Prepared for
CBH Group Pty Ltd
ABN: 29 256 604 947

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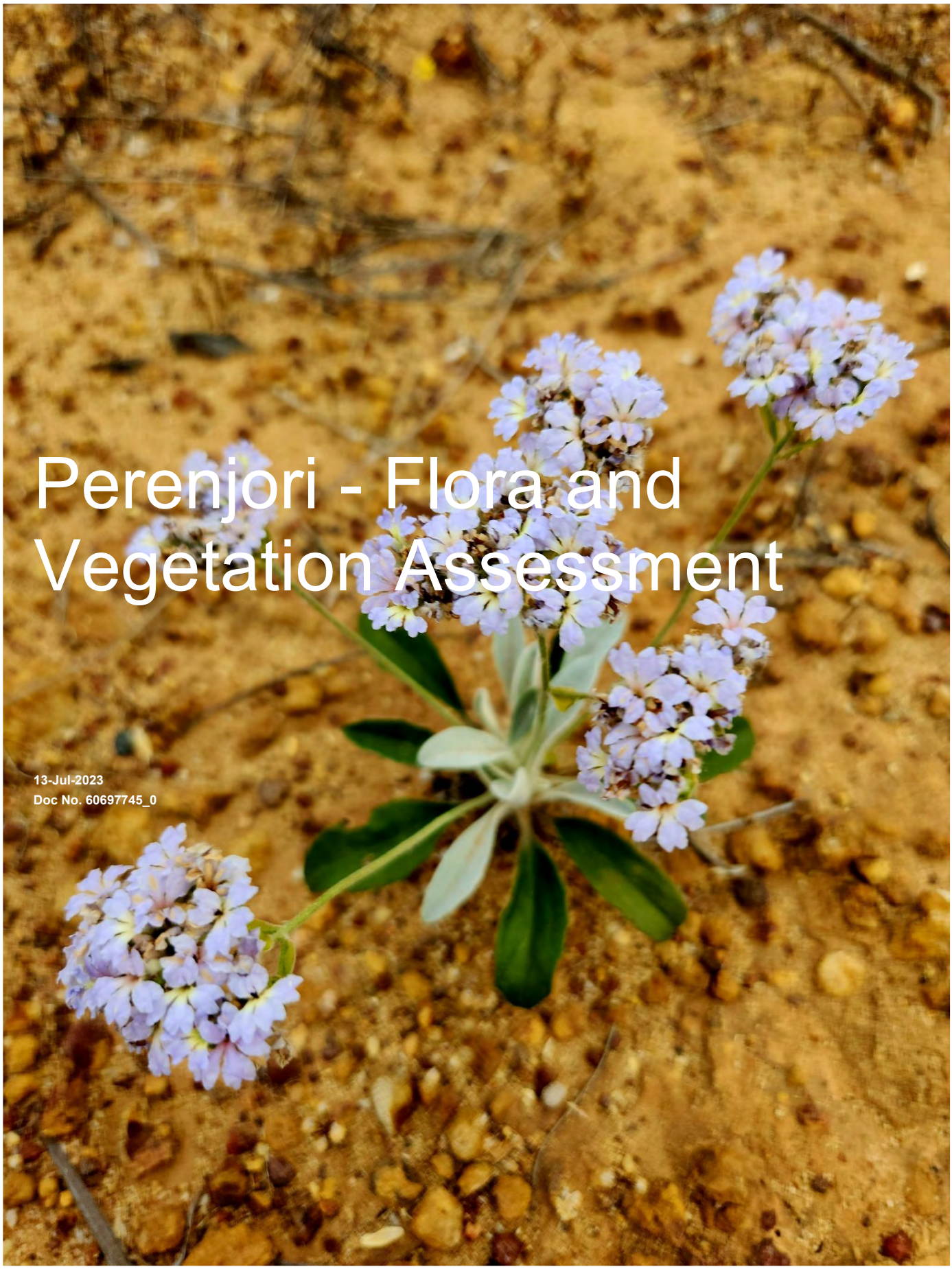

Perenjori - Flora and Vegetation Assessment

13-Jul-2023
Doc No. 60697745_0

Perenjori - Flora and Vegetation Assessment

Client: CBH Group Pty Ltd

ABN: 29 256 604 947

Prepared by

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13-Jul-2023

Job No.: 60697745

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Quality Information

Document	Perenjori - Flora and Vegetation Assessment
Ref	60697745
Date	13-Jul-2023
Originator	F de Wit
Checker/s	M Dunlop
Verifier/s	M Dunlop

Revision History

Rev	Revision Date	Details	Approved	
			Name/Position	Signature
A	08-Mar-2023	Draft Report	Floora de Wit Team Leader - Natural Resources	
0	13-Jul-2023	Final Report	Floora de Wit Team Leader - Natural Resources	

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Executive Summary

The CBH Group (CBH) engaged AECOM Australia Pty Ltd (AECOM) to undertake a detailed flora and vegetation assessment for a linear corridor adjacent to their Perenjori grain site and Wubin-Mullewa Road. The survey area represents 124.03 ha, of which 18.45 ha is considered native vegetation.

A desktop study, field survey, and reporting component were completed. The desktop study identified 105 significant flora species including 27 species listed as Threatened under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and *Biodiversity Conservation Act 2016* (BC Act), and 78 species listed as Priority by Department of Biodiversity, Conservation and Attractions (DBCA). Of these 105 species, three were 'known' to occur and one was 'likely' to occur based on habitat presence, proximity of known records, and age of records.

One Threatened Ecological Community (TEC) was "known to occur" based on DBCA extrapolated mapping using aerial imagery. The Eucalypt Woodlands of the WA Wheatbelt TEC is listed as Critically Endangered under the EPBC Act.

A field survey was undertaken by experienced botanist Floora de Wit supported by Adam Fenton on 17 and 18 November 2022, following two months of above-average rainfall. All areas of native vegetation were traversed on foot to conduct targeted searches and flora data was recorded at 7 quadrats and 2 relevés.

Four native vegetation communities were mapped including three Shrublands and one Woodland. The majority of the native vegetation in the survey area (17.72 ha, 96%) represents Grevillea, Acacia and Melaleuca Open Shrublands.

The Woodland, mapped for 0.73 ha (4% of native vegetation) represents a Eucalyptus Open Woodland, of which two patches were defined. These patches were assessed against the key diagnostic characteristics of the Approved Conservation Advice of the Eucalypt Woodlands of the WA Wheatbelt (DEE, 2015). Neither of the two patches meet the key characteristics of the federally protected TEC. As such, the survey confirmed that none of the native vegetation represents the Eucalypt Woodlands of the WA Wheatbelt TEC.

Five Priority flora species were recorded:

- *Baeckea* sp. Perenjori (J.W. Green 1516) (P2) collected at quadrat 3, not counted at the time, sample was sterile.
- *Enekbatus longistylis* (P1) collected at quadrat 2, not counted at the time due to inability to confidently identify species in the field.
- *Grevillea asparagoides* (P3) known to occur, represents common understorey species, 67 individuals counted.
- *Grevillea granulosa* (P3) known to occur, sterile at time of survey so confident identification was difficult. Seven individuals were counted in the survey. More than 60 individuals were counted in previous surveys (BDS, 2020).
- *Leptospermum exsertum* (P1) known to occur, common understorey species, more than 150 individuals counted.

The survey was successfully undertaken following two months of above-average rainfall. The inability to confidently identify the Priority small-leaf Myrtaceae species *Baeckea* sp. Perenjori and *Enekbatus longistylis* in the field means t that that no accurate population information was recorded during the field survey. These populations are therefore under-represented in the report. All areas of native vegetation were accessible and survey effort was considered suitable for meeting the objective of the survey.

1.0 Introduction

1.1 Background

CBH Group (CBH) is planning to expand its operations over the next 10 years, with planned infrastructure upgrades and the development of new sites within the distribution network. As part of this expansion, CBH is required to undertake a suite of ecological surveys to ensure the works are undertaken in accordance with regulatory and legal requirements.

AECOM has consequently been engaged to undertake an assessment of flora and vegetation within the Perenjori Survey Area to support the environmental assessment and approval process.

1.2 Location

The survey area is located approximately 1 km northwest from the township of Perenjori – a small agricultural town in the Wheatbelt region of Western Australia. Perenjori is 348 km north of Perth (Figure 1)and is within the Shire of Perenjori. There is a CBH facility outside of town which serves as a logistical hub for grain receival and distribution within the region.

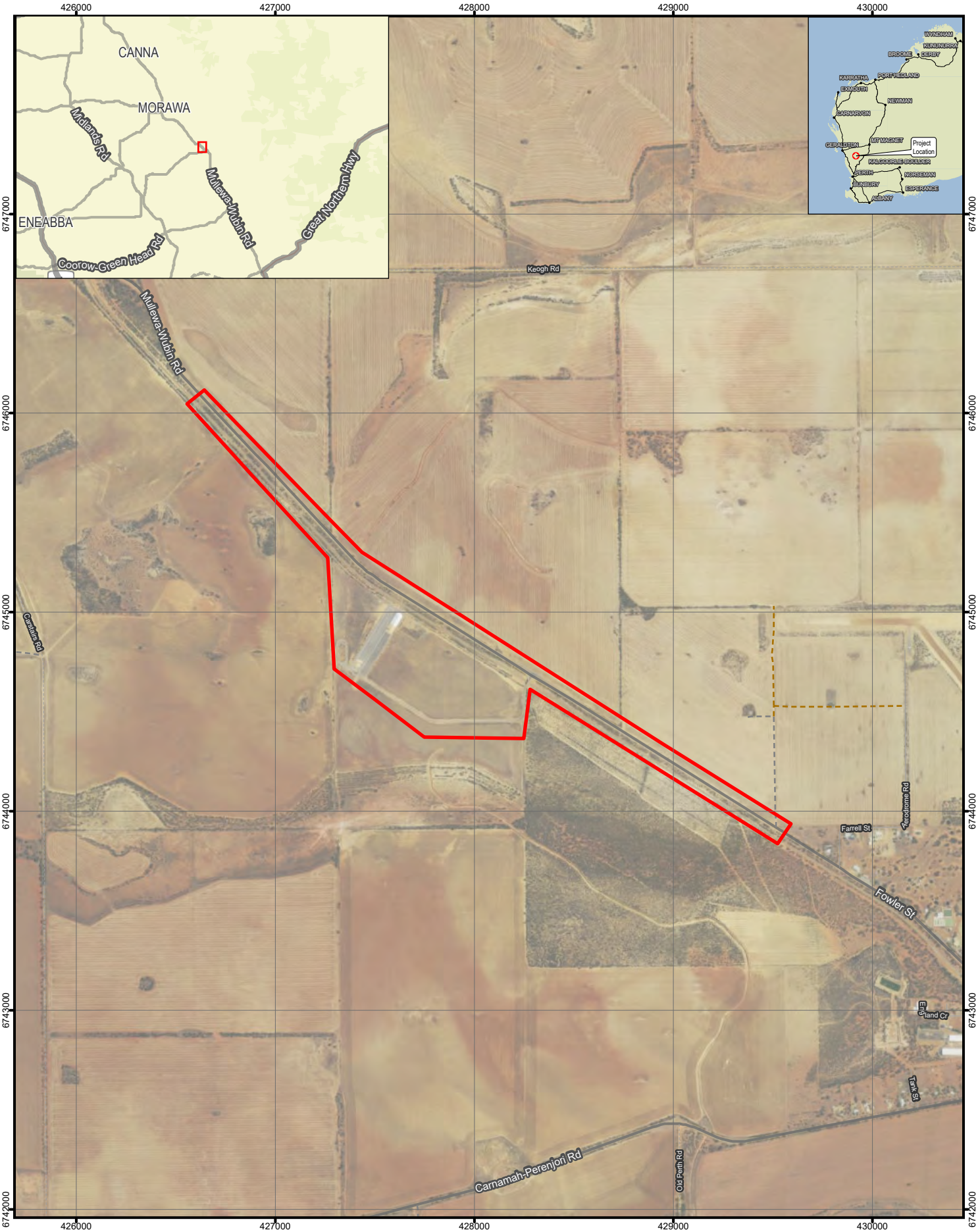
Perenjori is situated on Wildflower Way – a tourist drive that runs from Dalwallinu to Geraldton. Wildflower Way is characterised by a high diversity of native plants along the road verges that flower in the spring and serve as a tourist attraction to the region. The survey area extends along the road verges of Wubin-Mullewa Road which is part of the Wildflower Way Tourist Drive.

1.3 Objectives

The objective of this scope of work was to carry out a flora and vegetation survey of the Perenjori Survey Area. The purpose of the field survey was:

- to characterise floristic diversity, identify and map occurrences of conservation significant flora, identify, map and discuss the significance of any Threatened Ecological Communities (TECs) and Priority Ecological Communities (PECs),
- to classify and assess the condition of native vegetation within the survey area.

This report describes results of the flora and vegetation desktop assessment and field survey undertaken at the Perenjori site on 17 and 18 November 2022.



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LEGEND
Survey Area

Survey Area

CBH

PERENJORI DETAILED FLORA AND VEGETATION ASSESSMENT

PERENJORI

Figure
1

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2.0 Conservation Codes

2.1 Flora and Fauna

Species at risk of extinction are recognised at a Commonwealth level under the *Environment Protection, Biodiversity and Conservation Act 1999* (EPBC Act) and are categorised as outlined in Table 1.

Table 1 Categories of species listed under Schedule 179 of the EPBC Act

Code	Category
Ex	**Extinct Taxa** which at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
ExW	**Extinct in the Wild Taxa** which is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
CE	**Critically Endangered Taxa** which at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
E	**Endangered Taxa** which is not critically endangered and it is facing a very high risk of extinction in the wild in the immediate or near future, as determined in accordance with the prescribed criteria.
V	**Vulnerable Taxa** which is not critically endangered or endangered and is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
CD	**Conservation Dependent Taxa** which at a particular time if, at that time: the species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered the following subparagraphs are satisfied: the species is a species of fish the species is the focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised the plan of management is in force under a law of the Commonwealth or of a State or Territory cessation of the plan of management would adversely affect the conservation status of the species.
Mi	The EPBC Act also requires the compilation of a list of **migratory species** that are recognised under international treaties including the: Japan Australia Migratory Bird Agreement 1981 (JAMBA) China Australia Migratory Bird Agreement 1998 (CAMBA) Republic of Korea-Australia Migratory Bird Agreement 2007 (ROKAMBA) Bonn Convention 1979 (The Convention on the Conservation of Migratory Species of Wild Animals). All migratory bird species listed in the annexes to these bilateral agreements are protected in Australia as a MNES under the EPBC Act.
Ma	Species established under s248 of the EPBC Act.

Flora and fauna species that are considered Threatened and need to be specially protected because they are under identifiable threat of extinction are listed under the *Biodiversity Conservation Act 2016* (BC Act). These categories are defined in Table 2.

Table 2 Conservation codes for WA flora and fauna listed under the BC Act (DBCA, 2019)

Code	Category
CR	**Critically Endangered Species** Threatened species considered to be facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines. Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines.
EN	**Endangered Species** Threatened species considered to be facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines. Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines.
VU	**Vulnerable Species** Threatened species considered to be facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines. Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines.
EX	**Extinct Species** Species which have been adequately searched for and there is no reasonable doubt that the last individual has died, and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).
MI	**Migratory species** Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act). Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.
CD	**Species of special conservation interest (conservation dependent fauna)** Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).
OS	**Other specially protected species** Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

Species that have not yet been adequately surveyed to warrant being listed under the BC Act, or are otherwise data deficient, are added to a Priority List as Priority 1, 2 or 3 by the State Minister for Environment. Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are listed as Priority 4. Categories and definitions of Priority Flora and Fauna species are provided in Table 3.

Table 3 Conservation codes for WA flora and fauna as listed By DBCA and endorsed by the Minister for Environment

Code	Category
P1	**Priority One – Poorly Known Species** Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
P2	**Priority Two – Poorly Known Species** Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
P3	**Priority Three – Poorly Known Species** Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
P4	**Priority Four – Rare, Near Threatened and other species in need of monitoring** Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands. Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent. Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

2.2 Vegetation Communities

Threatened Ecological Communities (TECs) are naturally occurring biological assemblages that occur in a particular type of habitat and that may be subject to processes that threaten to destroy or significantly modify the assemblage across its range. TECs are listed by both State and Commonwealth legislation.

Communities can be classified as Threatened Ecological Communities (TECs) under the EPBC Act. Categories of EPBC Act listed TECs are described in Table 4.

Table 4 Categories of TECs that are listed under the EPBC Act

Code	Category
CE	**Critically Endangered** If, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future.
E	**Endangered** If, at that time, it is not critically endangered and is facing a very high risk of extinction in the wild in the near future.
V	**Vulnerable** If, at that time, it is not critically endangered or endangered, and is facing a high risk of extinction in the wild in the medium-term future.

Vegetation communities in Western Australia are described as TECs if they have been endorsed by the Western Australian Minister for Environment following recommendations made by the Threatened Species Scientific Committee. TECs are listed under the BC Act in one of four categories defined in Table 5.

The Department of Biodiversity, Conservation and Attractions (DBCA) maintains a database of state listed TECs which is available for online searches via their website. Possible TECs that do not meet survey criteria or are not adequately defined are listed as Priority Ecological Communities (PECs) under Priorities 1, 2 and 3. Ecological communities that are adequately known and are rare but not threatened, or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. Conservation dependent communities are classified as Priority 5. PECs are endorsed by the Minister for Environment and are described in Table 6.

DBCA requires that all Priority and Threatened ecological communities are considered during environmental impact assessments and clearing permit applications.

Table 5 Conservation codes for State listed Ecological Communities

Code	Category
PD	*Presumed Totally Destroyed*
CR	*Critically Endangered*
EN	*Endangered*
VU	*Vulnerable*

Table 6 Categories for Priority Ecological Communities

Code	Category
P1	**Priority One**: poorly-known ecological communities
P2	**Priority Two**: poorly-known ecological communities
P3	**Priority Three**: poorly known ecological communities
P4	**Priority Four**: ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list.

3.0 Existing Environment

3.1 Climate

The climate of Perenjori can be characterised by hot and dry summers, long and cold winters, and is typically windy and mostly clear year-round. Over the course of the year, the temperature typically varies from 7°C to 37°C.

The closest weather stations with recent rainfall observations is the Perenjori Weather Station (ID 008107), approximately 1 km from the township of Perenjori. Significantly higher than average rainfall was experienced in August and September preceding the survey, however the was no rainfall in October. The total rainfall in the 12 months preceding the survey was 48.3 mm higher than the long-term average (Figure 2).

The closest weather stations with recent temperature observations is the Morawa Airport Weather Station (ID 008296) approximately 37km from the township of Perenjori. The mean monthly maximum and minimum temperature in the 12 months preceding the survey was broadly similar to the long-term average.

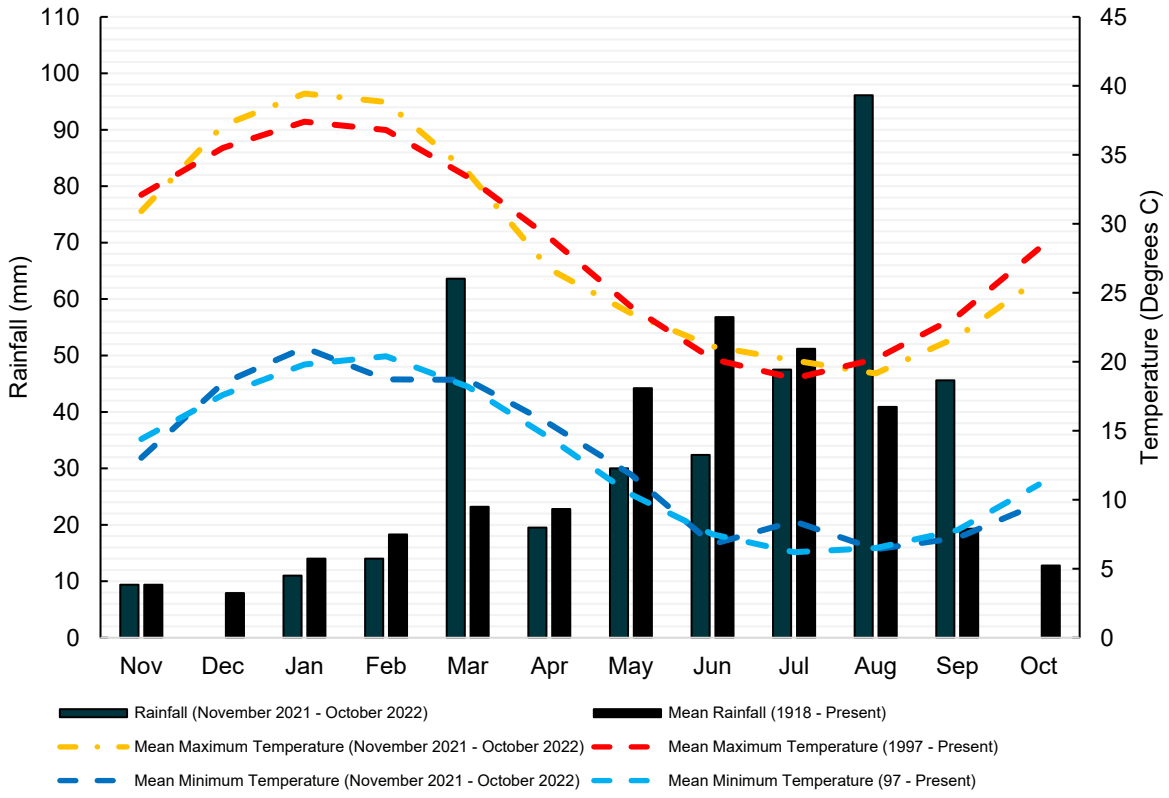


Figure 2 Climate statistics and rainfall and weather observations (BOM, 2023)

3.2 Interim Biogeographical Region of Australia Regions

The largest regional vegetation classification scheme recognised by Environmental Protection Authority (EPA) is the Interim Biogeographical Region of Australia (IBRA). The IBRA regions provide the planning framework for the systematic development of a comprehensive, adequate and representative (CAR) national reserve system. There are 89 recognised IBRA regions across Australia that have been defined based on climate, geology, landforms and characteristic vegetation and fauna (IBRA7, 2012).

