegTypeCondition_Rev0
Print date: 20 Jul 2021 - 11:00

Data source: Landgate_Subscription_Imagery\WANow: Landgate / SLIP. GHD: Sample Locations - 20210507, Vegetation Survey - 20210506. Created by: mmikkonen



Paper Size ISO A3

0 25 50 75

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

N

GHD

Horizon Power
West Kimberley Solar
Flora and Fauna Assessment

Fauna habitats (Djarindjin)

Project No. **12527328**
Revision No. **0**
Date **20/07/2021**

FIGURE 24

G:\61\12527328\GIS\Maps\Working\12527328_FloraAndFauna\12527328_FloraAndFauna.aprx\12527328_006_FaunaHabitats_Rev0
Print date: 20 Jul 2021 - 11:05

Data source: Landgate_Subscription_Imagery\WANow: Landgate / SLIP. GHD: Sample Locations - 20210507, Vegetation Survey - 20210506. Created by: mmikkonen

GHD
Level 10
999 Hay Street
T: 61 8 6222 8222 F: 61 8 9463 6012 E: permail@ghd.com

© GHD 2021
This document is and shall remain the property of GHD. The document may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

12527328-47727-23/https://projectsportal.ghd.com/sites/pp18_05/horizonpowerwestkimb/ProjectDocs/12527328-REVC_West Kimberley Solar flora and fauna assessment.docx

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	J Collins, R Browne-Cooper	J Collins	On file	D Farrar	On file	20/7/2021

www.ghd.com

Appendix C
WEPL (2025) Fauna Survey Report

Djarindjin-Aalga Goolil Solar Project

Fauna Surveys 2025

Western Environmental Pty Ltd
(08) 6162 8980
PO Box 437, Leederville, WA 6903
enquiries@westenv.com.au
westenv.com.au

=

Djarindjin-Aalga Goolil Solar Project

Fauna Survey 2025

Report No:
A25.029_RPT_FSR_A
Issue Date:
5-Nov-2025
Status
FINAL

Prepared for:
Right Foot Forward
RFF Australia Pty Ltd
PO Box 88
Karratha WA 6714

Prepared by
Western Environmental Approvals Pty Ltd
Suite 3, Level 1, 1209 Hay Street West Perth
WA 6005
westenv.com.au

Internal Review

Author	Reviewed by	Approved by
		
Jack Rogers	Martin Henson	Dale Newsome
Experienced Scientist	Principal Botanist	Director
6-Oct-2025	**16-Oct-2025**	**4-Nov-2025**

Distribution Record

Copies	Document ID / Version	Date	Received by
1(E)	A25.9029_RPT_FSR_A	5-Nov-2025	RFF
1(E)	A25.9029_RPT_FSR_FINAL	10-Nov-2025	RFF

Statement of Limitations

Copyright Statement

© Western Environmental Approvals Pty Ltd (WEPL). All rights reserved. No part of this work may be produced in any material form or communicated by any means without the permission of the copyright owner. The unauthorised copying or reproduction of this report or any of its contents is prohibited.

Scope of Services

This environmental report ("this report") has been prepared for the sole benefit and exclusive use of the Client for the purpose for which it was prepared in accordance with the agreement between the Client and WEPL ("the Agreement"). However, in addressing the requirements of the Contaminated Sites Act 2003, an Accredited Contaminated Sites Auditor may be engaged by the Client to undertake review of this report, prior to its submission to DWER. The report shall be made available and can be relied upon for the purposes of the Contaminated Sites Act.

WEPL disclaims any and all liability with respect to any use of or reliance upon this report for any other purpose whatsoever.

In particular, it should be noted that this report is based on a scope of services defined by the Client, and is limited by budgetary and time constraints, the information supplied by the Client (and its agents) and, in some circumstances, access and/or site disturbance constraints.

The scope of services did not include any assessment of the title to or ownership of the properties, buildings and structures referred to in this report, or the application or interpretation of laws in the jurisdiction in which those properties, buildings and structures are located.

Reliance on Data

In preparing this report, WEPL has relied on data, surveys, analyses, designs, plans and other information provided by the Client (or its agents), other individuals and organisations ("the data").

Except as otherwise stated in this report, WEPL has not verified the accuracy or completeness of the data. WEPL does not represent or warrant that the data is true or accurate, and disclaims any and all responsibility or liability with respect to the use of the data.

To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in this report ("conclusions") are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data.

WEPL does not accept any responsibility or liability for any incorrect or inaccurate conclusions should any data be incorrect, inaccurate or incomplete or have been concealed, withheld, misrepresented or otherwise not fully disclosed to WEPL.

The conclusions must also be considered in light of the agreed scope of services (including any constraints or limitation therein) and the methods used to carry out those services, both of which are as stated or referred to in this report.

Environmental Conclusions

In accordance with the scope of services, WEPL has conducted environmental field monitoring and/or testing in the preparation of this report. The nature and extent of monitoring and/or testing conducted is described in this report.

On all sites, varying degrees of non-uniformity of vertical and horizontal conditions in media (soil, water, air, waste or other media as described in the report) are encountered. Hence no monitoring, common testing or sampling technique can eliminate the possibility that monitoring or testing results/samples are not totally representative of media conditions encountered. The conclusions are based on the data and the environmental field monitoring and/or testing actually undertaken, and are therefore merely indicative of the environmental condition of the site at the time of preparing this report, including the presence or otherwise of contaminants or emissions. It should be recognised that site conditions, including the extent and concentration of contaminants, can change.

Within the limitations imposed by the scope of services, the monitoring, testing, sampling and preparation of this report have been undertaken and performed in a professional manner, in accordance with generally accepted practices and using a degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. To the maximum extent permitted by law, no other warranty, express or implied, is made.

Report for Benefit of Client

This report is confidential. Neither the whole nor any part of this report, or any copy or extract thereof, may be disclosed or otherwise made available to any third party without the prior written approval of WEPL.

WEPL accepts no liability or responsibility whatsoever in respect of any use of or reliance upon this report, by any person or organisation who is not a party to the Agreement. Reliance on this report by any person who is not a party to the Agreement is expressly prohibited. Any representation in this report is made only to the parties to the Agreement.

WEPL assumes no responsibility and disclaims any and all liability to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in this report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in this report (including without limitation matters arising from any negligent act or omission of WEPL or for any loss or damage suffered by any other party using or relying on the matters dealt with or conclusions expressed in this report, even if WEPL has been advised of the possibility of such use or reliance).

Other parties should not rely on this report or the accuracy or completeness of any conclusions contained in this report, and should make their own enquiries and obtain independent advice in relation to such matters.

Other Limitations

This report is intended to be read in its entirety, and sections or parts of this report should therefore not be read and relied on out of context.

WEPL will not be liable to update or revise this report to take into account any events or circumstances or facts becoming apparent after the date of this report.

Executive Summary

Western Environmental Approvals Pty Ltd (WEPL) was commissioned by Right Foot Forward (RFF) to undertake a targeted fauna survey to support the proposed Aalga Goolil Djarindjin Community Power Project (the Project) within Lot 297 on Deposited Plan 83256 (the Survey Area).

The biological surveys included:

- A desktop assessment of relevant databases and previous surveys.
- Targeted surveys for Bilby and Northern Brushtail Possum.
- A basic fauna survey and Likelihood of Occurrence assessment for threatened or priority fauna.

Biological surveys were undertaken across four person days sampling fauna habitats from 5th August and 6th August 2025.

Basic Fauna Survey

Database searches identified 58 conservation listed fauna species that potentially occur, or habitat likely occurs within the Survey Area, comprising:

- Three species had a high likelihood of occurrence.
    - *Erythrura gouldiae* (Gouldian finch) P4/EN
    - *Falco peregrinus* (peregrine falcon) OS
    - *Tiliqua scincoides intermedia* (northern blue-tongued Skink) C
- Five species had a medium likelihood of occurrence.
    - *Ozimops cobourgianus* (northern coastal free-tailed bat) P1
    - *Macrotis lagotis* (bilby) VU
    - *Trichosurus vulpecula arnhemensis* (northern brushtail possum) P4
    - *Lerista separanda* (Dampier plain slider) P2
    - *Simoselaps minimus* (Dampier burrowing snake) P2
- Fifty species had a low likelihood of occurrence. These were primarily marine species and pelagic seabirds.

One fauna habitat type was described. The habitat comprises an open eucalypt woodland.

No species of conservation significance were recorded within the Survey Area.

Threatened Fauna Survey

No evidence or sightings of bilby or Northern Brushtail Possum were detected within the Survey Area. None of the habitat within the Survey Area is considered significant for bilby. The habitat within the Survey Area is considered supporting habitat for Northern Brushtail Possum.

Given that neither signs nor individuals of these two species were recorded during the targeted survey it is considered that they do not utilise the Survey Area.

Table of Contents

1. Introduction 9
1.1 Project Background 9
1.2 Location 9
1.3 Objectives and Scope of Work 9
1.4 Relevant Legislation and Guidance 12
1.5 Survey Limitations and Constraints 12
2. Existing Environment 16
2.1 Climate and Rainfall 16
2.2 Interim Biogeographic Regionalisation for Australia 17
2.3 Geology and Soils 17
2.3.1 Geology systems 17
2.3.2 Soil Landscape Mapping 17
2.4 Pre-European Vegetation 19
2.4.1 Vegetation Association Mapping 19
2.5 Environmentally Sensitive Areas 21
2.6 Wetlands and Hydrology 21
3. Methodology 24
3.1 Desktop Assessment 24
3.1.1 Database Searches 24
3.1.2 Likelihood of Occurrence 24
3.2 Basic Fauna Survey 26
3.2.1 Fauna Habitat Type Assessment 26

3.2.2 Fauna Taxonomy 26
3.2.3 Targeted Transect Searches for Bilby and NBP 28
4. Results 29
4.1 Fauna Desktop Assessment 29
4.1.1 Fauna assemblage 29
4.1.2 Fauna likelihood of Occurrence 29
4.2 Fauna Field Survey 32
4.2.1 Fauna Habitat Types 32
4.2.2 Threatened and Priority Fauna 35
5. Discussion 40
5.1 Fauna Habitat Significance 40
5.2 Threatened Fauna Survey 41
References 42

Tables

Table 1: Limitations and Constraints of the Flora, Vegetation and Fauna Survey 13
Table 2: Geology Systems Intersecting the Survey Area (DPIRD-027) 17
Table 3: Soil Systems Intersecting the Survey Area (DPIRD-017) 17
Table 4: Pre-European Vegetation Intersecting the Survey Area (DPIRD-006) 19
Table 5: Pre-European Vegetation Association Representation 19
Table 6: Database Searches 24
Table 7: Likelihood of Occurrence Criteria 24
Table 8: Fauna Habitat Type Description within the Survey Area. 33
Table 9: Threatened and Priority Fauna 36
Table 10: Summary of Habitat Values 41

Figures

Figure 1: Survey Area 11
Figure 2: Survey Effort 15
Figure 3: Geology and Soils 18

Figure 4: Pre-European Vegetation Types 20
Figure 5: Environmentally Sensitive Areas, Conservation Estate and Bush Forever 22
Figure 6: Surface Water Features 23
Figure 7: DBCA Database Fauna Search Results 31
Figure 8: Fauna Habitat Types and Conservation Significant Fauna Observations 39

Appendices

Appendix A Legislation
Appendix B Definitions and Criteria
Appendix C Fauna Database Search Results and Likelihood of Occurrence

1. Introduction

1.1 Project Background

Western Environmental Approvals Pty Ltd (WEPL) was commissioned by Right Foot Forward (RFF) to undertake a targeted fauna survey to support the proposed Aalga Goolil Djarindjin Community Power Project (the Project) within Lot 297 on Deposited Plan 83256 (the Survey Area).