Perenjori is situated in the Avon Wheatbelt IBRA region, which is characterised by gently undulating landscape with low relief. It lies on the Yilgarn Craton, an ancient block of crystalline rock, which was uplifted in the Tertiary and dissected by rivers. The craton is overlain by laterite deposits, which in places have decomposed into yellow sandplains, particularly on low hills. Steep-sided erosional gullies, known as breakaways, are common. The bioregion has a semi-arid Mediterranean climate, with hot, dry summers and mild winters, with most rainfall occurring in the winter months.

The survey site is situated in the Merredin IBRA subregion of the Avon Wheatbelt, where there is no connected drainage. In this subregion, streams, which are remnants of ancient drainage systems, flow only during wet years, and drain to chains of salt lakes.

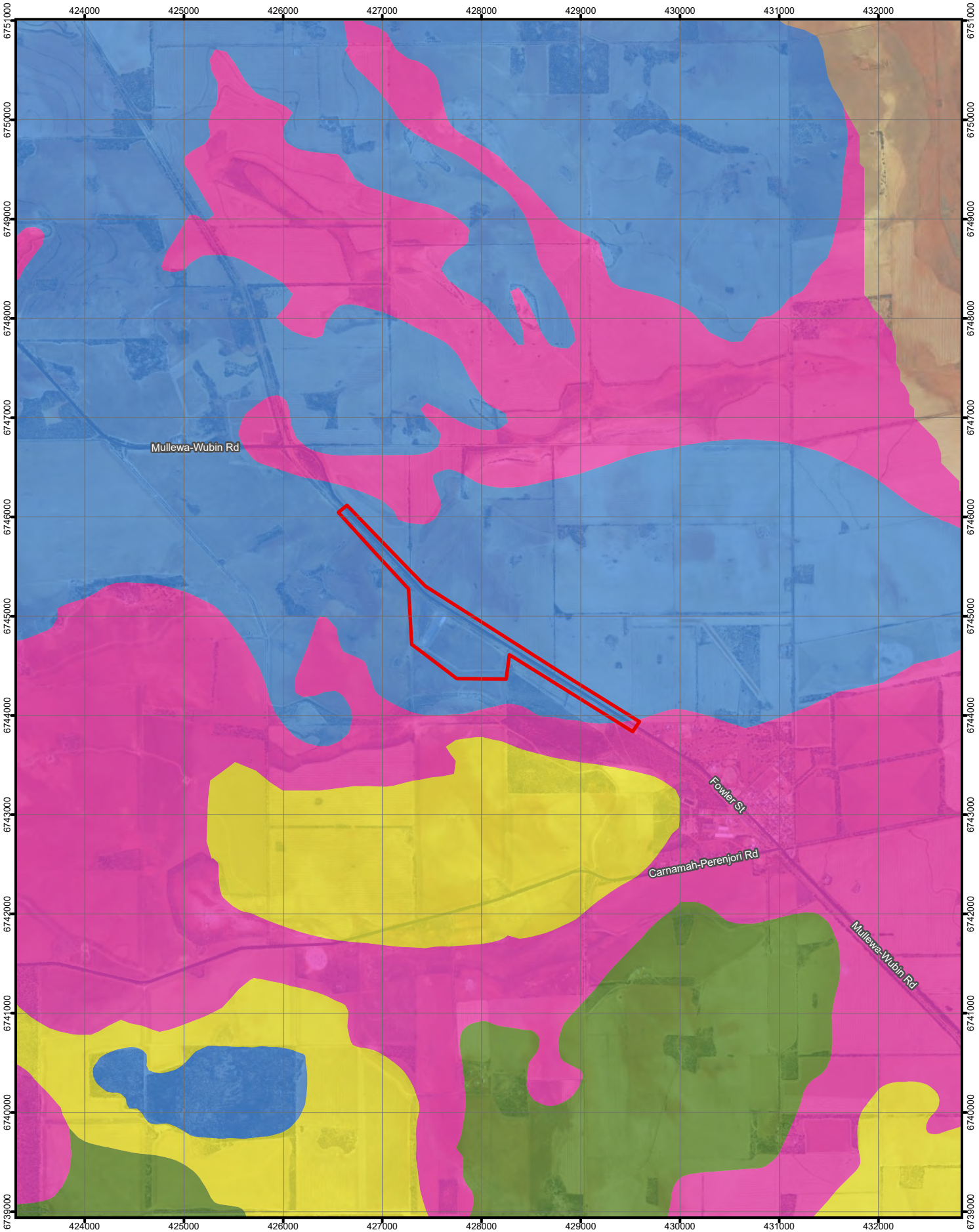
3.3 Geology and Landforms

The survey area is situated across three lands systems as mapped and described in DPIRD (2022).

Most of the Survey Area is situated on the Granada 1 Sub-system, which characterised by undulating plain to low rises with broad convex gently inclined slopes; yellow and brown deep sands and loamy earths and some shallow loams over red-brown hardpans.

The south-east corner of the Survey Area is situated on the Noolagabbi System, which is characterised by extensive level flats to very gently inclined slopes in broad valleys. Associated drainage networks are often saline.

The north-west corner of the Survey Area is situated on the Granada 5 Subsystem, which characterised by Undulating rises with broad gravelly ridge crests, long gentle gradients; yellow deep sands and sandy earths and some gravels (Figure 3).



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LEGEND
Survey Area
Land Systems
Granada System
Noolagabbi System
Pindar System
Rockdale System

Land Systems

CBH

PERENJORI DETAILED FLORA AND VEGETATION ASSESSMENT

PERENJORI

Figure
3

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3.4 Vegetation

Beard et al. (2013) mapping is used to determine the current extent of remnant vegetation remaining when compared to pre-European vegetation extent (Figure 4). The Beard (2013) vegetation association at the project site is Vegetation Association 352, characterised by Medium woodland; York gum (*Eucalyptus loxophleba*) & salmon gum (*Eucalyptus salmonophloia*). Vegetation association 352 has been largely cleared within Western Australia, the Avon Wheatbelt IBRA Regions, and the Shire of Perenjori (Table 7).

There are small patches of remnant native vegetation within the vicinity of the survey area, however native vegetation in the broader area has largely been cleared to make way for primary production.

Table 7 Beard et al. (2013) Vegetation Associations and Percent Remaining (Govt. of WA, 2019)

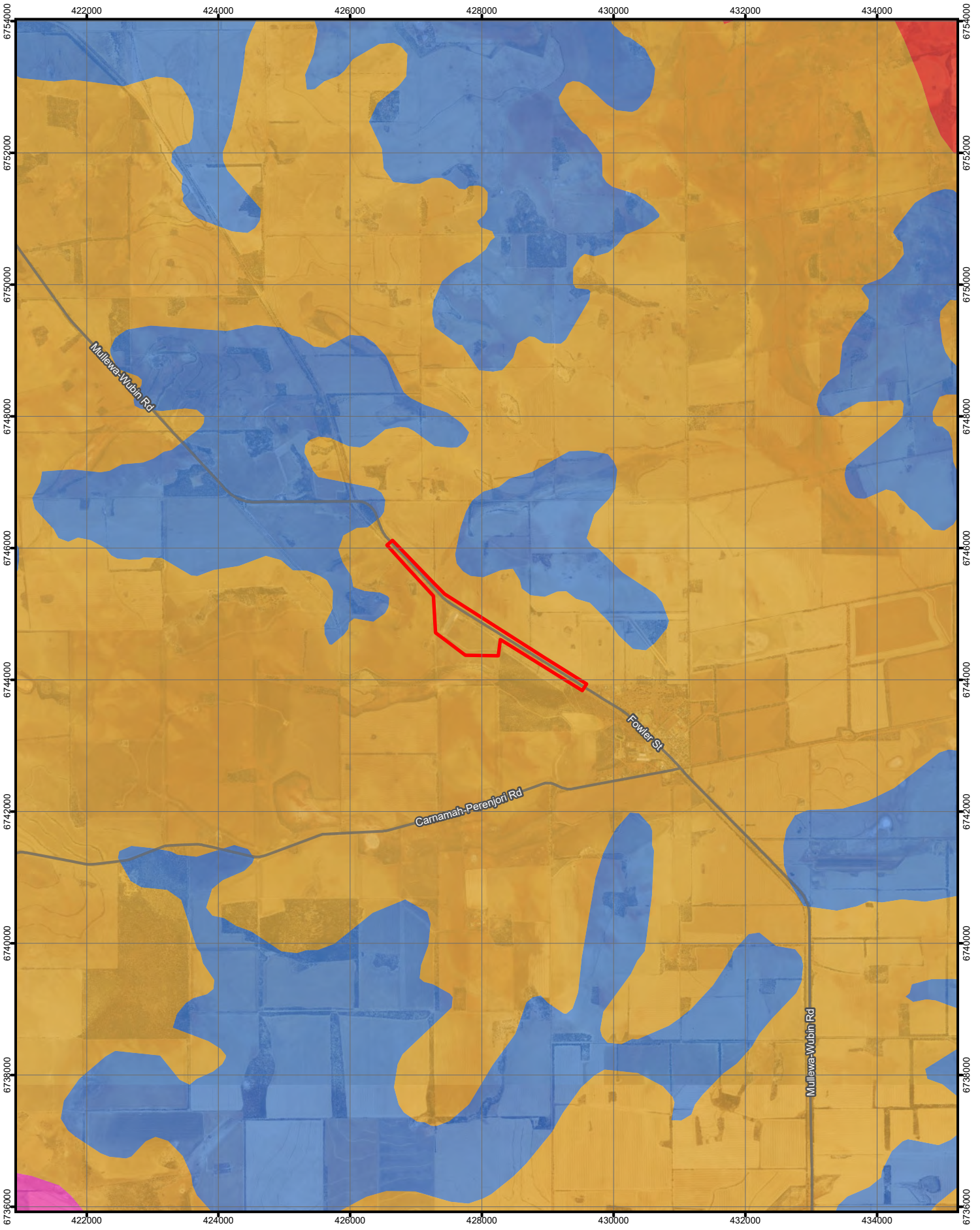
Vegetation Association	Description	Percentage Remaining (%)		
		Western Australia	Avon Wheatbelt IBRA Region	Shire of Perenjori
352	Medium woodland; York gum	19.61	17.27	29.99

3.5 Conservation Reserves and Environmentally Sensitive Areas

There are four DBCA Legislated conservation reserves or environmental sensitive areas within the vicinity of the survey area, listed in Table 8 and mapped in Figure 5. None of these occur in the survey area.

Table 8 Nature reserves within the vicinity of the Survey area

Name	Type	Purpose	Vegetation Association	Area (ha)	Distance from Survey Area (km)
Un-named	Nature Reserve	Conservation Of Flora and Fauna	551, 352	181.8	5.8
West Perenjori Nature Reserve	Nature Reserve	Conservation Of Flora and Fauna	551, 352	278.1	7.1
Bowgada Nature Reserve (1)	Nature Reserve	Conservation Of Flora and Fauna	551, 352	91.7	10.4
Bowgada Nature Reserve (2)	Nature Reserve	Conservation Of Flora and Fauna	551, 352	103.99	10.5



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LEGEND

Survey Area

Pre-European Vegetation (DPIRD-006)

1155, York gum / Shrublands; *Allocasuarina campestris* thicket

352,Wheatbelt; York gum, salmon gum etc. *Eucalyptus loxophleba*, *E. salmonophloia*. Goldfields; gimlet, redwood etc. *E. salubris*, *E. oleosa*. Riverine; rivergum *E. camaldulensis*. Tropical; *messmate*, woolyb

435,Wattle, *casuarina* and teatree *acacia-allocasuarina-melaleuca* alliance.

551,Wattle, *casuarina* and teatree *acacia-allocasuarina-melaleuca* alliance

Pre-European Vegetation

CBH

PERENJORI DETAILED FLORA AND VEGETATION ASSESSMENT

PERENJORI

Figure 4

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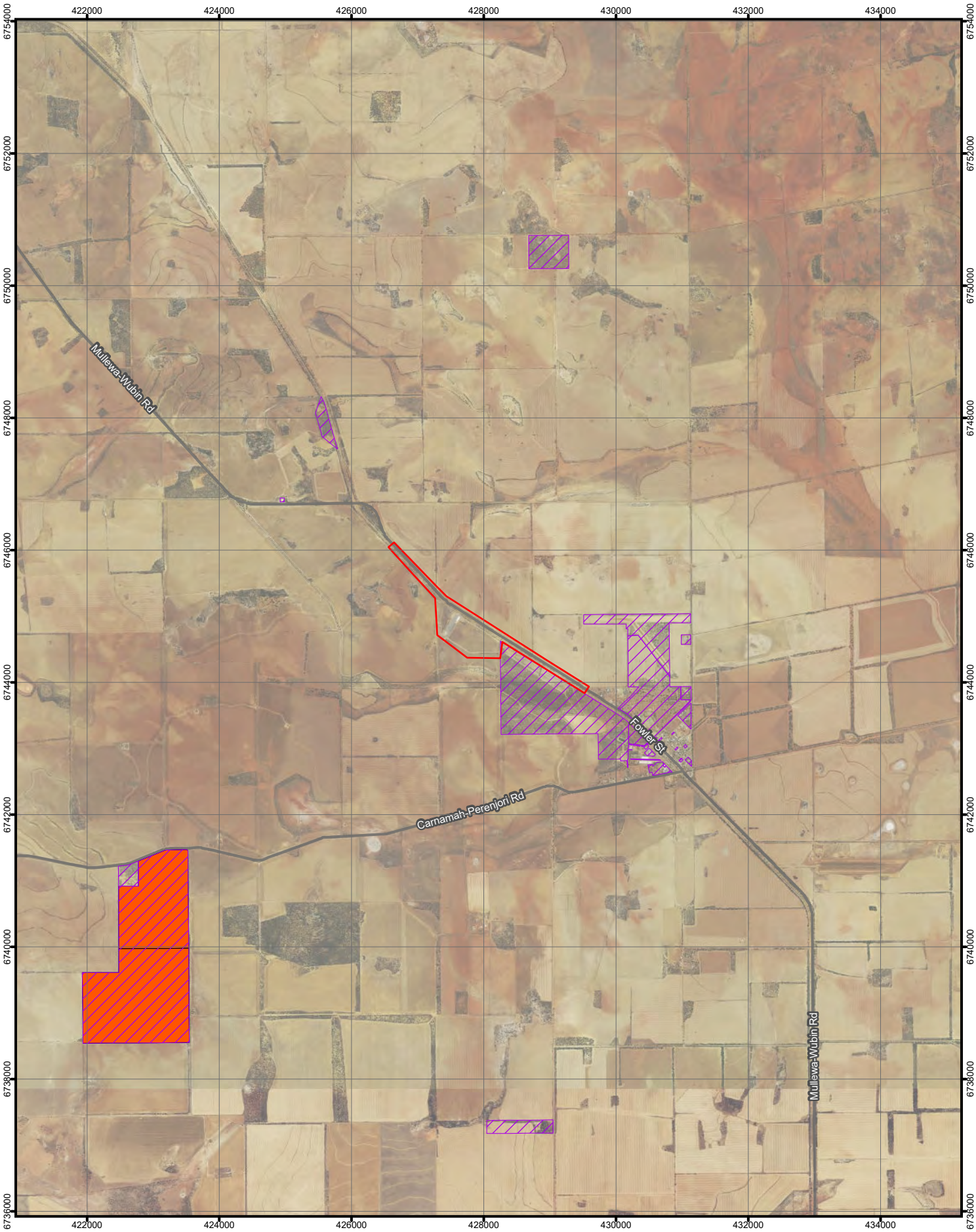

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LEGEND

- Survey Area
- Reserves (LGATE-227)

DBCA - Legislated Lands and Waters (DBCA-011)
- Nature Reserve

Reserves and Environmentally Sensitive Areas

CBH

PERENJORI DETAILED FLORA AND VEGETATION ASSESSMENT

PERENJORI

Figure

5

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4.0 Methodology

4.1 Desktop Study

A desktop study was undertaken prior to the field survey to identify significant environmental values likely to be present in the survey area including flora, and vegetation communities. Desktop database searches were requested from the following government databases (including a variable radius):

- DBCA Threatened Species and Communities database including Threatened and Priority flora (20 km buffer from survey area), and communities (20 km buffer from survey area).
- Western Australian Herbarium (WAH, 1998) records.
- EPBC Act Protected Matters Search Tool (PMST).

Significant flora species likelihood of occurrence was assessed systematically using a point-based system which takes into account proximity (<5km) and date (<20 years) of known records, presence within the Local Government Area (LGA) and habitat suitability (Table 9).

The likelihood of significant ecological communities occurring depends on the presence of suitable landforms, land systems, known occurrences and distance of known occurrences.

Table 9 Categories of likelihood of occurrence for flora species

Likelihood of Occurrence	Score	Definition
Known	6	Species is known to occur in the survey area.
Likely	5	Not known to occur in the survey area however there are records nearby and suitable habitat for the species is known or likely to be present within the survey area.
May	4 (if suitable habitat may be present within the survey area) 3 (if suitable habitat is known to be, or likely to be present)	Species is not known to occur within the survey area however there are nearby records AND/OR recent records OR records within the LGA AND suitable habitat for the species is known or likely to be present within the survey area. OR Not known to occur within the survey area but there are records nearby AND recent records AND records within the LGA, and suitable habitat for the species may be present (marginal habitat).
Unlikely	2,3	Species is not known to occur within the survey area but there are records nearby OR recent records OR within the LGA AND suitable habitat for the species may be present (marginal habitat).
Negligible (Suitable Habitat not Present)	1,2,3	Despite records nearby OR being present within the LGA OR recent records, no suitable habitat is present within the survey area and therefore the likelihood of the species occurring is negligible.

4.2 Flora and Vegetation Assessment

A detailed flora and vegetation assessment was undertaken utilising methods outlined in the *Flora Survey Technical Guide* (EPA, 2016). The field surveys were undertaken by Floora De Wit (collection permit FB62000137). Floora has 14 years' experience undertaking flora and vegetation assessments. Floora completed a Bachelor of Science in Environmental Biology (Environmental Restoration) and completed a Postgraduate Diploma in Environmental Management and Impact Assessment. Adam has five years' experience in environmental and ecological assessment. Adam completed a Bachelor of Biological Science and Master of Environmental Science.

The survey was undertaken on 17 and 18 November 2022. Data was collected from nine10 x10 m quadrats delineated with a measuring tape. The dataset was supplemented by one unbounded relevés and observation points. Data collected included the presence of plant species, their cover abundance, structural composition of vegetation, physical environment, and presence/absence of disturbance.

Each site was given a unique site number, and the following parameters recorded:

- date
- location using hand-held GPS (accuracy of 5 m)
- sample site type and size
- photograph (north-west corner)
- soil details (type, colour, moisture)
- landform
- vegetation condition
- fire history
- species list including:
    - estimated height
    - estimated percentage cover (for trees both percentage within relevé and within community was recorded to enable better description of vegetation community).

Any species unable to be identified in the field were collected for identification in AECOM's in-house herbarium and the specimens and taxonomic references and keys at the Western Australian Herbarium (WAH). Naming of species followed the convention of the WAH (1998).

4.2.1 Vegetation Mapping

Vegetation communities were described and mapped based on changes in dominant species composition and landform. Vegetation community descriptions were based on the Association Level V in accordance with the National Vegetation Information System (NVIS) Framework (DotEE, 2017a). Delineation of vegetation communities was supported by analysing floristic data collected within quadrats.

Vegetation community mapping was supported by assessing floristic similarity of quadrat and relevé data. The program Primer-e was used to conduct bray-curtis similarity analysis and produce dendrograms that illustrate this similarity. Data was incorporated using presence absence and scaled foliage (compositional) data. Scaling the foliage data overcomes the degree of error that is common in recording foliage and removes problems of subjectivity (Kent, 2012).

Vegetation condition was determined using the Keighery (1994) vegetation condition scale as recommended in the *Flora Survey Technical Guide* (EPA, 2016).

4.2.2 Targeted Flora Searches

Targeted searches were undertaken for conservation significant flora species that were known or likely to occur. A detailed field guide was produced which included photographs and describing morphological features that would assist in identifying the species in the survey area.

Where a potential Priority species was encountered, the following was recorded:

- location (using a hand-held GPS accuracy 5m)
- the number of individuals in the immediate population, or an estimate of the size (number) of the population with an estimated radius of its spatial extent plant height
- vegetation condition
- associated dominant species
- soil type and colour
- topography
- additional information relevant to the area including key characteristics and landforms.

5.0 Survey Limitations

No significant limitations were identified that may impact on the ability to use the data to inform the environmental impact assessment. Limitations of the biological surveys are discussed in Table 10.

Table 10 Limitations of the Perenjori flora and vegetation survey

Limitation	Flora and Vegetation Survey
Availability of contextual information on the region	**Nil** Contextual information was available using the DBCA database results and publicly available information. The BDS (2022) report was not made available until the field survey had been completed which presented a missed opportunity for incorporating previous survey results.
Competency/experience of consultant conducting survey	**Nil** The survey was led by Floora de Wit who has more than 15 years' experience undertaking flora and vegetation assessments.
Proportion of flora / fauna identified, recorded and/or collected (based on sampling, timing and intensity)	**Nil** The survey was undertaken in Spring following several months of average or above-average rainfall which maximises detection of flora species in the area. Floristic data was collected at 7 quadrats and 2 relevés from 18.45 ha of native vegetation. All areas of native vegetation were traversed on foot to undertake targeted searches.
Completion (is further work needed)	**Moderate** The objectives of the flora and vegetation assessment were met to delineate key flora and vegetation values including targeting significant flora and communities. Two significant small-leaf Myrtaceae species, *Enekbatus longistylis* and *Baeckea* sp. Perenjori, were not determined as Priority species in the field due to lack of flowering material and the difficulty in determining any small-leaf Myrtaceae. As such, they were not counted during the survey. Their identification relies on the observer being familiar with their habit, and the presence of flowering material aids in detection. Both species were sterile during the survey. No accurate counts of these individuals are available. Not all vegetation communities were represented by three or more quadrats as outlined in the EPA Technical Guidance. This was particularly relevant for communities less than 1 ha and communities that were Degraded.
Remoteness and/or access problems	**Nil** The entire survey area was traversed on foot.
Timing, weather, season, cycle	**Nil** The survey was undertaken during the ideal survey season of Spring as defined in the Technical Guide (EPA, 2016). Rainfall was near average in the months leading up to the survey and not expected to have influenced the outcome of the survey.
Disturbances (e.g. fire flood, accidental human intervention) which affected results of the survey	**Nil.** No disturbances were noted that may influence the outcome of the survey.

6.0 Desktop Assessment

6.1 Threatened and Priority Ecological Communities

The extrapolated mapping of the Eucalypt Woodlands of the WA Wheatbelt TEC overlaps with the survey area. No other Priority Ecological Communities (PECs) were considered likely to occur within the survey area.

The survey area is situated within the Wheatbelt Region of WA, at the north-central end of the known extent of the Eucalypt Woodlands of the WA Wheatbelt TEC, which was formerly extensive but now occurs mostly as small remnants, scattered across the Wheatbelt. Many patches are degraded (Commonwealth of Australia, 2016).

The Eucalypt Woodlands of the WA Wheatbelt TEC is nationally listed as Critically Endangered under EPBC Act. National protection applies to patches of Eucalypt Woodlands that are reasonably intact - they retain native understorey vegetation or important habitat features, such as large trees with hollows. Woodlands in the best, largely undisturbed condition are now rare, especially outside of nature reserves.

Woodland remnants that remain reasonably intact generally align with vegetation condition ratings used in southwestern Western Australia:

- For the Keighery (1994) condition scale, woodlands included are generally those rated as: Pristine – Excellent – Very good – Good.
- For the Roadside Conservation Value (RCV) rating of the Roadside Conservation Committee of WA, woodlands included are generally those rated as High – Medium-High.

Patches of Woodland considered ‘Good’ (Keighery 1994) or High and Medium-high (RCV) must be of a minimum size and meet specific criteria as described in Table 11 to be considered TEC. For patches that occur as roadside verges, a minimum patch width of 5 metres applies total Eucalypt Woodlands, and the patch must meet the exotic plant species understorey cover / presence of mature trees criteria.

Table 11 Minimum patch size and floristic characteristics criteria

Minimum Patch Size	Floristic Characteristics Criteria
2 ha	Applies where: • A high-quality native understorey remains – i.e. no more than 30% total vegetation cover is exotic plant species. OR • Exotic plant species account for 30 to 50% of total vegetation understorey cover, AND mature trees are present, with at least 5 such trees per 0.5 ha. Mature trees have a diameter at breast height of 30 cm or more, and often contain hollows.
5 ha	Applies where: • Exotic plant species account for 30 to 50% of total vegetation understorey cover BUT there are no or less than 5 mature trees present per 0.5 ha OR • Exotic plant species account for 50 to 70% of total vegetation understorey cover AND mature trees are present, with at least 5 such trees per 0.5 ha.

6.2 Conservation Significant Flora

A total of 105 significant flora species were identified as occurring within 40 km of the survey area. Of these three species are known to occur from DBCA records and BDS (2022) and two species were considered ‘likely’ to occur (Table 12). Another 29 species ‘may’ occur. These species represent those that are known from old records, where suitable habitat potentially occurs, and/or the nearest known record is more than 10 km from the survey area.

The exclusion of many significant species (70 species) as being ‘likely’ or ‘may’ occur in the survey area is due to lack of suitable habitat. Many significant species require specific landforms including ironstone, creeklines, breakaways, or hills. The survey area lacks these unique features therefore these species were considered as ‘negligible’ or in some cases of uncertainty, ‘unlikely’ to occur.

The comprehensive desktop study is presented in Appendix A.

Table 12 Conservation significant flora species that are known and/or likely to occur

Species	Cons. Code[1]		Habitat[2]
	EPBC Act	BC Act / DBCA	
Known			
Grevillea asparagoides		P3	Gravelly loam, white or yellow sand.
Grevillea granulosa		P3	Gravelly sand, loam, clay. Sandplains.
Leptospermum exsertum		P1	Sandy soils. Sandplains.
Likely			
Dasymalla axillaris	CE	CR	Native Foxglove grows in sandy soils. The species is thought to be a disturbance opportunist.
Enekbatus longistylus		P3	Yellow sand. Sandplains.

1. Conservation codes EPBC Act CE Critically Endangered, BC Act, CR Critically Endangered, P Priority
2. Habitat derived from WAH (1998) Florabase

Figure 6 Desktop Significant Flora and Communities

7.0 Field Survey Results

7.1 Vegetation

Four native vegetation communities were described and mapped representing three broad floristic formations:

- Eucalyptus Mid Open Woodland – ElsEttCe mapped for 0.73 ha representing 1% of the survey area.
- Grevillea Tall Open Shrubland – GofWaa mapped for 9.54 ha representing 8% of the survey area.
- Melaleuca Tall Open Shrubland – EeMhAe mapped for 7.12 ha representing 6% of the survey area.
- Acacia Tall Open Shrubland – AcCm mapped for 1.06 ha, representing 1% of the survey area.

Non-native vegetation includes Planted which represents tree windbreaks and shrubs, and Cleared. Planted and Cleared were mapped for 105.59 ha, representing 85% of the survey area.

The Eucalyptus Mid Open Woodland was represented by one quadrat and one relevé to inform the Eucalypt Woodlands of the WA Wheatbelt TEC assessment, presented in Section 7.2.

Descriptions of the communities are presented in Table 13 and mapped in Figure 8.

Table 13 Vegetation community descriptions and photographs

Description	Additional Detail	Photograph
GofWaa Grevillea Open Shrubland *Grevillea obliquistigma* subsp. *funicularis, Grevillea paradoxa* and *Leptospermum exsertum* (P1) tall to low open shrubland over *Waitzia acuminata* var. *acuminata, Ecdeiocolea monostachya* and *Amphipogon caricinus* var. *caricinus* low mixed open forb/grass land. Includes populations of significant flora; *Leptospermum exsertum* (P1), *Grevillea granulosa* (P3) and *Baeckea* sp. Perenjori (J.W. Green 1516) (P2).	Survey effort: quadrats 3, 6, 9 Flora diversity: 49 native species Area: 9.54 ha, 8% of survey area	
EeMhAe Melaleuca Open Shrubland *Eucalyptus ebbanoensis* low isolated clumps of mallee trees over *Melaleuca hamata, Acacia burkittii* and *Grevillea asparagoides* (P3) mid open shrubland over *Austrostipa elegantissima, Chrysitrix distigmatosa* and *Waitzia acuminata* var. *acuminata* low open mixed grass and forbland. Includes populations of Priority flora *Grevillea asparagoides* (P3) and *Leptospermum exsertum* (P1).	Survey effort: quadrats 4 and 5, relevé 7 Flora diversity: 64 native and 3 weed species Area: 7.12 ha, 6% of survey area	

Description	Additional Detail	Photograph
ElsEttCe Eucalypt Open Woodland *Eucalyptus loxophleba* subsp. *supralaevis* and *Eucalyptus horistes* mid to low open mixed woodland and mallee woodland over *Enchylaena tomentosa* var. *tomentosa, Chenopodium gaudichaudianum* and *Rhagodia drummondii* mid open shrubland over *Calandrinia eremaea, Leontodon rhagadioloides* and *Austrostipa elegantissima* tall to low mixed forb and grassland. Includes weedy grasses blown in from adjacent paddocks.	Survey effort: quadrat 1 and relevé 8 Flora diversity: 29 native and 7 weed species Area: 0.73 ha, 1% of survey area	
AcCm Acacia Open Shrubland *Acacia coolgardiensis, Grevillea granulosa* and *Darwinia capitellata* tall to mid open shrubland over *Calocephalus multiflorus, Waitzia acuminata* var. *acuminata* and *Trachymene pilosa* low open forbland. Evidence of historical disturbance, i.e. buried pipeline, gravel pit.	Survey effort: quadrat 2 Flora diversity: 23 native and 1 weed species Area: 1.06 ha, 1% of survey area	
Cleared and Planted	Area: 105.59 ha, 85% of survey area	

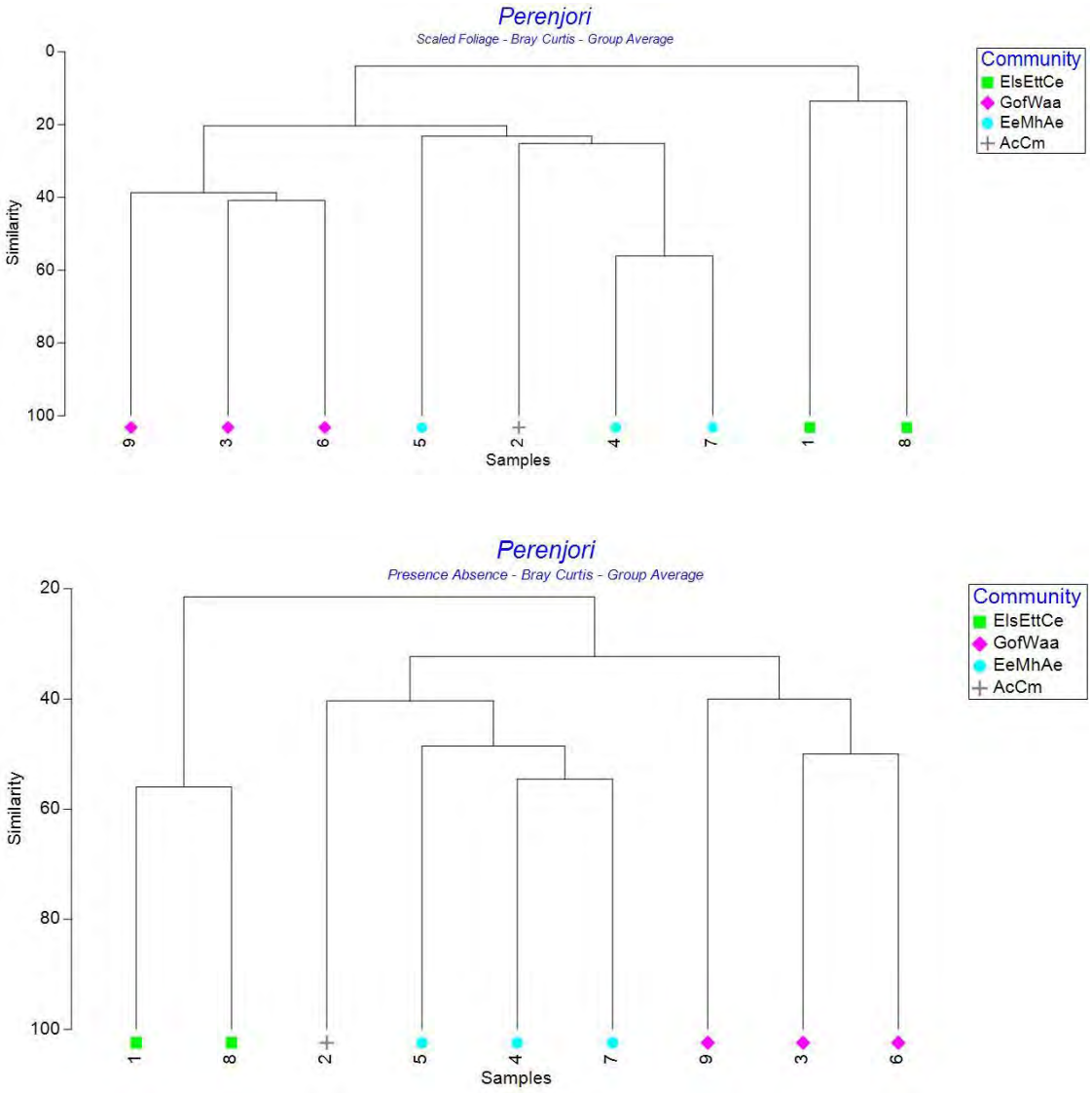


Figure 7 Graphs showing similarity of quadrat and relevé data symbolised by community. Analysis was done using scaled foliage cover (above) and presence-absence (below)

7.2 Significant Vegetation

The Eucalypt Woodland of the WA Wheatbelt TEC was considered likely to occur. It has been mapped in the survey area by DBCA using extrapolated mapping of aerial imagery. All patches of Eucalypt Woodlands (excluding Mallee Woodlands) were assessed against the key diagnostic characteristics outlined in Eucalypt Woodlands of the WA Wheatbelt Conservation Advice (DEE, 2015).

Two patches of Eucalypt Woodlands were assessed, represented by vegetation community ElsEttCee. Patch 1 is an isolated occurrence situated between the rail corridor and an adjacent paddock. The Patch is 0.29 ha of Very Good condition vegetation and is represented by quadrat 1.

The patch does not meet the key diagnostic characteristics (Table 14) to be considered part of the federally protected TEC for the following reasons:

- Minimum size threshold is 2 ha for non-roadside vegetation. The patch is 0.48 ha and does not extend beyond the survey area boundary
- The dominant overstorey species is *Eucalyptus loxophleba* subsp. *supralaevis* which is recognised as an associated canopy species, but is not a key species.

Table 14 Eucalypt Woodland TEC Assessment – Patch 1

<table>
<tr><td>Patch Assessment</td><td>Patch 1 represented by quadrat 1</td></tr>
<tr><td>Distribution</td><td>Patch is situated in the Avon Wheatbelt</td></tr>
<tr><td>Structure with minimum crown cover of 10%</td><td><table><tr><th>Tree</th><th>Q1</th></tr><tr><td>E. loxophleba subsp. loxophleba</td><td>30%</td></tr></table></td></tr>
<tr><td>Tree species are key species</td><td>No, this subspecies of E. loxophleba is no listed in Table 2a of DEE (2015) as key species.</td></tr>
<tr><td>Native understorey is present</td><td>Foliage cover excludes trees.<table><tr><th>Parameter</th><th>Q1</th></tr><tr><td>Species diversity</td><td>24</td></tr><tr><td>Native foliage cover</td><td>43%</td></tr><tr><td>Weed foliage cover</td><td>11.7%</td></tr></table></td></tr>
<tr><td>Condition</td><td>Very Good</td></tr>
<tr><td>Size</td><td>0.48 hectares, does not extend beyond survey area boundary.</td></tr>
<tr><td>Photographs</td><td>  </td></tr>
</table>

Patch 2 is a patch of ElsEttCee at the southeastern extent of the survey area (Figure 8). It is represented by relevé 8 which was undertaken in a narrow corridor of vegetation between private property and the rail access road.

The dominant overstorey tree is *Eucalyptus loxophleba* subsp. *supralaevis.* This tree is not recognised as a "key overstorey species" in the Eucalypt Woodland of the WA Wheatbelt Conservation Advice (DEE, 2015). As such, the patch does not meet the key diagnostic characteristics to represent the federally protected TEC, presented in Table 15.

It would meet condition and size thresholds if the entire patch was considered beyond the Survey Area. Further verification of patch condition and dominant overstorey species outside the Survey Area would be required.

Table 15 Eucalypt Woodland TEC Assessment – Patch 2

<table>
<tr><td>Patch Assessment</td><td>Relevé 8</td></tr>
<tr><td>Distribution</td><td>Patch is situated in the Avon Wheatbelt</td></tr>
<tr><td>Structure with minimum crown cover of 10%</td><td><table><tr><th>Tree</th><th>R8</th></tr><tr><td>E. loxophleba subsp. supralaevis</td><td>20%</td></tr></table></td></tr>
<tr><td>Tree species are key species</td><td>No, this subspecies of E. loxophleba is no listed in Table 2a of DEE (2015) as key species.</td></tr>
<tr><td>Native understorey is present</td><td>Foliage cover excludes trees<table><tr><th>Parameter</th><th>R8</th></tr><tr><td>Species diversity</td><td>24</td></tr><tr><td>Native foliage cover</td><td>43%</td></tr><tr><td>Weed foliage cover</td><td>0.1%</td></tr></table></td></tr>
<tr><td>Condition</td><td>Very Good, partial clearing evident. Low weed cover. Represents edge of larger patch.</td></tr>
<tr><td>Size</td><td>0.25 ha, part of larger patch extending outside survey area over 50 ha total.</td></tr>
<tr><td>Photographs</td><td>  </td></tr>
</table>