A previous fauna survey was undertaken in 2023 by GHD on behalf of Horizon Power which covers a portion of the current Survey Area. In WEPL's recent experience in the Broome region, regulators have flagged survey deficiencies for greater bilby (hereby referred to as bilby) and northern brushtail possum (hereby referred to as NBP). Deficiencies cited have been:

- Currency of bilby surveys: Surveys several years ago are not considered suitable to accurately identify current quality and availability of the bilby's resources as well as the activity, distribution and status of the bilby's breeding burrows within the proposed action area.
- Method: Targeted surveys for bilby via plot based and widely spaced transect searches not being of sufficient detail to satisfy guidelines such as the *Survey Guidelines for Australia's Threatened Mammals* (DSEWPaC, 2011).
- Assessment by habitat mapping alone: Targeted surveys for northern brushtail possum not being of sufficient detail to satisfy guidelines such as the *Survey Guidelines for Australia's Threatened Mammals* (DSEWPaC, 2011). Assessments undertaken by habitat mapping alone are not considered sufficient.

1.2 Location

The Survey Area is located within the Djarindjin Community, at the intersection of Djarindjin and Lombadina Roads and Chile Creek Road on the Dampier Peninsula. The Survey Area is located 190 km northwest of the town of Broome in the west of the Kimberley region. The Survey Area is 7.6 hectares in total. WEPL understand that Aalga Goolil Djarindjin Community Power Pty Ltd will be the developer and owner of the Project.

1.3 Objectives and Scope of Work

The objective of the survey was to delineate key fauna values as well as determine the value of the Survey Area to support bilby (*Macrotis lagotis*) and NBP (*Trichosurus vulpecula arnhemensis*).

The scope of work included:

- Desktop assessment of State and Commonwealth databases and other sources.

- Basic fauna survey consistent with Environmental Protection Authority (EPA) Fauna Survey Technical Guidance. *Technical Guidance - Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA, 2020)

- Targeted bilby survey consistent with the *Survey guidelines for Australia's Threatened Mammals* (DSEWPaC, 2011), and the Department of Biodiversity, Conservation and Attractions' *Guidelines for survey to detect the presence of bilbies, and assess the importance of habitat in Western Australia* (DBCA, 2017)

- Targeted NBP survey consistent with the *Survey guidelines for Australia's threatened mammals* (DSEWPaC, 2011).

- Technical report including the results of the desktop assessment.

This report presents the results of the desktop assessment and field survey undertaken to support the above objectives.







Figure 1: Survey Area

N

0 50 100 150 m

SCALE: 1:2,800	SHEET SIZE: A3 COLOUR
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	
DATA SOURCE: LANDGATE AERIAL IMAGERY NOW	

PROJECT/REPORT NAME: Dajarindjin-Aalga Goorlil Solar Project- Fauna Surveys 2025 Lombadina		
CLIENT: RFF		
PROJECT NUMBER: A25.029	VERSION: 0	
DRAWN BY / REVIEWED BY: JP/JR	DATE: 16/9/2025	

Legend

- Survey Area
- Cadastre (No Attributes) (LGATE-001)

No	Description	Drawn	Approved	Date
A	Original issue	JP	JR	16/9/2025

NOTES:

Cadastral boundary (LGATE-002). Base map ESRI Topo. Townsites (LGATE-248).

WESTERN ENVIRONMENTAL

Western Environmental Pty Ltd
08 6244 2310 | enquiries@westenv.com.au
Level 3/25 Prowse St, West Perth WA 6005
westenv.com.au

G:\GIS\Project Data\2025\A25.029\3. Projects\4. Fauna Solar\A25.029_FaunaSolar.qgz

COPYRIGHT: This document is and shall remain the property of The Client. This document may only be used for the purpose for which it was commissioned and in accordance with the terms of engagement. The Client does not hold any responsibility for the misuse of this document

Designed and Automated by AC

1.4 Relevant Legislation and Guidance

This environmental assessment was conducted in accordance with Commonwealth and State legislation and guidelines:

- *Commonwealth Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act).
- *Western Australian Environmental Protection Act* 1986 (EP Act).
- *Western Australian Biodiversity Conservation Act* 2016 (BC Act).
- *Western Australian Biodiversity Conservation Regulations* 2018.
- Department of the Environment (DotE). (2013). *Matters of National Environmental Significance. Significant Impact Guidelines 1.1 - Environment Protection and Biodiversity Conservation Act* 1999.
- Department of Sustainability, Environment, Population and Communities (DSEWPaC). (2011). *Survey Guidelines for Australia's Threatened Mammals*. Canberra, Australia.
- Department of Agriculture, Water and the Environment (DAWE). (2021) *Conservation Advice - Trichosurus vulpecula arnhemensis Northern Brushtail Possum*.
- Department of Agriculture, Water and the Environment (DAWE) (2016) Conservation Advice - Macrotis lagotis - Greater Bilby.
- Department of the Environment Water Heritage and the Arts (DEWHA) (2010). *Survey Guidelines for Australia's Threatened Birds.*
- Department of Biodiversity, Conservation and Attractions (DBCA) (2017) *Guidelines for survey to detect the presence of bilbies, and assess the importance of habitat in Western Australia*
- Environmental Protection Authority (2020) *Terrestrial vertebrate fauna surveys for environmental impact assessment*. Known herein as the 'Fauna Survey Technical Guidance'.

A short description of key legislation is provided in Appendix A. Other definitions, including species and ecological community conservation categories, are provided in Appendix B.

1.5 Survey Limitations and Constraints

Limitations and constraints of the fauna survey as outlined in the Fauna Survey Technical Guidance (EPA, 2020) are detailed below in Table 1.

Table 1: Limitations and Constraints of the Flora, Vegetation and Fauna Survey

Possible Limitation	Degree of Limitation (Significant, Moderate or Negligible)	Potential Constraints on Survey Outcomes
Survey Level/ Scope	Negligible	The Targeted bilby and NBP surveys and basic fauna survey is considered suitable based on species expected to be present and the extent and condition of vegetation/habitat present within the Survey Area. The level of information collected was suitable to provide information required to inform and support approvals and referrals.
Availability of contextual information at a regional and local scale	Negligible	All data required to complete the scope of works including regional and local contextual information was available. DBCA data was requested as part of the desktop assessment.
Site Access	Negligible	The entire Survey Area was readily accessed by vehicle and on foot.
Survey Intensity and Extent	Negligible	Suitable survey effort by experienced ecologists was applied. Survey effort included: Two person days for Targeted bilby, NBP and basic fauna survey. All planned Survey Areas were adequately sampled in line with the project scope of works. See Figure 2 for survey effort represented by tracklogs
Experience	Negligible	The ecologist leading the field survey (Sam Lostrom) has been conducting Targeted Fauna surveys in Western Australia for over 8 years. The second field ecologist the fauna field survey (Jack Rogers) has been conducting fauna targeted assessments in Western Australia as well as Targeted Ornithological Surveys in the UK, with over 4 years' experience. Back-office support was provided by senior ecologists who have worked in the region for over 10 years.
Timing, weather, season	Negligible	Bilby and NBP do not have hibernation periods within the Kimberly region, as such there is not a preferable season for surveying for these species. Bilby diggings, scat and burrows can persist in the environment for multiple years and as such timing is not considered a significant limitation to the Survey. The temperatures and weather experienced during the field survey was warm and dry (typically 28 ℃ in the day and 18 ℃ at night) not considered a limitation to the survey and did not affect the ability to record fauna or habitats.
Proportion of the fauna recorded and/or collected, and any identification issues	Negligible	A total of 18 vertebrate fauna species were recorded, including 2 introduced species. The number of species identified was considered good for this region. There were no other factors considered a limitation to the survey. Species sampling was in line with the Technical Guidance for a basic fauna survey.

Possible Limitation	Degree of Limitation (Significant, Moderate or Negligible)	Potential Constraints on Survey Outcomes
Mapping Reliability	Negligible	The entirety of the Survey Areas was traversed by foot and mapping reliability is considered high. Mapping accuracy and reliability was not considered a limitation.
Disturbances (fire, flood etc.)	Negligible	There was no evidence of clearing and some historical evidence of fire which is not considered a limitation to the field survey. However, post survey (before 3rd of September 2025) all vegetation within the Survey Area was burnt by a bushfire. This is not considered a limitation to the Survey as it occurred post Survey.

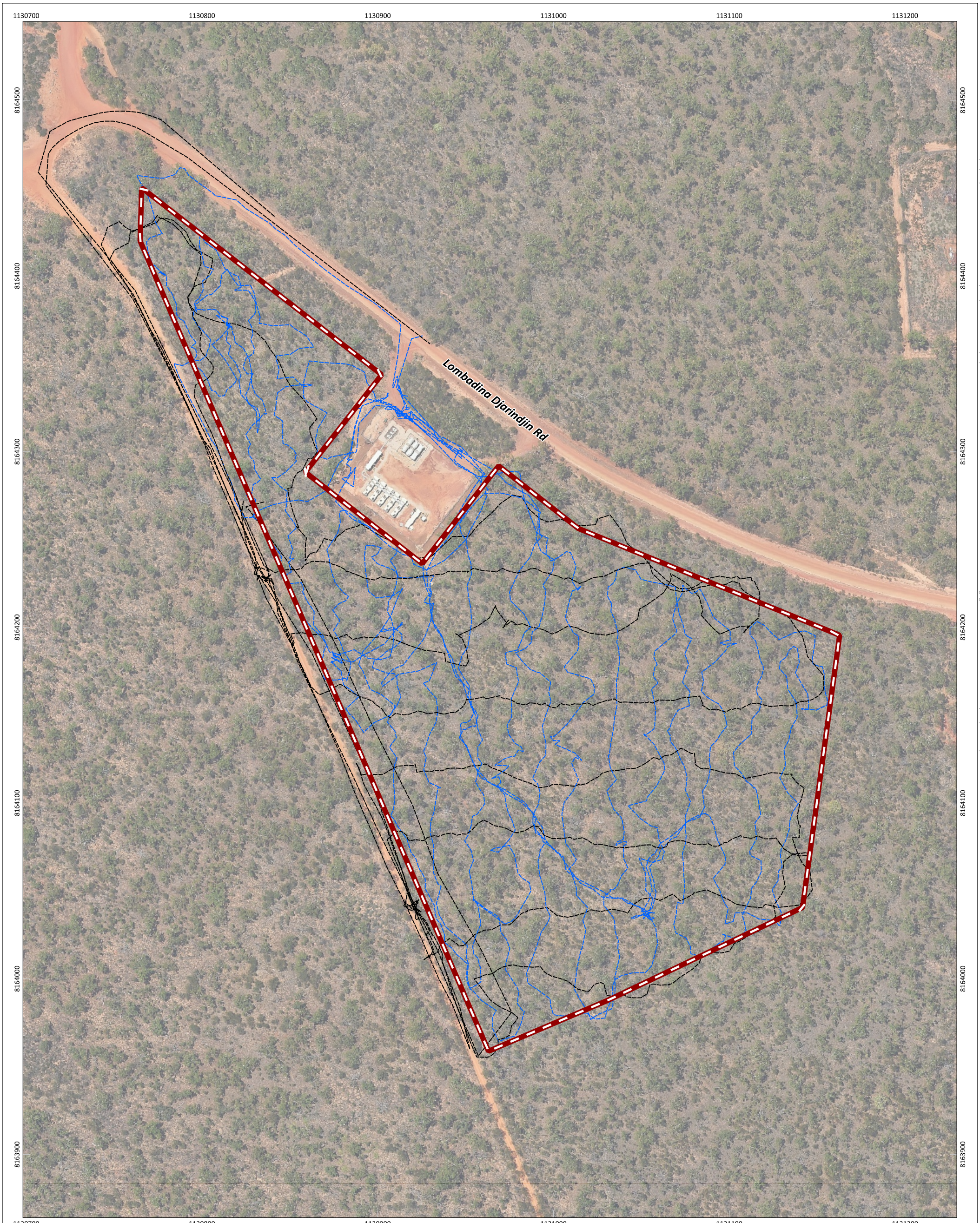


Figure 2: Survey Effort

0 15 30 45 60 m

N

PROJECT/REPORT NAME: Dajarindjin-Aalga Goorlil Solar Project- Fauna Surveys 2025 Lombadina		
SCALE: 1:2,000	SHEET SIZE: A3 COLOUR	CLIENT: RFF
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A25.029	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY NOW	DRAWN BY / REVIEWED BY: JP/JR	DATE: 18/9/2025