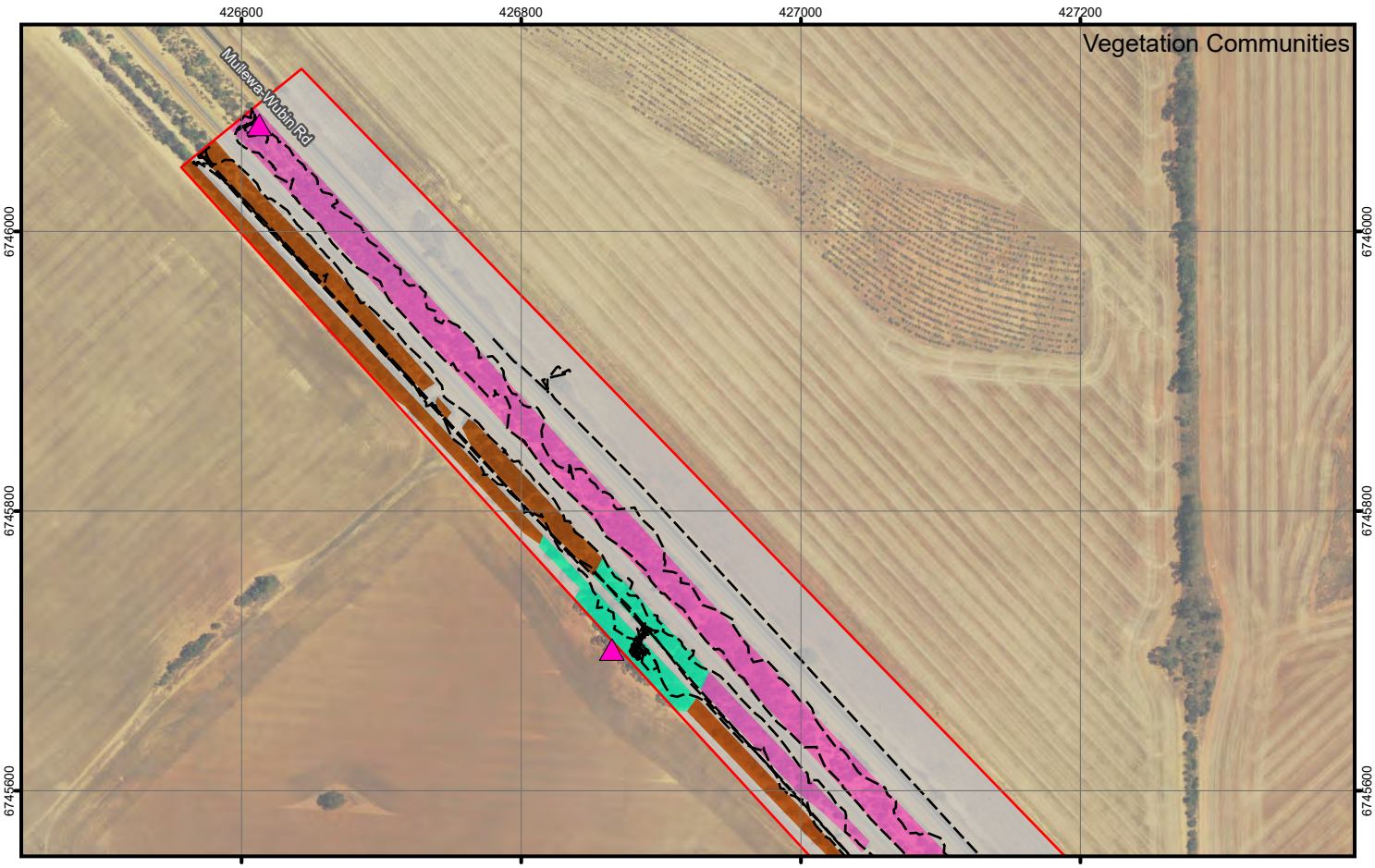
7.3 Vegetation Condition

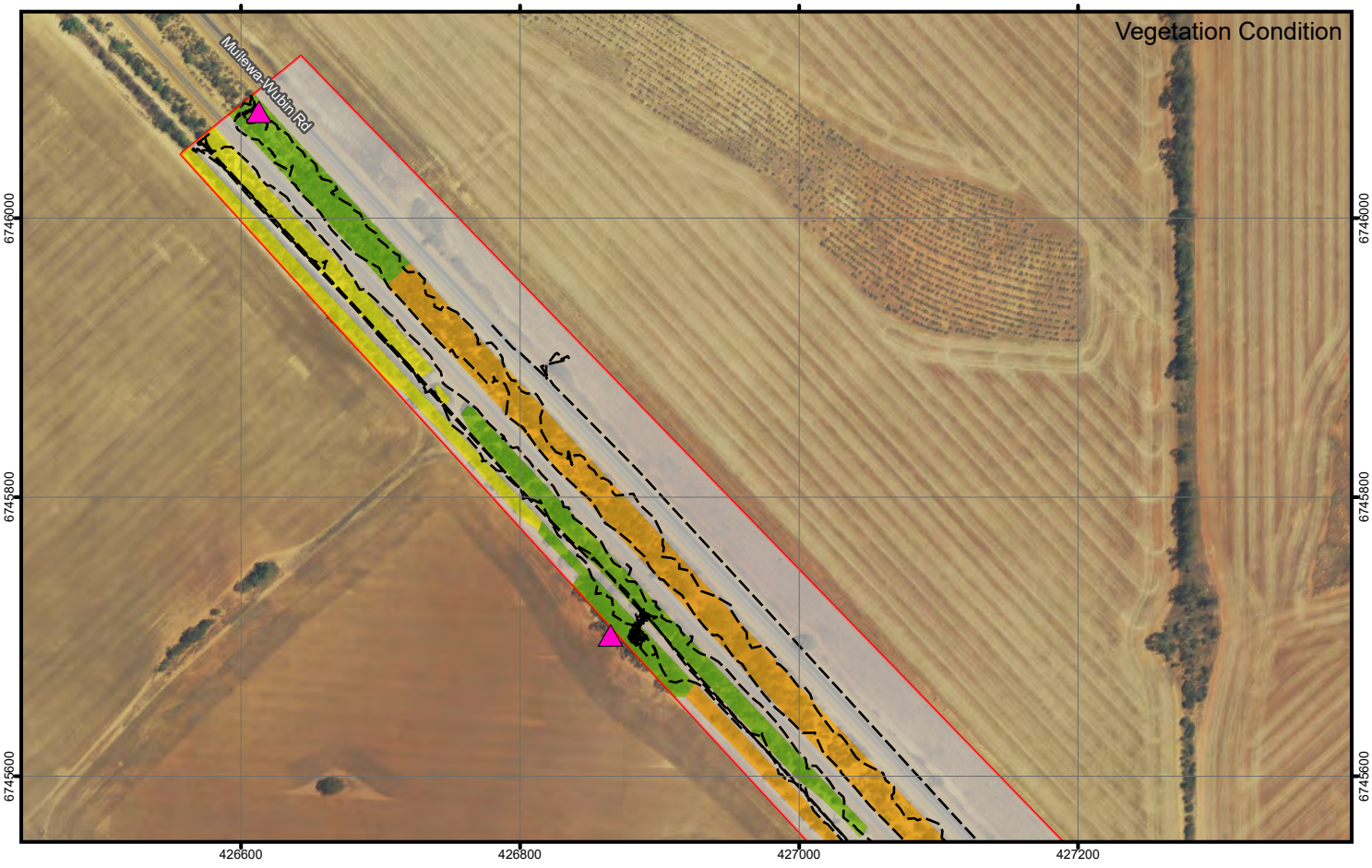
Vegetation condition varied between Very Good and Completely Degraded (Table 16). The majority of the survey area is Cleared, representing 105.03 ha (85%). Areas mapped as Completely Degraded represent planted vegetation. The rest represented linear corridors that varied between Degraded and Very Good. Condition decline was evident in the form of weed invasion, historical disturbance (buried pipeline), and gravel extraction (Plate 1). Numerous infrastructure corridors (road, rail and rail access road) intersect the survey area resulting in edge effects including clearing (vehicle turnaround points) and erosion (sedimentation).

Table 16 Vegetation condition extent

Condition	Extent (ha)	Percent of Native Vegetation
Very Good	8.55	7%
Good	4.04	3%
Degraded	5.86	5%
Completely Degraded	0.56	0%
Cleared	105.03	85%

Plate 1 Condition of the survey area including roadside / rail edge (above) and potentially a buried pipeline (below)





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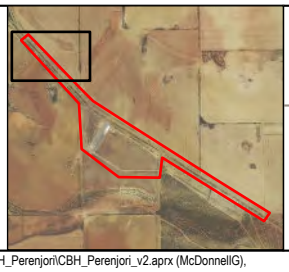
LEGEND

- Survey Area
- Quadrat
- Tracklog

Vegetation Communities
- Cleared
- EeMhAe
- ElsEttCe
- GofWaa

Vegetation Condition
- Very Good
- Good
- Degraded
- Cleared



Vegetation Communities and Condition

CBH

PERENJORI DETAILED FLORA AND VEGETATION ASSESSMENT

PERENJORI

Figure 8.1

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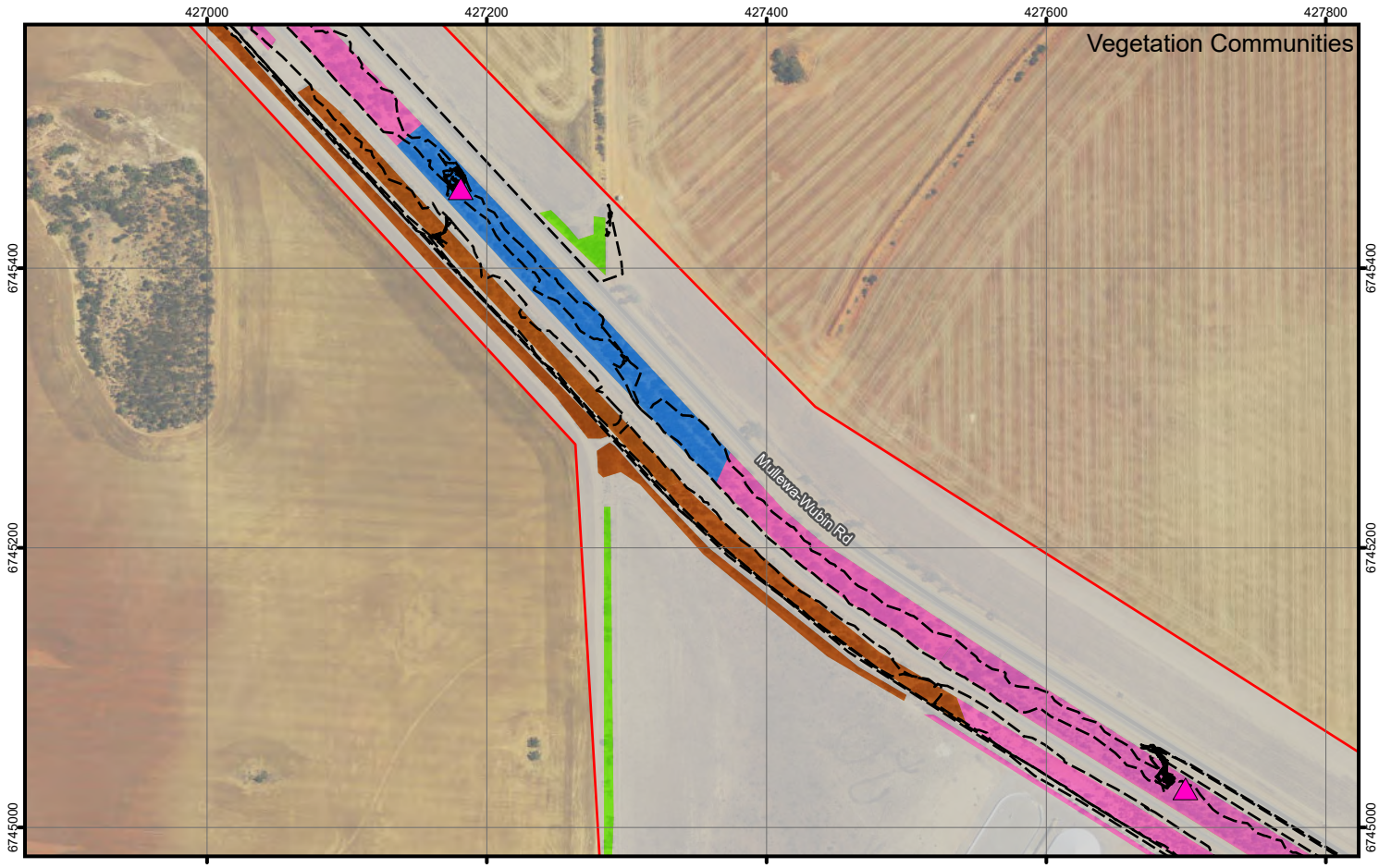

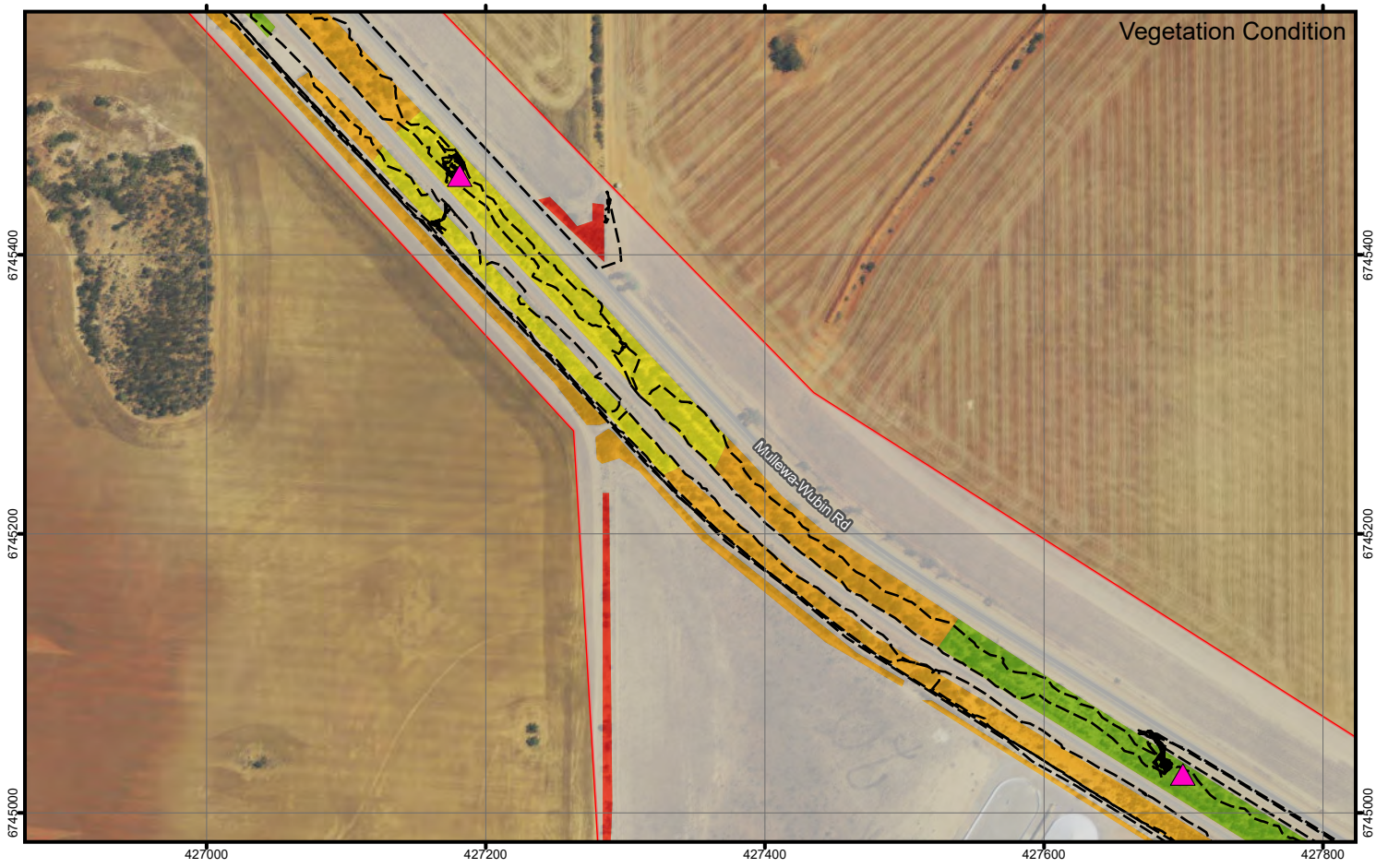

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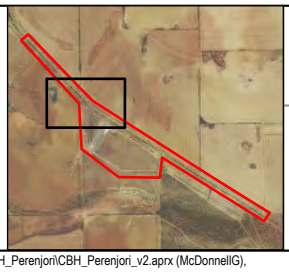
LEGEND

- Survey Area
- Quadrat
- Tracklog

Vegetation Communities
- AcCm
- Cleared
- EeMhAe
- GofWaa
- Planted

Vegetation Condition
- Very Good
- Good
- Degraded
- Completely Degraded
- Cleared



Vegetation Communities and Condition

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PERENJORI DETAILED FLORA AND VEGETATION ASSESSMENT

PERENJORI

Figure 8.2

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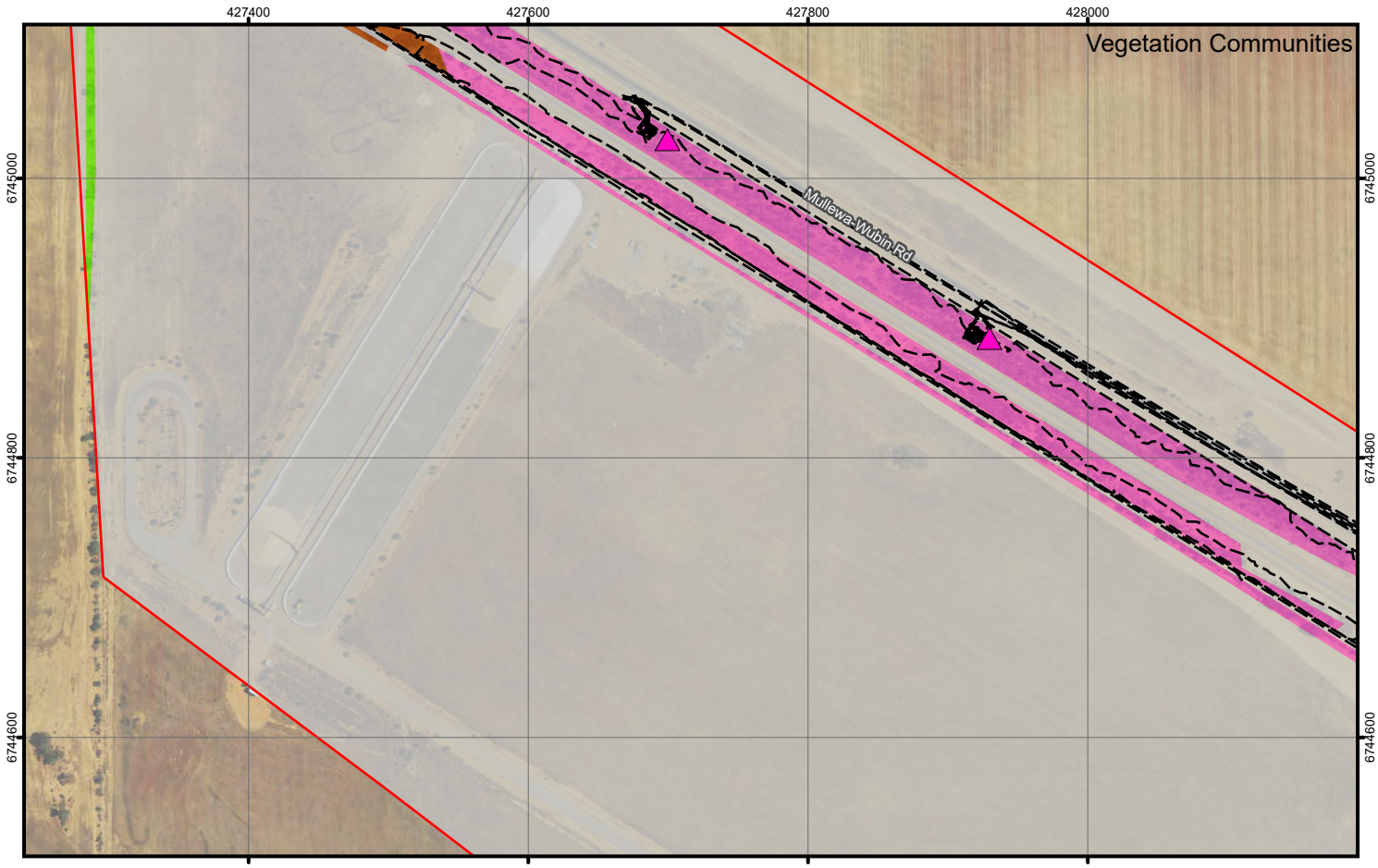

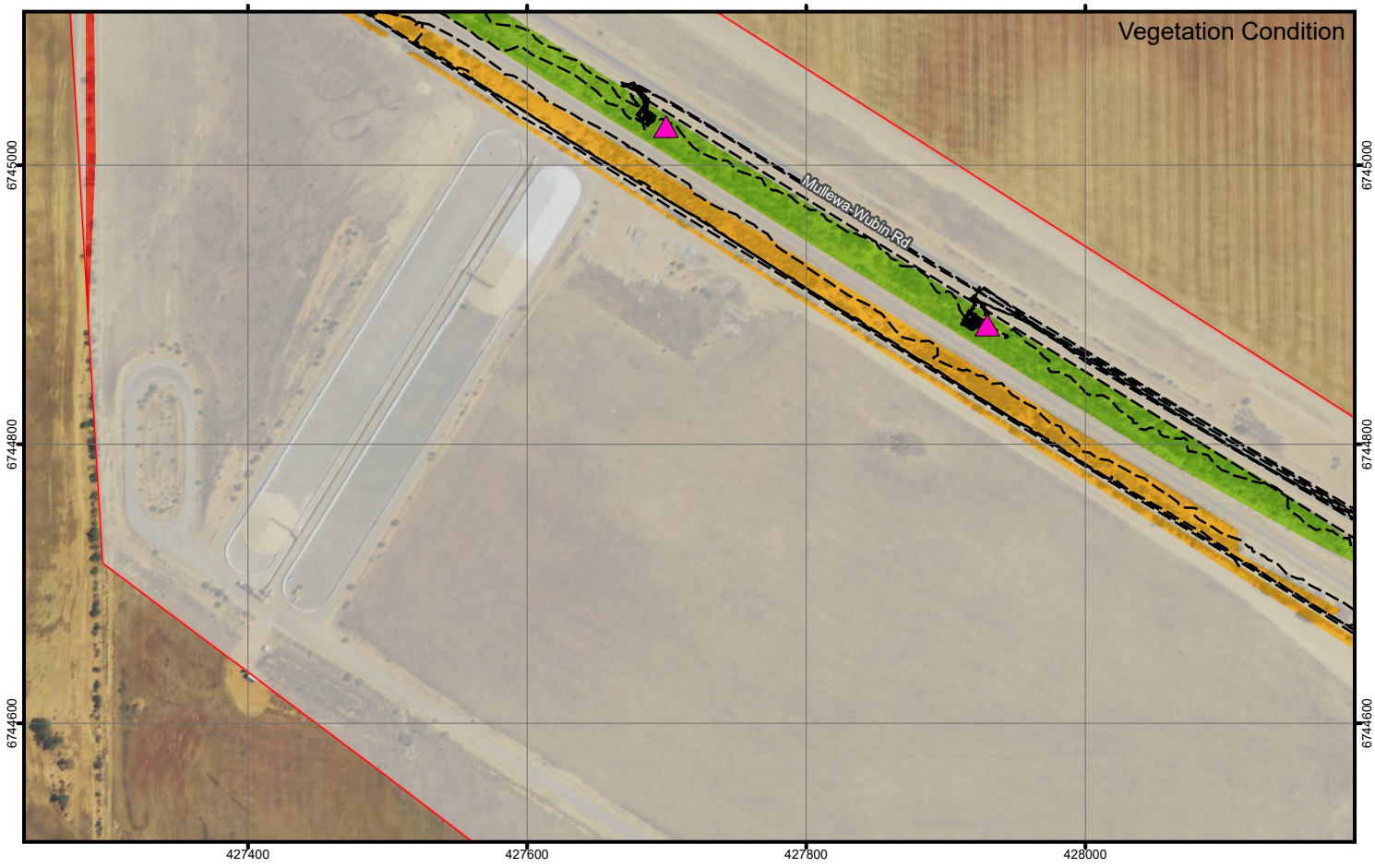

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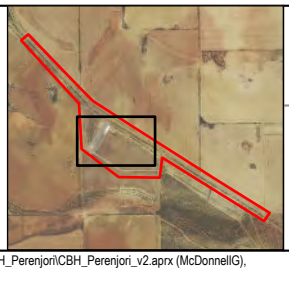
WMS:

LEGEND

- Survey Area
- Quadrat
- Tracklog

Vegetation Communities
- Cleared
- EeMhAe
- GofWaa
- Planted

Vegetation Condition
- Very Good
- Degraded
- Completely Degraded
- Cleared



Vegetation Communities and Condition

CBH

PERENJORI DETAILED FLORA AND VEGETATION ASSESSMENT

PERENJORI

Figure 8.3

A4 size

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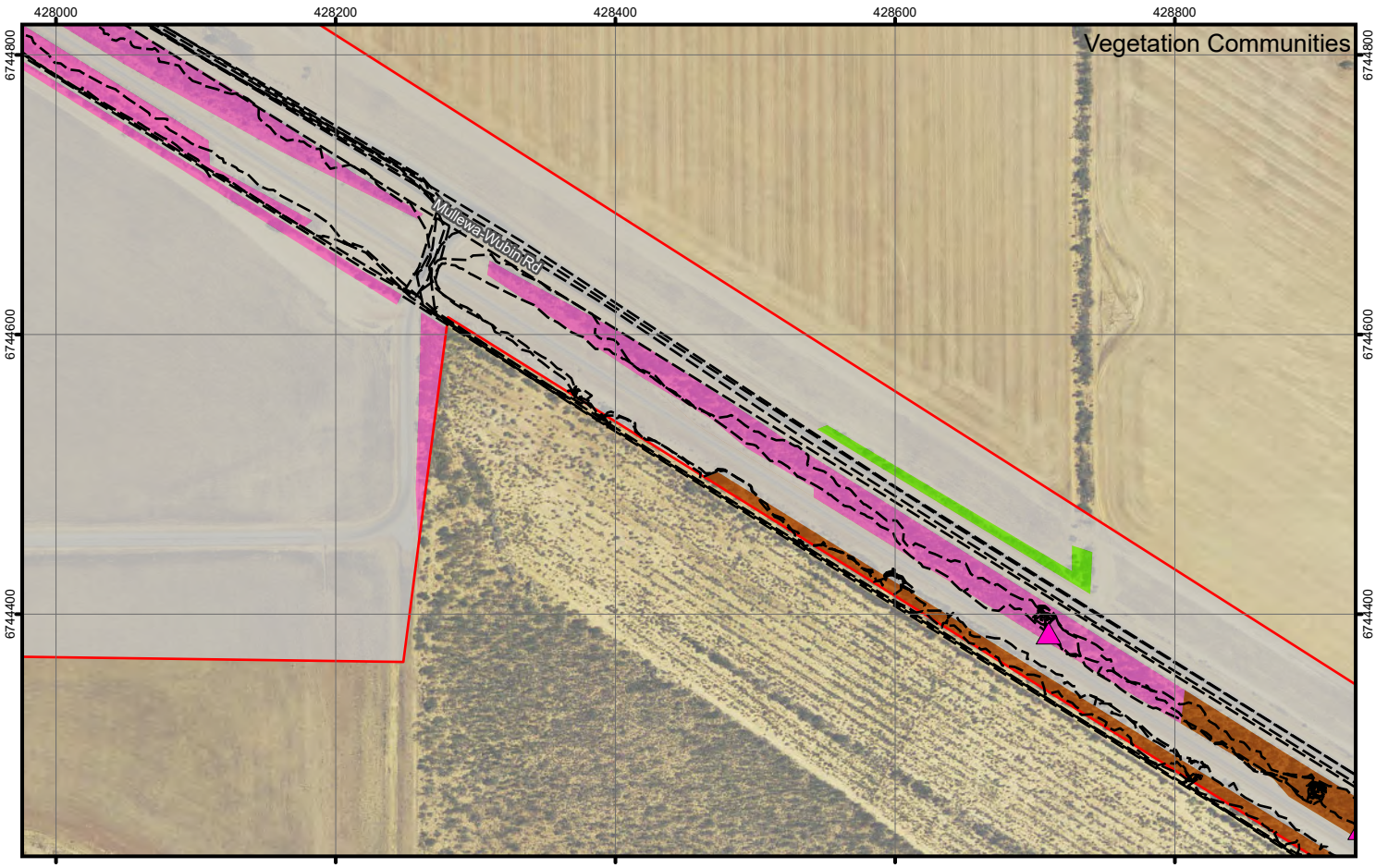

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- Survey Area
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Vegetation Condition
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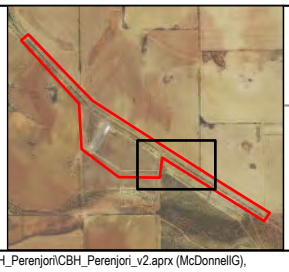
- Completely Degraded
- Cleared



Vegetation Communities and Condition

CBH

PERENJORI DETAILED FLORA AND VEGETATION ASSESSMENT

PERENJORI

Figure 8.4

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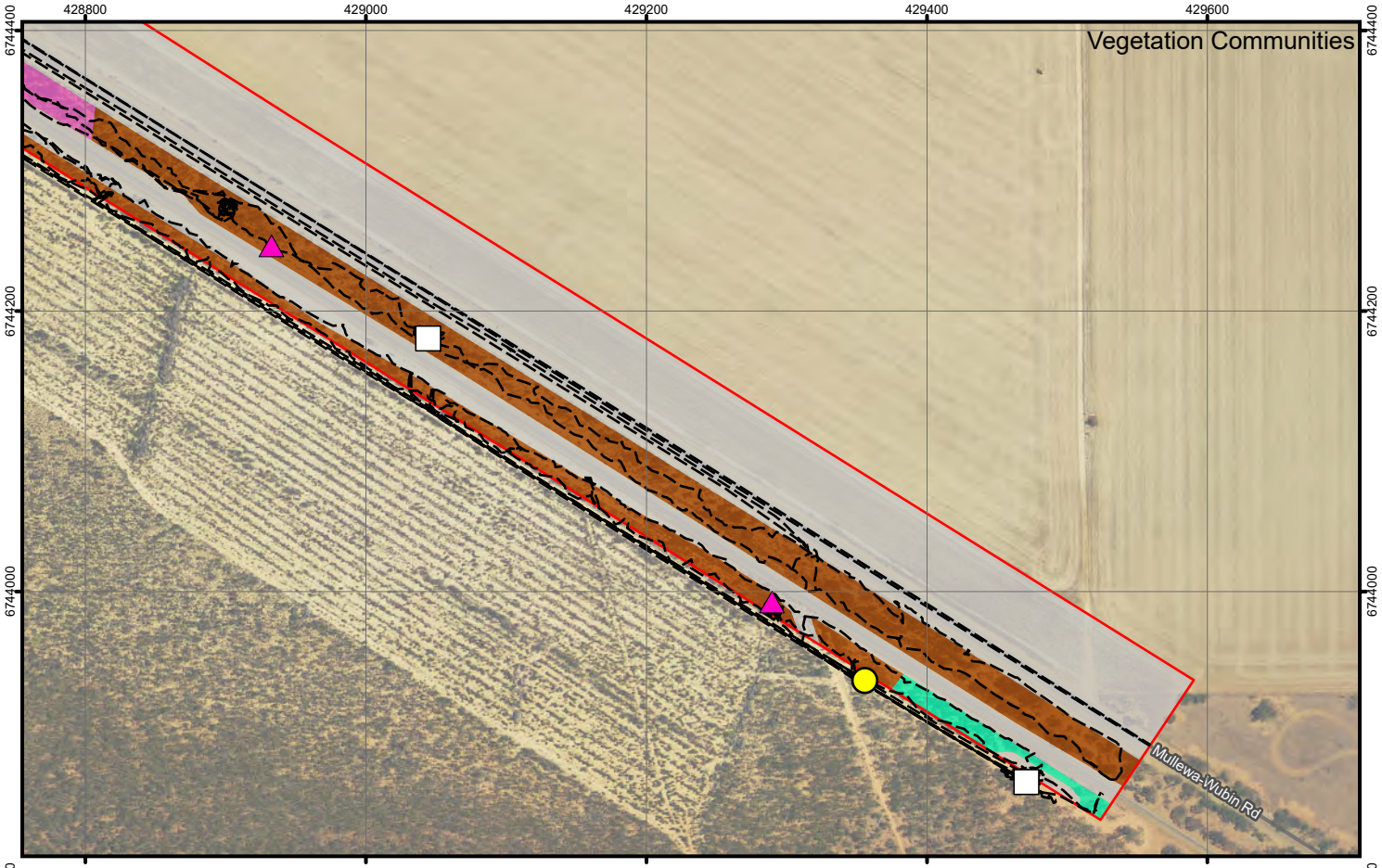

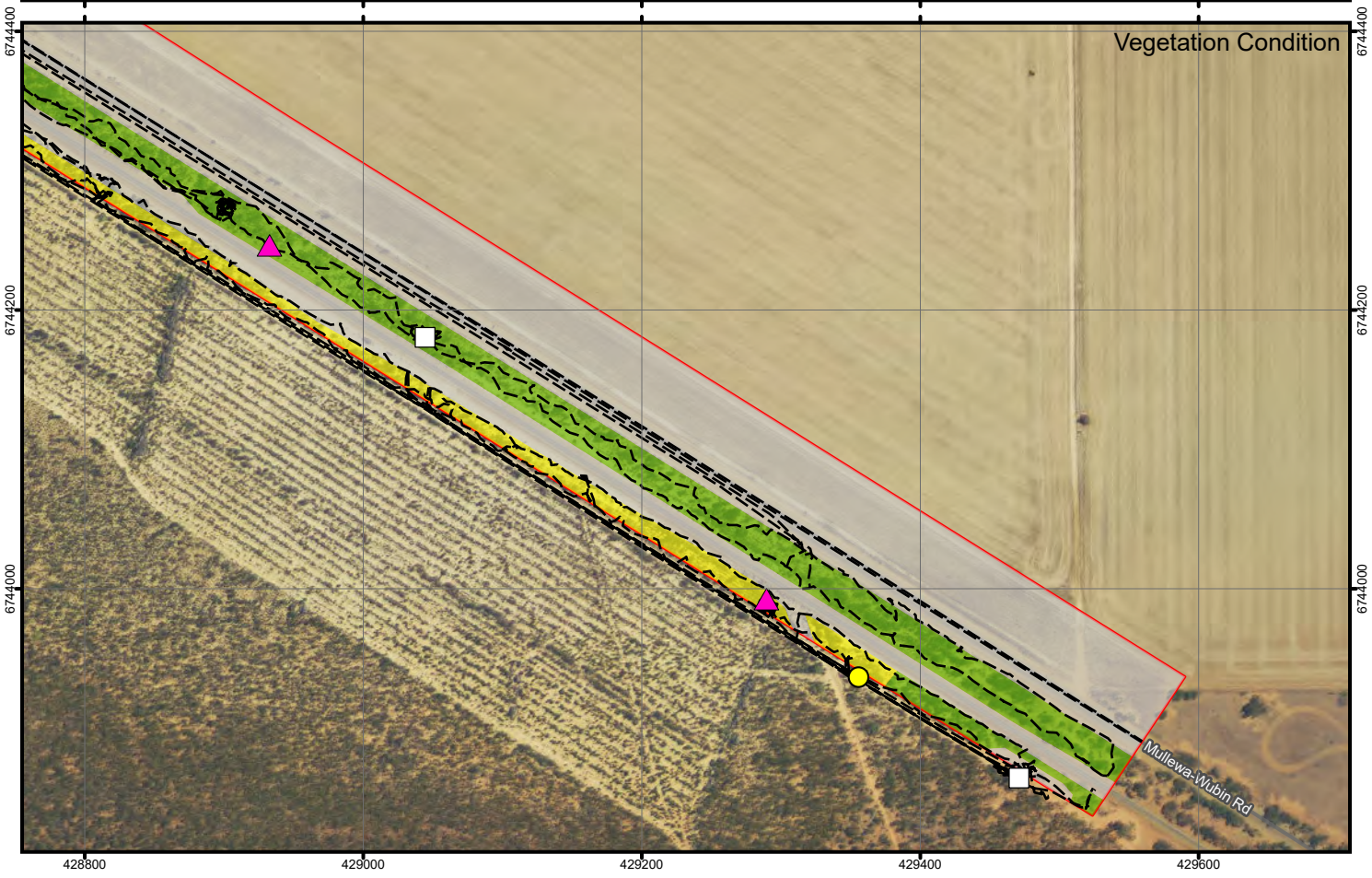

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metres

Data sources:
Base Data: (c) Based on information provided by and with the permission of the Western Australian Land Information Authority trading as Landgate (2010)
Service Layer Credits: Landgate_Subscription_Imagery\WANow:
WMS:

LEGEND

- Survey Area
- Observation
- Quadrat
- Releve
- Tracklog

Vegetation Communities
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- EeMhAe
- ElsEttCe
- GofWaa

Vegetation Condition
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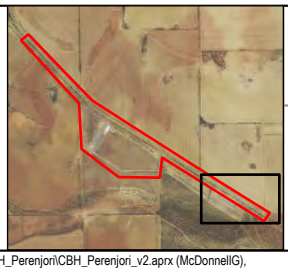
- Good
- Cleared



Vegetation Communities and Condition

CBH

PERENJORI DETAILED FLORA AND VEGETATION ASSESSMENT

PERENJORI

Figure 8.5

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7.4 Flora

A total of 97 native flora species were recorded, including five Priority flora species. Families best represented include Myrtaceae (14 species) and Poaceae (10 species). No flora species representing significant range extensions were recorded.

Nine weed species were recorded, of which **Leontodon rhagadioloides* (Cretan Weed) was the most common in quadrats. Based on observations, **Avena barbata* (Bearded Oat) was the most common weed species causing displacement of native vegetation.

Areas of vegetation that were considered Degraded were captured as observation points (i..e not quadrats or relevés). The weed species list is therefore not considered a comprehensive overview of weeds present. Instead, significant weeds including Declared Pest species and Weeds of National Significance (WoNS) were targeted. No Declared Pest or WoNS were recorded.

Five Priority flora species were recorded, discussed below.

7.4.1 *Baeckea* sp. Perenjori (J.W. Green 1516) (P2)

This species was collected at quadrat 3 (FdW221118-119, see Figure 9) and confirmed by Mike Hislop at the WA Herbarium (accession 10005). This species was not recognised as a Priority species in the field and was a sterile collection. It was therefore not counted. It was noted as 1% foliage cover within the quadrat, implying 2-5 individuals. It was not recorded at any other quadrats.

This species is a typical small-leaf Myrtaceae that is difficult to confidently identify in the field. Leaf morphology and habit are very typical of many other small-leaf Myrtaceae that occur in the area. Features are shown in Plate 2.

Plate 2 *Baeckea* sp. Perenjori (P2) pressed sample and leaf morphology (above and below)

7.4.2 *Enekbatus longistylis* (P1)

Enekbatus longistylis was collected in quadrat 2 (FdW221117-86, see Figure 9) and confirmed by Mike Hislop at the WA Herbarium (accession 9926). There is one known occurrence near quadrat 2 on the WA Herbarium database.

This species is a typical small-leafed Myrtle that is very difficult to confidently identify in the field without flowers. At the time of the survey this species was sterile. This species was not counted while in the field and no photograph is available.

7.4.3 *Grevillea asparagoides* (P3)

Grevillea asparagoides was locally common in the survey area, representing a dominant understorey species in vegetation community EeMhAe (see Figure 9). This species was recorded extensively by BDS (2022). A sample was collected (FdW221117-79) and confirmed by Mike Hislop at the WA Herbarium (accession 9926). There are 30 records representing 67 individuals within the survey area. it was readily distinguishable from the flowers and fruits present. Out of season it could be easily confused with *Grevillea paradoxa* which co-occurs with this species.

Plate 3 ***Grevillea asparagoides*** **(P3) in flower showing leaf/flower morphology (left) and habit (right)**

7.4.4 *Grevillea granulosa* (P3)

Grevillea granulosa was collected at one location (FdW221117-78) and confirmed by Mike Hislop at the WA Herbarium (accession 9926). The species was sterile at the time of the survey and not confidently identified as it appeared with typical *Grevillea* features at the time. It was recorded at 6 locations (see Figure 9) representing 7 individuals. BDS (2022) recorded more than 60 individuals. Using a precautionary approach, it would be prudent to incorporate the BDS (2022) and the spring 2022 results to delineate the extent of this species.

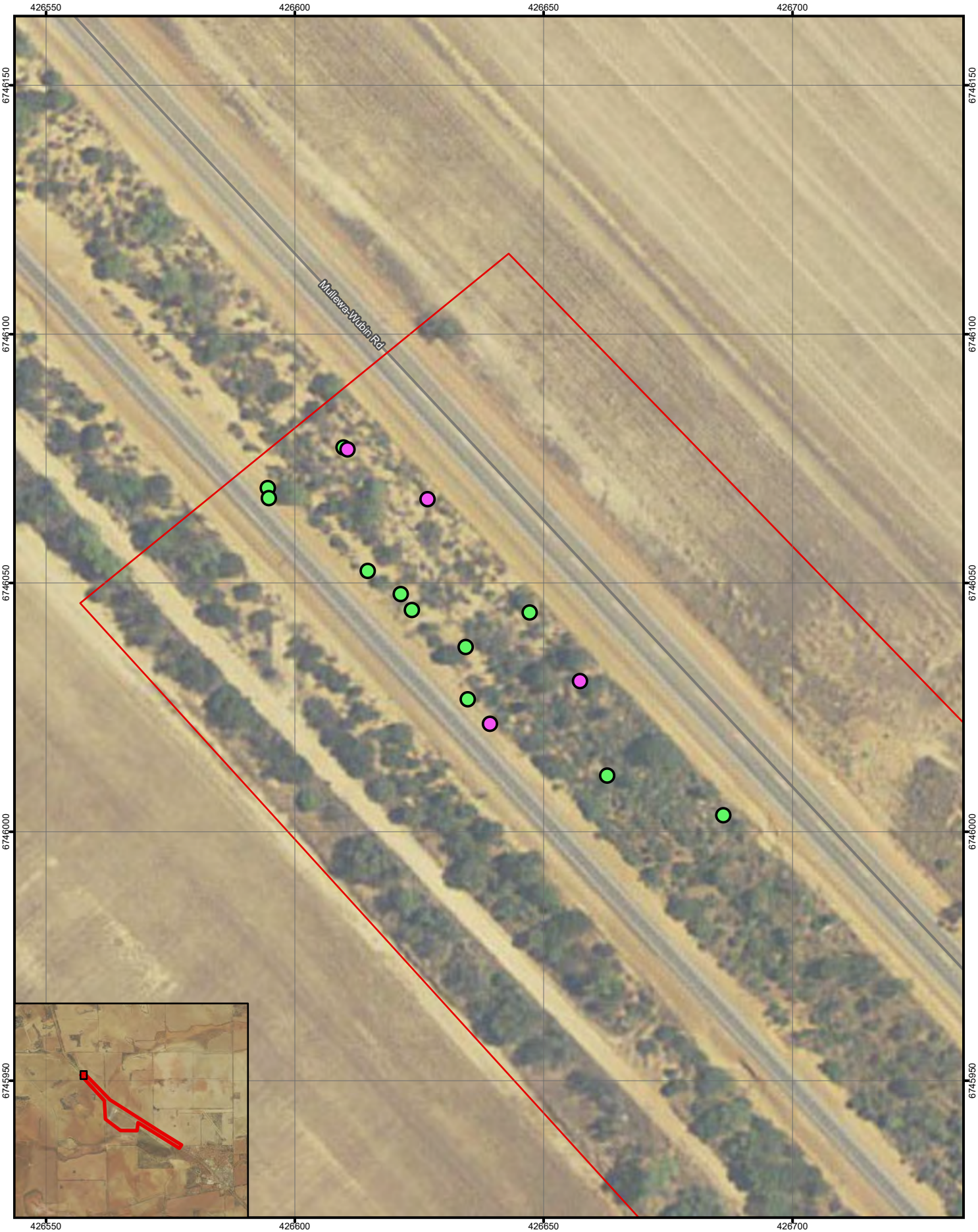
No photograph was taken of this species.