Legend

- Survey Area

Tracklog

- Daytime
- Nighttime

No	Description	Drawn	Approved	Date
A	Original issue	JP	JR	18/9/2025

NOTES:

Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

WESTERN ENVIRONMENTAL

Western Environmental Pty Ltd
08 6244 2310 | enquiries@westenv.com.au
Level 3/25 Prowse St, West Perth WA 6005
westenv.com.au

G:\GIS\Project Data\2025\A25.029\3. Projects\4. Fauna Solar\A25.029_FaunaSolar.qgz

COPYRIGHT: This document is and shall remain the property of The Client. This document may only be used for the purpose for which it was commissioned and in accordance with the terms of engagement. The Client does not hold any responsibility for the misuse of this document

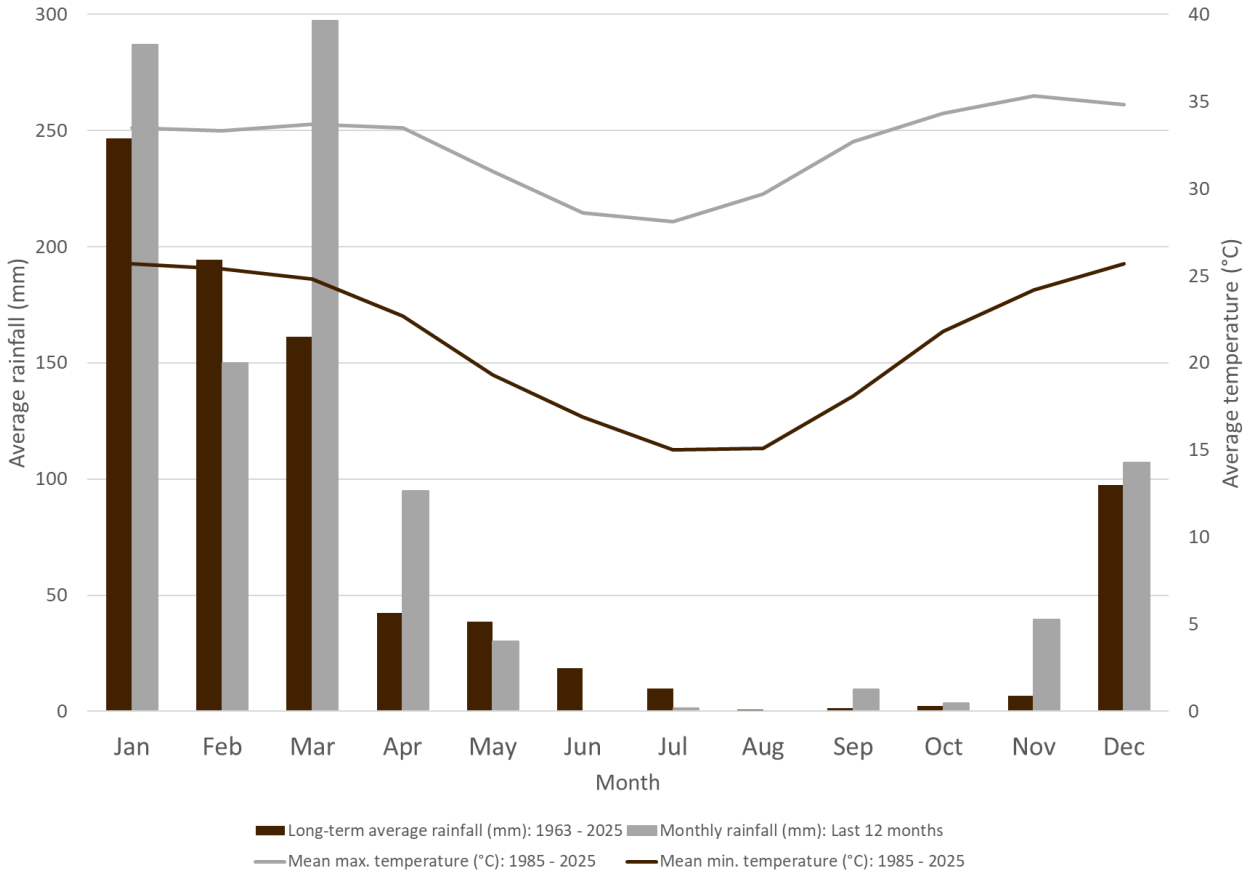
Designed and Automated by AC

2. Existing Environment

2.1 Climate and Rainfall

The Dampier Peninsula is characterized by a semi-arid climate which experiences warm/dry winters and hot/humid summers with occasional tropical cyclones in the summer months. The majority of rainfall occurs in the summer months followed by an average of five to six cooler months of low rainfall. The Bureau of Meteorology (BoM) Cygnet Bay Station (ID-003057) provides the closest and most consistent long term weather data for the site (1985-2025). Mean daily maximum temperatures ranges from 28.1 in June to 35.3 in November (BoM, 2025). Summary of daily temperature statistics below in Graph 1.

The mean annual rainfall for Cygnet Bay Bureau Station is 820.2 mm and in the 2024/2025 season presurvey was 1019.9 mm (199.7mm above average). Rainfall primarily falls during the months of October-April. Mean monthly rainfall ranges between 0.9 mm in August to 246.5 mm in January (BoM, 2025). Summary of monthly rainfall statistics below in Graph 1.



Graph 1: Long-term and Monthly Total Rainfall, Maximum and Minimum Temperatures for Cygnet Bay (ID-003057) (BOM, 2025)

2.2 Interim Biogeographic Regionalisation for Australia

The Interim Biogeographic Regionalisation of Australia (IBRA) divides Australia into 89 bioregions based on major biological, geographical and geological attributes. These bioregions are subdivided into 419 subregions as part of a refinement of the IBRA framework (DSEWPaC, 2012). The Survey Area occurs within the Dampier land Biogeographic Region, subregion Pindanland (DAL02).

2.3 Geology and Soils

2.3.1 Geology systems

The soil landscape mapping units by the Department of Primary Industries and Regional Development (DPIRD) (DPIRD-027) intersecting the Survey Areas are listed below in Table 2 and shown in Figure 3.

Table 2: Geology Systems Intersecting the Survey Area (DPIRD-027)

Mapping Unit Symbol	Map Unit Name	Description
335Ye	Yeeda system	Red sandplains supporting pindan vegetation with dense acacia shrubs, scattered bloodwood and grey box trees and curly spinifex and ribbon grass

2.3.2 Soil Landscape Mapping

Soil Landscape Mapping Zones by DPIRD (DPIRD-017) indicates that the Site is mapped as being within of the De Grey-Roebourne Lowlands Zone of the Pilbara soil-landscapes (Table 3).

Table 3: Soil Systems Intersecting the Survey Area (DPIRD-017)

Mapping Unit Zone	Map Unit Name	Description
335	Dampier Peninsula Sandplain Zone	Sandplains and dunes (with some sandy plateaux and coastal mudflats) on sedimentary rocks of the Canning Basin with Red deep sands and some Yellow sandy earths and Tidal soils.

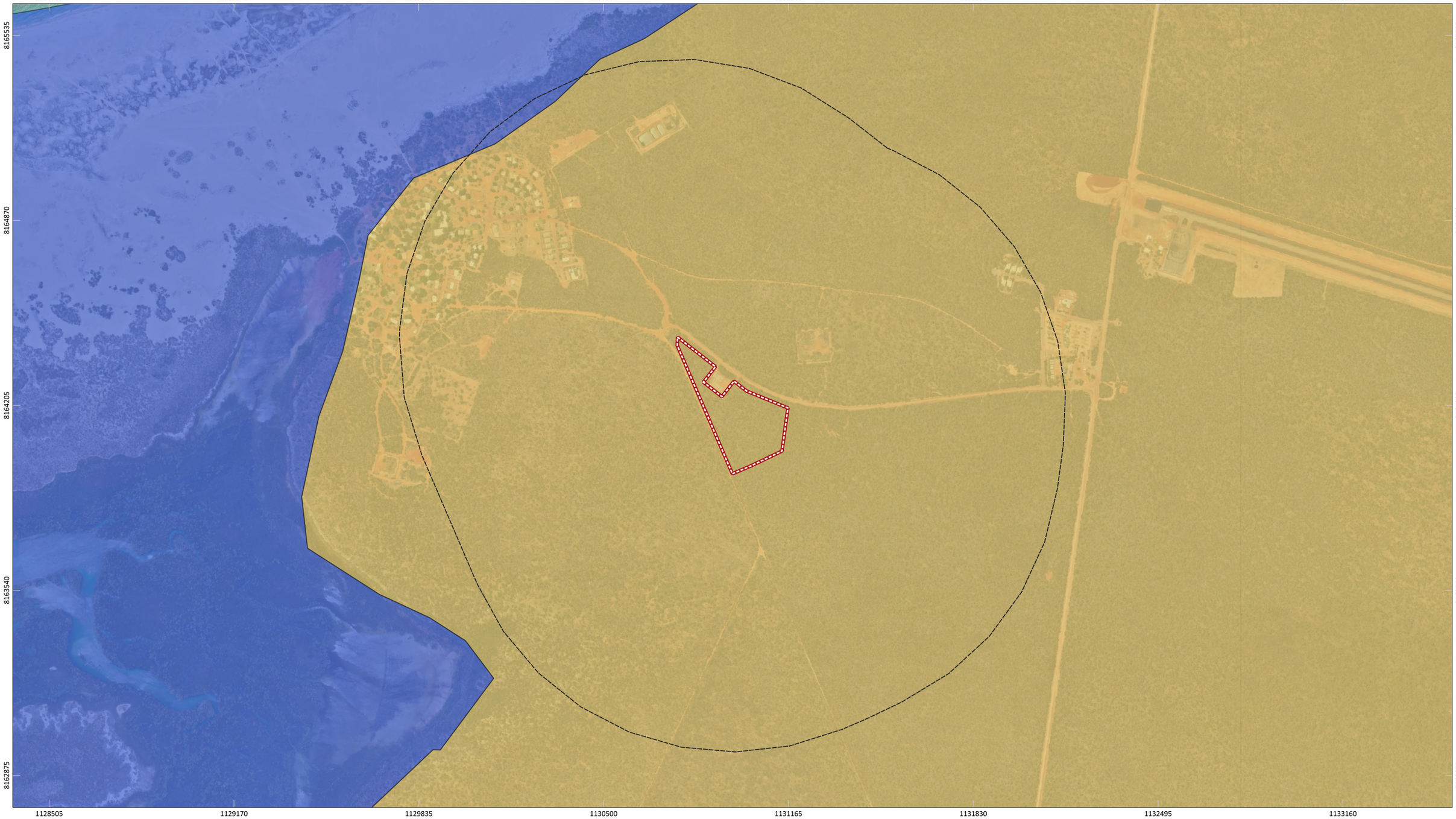


Figure 3: Geology and Soils

N

0 175 350 525 700 m

PROJECT/REPORT NAME: Dajarindjin-Aalga Goorlil Solar Project- Fauna Surveys 2025 Lombadina		
SCALE: 1:13,300	SHEET SIZE: A3 COLOUR	CLIENT: RFF
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A25.029	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY NOW	DRAWN BY / REVIEWED BY: JP / JR	DATE: 16/9/2025