7.4.5 *Leptospermum exsertum* (P1)

This species was recorded extensively in the survey area. This species was collected at two locations (FdW221117-81, FdW221117-84) and confirmed at the WA Herbarium by Mike Hislop (accession 9926). *Leptospermum exsertum* had been previously recorded by BDS (2022) in the survey area.

This species was in flower and represented a common understorey species of shrubland communities GofWaa and occasionally in EeMhAe. It was so abundant that a population extent and approximate count would be a better representation. There were 35 records representing more than 150 individuals (see Figure 9).

Plate 4 ***Leptospermum exsertum*** **(P1) common in the survey area showing morphology (above) and habit and some habitat (centre shrub in image below)**



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Datum: GDA2020 MGA Zone 50
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metres

LEGEND
- Survey Area

Priority Flora
- *Leptospermum exsertum*, P1
- *Grevillea asparagoides*, P3

Significant Flora

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Figure 9.1

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Datum: GDA2020 MGA Zone 50
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metres

Data sources:
Base Data: (c) Based on information provided by and with the permission of the Western Australian Land Information Authority trading as Landgate (2010)
Service Layer Credits: Landgate_Subscription_Imagery\WANow:

LEGEND
- Survey Area

Priority Flora
- *Leptospermum exsertum*, P1
- *Enekbatus longistylus*, P3
- *Grevillea asparagoides*, P3
- *Grevillea granulosa*, P3

Significant Flora

CBH

PERENJORI DETAILED FLORA AND VEGETATION ASSESSMENT

PERENJORI

Figure
9.2

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LAST MODIFIED	07 MAR 2023

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metres

Data sources:
Base Data: (c) Based on information provided by and with the permission of the Western Australian Land Information Authority trading as Landgate (2010)
Service Layer Credits: Landgate_Subscription_Imagery\WANow:

LEGEND
- Survey Area

Priority Flora
- *Leptospermum exsertum*, P1
- *Grevillea asparagoides*, P3
- *Grevillea granulosa*, P3

Significant Flora

CBH

PERENJORI DETAILED FLORA AND VEGETATION ASSESSMENT

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Figure 9.3

Project: \\na.aecomnet.com\lfs\APAC\Perth-AUPER1\Legacy\Projects\606X\60697745_CBH_FloraSurveys\900_CAD_GIS\920_GIS\02_MXD_APRX\CBH_Perenjori\CBH_Perenjori.aprx (McDonnellG),
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8.0 Discussion

8.1 Vegetation

Four native vegetation communities were mapped including three Shrublands and one Woodland. The Shrublands were dominated by Grevillea, Acacia and Melaleuca species over herbs and grasses. Vegetation mapping was supported by the analysis of floristic data using both presence absence and scaled foliage cover. Quadrat 2 was noted to be an outlier from the dominant shrublands therefore was depicted as its own vegetation community. This was influenced by the dominance of *Acacia coolgardiensis* which was not recorded in any other quadrat.

Patches of mallee *Eucalyptus ebbanoensis* were noted but were not recognised as floristically different from the adjacent shrublands. The mallee was prominent in quadrat 5 (30% foliage cover), yet quadrat 5 was more than 40%, similar to quadrats 4 and 7 and were therefore grouped together.

Ground cover in the three Shrublands was dominated by annual species, particularly *Waitzia acuminata* var. *acuminata*. During the summer, autumn and early winter months, ground cover is likely to be bare or comprise of dead daisies and grasses.

Two patches of Eucalyptus Woodlands were assessed against the key diagnostic characteristics of the Eucalypt Woodland of the WA Wheatbelt TEC as published in the Conservation Advice (DEE, 2015). Neither of the two patches were considered representative of the federally protected TEC. Patch 1 is too small, representing 0.48 ha of non-roadside vegetation. As such it does not meet the 2 ha minimum size requirements.

Patch 2 is part of a larger patch (at least 50 ha) and therefore further assessment was required. This patch, as with Patch 1, is dominated by *Eucalyptus loxophleba* subsp. *supralaevis.* This subspecies of *E. loxophleba* is not “key” Eucalypt species that determines the presence of the federally protected TEC (DEE, 2015).

The determinant of the *E. loxophleba* subspecies relies on bark characteristics, described in EUCLID (2020):

> *E. loxophleba* subsp*. Loxophleba.*
>
> This is the well known York Gum of the western part of the wheatbelt from Moora in the north, south to Kojonup and eastwards to about Merredin and Hyden. It is a tree with rough bark over the whole trunk.
>
> *E. loxophleba* subsp. *supralaevis*
>
> This is the tree of the northern wheatbelt, from Westonia and Mt Jackson north-west to Wannoo near Shark Bay. The trunk is rough-barked in the lower half only, with a clearly marked transition from rough bark to smooth bark.

A representative photograph of the Eucalypt tree in our survey area is shown in Plate 5 which supports our determination of *E. loxophleba* subsp. *supralaevis* with bark clearly present on the lower half only. Given the above, neither of the two Eucalyptus Woodland patches represent the Euclaypt Woodland of the WA Wheatbelt TEC.

Plate 5 ***Eucalyptus loxophleba*** **subsp.** ***supralaevis*** **bark characteristics**

Native vegetation comprises 18.45 ha which represents 15% of survey area. The remaining 105.58ha (85% of the survey area) is Cleared or Planted. Of the native vegetation present, most of it is considered Very Good (8.55 ha), with some mapped as Good (4.04 ha) and Degraded (5.86 ha). Degradation was caused by clearing, weed invasion and historical disturbance.

The areas surrounding the survey area represents agricultural land, predominantly producing wheat and other cereal crops. There are small patches of remnant native vegetation within the vicinity of the survey area, however native vegetation in the broader area has largely been cleared to make way for primary production. Vegetation in the survey area represents a connective corridor between larger parcels of remnant native vegetation, providing important refuge for significant flora and probably fauna species.

8.2 Flora

Flora diversity comprised 97 native species, which is comparative to the BDS (2022) survey where 115 native species were recorded across a larger survey area. Flora species not represented in quadrats were collected and recorded opportunistically while traversing the entire survey area on foot.

The historical disturbance of the survey area has led to the conclusion that all Priority flora that may occur (classified as ‘possible’) have been reduced to ‘unlikely’ or ‘negligible’. This is supported by the survey effort implemented and the low diversity present due to the historical disturbance of the native vegetation.

The three common Priority species, *Grevillea asparagoides* (P3), *Grevillea granulosa* (P3) and *Leptospermum exsertum* (P1) were all confirmed to occur by BDS (2022) with their population better established following the Spring 2022 survey. Two additional Priority species, both representing small-leaf Myrtaceae, were recorded in quadrats in Spring; *Baeckea* sp. Perenjori (J.W. Green 1516) and *Enekbatus longistylis* (P1). Both species are difficult to confidently determine in the field unless the observer is familiar with their morphology and *in-situ* habit. Both occurrences are considered under-representations of their actual extent and abundance in the area.

Enekbatus longistylis was considered ‘likely’ to occur with a known population occurring 2 km from the survey area. The *Baeckea* sp. Perenjori is known from the vicinity (10 km from survey area) but was considered ‘unlikely’ to occur as it is associated with clay loam soils (WAH, 1998) while the survey area comprised predominantly yellow sandplains.

9.0 Conclusion

A detailed flora and vegetation assessment was undertaken for the Perenjori survey area. The assessment included a desktop study which identified 105 significant flora species and one Threatened Ecological Community occur in the vicinity of the survey area.

A field survey was undertaken on 17 and 18 November, 2022. Two people traversed all areas of native vegetation on foot to conduct targeted flora searches and recorded flora data from 7 quadrats and two relevés.

Four native vegetation communities were mapped comprising three Shrublands and one Woodland, representing 18.45 ha of native vegetation within a 124.03 ha survey area. Two patches of Eucalyptus Woodlands were assessed against the key diagnostic characteristics of the Eucalypt Woodlands of the WA Wheatbelt TEC. Both patches are dominated by *Eucalyptus loxophleba* subsp. *supralaevis* which is not considered a “key” species of the TEC. Patch 1 also did not meet the size threshold. As such, no TEC was mapped in the survey area.

Five Priority flora species were recorded:

- *Baeckea* sp. Perenjori (J.W. Green 1516) (P2) collected at quadrat 3, not counted at the time, sample was sterile.
- *Enekbatus longistylis* (P1) collected at quadrat 2, not counted at the time due to inability to confidently identify species in the field.
- *Grevillea asparagoides* (P3) known to occur, represents common understorey species, 67 individuals counted.
- *Grevillea granulosa* (P3) known to occur, sterile at time of survey so confident identification was difficult. Could have more than 60 individuals taking into account BDS (2022) results.
- *Leptospermum exsertum* (P1) known to occur, common understorey species, more than 150 individuals counted.

The survey was successfully undertaken following two months of above-average rainfall. The inability to confidently identify the Priority small-leaf Myrtaceae species *Baeckea* sp. Perenjori and *Enekbatus longistylis* means that no accurate population information can be presented in this report. All areas of native vegetation were accessible and survey effort was considered suitable for meeting the objective of the survey.

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Appendix A

Significant Flora Desktop Results

Taxon	Habitat	Cons. Code		Distance from Survey Area (km)		Date of Recent Record		PMST	Likelihood Assessment					Total Score	Likelihood	
		EPBC Act	BC Act / DBCA	WA Herb	TPFL	WA Herb	TPFL		Recorded in Survey Area	Known Nearby (5km)	Recent Record (<20 years)	Known within LGA	Presence of Suitable Habitat (0,1,2)		Pre-Survey	Post-Survey
Acacia aprica	Red or gravelly sand, sandy loam. Plains, rocky hills.	E	CR	-	-			Yes	0	0	0	0	0	0	Negligible	Negligible, no suitable habitat
Acacia cochlocarpa subsp. *cochlocarpa*	Clayey, sandy, often gravelly soils.	E	CR	-	-			Yes	0	0	0	0	2	2	Unlikely	Unlikely, perennial species would have been observed.
Acacia graciliformis	Stony red-brown clay loams, laterite, banded ironstone, basalt. Rock outcrops, base of rocky hills, gentle slopes.	-	P1	12.9	12.8	19/09/2013	11/11/2006		0	0	1	0	0	1	Negligible	Negligible, no suitable habitat
Acacia isoneura subsp. *nimia*	Yellow/brown or red sand, stony soils. Sandplains & sand ridges.	-	P3	5.7	-	10/08/1999			0	0	0	1	2	3	May	Unlikely, perennial species would have been observed.
Acacia muriculata	Red-brown and yellow-brown soils, laterite, banded ironstone. Hill slopes and crests.	-	P1	17.1	17.4	16/09/2013	12/10/2005		0	0	1	0	0	1	Negligible	Negligible, no suitable habitat
Acacia nigripilosa subsp. *latifolia*	Yellow sand.	-	P1	15.6	36.3	30/11/2004	30/11/2004		0	0	1	1	1	3	May	Unlikely, perennial species would have been observed.
Acacia nodiflora	Rocky loam or clay. Rocky ranges, granite hills.	-	P3	33.3	32.7	2/09/2008	15/12/1991		0	0	1	0	0	1	Negligible	Negligible, no suitable habitat
Acacia pterocaulon	Rocky clay loam, sandy clay. Rocky hillslopes.	-	P1	32.0	36.4	15/07/2008	15/07/2008		0	0	1	0	0	1	Negligible	Negligible, no suitable habitat
Acacia recurvata	Sandy clay, granitic clay-loam. Creeklines, plains, breakaways, low hills.	E	VU	30.4	30.7	30/08/1996	30/08/1996	Yes	0	0	0	1	0	1	Negligible	Negligible, no suitable habitat
Androcalva adenothalia	Orange – brown sand, gravel, laterite. Disturbed road verge	CE	CR	32.0	-	11/09/1962			0	0	0	0	2	2	Unlikely	Unlikely, old record 32km from survey area.
Angianthus micropodioides	Saline sandy soils. River edges, saline depressions, claypans.	-	P3	28.8	28.8	29/10/1995	29/10/1995		0	0	0	0	0	0	Negligible	Negligible, no suitable habitat
Babingtonia minutifolia	Moderately inclined midslope of banded ironstone and laterised banded ironstone with light brown soils.	-	P1	22.9	26.5	23/09/2013	9/10/2002		0	0	1	1	0	2	Negligible	Negligible, no suitable habitat
Baeckea sp. Billeranga Hills (M.E. Trudgen 2206)	Yellow sand, clayey sand over granite. Stony hills.	-	P1	36.0	36.6	20/10/2004	20/10/2004		0	0	1	0	1	2	Unlikely	Negligible, no suitable habitat
Baeckea sp. Perenjori (J.W. Green 1516)	Loam, clay.	-	P2	10.8	-	12/07/2008			0	0	1	1	1	3	May	Known
Balaustion hemisphaericum	Dry, yellow, gravelly loamy-sand over laterite.	-	P1	36.5	-	15/07/2008			0	0	1	0	2	3	May	Unlikely, perennial species would have been observed.
Banksia benthamiana	Sandy loam, clay-loam, yellow sand, gravel.	-	P4	1.4	-	24/11/1953			0	1	0	1	2	4	May	Unlikely, perennial species would have been observed.
Caesia sp. Koolanooka Hills (R. Meissner & Y. Caruso 78)	Orange-red-brown soils on banded ironstone. Steep to slight hill slopes and crests.	-	P1	12.9	12.9	17/09/2013	14/10/2005		0	0	1	0	0	1	Negligible	Negligible, no suitable habitat
Calytrix ecalycata subsp. *ecalycata*	Yellow or white sand, sandy gravel, clay loam, granite, sandstone. Uplands, valley flats, ridges, hills, road verges.	-	P3	32.0	-	22/04/1997			0	0	0	0	2	2	Unlikely	Unlikely, old record 32km from survey area.
Calytrix plumulosa	Yellow sand with lateritic gravel, red loam.	-	P3	26.2	-	28/10/1984			0	0	0	1	2	3	May	Unlikely, perennial species would have been observed.
Chamelaucium sp. Bunjil (M.E. Ballingall 1970)	Hillside, road verge. Yellow-brown sand, ironstone gravel.	-	P1	29.1	29.1	3/10/2008	1/09/1985		0	0	1	1	2	4	May	Unlikely, perennial species would have been observed.
Chorizema humile	Sandy clay or loam. Plains.	E	CR	30.0	35.8	11/08/2003	12/08/2002	Yes	0	0	1	0	2	3	May	Unlikely, perennial species would have been observed.
Cryptandra stellulata	Side of hill. Damp yellow sand.	-	P3	33.3	-	10/08/2000			0	0	0	0	1	1	Negligible	Negligible, no suitable habitat

Taxon	Habitat	Cons. Code		Distance from Survey Area (km)		Date of Recent Record		PMST	Likelihood Assessment					Total Score	Likelihood	
		EPBC Act	BC Act / DBCA	WA Herb	TPFL	WA Herb	TPFL		Recorded in Survey Area	Known Nearby (5km)	Recent Record (<20 years)	Known within LGA	Presence of Suitable Habitat (0,1,2)		Pre-Survey	Post-Survey
Darwinia polychroma	This species occurs in open low scrub or shrubland with *Melaleuca* sp., *Acacia ligulata* , mallee (*Eucalyptus* sp.) and	E	EN	33.7	34.8	4/07/2012	4/07/2012	Yes	0	0	1	0	2	3	May	Unlikely, perennial species would have been observed.
Darwinia sp. Morawa (C.A. Gardner 2662)	Clay over granite, yellow/brown clayey sand. Flat, small hill.	-	P3	32.1	-	0/01/1900			0	0	0	0	0	0	Negligible	Negligible, no suitable habitat
Dasymalla axillaris	Native Foxglove grows in sandy soils. The species is thought to be a disturbance opportunist.	CE	CR	1.4	17.9	14/09/2007	24/09/2013	Yes	0	1	1	1	2	5	Likely	Unlikely, perennial species would have been observed.
Dodonaea scurra	Fine to coarse gravel, brown sandy loam, banded ironstone. Upper slopes of hills and crests of rock outcrops.	-	P1	15.9	15.9	21/09/2013	12/10/2005		0	0	1	0	0	1	Negligible	Negligible, no suitable habitat
Drummondita fulva	Skeletal, shallow, acidic soils of orange-red or red-brown sandy loams and clayey silts. Footslopes, lower to upper slopes	-	P3	36.0	-	19/08/1993			0	0	0	1	0	1	Negligible	Negligible, no suitable habitat
Drummondita rubriviridis	North facing gently inclined lower hillslope of banded ironstone and laterite with light orange brown soils.	-	P1	17.4	17.5	19/09/2013	12/10/2005		0	0	1	0	0	1	Negligible	Negligible, no suitable habitat
Enekbatus longistylus	Yellow sand. Sandplains.	-	P3	2.1	-	13/10/2003			0	1	1	1	2	5	Likely	Known
Epitriche demissus	Sandy & clayey soils. Saline depressions, lake edges.	-	P2	27.2	-	1/10/2000			0	0	0	0	0	0	Negligible	Negligible, no suitable habitat
Eremophila glabra subsp. Morawa (C.A. Gardner 7521)	Flat plain. Red, slightly saline sand.	-	P1	27.5	-	20/09/2016			0	0	1	0	1	2	Unlikely	Negligible, no suitable habitat
Eremophila nivea	Sandy clay, clay loam. Undulating plains, roadverges.	E	CR	14.8	7.2	30/01/1997	12/10/2021	Yes	0	0	1	1	2	4	May	Unlikely, perennial species would have been observed.
Eremophila resinosa	Clay loam, gravelly sandy clay. Road verges.	E	EN	-	-			Yes	0	0	0	0	2	2	Unlikely	Negligible, no suitable habitat
Eremophila rostrata	Sandy loam, stony saline clay, granite, quartzite. Hills and flats.	CE		-	-			Yes	0	0	0	0	1	1	Negligible	Negligible, no suitable habitat
Eremophila rostrata subsp. *trifida*	Hard, light brown, sandy loams, granite.	-	CR	22.4	6.1	23/06/2016	15/09/2017		0	0	1	1	0	2	Negligible	Negligible, no suitable habitat
Eremophila sericea	Hillside, low hill, gravel ridge. Road verge. Red loam/clay. Recent soil disturbance.	-	P1	9.7	-	31/03/2015			0	0	1	1	1	3	May	Negligible, no suitable habitat
Eremophila viscida	Granitic soils, sandy loam. Stony gullies, sandplains.	E	EN	10.8	-	18/09/1977		Yes	0	0	0	1	1	2	Unlikely	Negligible, no suitable habitat
Eucalyptus arachnaea subsp. *arrecta*	Clay loam on granite, gravelly loam. Breakaway slopes, gullies.	-	P3	25.4	-	5/09/2006			0	0	1	0	0	1	Negligible	Negligible, no suitable habitat
Eucalyptus beardiana	Red or yellow sand. Sand dunes & ridges.	V	EN	-	-			Yes	0	0	0	0	0	0	Negligible	Negligible, no suitable habitat
Eucalyptus synandra	Sandy & lateritic soils.	V	VU	24.6	31.9	6/04/2007	21/02/2017	Yes	0	0	1	0	2	3	May	Unlikely, perennial species would have been observed.
Fitzwillia axilliflora	Sand, clay loam. Margins of salt lakes, saline flats.	-	P2	27.6	27.3	26/09/2018	29/09/1994		0	0	1	0	0	1	Negligible	Negligible, no suitable habitat
Frankenia bracteata	Topography: Beside pan in braided saline drainage line. Surface soil: Moderately saline Pale brown-cream sand.	-	P1	33.7	33.7	3/10/2000	3/10/2000		0	0	0	1	1	2	Unlikely	Negligible, no suitable habitat
Frankenia conferta	The preferred habitat is around the high water mark of lake shorelines to the tops of low mounds within saline pans.	E	VU	32.6	32.7	10/10/2007	10/10/2007	Yes	0	0	1	1	1	3	May	Negligible, no suitable habitat

Taxon	Habitat	Cons. Code		Distance from Survey Area (km)		Date of Recent Record		PMST	Likelihood Assessment					Total Score	Likelihood	
		EPBC Act	BC Act / DBCA	WA Herb	TPFL	WA Herb	TPFL		Recorded in Survey Area	Known Nearby (5km)	Recent Record (<20 years)	Known within LGA	Presence of Suitable Habitat (0,1,2)		Pre-Survey	Post-Survey
Gastrolobium hamulosum	Sandy, often gravelly soils or clay. Flats, slopes, ridges.	E	CR	-	-			Yes	0	0	0	0	2	2	May	Unlikely, perennial species would have been observed.
Gnephosis setifera	Sand. Saline flats.	-	P1	27.2	27.8	26/09/2018	4/10/2001		0	0	1	0	0	1	Negligible	Negligible, no suitable habitat
Gompholobium cinereum	Yellow sand, clayey sand, brown loam, sandy gravel, laterite. Well-drained open sites, slopes, plains, roadsides.	-	P3	32.0	-	0/01/1900			0	0	0	1	1	2	Unlikely	Unlikely, perennial species would have been observed.
Goodenia perryi	Yellow sand.	-	P3	25.7	-	15/10/1961			0	0	0	1	2	3	May	Unlikely, perennial species would have been observed.
Grevillea asparagoides	Gravelly loam, white or yellow sand.	-	P3	0.1	-	2/09/2008			1	1	1	1	2	6	Known	Known
Grevillea bracteosa subsp. *howatharra*	Bracted grevillea grows in heavy soils, consisting of clay loam with laterite, in open sunny positions	CE	CR	32.0	-	0/01/1900			0	0	0	0	1	1	Negligible	Negligible, no suitable habitat
Grevillea christineae	Clay loam, sandy clay, often moist.	E	EN	-	-			Yes	0	0	0	0	1	1	Unlikely	Negligible, no suitable habitat
Grevillea granulosa	Gravelly sand, loam, clay. Sandplains.	-	P3	0.1	-	1/10/2003			1	1	1	1	2	6	Known	Known
Grevillea leptopoda	Loam & lateritic gravel, sand, clay.	-	P3	23.6	-	19/10/1996			0	0	0	0	2	2	Unlikely	Unlikely, perennial species would have been observed.
Grevillea murex	Yellow, brown or red sand, clay loam.	E	EN	36.9	36.9	18/08/2017	18/08/2017	Yes	0	0	1	0	2	3	May	Unlikely, perennial species would have been observed.
Grevillea pythara	Sand or sandy loam with gravel.	E	CR	-	-			Yes	0	0	0	0	2	2	May	Unlikely, perennial species would have been observed.
Grevillea tenuiloba	Sand, clay loam. Granite outcrops.	-	P3	32.0	-	24/10/1958			0	0	0	0	1	1	Negligible	Negligible, no suitable habitat
Gyrostemon reticulatus	The Net-veined Gyrostemon grows in dense shrubland in brown/yellow loamy sand on sloping topography.	CE	CR	17.3	17.4	30/09/2003	31/10/2014	Yes	0	0	1	1	2	4	May	Unlikely, perennial species would have been observed.
Hemiandra gardneri	Grey or yellow sand, clayey sand. Sandplains.	E	CR	-	-			Yes	0	0	0	0	2	2	May	Unlikely, perennial species would have been observed.
Hemigenia sp. major (C.A. Gardner 2677)	No habitat data.	-	P1	21.9	-	19/09/1931			0	0	0	0	1	1	Negligible	Negligible, no suitable habitat
Hibbertia cockertoniana	On an eastern sandy gravel ridge of Billeranga Hills.	-	P3	32.0	-	20/08/1997			0	0	0	0	0	0	Negligible	Negligible, no suitable habitat
Hydrocotyle spinulifera	Slope below sandy rise in salt lake. White coarse sandy clay over clay.	-	P3	30.3	-	26/09/2018			0	0	1	0	0	1	Negligible	Negligible, no suitable habitat
Jacksonia pungens	Yellow sand, gravelly lateritic soils. Undulating areas.	E	CR	-	-			Yes	0	0	0	0	2	2	May	Unlikely, perennial species would have been observed.
Lechenaultia galactites	Yellow sand, clay, gravel, laterite. Sandplains.	-	P3	23.7	26.0	14/09/2007	14/09/2007		0	0	1	1	2	4	May	Unlikely, perennial species would have been observed.
Lepidosperma sp. Blue Hills (A. Markey & S. Dillon 3468)	Soil surface: BIF and quartz pieces. Red / orange loam / clay. Underlying geology: BIF. Area burnt more than 5 years ago.	-	P1	14.7	-	4/10/2012			0	0	1	1	0	2	Negligible	Negligible, no suitable habitat
Lepidosperma sp. Koolanooka (K.R. Newbey 9336)	Pale brown clay-loam over granite outcropping.	-	P1	12.9	-	21/09/2013			0	0	1	0	0	1	Negligible	Negligible, no suitable habitat
Leptospermum exsertum	Sandy soils. Sandplains.	-	P1	1.4	5.9	20/09/2013	1/10/2003		1	1	1	1	2	6	Known	Known

Taxon	Habitat	Cons. Code		Distance from Survey Area (km)		Date of Recent Record		PMST	Likelihood Assessment					Total Score	Likelihood	
		EPBC Act	BC Act / DBCA	WA Herb	TPFL	WA Herb	TPFL		Recorded in Survey Area	Known Nearby (5km)	Recent Record (<20 years)	Known within LGA	Presence of Suitable Habitat (0,1,2)		Pre-Survey	Post-Survey
Leucopogon sp. Yanneymooning (F. Mollemans 3797)	White-grey sandy clay, brown gritty loam over granite, skeletal soils. Tops of valleys, hills and breakaways.	-	P3	35.3	-	24/08/2014			0	0	1	1	0	2	Negligible	Negligible, no suitable habitat
Melaleuca barlowii	Yellow-brown sand or red-brown clay loam. Roadside reserves, shrubland.	-	P3	7.7	6.3	11/11/2006	11/11/2006		0	0	1	0	2	3	May	Unlikely, perennial species would have been observed.
Melaleuca sclerophylla	Gravelly sand, clayey sand. Granite outcrops, rises.	-	P3	27.4	31.3	1/11/2006	15/12/1991		0	0	1	0	1	2	Unlikely	Negligible, no suitable habitat
Micromyrtus acuta	Grey-tan silty fine to coarse sand, laterite, granite. Rock outcrops.	-	P3	34.3	34.3	13/10/2003	13/10/2003		0	0	1	1	0	2	Negligible	Negligible, no suitable habitat
Millotia dimorpha	Red loamy soils.	-	P1	12.9	12.9	25/09/2008	17/10/2005		0	0	1	0	1	2	Unlikely	Negligible, no suitable habitat
Mirbelia ferricola	Mid-upper Banded Iron Formation (BIF) slope. Red-orange clay-loam with large amounts of BIF fragments and laterised BIF on surface.	-	P3	6.5	17.5	22/09/2013	2/09/2008		0	0	1	1	0	2	Negligible	Negligible, no suitable habitat
Mirbelia sp. Ternata (M.D. Crisp & L.G. Cook MDC 9267)	Dry grey brown sandy loam, sandstone/laterite,	-	P1	23.3	23.3	27/09/2000	27/09/2000		0	0	0	0	0	0	Negligible	Negligible, no suitable habitat
Papistylus grandiflorus	Brown, brown-red or yellow sandy clay, yellow-brown rocky sand, granite. Hillslopes, plains.	-	P2	34.5	-	15/10/2008			0	0	1	0	0	1	Negligible	Negligible, no suitable habitat
Persoonia chapmaniana	White sandy clay, yellow sand. Vicinity of salt lakes.	-	P3	33.7	-	3/10/2000			0	0	0	1	0	1	Negligible	Negligible, no suitable habitat
Persoonia pentasticha	Sand, loam. Base of granite outcrops.	-	P3	5.4	5.4	12/01/2010	2/10/1995		0	0	1	0	0	1	Negligible	Negligible, no suitable habitat
Petrophile conifera subsp. *divaricata*	Hillside. Brown-red sand loam, rocky, ironstone gravel, granite. 30-40% surface rock.	-	P2	34.5	-	3/10/2008			0	0	1	0	1	2	Unlikely	Unlikely, perennial species would have been observed.
Petrophile pauciflora	Decaying & dissected granite breakaways.	-	P3	25.8	25.8	18/09/2006	18/09/2006		0	0	1	1	0	2	Negligible	Negligible, no suitable habitat
Podotheca pritzelii	Yellow-orange, Sep to Oct. Sand. Sand ridges in salt flats.	-	P3	34.0	34.0	1/10/2000	1/10/2000		0	0	0	0	0	0	Negligible	Negligible, no suitable habitat
Podotheca uniseta	Yellow, Sep to Dec. White/grey sand, sandy loam. Samphire flats.	-	P3	27.2	27.2	26/09/2018	8/09/1995		0	0	1	0	0	1	Negligible	Negligible, no suitable habitat
Ptilotus fasciculatus	No habitat data.	-	P4	32.4	32.6	4/11/1992	4/11/1992		0	0	0	0	1	1	Negligible	Negligible, no suitable habitat
Rhodanthe collina	Loam. Rocky hills.	-	P3	22.8	22.8	19/10/2005	19/10/2005		0	0	1	0	0	1	Negligible	Negligible, no suitable habitat
Roebuckiella halophila	Growing under scattered Melaleuca and Acacia shrubs above saline depression on sandy, somewhat saline soil.	-	P3	34.0	-	1/10/2000			0	0	0	0	0	0	Negligible	Negligible, no suitable habitat
Roycea pycnophylloides	Sandy soils, clay. Saline flats.	E	VU	-	-			Yes	0	0	0	0	1	1	Negligible	Negligible, no suitable habitat
Salicornia globosa	Associated with saline drainage in Chenopod shrubland.	-	P3	33.6	-	3/10/2000			0	0	0	1	1	2	Unlikely	Negligible, no suitable habitat
Scholtzia brevistylis subsp. brevistylis	Yellow sand. OR red/brown loam.	-	P1	38.5	-	16/11/1996			0	0	0	0	1	1	Negligible	Negligible, no suitable habitat
Scholtzia brevistylis subsp. prowaka	Brown clay, lateritic. Plain, dry yellow sand.	-	P2	34.0	38.2	24/06/2008	19/09/1991		0	0	1	0	2	3	May	Negligible, no suitable habitat
Sclerolaena sp. Koolanooka Hills (R. Meissner & Y. Caruso 437)	Red-brown soils, banded ironstone. Lower slopes, mallee woodland.	-	P1	20.8	-	10/10/2005			0	0	1	0	0	1	Negligible	Negligible, no suitable habitat

Taxon	Habitat	Cons. Code		Distance from Survey Area (km)		Date of Recent Record		PMST	Likelihood Assessment					Total Score	Likelihood	
		EPBC Act	BC Act / DBCA	WA Herb	TPFL	WA Herb	TPFL		Recorded in Survey Area	Known Nearby (5km)	Recent Record (<20 years)	Known within LGA	Presence of Suitable Habitat (0,1,2)		Pre-Survey	Post-Survey
Spergularia nesophila	Inundated edge of small salt lake. Surface soil: Moderately saline sand.	-	P3	34.0	-	11/10/2000			0	0	0	0	0	0	Negligible	Negligible, no suitable habitat
Stenanthemum poicilum	Red clay or sandy clay, loam.	-	P3	14.0	14.0	21/09/2013	11/11/2006		0	0	1	0	2	3	May	Negligible, no suitable habitat
Stylidium amabile	Sandy lateritic gravel. Uplands, hillslopes. Allocasuarina and Acacia scrub.	CE	CR	-	-	-		Yes	0	0	0	0	2	2	Unlikely	Negligible, no suitable habitat
Stylidium ricae	Sandy loam and lateritic gravel, granite. Heath or shrubland, often associated with rock outcrops.	-	P3	36.6	-	24/08/2014			0	0	1	0	0	1	Negligible	Negligible, no suitable habitat
Tecticornia bulbosa	Saline sandy clay or red/brown loam.	V	VU	20.0	28.5	11/12/2008	19/04/2000	Yes	0	0	1	0	0	1	Negligible	Negligible, no suitable habitat
Tecticornia fimbriata	Clay, loam. Margins of salt & gypsum lakes.	-	P3	24.6	-	9/03/2009			0	0	1	0	0	1	Negligible	Negligible, no suitable habitat
Thryptomene shirleyae	Hillside. Yellow-brown sand-loam over granite.	-	P2	34.5	-	15/10/2008			0	0	1	0	2	3	May	Negligible, no suitable habitat
Urodon capitatus	Sandy gravelly soils. Plains.	-	P3	1.4	-	2/10/1962			0	1	0	1	2	4	May	Unlikely, perennial species would have been observed.
Verticordia capillaris	Yellow sand, sandy loam, sandy clay. Sandplains.	-	P4	32.0	-	0/01/1900			0	0	0	0	2	2	Unlikely	Unlikely, perennial species would have been observed.
Verticordia chrysostachys var. pallida	Sandplains, sand dunes.	-	P3	23.7	-	0/01/1900			0	0	0	1	2	3	May	Unlikely, perennial species would have been observed.
Verticordia comosa	Yellow or grey sand.	-	P1	29.8	38.0	18/08/1993	2/12/1999		0	0	0	0	2	2	Unlikely	Unlikely, perennial species would have been observed.
Verticordia dasystylis subsp. oestopoia	Gritty soils over granite. Outcrops.	-	P1	23.3	27.2	15/10/2008	22/10/2001		0	0	1	0	0	1	Negligible	Negligible, no suitable habitat
Verticordia halophila	Sandy clay or loam. Saline flats & lakes.	-	P2	38.4	-	10/10/1985			0	0	0	1	0	1	Negligible	Negligible, no suitable habitat
Verticordia spicata subsp. squamosa	Yellow sand, yellow-brown sand, yellow clayey sand. Sandplains, flats, road verges.	E	CR	39.8	39.3	30/12/1981	7/06/2017	Yes	0	0	1	0	2	3	May	Unlikely, perennial species would have been observed.
Verticordia venusta	Yellow sand, sandy gravel. Sandplains.	-	P3	1.4	27.9	29/10/1994	29/10/1994		0	1	0	1	2	4	May	Unlikely, perennial species would have been observed.
Wurmbea murchisoniana	Clay, sandy clay, loam. Seasonally inundated clay hollows, rock pools.	-	P4	36.7	-	27/08/1988			0	0	0	1	0	1	Negligible	Negligible, no suitable habitat
Wurmbea tubulosa	Clay, loam. River banks, seasonally-wet places.	E	VU	-	-				0	0	0	0	0	0	Negligible	Negligible, no suitable habitat

Appendix B

Flora by Family by Site Matrix

Appendix B Flora by Family by Community List

Family	Species	AcCm	EeMhAe			ElsEttCe		GofWaa		
		2	4	5	7	1	8	3	6	9
Aizoaceae										
	* *Mesembryanthemum nodiflorum*	x								
Amaranthaceae										
	Ptilotus drummondii					x	x	x	x	
	Ptilotus exaltatus				x	x	x			
	Ptilotus gaudichaudii		x				x			
	Ptilotus polystachyus	x	x	x	x	x	x			
Apiaceae										
	Daucus glochidiatus					x				
	Platysace trachymenioides	x	x		x					
Asparagaceae										
	?Arthropodium dyeri	x	x			x				
	Lomandra marginata			x	x		x			
	Thysanotus dichotomus			x						
	Thysanotus manglesianus	x	x						x	
Asteraceae										
	Calocephalus multiflorus	x	x					x	x	
	Gilberta tenuifolia			x	x					
	Gnephosis tenuissima	x	x					x	x	
	* *Leontodon rhagadioloides*	x		x		x				
	Trachymene pilosa	x				x	x	x		
	Waitzia acuminata var. *acuminata*	x	x	x	x	x	x	x	x	x
Boraginaceae										
	Echium plantagineum				x					
Boryaceae										
	Borya sphaerocephala	x			x			x		
Brassicaceae										
	* *Brassica tournefortii*					x	x			
Campanulaceae										
	Wahlenbergia preissii		x	x						
Caryophyllaceae										
	* *Spergula pentandra*					x				
Casuarinaceae										
	Allocasuarina campestris			x						
Chenopodiaceae										
	Chenopodium gaudichaudianum					x	x			
	Enchylaena tomentosa var. *tomentosa*					x	x			
	Maireana tomentosa subsp. *tomentosa*					x				
	Rhagodia drummondii					x	x			
	Sclerolaena densiflora		x			x				
Crassulaceae										
	Crassula colorata					x				
Cyperaceae										
	Chrysitrix distigmatosa		x	x	x				x	x
	Gahnia drummondii		x	x	x			x		
	Lepidosperma costale	x						x		
	Schoenus hexandrus								x	
Dilleniaceae										
	Hibbertia glomerosa var. *glomerosa*		x		x			x	x	
	Hibbertia stenophylla			x						
Ecdeiocoleaceae										
	Ecdeiocolea monostachya	x	x	x	x			x	x	
Fabaceae										
	Acacia acuminata				x	x				x
	Acacia burkittii				x				x	
	Acacia coolgardiensis	x		x						

Appendix B Flora by Family by Community List

Family	Species	AcCm	EeMhAe			ElsEttCe		GofWaa		
		2	4	5	7	1	8	3	6	9
	Acacia multispicata		x							
	Acacia tetragonophylla					x	x			
	Jacksonia ramulosa			x						
	Jacksonia venosa			x					x	
	Mirbelia microphylla							x		x
Goodeniaceae										
	Dampiera wellsiana							x	x	
	Dampieria spicigera								x	
	Dampiera sp.			x				x	x	
	Goodenia rosea	x	x	x	x			x		
	Scaevola restiacea subsp. *restiacea*							x	x	
Haloragaceae		**x**								
	Glischrocaryon aureum	x								
Hemerocallidaceae										
	Dianella revoluta	x	x	x	x	x		x		
	Herb				**x**					
Iridaceae										
	Patersonia graminea		x	x	x					
Lamiaceae										
	Dicrastylis soliparma		x		x					
	Hemigenia ciliata							x		
Lauraceae										
	Cassytha nodiflora		x	x	x			x	x	x
Loganiaceae										
	Orianthera flaviflora							x		
Montiaceae										
	Calandrinia eremaea	x				x	x	x		
Myoporaceae										
	Eremophila decipiens subsp. linearifolia						x			
Myrtaceae										
	Baeckea elderiana								x	x
	Baeckea sp. Perenjori (J.W. Green 1516) (P2)							x		
	Cyathostemon heterantherus			x					x	
	Darwinia capitellata	x	x		x			x	x	x
	Enekbatus longistylis (P1)							x		
	Ericomyrtus serpyllifolia		x		x			x		
	Eucalyptus ebbanoensis			x						
	Eucalyptus horistes					x				
	Eucalyptus loxophleba subsp. *supralaevis*					x	x			
	Leptospermum exsertum (P1)			x	x			x	x	x
	Melaleuca concreta				x				x	
	Melaleuca conothamnoides			x						
	Melaleuca cordata			x	x			x	x	x
	Melaleuca hamata		x							
	Verticordia chrysantha			x						
Orchidaceae										
	Diuris sp.		x							
Pittosporaceae										
	Bursaria occidentalis	x					x			
Poaceae										
	Amphipogon amphipogonoides				x					
	Amphipogon caricinus var. *caricinus*	x		x				x	x	x
	Austrostipa elegantissima	x	x	x	x	x	x		x	
	Austrostipa eremophila	x	x		x		x			

Appendix B Flora by Family by Community List

Family	Species	AcCm	EeMhAe			ElsEttCe		GofWaa		
		2	4	5	7	1	8	3	6	9
	Austrostipa scabra					x				
	Austrostipa sp.		x	x					x	
	* *Avena barbata*				x	x				
	* *Bromus rubens*					x				
	* *Lolium rigidum*					x				
	Neurachne alopecuroidea			x						
	Monachather paradoxus	x	x	x	x	x	x	x	x	
	Thyridolepis multiculmis		x	x	x					
	Pentameris airoides		x	x		x	x			
	* *Triticum aestivum*					x				
Polygalaceae										
	Comesperma scoparium								x	
	Comesperma volubile	x		x						
Proteaceae										
	Grevillea asparagoides (P3)			x	x					
	Grevillea didymobotrya subsp. *didymobotrya*				x					
	Grevillea granulosa (P3)	x		x				x		
	Grevillea obliquistigma subsp. *funicularis*			x				x	x	x
	Grevillea paradoxa				x			x	x	x
	Grevillea petrophiloides		x							
	Petrophile incurvata							x		
Pteridaceae										
	Cheilanthes sieberi		x		x					
Rhamnaceae										
	Cryptandra sp.								x	
Restionaceae										
	Lepidobolus preissianus		x	x	x				x	
Santalaceae										
	Leptomeria preissiana									x
	Santalum acuminatum			x						
Solanaceae										
	Solanum lasiophyllum			x	x					

Appendix C

Site Data

Appendix C Site Data

Site No: Q1	**Date**: 18/11/2022	**Longitude:** 116.246098	**Latitude**: -29.415868

Type: Quadrat

Soil Types: Red clay - moist

Topography: Flat

Surface Water: 15 pc bare

Fire: 10 +

Vegetation Condition: Very Good

Vegetation Type: Eucalypt Woodland ElsEttCe

Condition Notes: none

Descriprion: *Eucalyptus loxophleba* subsp. *supralaevis* and *Eucalyptus horistes* mid to low open mixed woodland and mallee woodland over *Enchylaena tomentosa* var. *tomentosa, Chenopodium gaudichaudianum* and *Rhagodia drummondii* mid open shrubland over *Calandrinia eremaea, Leontodon rhagadioloides* and *Austrostipa elegantissima* tall to low mixed forb and grassland

Weed	Cons. Status	Taxon	Height (cm)	Cover (%)	Comment
		Acacia acuminata	190	2	
		Acacia tetragonophylla	40	5	
		Asteraceae sp.	50	0.5	Dead
		Austrostipa elegantissima	50	1	

Weed	Cons. Status	Taxon	Height (cm)	Cover (%)	Comment
		Austrostipa scabra	15	1	
*		*Avena barbata*	15	0.5	
*		*Brassica tournefortii*	50	0.1	
*		*Bromus rubens*	40	0.5	
		Calandrinia eremaea	5	2	
		Chenopodium gaudichaudianum	30	10	
		Crassula colorata	10	0.5	
		Daucus glochidiatus	10	1	
		Dianella revoluta	60	1	
		Enchylaena tomentosa var. *tomentosa*	30	10	
		Enchylaena tomentosa var. *tomentosa*	30	0.1	
		Eucalyptus horistes	1200	1	
		Eucalyptus loxophleba subsp. *supralaevis*	1400	30	
*		*Leontodon rhagadioloides*	30	5	
*		*Lolium rigidum*	60	5	
		Maireana tomentosa subsp. *tomentosa*		0.1	
		Pentameris airoides	10	1	
		Pentameris airoides	30	0.1	
		Ptilotus drummondii	10	1	
		Ptilotus exaltatus	50	0.1	
		Ptilotus polystachyus	30	0.1	
		Rhagodia drummondii	50	6	
		Sclerolaena densiflora	30	0.1	
*		*Spergula pentandra*	15	0.1	
		Thyridolepis multiculmis	30	0.5	
		Trachymene pilosa	15	0.5	
*		*Triticum aestivum*	30	0.5	
		Waitzia acuminata var. *acuminata*	30	0.1	

Site No: Q2	**Date**: 18/11/2022	**Longitude:** 116.249344	**Latitude**: -29.418089

Type: Quadrat
Soil Types: Brown clay dirt- moist
Topography: Flat
Surface Water: 30 pc bare
Fire: 10 +
Vegetation Condition: Very Good
Vegetation Type: Shrubland AcCm
Condition Notes: earth/soil works have occurred at some point in time.