Legend

- Survey Area
- 1km Buffer

Soil Landscape Mapping - Best Available (DPIRD-027)

- 335Cr_2
- 335Ye

No	Description	Drawn	Approved	Date
A	Original issue	JP	JR	16/9/2025

NOTES:

Cadastral boundary from LANDGATE 2022. UFID stands for Unique Identifier

WESTERN ENVIRONMENTAL

Western Environmental Pty Ltd
08 6244 2310 | enquiries@westenv.com.au
Level 3/25 Prowse St, West Perth WA 6005
westenv.com.au

G:\GIS\Project Data\2025\A25.029\3. Projects\4. Fauna Solar\A25.029_FaunaSolar.qgz

COPYRIGHT: This document is and shall remain the property of The Client. This document may only be used for the purpose for which it was commissioned and in accordance with the terms of engagement. The Client does not hold any responsibility for the misuse of this document

Designed and Automated by AC

2.4 Pre-European Vegetation

2.4.1 Vegetation Association Mapping

During the 1970s, John Beard and associates conducted a systematic survey of native vegetation, describing the vegetation systems in Western Australia at a scale of 1:250 000 in the south-west and at a scale of 1:1,000,000 in less developed areas (Beard, 1976).

Beard's mapping attempted to depict the native vegetation as it was presumed to be at the time of settlement and is known as the pre-European vegetation type and extent. Beard's vegetation maps are maintained in digital form by Department of Primary Industries and Resource Development (DPIRD), in the DPIRD-006 (2019) dataset. Extents are updated periodically by Department of Biodiversity, Conservation and Attractions (DBCA, 2019). Pre-European vegetation associations are shown in Figure 4 and summarised in Table 4.

Table 4: Pre-European Vegetation Intersecting the Survey Area (DPIRD-006)

Vegetation Type	Description
DAMPIERLAND_750	Acacia thicket with eucalypt woodland over spinifex, *Acacia tumida, Eucalyptus tectifica, Corymbia grandifolia, Triodia pungens, T. bitextura*

The pre-European vegetation associations identified as intersecting the Survey Areas and their pre-European and current extents are listed in Table 5 (DBCA, 2018).

Table 5: Pre-European Vegetation Association Representation

Vegetation Association	Original Extent (ha)	Current Extent (ha)	% Remaining	% Managed for Conservation
DAMPIERLAND_750	195,860.89	191,711.41	97.88	-

*Percentage managed for conservation not available.

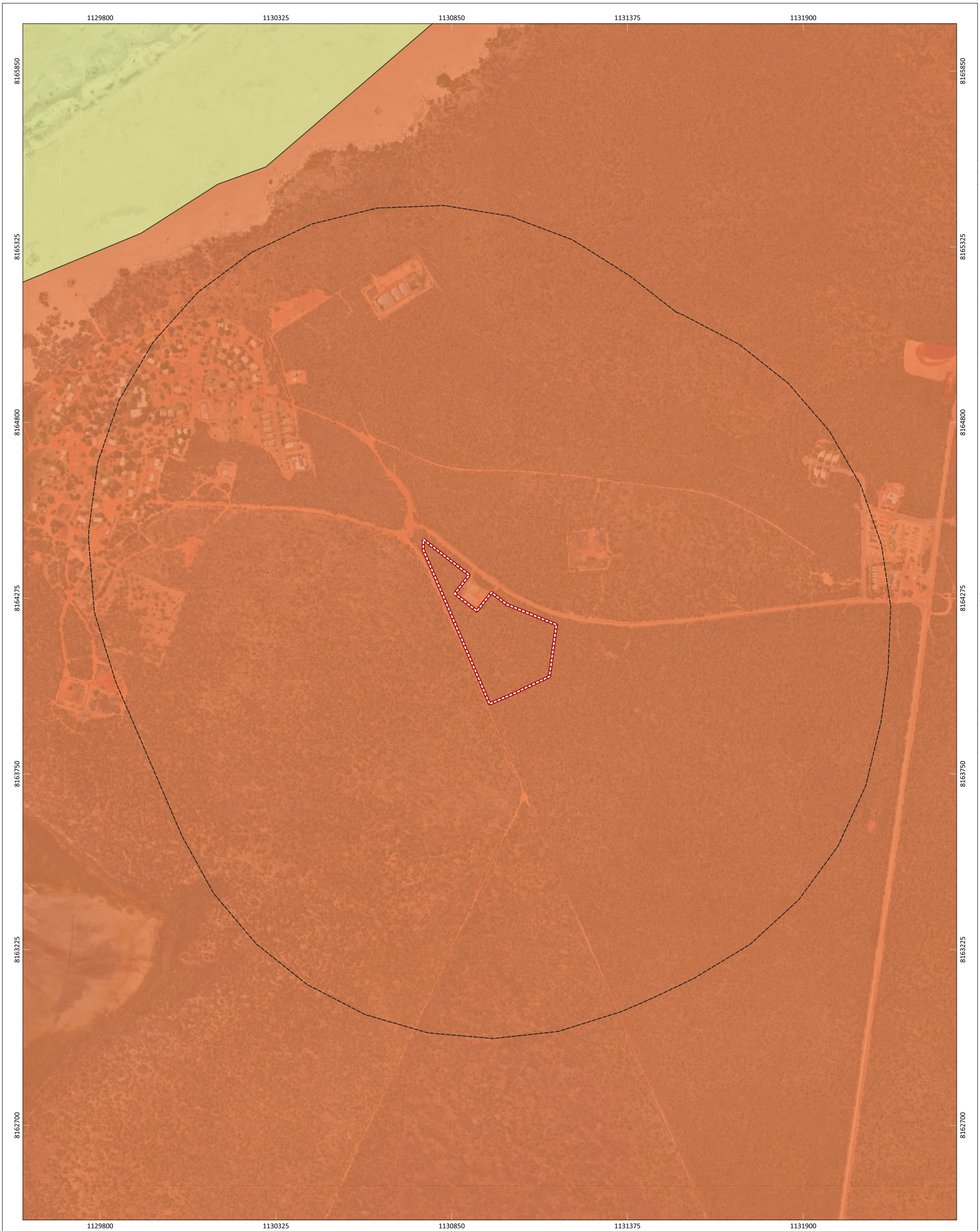


Figure 4: Pre-European Vegetation Types

0 75 150 225 300 m

N

SCALE	1:10,500
SHEET SIZE	A3 COLOUR
PROJECT/REPORT NAME	Dajarindjin-Aalga Goorlil Solar Project- Fauna Surveys 2025 Lombadina
CLIENT	RFF
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
PROJECT NUMBER	A25.029
VERSION	0
DATA SOURCE	LANDGATE AERIAL IMAGERY NOW
DRAWN BY / REVIEWED BY	JP/JR
DATE	16/9/2025

Legend

- Survey Area
- 1km Buffer

Pre-European Vegetation (DPIRD-006)

- DAMPIERLAND_129
- DAMPIERLAND_750

No	Description	Drawn	Approved	Date
A	Original issue	JP	JR	16/9/2025

NOTES:

Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

WESTERN ENVIRONMENTAL

Western Environmental Pty Ltd
08 6244 2310 | enquiries@westenv.com.au
Level 3/25 Prowse St, West Perth WA 6005
westenv.com.au

COPYRIGHT: This document is and shall remain the property of The Client. This document may only be used for the purpose for which it was commissioned and in accordance with the terms of engagement. The Client does not hold any responsibility for the misuse of this document

Designed and Automated by AC

G:\GIS\Project Data\2025\A25.029\3. Projects\4. Fauna Solar\A25.029_FaunaSolar.qgz

2.5 Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESAs) are declared by the Department of Water and Environmental Regulation (DWER) to prevent the degradation of important environmental values such as Threatened Flora, Threatened Ecological Communities (TECs) or significant wetlands.

The entire Survey Area occurs within an Environmentally Sensitive Area (DWER-046). The nearest ESAs and Conservation Areas to the Survey Area are shown in Figure 5.

2.6 Wetlands and Hydrology

The Survey Area does not intersect any wetlands listed under the Directory of Important Wetlands in Australia (DBCA-045). According to DWER Hydrography linear (DWER-031) the coastal waterline hydrology feature is 2 km northeast of the Survey Area and does not interact hydrologically with the Survey Area.

DWER Hydrology Catchment Tool (DWER-027) indicates that the Survey Area is within the Cape Leveque Coast catchment (Basin No.801), and within the groundwater subareas (DWER-083) of Canning-Kimberley.

The nearest hydrological features to the Survey Area are shown in Figure 6.