Description: *Acacia coolgardiensis, Grevillea granulosa* and *Darwinia capitellata* tall to mid open shrubland over *Calocephalus multiflorus, Waitzia acuminata* var. *acuminata* and *Trachymene pilosa* low open forbland.

Weed	Cons. Status	Taxon	Height (cm)	Cover (%)	Comment
		Acacia coolgardiensis	300	30	
		Amphipogon caricinus var. *caricinus*	40	4	
		Austrostipa elegantissima	30	4	
		Austrostipa eremophila	100	1	
		Borya sphaerocephala	15	0.1	
		Bursaria occidentalis			oppo

Weed	Cons. Status	Taxon	Height (cm)	Cover (%)	Comment
		Calandrinia eremaea	10	0.1	
		Calocephalus multiflorus		2	
		Comesperma volubile	0	0.5	commospera
		Dianella revoluta	80	0.1	
		Ecdeiocolea monostachya	70	1	
		Glischrocaryon aureum			oppo
		Gnephosis tenuissima	10	0.5	
		Goodenia rosea	10	0.1	
	P3	*Grevillea granulosa*	100	4	
*		*Leontodon rhagadioloides*	20	1	
		Lepidosperma costale	60	0.5	
*		*Mesembryanthemum nodiflorum*			oppo
		Pentameris airoides	80	0.1	
		Platysace trachymenioides	50	0.1	
		Ptilotus polystachyus	30	0.1	
		Darwinia capitellata	40	0	oppo
		Thyridolepis multiculmis	20	0.5	
		Thysanotus manglesianus	0	0.1	
		Trachymene pilosa	15	4	
		Waitzia acuminata var. *acuminata*	30	10	

Site No: Q3	**Date**: 18/11/2022	**Longitude:** 116.246098	**Latitude**: -29.415868

Type: Quadrat
Soil Types: Brown yellow clay- moist
Topography: Slightly sloped
Surface Water: 50 pc bare
Fire: 10 +
Vegetation Condition: Very Good
Vegetation Type: Shrubland GofWaa
Condition Notes: -

Description: *Grevillea obliquistigma* subsp. *funicularis, Grevillea paradoxa* and *Leptospermum exsertum* (P1) tall to low open shrubland over *Waitzia acuminata* var. *acuminata, Ecdeiocolea monostachya* and SUBMIT Grass 101 low mixed open forb/grass land.

No photo available

Weed	Cons. Status	Taxon	Height (cm)	Cover (%)	Comment
		Amphipogon caricinus var. *caricinus*	30	8	
	P2	*Baeckea* sp. Perenjori (J.W. Green 1516)	80	1	ID Mike Hislop Acc 10005
		Borya sphaerocephala	10	0.1	
		Calandrinia eremaea	5	0.5	
		Calocephalus multiflorus	30	0.5	
		Cassytha nodiflora	0	1	
		Dampiera sp.	30	0.1	
		Dampiera wellsiana	15	0.1	
		Dianella revoluta	80	0.5	
		Ecdeiocolea monostachya	100	1	
		Ericomyrtus serpyllifolia	40	0.1	ID Mike Hislop Acc 10005
		Gahnia drummondii	90	1	
		Gnephosis tenuissima	50	0.5	
		Goodenia rosea	5	0.1	
	P3	*Grevillea granulosa*	70	0.5	
		Grevillea obliquistigma subsp. *funicularis*	150	6	
		Grevillea paradoxa	100	2	
		Hemigenia ciliata	20	0.5	
		Hibbertia glomerosa var. *glomerosa*	30	0.5	
		Lepidosperma costale	30	1	
	P1	*Leptospermum exsertum*	50	1	
		Melaleuca cordata	100	4	
		Mirbelia microphylla	15	0.1	

Weed	Cons. Status	Taxon	Height (cm)	Cover (%)	Comment
		Monachather paradoxus	40	0.1	
		Orianthera flaviflora	10	0.1	
		Petrophile incurvata	100	4	
		Ptilotus drummondii	15	0.1	
		Scaevola restiacea subsp. *restiacea*	30	0.2	
		Darwinia capitellata	50	4	
		Trachymene pilosa	20	0.1	
		Waitzia acuminata var. *acuminata*	20	4	

Site No: Q4	**Date**: 18/11/2022	**Longitude:** 116.270981	**Latitude**: -29.431425

Type: Quadrat
Soil Types: yellow light brown sandy clay- moist
Topography: Flat
Surface Water: 5 pc bare
Fire: 10 +
Vegetation Condition: Very Good
Vegetation Type: Shrubland EeMhAe
Condition Notes: Disturbed earth

Description: *Eucalyptus ebbanoensis* low isolated clumps of mallee trees over *Melaleuca hamata, Acacia burkittii* and *Grevillea asparagoides* (P3) mid open shrubland over *Austrostipa elegantissima, Chrysitrix distigmatosa* and *Waitzia acuminata* var. *acuminata* low open mixed grass and forbland.

Weed	Cons. Status	Taxon	Height (cm)	Cover (%)	Comment
		Acacia multispicata	80	0.5	
		Asteraceae sp.	15	0.1	Dead
		Austrostipa elegantissima	60	4	
		Austrostipa eremophila	100	0.5	
		Austrostipa sp.	50	0.1	
		Calocephalus multiflorus	10	1	

Weed	Cons. Status	Taxon	Height (cm)	Cover (%)	Comment
		Cassytha nodiflora	0	0.1	
		Cheilanthes sieberi	10	0.1	Mostly dead
		Chrysitrix distigmatosa		2	
		Dianella revoluta	50	0.5	
		Dicrastylis soliparma	70		oppo
		Diuris sp.	30	0.1	Closed, old
		Ecdeiocolea monostachya	150	8	
		Ericomyrtus serpyllifolia	100	6	
		Gahnia drummondii	80	6	
		Gnephosis tenuissima	30	0.1	
		Goodenia rosea	20	1	
		Grevillea petrophiloides	10	0.1	juvenile
		Hibbertia glomerosa var. *glomerosa*	40	0.5	
		Lepidobolus preissianus	50	0.1	
		Melaleuca hamata	220	8	
		Monachather paradoxus	100	0.5	
		Patersonia graminea	50	0.1	
		Pentameris airoides	100	0.1	Arthropodium dyeri
		Platysace trachymenioides	30	0.1	
		Ptilotus gaudichaudii	40	0.1	
		Ptilotus polystachyus	30	0.1	
		Sclerolaena densiflora	10	0.1	
		Darwinia capitellata	60	4	
		Thyridolepis multiculmis	15	0.5	
		Thysanotus manglesianus	0*	0.1	
		Wahlenbergia preissii	50	0.1	
		Waitzia acuminata var. *acuminata*	50	20	

Site No: Q5	**Date**: 18/11/2022	**Longitude:** 116.267318	**Latitude**: -29.429113

Type: Quadrat

Soil Types: yellow light brown sandy clay - moist

Topography: Slightly Sloped

Surface Water: 30 pc bare

Fire: 10 +

Vegetation Condition: Very Good

Vegetation Type: Shrubland EeMhAe

Condition Notes: Previous earth/soil disturbance

Description: *Eucalyptus ebbanoensis* low isolated clumps of mallee trees over *Melaleuca hamata, Acacia burkittii* and *Grevillea asparagoides* (P3) mid open shrubland over *Austrostipa elegantissima, Chrysitrix distigmatosa* and *Waitzia acuminata* var. *acuminata* low open mixed grass and forbland.

Weed	Cons. Status	Taxon	Height (cm)	Cover (%)	Comment
		Acacia coolgardiensis	150	1	
		Allocasuarina campestris	240	6	
		Amphipogon caricinus var. *caricinus*	30	0.1	
		Austrostipa elegantissima	80	8	
		Austrostipa sp.	100	0.1	

Weed	Cons. Status	Taxon	Height (cm)	Cover (%)	Comment
		Cassytha nodiflora	0	0.1	
		Chrysitrix distigmatosa	60	1	
		Comesperma volubile	0	0.5	
		Comesperma volubile	0	1	
		Cyathostemon heterantherus	50	4	
		Dampiera sp.	30	1	
		Dianella revoluta	80	2	
		Ecdeiocolea monostachya	100	0.5	
		Eucalyptus ebbanoensis	400	15	
		Gahnia drummondii	40	1	
		Gilberta tenuifolia	5	4	
		Goodenia rosea	10	1	
	P3	*Grevillea asparagoides*	120	6	
	P3	*Grevillea granulosa*		oppo	
		Grevillea obliquistigma subsp. *funicularis*	90	8	
		Hibbertia stenophylla	30	0.6	
		Jacksonia ramulosa	120	2	
		Jacksonia venosa	30	0.5	
*		*Leontodon rhagadioloides*	10	0.1	
		Lepidobolus preissianus	20	0.1	
	P1	*Leptospermum exsertum*	60	1	
		Lomandra marginata	15	0.1	
		Melaleuca conothamnoides	50	6	
		Melaleuca cordata		oppo	
		Monachather paradoxus	60	0.5	
		Neurachne alopecuroidea	50	0.1	
		Patersonia graminea	50	0.5	
		Pentameris airoides	15	0.5	
		Ptilotus polystachyus	20	0.1	
		Santalum acuminatum		overstory	
		Solanum lasiophyllum	30	0.1	
		Thyridolepis multiculmis	40	1	
		Thysanotus dichotomus	0	0.1	
		Verticordia chrysantha	50	0.2	
		Wahlenbergia preissii	30	0.1	
		Waitzia acuminata var. *acuminata*	30	8	

Site No: Q6	**Date**: 18/11/2022	**Longitude:** 116.265030	**Latitude**: -29.427838

Type: Quadrat
Soil Types: yellow brown sandy clay - dry
Topography: Slightly sloped
Surface Water: 50 pc bare
Fire: 10 +
Vegetation Condition: Very Good
Vegetation Type: Shrubland GofWaa
Condition Notes:
Previous earth/soil disturbance

Description: *Grevillea obliquistigma* subsp. *funicularis, Grevillea paradoxa* and *Leptospermum exsertum* (P1) tall to low open shrubland over *Waitzia acuminata* var. *acuminata, Ecdeiocolea monostachya* and SUBMIT Grass 101 low mixed open forb/grass land.

Weed	Cons. Status	Taxon	Height (cm)	Cover (%)	Comment
		Acacia burkittii	300	8	
		Amphipogon caricinus var. *caricinus*	30	0.1	
		Austrostipa elegantissima	30	0.5	
		Austrostipa sp.	30	0.1	
		Baeckea elderiana	180	2	

Weed	Cons. Status	Taxon	Height (cm)	Cover (%)	Comment
		Calocephalus multiflorus	5	0.5	
		Cassytha nodiflora	20	0.1	
		Chrysitrix distigmatosa	40	0.1	
		Comesperma scoparium	130	0.1	
		Cryptandra sp.	30	0.1	
		Cyathostemon heterantherus	20	0.5	
		Dampiera sp.	30	0.1	
		Dampiera wellsiana	15	0.1	
		Dampieria spicigera	30	0.1	
		Ecdeiocolea monostachya	130	1	
		Gnephosis tenuissima	5	0.5	
		Grevillea obliquistigma subsp. *funicularis*	200	4	
		Grevillea paradoxa	70	4	
		Hibbertia glomerosa var. *glomerosa*			oppo
		Jacksonia venosa	20	0.5	
		Lepidobolus preissianus	30	0.1	
	P1	*Leptospermum exsertum*	50	6	
		Melaleuca concreta	80	2	
		Melaleuca cordata		oppo	
		Monachather paradoxus	30	0.5	
		Ptilotus drummondii	20	0.1	
		Scaevola restiacea subsp. *restiacea*	40	1	
		Schoenus hexandrus	20	0.2	
		Darwinia capitellata	40	4	
		Thysanotus manglesianus	0	0.1	
		Waitzia acuminata var. *acuminata*	50	8	

Site No: R7	**Date**: 18/11/2022	**Longitude:** 116.268466	**Latitude**: -29.429725

Type: Relevé
Soil Types: yellow brown sandy clay - dry
Topography: Flat
Surface Water: 15 pc bare
Fire: 10 +
Vegetation Condition: Very Good
Vegetation Type: Shrubland EeMhAe
Condition Notes: Disturbed earth

Description: *Eucalyptus ebbanoensis* low isolated clumps of mallee trees over *Melaleuca hamata, Acacia burkittii* and *Grevillea asparagoides* (P3) mid open shrubland over *Austrostipa elegantissima, Chrysitrix distigmatosa* and *Waitzia acuminata* var. *acuminata* low open mixed grass and forbland.

Weed	Cons. Status	Taxon	Height (cm)	Cover (%)	Comment
		Acacia acuminata	220	1	
		Acacia burkittii	300	8	
		Amphipogon amphipogonoides	45	0.1	
		Austrostipa elegantissima	60	2	
		Austrostipa eremophila	80	0.1	
*		*Avena barbata*	50	0.1	
		Borya sphaerocephala	15	0.1	

Weed	Cons. Status	Taxon	Height (cm)	Cover (%)	Comment
		Cassytha nodiflora	0	0.1	
		Cheilanthes sieberi	5	0.1	Mostly dead
		Chrysitrix distigmatosa	50	0.5	
		Dianella revoluta	60	0.1	
		Dicrastylis soliparma			oppo
		Ecdeiocolea monostachya	60	10	
*		*Echium plantagineum*	15	0.1	
		Ericomyrtus serpyllifolia			oppo
		Gahnia drummondii	30	4	
		Gilberta tenuifolia	10	1	
		Goodenia rosea	20	0.5	
	P3	*Grevillea asparagoides*	120	0.5	
		Grevillea didymobotrya subsp. *didymobotrya*	160	0.1	
		Grevillea paradoxa	160	1	petro shuttle
		Hibbertia glomerosa var. *glomerosa*	30	1	
		Lepidobolus preissianus	30	0.1	
	P1	*Leptospermum exsertum*	30	1	
		Lomandra marginata	20	0.1	
		Melaleuca concreta	250	4	
		Melaleuca cordata	170		oppo
		Monachather paradoxus	40	0.1	
		Patersonia graminea	50	2	
		Platysace trachymenioides	30	0.1	
		Ptilotus exaltatus	50	0.1	
		Ptilotus polystachyus	50	0.1	
		Solanum lasiophyllum	20	0.1	
		Darwinia capitellata	60	2	
		Thyridolepis multiculmis	30	1	
		Waitzia acuminata var. *acuminata*	40	15	

Site No: R8	**Date**: 18/11/2022	**Longitude:** 116.272843	**Latitude**: -29.432603

Type: Releve
Soil Types: Red brown clay - moist
Topography: Flat
Surface Water: 60 pc bare
Fire: 10 +
Vegetation Condition: Good

Vegetation Type: Eucalypt Woodland ElsEttCe
Condition Notes: Site extends beyond the fence

Descriprion: *Eucalyptus loxophleba* subsp. *supralaevis* and *Eucalyptus horistes* mid to low open mixed woodland and mallee woodland over *Enchylaena tomentosa* var. *tomentosa, Chenopodium gaudichaudianum* and *Rhagodia drummondii* mid open shrubland over *Calandrinia eremaea, Leontodon rhagadioloides* and *Austrostipa elegantissima* tall to low mixed forb and grassland

Weed	Cons. Status	Taxon	Height (cm)	Cover (%)	Comment
		Acacia tetragonophylla		1	
		Austrostipa elegantissima	50	1	
		Austrostipa eremophila	50	0.1	
*		*Brassica tournefortii*	50	0.1	
		Bursaria occidentalis	160	1.5	
		Calandrinia eremaea	20	4	
		Chenopodium gaudichaudianum	30	1	
		Enchylaena tomentosa var. *tomentosa*	40	1	
		Eremophila decipiens subsp. linearifolia	70	0.1	
		Eucalyptus loxophleba subsp. *supralaevis*	1400	20	
		Lomandra marginata	20	0.1	
		Monachather paradoxus	40	0.1	
		Pentameris airoides	10	0.5	
		Ptilotus drummondii	20	0.1	
		Ptilotus exaltatus	40	0.5	

Weed	Cons. Status	Taxon	Height (cm)	Cover (%)	Comment
		Ptilotus gaudichaudii	30	0.1	
		Ptilotus polystachyus	40	0.5	
		Rhagodia drummondii	30	0.5	
		Trachymene pilosa	10	1	
		Waitzia acuminata var. *acuminata*	30	1	

Site No: Q9	**Date**: 18/11/2022	**Longitude:** 116.2570217	**Latitude**: -29.423290

Type: Quadrat
Soil Types: yellow brown clay - moist
Topography: Slightly sloped
Surface Water: 60 pc bare
Fire: 10 +
Vegetation Condition: Good
Vegetation Type: Shrubland GofWaa
Condition Notes: Earth/soil disturbance

Description: *Grevillea obliquistigma* subsp. *funicularis, Grevillea paradoxa* and *Leptospermum exsertum* (P1) tall to low open shrubland over *Waitzia acuminata* var. *acuminata, Ecdeiocolea monostachya* and *Amphipogon caricinus* var. *caricinus* low mixed open forb/grass land.

Weed	Cons. Status	Taxon	Height (cm)	Cover (%)	Comment
		Acacia acuminata	320	8	
		Melaleuca cordata	80	6	
		Grevillea paradoxa	180	8	
		Cassytha nodiflora	0	0.5	
		Amphipogon caricinus var. *caricinus*	60	1	
		Darwinia capitellata	80	10	
		Waitzia acuminata var. *acuminata*	30	0.5	

Weed	Cons. Status	Taxon	Height (cm)	Cover (%)	Comment
		Grevillea obliquistigma subsp. *funicularis*	120	8	
	P1	*Leptospermum exsertum*	50	4	
		Darwinia capitellata	50	4	
		Leptomeria preissiana	50	0.1	
		Chrysitrix distigmatosa	50	0.1	
		Baeckea elderiana	170	4	
		Mirbelia microphylla	50	0.1	

Site No: Q10	**Date**: 18/11/2022	**Longitude:** 116.243525	**Latitude**: -29.412466
Type: Observation		**Soil Types:** Light sandy - dry	
Topography: Flat		**Surface Water:** 40 pc bare	
Fire: 10+		**Vegetation Condition:** Very Good	
Vegetation Type: GofWaa		**Condition Notes:** none	

Description*:* *Grevillea obliquistigma* subsp. *funicularis, Grevillea paradoxa* and *Leptospermum exsertum* (P1) tall to low open shrubland over *Waitzia acuminata* var. *acuminata, Ecdeiocolea monostachya* and SUBMIT Grass 101 low mixed open forb/grass land.

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