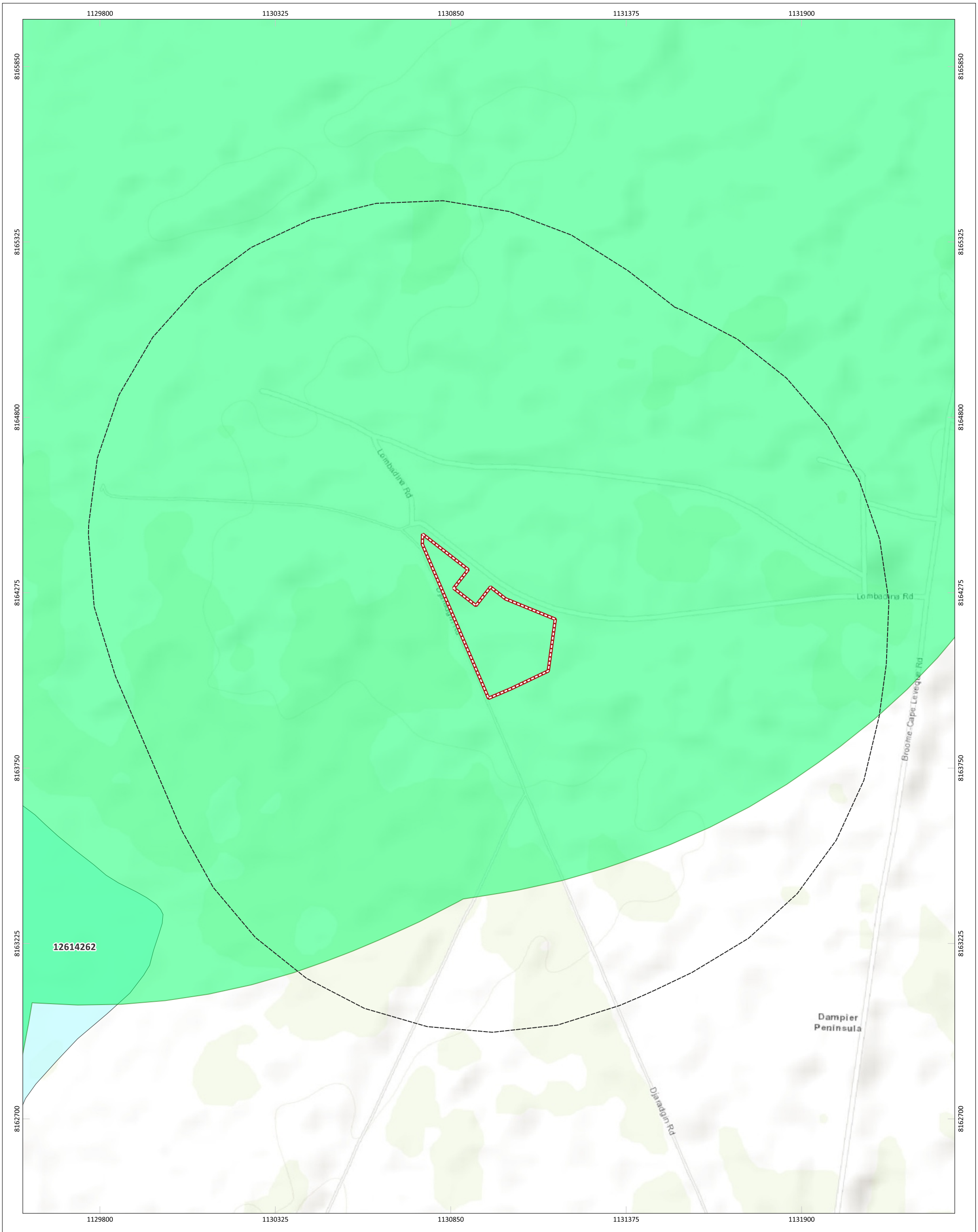


Figure 5: Environmentally Sensitive Areas

N

0 75 150 225 300 m

PROJECT/REPORT NAME: Dajarindjin-Aalga Goorlil Solar Project- Fauna Surveys 2025 Lombadina		
SCALE: 1:10,500	SHEET SIZE: A3 COLOUR	CLIENT: RFF
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A25.029	VERSION: 0
DATA SOURCE: ESRI Topographic Map	DRAWN BY / REVIEWED BY: JP/JR	DATE: 16/9/2025

Legend

- Survey Area
- 1km Buffer
- Clearing Regulations - Environmentally Sensitive Areas (DWER-046)

DBCA - Legislated Lands and Waters (DBCA-011)

- Marine Park

No	Description	Drawn	Approved	Date
A	Original issue	JP	JR	16/9/2025

NOTES:

Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

WESTERN ENVIRONMENTAL

Western Environmental Pty Ltd
08 6244 2310 | enquiries@westenv.com.au
Level 3/25 Prowse St, West Perth WA 6005
westenv.com.au

COPYRIGHT: This document is and shall remain the property of The Client. This document may only be used for the purpose for which it was commissioned and in accordance with the terms of engagement. The Client does not hold any responsibility for the misuse of this document

Designed and Automated by AC

G:\GIS\Project Data\2025\A25.029\3. Projects\4. Fauna Solar\A25.029_FaunaSolar.qgz



Figure 6: Surface Water Features and Geomorphic Wetlands

0 150 300 450 600 m

N

PROJECT/REPORT NAME	Dajarindjin-Aalga Goorlil Solar Project- Fauna Surveys 2025 Lombadina
SCALE	1:20,000
SHEET SIZE	A3 COLOUR
CLIENT	RFF
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
PROJECT NUMBER	A25.029
VERSION	0
DATA SOURCE	LANDGATE AERIAL IMAGERY NOW
DRAWN BY / REVIEWED BY	JP/JR
DATE	16/9/2025

Legend

- Survey Area
- 1km Buffer

Hydrography Linear (Hierarchy) (DWER-031)

- Coastal Waterline

No	Description	Drawn	Approved	Date
A	Original issue	JP	JR	16/9/2025

NOTES:

Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

WESTERN ENVIRONMENTAL

Western Environmental Pty Ltd
08 6244 2310 | enquiries@westenv.com.au
Level 3/25 Prowse St, West Perth WA 6005
westenv.com.au

COPYRIGHT: This document is and shall remain the property of The Client. This document may only be used for the purpose for which it was commissioned and in accordance with the terms of engagement. The Client does not hold any responsibility for the misuse of this document

Designed and Automated by AC

G:\GIS\Project Data\2025\A25.029\3. Projects\4. Fauna Solar\A25.029_FaunaSolar.qgz

3. Methodology

3.1 Desktop Assessment

3.1.1 Database Searches

Database searches of DBCA records were undertaken to compile a list of potential conservation significant flora, fauna and ecological communities previously recorded within or surrounding the Survey Areas (Table 6). In addition, an EPBC Act Protected Matters Search Tool (PMST) was undertaken to identify the potential for Matters of National Environmental Significance (MNES) to occur within or surrounding the Survey Area (DCCEEW, 2025).

Table 6: Database Searches

Database Name	Date Received and Reference Number	Search Type	Search Area
DBCA *Threatened and Priority Fauna* database search	21/01/2025 48-0125FA	Threatened and Priority Fauna	50 km buffer around the Survey Areas
Protected Matters Search Tool	15/08/2025	Commonwealth listed, fauna	50 km buffer around the Survey Areas

3.1.2 Likelihood of Occurrence

Conservation listed flora, fauna and ecological communities identified from the desktop assessment were assessed to determine the likelihood of their occurrence within the Survey Area, both prior to and post field survey. The assessment was completed based on the likelihood of occurrence criteria presented in Table 7.

Only species either recorded within the Survey Area or considered as having a high or medium likelihood of occurrence in post field survey assessment will be discussed in detail. Species classified as having a low likelihood of occurrence will not be discussed unless a justification for this classification is required.

The likelihood of occurrence assessment is contained within Appendix C.

Table 7: Likelihood of Occurrence Criteria

Likelihood	Criteria
Recorded	Recorded in the Survey Area from database searches, previous survey by others or by current survey.
High	Records of fauna species <10 km from the Survey Area. With record <20 years old; or For species with well understood and specific habitat preference/requirements, when specific habitat is present in the Survey Area, and records present <10 km from the Survey Area. Species with general habitat preference, which is present in the Survey Area, and records present <5 km from the Survey Area.

Likelihood	Criteria
Medium	There are records <10 km from the Survey Area, however: The species is strongly linked to a specific habitat, which is marginally suitable or small in extent in the Survey Area or Species has a general habitat preference, but small extent of suitable habitat is present. There is suitable habitat in the Survey Area, but records are >10 km from Survey Area.
Low	Records are historical only or are pre mapping procedures (e.g. records assigned to towns or place names). The species has well understood and specific habitat preference/requirements, which are absent from the Survey Area; or Suitable habitat is present, however there are no existing records of the species from the region despite reasonable previous search effort; or There is some suitable habitat in the Survey Area, however the species is very infrequently recorded in the locality (e.g. migratory bird species).

3.2 Basic Fauna Survey

The basic fauna survey incorporated a number of survey techniques as per the *Terrestrial Fauna Technical Guidance* (EPA, 2020). A basic survey is a low-intensity survey, conducted at the local scale to gather broad fauna and habitat information. The primary objectives are to verify the overall adequacy of the desktop study, and to map and describe habitats, with a focus on habitat for conservation listed fauna.

Fauna species were identified by active searches, secondary evidence such as scats, tracks, calls, remains, diggings and other signs. A fauna inventory was not compiled as part of this survey (not required under basic level survey) however observations are used to inform the fauna habitat type assessment.

The fauna survey was undertaken by two ecologists on the 5th and 6th of August 2025, totalling a four-person day effort (including time allowed for travel to site).

Potential habitats for conservation listed species were identified and evaluated and the likelihood of occurrence assessed.

3.2.1 Fauna Habitat Type Assessment

The fauna habitat types present within the Survey Area were defined considering landform, vegetation, structure such as rockpiles and logs and fauna assemblage occupying the area.

The following information was used to define and map all fauna habitat types within the Survey Area at specific fauna habitat assessment points and during traverses of the Survey Area:

- Land systems and landform.
- Vegetation type and condition mapping.
- Soil characteristics.
- Structure such as rockpiles and logs.
- Fauna assemblage information from desktop assessment and field observations.
- Aerial imagery and historic imagery.

Each fauna habitat type is described considering suitability for various fauna species groups or conservation listed species. In addition, the fauna habitat type's likelihood to harbour specialised fauna species which are not found in adjacent areas was taken into consideration. Habitat types were delineated in the field and digitised upon return from the field survey.

3.2.2 Fauna Taxonomy

Terrestrial vertebrate fauna taxa were identified in the field by an experienced ecologist.

Taxonomy and nomenclature follow the *Checklist of the Terrestrial Vertebrate Fauna of Western Australia* (Western Australian Museum [WAM], 2025). Conservation status follows DBCA *Threatened and Priority Fauna List* (DBCA, 2025). Where required verification of identification of secondary evidence (tracks, scats, diggings) may be undertaken by a relevant species group expert.

An Inventory of all vertebrate fauna identified within or over the Survey Area was prepared.

3.2.3 Targeted Transect Searches for Bilby and NBP

Targeted transect searches were undertaken to search for evidence of bilby and NBP presence.

Bilby survey

Bilby are reliably detected from their foraging and denning evidence (scats, digging evidence and burrow entrances). With sufficient survey coverage, absence of foraging and denning evidence of bilby is a reliable metric for determining species absence within an area (DAWE, 2016). Targeted searches comprised of regularly spaced transects being walked at approximately 20 metre spacing through the most likely habitat for this species. Transects were walked twice, once during the morning (between 8 am and 11 am), and again at nighttime between 8 pm and 11 pm. Any evidence of bilby was recorded as a GPS point. Survey effort for fauna transects is presented in Figure 2.

NBP survey

NBP are primarily nocturnal and are reliably detected by spotlight searching for individual animals within eucalypt trees. NBP are relatively large (30-50cm body length not including 20-40cm tail length) animals and can be detected by spotlight because of the presence of *Tapetum lucidum*, which is a layer of tissue behind the retina that allows greater vision in dimmer light and is present in many vertebrates. This layer brightly reflects visible light, a trait known as 'eyeshine', and detection of eyeshine is a reliable way of detecting individual animals during nocturnal survey. With sufficient survey coverage, absence of individual NBP observations is a reliable metric for determining species absence within an area (DAWE, 2021). Targeted searches comprised of regularly spaced transects walked at approximately 30-40 metres through appropriate habitat for this species. This spacing allowed observation of the canopy and trunk of every tree within the surveyor's torch beams. Transects were walked during the nighttime after last light (8pm to 11pm), during the time that NBP are more likely to be active and observed in surveyor torch beams. Observations of dreys (NBP nests, comprising rough spheres of vegetation), tree hollows, and foraging evidence were opportunistically recorded during the diurnal transect survey (see Bilby survey above). Survey effort for fauna transects is presented in Figure 2.

4. Results

4.1 Fauna Desktop Assessment

4.1.1 Fauna assemblage

A desktop assessment of expected conservation significant fauna assemblage was undertaken through searches of DBCA database records and the EPBC Act PMST, shown in Figure 7. Results are summarised in Appendix C.

Database searches identified 58 conservation listed fauna species that potentially occur, or whose habitat likely occurs within the Survey Area, comprising:

- Forty-seven bird species.
- Six mammal species.
- Five reptile species.

Species listed as Marine only under the EPBC Act (e.g. sharks, whales, turtles) as well as pelagic seabirds (Albatrosses, petrels, prions, shearwaters and frigatebirds) have been excluded from the likelihood of occurrence list as there is no marine habitat present within the Survey Area.

4.1.2 Fauna likelihood of Occurrence

The likelihood of occurrence for conservation listed fauna species found that:

- Three species had a high likelihood of occurrence.
- Five species had a medium likelihood of occurrence.
- Fifty species had a low likelihood of occurrence.

The three species that had a high likelihood of occurrence were:

- *Erythrura gouldiae* (Gouldian Finch) P4/EN
- *Falco peregrinus* (peregrine Falcon) OS
- *Tiliqua scincoides intermedia* (northern blue-tongued Skink) CR

The species that had a medium likelihood of occurrence were:

- *Ozimops cobourgianus* (northern coastal free-tailed bat) P1

- *Macrotis lagotis* (bilby) VU
- *Trichosurus vulpecula arnhemensis* (NBP) P4
- *Lerista separanda* (Dampier plain slider) P2
- *Simoselaps minimus* (Dampier burrowing snake) P2

The species assessed as low likelihood of occurrence are species that are locally extinct, have no recent records or for which no suitable habitat is present (e.g. wading birds). Species recorded or assessed as having a high or medium likelihood of occurrence are discussed in detail in Section 4.2.2.

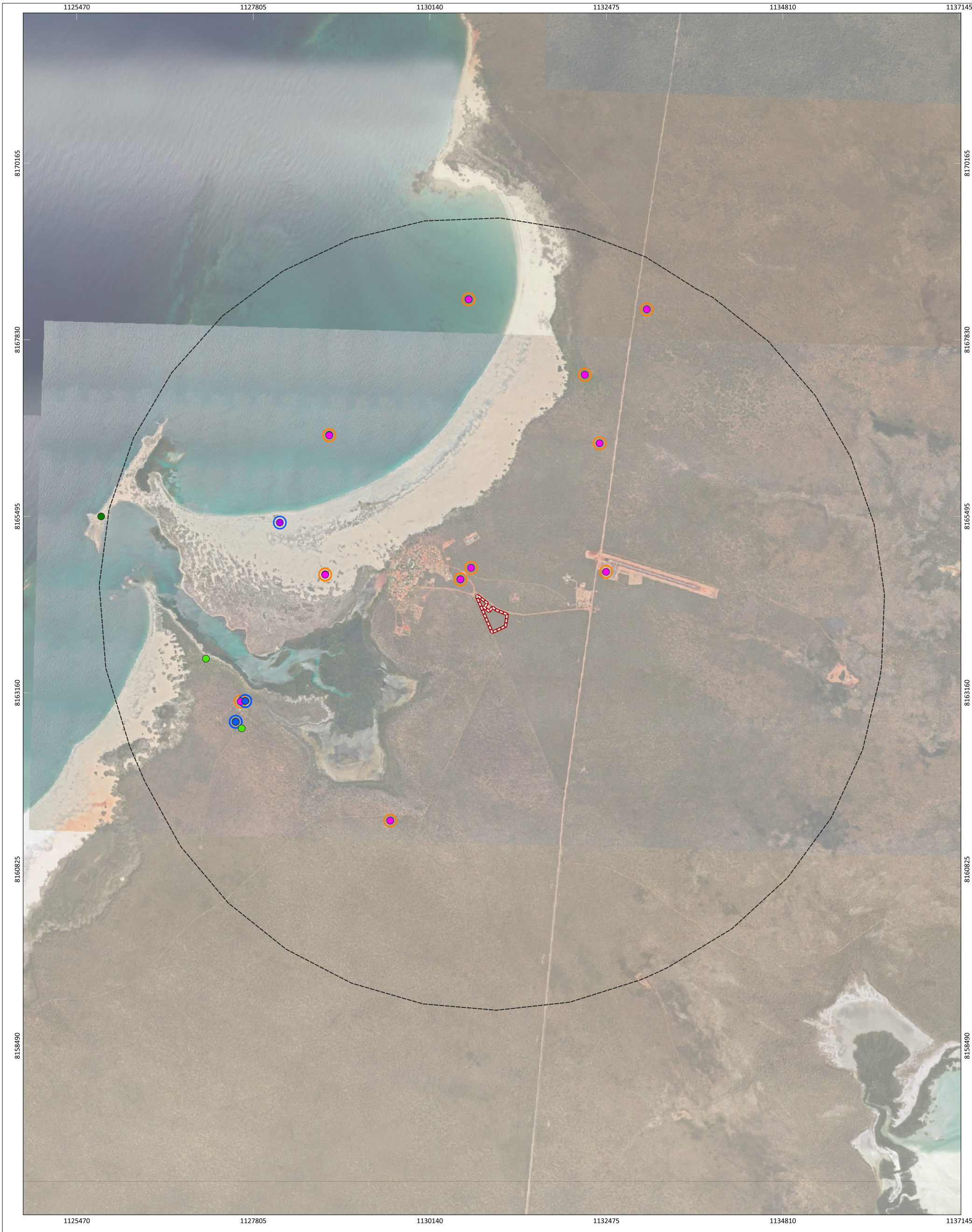


Figure 7: DBCA Database Search Results Fauna

N

0 500 1,000 1,500 m

PROJECT/REPORT NAME: Dajarindjin-Aalga Goorlil Solar Project- Fauna Surveys 2025 Lombadina		
SCALE: 1:46,700	SHEET SIZE: A3 COLOUR	CLIENT: RFF
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A25.029	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY NOW	DRAWN BY / REVIEWED BY: JP/JR	DATE: 16/9/2025

Legend

- Survey Area
- 5km Buffer

DBCA Threatened and Priority Fauna (EPBC Status)

- Endangered species
- Migratory species

DBCA Threatened and Priority Fauna (WA Status)

- Migratory species
- Migratory species and Priority 4
- Priority 1
- Priority 2
- Priority 4

No	Description	Drawn	Approved	Date
A	Original issue	JP	JR	16/9/2025

NOTES:

Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

WESTERN ENVIRONMENTAL

Western Environmental Pty Ltd
08 6244 2310 | enquiries@westenv.com.au
Level 3/25 Prowse St, West Perth WA 6005
westenv.com.au

G:\GIS\Project Data\2025\A25.029\3. Projects\4. Fauna Solar\A25.029_FaunaSolar.qgz

COPYRIGHT: This document is and shall remain the property of The Client. This document may only be used for the purpose for which it was commissioned and in accordance with the terms of engagement. The Client does not hold any responsibility for the misuse of this document

Designed and Automated by AC

4.2 Fauna Field Survey

4.2.1 Fauna Habitat Types

The entire Survey Area consists of one fauna habitat type. The fauna habitat types are described below in Table 8 and shown in Figure 8.

For possibly occurring conservation listed fauna species, habitat types are assessed as either core, supporting or non-significant habitat. As per *Commonwealth Matters of National Environmental Significance – Significant Impact Guidelines 1.1* "core" habitat is defined as that critical to the survival of the species and considered to contain denning/breeding sites, primary foraging areas and refuge from drought, fire and other stresses (DEWHA, 2013). "Supporting" habitat is defined as that which is likely used for foraging and dispersing/ connective purposes but is not essential habitat for the continuation of a local population. "Non-significant" habitat is that which would be used only very infrequently for foraging or dispersing.

Table 8: Fauna Habitat Type Description within the Survey Area.

Fauna Habitat Type	Habitat Description	Total Area, Proportion of the Survey Area (ha)	Representative Photo
FHT-01 **Open Eucalypt woodland**	Open eucalypt woodland dominated by *Corymbia greeniana* and *Eucalyptus miniata*. Canopy dominated by moderate combined cover of 30% *C. greeniana* and *E. miniata,* with occasional *Acacia*, open midstory, mostly saplings, high ground cover of tussock grass. light leaf litter cover with exposed soil, brown red pindan sand with high burrowing suitability, moderate cover of woody debris, moderate presence of small to medium tree hollows (<10 cm diameter), low presence of large (>10 cm diameter) tree hollows, isolated large rocks on ground. Habitat within the Survey Area is contiguous with approximately 170 ha of the same habitat bounded by sand/dirt tracks approximately 5 - 15 m wide. From a review of aerial images, a grove of mangroves and an extensive area of sand dunes occur approximately 1.5 km west of the Survey Area. Due to this proximity, mangrove and dune specialist species have been assigned a medium likelihood of occurrence **Core habitat for:** *Tiliqua scincoides intermedia* (Northern blue tongued skink) **Supporting habitat for:** *Erythrura gouldiae* (Gouldian Finch) *Trichosurus vulpecula arnhemensis* (NBP)	7.6 ha 100 %	

Fauna Habitat Type	Habitat Description	Total Area, Proportion of the Survey Area (ha)	Representative Photo
	Not significant habitat for: *Falco peregrinus* (peregrine falcon) *Macrotis lagotis* (bilby) *Ozimops cobourgianus* (northern coastal free-tailed bat) *Lerista separanda* (Dampier plain slider) *Simoselaps minimus* (Dampier burrowing snake)		
Total		7.6 ha	

4.2.2 Threatened and Priority Fauna

There were no observations of, or secondary evidence recorded for threatened and priority fauna within the Survey Area. Discussion of habitat type suitability for species identified as having a high or medium likelihood of occurrence is presented below in Table 9.

Table 9: Threatened and Priority Fauna

Scientific Name	Common Name	Habitat significance in Survey Area (ha)			Post Survey likelihood of occurrence	Habitat use and species description
		Core	Supporting	not significant		
Erythrura gouldiae	Gouldian finch	0	7.6	0	High	Gouldian finch are small granivorous (seed eating) birds. They are widespread but uncommon in a number of habitats in the Kimberley region. Core habitat for this species is eucalypt woodland over dense grasses on stony plain, and usually near fresh water. Although habitat within the Survey Area was eucalypt woodland, the ground cover of grasses was not considered dense enough to constitute core foraging habitat for Gouldian finch. There are 11 records of this species within 50 km of the Survey Area within the previous 20 years, with a number of records in open eucalypt woodland 2km from the Survey Area.
Falco peregrinus	Peregrine falcon	0	0	7.6	High	This species is a common and wide-ranging raptor, occurring across most regions of Australia. It occupies an extremely diverse range of habitats of Australia. The species typically nests on cliff ledges, shallow hollows in tall trees, or artificial structures such as building ledges and communication towers. The habitat within the Survey Area is not considered core or supporting for this species, however they may occasionally forage their preferred prey (other bird species) in or over the eucalypt woodland. There are two records of this species within 50km of the Survey Area within the previous 20 years, the nearest record is of an individual sighting 13km north of the Survey Area in Kooljaman community.
Tiliqua scincoides intermedia	Northern blue-tongued skink (blue tongue)	7.6	0	0	High	Northern bluetongue skink is the northern subspecies of the abundant and common blue tongue skink, and occurs from Broome to Kununurra in WA. Bluetongue skinks are relatively large slow-moving omnivores. There were no records of northern blue tongue returned by the DBCA database search; however they were identified by the PMST.

Scientific Name	Common Name	Habitat significance in Survey Area (ha)			Post Survey likelihood of occurrence	Habitat use and species description
		Core	Supporting	not significant		
						Northern blue tongue was opportunistically sighted by the surveyors at Cygnet bay Pearl Farm, 13 km northeast of the Survey Area, in similar habitat (open *Acacia* and eucalypt woodland transitioning to rocky coastline).
Macrotis lagotis	Greater bilby, dalgyte, ninu	0	0	7.6	Medium	Bilby are medium sized nocturnal omnivores which forage for food by digging. Bilby are known to utilise a number of different habitat types; however, eucalypt woodland (FHT-01) is not considered core habitat for this species Bilby are reliably surveyed for by searching for digging and foraging evidence and survey effort was considered sufficient to show that digging and foraging evidence as absent within the Survey Area There are three records of Bilby within 50km of the Survey Area within the previous 20 years. The nearest record is of a sighting of an individual in similar habitat 40km southwest of the Survey Area. The targeted transect survey effort is considered sufficient to determine that there was no foraging, denning or scat evidence within the Survey Area.
Trichosurus vulpecula arnhemensis	NBP	0	7.6	0	Medium	NBP are nocturnal arboreal omnivores that make nests within balls of vegetation (dreys) and large tree hollows. FHT-01 contained a number of large eucalypts with hollows, but none of them appeared suitable to support NBP nesting, these hollows were observed with head torches during the nocturnal survey, but no observations of NBP were made. NBP usually prefer dense eucalypt woodland or forest with a connected canopy, FHT-01 had an estimated canopy cover of 30% which is comparatively sparse, and as such FHT-01 does not constitute core habitat for this species. There were no records of NBP returned by the DBCA database search; however, they were identified by the PMST.

Scientific Name	Common Name	Habitat significance in Survey Area (ha)			Post Survey likelihood of occurrence	Habitat use and species description
		Core	Supporting	not significant		
Ozimops cobourgianus	Northen coastal free-tailed bat	0	0	7.6	Medium	Northen coastal free-tailed bat are a mangrove specialist bat that roosts in mangrove hollows. There are 10 records of this species within 50 km of the Survey Area within the previous 20 years. All records have been from mangrove habitat on the coast of Cape Leveque. The nearest mangrove habitat to the Survey Area is 1.5 km west, and as such it is possible that the species occasionally commutes or forages (for nocturnal insect prey) near or within the Survey Area, however roosting is unlikely. Small bat species were observed foraging through the upper story of vegetation during the nocturnal field survey; however, they were not identified to species.
Lerista separanda	Dampierland plain slider, skink	0	0	7.6	Medium	Dampier plains slider are cryptic, nocturnal, subterranean reptiles endemic to the Dampier Peninsula. Due to these cryptic habits, very little is known about this species. All previous records of this species have been from sand dunes and dune adjacent habitat. There are two records of this species within 50km of the Survey Area within the previous 20 years, both records were of individuals trapped on Packer Island, 15km east of the Survey Area. *Lerista* tracks were detected in the sand road on western edge of the Survey Area
Simoselaps minimus	Dampierland burrowing snake	0	0	7.6	Medium	Dampier burrowing snake are cryptic, nocturnal, subterranean reptiles endemic to the Dampier Peninsula. Due to these cryptic habits, very little is known about this species. All previous records of this species have been from sand dunes and dune adjacent habitat. The Survey Area is approximately 1.5 km from a complex sand dune system. There are two records of this species within 50km of the Survey Area within the previous 20 years, both records were of individuals trapped on Packer Island and Chile Creek area.



Figure 8: Fauna Habitat Types And Conservation Significant Fauna Observations

0 15 30 45 60 m

N

PROJECT/REPORT NAME: Dajarindjin-Aalga Goorlil Solar Project- Fauna Surveys 2025 Lombadina		
SCALE: 1:1,900	SHEET SIZE: A3 COLOUR	CLIENT: RFF
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A25.029	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY NOW	DRAWN BY / REVIEWED BY: JP/JR	DATE: 16/9/2025

Legend

Survey Area

Fauna Habitat

FHT-01 - Open Eucalypt Woodland

No	Description	Drawn	Approved	Date
A	Original issue	JP	JR	16/9/2025

NOTES:

Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

WESTERN ENVIRONMENTAL

Western Environmental Pty Ltd
08 6244 2310 | enquiries@westenv.com.au
Level 3/25 Prowse St, West Perth WA 6005
westenv.com.au

COPYRIGHT: This document is and shall remain the property of The Client. This document may only be used for the purpose for which it was commissioned and in accordance with the terms of engagement. The Client does not hold any responsibility for the misuse of this document

Designed and Automated by AC

G:\GIS\Project Data\2025\A25.029\3. Projects\4. Fauna Solar\A25.029_FaunaSolar.qgz

5. Discussion

5.1 Fauna Habitat Significance

One fauna habitat type was described within the Survey Area. The habitat comprises open eucalypt woodland dominated by *Corymbia greeniana* and *Eucalyptus miniata*. The habitat type is present extensively surrounding the Survey Area.

Database searches identified 58 conservation listed fauna species that potentially occur, or whose habitat likely occurs, within the Survey Area, comprising:

- Forty-seven bird species.
- Six mammal species.
- Five reptile species.

A Likelihood of Occurrence Assessment concluded that of these 58 species:

- Three species had a high likelihood of occurrence, being (DBCA/EPBC conservation codes in brackets):
    - *Erythrura gouldiae* (Gouldian finch) (P4/EN)
    - *Falco peregrinus* (peregrine falcon) (OS)
    - *Tiliqua scincoides intermedia* (northern blue-tongued Skink) (CR/CR)
- Five species had a medium likelihood of occurrence, being:
    - *Ozimops cobourgianus* (northern coastal free-tailed bat) (P1/-)
    - *Macrotis lagotis* (bilby) (VU/VU)
    - *Trichosurus vulpecula arnhemensis* (NBP) (VU/VU)
    - *Lerista separanda* (Dampier plain slider) (P2/-)
    - *Simoselaps minimus* (Dampier burrowing snake) (P2/-)
- Fifty species had a low likelihood of occurrence. These are mainly marine species and pelagic birds.

No species of conservation significance were recorded within the Survey Area.

The extent of core and supporting habitat present within the Survey Area by species is summarised in Table 10

Table 10: Summary of Habitat Values

Species	Extent Core Habitat (ha)	Extent Supporting Habitat (ha)
Erythrura gouldiae	0	7.6
Falco peregrinus	0	0
Tiliqua scincoides intermedia	7.6	0
Macrotis lagotis	0	0
Trichosurus vulpecula arnhemensis	0	7.6
Ozimops cobourgianus	0	0
Lerista separanda	0	0
Simoselaps minimus	0	0

5.2 Threatened Fauna Survey

No evidence or sightings of bilby or NBP were detected within the Survey Area. Of the habitat within the Survey Area, none is considered significant for bilby. However, it is all considered supporting habitat for NBP.

Given that neither signs or individuals of these two species were recorded during the targeted survey it is considered that they do not utilise the Survey Area.

References

Beard, J. S. (1976). *Vegetation Survey of Western Australia - Western Australia 1: 1 000 000 Vegetation Series.* Department of Geography, University of Western Australia.

Bureau of Meteorology (BOM). (2007). *About Climate Statistics.* Retrieved on 18 August 2025from http://www.bom.gov.au/climate/cdo/about/about-stats.shtml.

Bureau of Meteorology (BOM). (2025). *Monthly Climate Data Statistics*. Retrieved on 18 August 2025 from www.bom.gov.au/climate/data.

Department of Agriculture, Water and the Environment (DAWE). (2021*) Conservation Advice - Trichosurus vulpecula arnhemensis Northern Brushtail Possum.* Accessed August 2025 Conservation Advice Trichosurus vulpecula arnhemensis Northern Brushtail Possum

Department of Agriculture, Water and the Environment (DAWE) (2016) Conservation Advice - Macrotis lagotis - Greater Bilby. 282 - Conservation Advice - 150716 accessed August 2025.

Department of Biodiversity, Conservation and Attractions (DBCA) (2017) *Guidelines for survey to detect the presence of bilbies, and assess the importance of habitat in Western Australia*. https://library.dbca.wa.gov.au/FullTextFiles/072208.pdf Accessed August, 2025.

Department of Biodiversity, Conservation and Attractions (DBCA) (2019). *2018 Statewide Vegetation Statistics (formerly the CAR Reserve Analysis)*. DBCA Statewide Vegetation Statistics - 2018 Statewide Vegetation Statistics - Full report - data.wa.gov.au Accessed August 2025.

Department of Biodiversity Conservation and Attractions (DBCA). (2025). *Threatened and Priority Fauna List.* Retrieved on 18 August 2025 from Threatened and Priority Fauna List - July 2025.xlsx

Department of Climate Change, Energy, the Environment and Water (DCCEEW). (2025). *Protected Matters Search Tool* Protected Matters Search Tool: Interactive Map. Accessed August 2025.

Department of Climate Change, Energy, the Environment and Water (DCCEEW). (2025). *Species Profile and Threats Database.* Retrieved on 15 May 2025 from http://www.environment.gov.au/cgi-bin/sprat/public.

Department of the Environment Water Heritage and the Arts (DEWHA). (2010). *Survey Guidelines for Australia's Threatened Birds: Guidelines for Detecting Birds Listed as Threatened under the EPBC Act.* Canberra, Australia.

Department of the Environment Water Heritage and the Arts (DEWHA). (2013). *Matters of National Environmental Significance: Significant Impact Guidelines 1.1*. Significant Impact Guidelines 1.1 - Matters of National Environmental Significance - DCCEEW Accessed August 2025.

Department of Sustainability Environment Population and Communities (DSEWPaC). (2011). *Survey Guidelines for Australia's Threatened Mammals*. Canberra, Australia.

Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC). (2012) *Interim Biogeographic Regionalisation for Australia, Version 7*.

Environmental Protection Authority (EPA). (2020). *Technical Guidance - Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment.*

Western Australian Museum (WAM). (2025). *Checklist of the Terrestrial Vertebrate Fauna of Western Australia*. WA-Checklist-Terrestrial-Vertebrates-September-2025.xlsx Accessed September 2025

Datasets used

Department of Agriculture Water and the Environment (DAWE). (2024). *Protected Matters Search Tool*. Canberra, Australia. Retrieved on 18 August 2025 from http://www.environment.gov.au/webgisframework/apps/pmst/pmst.jsf.

Department of Biodiversity Conservation and Attractions (DBCA). (2023). *Legislated Lands and Waters (DBCA-011)*. Retrieved on 18 August 2025 from https://catalogue.data.wa.gov.au/dataset/dbca-legislated-lands-and-waters.

Department of Climate Change, Energy, the Environment and Water (DCCEEW). (2023). Directory of Important Wetlands (DBCA-045). Retrieved on 18 August 2025 from https://www.environment.gov.au/cgi-bin/wetlands/report.pl.

Department of Primary Industries and Regional Development (DPIRD). (2017). *Soil Landscape Mapping – Best Available (DPIRD-027)*. Retrieved on 18 August 2025 from https://catalogue.data.wa.gov.au/dataset/soil-landscape-mapping-best-available.

Department of Primary Industries and Regional Development (DPIRD). (2019). *Pre-European Vegetation (DPIRD-006)*. Retrieved on 18 August 2025 from https://catalogue.data.wa.gov.au/dataset/pre-european-dpird-006

Department of Water and Environmental Regulation (DWER). (2018). *Hydrography, Linear (Hierarchy) (DWER-031)*. Retrieved on 18 August 2025 from https://catalogue.data.wa.gov.au/dataset/hydrography-linear-hierarchy.

Department of Water and Environmental Regulation (DWER). (2022). *Clearing Regulations - Environmentally Sensitive Areas (DWER-046).* Retrieved on 18 August 2025 from https://catalogue.data.wa.gov.au/dataset/clearing-regulations-environmentally-sensitive-areas-dwer-046.

Appendix D
Flora Desktop Assessment and Likelihood of Occurrence

Flora Likelihood of Occurrence Assessment (GHD, 2023; DBCA, 2025b)

Species	Conservation Status		Preferred Habitat	Habitat Occurs Within the Site	Likelihood of Occurrence
	State	Federal			
Parsonsia kimberleyensis	P1		Vine thickets.	No	Unlikely - Suitable habitat present. The closest known record is located approximately 13 km northeast of the Site.
Haemodorum capitatum	P1		Pindan shrubland.	Yes	Unlikely - The closest known record is located approximately 13 km northwest of the project area. Suitable habitat is present in the Site, however, suitable search effort did not record the species.
Utricularia bidentata	P3		Pindan woodland.	Yes	Unlikely - The closest known record is located approximately 15 km southwest of the Site. Suitable habitat is present in the Site, however, suitable search effort did not record the species.
Lophostemon grandiflorus* subsp. *grandiflorus	P3		Coastal dunes, drainage basins.	No	Unlikely - The closest known record is located approximately 5 km northeast of the Site. Suitable habitat does not occur in the Site.
Triodia acutispicula	P3		Found on Plain/Red sand.	Yes	Unlikely - Suitable habitat present, however, suitable search effort did not record the species. The closest known record is located approximately 5 km northeast of the Site.
Stylidium pindanicum	P3		Flat, sandy clay, seasonal swamps.	No	Unlikely - The closest known record is located approximately 16 km northeast of the Site. Suitable habitat does not occur in the Site.
^Acacia monticola x tumida* var. *kulparn	P3		Exposed cliff top, footscree below steep gorge, road verges.	No	Low - The closest known record is located approximately 310 m northwest of the Site. Suitable habitat does not occur in the Site. The record is >30 years old.
^Cupaniopsis anacardioides	P3		Vine thickets.	No	Low - Suitable habitat present. The closest known record is located approximately 7 km northeast of the Site. The record is >30 years old.
^Paranotis halfordii	P3		Previous records from rocky soils of cliff tops.	No	Low - The closest known record is located approximately 1 km northeast of the Site. Suitable habitat is not present within the Site.

^Identified in DBCA database search from 2025 (DBCA, 2025b).

Appendix E
Fauna Desktop Assessment and Likelihood of Occurrence

Scientific Name	Common Name	Conservation Status		Database Source		Likelihood of Occurrence	Justification
		WA	EPBC	DBCA	PMST		
Aves							
Actitis hypoleucos	Common Sandpiper	MI	MI	x		Low	Shorebird, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Anous stolidus (all sub-species)	Common Noddy	MI	MI	x		Low	Pelagic species, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Anous tenuirostris melanops	Australian Lesser Noddy	EN	VU		x	Low	Pelagic species, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Apus pacificus	Fork-tailed Swift	MI	MI	x		Low	Uncommon fly over species, unlikely to stop and perch up within Survey Area
Arenaria interpres	Ruddy Turnstone	MI	MI	x		Low	Shorebird, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Calidris acuminata	Sharp-tailed Sandpiper	MI	MI	X	x	Low	Shorebird, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Calidris alba	Sanderling	MI	MI	x		Low	Shorebird, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Calidris canutus	Red Knot, Knot	EN	VU	x	x	Low	Shorebird, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Calidris ferruginea	Curlew Sandpiper	CR	CR	x		Low	Shorebird, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Calidris ruficollis	Red-necked Stint	MI	MI	x		Low	Shorebird, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Calidris tenuirostris	Great Knot	CR	CR	x		Low	Shorebird, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Charadrius leschenaultii	Greater Sand Plover	VU	VU	x	x	Low	Shorebird, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur

Scientific Name	Common Name	Conservation Status		Database Source		Likelihood of Occurrence	Justification
		WA	EPBC	DBCA	PMST		
Charadrius mongolus	Lesser Sand Plover	EN	EN	x		Low	Shorebird, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Chloebia gouldiae	Gouldian Finch	P4	EN	x	x	High	Species not recorded within the Site
Erythrotriorchis radiatus	Red Goshawk	VU	VU		x	Low	Very rare species, no records within 100km in DBCA data, however perching and foraging habitat is present within Survey Area
Falco hypoleucos	Grey Falcon	VU	VU		x	Low	Common and widespread bird species, may perch and forage within Survey Area
Falco peregrinus	Peregrine Falcon	OS		x		High	Common and widespread bird species, may perch and forage within Survey Area
Fregata ariel	Lesser Frigatebird	MI	MI	x		Low	Pelagic species, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Gelochelidon nilotica	Gull-billed Tern	MI	MI	x		Low	Coastal specialist, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Hydroprogne caspia	Caspian Tern	MI	MI	x		Low	Coastal specialist, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Limnodromus semipalmatus	Asian Dowitcher	MI	VU, MI		x	Low	Shorebird, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Limosa lapponica (all subspecies)	Bar-tailed Godwit	MI	EN, MI	x	x	Low	Shorebird, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Limosa limosa	Black-tailed Godwit	MI	MI	x		Low	Shorebird, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Numenius madagascariensis	Eastern Curlew	CR	CR, MI	x	x	Low	Shorebird, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur

Scientific Name	Common Name	Conservation Status		Database Source		Likelihood of Occurrence	Justification
		WA	EPBC	DBCA	PMST		
Numenius minutus	Little Curlew, Little Whimbrel	MI	MI	x		Low	Shorebird, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Numenius phaeopus	Whimbrel	MI	MI	x		Low	Shorebird, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Onychoprion anaethetus	Bridled tern	MI	MI	x		Low	Coastal specialist, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Pandion cristatus	Osprey, Eastern Osprey	MI	MI	x		Low	Although likely to occur as Survey Area is 1km from coast, unlikely to utilise any habitat within Survey Area other than aa a flyover
Papasula abbotti	Abbott's Booby	MI	EN		x	Low	Pelagic species, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Pezoporus occidentalis	Night Parrot	CR	EN		x	Low	Extremely rare and hard to detect species, no records within 100km in last 20 years
Phaethon lepturus fulvus	Christmas Island White-tailed Tropicbird, Golden Bosunbird		EN, MI		x	Low	Pelagic species, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Phaethon rubricauda (all subspices)	Red-tailed Tropicbird	P4, MI	EN	x	x	Low	Pelagic species, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Pluvialis fulva	Pacific Golden Plover	MI	MI	x		Low	Shorebird, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Pluvialis squatarola	Grey Plover	MI	MI	x		Low	Shorebird, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Rostratula australis	Australian Painted Snipe	EN	EN		x	Low	Wetland species, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur

Scientific Name	Common Name	Conservation Status		Database Source		Likelihood of Occurrence	Justification
		WA	EPBC	DBCA	PMST		
Sterna dougallii (all sub-species)	Roseate Tern	MI	MI	x		Low	Coastal specialist, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Sterna hirundo (all sub-species)	Common Tern	MI	MI	x		Low	Coastal specialist, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Sternula albifrons	Little Tern	MI	MI	x		Low	Coastal specialist, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Sula leucogaster (all sub-species)	Brown Booby	MI	MI	x		Low	Pelagic species, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Thalasseus bergii	Crested Tern	MI	MI	x		Low	Coastal specialist, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Tringa brevipes	Grey-tailed Tattler	P4	MI	x		Low	Shorebird, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Tringa glareola	Wood Sandpiper	MI	MI	x		Low	Shorebird, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Tringa nebularia	Common Greenshank, greenshank	MI	EN, MI	x	x	Low	Shorebird, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Tringa stagnatilis	Marsh Sandpiper	MI	MA, MI	x		Low	Shorebird, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Tringa totanus	Common Redshank, redshank	MI	MI	x		Low	Shorebird, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Tyto novaehollandiae kimberli	Masked Owl	P1	VU		x	Low	Appropriate habitat present within Survey Area, reasonably dense Eucalyptus and Corymbia woodland with sparse tree hollows, none detected during Survey

Scientific Name	Common Name	Conservation Status		Database Source		Likelihood of Occurrence	Justification
		WA	EPBC	DBCA	PMST		
Xenus cinereus	Terek Sandpiper	MI	MI	x		Low	Shorebird, Site is 1km from nearest coastline, however no utilisable habitat within Survey Area, unlikely to occur
Mammals							
Macroderma gigas	Ghost bat	VU	VU		x	Low	Species requires caves to roost, no caves within or near Survey Area
Macrotis lagotis	Greater Bilby, Dalgyte, Ninu	VU	VU	x	x	Medium	Presence not detected during Survey, but has been recorded in habitat contiguous with Survey Area
Mormopterus cobourgianus	North-western free-tailed bat	P1		x		Low	Species confined to mangroves, non-present within Survey Area, mangroves occur within 1 km of Survey Area, so species may be occasional flythrough
Ozimops cobourgianus	northen coastal free-tailed bat	P1		x		Low	Same species as above
Saccolaimus saccolaimus nudicluniatus	Bare-rumped Sheath-tailed Bat,	P3	VU		x	Low	Species not present within 100km, unlikely to occur within Survey Area
Trichosurus vulpecula arnhemensis	Northern Brushtail Possum	VU	VU		x	Medium	Appropriate habitat present within Survey Area, reasonably dense Eucalyptus and Corymbia woodland with sparse tree hollows, none detected during Survey
Xeromys myoides	Water Mouse, False Water Rat, Yirrkoo		VU		x	Low	Species almost always associated with water features, streams and dams, none present within the Survey Area
Reptiles							
Lerista separanda	Dampierland plain slider, skink	P2		x		Medium	Species is a sand dune specialist, no habitat present within Surve Area
Simoselaps minimus	Dampierland Burrowing snake	P2		x		Medium	Species is a sand dune specialist, no habitat present within Surve Area

Scientific Name	Common Name	Conservation Status		Database Source		Likelihood of Occurrence	Justification
		WA	EPBC	DBCA	PMST		
Tiliqua scincoides intermedia	Northern Blue-tongued Skink	CR	CR		x	High	Species is widespread and has been known to associate with man made structure (present near or in Survey Area, although no evidence recorded in Survey, cannot discount potential presence in large area of connected habitat
Varanus mertensi	Mertens' Water Monitor, Mertens's Water Monitor	EN	EN		x	Low	Species almost always associated with water features, streams and dams, none present within the Survey Area
Varanus mitchelli	Mitchell's Water Monitor	CR	CR		x	Low	Species almost always associated with water features, streams and dams, none present within the Survey Area